The Fragility of 'Success': An Actor Network Theory Analysis of the Regional Greenhouse Gas Initiative

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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.

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Introduction

As global temperatures continue to rise and extreme weather developments such as hurricanes and tornadoes increase in both frequency and intensity, legislative bodies have begun enacting policies and establishing programs in the hope of reversing the harmful effects of climate change. One such program is the Regional Greenhouse Gas Initiative (RGGI), the first mandatory market-based cap-and-trade program in the United States aimed at reducing cumulative greenhouse gas emissions. At present, scholars have taken on an optimistic perspective regarding the stability of RGGI moving forward, marveling at its success where similarly designed programs have failed. Although RGGI has undoubtedly contributed to the marked improvements in environmental quality and economic stimulation, this perspective is limited in that it fails to account for any vulnerabilities that currently threaten the program's ability to accomplish its tangible goals. By failing to acknowledge this inherent fragility in the network that encompasses the program, the risks associated with misunderstanding the state of the network become all the more likely and dangerous, thereby exposing RGGI to ignorance-based problems down the line.

I argue that RGGI is impregnated with two major vulnerabilities: (i) an imbalance in the distribution of power, and (ii) a lack of focus placed on the influence that actors considered outside the network could have. To corroborate this claim, I will make use of Actor Network Theory (ANT), a science, technology, and society (STS) framework used to open the black box of any complex web of interactions between heterogenous components. This framework is used to portray how both human and non-human actors contribute toward the shaping of technology, as well as the society that interacts with it (Cressman, 2009). For the purpose of showing how the current viewpoint of most scholars is incomplete, I will draw on Hibbard, Tierney, Darling, and

Cullinan's analysis of RGGI's economic and public health impacts, as well as Bruce Huber's journal article on the strengths and weaknesses of the current system. These sources provide valuable insight into how RGGI has shaped the lives of the citizens within participating states, as well as how other actors, such as government officials, and companies who purchase allowances, have shaped the way RGGI has developed into its current state.

Background

Through RGGI, a cap is set for the production of greenhouse gases, and later, "emission allowances" are sold via auction to companies in exchange for the right to produce the number of emissions specified by their allowance, hence the term 'cap-and-trade.' Per the guidelines given in the Memorandum of Understanding (MOU), the document that outlines the rules participating states are expected to abide by, a minimum portion of the proceeds from the auction, roughly $3.2 billion to date across all participating states, are then supposed to be invested in consumer benefit programs such as energy efficiency and renewable energy. Each year from 2015-2020, the emissions cap has been lowered by 2.5% in the hopes that a restriction in the supply will result in each state's energy grid being slowly weaned away from the use of fossil fuels, opting instead to redirect it towards less carbon-intensive sources (Ramseur, 2019).

Setting out in late 2005, the initiative began with only seven states agreeing to implement the program, a number which quickly grew to 10: Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, and Vermont. In 2011, then-Governor of New Jersey Chris Christie decreed that his state would be withdrawing from the agreement, an action that resulted in scrutiny on both moral and legal grounds (Hibbard, Tierney, Darling, & Cullinan, 2018). New Jersey would however later announce its intent to

return to RGGI in 2019. As it currently stands, 10 states, all in the northeast, have agreed to the terms of RGGI with an 11th, Virginia, planning to join at some point in 2021.

Literature Review

A multitude of scholars have investigated the efficacy of RGGI in an attempt to better understand the reasons for its success. The following analyses focus on RGGI's impact on the economic and environmental landscape of participating states. However, per an ANT analysis, both analyses fall short in addressing how these convictions exhibit a lapse in adequately identifying and addressing RGGI's vulnerabilities, as well as their subsequent implications.

Hibbard, et al. focus primarily on the effects that RGGI has had on state-level economic development throughout the course of its existence (Hibbard, Tierney, Darling, & Cullinan, 2018). Economic data from each of the participating states was analyzed to ascertain the overall changes that have occurred since RGGI's implementation. These changes were then compared to changes observed in a counterfactual report crafted with the purpose of representing the system in the absence of RGGI. Any difference between these two reports was thereby determined to have been the result of RGGI's implementation. The results of this method showed that since its implementation in 2009, "RGGI has resulted in economic benefits for the participating states totaling $4.7 billion," $2.7 billion of which was the direct result of auction proceeds (Hibbard, Tierney, Darling, & Cullinan, 2018).

Bruce R. Huber explores how the initiative has come to take the form it currently holds. He then goes on to explain the significance of the auction system used in RGGI, as well as the implications it may have moving forward on both the wholesale and retail markets (Huber, 2013). In his analysis, he concedes the importance of adhering to the MOU's guidelines for the investment of auction proceeds, acknowledging the fact that they may be even more "important

to the accomplishment of emission reduction than the capping of emissions." In addition, he is able to identify several vulnerabilities of the auction process, acknowledging the threat of leakage, a phenomenon brought upon by excluded actors that will be discussed further in the analysis section of this paper.

Although both papers do go on to acknowledge that the success of RGGI is in part contingent upon adhering to the instructions outlined in the program's MOU, they fail to recognize or properly appreciate the magnitude by which proper investment of auction proceeds drives the success of the program as a whole. This blind spot is made particularly relevant and dangerous due to the fact that because of its perceived success, RGGI has been lauded as a "blueprint for other programs," largely informing the EPA's Clean Power Plan (Manion, et al., 2017). For this reason, ignoring the nuance and vulnerabilities of RGGI has the potential to lead to sizable negative consequences not only for the success of RGGI, but for the success of other environmental policies as well. Similarly, although Huber is aware of the importance of the reinvestment of auction profits, he makes no mention of how the imbalance of power inherent to RGGI's actor-network contributes to the fragility of these investment patterns. Furthermore, despite the fact that Huber acknowledges the threat posed by excluded actors, he dismisses it as something of little importance. By better taking into account the vulnerabilities of RGGI's actor-network, a more well-informed understanding of RGGI's condition can take root.

Conceptual Framework

The concept of ANT provides an effective framework for both depicting and decomposing the complex web of relationships that influence a network's points of strengths and stability. In this paper, ANT will follow the form laid out by the sociologists who are credited with establishing the concept: Michel Callon and Bruno Latour. At its core, ANT is a tool

through which sociologist-engineers are able to map out and isolate heterogeneous actors (both human and nonhuman) amidst complex systems (Callon, 1987). In decomposing how each actor functions and interacts within these complex systems, or "networks," boundary lines need to be drawn around the system to designate who/what the actors in this network are. Although this simplification can often by helpful in constraining the scope of the network, a great amount of nuance relating to the system is lost. Importantly for this paper, this can result in relevant actors being excluded, ignoring the impact they have on the system.

Translation, a concept first outlined by Michel Callon, is the process by which "the identity of actors, the possibility of interaction, and the margins of manoeuvre are negotiated and delimited" by and around some primary actor (Callon, 1986). This is done through four crucial steps: problemization, interessement, enrolment, and mobilisation (Callon, 1986). In the problemization phase, the primary actor defines the problem, identifies all necessary actors to be recruited, and sets itself up as the "obligatory passage point" through which all actors must pass to address their problem. In interessement, the primary actor attempts to lock other actors "into the roles that had been proposed for them." In enrolment, the primary actor defines and interrelates the various roles that they have had allocated. Finally, in mobilisation, the primary actor assumes their role as the spokesperson and head of the network. If any actor is unable to perform their role, or simply refuses to, this can result in a lack of stability for the network.

Power within these heterogenous networks is sourced from the relationships that tie each of the actors together, not from the actors themselves. The magnitude by which power can be realized by each respective actor is therefore determined by the strength of each actor's associations with other actors (Latour, 1986). Importantly for this paper, if this power is not properly balanced, it can be used by dominant actors to control a network.

Callon and Latour's Actor-Network Theory offers a productive framework for analyzing the Regional Greenhouse Gas Initiative because of its focus on how inter-actor relationships influence power dynamics within a larger heterogenous network. Latour's explanation on the sources of power will allow me to identify relationships that exhibit imbalances of power capable of jeopardizing the integrity of the network. Callon's concept of translation will aid me in understanding the role of the creators of RGGI's MOU as network builders, and how their inability to properly identify all relevant actors contributes to the vulnerability of the program.

Analysis

The actor-network of the Regional Greenhouse Gas Initiative is vulnerable from two perspectives: (i) an imbalance in the distribution of power, and (ii) a lack of focus placed on the influence that actors considered outside the network could have. The weakness that each of these perspectives highlight manifest in an actor-network that is highly susceptible to volatility in its stability. Since vulnerabilities in any actor or relationship jeopardize the security of the whole actor-network, it logically follows that if RGGI's actor-network possesses vulnerabilities, the program in itself is vulnerable. In this case, the actor-network is deficient in two respects. The following sections elaborate on each vulnerability and details how they result in an instability that has the potential to undermine the integrity of the initiative.

Network Formation

To best understand how outside actors and imbalances of power can contribute to the vulnerability of an actor-network, it is necessary to define each actor as well as the relationships that encompass the network. I will start first with defining the list of all relevant actors as the following: (i) the creators of RGGI's MOU; (ii) the MOU itself; (iii) RGGI-participating state governors; (iv) RGGI-participating state legislature; (v) energy production facilities in RGGI

states; (vi) energy production facilities outside of RGGI states; (vii) auction proceeds, intended to be reinvested in efforts that will lower greenhouse gas levels; and (viii) greenhouse gas levels. Identifying the relationships that exist between each actor comes with a complication: the network builders (the creators of RGGI's MOU) did not include the energy production facilities of non-RGGI states as a relevant actor. The actors and relationships that were intended to be in this network can be seen in Figure 1, where the actor representing the creators of the MOU is colored pink to indicate it as the primary actor and, in this case, network builder. In addition to this distinction, arrows between different actors are representative of relationships; the direction of the arrow correlates to the direction of control in the relationship, with the controller pointing to the controlled. Some arrows, such as those that connect state governors to state legislatures, flow in both directions, indicating an intended system of reasonable checks and balances.

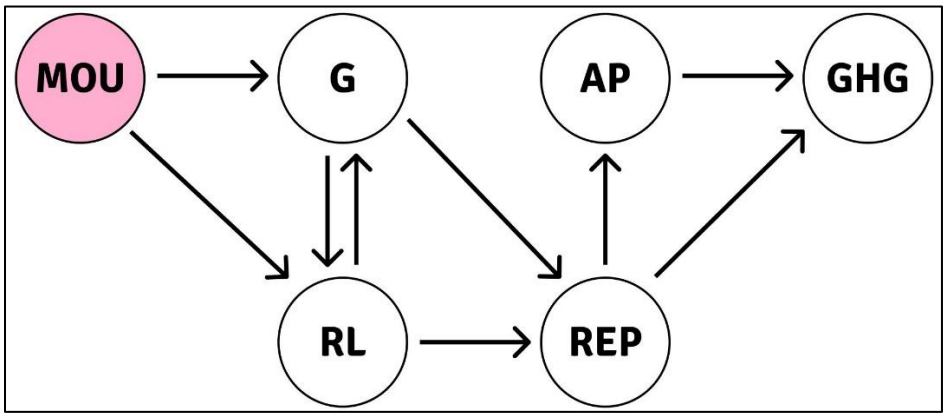

Figure 1 – The general RGGI actor-network. C is the creator of RGGI's Memorandum of Understanding, MOU is the MOU document itself, G is RGGI-state governors, AP is auction proceeds, GHG is greenhouse gases, RL is RGGI-state legislature, and REP is RGGI-state energy production facilities.

However, the actor-network that the creators of RGGI's MOU intended to build is not necessarily the actor-network that came to fruition. Aside from excluding energy production facilities outside of RGGI states, the relationships that comprise the network are not as balanced as they were intended to be, concentrating power in the hands of too few actors. The manifestation of these oversights can be seen in Figure 2.

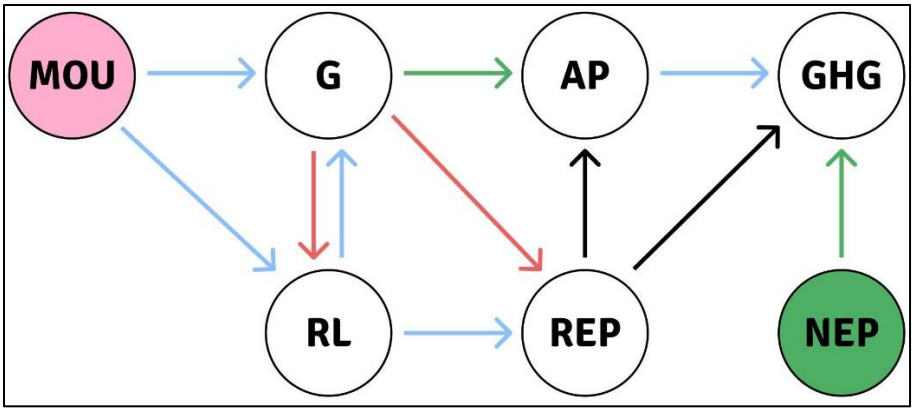

Figure 2 – The RGGI actor-network in practice. C is the creator of RGGI's Memorandum of Understanding, MOU is the MOU document itself, G is RGGI-state governors, AP is auction proceeds, GHG is greenhouse gases, RL is RGGI-state legislature, REP is RGGI-state energy production facilities, and NEP is non-RGGI-state energy production facilities.

The color green is used to refer to actors and/or relationships that were not anticipated when the program was originally laid out. The color pink is again used to denote the primary actor, and in this case network builder. The colors of the arrows are broken down in the following way: red arrows indicate a stronger relationship than was intended, blue arrows indicate a weaker relationship than was intended, and black arrows indicate a relationship dynamic that is similar to what was intended. In this way, with the exclusion of black arrows and a pink actor, all color represents a deviation from the intended actor-network laid out by the creators of the MOU. Based upon the existence of green actors, it is evident that there were issues in the problemization phase of translation, seeing as not all relevant actors were accounted for. In the same vein, based upon the existence of green arrows, it is evident that the enrolment phase was flawed as well given that not all relationships that would come to exist were properly identified.

An Imbalance of Power

In an actor-network, power is derived from the relationships that tie actors together, as was touched on before. As the level of influence/control that one actor can have over another

changes, so does its power. The focal point of these changes in power rests in the increased amount of power given to state governors and the shockwave of decreased power that has rippled through the network as a result. The negative effects of this shift in power take on two primary forms: (i) a lack of enforceability regarding guidelines for responsible investment of auction proceeds into consumer benefit programs, and (ii) the ease by which governors can make unilateral decisions regarding a state's participation in RGGI.

In order to prove that the investment of auction proceeds in consumer benefit programs is an integral component of continued success and stability in the RGGI actor-network, RGGI must first be proved to be beneficial. Between 2008 and 2019, RGGI has accounted for $5.7 billion in public health benefits attributed to improvements in air quality. Over this same time frame, auction profits have totaled $3.2 billion, much of which has been reinvested back into the economy in the form of consumer benefit programs (Ramseur, 2019). In terms of RGGI's more tangible goals, carbon dioxide levels were also reduced by 23% in participating states from 2008 to 2011.

Although this proves that the initiative has been successful, it does not prove that the investment of auction proceeds is the primary driver of the success. As of 2017, Hibbard et al estimate that RGGI had been responsible for $4.7 billion in total economic benefits, $2.7 billion of which came from auction proceeds (Hibbard, Tierney, Darling, & Cullinan, 2018). This figure for auction proceeds correlates to roughly 57% of the total economic benefits, establishing it as the primary driver of value. To further prove the importance of *where* the money is invested, New Jersey can be used as a case study.

From a technical perspective, RGGI's MOU does not constitute a legally binding commitment, thereby making a state "free to appropriate RGGI funds as it sees fit," retracting

from the informal agreement reached that each state would contribute 25% of auction proceeds to consumer benefit programs (Maher, 2011). This sheds light on issues that must have occurred during the mobilisation and phase of translation. Despite being the network builder and primary actor, the creators of RGGI's MOU do not have the ability to control or even influence the actions of state governors, thereby neutralizing their powers as the head of the network. With this in mind, then-Governor of New Jersey Chris Christie was able to redirect auction proceeds from consumer benefit programs to covering budget deficits.

By using the funds freely instead of for their intended purpose, the auction proceeds became functionally indifferent from a tax, the premise upon which Christie later used as justification for leaving RGGI in 2011. However, briefly after leaving the agreement, New Jersey was faced with a revenue shortfall of over $800 million and was forced to cut $2.5 billion from the worker's pension as a result (Baussman, 2014). Had New Jersey stayed in the program, total electricity bill savings alone would have amounted to approximately $150 million (Schneider & Elliott, 2012). This clearly displays the significance of the decreased level of control exhibited by the creators of RGGI's MOU over state governments, as well as the significance of the state governor's increased power over energy production facilities and the destination of auction proceeds.

Under the current format by which RGGI operates, entirely outlined within the MOU, power is concentrated far too intensely within too few hands, with state governors being the primary culprits. The process by which Christie withdrew New Jersey from RGGI can be used to exemplify the magnitude of this power and how the current system allows for its abuse. In 2011, after participating in RGGI for 3 years, Christie unilaterally decreed that he was withdrawing New Jersey from the program without any input from state legislature or the public. Despite a

bill in the New Jersey Senate being passed to revive RGGI policies, the majority was not enough to withstand Christie's veto (Maher, 2011). It was not until March of 2014 that the courts ruled that Christie could not opt out by decree. At this point, 3 years had already passed during which New Jersey was operating as a non-RGGI state. However, the court's ruling would make no difference because by July Christie had already initiated the formal process of manually repealing each regulation. In misunderstanding and underestimating the ability of state governors to undermine the program's goals, vulnerabilities cannot be addressed or fixed.

The Dangers Posed by Non-Actors

In order to understand the magnitude of vulnerability that the exclusion of energy production facilities in non-RGGI states from this actor-network poses, additional background on the kind of danger they pose will be necessary. Since emission production is only being capped within participating states, RGGI states are able to import energy from non-RGGI states without having to be concerned about the number of emissions that came from its production. This outsourcing phenomenon is known as "leakage" (Schneider & Elliott, 2012). Given that having to purchase allowances will often make energy production more costly within RGGI states, outsourcing dirtier energy production is often financially cheaper. For this reason, Manion, et al. argue that any CO_2 reductions are almost completely void because of increased emissions from non-RGGI states (Manion, et al., 2017).

Although it is reasonable to assume some leakage is happening, actually quantifying the amount is a task that can never be done with complete certainty. Changes in the political and economic spheres (among others) can contribute towards changes in emission outputs as well. Due to their complexity, it is extremely difficult to know with certainty what contribution each type of change made to emission outputs. A self-proclaimed "middle-of-the-road" scenario

estimates cumulative leakage through 2015 at somewhere "in the magnitude of 30%" (Chen, 2009). From an emissions standpoint, this figure is further corroborated by a model generated by Resources for the Future. In this model it was estimated that "for every 100 tons of CO_2 reductions within the RGGI region, non-RGGI states and provinces adjacent to the RGGI region could emit an additional 37 tons of CO_2" (Manion, et al., 2017). Although this implies a level of success (in that the overall trend leans towards a reduction in emissions), the aforementioned lowering of the emissions cap by 2.5% each year poses a problem. As supply is constrained, the prices of allowances are expected to raise, incentivizing RGGI states to outsource energy production.

Beyond environmental concerns, leakage pushes jobs away from RGGI participating states as demand for state-generated energy dwindles away. This reduction in demand will certainly be met with a reduction in the number of energy sector jobs available in the area. Despite northeastern states leading the shift from coal to natural gas that began in the 1990's, many of the states' energy grids are still reliant on coal-fired power to some degree. Replacing these coal-based energy sources with less carbon-intensive sources is something that "would become increasingly expensive." This problem is exacerbated by the fact that states bordering the RGGI region have "ample coal-fired power generating capacity," an alternative that likely would be less expensive, though worse for the environment, than producing the power within their own borders (Huber, 2013).

Despite studies that have found leakage to be a significant threat to RGGI's ability to make measurable difference, many scholars have taken a different stance, insisting that "improvements in energy efficiency, and consequent reductions in energy demand" will mitigate the risks associated with leakage (Huber, 2013). Although fundamentally correct, this

perspective operates under the assumption that efforts are actively being made to increase energy efficiency, a phenomenon that would require prolonged investment on the part of government entities. This assumption is disproved in the case of New Jersey where inexplicitly given the autonomy to redirect funds wherever he sees fit, the state governor opted to put the auction proceeds towards budget deficits instead of consumer benefit programs. Therefore, this perspective is incomplete, ignoring the ways that RGGI-granted autonomy at the state level can run antithetical to the overarching goals of the program.

Conclusion

Through the lens of Actor-Network Theory, I have argued that the Regional Greenhouse Gas Initiative's Actor-Network is fragile, sourcing its fragility from two primary sources: (i) an imbalance in the distribution of power, and (ii) a lack of focus placed on the influence that actors considered outside the network could have. Through these two sources of vulnerability, RGGI's network builders have contributed to a system in which continued ignorance towards the existence of these vulnerabilities will result in the initiative's demise.

Given that RGGI was designed with the purpose of improving public health through the reduction of greenhouse gas emissions, its success is of great importance to everyone, particularly those living within participating states and along coastlines. As it currently stands, the RGGI states represent 22% of the U.S. economy, equal to the world's fourth largest economy behind only China, the U.S. as a whole, and Japan (Hibbard, Tierney, Darling, & Cullinan, 2018). In the east coast of the United States, where RGGI currently has its only foothold, rising sea levels are expected to result in $7.4 trillion in lost assets for metropolitan areas by 2050 if proper steps are not taken to intervene (Maher, 2011). In order to fight climate change, it is essential to identify the vulnerabilities inherent in RGGI so that they may be properly addressed,

and fixed wherever possible. Protecting RGGI, as well as other proven climate policies, is akin to protecting humankind.

Word Count: 3852

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