Complexity of American Climate Politics and Public Numbness on transitioning to a Renewable Energy Society

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Andrew Hui
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On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments

Andrew Hui	05/08/2021

Signature _____ Date

Andrew Hui

Approved _____ Date _____
Tsai-Hsuan Ku, Department of Engineering and Society

STS Thesis

Introduction

The debate on climate change action has been circling around the United States and countries globally for decades, and with a clean energy society on the horizon, what does society need to do to help save the environment? Scientists from the NOAA, to NASA, to the IPCC as well as countless scientific reports conclude that anthropogenic warming is causing rising temperatures through output of emissions causing disastrous effects in the climate via wildfires, sea level rise, destruction of habitats, resource loss, and other extreme weather that will inevitably make the world uninhabitable. According to energy analysts, wind and solar plants can already provide the cheapest source of power to 67% of the world and their energy can be easily managed on the grid, while being cost-effective, produce millions of new jobs, and displace emissions. If in fact renewable energy is already fully feasibly to replace carbon emitting resources, then it is puzzling as to why clean technology has not proliferated globally and even in the United States itself. The complexity of US climate politics and public perception demands an STS investigation as to what sociotechnical factors are preventing a transition to a renewable energy society. To answer the questions of why Americans are reluctant to accept a green powered grid, I will need to successfully examine document analysis from credible and minimally biased climate agencies. In terms of data, I will use a case study from the February 2021 Texas ERCOT power grid failures to make apparent the socio-technical complexities in the American climate agenda. The case study I want to examine is in regards to the Texas power shortages caused by extreme weather, namely uncharted freezing temperatures, in February 2021 that caught the entire state of Texas by surprise. This specific scenario is a perfect example of how numb the general public of the US, as well as the policy makers, are to climate change. It is apparent that there are still many Americans that don't understand that climate change is not strictly global warming and rising temperatures, but in reality, it is fluctuations in our climate cycles caused by rising emissions like carbon dioxide and methane released from anthropogenic outputs. This is concerning and also a wake-up call to much of Texas and the rest of the US. The case of Texas can act representatively of American numbness to extreme climate issues and how hesitancies to act on climate change and clean energy could be detrimental to humanity. While solar and wind energy is feasible today, this thesis will help uncover how and why American society has shied away from climate change action.

Research Question

Despite solar and wind power systems being readily deployable today in the United States, what role does American politics and societal numbness play in preventing a full transition towards adopting renewable energy. Can extreme weather events in the United States cause a shift in ideology towards climate and renewable perception?

Literature Review

A transition to a clean energy society has not fully occurred and can be attributed to the complexity of American climate politics and public numbness. According to a study done by the Brookings Institute (Kamarck, 2019), it is evident that over the last 20 years, public perception has largely been more positive towards adopting renewable energy and decreasing carbon output, and though there has been progress the main issues lie in party lines, generational gaps, and collective action. It is evident that it takes everyone on board in society domestically and

internationally, but it's not feasible to ask everyone to buy an electric car or even just shutting off unused electricity. In this case, how can we get everyone to adopt the idea of renewable energy? Without complete trust from the public in one's particular government, which can specifically be seen in the case of the United States, it may not be possible to transition without some drastic change in time to prevent four degree warming (Buis, 2020), which would cause existential threats to humanity according to IPCC reports. Public perception, though, can be changed by current events and with recent environmental devastations such as the California wildfires in 2020, as well as Texas winter storm power outages of 2021, it is important to examine the nature of changing events and the way the public might view climate policy and renewable adoption. According to surveys from 2017 and 2018 done on the ever-growing hurricanes in the US, no visible change was detected in public opinion regarding "social bases of renewable energy support, and of ACC acceptance, across two very different US regions" (Hamilton, et al. 2019). However, it wasn't until drastic change highlighted by the coronavirus and Texas storm outages that finally has caused a large public perception shift towards demanding environmental change and justice. Energy blackouts in Texas during February 2021 caused by extreme weather storms caused the public to blame the state's faulty independent energy system and the government leaders in charge of their energy sector; this came after it became apparent that backup grids run my renewable energy could have prevented the grid failures especially since it was made clear that "the state has not adequately integrated renewables into the power system." These events in 2020 and 2021 have shown that while the public have still lacked a certain trust, there is a large progression towards adopting renewable energy. Domestic and global politics need to be examined as well. No country or political figure has been able to 'step up to the plate' in a manner that has the ability to draw attention from everyone. "The compliance gap is the most serious global governance deficit" (Zerrenner, 2020), which is the root cause of failures of international agreements such as Kyoto all the way to Paris and Copenhagen. Evidence shows that while multilateral agreements have been able to form, implementation is the lacking factor. In the context of the US, partisanship in the government have halted political pushes during certain political party rulings (Thakur, 2020), which is a large reason for climate policy stalemate in the US. That is not to blame any particular group of people, but it is evident that there is a lack of direction in terms of governmental stance, which could be a deciding factor in why public perception has fluctuated in the past. As an analyst of renewable energy adoption, it is crucial to discuss the energy industry and domestic and global fossil fuel companies. The economics behind oil and fossil fuels are clear in that dirty energy is cheap and renewable energy is expensive, but advancements in technology over the past decade have proven that solar and wind power can operate at a cost-effective level to feasibly displace oil. Public perception has slowly shifted on fossil fuel usage, but it doesn't look like consumer behavior will change any time soon (Worland, 2020), which combats the idea of a renewable energy transition. Once again, it is evident now that something drastic must occur for this sort of transition to be possible in the light of fossil fuels powering society and carbon tipping points approaching. Maybe looking at individual components of climate change is wrong, and it might be more affective to analyze multiple stakeholders in renewable energy simultaneously. Social and political impacts are key players in renewable adoption and it is thus important to analyze how they are inter-related (Sheikh, 2016). Or maybe the public is influenced by the technology itself making the components of social and technical aspects intertwined (Hamilton, et al. 2018). It is also important to analyze how the US plays a role in the global transition and how our technology can help create a domino effect (Gielen, 2019). It may take drastic change to create a feasible

transition to a clean energy society (Kuzemko, et al. 2020). These are all considerations when analyzing the root causes of climate change perception and adopting a renewable energy transition.

STS Framework and Method

The topic of renewable energy adoption and climate change requires a complex examination of multi-stakeholders and many relevant social groups. Thomas Hughes' "Large Technical System" theory suggests that systems and devices are constituted by many sub-systems and can be used to analyze all renewable system builders and the notion of the construction of technology itself. There are many socio-technical components that are not just attributed to societal numbness, but also the complexity of political systems and the renewable company's ability to construct a maintainable system. This theory also feeds into notion of technology as a social construct, where acceptance or rejection of technologies like renewable energy can be attributed to the social world. That is, socio-technical systems can succeed when a system's groups and stakeholders define what that success means. In the case of climate action, what does success mean?

My research method will strictly come from secondary data based on qualitative analyses on policy news, credible climate-based organizations, and database trends to see populational views. Qualitative data in the form of a case study will best help me analyze stakeholders in the complex climate political regime, as well as allow me to analyze data and information from renewable energy action from current trends. Of course, biases in climate change and renewable energy arise from political affiliated sources and even from geographic areas and people's direct experience with global warming, which will be considered when using certain information.

Data Analysis
Texas 2021 Energy Failure:

The Texas energy infrastructure failure of 2021 is a unique case study that can represent the numbness in climate politics not only in Texas, but across America, and explains the socio-technical processes in the traditional US energy regime while fitting the genre of Thomas Hughes' sub-system analysis. On February 12th, millions of Texans lost power and the Electric Reliability Council of Texas, ERCOT, described statewide outages from extreme weather cold storms, which can be attributed to the power grid being mostly run by non-renewable energy sources such as coal and natural gas. These non-renewable energy sources fuel about 80% of Texas' power grid, while only a fraction is fueled by wind and solar, meaning when gas and oil pipelines freeze over similar to this case, there is no other way to get power to its state traditionally (O'Brien 2021). The Texas outages left 15 million people without heat or electricity, as well as no running water. Despite the extreme weather, Texans were part of a preventable disaster that disproportionally affected its most vulnerable populations, specifically people living in poverty and those most affected by the pandemic (Cantina and Hayhoe 2021). Meteorologists and climate scientists correctly predicted the storms and warned the public via news outlets weeks in advance, so it comes as a surprise that the public and energy companies did not heavily prepare in advance, or does it?

Independence and Past Failures:

The unique nature of Texas' power grid, is that it prides itself on its independently run energy grid, which allows Texas to circumvent federal regulations while "feeding its massive appetite" for electricity. ERCOT is the independent state agency that owns and manages Texas'

grid while being supervised by the governor and state legislatures. Shortly after, the 2021 Texas extreme weather power failure, ERCOT issued a statement that they would have no idea when power would be back, which feeds into the notion of numbness towards the changing climate by even the highest of leadership in the state due to their lack of effort and urgency. But why was this "unpredictable grid failure" event seemingly so predictable in Texas? This is because there have been several previous cases that feed the fire on Texas' inaction towards shifting the traditional energy infrastructure and keeping the momentum of fossil fuel investment. Specifically, in 2011, the Luminant energy company in North Texas failed to prepare for a similar extreme cold weather storm that caused grid equipment malfunctions as well as power failures. Additionally, in January 2014, freezing temperatures caused sweeping blackouts to the power grid causing generators to fail and the entire grid to nearly collapse (Collier et. al 2021). The fact the 2021 grid failure in Texas was not prevented after all of these cases, shows that their government and energy sector run by state leaders are stuck in their norms of traditional energy usage and momentum towards money grabs were seemingly not enough for them to consider changes to their infrastructure and neglected the impacts of climate change prior to 2021. It is even more concerning that the state has not showed its understanding that climate change can occur in the form of extreme cold, not only global warming, which is evident in these cases and has rubbed off on its society; this is not only the case in Texas, but across the US and will be examined later. The question becomes, how many more extreme climate disasters need to occur to awake Texas leaders and its public from its numbness towards changing its energy infrastructure towards renewables and become more prepared for the future? The sweeping neglect despite recommendations of "weatherization of Texas energy systems" leading up to the most recent case is a gloom reminder of the unnecessary deaths and hospitalizations towards its citizens that come from a failure to invest in new renewable systems (Cantina and Hayhoe 2021). And despite its leaders seemingly sticking to its norms for cost-efficiency, Texans have been hit the hardest by these climate cases and has independently expended $124 billion since 1980 from weather and power events.

Complex Climate Politics and Numbness:

Texas does not stand alone when it comes to climate numbness and renewable energy adoption failure. To truly understand the complexity of American climate politics, we must look at quantitative data. A study done by the Yale Program on Climate Communication, that followed US Census parameters, indicated that a bipartisan majority of voters would support legislation requiring electric companies to transition to renewable energy (Gustafson 2019). This means most Americans are willing to pay more for their electric bills to help the environment; yet, the statistics varied significantly among political affiliation, democrats being the majority who supported renewable transition, along with younger adults, and ethnic minorities. This liberal progressive stance helps give us an idea on the political support behind pro-climate action, and who might be numb. Specifically, 90% of democrats believe that America should prioritize alternative energy development over fossil fuel investment, while conservative republicans, which represent the party's majority, is evenly divided at 50-50 on whether to prioritize alternative energy or expand fossil fuel production (Funk and Hefferon 2020). What is even more glaring, is that of the conservative republican group selected, only 25% said climate policies do more-good than harm towards the environment, while 62% boasted that these policies damage the economy. This is important to note because it feeds the narrative that there is a stalemate in overall American climate policies where action cannot be pushed forward and traditional norms and fossil fuels continue to stick around. This is a perfect example for why

Texas, which is a largely republican run state, acts as a representative for nationwide climate policy action.

Now that we understand the complex politics behind American climate agendas, we can further examine how that translates into public numbness towards renewable adoption in Texas and nationwide. Revisiting a previous Texas grid failure, in May 2014 following the January incident, the Texas Public Utility Commission, PUC, stated that energy companies like Luminant needed to identify critical failure points in the grid that could lead to potential weather exploits, but Luminant motioned to stop the PUC approval and won, leaving the grid completely susceptible to vulnerabilities. This seems to be a pattern in Texas, where too often these power companies can circumvent authority from the PUC, which is a direct cause from capitalistic tendencies of these large corporations to think about money before the effectual damages towards the environment. Similarly, in the 2011 case, formed Texas governor and recent Trump energy secretary Rick Perry denied former democratic state rep Sylvester Turner's legislation to maintain backup power in case of blackouts (Collier et. al 2021). Perry's suggested that the blackout disaster then and in 2021 were worth it to keep rates low and from preventing federal regulators from changing the current system. The complexity within these competing political agendas towards action and inaction feeds into ethical values and will be examined further in the discussion.

STS Analysis:

To tie the entire case of Texas energy infrastructure failure together, we will re-introduce Thomas Hughes' LTS approach. Specifically, that socio-technical systems can succeed when its sub-systems and sub-actors define what that success means. In the case of Texas, its system builders are primarily ERCOT, energy companies such as Luminant, the PUC, its independence from other states, the governors and legislators, citizens who pay for state electricity, and voters who play a large role in the overall system of Texas' energy infrastructure and climate regime. The way that Texas has seemingly defined what "success" means in terms of climate policy as whatever is most cost-effective and drives in the most profit is a capitalistic standpoint that not all agree with. However, after the 2021 Texas outage, the public demanded better from its state electricity and has pushed for more action towards reliable sources of energy, namely renewables. This trend has caused the system to change, and in the eyes of Hughes', all sub-systems constitute an entire system, and for the Texas energy system to succeed in the future, its public and government as well as ERCOT need to work together towards progressive energy standards. This can be said about the entirety of American climate politics, as mentioned earlier, where the sub-systems such as democrats and republicans disagree on motivation towards renewable policies. These system builders need to work together towards a common goal, not competing interests. While the economy is important for any nation to stay afloat and credible, the planet's health and future generations provides an ethical and epistemological reason to reconsider the norm. The question now becomes, how should this energy infrastructure system evolve, and how can we learn from the Texas case and move forward? Of course, it is more complex than just immediately pushing towards liberal climate agendas and completely switching to renewable energy grids. However, steps can be made as a collective whole where the leaders in Texas, and across the country can create a more renewable friendly "norm" and thus encourage climate action and loosen the numbness towards renewables by spreading awareness.

Discussion
Texas Generalization:

      The Texas case data analysis has uncovered that there is a disruption in agreement between sub-systems within the larger scope of the American energy infrastructure. Specifically, climate is a complex political arena where its actors like state governments, lobbyists, energy companies, and the public all have not come to a common agreement on what it means for the American energy and climate system to succeed. It is evident that more liberal leaning agenda towards renewable energy adoption would inevitably create a divide, but push Texas, and the rest of America towards greener policies and urgent rhetoric on climate action; the transition from Trump to President Joe Biden has created a head start towards that case. The 2021 Texas case acts as a representative case towards all of America's climate socio-technical system because its internal divide and normative fossil fuel energy sector is a large reason why Texas has not got much done in terms of progressive climate action, and specifically why America as a whole hasn't been able to achieve much collective success. Actions such as Rick Perry denying legislative action for backup power to lower rates, as well as Luminant disapproving of internal grid conditions are sub-systems that are working toward the common good of the overall system and kept the momentum going for normative traditional energy usage. Our STS analysis shows that for "successful" climate action and renewable adoption to take place, all of the sub-actors like Rick Perry, ERCOT, and the public need to be on the same page, and can be spilled over to the entire US energy system where political parties need to create more bipartisanship to reach a common goal.

Ethical Framework:

      When discussing the STS framework, it is important to discuss an ethical framework in regards to the topic. The first framework is in regards to numbness. Specifically, evil action such as using fossil fuels especially in Texas, comes from society's disinterest, state governmental silence, and overall ignorance to acting towards renewable energy implementation and climate change action. Is it ethical for us to keep outputting carbon emissions and methane from fossil fuel usage when science shows that it could permanently destroy our planet and make earth uninhabitable? The Texas case can prove the 'numbness' ethical framework because its government stuck to norms and showed them that their energy infrastructure was sustainable to its people, causing the public to have no concerns around the topic. The second ethical framework is technological mediation. This relates to economic issues, money grabs, and the capitalism around keeping traditional energy usage, like in the case of Luminant and Rick Perry, as opposed to the long-term investment of transitioning to renewable energy. Specifically, it is fundamentally cheaper to continue to fund and use oil and gas because the foundations and institutions have already been nurtured, so large corporations who are numb to climate change action don't have an incentive to transition and invest in renewable energy because of the start-up investment and because a cheaper option is already effective, despite it destroying the environment. This can be proven by the Texas case because the state relies completely on traditional energy usage, as well as the media being stale to the issue, and ultimately energy issues were a problem of cost since companies and the government weren't willing to make a change. The traditional energy usage and the local "traditions" and norms of the state got broken because of the lack of trust brought from the energy shortage and miserable weeks of cold, causing the people to question the norms and traditional energy grids. Ultimately, ethics is embedded in this large technical system of energy and climate politics, which is a system that favors the momentum of large fossil fuel companies instead of renewables. We all become a

small piece of society and the system, people don't think emitting small amounts of carbon will change the large system, this style of thought leads to benign evil because we are all blinded by the large system. In reality, we need to rally around momentum stoppers because change in society is formed from this.

Conclusion

Exploring, examining, and analyzing the root cause and the snowball effect for why potentially deep socio-technical issues are halting the effective transition to a clean energy economy in the United States will be important for not only future policies, but also allow society to take a step back and examine the rate of climate change and the impacts it imposes to them and future generations. Data analysis on the Texas energy failure case helped uncover truths about the way its citizens, and comparatively American society, are currently numb towards climate action and lack urgency towards adopting renewables. The positive outcome in the 2021 Texas case was that its public lost trust in the way its government handled their electricity and has since urged for direct action. Using Thomas Hughes' LTS analysis helped us fully understand the complex nature of US climate politics by examining all of the necessary system builders and how they can work together collectively to change the perception towards how we view climate action and renewables. While the American energy infrastructure continues to be complex and numb in certain aspects, money and competing political agendas were leading causes towards American climate inaction and their public perception on renewable energy. Though, the future is bright as the entire American energy system is still evolving today; the transition from Trump to Biden shifted the rhetoric and perception on climate urgency and action as President Biden swiftly re-entered the Paris Accord and has made policies to increase funding towards renewable development and deployment already. I think in the future, primary and secondary schools should require environmental and climate learning because it would prevent cases like Texas and extreme cases where climate denial rhetoric and traditional energy action is encouraged; this is not to create biases in the education system, but necessitates climate education itself, which will truly create a more natural public perception towards renewable energy and hopefully encourage pro-climate action in the future. Additionally, policies like carbon taxing and net-emissions standards will help set goals for the US and following nations to live a cleaner and more climate friendly lifestyle that could shift the direction of irreparable climate damage. In the end, I think that extreme weather events have not shifted the perception on climate and renewables in the past, but Texas outages and cases to follow have now triggered a domino-effect that will lead to pro-climate action in the very near future.

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