# DOMESTIC DETERMINANTS OF CLIMATE CHANGE MITIGATION COMMITTMENT

by

Katie Nissen

Submitted in partial fulfillment of the

requirements for Departmental Honors in

the Department of Political Science

Texas Christian University

Fort Worth, Texas

May 4, 2020

DOMESTIC DETERMINANTS OF CLIMATE CHANGE MITIGATION COMMITTMENT

Project Approved:

Supervising Professor: Michael Strausz, Ph.D.

Department of Political Science

James Scott, Ph.D.

Department of Political Science

Kyle Walker, Ph.D.

Department of Geography

## ABSTRACT

Climate change is the most pressing global issue. Despite the increasingly credible threats associated with this phenomenon, countries have chosen vastly different levels of mitigation efforts. While some countries are leaders in reducing the human impact on the climate, others tend to disagree about the credibility of climate science in politically meaningful ways. Previous research on this topic has focused primarily on international cooperation, but there has been less analysis of the domestic attributes driving countries' mitigation attitudes. Consequently, this paper aims to uncover what motivates the global variance in levels of climate change mitigation efforts from a domestic standpoint. To analyze these factors, I employ comparative case studies of Sweden, Austria, the United States to assess the impact of cultural, economic, and geographic factors from the Kyoto Protocol through the present. Ultimately, I argue that public opinion and climate change denialism tend to have the largest effect on a country's willingness to undertake mitigation efforts. Economic factors also play a large role, while the relationship between geographic vulnerability and policy is less clear.

As of 2020, the Bulletin of the Atomic Scientists have placed the famous "Doomsday Clock" at just 100 seconds to midnight, partially due to the threat of global climate change. One of the primary reasons cited for this precarious placement is the threat of global climate change. Research from the Intergovernmental Panel on Climate Change (IPCC) suggests that if current trends in human activity continue, global warming is likely to reach 1.5°C between 2030 and 2052 (Masson-Delmotte et al., 2018). This will have a multitude of consequences, such as higher temperatures, more extreme temperatures, precipitation changes, and increasing frequency of natural disasters, to name a few (Masson-Delmotte et al., 2018; IPCC 2014). As the effects of climate change are felt and amplified over time, countries have been required to critically consider their actions and policymaking today that might impact the world tomorrow. While some have become champions of climate policy (e.g. Sweden), others have failed to push for progressive reforms (e.g. United States).

Curiously, the clustering of countries by traditional methods fails to reveal much of the logic behind climate policy discrepancies – like countries do not necessarily appear to adopt like policies. For example, Morocco was ranked fifth based on the Climate Change Performance Index, while the United States was ranked fifty-ninth out of sixty. The United States shares a diverse cohort of underperformance with countries such as Saudi Arabia, Iran, Canada, and Japan (Burck et al., 2018). In contrast, Morocco is joined by countries such as Sweden, India, Malta, and the United Kingdom in their high commitment to combating climate change (Burck et al., 2018). Herein lies the puzzle climate change policy presents – there appears to be little consensus among countries' decisions to embrace climate change policy. Furthermore, the multipolar structure of the world today means that no one hegemon has been able to utilize either coercive or soft, persuasive power to encourage broad acceptance of their climate change attitude

(Nye, 1990). In other words, countries do not appear to be listening to each other or to their "leaders," and international influence seems to lack explanatory power in the realm of climate change decision-making. Consequently, I argue that domestic attributes are crucial to understanding what factors account for the variation in countries' responses to the problem of global climate change.

The following paper begins with a review of the existing literature on what motivates adoption of climate change policies and establishes my hypotheses. Next, I conduct an analysis using comparative case studies of three countries that vary by rank on the Climate Change Performance Index – Sweden, Austria, and the United States, in decreasing order of climate change commitment. By examining these countries, I hope to illuminate how, and to what extent, cultural, economic, and geographic differences each affect countries' level of commitment to climate change mitigation.

**Literature Review**

By April 21, 2017, 195 parties had signed on to the Paris Agreement from the United Nations Framework Convention on Climate Change. This Agreement aims to push for the global temperature increase above pre-industrial levels to be kept at least below 2°C, or an ideal 1.5°C, for this century by reducing greenhouse gas emissions. There is an important facet of many climate change policies and agreements that make them unique – lack of enforceability or immediate consequences. The Paris Agreement, for example, is a legally binding treaty, but the actions to reduce the effects of climate change it outlines are completely voluntary (Lawrence & Wong, 2017). Furthermore, countries can opt out of the agreement three years after signing. Under this rule, the administration of President Trump in the United States has declared an intent to withdraw from the agreement at the earliest opportunity. This means that the world's second

biggest GHG emitter is reneging its pledges to cut GHG emissions roughly 25 percent below 2005 levels by 2025 and commit up to $3 billion in aid for poorer countries by 2020 (Shear, 2017) with little consequence. The flexibility of this agreement is not unique when we compare it with other international climate change agreements, such as the 1997 Kyoto Protocol.

Climate change presents an exceptional political challenge. The premier dilemma with this issue is that the environment is a common good; it is rivalrous and non-excludable. In other words, countries are presented with a classic game theory dilemma. A single country's reliance on the production of greenhouse gasses and environmental destruction may not cause the sort of climate change that warrants globalized action, but as a collective the countries of the world can do extreme damage. Thus, the ideal situation for each country is one where you, and no one else, is allowed to exploit the environment, and the worst situation is one where you, and no one else, puts resources into combating climate change while the others enjoy the benefits of exploitation. The moderately beneficial option is where all countries collectively engage in policies against climate change together, but this requires loss of some level of sovereignty.

Give the dilemma outlined above, why would any country willingly enter into an agreement or international governing organization (IGOs), such as the Paris Agreement, that limits their sovereignty, especially when these agreements have little formal enforcement power? There are several explanations that focus on the international influence countries have on each other. The following section examines several explanations for joining international efforts and their explanatory limitations when we consider the case of climate change.

## International Influences

### *Diffusion*

One influence on countries' behavior that has been widely studied is international diffusion of norms from country to country. In accordance with Tobler's First Law of Geography, "everything is related to everything else, but near things are more related than distant things" (1970). Indeed, much research has provided evidence of the influence that neighboring countries can have on each other. For example, dependence network neighbors have great influence over the level of democratization in a country. When a country's trading partners, security partners, or international organization partners become more democratic, that country will become more democratic in the long run (Goodliffe & Hawkins, 2017). Overall, we should expect that the individual characteristics of a given state should be similar to its neighbors (Zhukov & Stewart, 2013). Curiously, however, this is not a pattern that emerges when we examine certain issues.

In her work on disability rights in Europe, Lisa Vanhala (2015) looked at the spread of disability equality norms in Europe to determine if top-down diffusion of norms between countries could explain their adoption in more than thirty European countries over twenty years. Despite conventional wisdom that top-down diffusion would be driven by liberal democratic leaders, some of the earliest adopters were Hungary, Cyprus, and Malta. Furthermore, heavy top-down pressure failed to get certain states, such as Denmark, to adopt the same norms. Ultimately, she argues that the archetypal methods of diffusion that focus on international relationships – coercion, persuasion, learning, and emulation – are inadequate to explain the pattern, or lack of a pattern, of disability rights in Europe. The issue space for disability rights is akin to climate change, and thus very informative for the expectations of this paper. Both issues are considered

"social" issues (i.e. not purely economic or political, but rather some degree of morally justified) and do not experience cohesion among traditionally similar actors. Consequently, Vanhala's conclusion that domestic movements "may in some cases matter more than international prompts" implies that international diffusion is poised to be an inadequate explanation for countries' attitudes towards climate change.

### *Hegemony*

Another notable concept used in international relations to describe state secession of sovereignty is hegemony which, among other things, suggests that the state that acts as the global hegemon can influence rules and arrangements to maximize their power (Bayar & Kotelis, 2014). American hegemony has been wielded to shape international issues, such as the World Trade Organization, NAFTA, and the global response to terrorism, and to resist joining other multilateral agreements, such as the Kyoto Protocol (Kinacioğlu, 2012). Holding the position of hegemon gives that country an ability to claim the legitimacy of their decisions, which other countries may be expected to follow. Hegemony, however, need not be a unipolar hegemonic system and it does not require heavy-handed coercion to function. A multipolar system is more common, and those states who share hegemony have still historically been able to exact great global influence via soft power (i.e. the power to persuade predicated on the appearance of being a country that is desirable to follow) if they are very powerful relative to other states in the system (Webb & Krasner, 1989; Nye, 1990). Today, the three primary hegemonic powers of the world are arguably the United States, China, and the European Union, which collectively account for both half of the world's GDP and carbon emissions (Viola, Franchini, & Ribeiro, 2012). Within this group, the European Union acts as the most radical combatant of climate change (Viola, Franchini, & Ribeiro, 2012). Although there is a fair amount of diversity among the 27

countries that make up the EU, some of the greatest leaders in climate policy arise from this hegemon (Viola, Franchini, & Ribeiro, 2012). China represents a surprising middle-ground for climate policy. Although they are voracious carbon emitters currently due to their focus on rapid economic development, recent feelings of vulnerability have induced China to make more robust commitments to combating climate change (Viola, Franchini, & Ribeiro, 2012; Burck et al., 2018). This vulnerability is exemplified by the 2020 COVID-19 pandemic, where poor air quality in China has been theorized to contribute to a higher death rate from the virus (Carrington, 2020). The United States is the conservative voice among the hegemons, especially since the largely climate-denialist Republican Party has enjoyed control of the White House from 2000 to 2008, and again from 2016 to the present (Viola, Franchini, & Ribeiro, 2012). Although it has been consistently ranked among the bottom tier of countries in climate change policy by the Climate Change Performance Index, it has only fallen in recent years. As of 2018, their CCPI score for policy was zero, ranking last among all countries scored (Burck et al., 2018).

Because the current global hegemons are so distinct from each other on climate change policy, hegemony-based explanations of international behavior are somewhat lackluster. The strong leadership of each of these countries appears to have little effect on the countries we would expect them to influence. Additionally, the simple fact that they each set a different example means that there is no rallying point for policy. Less powerful countries can simply choose which policy they desire and then back it up with the legitimacy of whichever hegemon matches their interests. In other words, the lack of a unified hegemonic position on climate change renders their power in that domain null.

**State Preferences**

Climate change policy adds an additional layer of complexity to encourage countries to engage. Besides the fact that the climate is a common good, it is also difficult to measure or see results in real time. Politics rarely lends itself well to long-term thinking, but this long-term thinking is especially abstract when dealing with climate change. Although the scientific consensus leans in the same direction, there is a great deal of variability in the models and predictions. Climate change is also tricky because initially there may be benefits for some; for example, increased carbon in the atmosphere is predicted, in the short-run, to improve crop yields (Dell, Jones, & Olken, 2014). Temperature increases also may have initially positive effects, until it reaches a critical point. However, by the time these positive effects are felt there will likely be little to stop the GHG emissions from snowballing past the beneficial threshold, at which point the consequences become decidedly negative (Dell, Jones, & Olken, 2014).

So, the challenge is not only to get states to relinquish sovereignty to join international governance organizations or treaties, it is to entice them to do so when the benefits of joining such institutions are far removed from our current world. This may well be the reason we see little cohesion among the groups of countries that support climate change policies. These agreements are costly, for taking progressive mitigation actions like cutting GHG emissions requires the investment of time and money, so agreeing to do so (and actually following through on those agreements) must be driven by more than just a standard cost-benefit analysis. This is especially true for the politicians who ultimately act to enter these agreements, for they will likely not be in office by the time the fruits of their labor can be seen.

Two subdisciplines of international relations focus on the domestic aspects of a country to explain the willingness to give up state sovereignty: rationalism and constructivism.

Rationalism states that egoistic states cede sovereignty because they cannot achieve goals that are important to them without a joint venture. The institutions they join represent a credible commitment for the state, which binds themselves, their partners, and their successors to the goal (Cooper, Hawkins, Jacoby, & Nielson, 2008). In contrast to the self-interest focus of rationalism, constructivism posits that states cede sovereignty to legitimize their principled normative commitments (Cooper, et al., 2008). Under this concept, states intrinsically value some outcome (e.g. combatting climate change) and are willing to pay a large price to achieve that goal. Under both cases, the state is primarily considering their own motivations to engage in international movements, but constructivism tends to focus on international sociological processes to determine those motivations. The issue with that assumption is that we do not necessarily see a pattern of other states influencing each other in a horizontal way in the realm of climate change politics. Traditional state relationships do not necessarily predict how a country behaves on climate change policy. Likewise, rationalism is incomplete to explain international behavior. Although assuming the states' individual preferences drive international behavior is sound, it lacks the power to reveal why those preferences develop in the first place.

To create the most comprehensive framework for climate change policy behavior of states, we must combine rationalism and constructivism to determine countries' domestic preferences. Rationalism contributes the logic that state preferences are the force behind their international actions, particularly in the unique cases where states willingly cede sovereignty to address an issue. However, constructivism validly criticized the practice of treating these preferences as exogenous. Although it is not the international community that seems to exact the greatest influence on climate change actions, it is still necessary to consider the construction of

the domestic factors when uncovering the rationale behind each country's willingness – or lack thereof – to give up sovereignty on this issue.

## Domestic Attributes

Using the above concept of the domestically-driven preferences as the frame for examining why certain countries do or do not enter into climate change commitments, the following discussion highlights some of the existing literature on domestic attributes' effects on the willingness to give up sovereignty to participate in international actions. From this literature, I formulated my hypotheses to be tested during the case study analysis section of this paper.

### *Cultural Pressures*

The first factor that appears to influence countries' behavior on climate change issues is the cultural attitudes of the country itself. Existing literature has shown the powerful effects of public attitudes on countries' decision-making. In the case of the International Criminal Court, for example, Simmons and Danner (2010) posit that states may join to show their commitment to peace to their citizens at home, even though this forfeits some state autonomy to decide the punishment (or rewards) of their own people. In climate change policy, agreements that limit sovereignty may have their costs offset by a country's desire to appear as a progressive leader to their citizenry. In the United States alone, research by Vandeweerdt, Kerremans, and Cohn (2016) regarding Congressional voting reveals that public opinion has a profound effect on legislators' decision to support policies that combat climate change. Even when controlling for other factors that could affect legislators' opinions (e.g. interest groups for and against pro-climate policies), public opinion remains a significant influence on the outcome of a vote.

The United Nations Convention on the Law of the Sea (UNCLOS) that took effect in 1994 exemplifies a situation where countries joined a treaty that limited their sovereignty. This treaty imposes rules on the use of all oceans and seas and their resources, which significantly limits the freedom of all signatory states. Furthermore, this treaty was enacted despite an alternative, more individualistic solution to the overuse of ocean resources: privatization through the expansion of Exclusive Economic Zones that would allow countries greater autonomy over the use of resources in their delineated ocean territory (Nemeth, Mitchell, & Nyman, 2014). Despite this alternative solution, as of June 2016, 167 countries and the European Union are parties to the UNCLOS ("United Nations Convention," 1982). As Nemeth, et al. (2014) explain, this can partially be attributed to the ability of states to choose the dispute-settlement system they prefer. However, the fact remains that opting into a dispute-settlement system in the first place is *mandatory* for joining UNCLOS, which means states are giving up power both in territory and in governance. What this shows is that the benefits to individual countries of ensuring clear rules, and a forum for dispute in the event the rules are broken, afforded by treaties can outweigh the loss of sovereignty that would be available with privatization.

Even if a treaty imposes cumbersome limitations, the secure platform they provide when dealing with other countries may be enticing. Deferring power to enforce the rules to a third-party allows peace of mind in cases where parties may try to take advantage of each other. In the case of climate change, we have already mentioned how there are incentives to free-ride and leave the task of mitigation to other actors. Consequently, if a country truly desires commitments to combat climate change, forfeiting some sovereignty may be relatively low cost to ensure an institution exists to enforce such goals. If the former assumption is robust, we may expect that countries who face strong pressure from citizens to pursue climate change policy, or simply lack

a climate policy opposition movement within its borders, to be the same countries that engage in the most climate change mitigation and advocate for the creation of sovereignty-limiting institutions. This leads to the first two hypotheses (H1 and H2, respectively) I test in my analysis: 1) if public opinion is strongly in favor of climate change policies, then countries will be more likely to pursue climate change mitigation policy initiatives, and 2) if there is a prevalent climate change denialist movement in a country, then countries will be less likely to pursue climate change mitigation policy initiatives.

Tjernstrom and Tietenberg's (2008) research on the effect of individual attitudes on the adoption of climate change policy reveals several noteworthy results. Increases in an individual's affinity for the global community, support for public goods, liberal political views, and urban residency all increase support for policies that would decrease GHG emissions. Furthermore, increases in a low demand for long-term goods (i.e. lack of patience for future rewards), unfamiliarity with climate change science, and per capita household income all result in decreased favorability for policies that reduce GHG emissions. Tjernstrom and Tietenberg also found that a one percentage-point increase of people in a country who think that climate change is an important issue translates to a 0.49 percentage point reduction in greenhouse gas emissions. In other words, the factors that affect attitudes towards GHG emissions on an individual level translate to tangible, meaningful policy outcomes. This provides justification for the focus on country-level factors for this study and leads to my third hypothesis regarding cultural attitudes (H3) – higher demand for climate policy within a country will have a positive impact on objective mitigation measurements, such as reduction of GHG emissions. Although there is significant support for the impact public opinion and public demand (H1, H2, H3) can have on climate change mitigation levels in a country, whether this is more impactful than economic or

geographic factors will likely depend upon the strength of the opinions and demand (e.g. are people protesting actively or is the issue not particularly salient?). While cultural attitudes may have influence in this arena, outweighing the economic and geographic motivators will require an exceptional level of commitment by the public to their climate change mitigation preferences.

### *Economic Influencers*

Using a summative content analysis of over 7,000 Tweets surrounding the time period of Hurricane Sandy in 2012, Jacques and Knox (2016) sought to examine individual-level rationales for global climate change denialism and counter-movements. Their research revealed a common attitude of support for neoliberalism and existing energy industries (e.g. using #coal or #oil to indicate support for those industries over renewable energy). The three major themes they identified of the climate denialist movement were opposition to renewable energy policies, opposition to climate-related taxation, and the fear of governmental overreach. Broadly speaking, these themes coalesce to paint a picture of an opposition to climate change policy driven by a fear that the government will dethrone the existing economic system in order to combat climate change. As Jacques and Knox write, "we might see climate denial as a project not only meant to protect entrenched corporate power, but a reactionary program of ontological security for people who deeply identify with a global capitalist regime" (847).

The above assessment of individual-level climate change rationales highlights the important position of economics in the climate change arena. Particularly, the power invested in corporate interests seems to dominate the discourse around climate change denialism. In the United States alone, oil and gas corporations contributed nearly half a billion dollars in campaign contributions; furthermore, roughly 80 percent of their political donations during this time have been to the Republican Party (Oil & Gas, n.d.), which self-identifies as the party that wants to

"reject the agendas of both the Kyoto Protocol and the Paris Agreement… [and] demand an immediate halt to U.S. funding for the U.N.'s Framework Convention on Climate Change" (Republican National Committee, n.d.). Likewise, Saudi Arabia and other oil-exporting economies in OPEC have consistently played an obstructionist role in climate change politics and allied themselves with lobbyists from the oil and gas industry to challenge the assumed threat of climate changed proposed by organizations such as the IPCC (Depledge, 2008). Somewhat unsurprisingly, it appears that the influence of the fossil fuel corporations is able to translate to international patterns of climate change opposition. If there is a strong tradition of neoliberal and laissez-faire attitudes towards the regulation of the energy industry within a country, then there will likely be less support for climate change mitigation policies in that country as well (H4).

An important note is that conventional wisdom here may be inclined to suggest that dependence upon fossil fuels in an economy is solely what drives countries to oppose climate change policies and institutions. However, that is not a straightforward relationship. For example, South Africa is the world's seventh largest coal producer and mining makes up a substantial portion of its economy, but it has been much more proactive than Saudi Arabia in combating climate change ("Coal mining," 2018; Depledge, 2008; Burck et al., 2018). Furthermore, coal is highly vulnerable to targeting in climate change policy because it is high in carbon and more readily replaceable than oil (Depledge, 2008); thus, South Africa's willingness to support climate change policies is even more surprising if we assume that climate policy opposition will automatically develop from a strong fossil fuel economy. This demonstrates a need to examine the *power* the fossil fuel industry has within a country rather than just the size. The more entangled the fossil fuel industry is with the government, the less likely that country

should be to make meaningful progress on climate change mitigation (H5). Additionally, given the importance of the energy sector on a global scale, we may expect the power it wields in a particular country (H5), and the freedom it has to wield that power (H4), to play an exceptionally large role in countries' climate change attitudes.

### *Geographic Vulnerability*

The final factor that appears to be worth examining to determine why states invest in climate change policy is geographic vulnerability. Much existing literature has identified vulnerability as one of the most important factors for countries' drive to combat climate change (Bustos, 2018; Sprinz & Vaahtoranta, 1994, So Young & Wolinsky-Nahmias, 2014). As demonstrated by So Young and Wolinsky-Nahmias (2014), vulnerability to climate change increases willingness to adopt climate change mitigation policies at a national level. Geographic vulnerability may provide a catalyst for many countries to induce them to fight climate change.

Some of the most geographically vulnerable locations on Earth are island nations that are imminently threatened by rising sea levels, as well as many other complications, associated with climate change. Their vulnerability is particularly acute due to lack of land availability to use for adaptation should climate conditions worsen. In response to their position, the Small Island Developing States (SIDS) and Association of Small Island States (AOSIS) emerged as champions of progressive climate change policy, such as pushing for the 1.5°C target cap on temperature increases this century that was eventually adopted as a goal for many countries (Águeda & Mol, 2014; Karthikheyan, 2010). The Republic of Maldives, which is extremely threatened by rising sea levels, is particularly active among these organizations and presented climate change as a moral human rights cause that threatened island nations who had little to do with causing the problem. After promoting this narrative at the UN Human Rights council, the

Maldives successfully saw the council accept resolutions regarding the human rights issue of climate change in 2009 (Águeda & Mol, 2014). The Maldivian President, Mohamed Nasheed, event went so far as to hold a cabinet meeting underwater by scuba diving in October 2009 ("Climate Change in the Maldives," 2010). In 2015, six Pacific island states (Vanuatu, Kiribati, Tuvalu, Fiji, Solomon Islands and the Philippines) launched a lawsuit against the worlds' biggest polluting companies, including Exxon and BP (Newman, 2015). Although the realistic international impact of these islands may not be enormous, they clearly demonstrate how geographic vulnerability leads to a dire sense of urgency and willingness to relinquish sovereignty for the sake of future security against climate change.

African states, particularly in Sub-Saharan Africa, are also expected to experience some of the greatest difficulties from climate change. Africa's temperature increases, annual precipitation changes, risks to food production, increased water scarcity, economic losses, and health care lapses are all expected to be some of the worst experienced in the world (IPCC, 2014; Abidoye & Odusola, 2015). Consequently, African nations have made increasing efforts to insert themselves into the climate change discussion via joining coalitions (e.g. African Group of Negotiators) and participating more in international climate change initiatives, such as submitting more proposals to the UNFCCC (Roger & Belliethathan, 2016). Like the vulnerable island countries, this case demonstrates the increased willingness to join and work to strengthen international commitments to climate change when geographic vulnerability is present. Therefore, we should expect to see the geography of countries play an important role in their assessment of the costs of combating climate change. Countries who are more susceptible to droughts (H6) or floods (H7) will also be more inclined to pursue climate change mitigation efforts. For those countries in more favorable climatic conditions, the threat may not appear

imminent enough to induce action. Greater adaptability capabilities of a country, particularly through greater favorable land area, will decrease the willingness to engage in costly mitigation to those countries (H8), for it is "less necessary" for them to do so. As shown by the cases of island nations and Sub-Saharan Africa, the urgency to combat climate change derived from geographic vulnerability is a powerful motivator to be proactive on this issue. Consequently, H7 and H8 are likely to be critical for some countries' decisions on mitigation levels.

Long-term trends induced by climate change are also predicted to threaten the incomes of those who depend on current land and climatic conditions. While there may be some initial, brief benefits to increases in CO2 and higher temperatures for the agricultural industry, GHG emissions at that point would likely be too high to be reversable and the CO2 content of the atmosphere will quickly surpass the beneficial threshold, at which point they are no longer beneficial for agricultural products (Dell, Jones, & Olken, 2014). Consequently, farmers who depend upon their agricultural products for their livelihoods will bear the economic burden of climate change (IPCC 2014). As agricultural dependence increases in a country, climate change mitigation efforts are also expected to increase (H9). However, the size and power of the agricultural sector in a country, especially compared against the power of the incredibly lucrative and geopolitically important energy industry, may make its influence underwhelming as an explanatory factor for climate change mitigation attitudes in many countries.

The framework I have outlined is broken down in Figure 1 below. At each successive stage in this layout, I aim to narrow in on the specific factors that influence individual countries' level of commitment to climate change mitigation and ultimately derive my hypotheses. The following section discusses my case study selection process and briefly outlines the operationalization of each of the domestic factors examined in the analysis portion of this paper.

***Figure 1.***

| International influences' lack of explanatory power | | |
|---|---|---|
| Domestic preference-driven climate change mitigation | | |
| Cultural Hypotheses | Economic Hypotheses | Geographic Hypotheses |
| H1: If public opinion is strongly in favor of climate change policies, then countries will be more likely to pursue climate change mitigation policy initiatives.<br><br>H2: If there is a prevalent climate change denialist movement in a country, then countries will be less likely to pursue climate change mitigation policy initiative.<br><br>H3: Higher demand for climate policy within a country will have a positive impact on objective mitigation measurements. | H4: If there is a strong tradition of neoliberal and laissez-faire attitudes towards the regulation of the energy industry within a country, then there will likely be less support for climate change mitigation policies in that country.<br><br>H5: The more entangled the fossil fuel industry is with the government, the less likely that country should be to make meaningful progress on climate change mitigation. | H6: Countries who are more susceptible to droughts will be more inclined to pursue climate change mitigation efforts.<br><br>H7: Countries who are more susceptible to floods will be more inclined to pursue climate change mitigation efforts.<br><br>H8: Greater adaptability capabilities of a country, will decrease the willingness to engage in mitigation for those countries.<br><br>H9: As agricultural dependence increases in a country, climate change mitigation efforts will increase. |

**Research Design**

In order to test the above hypotheses about what explains the variation in countries' level of commitment to climate change mitigation, I conducted a comparative case study of three countries with a range of commitment from low, to moderate, to high based on the Climate Change Performance Index rankings for 2019[1]. The 2019 rankings included 56 countries and the European Union. The CCPI scores countries based on GHG emissions (40% weighting), renewable energy usage (20% weighting), energy usage (20% weighting), and climate chance

[1] The CCPI symbolically leaves the top 3 spots of its ranking blank to indicate that they feel no countries are doing enough mitigate climate change. For the purposes of this analysis, however, I have ignored those empty spots and adjusted the rankings accordingly. For example, Sweden is ranked 4th on the CCPI, but with only blank spaces ahead of it. Removing the blank spaces bumps Sweden into 1st place and I repeated this process for each country in my case studies.

policy (20% weighting). See Figure 2 below for the full scoring breakdown. The full CCPI is a useful dependent variable for understanding actual commitment to these policies as opposed to just nominal commitment, for it includes policy commitment measures along with objective environmental measures. Countries that score well overall on the CCPI tend to score well in both nominal and actual mitigation commitment; in other words, proactive policymaking and successful mitigation are both required to rank among the top performing countries. The independent variables tested in this research are intended to target either policy, actual, or both types of commitment. Additionally, while all case studies are subject to issues with external validity and over-generalization, by analyzing countries that represent low, medium, and high commitment to mitigation, I hope to extract nuanced information about what drives mitigation preferences.

***Figure 2.***

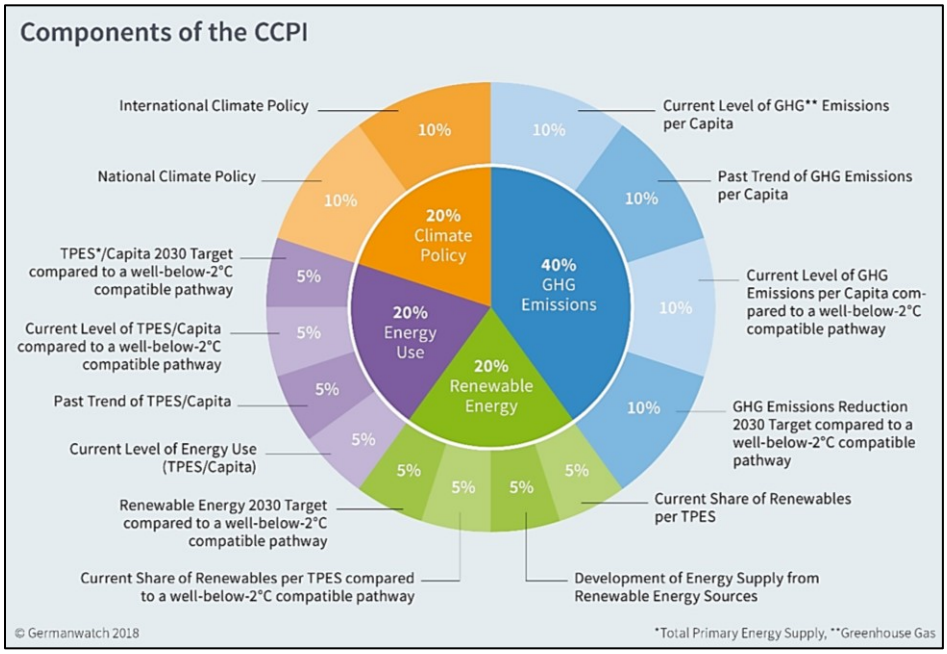



*Image obtained from the Climate Change Performance Index 2019 report (Burck et al., 2018).*

Ultimately, I elected to examine three developed countries from those ranked by the CCPI (Figure 3). I utilize only economically developed cases at this stage in order to minimize

the impact of different economic situations. Emerging economies may have a better claim to "need" fossil fuels and climate-unfriendly policies in order to catch up to developed economies. It would not be unreasonable of them to assert their right to enjoy the same privileges earlier industrialized economies enjoyed getting to their current level of industrialization. This is also not an unprecedented claim, for the Kyoto Protocol famously placed the burden of improvement on developed countries rather than all countries. Though this decreases global external validity, it is a necessary first step upon which I hope to build from for future research of more diverse cases.

***Figure 3.***

| | **Developed Economies** | **CCPI Ranking** |
|---|---|---|
| **High Commitment** | Sweden | 1 |
| **Moderate Commitment** | Austria | 33 |
| **Low Commitment** | United States | 56 |

***Case Selection***

Sweden was selected to represent a case of high commitment to climate change mitigation, for it ranked first in the 2019 CCPI. Sweden is recognized as one of the most progressive countries on climate change initiatives. It was the first country to establish an environmental protection agency in its government in 1967 and signed on to agreements such as the Kyoto Protocol and the Paris Climate Agreement ("Sweden tackles climate change," 2018). Sweden's self-declared goal by 2020 is to reduce GHG emissions compared with 1990 by 40 percent, and to have a vehicle fleet completely rid of fossil fuels by 2030. (NDC Interim Registry, n.d.; "Sweden tackles climate change," 2018) The OECD Environmental Performance Review on Sweden (2014) places them as "among the most innovative OECD countries when it comes to environment-related technology." From the period of 2000 to 2012, Sweden managed

to cut CO2 emissions from fuel combustion by 16 percent while sustaining a 30 percent increase in GDP per capita (OECD, 2014). In addition to their status as a world leader among climate change initiatives, Sweden is also useful to include because of their membership in the European Union, which ranks 13th as a collective score in the CCPI. Although the EU will not be examined as one of the case study selections, including Sweden as a representative member (both Sweden and the EU's rankings place them among the highest performers) will ensure that the broad trend of one of the current major hegemonic institutions is found in this analysis.

The second case is Austria, which exhibits a moderate commitment to climate change mitigation and is ranked in the bottom half of countries in the CCPI. While Austria is making positive strides towards combating climate change, they are not at the forefront of innovation and pro-mitigation attitudes. Their nominal commitment to climate change mitigation generally exceeds their actual mitigation efforts. Austria is also ranked 21st out of 28 European Union countries. This means Austria is relatively behind its closest counterparts, such as Germany and Italy which are EU members and neighbor states ("SGI 2017: Austria," 2018). Furthermore, most of its favorable ranking appears to come from its share of renewable energy resources as opposed to GHG emissions and overall energy usage where it ranks generally worse than its overall ranking. While renewable energy sources totaled roughly 34.4 percent of energy consumption in Austria in 2015, over 80 percent of that renewable energy is from hydropower ("Energy consumption in Austria," n.d.; International Energy Agency, 2018). Although it is typically considered a renewable source of energy, hydropower is largely not sustainable and can have incredibly negative impacts on local communities, wildlife, vegetation, and can product additional GHG emissions where water catchments are shallow (Burck et al., 2018). Consequently, measurements that use hydropower as a measure of renewable energy will likely

overstate the progress made to convert to sustainable renewable sources. We can see this in the CCPI breakdown of Austria's scoring, which ranked it 10th in renewable energy when factoring in hydropower, but dropped it all the way down to 43rd when hydropower was excluded (Burck et al., 2018). Although Austria is tacked on to the EU goal of an at least 40 percent domestic reduction in greenhouse gas emissions by 2030 compared to 1990 (NDC Interim Registry, n.d.), their commitment to technologies that can combat climate change in the long-term is questionable.

Finally, since the rise of the environmentalism movement of the 1970s, there has been a large amount of opposition to the idea that human activity causes climate change in the United States. While agencies such as the Environmental Protection Agency were being established, there were many who sought to dismantle environmental regulations and label climate change a mere "hoax" (Armitage, 2005). This trend largely continued as climate science developed and the world became more aware of the consequences of human activities on the long-term environment. In 1998, the United States signed the Kyoto Protocol under President Bill Clinton, but the Senate unanimously (95-0) voted against adopting the treaty (Armitage, 2005). When President George W. Bush took office in 2001, he reaffirmed that the United States would not submit to the protocol, stating that it would "have a negative economic impact, with layoffs of workers and price increases for consumers" (Sanger 2001). During the Obama administration, multiple cap-and-trade bills were unable to get past the Republican Congress (Oremus, 2015; Sherman, 2014). In the most recent iteration of United States climate change opposition, President Donald Trump has vowed to pull out of the Paris Climate Agreement at the earliest opportunity and repealed Obama-era environmental actions like the Clean Power Plan (Vitali, 2017; "Energy and Environment," n.d.; "Complying," 2018). He even attempted to get the EPA

to remove or censor mentions of climate change from its website (Volcovici, 2017; Dennis & Eilperin, 2017; Barron, 2018). As of March 2019, President Trump had proposed cutting the budget of the EPA by roughly 31 percent for Fiscal Year 2020 (Green, 2019). While the United States scores moderately on its use of renewable energy (7.21 percent renewable energy as a share of total primary energy supply in 2016), it scores poorly in GHG emissions, energy usage, and energy policy in the CCPI (Burck et al., 2018). In 2015, 82.5 percent of total energy consumption in the United States was from fossil fuels (World Development Indicators, n.d.). Furthermore, the United States ranked 10$^{th}$ in 2014 on energy use per capita (6,955.5kg of oil equivalent) and CO2 emissions (16.5 metric tons per capita) worldwide (World Development Indicators, n.d.). Not only is the United States dropping off in its nominal participation in climate mitigation, it is retaining its disproportionately large carbon footprint as well, making it an exemplary case of low commitment to climate change action.

### *Independent Variables*

Using the three cases outlined above, I examined each to tests my hypotheses regarding domestic factors' contribution to their individual climate change mitigation commitment. As outlined in the literature review, the three broad categories that appear to have an impact on climate change policy decisions are cultural, economic, and geographic domestic factors, and from these I identified nine hypotheses to be examined in this paper (Figure 1). To test each of these hypotheses within my cases, I selected several proxies for each independent variable (Figure 4) based on the primary components of the existing literature on each factor. Not only did this research aim to test the hypotheses' individual validity, but also how influential each independent variable was on the respective dependent variable. In doing so, I was able to

determine which variables had the *most* explanatory power over climate change mitigation commitment as opposed to simply explaining a small proportion of the variation.

***Figure 4.***

| Culture | Economics | Geography |
|---|---|---|
| Public opinion | Strong neoliberal/laissez-faire policies | Flooding vulnerability |
| Presence of prevalent climate denialist movement | Politically powerful fossil fuel sector | Drought vulnerability |
| Demand for climate policy | | Land diversity/adaptability |
| | | Agricultural Dependence |

To gauge public opinion towards climate change, I looked at survey data in each country that examines what extent of the general population feels threatened by climate change and how large of a problem they feel it is, as well as any relevant news media to gauge opinions and attitudes at the national level. Similarly, I looked at surveys regarding knowledge of climate change (e.g. what can affect it; what it affects) to gauge familiarity with climate science, which would likely spur demand for climate policy (Funk, 2017). Both public opinion and level of demand for climate policy are expected to influence the policy score of the CCPI. Additionally, as seen in the existing literature, public demand for climate change action translated to real GHG emission changes (Tjernstrom & Tietenberg, 2008); therefore, the level of demand is also expected to influence actual measures of climate change mitigation. Lastly for the culture factor, I searched for the presence of a climate denialist movement within each country, and then examined the prevalence of the movement. In this case, "prevalent" refers to some formal level of organization and cohesion about climate denial beliefs (e.g. the Republican Party in the United States formally rejects the premise of climate change as a man-made phenomenon). Additionally, I considered more prevalent movements ones that received national news attention or had visible

organized protests. Again, the presence and prevalence of a climate change denialist movement is likely to influence the policy score of the CCPI.

Economic factors were composed of two measures: strong laissez-faire policies and the presence of a politically powerful fossil fuel sector. The former measure refers to policies that are intended to deregulate energy industries and that favor firms over environmental concerns, primarily enacted since the introduction of the Kyoto Protocol in 1997. Additionally, countries that highly subsidize renewables are considered to not have a strong laissez-faire stance, for subsidies are a mechanism of government regulation in the energy sector that may artificially be propping up renewables when fossil fuels would otherwise dominate the market. By looking at both the level of fossil fuel regulation and the promotion of renewables, this hypothesis gauges the effects of economic factors on both nominal and actual commitment to climate change mitigation. The latter measure was examined by looking at the overlap between the fossil fuel industry and each government using indicators such as lobbyist spending to politicians or the presence of people with ties to the fossil fuel industry in positions of political power in the government itself. This measure is intended to gauge the strength of the relationship between countries' governments and industries that are likely to oppose climate change mitigation. The political power of the fossil fuel sector will also likely affect a country's CCPI policy score.

The final factors examined were geographic vulnerability aspects of each country. Both flooding and draught vulnerability were judged by looking at recent weather events that may stem from, or be exacerbated by, climate change, if such events existed in a country. As stated in H6 and H7, increases in vulnerability are likely to increase the level of effort a country undertakes to mitigate climate change, both in nominal and actual CCPI measures. Adaptability was also examined by looking at the World Risk Report rankings, which detail how countries are

expected to fare in the event of a natural disaster. Finally, agricultural dependence was measured by the percentage employed in the primary sector in the most recent data year available for each country as well as how much land area is used for agricultural activities. These measures allow us to see how dependent each country is on current climatic conditions and how adaptable they may be if conditions worsen. As dependence increases and adaptability decreases, countries are likely to be both more nominally and actually committed to mitigation, for geographic vulnerability appears to be a strong driver of mitigation efforts.

**Expected Results**

From these case studies, I expect to be able to test the nine hypotheses proposed after studying the relevant literature. The aim of testing these hypotheses is threefold: first, it will allow me to discern whether the independent variables in each hypothesis has any effect on a country's level of commitment to climate change mitigation efforts. Second, if a relationship does exist, the case studies should reveal the directionality of that relationship. In other words, what factors lead to increases and decreases in climate change mitigation commitment, respectively. Finally, and perhaps most importantly, I will attempt to gauge the relative impact of each explanatory variable to understand what the most important factor is in a country's decision to pursue their level of climate change mitigation. Based on the explanatory strength of each hypothesis, I will conclude by estimating whether any of the identified domestic attribute categories – cultural, economic, or geographic – have exceptionally high or low influence in a country's decision-making over the others. In other words, not only will these hypotheses be examined for validity in their own right, but also judged against the other hypotheses to determine its relative influence in the issue of climate change mitigation.

## Case Study 1: Sweden

As previously mentioned, Sweden represents an economically developed country that has taken relatively large progressive measures to combat climate change. According to the International Energy Agency (2019), Sweden has exceeded their commitments to the international community in the area of climate change mitigation. This level of commitment appears to have multifaceted motivations and sources encompassing cultural, economic, and some geographic factors.

### Cultural Attitudes

Overwhelmingly, Swedish public opinion has leaned in favor of environmental issues and support for climate change mitigation. According to the 2018 Eurobarometer survey conducted by the European Commission on the Future of Europe (2018c), Sweden ranked environmental issues as the second biggest challenge facing the EU (narrowly surpassed by social inequality when respondents were allowed to select up to three issues). Notably, Swedish people reported it as a challenge far more than the average respondent from the EU; 45 percent of Swedish respondents identified environmental issues as one of the main future challenges versus just 22 percent of the EU respondents as a whole. Furthermore, Swedish respondents listed protecting the environment as the number one societal emphasis that should be focused on to combat major global change. A similar study by the European Commission (2017b) found that 81 percent of respondents from Sweden think that climate change is a ‘very serious’ problem versus just 74 percent of respondents from the total EU. Additionally, this figure is a 10-percentage point increase from 2015, indicating that not only do most Swedish citizens feel that climate change is a legitimate threat, but also an increasing threat. When asked to identify the single most pressing

problem facing the world as a whole, 38 percent of Swedish respondents selected climate change, which received the plurality of votes by a margin of 15 percent. Swedish citizens also report personally taking action to fight climate change and supporting more action by the government to fight climate change at significantly higher percentages than the average for the EU.

This attitude within Sweden is not new, for the Eurobarometer survey conducted in 2008 found similar results whereby Sweden was not only extremely focused on the issue of climate change, but also markedly more concerned and active within this issue space than the rest of the EU ("European Commission," 2008b). The World Values Survey for Sweden in 2011 found that environmental pollution was identified as the second most pressing problem for the world (Inglehart et at., 2014). Nearly two-thirds of the respondents stated that 'protecting the environment should be given priority, even if it causes slower economic growth and some loss of jobs.' For comparison, this sentiment was shared by just 48 percent of German respondents and 41 percent Dutch respondents. This exceptional desire to support environmental protection efforts and overall attitude of concern regarding climate change likely has an enormous impact on their willingness to undertake international-scale climate change mitigation. The strong support displayed for climate change mitigation efforts in Sweden and resulting high level of commitment to climate policy in Sweden provides evidence for H1.

In addition to an overwhelming support movement that drives climate policy, Sweden also undoubtedly lacks a prominent climate change denialist movement. Of the eight political parties that currently have seats in the Swedish parliament, all eight have climate policy listed on their agendas ("Klimat," n.d.; "Klimatet," n.d.; "Klimat och miljö," n.d.; "K-arkiv," n.d.; "Miljöpolitik," n.d.; Nordin, n.d.; "Nu. Klimatet kan inte vänta," 2019; "Socialdemokraterna –

Miljö," 2018). Additionally, each party has proposed relatively progressive goals for mitigation efforts when considered in a global context, regardless of where they lean on the political spectrum. The largest party – the liberal-leaning Social Democrats – states that they want Sweden to "be the first fossil-free welfare nation… [and] drive for tougher chemicals regulations in the EU and introduce domestic taxes on hazardous substances" among other goals[2] ("Socialdemokraterna – Miljö," 2018). On the opposite end of the spectrum, the relatively conservative (occasionally labeled far-right) Sweden Democrats party which holds the third greatest number of seats in the parliament states that "to reduce the climate impact in Sweden and globally, [they] want to invest in nuclear power, energy research and international efforts"[3] ("Miljöpolitik," n.d.). While the policy propositions of these parties have many differences (and the use of nuclear power as an environmentally friendly energy source is hotly debated in its own right), there is a notable agreement that climate change is a threat that requires human intervention and proactive policymaking.

Individually, the previously mentioned 2018 Eurobarometer survey found that zero percent of Swedish respondents held the opinion that climate change does not exist or that they do not believe in climate change and just one percent stated that climate change was not at all due to human activity ("European Commission," 2018b). The remaining 99 percent, the highest percentage in the EU, were spilt roughly in half between believing that climate change is either partially or entirely due to human activity. Additonally, a Google search for climate change denialism in Sweden returned no news items or other results. This indicates that there is neither a

[2] Untranslated text: "Socialdemokraterna vill Sverige ska bli den första fossilfria välfärdsnationen… [and] driva på för tuffare kemikalieregler i EU och införa inhemska skatter på farliga ämnen" ("Socialdemokraterna – Miljö," 2018). Webpage translation by Google Translate.

[3] Untranslated text: "För att minska klimatpåverkan i Sverige och globalt vill vi satsa på kärnkraft, energiforskning och internationella insatser" ("Miljöpolitik," n.d.). Webpage translation by Google Translate.

prominent political party-led nor grassroots movement in Sweden that provides a serious challenge to the pro-climate change mitigation sentiment, thus providing support for H2. While Swedish individuals who hold climate change denialist opinions almost certainly exist, they do not appear to have the numbers, voice, or power to constitute either a grassroot or institutionally supported (i.e. recognized by political actors) movement necessary to meaningfully influence climate change policy.

The combination of high public concern over climate change and lack of a prominent and powerful denialist movement in Sweden indicates that there is overall a high demand for climate policy. Not only do the majority of Swedish people overwhelmingly believe in climate change, but also see it as one of the most pressing threats that need to be addressed. The ramifications of this demand are clearly seen in their climate policy. They routinely set ambitious goals and the International Energy Agency reports that that Sweden outperforms its commitments to the international community (International Energy Agency, 2019). In March 2019, Sweden has once again made headlines in climate policy thanks to activist Greta Thunberg, who was nominated for the Nobel Peace Prize for her school strike for the climate (‘skolstrejk för klimatet’) (Brito, 2019). Her activism has called for more drastic, immediate actions to combat climate change and spawned student protests around the world. Although Thunberg represents a singular extreme of climate activism (e.g. she does not fly in airplanes nor allow her family to fly), she echoes the broader trend in Sweden of demand for proactive, increasingly ambitious mitigation efforts. In aggregate, the individual and political opinions that exist in Sweden towards climate change mitigation seems to provide strong support for H1, H2, and H3.

**Economic Influencers**

Although the notoriously conservative-leaning Heritage Foundation ranked Sweden as one of the most economically free countries as of 2019, they note that Sweden falters within the subcategory of business freedom due to the use of "significant subsidies to encourage renewable energy" (Heritage Foundation, 2019b). For example, Sweden and Norway participate in a joint subsidy program that is found nowhere else in the world. Under this program, energy producers are paid a premium for renewable power they sell on the market to encourage the construction of wind turbines, solar plants, hydropower energy and other renewable energy sources (Solsvik, 2017). While Norway had sought to end the project in 2016, Sweden successfully secured its continuation and extension through 2045 (Solsvik, 2017). Furthermore, the proposed budget changes to the Swedish federal budget for Spring 2019[4] (Spring Fiscal Policy Bill and Spring Amending Budget) allocates roughly 1,950 million Swedish Korona (SEK) (roughly $200 million) to climate change mitigation efforts aimed at making Sweden a fossil fuel-free nation (Ministry of Finance, 2019a). This figure alone makes up over 43 percent of the budget increases for the national government, handily surpassing other spending areas such as programs to create jobs and strengthen welfare systems. If a 350 million SEK ($37 million) budget item to increase "measures and support to agriculture due to extreme weather," is included in the overall climate change budget, then the percentage jumps to over 50 percent of the Swedish budget increase for 2019 allocated to climate change mitigation and adaptation efforts alone (Ministry of Finance, 2019a). Additionally, several of the proposed cuts to the budget also support climate mitigation efforts. For example, 140 million SEK ($15 million) will be returned to the budget by abolishing the tax reduction for diesel in industrial mining activities (Ministry of Finance, 2019a). The 2015

[4] Tentative final vote date for the 2019 budget proposal is June 18, 2019.

program Climate Leap ("Klimatklivet") has also provided SEK 3.2 billion in funding for 1,900 projects (as of 2018) related to local or regional infrastructure investments aimed at reducing GHG emissions (International Energy Agency, 2019). This program is run and ultimately funded through the Swedish Environmental Protection Agency. As Sweden adopts more ambitious climate goals, it is clear that they are willing to do so at the expense of the Swedish taxpayer and fossil fuel-dependent industries. This sentiment was echoed by the public in the World Values Survey where the majority of Swedish respondents prioritized "protecting the environment… even if it causes slower economic growth and some loss of jobs" (Inglehart et at., 2014). Ultimately, Sweden does not appear have a strong tradition of laissez-faire policymaking in the energy sector, thus allowing them to regulate and finance it to match their desired climate policy level (H4).

Despite the fact that Sweden has one of the highest electricity usages per capita in the world, their emissions per capita are the second lowest among the 38 countries who are part of the International Energy Agency (IEA) due to the high level of renewable energy available (International Energy Agency, 2019). In their 2016 Framework Agreement on Energy Policy ("Energy Agreement"), Sweden pledged to have 100 percent renewable energy production by 2040, and negative emissions after 2045 (Ministry of the Environment, 2019). While some of this target will be met using nuclear power, the Swedish government maintains its stance on not subsidizing nuclear power plants as it does renewable energy sources (Ministry of the Environment, 2019; "Nuclear Power," 2019). Furthermore, until 2019, nuclear energy has been heavily taxed – the tax rate made up about one-third of the operating costs for nuclear power plants ("Nuclear Power," 2019). In contrast, wind and biomass were *subsidized* at a rate roughly three times higher than the tax on nuclear energy ("Nuclear Power," 2019). Additonally, carbon

emissions in Sweden have been taxed since 1991, and as of 2018 the tax is roughly SEK per 1.15 kilograms ($140 per ton), which is the highest level of carbon taxation in the world (International Energy Agency, 2019). Transportation is the major remaining sector that relies on oil in Sweden. Oil has been phased out of most facets of the residential, commercial, and industry sectors, and the 2016 Energy Agreement set a goal to reduce emissions from domestic transport by 70 percent from 2010 levels by 2030 (Ministry of the Environment, 2019; International Energy Agency, 2019). This will be accomplished by several mechanisms, most notably more electric transportation and lightweight vehicles 2030 (Ministry of the Environment, 2019; International Energy Agency, 2019). The rampant subsidization of renewable energies and efforts to completely cut fossil fuels suggests that not only is the Swedish government disassociated from fossil fuel interests (H5), but overwhelmingly is favorable, in the long run, primarily to wholly renewable energy sources instead of partial solutions like nuclear.

One important thing to note is that oil is still one of Sweden's top exports ("Sweden Trade at a Glance," n.d.). This demonstrates why simply the size and presence of a fossil fuel industry cannot adequately explain a country's climate change mitigation preferences. If we assumed that to be true, we might also assume that Sweden should be much less favorable towards renewable energy because it presents a threat to its oil industry. However, clearly Sweden downplays economic interests in this situation in favor of environmental ones, suggesting that the economic influence of the fossil fuel industry is sufficiently *weak* enough to allow for favoritism towards renewables to exist.

**Geographic Vulnerability**

As of April 2019, Sweden's national weather agency SMHI reported that from 1991 to 2018, Sweden's annual average temperature rose by 1.7°C compared to average temperatures in

pre-industrial times (The Local, 2019). During the same period, the global average temperature rose by just 0.73°C, indicating that Sweden seems to be experiencing faster effects of global warming (The Local, 2019). While Sweden may be in one of the best positions to handle these climatic changes, that may do little to negate their feeling of vulnerability as those changes do occur. These feelings are likely to have been amplified after the summer of 2018 when Sweden experienced a record-breaking heat wave and subsequent drought. According to hydrologist Jonas Olsson with the Swedish Meteorological and Hydrological Institute, rainfall during this period was roughly one seventh of the normal amount, which was the lowest amount in recordkeeping history (Anderson & Cowell, 2018). While the snow the previous winter had been above average and given way to large spring floods, the heat wave set in during the summer and led to massive fires breaking out as far north as the Arctic Circle. The fires became so severe that Italy and Norway, the latter of which was experiencing wildfires as well, sent helicopters to help Sweden combat the issue (Anderson & Cowell, 2018). Sweden also experienced massive flooding of two lakes – Mälaren and Vänern – in 2001 and a large cyclone - Gudrun – in 2005 (Juhola et al., 2011), which prompted many environmental concerns and the implementation of adaptive measures. Arcanjo (2018) asserts that according to climate change predictions, up to 200,000 of Sweden's buildings could be at risk from flood damage as the sea level rises. Northern latitudes in general are expected to face more temperature fluctuation, leading to uncertainty and increased incidents of severe weather events (Arcanjo, 2018). Consequently, Sweden is both vulnerable drought and flooding, presenting evidence for both H6 and H7.

However, Sweden's geographic vulnerability to the effects of climate change is relatively negligible when compared to the global perspective. The United Nations University Institute for Environment and Human Society's 2017 World Risk Index classifies Sweden as the tenth *least*

vulnerable country to natural disasters (such as droughts, floods, and storms) out of 171 countries studied ("WorldRiskReport," 2017). This index, which includes exposure, vulnerability, susceptibility, coping capacities, and adaptive capacities, aims to provide a comprehensive assessment of not only the likelihood of experiencing natural disasters, but also the degree to which a disaster would impact a country and how prepared a country is to handle disasters. However, it is worth noting that within the top ten countries ranked as low-risk, only two countries – Iceland and Sweden – are scored in the best percentile in each category that makes up the index ("WorldRiskReport," 2017). Other countries, such as Kiribati, are ranked well due to their incredibly low exposure to natural disasters, but are actually poorly equipped to handle a disaster were one to occur ("WorldRiskReport," 2017). Iceland and Sweden are not only low risk in terms of exposure, but also adequately prepared to handle and adapt to disaster conditions. Despite this, Sweden continues to engage in its high level of mitigation efforts, which appears to contradict H8. This may present evidence that the susceptibility to threat is more important than adaptability. Experiencing climate-related disasters such as drought and flooding, even if recoverable, may still induce countries to pursue higher levels of mitigation (H6, H7). One possible explanation is that willingness to mitigate despite ample adaptability to future effects that could accompany climate change displays the demand for climate change policy in a country; citizens would rather stave off disaster to begin with by trying to reduce the sources of the problem rather than deal with the consequences of the disaster once it has occurred. Again, Sweden's case suggests that simply experiencing disaster (H6, H7) is a stronger motivation than the security of adaptive capabilities (H8). This is consistent with the findings Juhola et al. (2011), which assert that Sweden frames its adaptation in terms of vulnerability. In other words, Sweden pursues its adaptive strategies because of its perceived vulnerability. Likewise, Sweden appears

to include mitigation as a strategy to deal with the vulnerability to climate change effects such as droughts and floods.

Economically, Sweden is hardly dependent upon agricultural activities at all. The primary sector in Sweden makes up just 1 percent of its GDP (International Energy Agency, 2019). Additionally, just 7.5 percent of the land in Sweden is designated as agricultural ("Sweden Land Use," 2018). Other areas of vulnerability, such as drought-induced wildfires and coastal flooding, are significantly larger than their risk from agricultural concerns. Consequently, H9 is not supported by Sweden's case.

### Conclusion

Sweden appears to be primarily driven by high public support for renewable energy and concern over climate change, which is aided by a lack of a prevalent climate denialist movement or laissez-faire tradition in the energy sector. Geographical concerns and motivations are somewhat less clear, as Sweden does not suffer from low adaptability not agricultural vulnerability but will likely experience more droughts and floods as climate change effects are felt more strongly. Ultimately, this case provides the strongest support for H1 through H7, inclusive, while providing little support for H8 and H9.

## Case Study 2: Austria

Austria represents a case of moderate commitment to climate change mitigation within a developed economy. Despite its similarities with Sweden as a member of the European Union, they have pursued very different paths of climate policy. While Austria has a moderate fleet of renewable energies, the CCPI docks their score for their use of hydropower instead of investing in more ambitious mitigation endeavors. Furthermore, Austria allows actions that ultimately

exacerbate climate change, like fuel tourism, to continue, signaling their commitment to climate change is moderate, and mostly vocal rather than real. Cultural and economic factors appear to play the largest role in Austria's policy outcomes on this issue.

**Cultural Attitudes**

One of the benefits to examining two countries within the European Union that have differing levels of climate change mitigation commitment is the opportunity for direct comparison of public opinion via EU-wide surveying. In contrast to Sweden's truly exceptional level of support for climate change issues, Austria tracks much more closely to the EU average response, which is far less climate change mitigation-inclined than Sweden. In the 2018 Eurobarometer survey (2018a), Austria fell below the EU average (45 percent of responses) in reporting that protecting the environment should be a focus for society at just 40 percent. While 29 percent of Austrians ranked environmental issues as one of the main challenges for the EU (greater than the EU average response of 22 percent of respondents), this is notably lower than Swedish respondents at 45 percent and was Austria's fifth ranked concern out of the ten specified issues polled. In the 2017 Eurobarometer survey on climate change (2017a), just 16 percent of Austrian respondents stated that climate change is the single most serious problem facing the world as a whole, making it the third biggest problem selected. Interestingly, Austria's results for the Eurobarometer 2008 survey suggest that public support for climate change mitigation may have either fallen, or at least stagnated, in recent years (2008a). In 2008, the proportion of Austrian respondents who felt that climate change was either a fairly or very serious problem was nearly identical to Sweden. Additionally, Austria most frequently reported that climate change was the most serious issue facing the world, while Sweden ranked it second. This suggests that Austria's initially high level of public support for climate change mitigation

has not kept up with the growing concern over environmental issues experienced in other areas. Consequently, Austrian leaders may not feel the same consistent, mounting pressure as Swedish officials to tackle climate change, leading to their moderate climate policy outcomes. This is consistent with H1, which posits that moderate levels of public support for climate change policies should be met with moderate levels of mitigation achievements.

Like Sweden, it appears that no major political party in Austria outright denies climate change. Of the five parties currently represented in the Austrian legislature[5], all five dedicate some portion of their platform to climate change policies ("Klima- und Umweltschutz," 2019; "Reconciling," 2018, "Heimat, Identität und Umwelt," n.d.; "Kampf gegen den Klimawandel," n.d.; "DIE JUGEND," n.d.). The current party in control of the parliament, the conservative Austrian People's Party (ÖVP), notes that their "focus is on the long-term reduction of CO2 emissions in the transport and building sector and the complete switch to renewable energy by 2030"[6] ("Klima- und Umweltschutz," 2019). However, they do employ more moderate language than the conservative parties of Sweden. For example, they state that the goal of their desired climate policymaking is to "promote the reduction of CO2 emissions, but not at the expense of commuters and people in rural areas. 'We do not want to ban people from driving when they need it, but we want to significantly reduce CO2 emissions'"[7] ("Klima- und Umweltschutz,"

[5] As of July 2019. A snap election was called for September 2019 due to the resignation of the FPÖ ministers over a scandal regarding government contracts being sold to Russians for campaign donations. Polls as of July 4, 2019 show ÖVP at 37%, SPÖ at 22%, FPÖ at 18%, GRÜNE (Austrian Greens, who fell below the 4% threshold required to obtain seats in the 2017 election) at 11%, and NEOS at 8% (JETZT is polling at 2%, which would be below the 4% threshold). Retrieved from https://www.politico.eu/2019-european-elections/austria/.

[6] Untranslated text: "Schwerpunkte liegen auf der längerfristigen Reduktion von CO2-Emissionen im Verkehrs-und Gebäudebereich und dem Komplettumstieg auf erneuerbare Energie bis 2030" ("Klima- und Umweltschutz," 2019). Webpage translation by Google Translate.

[7] Untranslated text: "Ziel sei es, die Reduktion von CO2-Emmissionen voranzutreiben, jedoch nicht auf Kosten von Pendlern und Menschen im ländlichen Raum. „Wir wollen den Menschen nicht verbieten, dass sie mit dem Auto fahren, wenn sie darauf angewiesen sind, aber wir wollen den CO2-Ausstoß deutlich reduzieren"." ("Klima- und Umweltschutz," 2019). Webpage translation by Google Translate.

2019). While Sweden's focus with climate change issues is almost entirely on the environmental impacts across the board, it appears that segments of the Austrian government are tailoring their goals towards other areas outside of environmental concerns; in other words, while Sweden myopically pursues environmental protection, Austria is willing to split its attention with other interests.

However, unlike Sweden where I could not identify any prominent political party that lacked a fairly high level of climate policy ambition, Austria's third largest party represented in the legislature[8], the right-wing populist Freedom Party of Austria (FPÖ), has some history of climate change policy obstructionism. They have previously been against the declaration of a climate emergency in the National Council, believing that it would "only create fear, but fear is a bad guide"[9] ("Klimaschutz," 2019). In December 2018, the then Federal Minister of Transport, Innovation and Technology (now serving as the FPÖ party chairman as of May 2019) Ing. Norbert Hofer expressed similar sentiments in an interview where he stated "[the climate change] debate should be conducted with more common sense and less hysteria"[10] ("Designierter Bundesparteiobmann," n.d.; "Wir fördern Forschung," 2018). In the same interview, he also displayed the previously observed proclivity for climate change policy in Austria to be less purely environmentalist than Sweden's; he asserted that "this federal government is doing what makes sense without penalizing our economy or even driving it out of the country"[11] ("Wir fördern Forschung," 2018). Furthermore, during the 2014 election in Austria, the FPÖ entirely

[8] Again, as of July 2019 the FPÖ is dealing with the aftermath of a major scandal. However, they are still polling to be the third largest winner in the September 2019 snap election.
[9] Untranslated text: "…nur Angst erzeugen, aber Angst ist ein schlechter Ratgeber" ("Klimaschutz," 2019). Webpage translation by Google Translate.
[10] Untranslated text: "Es sollte diese Debatte mit mehr Hausverstand und weniger Hysterie geführt warden" ("Wir fördern Forschung," 2018). Webpage translation by Google Translate.
[11] Untranslated text: "Diese Bundesregierung tut, was sinnvoll ist, ohne unsere Wirtschaft zu benachteiligen oder gar aus dem Land zu vertreiben" ("Wir fördern Forschung," 2018). Webpage translation by Google Translate.

failed to mention climate or energy policy as part of its platform (Thaler, 2013). More egregiously, however, several members of the party, including the former (until May 2019) chairman Heinz-Christian Strache, have expressed outright climate change denialist sentiments (Farand, 2019). In a 2014 tweet, Strache posted "climate change has always had natural causes and cannot be prevented!" along with an article discussing scientific findings that seem to contradict climate change theories (HCStracheFP, 2014). Although this is not necessarily representative of a party (or peoples) that overwhelmingly, collectively denies climate change, it paints a very different picture than the Swedish case where climate change is a relatively agreed upon matter across the political spectrum. Consequently, it seems like the climate change denialist sentiments are not robustly entrenched and empowered in the Austrian culture, but if someone wanted to find political representation sympathetic to their denialist views, the FPÖ may provide a suitable option that does not exist comparably in Sweden.

Outside of political parties, a general Google search for climate change denialist movements in Austria returned no results in the news or otherwise. However, as of 2018, seven percent of Austrian respondents to the Eurobarometer survey on climate change reported that they either do not believe climate change is due to human activity at all or that they do not believe in climate change ("European Commission," 2018b). Ninety-two percent of Austrians feel that climate change is either entirely or partially due to human activity. While this may not seem like a large difference from Sweden at 99 percent of respondents, the range of responses for EU countries believing that climate change is entirely or partially due to human activity is only 84 to 99 percent, placing Austria below the average (93 percent) and median (93.5 percent) for that question ("European Commission," 2018b). This moderate display of climate denialist sentiments with access to power provides support for H2, which implies that moderate levels of

climate denialism should induce moderate climate change mitigation effort in a country. Given that Austria harbors slightly more climate change denialism and a political party that is at least willing to tolerate such sentiments, it makes sense that less ambitious climate policy follows.

Due to Austria's lower level of overall public support for climate change policies and the presence of some denialist sentiments both in the general public and political power, Austria's level of demand for climate policy appears to be less than Sweden's. The consequences of this discrepancy are striking; for example, Austria failed to meet its Kyoto Protocol targets and had to cover the difference by purchasing €700 million of carbon credits (Tobin, 2017). Ultimately, the demand in Austria for climate change mitigation policy does not appear to be sufficiently high to produce the kinds of ambitious initiatives seen in Sweden. The demand is still there, but the lower level versus Sweden is consistent with H3 in predicting Austria's climate change mitigation performance.

**Economic Influencers**

Austria's economic strength does not lie in fossil fuel extraction and export. Austria's exports of fossil fuel materials make up just roughly 1.5 percent of their total exports by dollar value and the broad category of mineral products (including, but not limited to, fossil fuels) is only the thirteenth largest export sector out of 21 categories (Observatory of Economic Complexity, n.d.a). Furthermore, the mineral and fossil fuel sector in Austria is in decline. Exports have been falling since 2006, and in the last five years petroleum products have seen a negative annual growth rate of -0.082 percent per year ("Austria Exports," 2018). Consequently, it is easy to assume that Austria's fossil fuel industry does not have the capacity for much political power simply by virtue of its size. However, Tobin (2017) identified two reasons for Austria's uniquely poor performance on climate change mitigation that are related to the fossil

fuel industry: their social partnership corporatist governance model and fuel tourism. The former of these features is not entirely unique to Austria, but they do rank consistently among the top of indices of corporatism (Paster, 2014). Their system is made up primarily of the Labor, Agricultural, and Commerce Chambers (Tobin, 2017), and the Chamber of Commerce – the Austrian Economic Chamber (Wirtschaftskammer Österreich [WKÖ]) – is a nationalized chamber as opposed to a compilation of many distinct regional chambers (Paster, 2014). In 2004, the WKÖ was integral to reducing the value and quantity of feed-in tariffs, arguing that "technological renewables [were] an extra cost for business" (Tobin, 2017). Furthermore, Tobin points out that since Austria remained committed to its stance against nuclear energy, reducing feed-in tariffs, and thus renewable energies, left little choice for Austria but to continue to rely upon fossil fuel sources.

Although relatively few businesses within the WKÖ, which has compulsory membership for all businesses in Austria, are in the fossil fuel sector (Paster, 2014), their interests are hardly underrepresented. For example, the current headquarter officials have various ties to the industry. Mag. Jürgen Roth (WKÖ Vice President Association Chairman Obmann) works for the oil company Roth Heizöle GmbH and has previously served in various chairmanships related to the energy sector, such as Chairman of the trade association of the energy trade (Roth, n.d.). Since 2016, Mag. Ulrike Rabmer-Koller (WKÖ Vice-President KommR) has served as the President of SMEunited (European Small and Medium Enterprises [SME] Association), which supports the Paris Agreement targets, but cautions against more ambitious reduction targets that could come at the expense of SMEs, favors energy decentralization, and favors protecting low energy prices (Rabmer-Koller, n.d.; Huemer, 2019). Perhaps most notably, however, the current WKÖ Vice President Senator h.c. KommR Dr. Richard Schenz, who has been a vice president of WKÖ

since 2000, has an extensive record in the fossil fuel industry. He served as CEO and Chairman of the Board of the Austrian integrated oil and gas company ÖMV Aktiengesellschaft from 1992 to 2001 (Schenz, n.d.). He also served as the Head of the Association of the Oil Industry from 1992 to 2001, Chairman of the Infrastructure Committee of the Federation of Industrialists since 2001, and a member of the supervisory board of BIOLUX GmbH (a biodiesel plant in China) since 2007 (Schenz, n.d.). In total, of the eight headquarter presidents and vice presidents that comprise WKÖ, at least three have identifiable ties or sympathies to the fossil fuel industry. Given that this sector is so small in Austria, their representation in the government seems to be somewhat disproportionate. Adding to this analysis is the fact that in the Austrian lobbying register, the largest number of companies represented (31) are in the energy sector, followed by the finance sector with just 19 (Reinberg-Leibel, 2014). The ability of the WKÖ to wield the social partnership to aid the fossil fuel industry (e.g. reducing feed-in tariffs) represents support for both H4 and H5. Not only is the fossil fuel industry able to hold power within the Austrian government's decision-making process despite its small size, it has also successfully used that power to promote laissez-faire energy policies that inhibit the expansion of renewable energies.

Tobin's second argument for Austria's poor performance is its fuel tourism whereby "consumers from neighboring states, particularly Germany and Italy, purchase vehicle fuel in Austria because of its central location and deliberately low fuel prices" (Tobin, 2017). This practice had support throughout the Austrian government and has been cited as one of the major challenges Austria faces to reduce its emissions. The IEA notes that stopping this practice is one of the simplest ways for Austria to reduce its emissions from transportation (International Energy Agency, 2014a); however, considering the revenue generated under this system is roughly €1.3 billion per year, this seems like an unlikely outcome (Tobin, 2017). As of June 2019, Austria was

still ranked among the cheapest countries for travel in Europe by fuel costs (Gratton, 2019). Austria maintains notably lower taxes on petroleum products than many other European countries. Among the European IEA member countries, Austria had the seventh lowest tax rate on premium unleaded petrol in 2013[12] and the third lowest overall price (International Energy Agency, 2014). Keeping taxes on petroleum products so low understandably reinforces fuel tourism and ensures that Austria will continue to see high emissions from its transportation sector, which is their second highest emitting sector (International Energy Agency, 2014). The persistence of fuel tourism supports H4 – the lack of taxes on petroleum fuel products indicates low regulation of the fossil fuel industry, which significantly contributes to Austria's lackluster mitigation performance.

Looking again at the Freedom Index published by the Heritage Foundation, Austria joins Sweden in the cohort of most free countries. Notably, Austria is actually ranked lower in economic freedom than Sweden and is also docked specifically in the Business Freedom subcategory because "the government continues heavy subsidies for renewable energy sources and electric vehicles" (Heritage Foundation, 2019a). However, the federal budgets published by the Federal Ministry of Finance (2018; 2019) demonstrate that spending on the environment, energy, and climate has fallen in the past two years. In 2018, this category made up 0.80 percent of the budget versus 0.79 percent in 2019 (Federal Ministry of Finance, 2018; Federal Ministry of Finance, 2019). While this difference may not seem astronomical, it represents roughly €4 million reduction in spending on this category. In contrast, the Swedish government spent 0.87 percent of its 2017 budget solely on "general environmental protection and nature conservation,"

[12] The United States has the lowest tax rate of all IEA member countries (15%) by a large margin. The next lowest rate is Canada at 29%. In contrast, all European countries apart from Luxembourg (49%) are at or above a 50% tax rate on premium unleaded petrol (International Energy Agency, 2014).

increased this to nearly 1.1 percent in 2018, and, as stated above, is expected to increase that budget further in 2019 (Ministry of Finance, 2018; Ministry of Finance, 2019b; Ministry of Finance, 2019a). Additionally, while both Sweden and Austria use monetary incentives to promote renewable energy generation (quotas and feed-in tariffs, respectively), quotas have been shown to be more effective at crowding out fossil fuels than feed-in tariffs (Requate, 2015). While quotas may not be the best policy to ensure that energy prices stay low for consumers, the use of them suggests that Sweden's commitment to the environment trumps its commitment to businesses and consumers. In contrast, and as displayed in the political realm as well, Austria appears to aim for a less ambitious and focally environmental option; instead, they afford more weight to other interests and economic concerns. Although the Heritage Foundation may be inclined to rate Sweden better on overall economic and business freedom, it seems less likely that this would be the case if they were to solely measure government involvement in climate change mitigation.

Ultimately, while Austria has demonstrated some commitment to mitigation efforts, such as feed-in tariff programs and the 2007 Climate and Energy Fund (KLI.EN) that has provided a total of €1.4 billion for programs from 2007 to 2019[13], their energy concerns seem to primarily focus on energy security first (International Energy Agency, 2014a; "Über uns.," n.d.). According to the IEA (2014a) report, "two of the main aims of Austrian energy policy have been to reduce its dependence on energy imports and to strengthen its security of supply." This has chiefly been achieved through dependence upon oil and natural gas; over two-thirds of their energy supply is made up of fossil fuels as of 2016 (International Energy Agency, 2018). Austria's continued expansion of the use of fossil fuels and successful deregulation of the fossil

[13] Webpage translation provided by Google Translate ("Über uns.," n.d.).

fuel industry and energy prices, aided by fossil fuel interests with disproportionate access to the policymaking arena, provides substantial support for H4 and H5.

**Geographic Vulnerability**

Contrary to the themes expressed in H6 and H7, Austria appears to be more vulnerable to climate change but still less willing to mitigate. According to the World Bank (n.d.), "Austria is expected to be very vulnerable to a climatic change given that ecosystems in mountainous regions are highly sensitive and about 70% of Austria's surface is situated higher than 500 m above sea level." Furthermore, the 2017 World Risk Index only placed Austria as the 39$^{th}$ least vulnerable country out of 171 to natural disasters ("WorldRiskReport," 2017). While this ranking is still relatively good, it is much lower than Sweden at ten and puts Austria in the "low risk" cohort as opposed to the "very low risk" cohort. Notably, Austria's score for the exposure category places them in the "medium risk" range. They are ranked 96$^{th}$ out of 171 in exposure, denoting that they are at an above average risk of exposure to natural disasters ("WorldRiskReport," 2017).

Austria faces unique challenges from climate change due to the fact it is a landlocked country and the presence of the Austrian Alps. The Austrian Climate Change Assessment Report from 2014 stated that temperatures in Austria have risen nearly 2°C since 1880, which is much higher than the global average increase of 0.85°C (Bell, 2014). The report blames the combination of Austria's landlocked status (meaning Austria is entirely continental with no coastal zones to pull temperatures down) and the mountainous terrain that has seen decreased snowfall over this time period (Bell, 2014). Consequently, Austria has experienced more severe warming patterns and can expect this trend to continue if mitigation efforts are not sufficiently undertaken. Coming off a record-breaking heatwave in June 2019 (Livingston, 2019), the effects

of altered climate patterns may already be a reality for Austria. Additionally, although Austria is landlocked and consequently not at risk from sea level rise, their mountainous terrain lends itself to downstream floods and landslides that could be exacerbated if precipitation patterns change. Since only 38 percent of Austria's land has elevation and terrain usable for permanent settlement, populations tend to be concentrated at lower elevation basins and valleys that are more prone to flooding ("Assessing flood risk," n.d.). In recent years including 2002, 2005 and 2013, Austria has experienced floods that caused hundreds of millions of euros worth of damage ("Assessing flood risk," n.d.). Despite this risk, the ECONADAPT project[14] states that "Austria has not actively factored-in the effects of future climate change into flood risk management strategies" ("Assessing flood risk," n.d.).

Given that Austria appears to be relatively vulnerable both to temperature increases that could spawn drought conditions and floods spurred by mountainous terrain, it is surprising that they have not undertaken more ambitious mitigation efforts. Their poor climate policy performance is also surprising since it has been identified as a geographically vulnerable country by both the World Bank and the World Risk Index. One explanation is that this may be a case where adaptive capabilities have induced greater mitigation apathy (H8). Austria is ranked among the top cohort for coping and adaptive capabilities in the World Risk Report (2017), so Austrians may be less inclined to expend resources to mitigate climate change in advance. Instead, it may be more favorable for the Austrian government to adapt to climate change as it arrives rather than halting before consequences arise. Although H8 was not supported by

[14] "ECONADAPT is an EC FP7 research project whose purpose is to support adaptation planning through building the knowledge base on the economics of adaptation to climate change and converting this into practical information for decision makers. The project is being undertaken by a pan-European consortium led by the University of Bath" Retrieved July 13, 2019, from https://econadapt.eu/.

Sweden's case, it may explain why Austria seems to act contrary to their risk realities. Overall, Austria appears to contradict my hypotheses in both H6 and H7 but provides some support for H8.

Finally, Austria joins Sweden in its lack of a significant agricultural sector. Agriculture made up just 1.3 percent of Austria's GDP as of 2017 (World Factbook, 2019a). Notably, agricultural land does cover nearly 40 percent of the country ("Austria Land Use," 2018). However, while Austria may have more land allocated towards agriculture than Sweden, that will not necessarily alter their mitigation efforts. The relatively small GDP contribution that the agricultural sector makes signifies that Austria has little to lose should agricultural conditions be affected by climate change. H9 is not particularly supported by Austria, for low dependence upon agriculture has still been met with a moderate level of willingness to mitigate climate change.

**Conclusion**

Austria provides strong support for both cultural and economic explanations of their climate change mitigation commitment level. Culturally, we observe a decline in support for climate change policy and an increase in the presence of prominent climate change denialism versus Sweden. This combination drives lower demand for climate policy, resulting in their lackluster efforts thus far. Additionally, Austria appears to have a much more accessible channel for fossil fuel interests to influence policymaking through their social partnership corporatist government. These interests have successfully been able to staunch some policy efforts that would improve climate policy performance and have allowed the fossil fuel industry to remain less regulated, particularly regarding fuel prices, than is optimal for the environment. The geography of Austria plays a less clear role in their mitigation commitment levels. While Austria

appears to be more at-risk from the effects of climate change, it has not driven more ambitious climate policy. This perhaps suggests that adaptability outweighs risk in Austria, contradicting the findings for Sweden. The Austrian case overall provides the best support for H1 through H5, inclusive, and H8, but does not support H6, H7, or H9.

## Case Study 3: United States

The United States has a murky record on climate change mitigation that might best be described as 'one step forward, two steps back.' Under President Clinton, the Kyoto Protocol was signed in 1998, but the Senate unanimously voted not to ratify the treaty which prevented it from becoming binding. Similarly, President Obama led the adoption of the Paris Agreement in 2016, but President Trump made leaving the agreement a key part of his platform (Vitali, 2017). More recently in 2019, U.S. Representative Alexandria Ocasio-Cortez and U.S. Senator Ed Markey proposed a "Green New Deal" which has proposed more radical steps to curb climate change, but it has been met with strong opposition even within the Democratic party (Zhou & Nilsen, 2019). Although GHG emissions began falling in the United States in 2007, this was largely due to the increase in natural gas usage over coal[15] and the Great Recession ("US CO2 emissions," 2014). Emissions had tracked steadily upward until that point and have been moving upward again as of 2012 ("CO2 Emissions," n.d.). Ultimately, the United States is an economically developed country that has made incredibly slow strides in mitigation, despite occasional moments of progress, making them a crucial case for this study.

[15] Given that coal is one of the dirtiest energy sources for emissions possible, this essentially means the United States was starting from a bare-minimum baseline. Natural gas still emits greenhouse when burned, but virtually no energy source beats coal in terms of emissions.

**Cultural Attitudes**

Climate change is one of the most polarizing issues in the United States, and beliefs are divided sharply among party lines. In July 2019, the Pew Research Center revealed that, among seven current issues polled, climate change showed the widest partisan gap regarding whether the issue is a threat to the well-being of the United States. While 84 percent of Democrats (and leans-Democrat) said climate change is a major threat to the country, just 27 percent of Republicans (and leans-Republican) felt the same way (Pew Research Center, 2019). Additionally, climate change was the most threatening issue to Democrats but the *least* threatening issue to Republicans.

The Yale Program on Climate Change Communication reports that roughly three fourths of registered voters in the United States believed that global warming was happening as of 2018 (Leiserowitz et al., 2018). A little over half of registered voters believe global warming is caused by human activity. However, there is a stark partisan divide at play within those overarching figures. While 95 percent of liberal Democrats believe global warming is happening, only 40 percent of conservative Republicans agree. Furthermore, as of 2018, conservative Republicans are at a relative high for believing in global warming. In 2013, only about 25 percent of conservative Republicans believed in global warming. Similarly, 84 percent of liberal Democrats believed global warming is a man-made phenomenon as of 2018, but only 26 percent of conservative Republicans agreed. While every group (liberal Democrat, moderate/conservative Democrat, liberal/moderate Republican, and the U.S. average) rose in the overall proportion of registered voters who believe global warming is mostly caused by human activities from 2008 to 2018, conservative Republicans declined from 28 percent to 26 percent.

Additionally, the conservative Republicans were the only group where the majority (53 percent) feel that economic growth is more important than protecting the environment. Overall, Republicans were split with 52 percent prioritizing the environment over the economy, but the large block of conservative Republicans espousing economic growth over environmental protections demonstrates the lack of clear mitigation priorities within the United States public. Given that consistently about 60 percent of Republican voters identify as "conservative" (Saad, 2019), there is clearly a large proportion of people that are unconvinced about climate change. Notable for policymaking, 74 percent of conservative Republicans support President Trump's decision to pull out of the Paris Agreement. In contrast to the near consensus regarding climate change that both the Swedish and Austrian public displayed, the United States is far more divided among partisan lines. A sizable proportion of the population does not believe in the human causes of climate change, favors the prioritization of the economy over the environment, and supports President Trump's efforts to scale back climate policy.

However, the low prioritization of climate change in public policy is not totally unique to conservative Republicans, or even Republicans in general. The average American ranked global warming 15$^{th}$ on a list of 28 political issues relevant to the 2018 Congressional election. Unsurprisingly, conservative Republicans placed the issue last on their list, but even moderate/conservative Democrats placed global warming in the bottom half at 16$^{th}$. As a massive outlier, liberal Democrats ranked it the 4$^{th}$ most important issue, pulling up its average importance rank. Without the heavy emphasis by the liberal Democrats, global warming would only have ranked 22$^{nd}$ out of 28 issues if we average its ranking from the other ideological groups. The World Values Survey for the United States conducted in 2011 found that environmental pollution was ranked the fourth most serious issue for the world as a whole out of

five issues; less than 10 percent of respondents ranked it as the most serious issue (Inglehart et at., 2014). Additionally, and in stark contrast to Swedish respondents, only one-third of respondents from the United States supported the position that 'protecting the environment should be given priority, even if it causes slower economic growth and some loss of jobs' (Inglehart et al., 2014). While a clear majority of Swedish respondents supported this sentiment, the United States did not appear to favor the prioritization of environmental issues. Finally, in a 2018 survey of 26 countries on how threatening climate change is to the world, the United States ranked 20$^{th}$ for the number of respondents who considered it a "major" threat (Pew Research Center, 2018). Though Republicans may be driving the skepticism around climate change, the overall low prioritization of the issue is pervasive throughout the country. The mediocre (at best) support shown in the United States for climate change mitigation policy is consistent with the poor mitigation performance predicted under H1.

One of the most important reasons to include the United States in a discussion of the causes behind climate change attitudes is the formal institution of the Republican Party, which has rather brazenly taken on a climate change denialist identity. The current official Republican Party platform on agriculture, energy, and the environment asserts that "Climate change is far from this nation's most pressing national security issue. This is the triumph of extremism over common sense, and Congress must stop it" (Republican Platform 2016, n.d.). The Republican Party has a long history of opposition to climate change science and policy that dates to the 1970s. As described by Armitage's (2005) analysis of conservative opposition to global warming in the United States, both "scientific uncertainty" and outright deny have become focal points of the Republican stance on climate issues. Armitage asserts that "Environmental initiatives threatened core components of right-wing ideology such as the primacy of individual liberty, the

absolute rights of private property, free enterprise and laissez-faire government." Given these assumptions about Republican values, it is somewhat easy to understand why they have rejected a movement that largely implies greater regulation and possibly more taxation.

However, it appears that the Republican discussion of climate change issues has gotten increasingly contentious in recent years. While the United States has never ranked particularly well on the CCPI (even under the Democratic President Obama, although improvements did occur), they have certainly fallen downwards on the list since President Trump has been in office. It is worth noting at this point that President Trump is not entirely unique as a Republican president; President George W. Bush was slightly less overt about his objection to the climate change mitigation movement, but the sentiment remained. He frequently opted for the cop-out dismissal of climate science as clouded in "scientific uncertainty" where almost none has existed (Armitage, 2005). More concretely, in 2001 the Bush administration renounced the Kyoto Protocol and its emissions targets for the United States (Armitage, 2005). However, towards the end of his first term as president in 2004, Bush did release a report that "unequivocally stated that CO2 emissions were the most plausible explanation for observed greenhouse warming" (Armitage, 2005). While this did not come with any policy recommendations or changes, it is a notable difference from the current Republican administration in the United States.

Despite the air of doubt and rejection about climate science that has been a staple of the Republican Party for the last fifty years, the Trump administration warrants some special consideration. Figure 5 below shows a sample of tweets from President Trump that have been posted over the last eight years regarding climate change (Brown, n.d.). According to the curator of the Trump Twitter Archive, roughly 126 of Donald Trump's tweets (either before or during his presidency) imply that global warming is fake (Brown, n.d.). Clearly, President Trump has

taken a stance of skepticism; colder than average weather, which has repeatedly shown to be aligned with the environmental consequences of climate change and overall global warming patterns, appears to indicate to President Trump that climate science is not concrete and correct in its predictions.

***Figure 5.***


During his 2016 presidential campaign, Trump famously called climate change a "hoax" ("Trump," 2018). Following election to the office of the president, Trump has removed climate change from a list of national security threats identified in the National Security Strategy of the United States (Guy, 2018), removed many mentions of climate change from federal websites (Emerson, 2019; Rainey, 2018), sustained his promise to back out of the Paris Agreement, denied the findings of the Fourth National Climate Assessment that occurred under his own administration ("Trump," 2018), and called for the end to numerous Obama-era climate programs (e.g. Climate Action Program (Thorbecke, 2017), Clean Power Program (Wheeler, 2018), etc.). More recently, President Trump has called for an overhaul of the enforcement of the

Endangered Species act that was widely criticized for catering to economic interests rather than environmental ones. The New York Times reports that "the changes would also make it more difficult for regulators to factor in the effects of climate change on wildlife when making those decisions because those threats tend to be decades away, not immediate" (Friedman, 2019b). President Trump also has appointed two heads to the Environmental Protection Agency. The first, Scott Pruitt, has denied the link between human activity and climate change and had sued the EPA multiple times prior to taking office (Diamond, Watkins, & Summers, 2018). The second, Andrew Wheeler, is a former coal industry lobbyist who has pursued heavy environmental deregulation (Friedman, 2019a).

The United States represents a sharp departure from the cases of Sweden and Austria, where the climate change denialism is either absent or a clear minority. The United States, however, is operating under a president and political situation that has fostered rather outright climate change denialism for public officials that goes about as far as one can without calling science entirely fictionalized. President Trump is not as radically anti-climate change mitigation as some politicians, such as Senator Jim Inhofe (R-OK) who brought a snowball to the Senate floor in 2015 to "prove" that climate change is a hoax (Bump, 2015), but his skepticism and deterioration of mitigation efforts demonstrates an established, entrenched, and politically powerful climate change denialist movement exists within the United States and provides a home for those citizens who hold anti-mitigation opinions. Not only is public opinion less unanimously in favor of climate change policy in the United States than the other two cases, but climate change denialism is also far more common and, crucially, has the support of one of the major political parties. Ultimately, this case provides strong support for both H1 and H2, which posit that the lack of public favor for climate policy and the existence of a politically powerful

denialist movement will be associated with poor mitigation performance like we observe in the United States.

Unlike Sweden and Austria, a Google search for climate change denial in the United States [search: “climate change denial united states”] returns numerous results, mostly in the form of webpages dedicated to debunking climate science. In a study by Cody et al. (2012) on public opinion of climate change on Twitter, they found that words such as “deny”, “denial”, and “deniers” were used more often in tweets that also contained the word “climate” in the United States. The study did not specify whether these tweets were positive or negative in connotation, but it does support the notion that climate change denial is a much more salient aspect of United States politics than the other countries examined thus far. Brulle, Carmichael, and Jenkins (2012) found that elite cues were the most important factor in public opinion on climate change in the United States. When Democrats and Republicans diverged on the issue (which has only become more commonplace), the public followed suit. This has massive implications for climate policy demand in the United States. As we have already seen, there is a sizable subset of the American public that is unconvinced about the threat of climate change and the role that human actions have on climatic patterns. This is combined with a climate change denialist sentiment that is well-supported by a politically powerful party (and president) that has an ability to sway the conversation with elite cues. While I am not suggesting that most Americans (or even the majority of Republicans), fall under the category of climate change denialism, there is clearly far more skepticism, rejection, and hostility accepted towards climate science in the United States than in Sweden or Austria. The liberal Democrats who are trying to tackle climate change with increasing fervor will likely face high opposition and have their efforts stymied. The level of

demand for climate change mitigation is far more balanced with the demand for less mitigation in the United States than Sweden or Austria, providing support for H3.

**Economic Influencers**

Of the three economically developed cases, the United States is ranked freest on the Heritage Foundation's Freedom Index (2019c). Their score on Business Freedom places them among the top cohort of freedom, along with Sweden. The United States' score on Business Freedom is mainly docked for minimum wage laws, but the Heritage Foundation also argues that "subsidies for agriculture, health care, green energy, and corporate welfare continue to add billions of dollars per year to the U.S. national debt" (2019c). However, the foundation praises the United States for the "delay or withdrawal of 2,253 pending regulatory actions since January 2017" (Heritage Foundation, 2019c). Although it does not specify which regulations were not implemented, this provides early indications that the United States has a stronger laissez-faire sentiment than we have seen in Sweden or Austria.

The 2014 IEA report on the United States[16] praises the efforts made to enhance energy security in the country, but it seems to come at the price of renewable expansion. As briefly

[16] The IEA report for the United States offers a less complete, current picture than for either Sweden or Austria. Although both Austria and the United States' reports are from 2014, the United States 2016 election altered the administration drastically. While the Obama administration was not without its faults on climate change policy, it is hard to imagine a more striking contrast than the change from the Obama administration (which was frequently criticized for being far too liberal) and the Trump administration (which is often criticized for being far too conservative). During the same time period, Austria saw the grand coalition between its two major parties (one left-leaning, one right-leaning) dissolve and the more conservative party take control with a different coalition. While this may make Austria's IEA report seem equally as antiquated as the United States, there are four primary reasons that this is untrue: (1) the second largest represented party in Austria's legislature is still the major left-leaning party, (2) the new coalition in Austria has only been in power since 2018, which simply means it has not had a chance to alter as much, (3) the European Union has a large stabilizing influence on environmental policy, which the United States is obviously not subject to, and (4) climate change policy is not as much of an acute partisan issue outside the United States. I will still discuss the IEA report for the United States, but with the caveat that it omits many changes that have occurred under the most recent administration.

noted, GHG emissions in the United States have fallen in recent years largely due to the shift away from coal's dominance and towards natural gas production. Coal is a heavy emitter and natural gas in undoubtedly "cleaner" burning fuel. However, natural gas comes with high environmental consequences of its own. Hydraulic fracturing is one of the common techniques used to extract natural gas, but its environmental impact is very controversial. The IEA (2014b) explains the issue as follows:

> *"…greater volumes of associated gas as a by-product of oil production are being flared as there is little incentive to market the associated gas or build and upgrade the necessary infrastructure needed to transport it… Water use also presents a problem as shale gas production may consume large volumes of water. Wastewater, if not properly treated, can threaten supplies of drinking water. As more and more areas of the United States are opened up to exploration and production, public concern about the environmental effects on water resources as well as road use/degradation, local traffic, ecosystems and urban disruption is likely to grow."*

Despite the consequences of natural gas extraction, it has continued to boom as an energy source and renewables still account for a very insignificant proportion of energy in the United States. Just 7.4 percent of total primary energy supply came from renewables as of 2016, while coal, oil, and natural gas supply 15.8 percent, 36.4 percent, and 30.2 percent, respectively (World Energy Balances, 2018). In 2013, the IEA member country average percentage of energy supplied by renewables was 22.3 percent, and the United States was (and is) underperforming significantly at just 6.4 percent (International Energy Agency, 2014b). With falling natural gas prices from domestic production, renewables will likely have slow growth in the United States (despite their prices falling also) without a broad initiative.

The preeminent takeaway from the IEA report is that the United States has no unified energy policy by design. The federal government sets targets and goals that are nonbinding for states; for example, under the Obama administration the United States set a goal to double renewable energy production by 2020 (versus 2012 levels), but the federal government has no enforcement mechanism to coerce states to comply. While the United States has successfully imposed regulations in certain industries to try to reduce emissions (e.g. fuel economy standards for vehicles), it is clear from the IEA report that their attempts at regulation are lackluster compared to our previous cases. Most attempts to increase renewable energy production in the United States come from tax credit programs. One of the major mechanisms to encourage renewable production is state-level renewable portfolio standards (RPS). As of 2019, 29 states and Washington, D.C. have adopted an RPS, and eight states have made goals to increase renewable energy ("State Renewable Portfolio," 2019). However, some states have since looked to scale back their RPS to cut costs and the specific policies in each state can be quite variable, if they exist at all ("State Renewable Portfolio," 2019).

Additionally, energy is taxed very little in the United States versus other member countries of the IEA. There is a federal-level gas tax, but it is very modest in comparison to other countries. The IEA reports that "[the United States] levels of gasoline and diesel taxes are among the lowest in the IEA, and gasoline is considerably cheaper in the United States than in any other member country" (2014b). Similarly, electricity prices in the United States are very low compared to OECD countries and there are low taxes on energy consumption. For example, industry faces the lowest electricity prices in the United States versus other OECD countries and households face the second lowest electricity prices, undoubtedly because they are the only country that has no national tax rate on electricity consumption. Ultimately, the delegation of

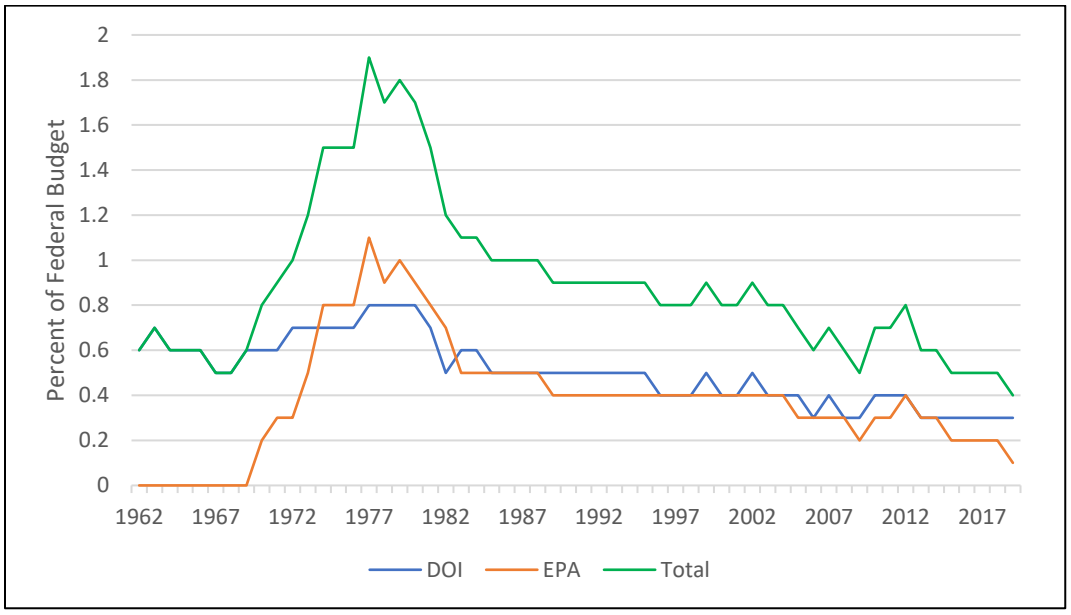
energy policy largely to the states allows for extreme variation within the United States and a prioritization of lower energy prices over sustainable sourcing policies. Consistent deregulation of the energy industry and continued prioritization of fossil fuel expansion in the United States demonstrates the laissez-faire attitude with regards to energy in the United States. Furthermore, with many regulations on fossil fuels or incentive programs for renewable energy left to state-level decisions, it is likely that any attempts at meaningful national policy movements to mitigate climate change will be met with strong opposition and unable to come to fruition (e.g. the American Clean Energy and Security Act of 2009 or Green New Deal of 2019, which both died in the Senate (Roberts, 2019)). Consequently, the United States case of laissez-faire dominance provides support for H4.

The budget for the United States over time has significantly reduced the proportion of its spending dedicated to agencies with jurisdiction over environmental matters. Two of the main agencies who oversee environmental issues are the Department of the Interior (DOI)[17] and the EPA. Looking at the individual and combined budgets of these two agencies in Figure 6, we can see the overall downward trend since the budgets peaked in the late 1970s ("Budget of the U.S. Government," 2018). There was a slight uptick in EPA funding under President Obama's first term, but it has since fallen dramatically to the lowest since the agency's inception in 1970. Furthermore, President Trump's proposed 2020 budget aims to cut $2.0 billion from the DOI and $2.7 billion from the EPA (Rabinowitz & Uhrmacher, 2019). Though Congress has been reluctant to slash those budgets as deeply as Trump desires (Rabinowitz & Uhrmacher, 2019),

[17] However, the DOI is also involved in some activities related to land and energy development that may exacerbate climate change. They were included for their role in land preservation. Additonally, with incredibly small budgets for both the EPA and DOI relative to the size of the federal budget, the possibility of slight over-exaggeration of the benefits of the DOI to climate change related issues is unlikely to alter the results.

any cuts to these already infinitesimal budgets (particularly the EPA's) will be majorly harmful in future efforts to mitigate climate change. Again, the incredibly low and notably falling prioritization of environmental protection in the United States budget highlights the laissez-faire attitudes towards environmental issues. Such small budgets will almost certainly come with decreased regulatory power, leaving these agencies much less able to help combat climate change and reign in the expansion of fossil fuels relative to renewables; thus, I find further support for H4.

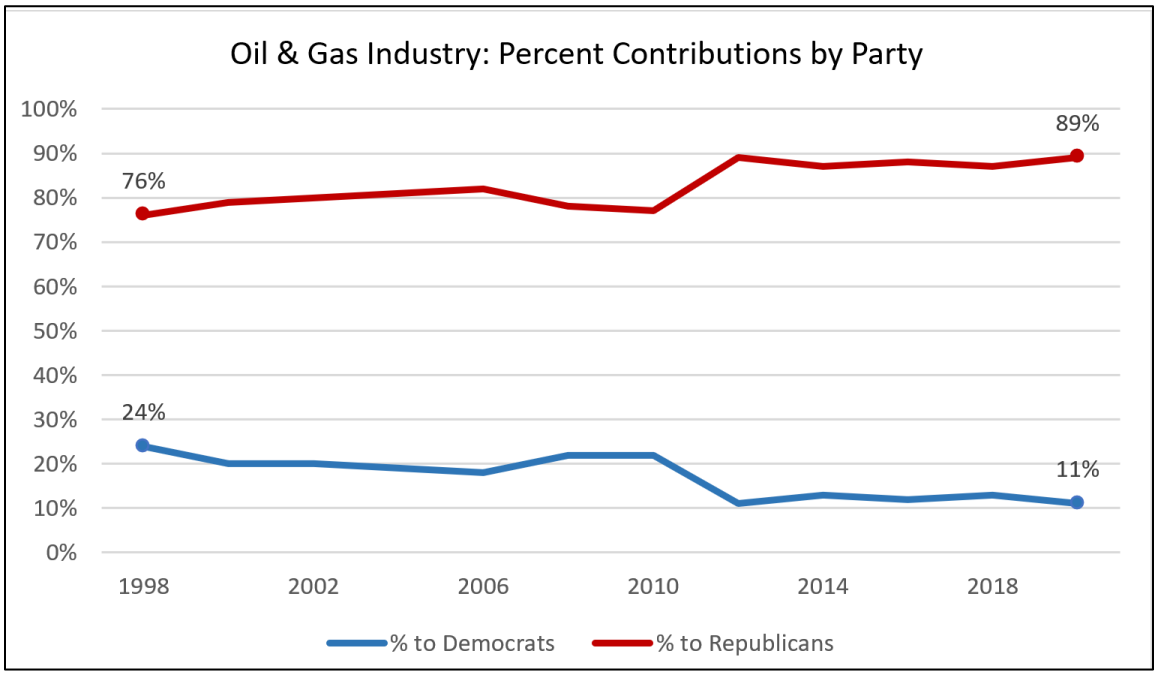
***Figure 6.***




The fossil fuel industry in the United States is much larger than Austria or Sweden. As of 2017, fossil fuels made up roughly 10.4 percent of the country's export value, making them the fourth largest export sector of the economy (Observatory of Economic Complexity, n.d.b). As a single product, refined petroleum is the number one export from the United States. Not only are fossil fuels a major player in the country's economy, they wield large political influence. As shown in Figure 7 below, the oil and gas industry has played a significant role in substantiating the partisan divide on environmental issues through campaign contributions ("Oil & Gas," n.d.).

According to the independent research organization OpenSecrets, the Republican Party has consistently enjoyed vast donations from the oil and gas industry in exchange for a continued platform of deregulation and support for traditional energy sources ("Oil & Gas," n.d.).

***Figure 7.***




Since 2012, the mining industry (led mostly by coal) has been even more partisan than oil and gas, contributing over 90 percent of its donations to Republicans (Sultan, 2017). These donations appear to have paid off, for President Trump has made the revitalization of coal one of his most famous promises. Although coal continues to struggle to be competitive and avoid obsoletion, about 1,000 new jobs were created in the industry since President Trump's election (Farley, 2017). Not only are these traditional fuel industries wealthy, they have successfully wielded that wealth to their political advantage, which provides support for H5.

The recent restructuring of the enforcement process for the Endangered Species Act embodies the debate between economic and environmental interests in the United States. As

previously mentioned, President Trump has elected to alter the enforcement of the act to make it harder to factor climate change into decision making about wildlife. Perhaps even more significantly, however, is that for the first time "regulators would be allowed to conduct economic assessments — for instance, estimating lost revenue from a prohibition on logging in a critical habitat — when deciding whether a species warrants protection" (Friedman, 2019b). This is a monumental victory for Republicans who have long sought to reduce what they feel are overly restrictive burdens on industry. The New York Times asserts that "over all, the revised rules appear very likely to clear the way for new mining, oil and gas drilling, and development in areas where protected species live" (Friedman, 2019b). Presently, the United States is on a clear path away from the prioritization of climate change and environmental damage mitigation and towards a deregulated, laissez-faire environmental policy future that stands to benefit traditional fuel interests, providing further support for H5.

**Geographic Vulnerability**

Relative to the other economically developed countries in this study, the United States has a much more diverse geography simply by virtue of its size and sprawl. Spanning over half of the northern hemisphere and roughly half of the western hemisphere (non-contiguously), it is unsurprising that the country faces a wide variety of risks associated with climate change, sometimes standing in contrast to one another. For example, the northern United States is expected to see temperatures rise dramatically, while the southern United States may remain relatively unaffected. In contrast, Alaska has seen sea level fall, while the states bordering the Gulf of Mexico have seen a great increase in sea level that is expected to continue as glaciers melt (Climate Change Indicators, 2016).

According to the World Risk Report index (2017), the United States is rated as the 46th least vulnerable country to natural disasters. Like Austria, they are ranked medium in exposure to natural disasters. The United States ranks worse than both Sweden and Austria in both the coping and adaptive capabilities subcategories of the WRR (though it is still in the top performing cohort for these categories overall). Interestingly, the World Risk Report index seems to show evidence for the exact opposite of H8. In the cases of Sweden, Austria, and the United States, as adaptability to disaster decreases, so does willingness to mitigate climate change. Possible reasons for this relationship could be that adaptability is correlated with an increased proclivity to plan for natural disasters, or that countries who have chosen to mitigate climate change have made changes that inadvertently aid adaptability in disasters. Further research on this relationship will be conducted in the economically developing cases, but the three cases examined so far do not provide support for H8.

Additionally, the United States does not offer support for both H6 and H7. Using ArcGIS Pro, I performed an analysis of counties in the United States that are susceptible to drought[18] and/or coastal flooding[19] using geographic data from the U.S. Geological Survey (USGS), the

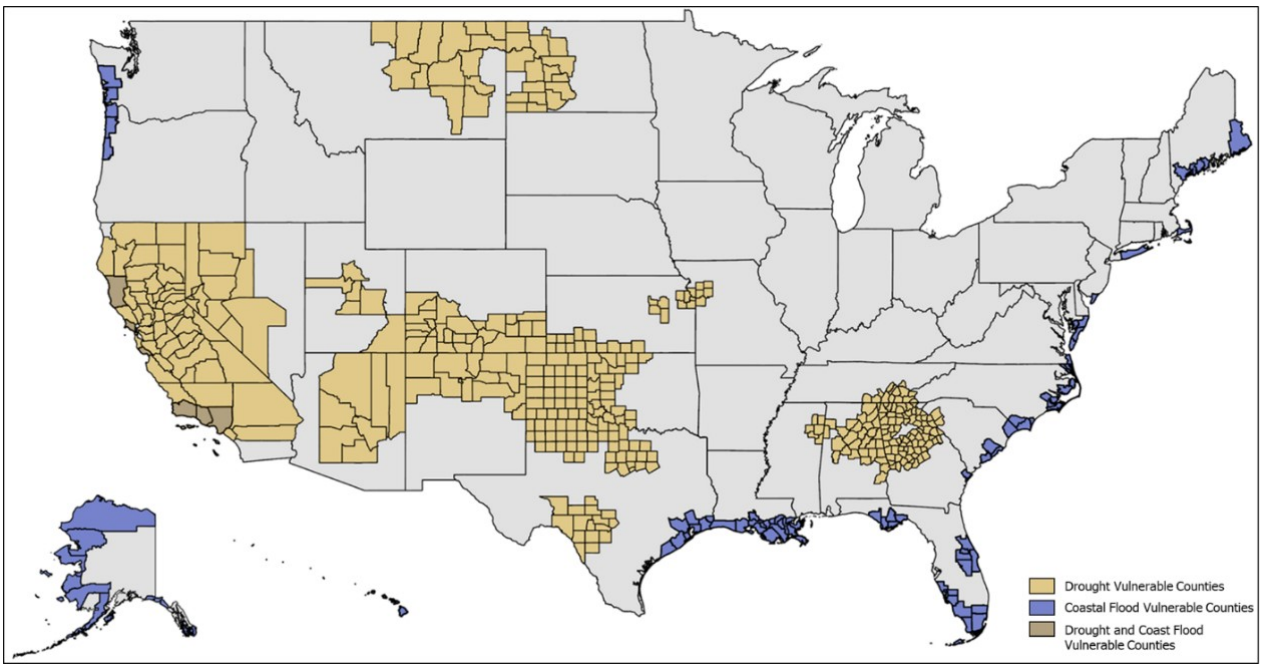
[18] Drought data was obtained from the United States Drought Monitor published by the U.S. Department of Agriculture. The subset of data I elected to use ranged from January 1, 2014 to January 1, 2019 and included only counties that had experienced at least four weeks (not required to be consecutive) of Exceptional (D4) drought. Using the last five years of data both provides current information on drought patterns and captures places with recurring drought issues. D4 droughts represent the most severe type of drought recorded by the Drought Monitor and was used to proxy counties that are most likely to experience at least some level of drought as temperatures rise, given that they experience such extreme drought under current conditions. A resulting 422 counties are identified as vulnerable to drought.

[19] Elevation data was obtained from the U.S. Geological Survey (USGS) and the National Geospatial-Intelligence Agency's (NGA) Global Multi-resolution Terrain Elevation Data 2010 (GMTED2010). This dataset grids the surface of the globe by latitude and longitude lines where each grid cell is 1° latitude by 1° longitude (roughly 110 meters by 110 meters). After clipping the extent of the data to just the United States, I queried the counties that had any portion of their land area five meters or less in average elevation. This limit was chosen by adding the high emissions scenario prediction for sea level rise by 2100 of roughly 1 meter and a low-grade storm surge of roughly 4 meters (IPCC 2014; "Storm Surge Overview" n.d.). The addition of the storm surge was included to account for an influx of flood water along the coast that would cause flooding, not just a gradual increase in sea level. The storm surge size was selected to be a low-grade surge in order to avoid egregious dramatization of coastal flooding while

National Geospatial-Intelligence Agency's (NGA) Global Multi-resolution Terrain Elevation Data 2010 (GMTED2010), and the United States Drought Monitor published by the U.S. Department of Agriculture. The 515 counties highlighted in Figure 8 identify counties that are susceptible to drought, coastal flooding, or both. This means that roughly 16 percent of counties in the United States are very likely to be afflicted by the climatic variation associated with climate change. The areas that are most vulnerable to coastal flooding are highly associated with areas identified by the EPA and National Oceanic and Atmospheric Administration (NOAA) as areas that have experienced upwards of eight inches of sea level rise from the period 1960 to 2015. This suggests that large parts of the Gulf Coast and Eastern United States will be highly vulnerable to flooding as the sea level rises. Furthermore, the vast majority of the United States (with the exception of parts of the South like Alabama and Mississippi), has seen anywhere from about 0.5°C to 2.0°C increase in the rate of temperature change (Climate Change Indicators, 2016). Forty-one states have seen the rate of temperature change increase from 1901 to 2015 in every single county, while only two have had no counties with warming (Climate Change Indicators, 2016). Evidence of temperature change from global warming affecting the United States is abundant.

still accounting for its occurrence. Finally, I removed all counties that were not adjacent to a body of water. A resulting 97 counties are identified as vulnerable to coastal flooding.

***Figure 8.***




*Map generated by Katie Nissen (2019) using data from the USGS, NGA, and USDA.*

In addition to susceptibility to drought and coastal flooding, there have been a myriad of other climatic events associated with the potential effects of climate change that have impacted the United States. The northeastern and Great Lakes portions of the country have seen significant increases in the magnitude of river flooding since 1965 (Climate Change Indicators, 2016). The power of storms in the North Atlantic have risen sharply since the mid-1970s in conjunction with sea surface temperature increases (Climate Change Indicators, 2016). The average number of flood events per year in major cities has skyrocketed since the 1950s; for example, cities like Annapolis, Maryland, Washington D.C., Wilmington, North Carolina, and Boston, Massachusetts saw the number of average flood events roughly double just from the period 1990-2009 to 2010-2015 (Climate Change Indicators, 2016). Although there is some lack of consensus about whether the frequency of hurricane events will be increased in the Atlantic due to climate change (King, 2011), research has already linked the rising severity of the flooding and timing of hurricanes (e.g. 2017 Hurricane Harvey in Houston, Texas) to the effects of global

warming (Lopez, 2017; Stone, 2013). Finally, according to a report published by the Governor of California, "climate change has created a new wildfire reality for California. The state's fire season is now almost year-round. More than 25 million acres of California wildlands are classified under very high or extreme fire threat. Approximately 25 percent of the state's population – 11 million people – lives in that high-risk area. Wildfires are not only more frequent but far more devastating" (Office of Governor Newsom, 2019).

The United States is poised to feel a multitude of effects from climate change. The geographic variability of the country means that different effects will be felt regionally (e.g. droughts in the southwest, floods in the northeast), but the predicted effects of climate change are likely to alter climatic patterns in nearly every part of the country. Despite this vulnerability, the United States has not taken ambitious mitigation efforts, which does not provide support for H6 or H7. The explanation for this lack of support for mitigation may simply be that the cultural and economic factors weigh too heavily into the United States' case to make the geographic concerns relevant. In other words, the culture of climate change skepticism and favor shown towards laissez-faire environmental policy may simply outweigh geographic factors. Additionally, regional and seasonal variation may be undermining the overall increase in the severity of climatic events. If one region of the country experiences an unusually cold winter while another region deals with wildfires, it may be hard to come to a unified concern about climatic matters, though both cases could be rooted in the effects of climate change.

Like Austria and Sweden, the United States is not particularly dependent upon its agricultural sector. Agriculture made up just 0.9 percent of the country's GDP as of 2017 (World Factbook, 2019b). However, over 40 percent of the land in the United States is dedicated to agricultural activities (World Factbook, 2019b); additionally, combining vegetable and animal

product exports yields over 7 percent of the export value of the country, which would make agricultural products the fifth largest export for the United States (Observatory of Economic Complexity, n.d.b). Although I would hardly assert that this shows "dependence" upon the agricultural sector, it does indicate far more "dependence" than either Sweden or Austria. Consequently, we would expect to see the United States trying to do more to mitigate climate change, not less. Therefore, this case does not provide support for H9.

**Conclusion**

The United States is a vastly different case than either Sweden or Austria. While moderate differences between the first two cases did translate into mitigation differences, the United States provides strong evidence that cultural and economic factors can alter mitigation preferences of a country. Public opinion in the United States is far more balanced between economic and environmental interests. When combined with climate change denialism within the population and in one of the two dominant political parties, this leads to decreased demand for climate change mitigation and the resulting poor mitigation performance. Furthermore, the energy sector is incredible laissez-faire and politically powerful, paving the way for less mitigation. Finally, geographical vulnerability continues to play a counterintuitive role in the cases. The United States has numerous reasons to be concerned about the effects of climate change on weather events but does not display increased mitigation as a result. Further research should examine how geographic vulnerability to climate change impacts policymaking. Although evidence shows that experiencing a natural disaster has an adverse effect on mental health, we do not truly understand how these events impact our day-to-day anxieties, desire for preparedness, and whether we are linking our fears about natural disasters to climate change, all of which would be important for driving meaningful policy changes (Koerth-Baker, 2019). These

questions are paramount to understanding how geography drives climate change mitigation efforts. Ultimately, the United States ultimately provides strong support for H1 through H5, inclusive, but appears to negate H6 through H9.

## Discussion and Conclusion

Ultimately, the cases of Sweden, Austria, and the United States appear to demonstrate overall support for the positive effects of favorable public opinion, decreased denialism, increased climate policy demand, decreased laissez-faire economies, and decreased power of the fossil fuel sector on mitigation commitment. A breakdown of the findings for each hypothesis by country is shown in Figure 9, where support for the hypothesis is denoted by a check mark.

***Figure 9.***

| | H1: Public Opinion | H2: Denialism | H3: Demand | H4: Regulation | H5: Political Power | H6: Drought | H7: Flood | H8: Adaptability | H9: Agriculture |
|---|---|---|---|---|---|---|---|---|---|
| Sweden | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | |
| Austria | ✓ | ✓ | ✓ | ✓ | ✓ | | | ✓ | |
| USA | ✓ | ✓ | ✓ | ✓ | ✓ | | | | |

Cultural and economic attributes appear to be the largest players of overall mitigation commitment. In particular, the United States case demonstrates the profound ability of widespread climate change denialism to inhibit the growth of mitigation efforts. Furthermore, the different regulatory practices of Sweden (i.e. relatively high regulation) versus the United States (i.e. laissez-faire) indicates the power of the fossil fuel industry to sway political outcomes. The difference in how intertwined the fossil fuel industry is with the government in Sweden and Austria demonstrates the ability of a politically powerful fossil fuel industry to alter mitigation

efforts in otherwise very similar countries. Geographic vulnerability effects are less clear in these cases, likely because of overall small variation within economically developed countries – each of these cases is readily able to adapt to climatic changes despite minor differences in exposure and adaptability. While Sweden showed support for the hypotheses that drought and flood exposure should induce greater mitigation efforts, both Austria and the United States displayed less mitigation than we would expect based on their vulnerability to climate change effects. Perhaps most notably, there was an inverted relationship between adaptability and mitigation commitment relative to what was expected in H8. As adaptability scores worsened on the World Risk Report, countries became less committed to mitigating climate change. This result is counterintuitive to the findings of past literature, suggesting that more research is needed into the effects of geographic vulnerability on climate change mitigation commitment.

Ultimately, this research contributes to the literature on climate change policymaking and provides insights into the domestic factors that influence international climate change decisions. Future research into this subject should first and foremost include a more diverse array of cases. Potentially promising candidates for a case study of emerging economies are Morocco, China, and Russia, representing high, moderate, and low mitigation efforts, respectively. Including cases that have more socioeconomic, political, and geographic diversity in future research would help parse out the relationships proposed in the hypotheses outlined here and broaden the explanatory power of these theories. But, this research into economically developed cases contributes to the literature by providing a framework for future analyses and as a first effort at comprehensively examining multiple causal factors across levels of climate change mitigation commitment. The results of this analysis certainly suggest that if we hope to see meaningful action on climate change mitigation, countries need to have a population that believes in climate change and

supports mitigation efforts, and an economy that is disentangled from fossil fuel interests that inhibit meaningful progress on improving emissions reduction efforts.

References

Abidoye, B., & Odusola, A. (2015). Climate change and economic growth in Africa: An econometric analysis. *Journal of African Economies*, 24(2), 277-301. doi:10.1093/jae/eju033

Águeda Corneloup, I., & Mol, A. (2014). Small island developing states and international climate change negotiations: the power of moral "leadership*." International Environmental Agreements: Politics, Law & Economics*, 14(3), 281–297. https://doi-org.ezproxy.tcu.edu/10.1007/s10784-013-9227-0

Anderson, C., & Cowell, A. (2018, July 19). Heat Wave Scorches Sweden as Wildfires Rage in the Arctic Circle. Retrieved June 9, 2019, from https://www.nytimes.com/2018/07/19/world/europe/heat-wave-sweden-fires.html

Apparicio, S., & Sauer, N. (2019, February 06). Which countries have not ratified the Paris climate agreement? Retrieved April 12, 2019, from https://www.climatechangenews.com/2018/07/12/countries-yet-ratify-paris-agreement/

Arcanjo, M. (2018, July 24). Learning from the "Least Vulnerable"? Climate Adaptation in the Nordic Countries. Retrieved June 8, 2019, from http://climate.org/learning-from-the-least-vulnerable-climate-adaptation-in-the-nordic-countries/

Armitage, K. (2005). State of Denial: The United States and the politics of global warming. *Globalizations,* 2(3), 417–427. https://doi-org.ezproxy.tcu.edu/10.1080/14747730500368064

Assessing flood risk management: Austria. (n.d.). Retrieved July 13, 2019, from https://econadapt-toolbox.eu/node/52

Austria Exports by Product Sub-Chapter in US Dollars - Mineral fuels, mineral oils and products of their distillation - Yearly. (2018, January 20). Retrieved July 10, 2019, from https://www.indexmundi.com/trade/exports/?country=at&chapter=27

Austria Land Use. (2018, January 20). *IndexMundi*. Retrieved July 10, 2019, from https://www.indexmundi.com/austria/land_use.html

Barron, L. (2018, March 01). The EPA's Website After a Year of Climate Change Censorship. Retrieved April 8, 2019, from http://time.com/5075265/epa-website-climate-change-censorship/

Bayar, M., & Kotelis, A. (2014). Democratic Peace or Hegemonic Stability? The Imia/Kardak Case. *Turkish Studies*, 15(2), 242–257. https://doi-org.ezproxy.tcu.edu/10.1080/14683849.2014.933948

Bell, B. (2014, September 17). Austria's Alps hit by climate change. Retrieved July 13, 2019, from https://www.bbc.com/news/world-europe-29245606

Bradsher, K., & Friedman, L. (2017, December 19). China Unveils an Ambitious Plan to Curb Climate Change Emissions. Retrieved April 12, 2019, from https://www.nytimes.com/2017/12/19/climate/china-carbon-market-climate-change-emissions.html

BRICS information portal. (n.d.). Retrieved April 13, 2019, from http://infobrics.org/page/history-of-brics/

Brito, C. (2019, March 25). Teen climate activist Greta Thunberg nominated for Nobel Peace Prize. Retrieved June 10, 2019, from https://www.cbsnews.com/news/nobel-peace-prize-greta-thunberg-youth-climate-strike/

Brown, B. (n.d.). Trump Twitter Archive. Retrieved August 2, 2019, from http://trumptwitterarchive.com/

Brulle, R. J., Carmichael, J., & Jenkins, J. C. (2012). Shifting public opinion on climate change: An empirical assessment of factors influencing concern over climate change in the U.S., 2002-2010. *Climatic Change,* 114(2), 169-188. doi:http://dx.doi.org.ezproxy.tcu.edu/10.1007/s10584-012-0403-y

Budget of the U.S. Government, Fiscal Year 2019. (2018, February 12). Historical Tables. Retrieved August 10, 2019, from https://www.govinfo.gov/features/budget-fy2019

Bump, P. (2015, February 26). Jim Inhofe's snowball has disproven climate change once and for all. Retrieved August 5, 2019, from https://www.washingtonpost.com/news/the-fix/wp/2015/02/26/jim-inhofes-snowball-has-disproven-climate-change-once-and-for-all/

Burck, J., Hagen, U., Marten, F., Höhne, N. & Bals, C. (2018). *The Climate Change Performance Index 2019*. Retrieved from: https://www.climate-change-performance-index.org/the-climate-change-performance-index-2019.

Bustos, M. C. (2018). What Shapes Colombia's Foreign Position on Climate Change? *Colombia Internacional*, 94, 27–51. https://doi-org.ezproxy.tcu.edu/10.7440/colombiaint94.2018.02

Carrington, D. (2020, March 17). Air pollution likely to increase coronavirus death rate, warn experts. Retrieved April 27, 2020, from

https://www.theguardian.com/environment/2020/mar/17/air-pollution-likely-to-increase-coronavirus-death-rate-warn-experts

China issues long-awaited 1st draft of rules for carbon emissions trading (2019, April 4). *Times of India*. Retrieved April 5, 2019, from https://timesofindia.indiatimes.com/world/china/china-issues-long-awaited-1st-draft-of-rules-for-carbon-emissions-trading/articleshow/68716804.cms

Choi, S. (2018). The Impact of US Financial Uncertainty Shocks on Emerging Market Economies: An International Credit Channel. *Open Economies Review, 29(1),* 89–118. Retrieved from http://search.ebscohost.com.ezproxy.tcu.edu/login.aspx?direct=true&AuthType=cookie,ip,uid&db=eoh&AN=1697212&site=ehost-live

Climate Change in the Maldives. (2010, April 6). *The World Bank*. Retrieved March 21, 2019, from http://www.worldbank.org/en/news/feature/2010/04/06/climate-change-in-the-maldives.

Climate Change Indicators: Weather and Climate. (2016, August 2). United States Environmental Protection Agency. Retrieved August 1, 2019, from https://www.epa.gov/climate-indicators/weather-climate

Coal mining. (2018, January 09). *World Coal Association*. Retrieved March 24, 2019, from https://www.worldcoal.org/coal/coal-mining

Cody, E., Reagan, A., Mitchell, L., Dodds, P., & Danforth, C. (2015). Climate change sentiment on twitter: An unsolicited public opinion poll. *Plos One*, 10(8), e0136092-e0136092. doi:10.1371/journal.pone.0136092

Complying with President Trump's Executive Order on Energy Independence. (2018, June 18). Retrieved April 14, 2019, from https://www.epa.gov/energy-independence

Cooper, S., Hawkins, D., Jacoby, W., & Nielson, D. (2008). Yielding Sovereignty to International Institutions: Bringing System Structure Back In. *International Studies Review*, 10(3), 501–524. https://doi-org.ezproxy.tcu.edu/10.1111/j.1468-2486.2008.00802.x

"CO2 emissions (kt)." World Bank Open Data. Accessed August 3, 2019, from https://data.worldbank.org/indicator/EN.ATM.CO2E.KT?end=2014&locations=US&start=1970.

Davenport, C. (2015, December 01). A Change in Tone for Vladimir Putin's Climate Change Pledges. Retrieved April 12, 2019, from https://www.nytimes.com/interactive/projects/cp/climate/2015-paris-climate-talks/vladimir-putin-climate-change-pledges-russia

Dell, M., Jones, B. F., & Olken, B. A. (2014). What do we learn from the weather? the new Climate–Economy literature. *Journal of Economic Literature,* 52(3), 740-798. doi:10.1257/jel.52.3.740

Dennis, B., & Eilperin, J. (2017, January 25). Trump administration backs off plan to scrub climate pages from EPA website. Retrieved April 8, 2019, from https://www.washingtonpost.com/news/energy-environment/wp/2017/01/25/trump-administration-backs-off-plan-to-scrub-climate-pages-from-epa-website/?utm_term=.99b975bb366e

Depledge, J. (2008). Striving for No: Saudi Arabia in the Climate Change Regime. *Global Environmental Politics*, 8(4), 9–35. https://doi-org.ezproxy.tcu.edu/10.1162/glep.2008.8.4.9

Designierter Bundesparteiobmann. (n.d.). Retrieved July 4, 2019, from https://www.fpoe.at/team/die-fpoe/bundesparteiobmann/

Diamond, J., Watkins, E., & Summers, J. (2018, July 05). EPA chief Scott Pruitt resigns amid ethics scandals. Retrieved August 10, 2019, from https://www.cnn.com/2018/07/05/politics/scott-pruitt-epa-resigns/index.html

DIE JUGEND ERNST NEHMEN, KLIMAKATASTROPHE VERHINDERN. (n.d.). Retrieved July 4, 2019, from https://partei.jetzt/jugend-ernst-nehmen-klimakatastrophe-verhindern/

Domonoske, C. (2016, February 04). Morocco Unveils A Massive Solar Power Plant In The Sahara. Retrieved April 8, 2019, from https://www.npr.org/sections/thetwo-way/2016/02/04/465568055/morocco-unveils-a-massive-solar-power-plant-in-the-sahara

Emerson, S. (2019, July 22). Under Trump, 26% of Climate Change References Have Vanished From .Gov Sites. Retrieved August 2, 2019, from https://www.vice.com/en_us/article/kzmmwe/under-trump-26-of-climate-change-references-have-vanished-from-gov-sites

Energy and Environment. (n.d.). Retrieved April 12, 2019, from https://www.promiseskept.com/achievement/overview/energy-and-environment/#

Energy consumption in Austria. (n.d.). Retrieved April 11, 2019, from https://www.worlddata.info/europe/austria/energy-consumption.php

European Commission. (2008a). *Special Eurobarometer 300: European's Attitudes Towards Climate Change – Austria*. Luxembourg: Office for Official Publications of the European Communities.

European Commission. (2008b). *Special Eurobarometer 300: European's Attitudes Towards Climate Change - Sweden.* Luxembourg: Office for Official Publications of the European Communities.

European Commission. (2017a). *Special Eurobarometer 459: Climate Change - Austria.* Luxembourg: Office for Official Publications of the European Communities.

European Commission. (2017b). *Special Eurobarometer 459: Climate Change - Sweden.* Luxembourg: Office for Official Publications of the European Communities.

European Commission. (2018a). *Special Eurobarometer 479: Future of Europe – Austria.* Luxembourg: Office for Official Publications of the European Communities.

European Commission. (2018b). *Special Eurobarometer 479: Future of Europe*. Luxembourg: Office for Official Publications of the European Communities.

European Commission. (2018c). *Special Eurobarometer 479: Future of Europe – Sweden*. Luxembourg: Office for Official Publications of the European Communities.

Farand, C. (2019, May 17). Denial and Dampening Ambition: Where do Europe's Right-Wing Populist Parties Stand on Climate Change? Retrieved July 8, 2018, from https://www.desmog.co.uk/2019/05/16/right-wing-populist-parties-climate-science-denial-european-parliament-elections#Freedom Party

Farley, R. (2017, June 12). Trump's Coal Spin. Retrieved August 12, 2019, from https://www.factcheck.org/2017/06/trumps-coal-spin

Federal Ministry of Finance – Austria. (2018). Budget 2018 at a glance. Retrieved July 10, 2019, from https://english.bmf.gv.at/budget-economic-policy/Federal-Budget-2018-2019.html.

Federal Ministry of Finance – Austria. (2019). Budget 2019 at a glance. Retrieved July 10, 2019, from https://english.bmf.gv.at/budget-economic-policy/Budget_2019_at_a_glance.pdf?6fr4yr.

Friedman, L. (2019a, January 16). Andrew Wheeler, at E.P.A. Confirmation Hearing, Walks a Fine Line on Climate Change. *The New York Times.* Retrieved August 10, 2019, from https://www.nytimes.com/2019/01/16/climate/wheeler-senate-epa-confirmation-hearing.html

Friedman, L. (2019b, August 12). U.S. Significantly Weakens Endangered Species Act. *The New York Times.* Retrieved August 12, 2019, from https://www.nytimes.com/2019/08/12/climate/endangered-species-act-changes.html

Funk, C. (2017, March 22). How much does science knowledge influence views on climate, energy? Retrieved April 14, 2019, from https://www.pewresearch.org/fact-tank/2017/03/22/how-much-does-science-knowledge-influence-peoples-views-on-climate-change-and-energy-issues/

Global Greenhouse Gas Emissions Data. (2017, April 13). Retrieved April 13, 2019, from https://www.epa.gov/ghgemissions/global-greenhouse-gas-emissions-data

Goodliffe, J., & Hawkins, D. (2017). Dependence Networks and the Diffusion of Domestic Political Institutions. *Journal of Conflict Resolution,* 61(4), 903–929. https://doi-org.ezproxy.tcu.edu/10.1177/0022002715596772

Gratton, J. (2019, June 21). The cheapest European destinations to drive through this summer – and where you'll spend the most. Retrieved July 7, 2019, from https://www.thesun.co.uk/motors/9346246/the-cheapest-european-destinations-to-drive-through-this-summer-and-where-youll-spend-the-most/

Green, M. (2019, March 11). Trump proposes slashing EPA budget by 31 percent. Retrieved April 14, 2019, from https://thehill.com/policy/energy-environment/433496-white-house-proposes-dramatic-cuts-to-energy-and-environment

Guy, B. (2018, January 09). Trump Removes Climate Change from U.S. Security Priorities. Retrieved August 2, 2019, from https://www.nrdc.org/experts/brendan-guy/trump-removes-climate-change-us-security-priorities

Hadavi, T. (2019, April 14). The BRICs were supposed to take over the global economy. What happened? Retrieved April 14, 2019, from https://www.cnbc.com/2019/04/11/what-happened-to-brazil-russia-india-and-china-as-the-brics.html

HCStracheFP. (2014, November 20). Der Klimawandel hat immer natürliche Gründe gehabt und ist auch nicht zu verhindern! Daher kann man auch Klima... [Tweet]. Retrieved from https://twitter.com/HCStracheFP/status/535407108691619840.

Heimat, Identität und Umwelt. (n.d). Retrieved July 4, 2019, from https://www.fpoe.at/themen/parteiprogramm/heimat-identitaet-und-umwelt/

Heritage Foundation (Washington, D.C.), & Wall Street Journal (Firm). (2019a). The index of economic freedom. Washington, D.C: Heritage Foundation. Retrieved from https://www.heritage.org/index/country/austria.

Heritage Foundation (Washington, D.C.), & Wall Street Journal (Firm). (2019b). The index of economic freedom. Washington, D.C: Heritage Foundation. Retrieved from https://www.heritage.org/index/country/sweden

Heritage Foundation (Washington, D.C.), & Wall Street Journal (Firm). (2019c). The index of economic freedom. Washington, D.C: Heritage Foundation. Retrieved from https://www.heritage.org/index/country/unitedstates

Huemer, G. (2019). Contact SME2024: Strengthening Crafts & SMEs for the Future of the European Union. SMEunited. Retrieved July 10, 2019, from https://smeunited.eu/admin/storage/smeunited/190701-sme2024.pdf.

Inglehart, R., C. Haerpfer, A. Moreno, C. Welzel, K. Kizilova, J. Diez-Medrano, M. Lagos, P. Norris, E. Ponarin & B. Puranen et al. (eds.). (2014). World Values Survey: Round Six - Country-Pooled Datafile Version: www.worldvaluessurvey.org/WVSDocumentationWV6.jsp. Madrid: JD Systems Institute.

International Energy Agency. (2014a, April 5). *Energy Policies of IEA Countries: Austria 2014 Review*. Retrieved from https://www.iea.org/publications/freepublications/publication/Austria2014.pdf.

International Energy Agency. (2014b). *Energy Policies of IEA Countries: United States 2014 Review.* Retrieved from: https://webstore.iea.org/energy-policies-of-iea-countries-the-united-states-2014-review.

International Energy Agency. (2018, August). *World Energy Balances 2018*. Retrieved from https://webstore.iea.org/download/direct/2263?fileName=World_Energy_Balances_2018_Overview.pdf.

International Energy Agency. (2019, April 9). *Energy Policies of IEA Countries: Sweden 2019 Review.* Retrieved from: https://webstore.iea.org/download/direct/2495?fileName=Energy_Policies_of_IEA_Countries_Sweden_2019_Review.pdf.

IPCC. (2014). Climate change 2014: Impacts, adaptation and vulnerability. Retrieved March 21, 2019, from https://www.ipcc.ch/report/ar5/wg2/.

Jacques, P. J., & Knox, C. C. (2016). Hurricanes and hegemony: A qualitative analysis of micro-level climate change denial discourses. *Environmental Politics,* 25(5), 831–852. https://doi-org.ezproxy.tcu.edu/10.1080/09644016.2016.1189233

Juhola, S., Keskitalo, E. C., & Westerhoff, L. (2011). Understanding the framings of climate change adaptation across multiple scales of governance in Europe. *Environmental Politics,* 20(4), 445–463. https://doi-org.ezproxy.tcu.edu/10.1080/09644016.2011.589571

Kampf gegen den Klimawandel. (n.d.). Retrieved July 4, 2019, from https://www.neos.eu/programm/kampf-gegen-den-klimawandel

K-arkiv. (n.d.). Retrieved June 10, 2019, from https://kristdemokraterna.se/?post_type=politic&politic-categories=k

Karthikheyan, T. C. (2010). Environmental Challenges for Maldives. *South Asian Survey,* 17(2), 343–351. https://doi-org.ezproxy.tcu.edu/10.1177/097152311201700210

Keohane, R. O. (2015). Nominal democracy? Prospects for democratic global governance. *International Journal of Constitutional Law,* 13(2), 343–353. https://doi-org.ezproxy.tcu.edu/10.1093/icon/mov029

Kinacioğlu, M. (2012). "War on Terror" and Hegemony: International Law-Making Regarding Terrorism After 9/11. *International Relations / Uluslararasi Iliskiler,* 8(32), 67–84. Retrieved from http://lib.tcu.edu/PURL/EZproxy_link.asp?url=http://search.ebscohost.com.ezproxy.tcu.edu/login.aspx?direct=true&AuthType=cookie,ip,uid&db=poh&AN=75243608&site=ehost-live

King, B. (2011, August 26). Did global warming cause Irene? Retrieved August 10, 2019, from https://www.politico.com/story/2011/08/did-global-warming-cause-irene-062163

Klima- und Umweltschutz ernst nehmen. (2019, July 1). Retrieved July 4, 2019, from https://www.dieneuevolkspartei.at/Volkspartei-praesentiert-ihr-Klimakonzept

Klimaschutz: Konkrete Projekte statt Klimahysterie gefordert. (2019, July 2). Retrieved July 4, 2019, from https://www.fpoe.at/artikel/klimaschutz-konkrete-projekte-statt-klimahysterie-gefordert/

Klimat och miljö. (n.d.). Retrieved June 10, 2019, from https://moderaterna.se/klimat-och-miljo

Klimat. (n.d.). Retrieved June 10, 2019, from https://www.vansterpartiet.se/politik/klimat/

Klimatet. (n.d.). Retrieved June 10, 2019, from https://www.liberalerna.se/politik/klimatet/

Koerth-Baker, M. (2019, July 25). We Don't Really Know How Stressed Americans Are About Climate. Retrieved July 25, 2019, from https://fivethirtyeight.com/features/we-dont-really-know-how-stressed-americans-are-about-climate/

Lawrence, P., & Wong, D. (2017). Soft law in the Paris Climate Agreement: Strength or weakness? *Review of European Comparative & International Environmental Law,* 26(3), 276–286. https://doi-org.ezproxy.tcu.edu/10.1111/reel.12210

Leiserowitz, A., Maibach, E., Roser-Renouf, C., Rosenthal, S., Cutler, M., & Kotcher, J. (2018, May 8). *Politics & Global Warming, March 2018*. Yale University and George Mason University. New Haven, CT: Yale Program on Climate Change Communication.

Livingston, I. (2019, July 02). After a blistering heat wave boosted by climate change, Europe just notched its hottest June on record. Retrieved July 3, 2019, from https://www.washingtonpost.com/weather/2019/07/02/after-blistering-heat-wave-boosted-by-climate-change-europe-just-notched-its-hottest-june-record/?noredirect=on&utm_term=.c2c960993820

Lopez, G. (2017, August 28). How global warming likely made Harvey much worse, explained by a climatologist. Retrieved August 11, 2019, from https://www.vox.com/science-and-health/2017/8/28/16214268/houston-floods-harvey-global-warming

Masson-Delmotte, V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A., … T. Waterfield (eds.). (2018). *Global Warming of 1.5°C*. Retrieved from The Intergovernmental Panel on Climate Change website: https://www.ipcc.ch/.

Miljöpolitik. (n.d.). Retrieved June 10, 2019, from https://sd.se/vad-vi-vill/miljopolitik/

Ministry of Finance – Sweden. (2018, June 4*). Central government annual report 2017 – summary*. Retrieved July 10, 2019, from https://www.government.se/legal-documents/2018/06/skr.-201718101/.

Ministry of Finance – Sweden. (2019a, April 10). *The 2019 Spring Budget.* Retrieved June 10, 2019, from https://www.government.se/articles/2019/04/the-2019-spring-budget-in-five-minutes/

Ministry of Finance – Sweden. (2019b, June 5). C*entral government annual report 2018 – summary.* Retrieved July 10, 2019, from https://www.government.se/legal-documents/2019/06/skr.-201819101/.

Ministry of the Environment. (2019, January 20). *Agreement on Swedish energy policy.* Retrieved June 9, 2019, from https://www.government.se/articles/2016/06/agreement-on-swedish-energy-policy/

Müller, M. (2007). Motivation of politicians and long-term policies. *Public Choice,* 132(3/4), 273-289. doi:10.1007/s11127-007-9151-3

NDC Interim Registry. (n.d.*). Nationally Determined Contributions Interim Registry.* Retrieved April 8, 2019, from https://www4.unfccc.int/sites/NDCStaging/Pages/All.aspx

Nemeth, S. C., Mitchell, S. M., Nyman, E. A., & Hensel, P. R. (2014). Ruling the Sea: Managing Maritime Conflicts through UNCLOS and Exclusive Economic Zones. *International Interactions*, 40(5), 711–736. https://doi-org.ezproxy.tcu.edu/10.1080/03050629.2014.897233

Newman, S. (2015, June 15). Tiny islands sue big polluters | 1 Million Women. Retrieved April 10, 2019, from https://www.1millionwomen.com.au/blog/tiny-islands-sue-big-polluters/

Noor Ouarzazate Solar Complex. (n.d.). Retrieved April 13, 2019, from https://www.power-technology.com/projects/noor-ouarzazate-solar-complex/

Nordin, R. (n.d.). Klimat. Retrieved June 10, 2019, from https://www.centerpartiet.se/var-politik/politik-a-o/miljo/klimat

Nu. Klimatet kan inte vänta. (2019, June 05). Retrieved June 10, 2019, from https://www.mp.se/politik

"Nuclear Power in Sweden." (January 2019). World Nuclear Association. Retrieved June 8, 2019, from: http://www.world-nuclear.org/information-library/country-profiles/countries-o-s/sweden.aspx

Nye, J. S. (1990). Soft Power. *Foreign Policy,* 80, 153–171. JSTOR. https://doi.org/10.2307/1148580

Observatory of Economic Complexity. (n.d.a). Products exported by Austria 2017. Retrieved July 10, 2019, from http://atlas.media.mit.edu/en/visualize/tree_map/hs92/export/aut/all/show/2017/

Observatory of Economic Complexity. (n.d.b). Products exported by the United States 2017. Retrieved August 6, 2019, from https://oec.world/en/profile/country/usa/#Exports.

OECD (2014), OECD Environmental Performance Reviews: Sweden 2014, *OECD Environmental Performance Reviews,* OECD Publishing, Paris, https://doi.org/10.1787/9789264213715-en.

Office of Governor Newsom, Governor Newsom's Strike Force. (2019, April 12). Wildfires and Climate Change: California's Energy Future. Retrieved August 10, 2019, from https://www.gov.ca.gov/wp-content/uploads/2019/04/Wildfires-and-Climate-Change-California's-Energy-Future.pdf

Oil & Gas. (n.d.). Center for Responsive Politics. Retrieved March 22, 2019, from https://www.opensecrets.org/industries/background.php?cycle=2018&ind=E01

Oremus, W. (2015, August 04). Surprise: Obama's Climate Plan Is Cap and Trade After All. Retrieved April 13, 2019, from http://www.slate.com/blogs/moneybox/2015/08/04/clean_power_plan_obama_s_climate_plan_is_cap_and_trade_after_all.html

Paris Agreement, (n.d.). *United Nations,* New York (CHAPTER XXVII, 7. d), as available on https://treaties.un.org/Pages/AdvanceSearch.aspx?tab=UNTS [April 8, 2019].

Paster, T. (2014). Why did austrian business oppose welfare cuts? how the organization of interests shapes business attitudes toward social partnership. Comparative Political Studies, 47(7), 966-992. doi:10.1177/0010414013488556

Pew Research Center. (2018, April 18). In most surveyed countries, majorities see climate change as a major threat. Retrieved August 5, 2019, from https://www.pewresearch.org/fact-tank/2019/04/18/a-look-at-how-people-around-the-world-view-climate-change/ft_19-04-18_climatechangeglobal_inmostsurveyedcountries_edited_2/

Pew Research Center. (2019, July 30). "Climate Change and Russia Are Partisan Flashpoints in Public's Views of Global Threats." Retrieved from https://www.people-press.org/2019/07/30/climate-change-and-russia-are-partisan-flashpoints-in-publics-views-of-global-threats/.

Political parties in Sweden. (2019, February 26). Retrieved June 10, 2019, from https://sweden.se/society/political-parties-in-sweden/

Rabinowitz, K., & Uhrmacher, K. (2019, March 13). What Trump proposed cutting in his 2020 budget. Retrieved August 4, 2019, from https://www.washingtonpost.com/graphics/2019/politics/trump-budget-2020/#dept-17

Rabmer-Koller, Ulrike. (n.d.). Mag. Ulrike Rabmer-Koller Curriculum Vitae. Retrieved July 10, 2019, from https://www.wko.at/service/funktionaer.html?rollenid=2322727.

Rainey, J. (2018, July 17). The Trump administration scrubs climate change info from websites. These two have survived. Retrieved August 2, 2019, from https://www.nbcnews.com/news/us-news/two-government-websites-climate-change-survive-trump-era-n891806

Reconciling environment with our economy. (2018, December 18). Retrieved July 4, 2019, from https://www.socialistsanddemocrats.eu/what-we-stand-for/our-achievements/reconciling-environment-our-economy

Reinberg-Leibel, M. (2014). Lobbying in Austria. Transparency International – Austrian Chapter. Retrieved July 8, 2019, from https://www.ti-austria.at/wp-content/uploads/2016/01/Lobbying-in-Austria.pdf.

Republican National Committee: America's Natural Resources: Agriculture, Energy, and the Environment. (n.d.). Retrieved March 24, 2019, from https://www.gop.com/platform/americas-natural-resources/

Republican Platform 2016. (n.d.) Republican National Committee. Retrieved August 3, 2019, from https://www.gop.com/platform/americas-natural-resources/.

Requate, T. (2015). Green Tradable Certificates versus Feed-In Tariffs in the Promotion of Renewable Energy Shares. *Environmental Economics and Policy Studies*, 17(2), 211–239. https://doi-org.ezproxy.tcu.edu/https://link.springer.com/journal/volumesAndIssues/10018

Roberts, D. (2019, March 30). The Green New Deal, explained. Retrieved August 6, 2019, from https://www.vox.com/energy-and-environment/2018/12/21/18144138/green-new-deal-alexandria-ocasio-cortez

Roger, C., & Belliethathan, S. (2016). Africa in the global climate change negotiations. International Environmental Agreements: *Politics, Law and Economics,* 16(1), 91-108. doi:10.1007/s10784-014-9244-7

Roth, J. (n.d.). Mag. Jürgen Roth Curriculum Vitae. Retrieved July 10, 2019, from https://www.wko.at/service/funktionaer.html?rollenid=2352661.

Saad, L. (2019, May 24). U.S. Conservatives Outnumber Liberals by Narrowing Margin. Retrieved August 2, 2019, from https://news.gallup.com/poll/201152/conservative-liberal-gap-continues-narrow-tuesday.aspx?g_source=Politics&g_medium=lead&g_campaign=tiles

Sanger, D. E. (2001, June 12). Bush Will Continue to Oppose Kyoto Pact on Global Warming. Retrieved April 11, 2019, from https://www.nytimes.com/2001/06/12/world/bush-will-continue-to-oppose-kyoto-pact-on-global-warming.html?mtrref=www.bing.com

Schenz, Richard. (n.d.). Richard Schenz Curriculum Vitae. Retrieved July 10, 2019, from https://www.wko.at/service/funktionaer.html?rollenid=2312846.

Sen. Jim Inhofe denies climate change, tosses snow ball in Congress. (2015, November 23). Retrieved August 5, 2019, from https://www.cbsnews.com/news/sen-jim-inhofe-climate-change-is-not-real-because-here-is-a-snowball/

SGI 2017: Austria. (2018). *Sustainable Governance Indicators.* Retrieved April 11, 2019, from http://www.sgi-network.org/2017/Austria/Environmental_Policies

Shear, M. (2017, June 01). Trump Will Withdraw U.S. From Paris Climate Agreement. Retrieved March 14, 2019, from https://www.nytimes.com/2017/06/01/climate/trump-paris-climate-agreement.html

Sherman, A. (2014, May 23). Cap and trade legislation was originally 'a Republican idea,' Wasserman Schultz says. Retrieved April 13, 2019, from

https://www.politifact.com/florida/statements/2014/may/23/debbie-wasserman-schultz/cap-and-trade-legislation-was-originally-republica/

Simmons, B. A., & Danner, A. (2010). Credible Commitments and the International Criminal Court. *International Organization*, 64(2), 225–256. https://doi-org.ezproxy.tcu.edu/10.1017/S0020818310000044

So Young Kim, & Wolinsky-Nahmias, Y. (2014). Cross-National Public Opinion on Climate Change: The Effects of Affluence and Vulnerability. *Global Environmental Politics,* 14(1), 79–106. https://doi-org.ezproxy.tcu.edu/10.1162/GLEPpass: [_] a_00215

Socialdemokraterna - Miljö. (2018, June 8). Retrieved June 10, 2019, from https://www.socialdemokraterna.se/var-politik/a-till-o/miljo/

Solsvik, T. (2017, April 19). Sweden, Norway compromise on renewable power subsidy scheme (N. Adomaitis & D. Evans, Eds.). Retrieved June 10, 2019, from https://af.reuters.com/article/energyOilNews/idAFL8N1HR15X

Sprinz, D., & Vaahtoranta, T. (1994). The interest-based explanation of international environmental policy. *International Organization,* 48(1), 77-105. doi:10.1017/S0020818300000825

Sraders, A. (2018, December 31). What Are Emerging Markets? Characteristics and List in 2019. Retrieved April 11, 2019, from https://www.thestreet.com/markets/emerging-markets/what-are-emerging-markets-14819803

State Renewable Portfolio Standards and Goals. (2019, February 1). Retrieved August 4, 2019, from http://www.ncsl.org/research/energy/renewable-portfolio-standards.aspx

Stone, D. (2013, March 19). Rising Temperatures May Cause More Katrinas. Retrieved August 1, 2019, from https://www.nationalgeographic.com/news/2013/3/130319-hurricane-climate-change-katrina-science-global-warming/

Sultan, N. (2017, April). Mining: Background. Retrieved August 3, 2019, from https://www.opensecrets.org/industries/background.php?cycle=2020&ind=E04/

Sweden Land Use. (2018, January 20). IndexMundi. Retrieved June 8, 2019, from https://www.indexmundi.com/sweden/land_use.html

Sweden tackles climate change. (2018, October 05). Retrieved April 12, 2019, from https://sweden.se/nature/sweden-tackles-climate-change/

Sweden Trade at a Glance: Most Recent Values. (n.d.). *World Integrated Trade Solution – World Bank.* Retrieved June 8, 2019, from https://wits.worldbank.org/CountrySnapshot/en/SWE/textview

Thaler, J. (2013, September 3). Out of the spotlight: The role of climate policy in the Austrian election campaign. Retrieved July 8, 2019, from https://www.jetdencre.ch/out-of-the-spotlight-the-role-of-climate-policy-in-the-austrian-election-campaign-4465

The Local. (2019, April 01). Sweden's temperature is rising more than TWICE as fast as the global average. Retrieved June 8, 2019, from https://www.thelocal.se/20190401/swedens-temperature-rising-more-than-twice-as-fast-as-the-global-average

Thorbecke, C. (2017, January 20). Trump Posts Vow to Scrap Climate Action Plan on White House Website. Retrieved August 2, 2019, from https://abcnews.go.com/Politics/trump-posts-vow-scrap-climate-action-plan-white/story?id=44929913

Tjernstrom, E., & Tietenberg, T. (2008). Do differences in attitudes explain differences in national climate change policies? *Ecological Economics,* 65(2), 315-324. doi: 10.1016/j.ecolecon.2007.06.019

Tobin, P. (2017). Leaders and Laggards: Climate Policy Ambition in Developed States. *Global Environmental Politics*, 17(4), 28–47. https://doi-org.ezproxy.tcu.edu/10.1162/GLEP_a_00433

Tobler, W. (1970). A Computer Movie Simulating Urban Growth in the Detroit Region. *Economic Geography,* 46, 234-240. doi:10.2307/143141

Trump on climate change report: 'I don't believe it'. (2018, November 26). Retrieved August 3, 2019, from https://www.bbc.com/news/world-us-canada-46351940

U.S. EIA - Independent Statistics and Analysis. (n.d.). Retrieved April 13, 2019, from https://bit.ly/2PNOuXX

Über uns. (n.d.). Klima- und Energiefonds. Retrieved July 9, 2019, from https://www.klimafonds.gv.at/ueber-uns/.

United Nations Convention on the Law of the Sea. Dec. 10, 1982. vol. 1833. https://treaties.un.org/pages/ViewDetailsIII.aspx?src=TREATY&mtdsg_no=XXI-6&chapter=21&Temp=mtdsg3&clang=_en#1

US CO2 emissions are falling, and the reasons are many. (2014, April 17). *The Economist.* Retrieved August 3, 2019, from http://www.eiu.com/industry/article/521735836/us-co2-emissions-are-falling-and-the-reasons-are-many/2014-04-17

Vandeweerdt, C., Kerremans, B., & Cohn, A. (2016). Climate voting in the US Congress: the power of public concern. *Environmental Politics,* 25(2), 268–288. https://doi-org.ezproxy.tcu.edu/10.1080/09644016.2016.1116651

Vanhala, L. (2015). The Diffusion of Disability Rights in Europe. *Human Rights Quarterly,* 37(4), 831-853. doi:10.1353/hrq.2015.0058

Viola, E., Franchini, M., & Ribeiro, T. L. (2012). Climate governance in an international system under conservative hegemony: The role of major powers. *Revista Brasileira De Politíca Internacional,* 55(spe) doi:10.1590/S0034-73292012000300002

Vitali, A. (2017, June 1). President Donald Trump has pulled the U.S. out of the Paris Climate Agreement. Retrieved April 8, 2019, from https://www.nbcnews.com/politics/white-house/trump-pulls-u-s-out-paris-climate-agreement-n767066

Volcovici, V. (2017, January 25). Trump administration tells EPA to cut climate page from website:.. Retrieved April 8, 2019, from https://www.reuters.com/article/us-usa-trump-epa-climatechange-idUSKBN15906G

Webb, M., & Krasner, S. (1989). Hegemonic Stability Theory: An Empirical Assessment. *Review of International Studies,* 15(2), 183-198. Retrieved from http://www.jstor.org/stable/20097178

Wheeler, A. (2018, August 21). A Better Way to Ensure Clean, Reliable Energy. Retrieved August 2, 2019, from https://www.whitehouse.gov/articles/better-way-ensure-clean-reliable-energy/

Wir fördern Forschung, nicht die Hysterie. (2018, December 14). Retrieved July 4, 2019, from https://www.fpoe.at/artikel/wir-foerdern-forschung-nicht-die-hysterie/

World Bank Climate Change Knowledge Portal – Austria. (n.d.). Retrieved July 13, 2019, from https://climateknowledgeportal.worldbank.org/country/austria

World Bank. (2016, November 17). 5 things Morocco is doing about Climate Change. Retrieved April 11, 2019, from http://www.worldbank.org/en/news/feature/2016/11/17/5-things-morocco-is-doing-about-climate-change

World Development Indicators. (n.d.). *World Bank.* Retrieved April 8, 2019, from https://databank.worldbank.org/data/reports.aspx?source=2&series=EN.ATM.CO2E.PC&country=

World Energy Balances. (2018, August). International Energy Agency. Retrieved August 10, 2019, from https://www.iea.org/statistics/?country=USA&year=2016&category=Energy supply&indicator=TPESbySource&mode=chart&dataTable=BALANCES

World Factbook – Austria. (2019a, June 24). *Central Intelligence Agency*. Accessed July 9, 2019. https://www.cia.gov/library/publications/the-world-factbook/geos/au.html

World Factbook – United States. (2019b, July 29). Central Intelligence Agency. Accessed August 14, 2019. https://www.cia.gov/library/publications/the-world-factbook/geos/us.html

*WorldRiskReport: Analysis and prospects.* (2017). Institute for Environment and Human Security of the United Nations University. Berlin, Germany: Bündnis Entwicklung Hilft. doi: https://reliefweb.int/sites/reliefweb.int/files/resources/WRR_2017_E2.pdf

Zhou, L., & Nilsen, E. (2019, March 26). Senate Democrats broadly shut down Republican trolling on the Green New Deal. Retrieved August 10, 2019, from https://www.vox.com/2019/3/26/18281323/green-new-deal-democrats-vote

Zhukov, Y. M., & Stewart, B. M. (2013). Choosing Your Neighbors: Networks of Diffusion in International Relations. *International Studies Quarterly,* 57(2), 271–287. https://doi-org.ezproxy.tcu.edu/10.1111/isqu.12008