Examining the market and regulatory dynamics behind the Coastal Virginia Offshore Wind project

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ABSTRACT

The Coastal Virginia Offshore Wind (CVOW) pilot project will be only the second operating offshore wind project in the United States when it enters service later this year. This gives Virginia, a state criticized for a weak regulatory environment and environmental policy that has been slow to embrace renewable energy, an opportunity to take a leadership position in the development of this zero-carbon resource. One explanation for the CVOW project's emergence is the Diffusion of Innovation Theory (DIT), which relates the rate of adoption of novel solutions to factors such as relative advantage, compatibility, complexity, trialability and observability – all factors which play, to varying degrees, in favor of this project. Another explanation involves an inversion of Regulatory Capture Theory (RCT). RCT posits that regulated industries capture otherwise neutral regulating bodies, to the detriment of the generic public interest. Others argue that RCT underplays the degree to which regulators prioritize the interests of the regulated community over the public interest, defending a Climate of Capitulation Theory (CCT). While Virginia has recently taken an aggressively pro-wind policy position as it competes with other states to serve as a hub for the offshore wind

industry and responds to voter interests in sustainability, the CVOW project problematizes RCT. It also suggests that a real-world climate of capitulation may not always work against the public interest. Judiciously combined with DIT, CCT can explain how external pressures on Virginia government, combined with internal pressures exerted by public opinion in relation to the development of the offshore wind industry, are steering 'capitulation' in directions that assist the public interest in sustainability. In the real world of energy politics, and against RCT, regulators are and have never been neutral, and therefore liable to capture. In a climate of capitulation, and setting aside other questions of the public interest, the willingness of regulators to serve the interests of the regulated community can, when taking external and internal factors into account, redound to the public interest in sustainability.

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GENERAL AUDIENCE ABSTRACT

Virginia has historically been criticized for a weak regulatory environment and for having environmental policies that have been slow to embrace renewable energy. Yet, the state is about to become home to just the second offshore wind project in America and plans are moving forward on a proposal to build the largest offshore wind project in North America off the Commonwealth's coast by 2026. This thesis explores the factors that led to the development of the Coastal Virginia Offshore Wind (CVOW) pilot project and how Virginia became a major player in this zero-emission clean energy resource. One explanation is provided by the Diffusion of Innovation Theory (DIT) which details how innovative solutions take hold and examines factors which can accelerate adoption rates. Another explanation is found by considering an inversion of Regulatory Capture Theory (RCT). RCT is premised on the idea that regulated industries can hold sway over the regulating bodies, often to the detriment of the generic public interest. A variation of RCT focused on Virginia environmental policy, Climate of Capitulation Theory (CCT), explains how Virginia regulators have, at times, not provided strong enough environmental protections.

However, the CVOW project shows how the regulated community, policy makers and public opinion are coming together to position Virginia at the forefront of the offshore wind industry and how the willingness of regulators to serve the interests of the regulated community can serve the interests of both the public and the environment, as well.

Dedication

This project would not be possible without my family whose patience, support and love sustained my efforts. I also owe a debt of gratitude to Dr. Scerri for providing the motivation and guidance throughout this process.

Acknowledgements

The long-form first-hand interviews conducted as part of this research project provided a great deal of clarity and context for this project. My sincere gratitude goes to those participating in interviews for this research for sharing their perspectives on the Coastal Virginia Offshore Wind project, the impact of federal and state regulation on the project and the global and domestic offshore wind landscape.

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Chapter 1: Introduction

Offshore wind is growing as a zero-emission resource, with more than 176 projects in operation globally and installed wind capacity expected to grow 12-fold from 22.6 gigawatts to 272 gigawatts in the coming years. In the United States, offshore wind development is still in its nascent stages with just one project currently generating power. However, momentum is growing with 41 more projects currently under development with the potential to provide 25.8 gigawatts of energy (NREL 2018, 12). An effort currently underway to build the first offshore wind farm in the mid-Atlantic by Virginia's largest electric utility, Dominion Energy, has the commonwealth positioned to take a leading role in the advancement of clean energy.

The Coastal Virginia Offshore Wind (CVOW) pilot project consists of two wind turbines expected to be in service in 2020. A proposed 2,640 megawatt build out could follow in the adjacent lease area, if lessons learned from the pilot prove out large-scale viability. A wind farm of that scale would be a sizable source of renewable energy which could displace fossil fuel-based forms of electricity generation and significantly reduce greenhouse gasses. (VOWDA, 2019)

Virginia would not have been a likely state to take such a leadership role just a few years ago. Three theories help inform the transformation. Diffusion of Innovation Theory (DIT)

explains the market factors enabling the rapid rate of adoption of the offshore wind industry domestically while Regulatory Capture Theory (RCT) and its Virginia energy policy-specific subset Climate of Capitulation Theory (CCT), explain the incumbent political forces which would seem to keep it at bay.

1.1 Research Questions

Questions about the decisions made and the motivation behind them are implicit in case study designs (Thomson, 51). For example, interviews conducted as part of this study provide insight into the role Virginia Governor Ralph Northam's executive orders on carbon emissions and on the potential participation in regional cap-and-trade initiatives had on Dominion Energy's motivation for the project. What did the company have to gain, what risks did it face, and what interests were at the core of that decision? What events or discussions led to changes in those factors during the planning and implementation phases? How did the economic climate impact the desire to innovate? Was the project furthered by the Clean Power Plan, Democratic gains in the Virginia legislature or changes in public opinion? Did environmental sustainability drive the need for offshore wind or is the motivation driven more by business and financial concerns?

Questions also help shed light on the perspectives of the administrative, legislative and regulatory community. What organized interests were part of the policy making process? Is the project an example of market-based regulation or the result of command and control schemes? What events or discussions led to shifts in the perspectives throughout the project?

1.2 Study Design Overview

The exploration of offshore wind in Virginia dates back to at least 2006 when the General Assembly passed Senate Bill 262 creating the Virginia Coastal Energy Research Consortium to study coastal energy issues.

The Coastal Virginia Offshore Wind (CVOW) pilot project's inception came in 2012 when the U.S. Department of Energy (DOE) awarded the lease through the Bureau of Ocean Energy Management (BOEM) to Dominion Resources, Inc., which partnered with the Virginia Department of Mines, Minerals and Energy (DMME) and others to establish the Virginia Offshore Wind Technology Advancement Project (VOWTAP).

As the CVOW project sits in federal waters while providing electric service to Virginia customers, it crosses both federal and state jurisdictions and involved regulatory bodies from both sets of agencies. Over the past eight years, Dominion Energy has engaged with numerous federal entities, including DOE, BOEM, the

Army Corps of Engineers, U.S. Fish and Wildlife Service, the National Marine Fisheries Service, the U.S. Department of Defense, the U.S. Department of Commerce, and Environmental Protection Agency. Additionally, the project is subject to review by state agencies in Virginia including the Department of Environmental Quality (DEQ), State Corporation Commission (SCC) and DMME. As the project is one of the first offshore wind projects projected to go into service in the United States, the permitting process is rigorous. It would also be the first to be owned and undertaken by an investor-owned utility in the U.S. and the first constructed in a federal lease area.

Through a series of long-form interviews with members of the federal and state regulatory community, as well as with members of the regulated community I will explore the market and regulatory factors at play in CVOW and offshore wind's expansion in Virginia and across the United States. Using their observation and other public data I will see how DIT, RCT and CCT can help explain how Virginia has become a state where "it used to be that you couldn't be elected governor of Virginia without an approval from the coal lobby and that's not true anymore," according to Respondent 1, a senior official at a Virginia regulatory authority.

1.3 Outline

In order to place the CVOW project in the proper market and regulatory context we will first conduct a review of the existing literature. While there is little contemporaneous research on the topic, there is significant research on the shifts in environmental policy and the impact on renewable energy expansion. Further, we will rely largely on the authors of three significant theories contributing to research related to this study. Everett M. Rogers' research on DIT provides the fundamental market framework for our exploration, while George Stigler's work on RCT provides the regulatory framework. Further, Thomson's CCT research based off her first-hand experience provides specific insights on Virginia's energy policy.

A series of long-form, in-depth interviews allows an exploration of how those theories were enacted through CVOW. As this project crosses both state and federal jurisdictions it was imperative to interview members from both state and federal regulatory agencies. Respondents 2 and 5, both officials with a federal regulatory authority both provide perspective from the federal side of the project, while Respondent 1 provides a state-level account. Inclusion of the perspective from the regulated community was also important. Respondents 3 and 4, officials from Ørsted Energy and Dominion Energy respectively,

explain the industry perspective based on their involvement with the CVOW project.

Respondent	Title	Agency
1	Senior Official	Virginia Regulatory Authority
2	Senior Official	Federal Regulatory Authority
3	Senior Official	Ørsted Energy North America
4	Senior Engineer	Dominion Energy
5	Official	Federal Regulatory Authority

Through this data, and other public materials, we will examine the CVOW project to see how market and regulatory factors led to its conception, acceptance and construction to gain a better understanding of the forces at play in the broader offshore wind industry and Virginia energy policy dialogue. The conclusions drawn will better inform future research on these topics and further contextualize the DIT, RCT and CCT arguments to date.

Chapter 2: Literature Review

2.1 Environmental Policy and Renewable Energy Growth: External and Internal Pressures for Change in Virginia

Virginia's position as a potential national leader in offshore wind development would have been hard to foresee just a decade ago. Researchers have found in Virginia "cultural inclinations

and institutional weaknesses" which complicate the ability for "state officials to develop responsive, effective plans for reducing carbon dioxide from fossil-fuel-fired power plants." (Thomson, 17) As will be detailed later in this thesis, researcher Vivian Thomson contends in her Climate of Capitulation Theory (CCT) this is due, in part, to three key factors which allow a disproportionate influence to the regulated community: lax campaign finance laws, a traditionalistic political culture and a part-time legislature. (20)

Yet, Virginia is expected to soon be home to just the second offshore wind project operating in America. Once completed, the two 6-megawatt wind turbines 27 nautical miles off Virginia Beach will make the Coastal Virginia Offshore Wind (CVOW) pilot project the first in the mid-Atlantic and first in federal waters. Further, Dominion Energy – the largest electric utility in the state – will be the first utility to own an offshore wind project and has stated its intent to develop the largest offshore wind project in America in the lease area adjoining the pilot project. By 2026, up to 650,000 Virginia homes could be powered by the project's 2,640-megawatt installation, according to the company's projections. (Dominion Energy, 2019)

These planned expansions in renewable energy resources have occurred with only minor changes to Virginia's campaign finance laws, and no real adjustments in political culture and part-time legislature. Instead, a combination of pressures ranging from growth in global renewable markets to statewide changes in public opinion, political representation and environmental policy have driven this shift. As such, an exploration of the CVOW pilot project allows an opportunity to reflect on the CCT and how it is at play in Virginia today.

The dramatic increase in domestic adoption of this zero-carbon resource has occurred in largely the last ten years. The considerable shift has been documented by the Department of Energy's work through the National Renewable Energy Laboratory (NREL), which has been tracking the industry's progress. In 2010, it issued a benchmarking study showing 42 projects around the globe had an installed capacity of 2,377 MW. (22) At that time, the United States had no offshore wind projects built and just 20 in the planning and permitting phase representing 2,000 MW of generation. (2)

Still, the study foreshadowed the expansion of offshore wind power in America as a "essential contribution to a clean, robust and diversified U.S. energy portfolio" given the country's "large and accessible offshore wind resource" with the potential capacity of 4,000 GW or four times 2010's existing

capacity. (4) The growth could bring along with it $200 billion in new economic activity and 43,000 permanent, well-paid technical jobs. (2)

The study acknowledged barriers, such as limitations of technology, costs, environmental and social risks and called for "a sustained, nationally focused research and development initiative" to find solutions. (4) Further it noted uncertainties, such as financial risks, costs related to installation, operation and maintenance and decommissioning, as well as reliability and efficiency concerns. Another complication noted was the lack of institutional knowledge both domestically and in Europe, where utility-scale projects had less than a 10-year operational history at the time. (7) While it noted that costs could decrease through a combination of technological improvements and industry experience, it suggested the federal government strategically partner with states with high potential for offshore wind development. (7-8).

Ten years later some of NREL's suggestions appeared to have come to fruition, spurring the industry in the United States, though it still lags global capacity. NREL's most recent report showed a nearly ten-fold growth in global installed capacity compared to the 2010 report showing 176 operating projects with a total installed capacity of 22,592 MW were in place by the end of 2018. (11) Further, the total capacity for planned

installations globally was about 272,000 MW with medium-term forecasts of between 154 to 193 GW by 2030(see fig 2-1). The United States continues to lag with only one project in operation – the Block Island Wind Farm in Rhode Island with an installed capacity of 30 MW – however the domestic pipeline had grown to 25,824 MW. (9) In the medium-term forecasts put U.S. offshore wind capacity at 11 to 16 GW by 2030 (see fig 2-2). (12)

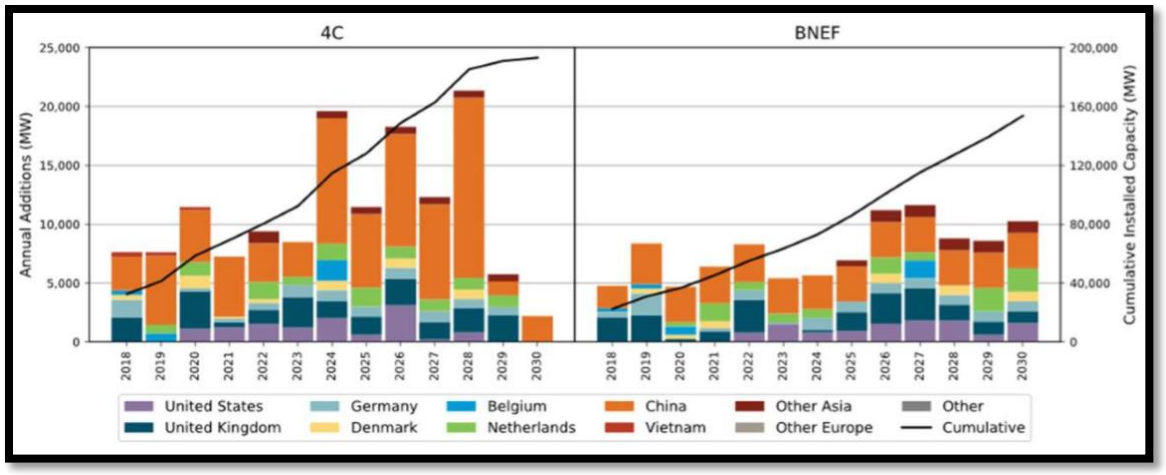


Fig. 2-1. Medium-term wind capacity forecasts by country through 2030. Graph from National Renewable Energy Laboratory. *2018 Offshore Wind Technologies Market Report.* (Washington, 2018)

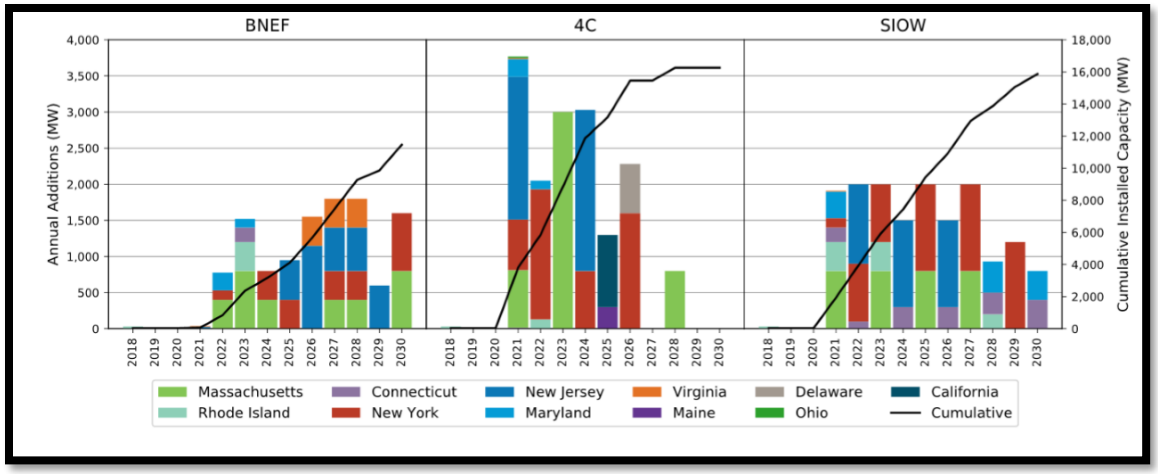


Fig. 2-2. Medium-term wind capacity forecast in the United States through 2030. Graph from National Renewable Energy Laboratory. *2018 Offshore Wind Technologies Market Report.* (Washington, 2018)

Domestic offshore wind growth over that time period has not seen uniform support in the form of federal policy. The American Recovery and Reinvestment Act of 2009 during Barack Obama's presidency provided "more than $100 billion in spending, tax incentives and loan guarantees to promote energy efficiency, renewable energy development, fuel-efficient cars, and control of climate-warming emissions" (Rosenbaum, 35). New and revised environmental regulatory programs enacted by the Environmental Protection Agency (EPA) provided stricter limits on fossil fuel combustion which were furthered by the Clean Power Plan (CPP) in 2015. The CPP established state-by-state goals for carbon emission reductions from electric utilities but has been largely discarded under Donald Trump's administration and is facing prolonged litigation delaying or denying its implementation (37).

Renewable energy development has its own set of costs and benefits, both economic and social, to consider. (Vig & Kraft, 2018) Economic costs once served as a heavy finger tipping the scales of energy planning toward reliance on fossil fuels, such as coal and natural gas. The price gaps between fossil fuels and renewable energy have diminished as the levelized cost of energy for fixed-bottom offshore wind projects, like the CVOW project, have fallen globally and are expected to continue to decrease (see fig 2-3). Yet economic conservatives, Republicans, the energy sector and industries requiring high energy use all have been slow to embrace renewable energy sources, such as solar and wind (295). The Trump administrations rollback of Obama-era regulations and resultant inertia in the private sector created greater activity from activists and an increase in state-level regulations, which have filled the federal regulatory vacuum and continued programs to limit greenhouse gas emissions. (20, 294)

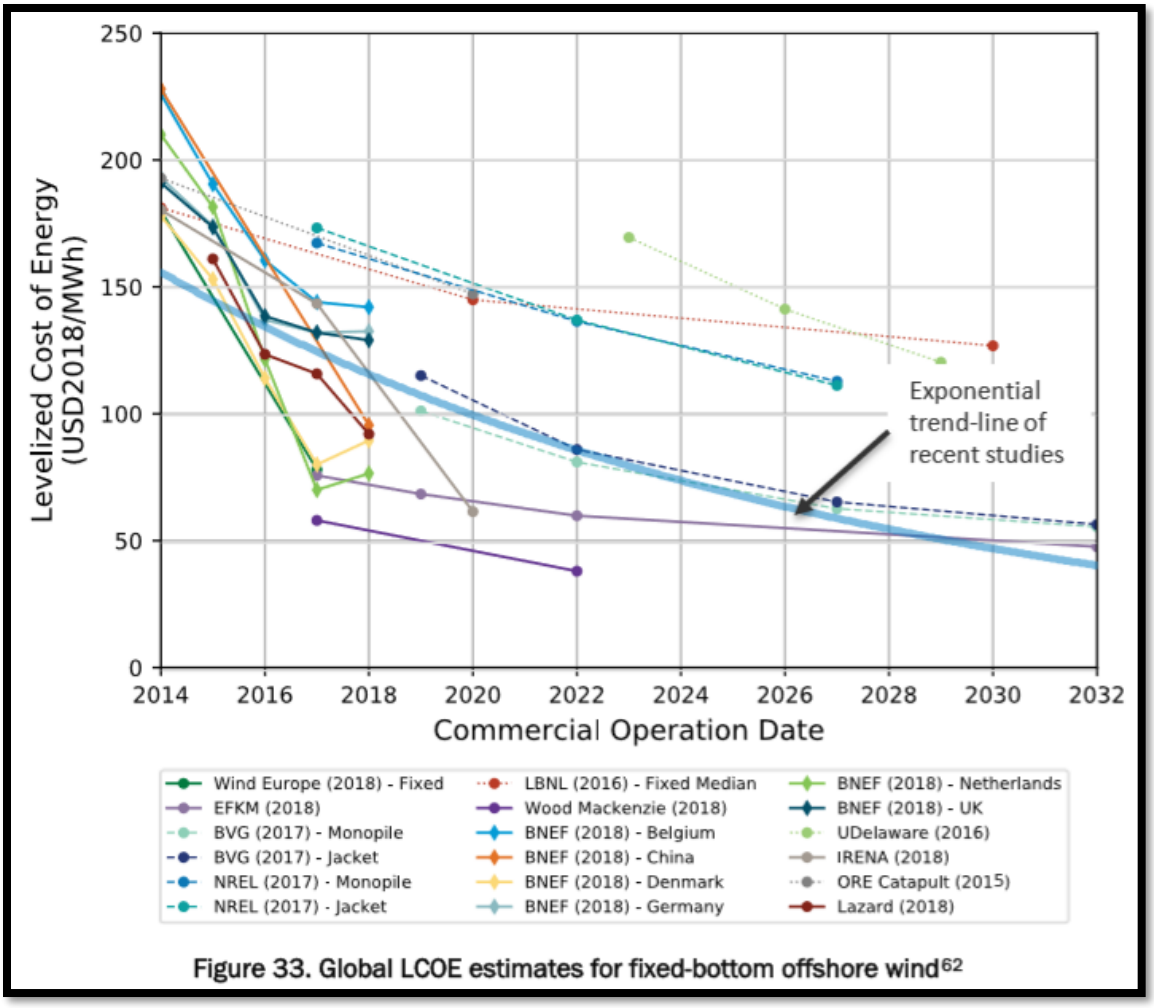


Fig. 2-3. Global levelized cost of energy estimates for fixed-bottom offshore wind projects. Graph from National Renewable Energy Laboratory. *2018 Offshore Wind Technologies Market Report.* (Washington, 2018)

NREL specifically cites state-level environmental policy commitments as a key driver for the increase in market interest with significant increases occurring in 2018. The commitments came in the form of renewable portfolio standards, carbon

reduction policies, and specific offshore wind mandates totaling 19,968 MW of offshore wind capacity by 2035. (18) In Virginia, a 2,000 MW target was set in the state energy plan published in October 2018 (20).

Since then, Virginia has taken several more significant policy leaps in support of the offshore wind industry. Governor Ralph Northam's administration has further raised the bar on offshore wind via executive order calling for development of up to 2,500 MW of offshore wind by 2026 (Commonwealth of Virginia, 2019). Two months later Democrats won a majority in both the Virginia Senate and House of Delegates making it the first time in 26 years a Democratic governor could rely on a majority from his party in both houses and held the Governor's Office. Meeting for the first time in Richmond in January 2020, the Democrats introduced a number of energy policy bills aimed at bolstering renewables and transitioning away from fossil fuels. The result was a comprehensive energy reform bill, calling for several measures to strengthen environmental policies, including a renewable portfolio standard, participation in the Regional Greenhouse Gas Initiative and a massive expansion in solar and wind energy. Gov. Northam signed the legislation which calls for up to 5,200 MW of offshore wind by 2035. (Virginia LIS, 2020)

At the same time, sustainable development has become increasingly important for public and private institutions.

(Rosenbaum, 2017). Economic, social and environmental components are now taking a more central role in policy making and implementation (47). The environmental justice movement has grown in size, skill and political influence (200). Public opinion has flagged at times, but on the whole support for environmental protection is widespread (92).

As these shifts have taken place, private industry has expanded plans for offshore wind energy in Virginia. The two-turbine Coastal Virginia Offshore Wind pilot project owned by Dominion Energy is currently under construction and expected to go into service later in 2020. Following Governor Ralph Northam's executive order, the company announced plans to build the largest offshore wind project in America adjacent to the pilot project (Dominion Energy, 2019). It named Siemens Gamesa Renewable Energy (SGRE) as the preferred turbine supplier for the project and during the General Assembly SGRE indicated it was "actively examining" the possibility of a $200 million blade manufacturing facility in Hampton Roads. Ørsted Energy, which is contracted by Dominion Energy for the engineering, procurement and construction on the CVOW pilot project, signed a lease for space at the Portsmouth Marine Terminal which could service nearly three gigawatts of wind energy projects in the United States (Foxwell, 2020).

It's worth exploring what role the combination of both market factors and policy support in Virginia have played in creating an environment in which the offshore wind industry is enabled to grow, despite the recent obscurity of the industry in America and the recent criticism of the state's regulator of favoring the regulated community over the environment. By exploring how three theories -- Diffusion of Innovation Theory, Regulatory Capture Theory and Climate of Capitulation Theory – apply when viewed through the lens of the CVOW pilot project we can get a better sense of the context behind Virginia's shift to renewable energy sources.

2.2 Hurdles and Accelerants: Diffusion of Innovation Theory

To understand how Virginia came to be on the brink of taking a leadership position in the domestic expansion of the offshore wind industry, we must first understand the drivers behind the rapid acceleration in adoption of the offshore wind industry, globally and domestically. An explanation can be found in the Diffusion of Innovation Theory (DIT) originally posited by Everett M. Rogers in 1962. DIT has been applied to a number of innovative solutions across industries over the course of decades to explain the success or failure of those solutions and the key influences of adoption rates.

DIT provides a framework for examining innovation and explains the factors, actors, and stages involved in the adoption of new solutions. The diffusion of these solutions, defined by Rogers as the "process by which an innovation is communicated through certain channels over time among the members of a social system," is a kind of social change and "a special type of communication, in which messages are concerned with a new idea." (5-6). The process is made up of four main elements: the innovation, communication channels, time and the social system involved, as seen in figure 2-4. (10-11)

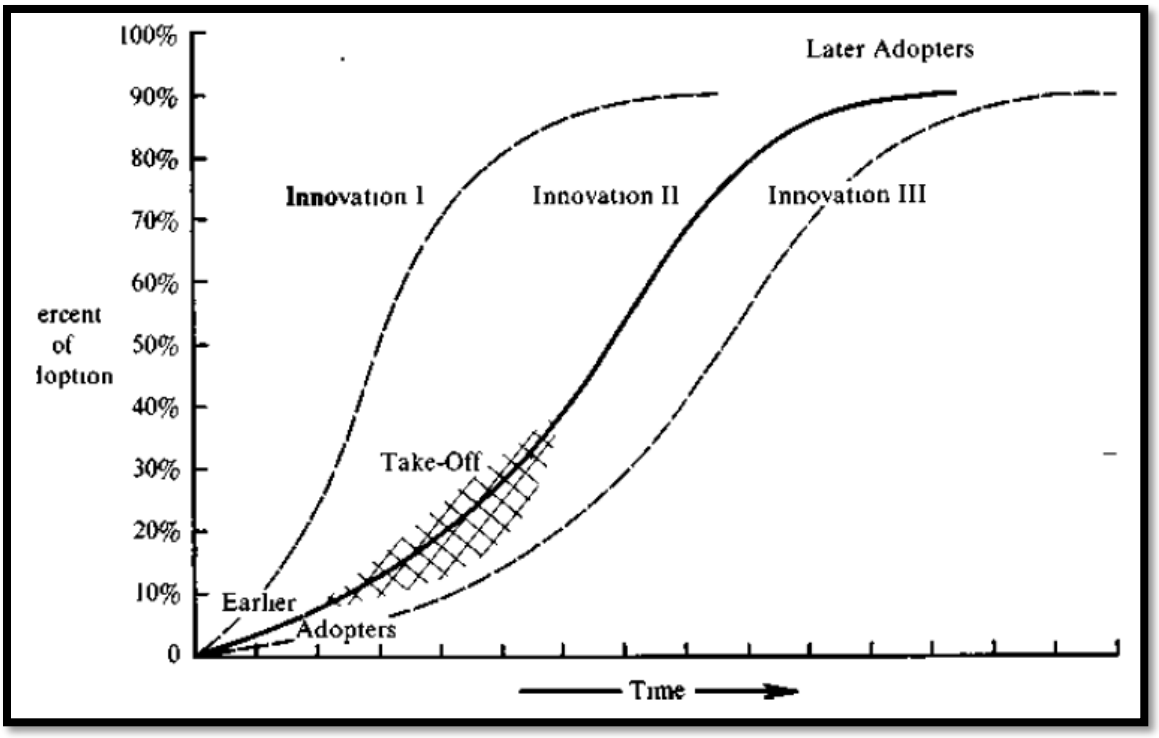
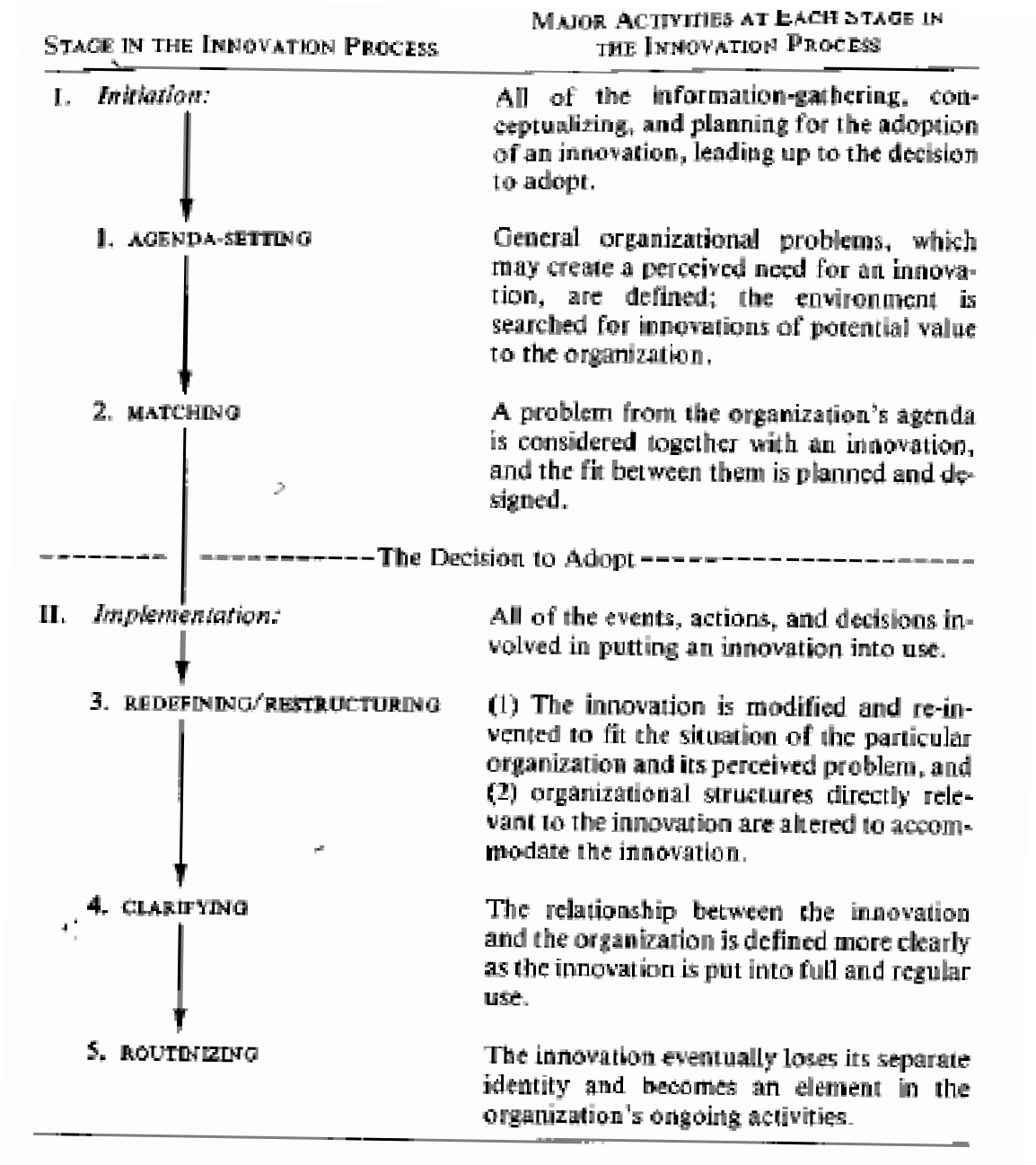


Fig. 2-4. DIT defines the process by which innovations diffuse through a social system. Graph from Everett Rogers, The Diffusion of Innovation. (New York: Free Press, 1983)

DIT also defines the process of innovation development, identifying five stages in the innovation-decision process and

the categories of adopters that interface throughout the process. The phases are defined as 1) knowledge, 2) persuasion, 3) decision, 4) implementation and 5) confirmation (see fig. 2-5).



Stage in the Innovation Process	Major Activities at Each Stage in the Innovation Process
I. *Initiation:*	All of the information-gathering, conceptualizing, and planning for the adoption of an innovation, leading up to the decision to adopt.
1. AGENDA-SETTING	General organizational problems, which may create a perceived need for an innovation, are defined; the environment is searched for innovations of potential value to the organization.
2. MATCHING	A problem from the organization's agenda is considered together with an innovation, and the fit between them is planned and designed.
The Decision to Adopt	
II. *Implementation:*	All of the events, actions, and decisions involved in putting an innovation into use.
3. REDEFINING/RESTRUCTURING	(1) The innovation is modified and re-invented to fit the situation of the particular organization and its perceived problem, and (2) organizational structures directly relevant to the innovation are altered to accommodate the innovation.
4. CLARIFYING	The relationship between the innovation and the organization is defined more clearly as the innovation is put into full and regular use.
5. ROUTINIZING	The innovation eventually loses its separate identity and becomes an element in the organization's ongoing activities.

Fig. 2-5. Stages in innovation-decision process Graph from Everett Rogers, The Diffusion of Innovation. (New York: Free Press, 1983)

A full study of how DIT applies to the CVOW project and the offshore wind industry as a whole would require more detail and greater scope than available here. Instead, we will focus on the five characteristics listed in DIT which have historically shown to be the major factors in explaining the variance in rates of adoption (238-240):

1. relative advantage
2. compatibility
3. complexity
4. trialability
5. observability.

We will now explore how DIT defines each of these characteristics so that we can later examine their application in CVOW to provide greater perspective on the broader adoption of the offshore wind industry domestically and globally.

DIT defines relative advantage as "the degree to which an innovation is perceived as better than the idea it supersedes." (233) Relative advantage is one of the best predictors of an innovation's rate of adoption as it places a value on the solution in comparison to the status quo. (Rogers, 217) This takes into account both economic and other factors in

determining relative advantage, such as social-prestige, convenience and satisfaction. (15)

Compatibility, as defined by DIT, is "the degree to which an innovation is perceived as being consistent with the existing values, past experiences, and needs of potential adopters." (223) If an innovation is congruent with prevailing values and norms, it is more likely to be adopted. Conversely, incompatibility can block adoption. The caveat to this is if a new value system is adopted, which can then allow the adoption of an innovation which is incompatible with prevailing values and norms. (15) In addition to normative and value-based compatibility, innovation's rate of adoption is tied to the degree it meets clients' needs. (225)

The third characteristic used in DIT is complexity, defined as the perceived difficulty of the innovation to understand and use. In order for innovations to have a faster rate of adoption they must reduce uncertainty. The easier the solution is to understand and apply, the faster it will be adopted. Complex solutions require time for individuals to understand and adopt. (231)

DIT defines the fourth characteristic, trialability, as the "degree to which an innovation can be experimented with on a limited basis." (231) This reduces uncertainty and perceived risk and speeds rates of adoption. The final characteristic is

observability, or the “degree to which the innovation is visible to others.” (232) Seeing an innovation in action provides discussion among similar groups and spurs clustered adoption which can then diffuse through social systems.

Innovations which combine these characteristics – relative advantage, compatibility, trialability, observability, and less complexity -- are adopted more rapidly. (36) Studies have found these five attributes were responsible for 49 to 87 percent of variance in the rate of adoption of an innovative solution. While most innovations follow the s-shaped rate of adoption depicted in figure 2-4 those with greater perceived merit in those characteristics will have a steeper slope. (23)

The remaining variables, type of innovation-decision, communication channels, nature of the social system and the extent of change agents’ promotion efforts, (see fig. 2-6) account for the remainder of the variance in adoption rates.

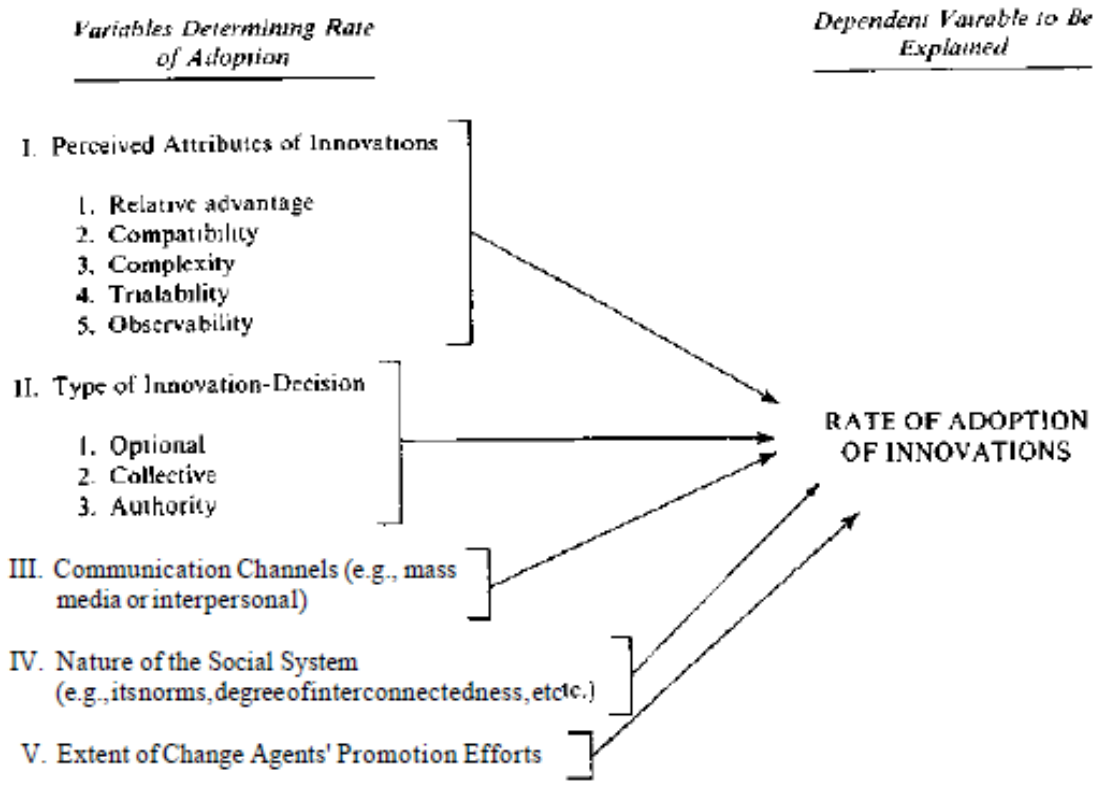


Fig. 2-6. Variables in determining rates of adoption in DIT. Graph from Everett Rogers, The Diffusion of Innovation. (New York: Free Press, 1983)

DIT explains that all innovation-decisions can be divided into three standard types (347).

1. *Optional innovation-decisions* are choices made by an individual without regard for the decisions of other members of a system.

2. *Collective innovation-decision* are consensus decisions among the members of a system.

3. *Authority innovation-decisions* are decisions made by a few individuals in a system who possess power, status, or technical expertise.

These three innovation-decision types explain how social systems can adopt an innovation: by individual members, by the entire

system collectively, or by the entire system following an authority decision. (29) The latter is seen when a "relatively few individuals in a system who possess power, status, or technical expertise" choose to adopt or reject an innovation. (30). While in the former two explanations the rate of adoption is guided by the exertion of influence, authority-innovation decisions are a matter of implementation. These sorts of decisions provide not only the fastest rate of adoption for innovations, but also are more common in formal organizations – such as government organizations -- than the other forms of decision making. We will take time later in this study to discuss the type of innovation-decision involved in CVOW and how that impacts the other remaining variables.

Another key factor in adoption rates are the norms, or established behavior patterns, of the social system in which the innovation is presented. (27) Normative variance from one system to the next has been found to lead innovative solutions to produce vastly differing outcomes. Rogers and Kincaid illustrated this point in their investigation of the diffusion rate of family-planning methods in Korean villages. (26) Twenty-four villages offered the same slate of contraceptive options resulted in widely varying results.

One village had 51 percent adoption of the IUD (intrauterine device) and only one vasectomy adopter.

Another village had 23 percent adoption of vasectomy. Yet another was a "pill village" in which all of the adopters chose to use contraceptive pills. Clearly these differences were not due to the nature of the national family-planning program in Korea, which had promoted the same ' 'cafeteria'' of contraceptive methods in all villages for ten years prior to our data gathering. The explanation for the different contraceptive behavior from village to village had to come mainly from within each village. One explanation was these systems' norms.

Taken together, these factors can help explain how an idea takes off and spreads through a social system. For our purposes, we will use the DIT framework to explore the global and domestic expansion of the offshore wind industry and to explain how CVOW came to be in Virginia today.

2.3 Regulatory Capture Theory

While DIT provides an explanation for the success and adoption rate of innovative solutions, it doesn't explain the relationships between the regulatory agency and other key players involved in the CVOW project or provide adequate contextualization of the impacts of environmental policy changes at the state and federal level. For that we need to look to other existing research, namely Regulatory Capture Theory (RCT)

and a Virginia energy policy-specific subset, Climate of Capitulation Theory (CCT).

Regulatory capture has been explored in some depth. Steven Croley indicates how pervasive the concept of regulatory capture has been in scholarly research of all fields (26).

> *This account holds sway over much scholarly discourse about public law institutions generally, and regulatory bodies in particular. Even those who approach regulation indirectly – from the perspective of other legal fields or even other disciplines – often seem osmotically influenced by the public choice theory's conclusions.*

At its core, RCT explains the ability of powerful interest groups to win over the favor of regulators, often when those who write the laws and those who enforce them are complicit in providing leniency to the regulated industry. Alternatively, it can occur because the administrators themselves show favor toward the desires of the regulated community. In nearly all cases, the powerful industry interests are able to tip the scales in order to gain a benefit, usually but not always economic, at the expense of the public interest. (Stigler, 1971)

Nobel laureate George Stigler's seminal work on the subject, *The Theory of Economic Regulation,* in 1971 set out to explain "who will receive the benefits or burdens of regulation, what form regulation will take, and the effects of regulation upon the allocation of resources." RCT holds that "regulation is

acquired by the industry and is designed and operated primarily for its benefit" and disputes counterarguments that the political process is irrational or that regulation can be harmful to the public only at the cost of a greater social goal (3).

RCT explains the ways in which industry will use influence to seek four sets of powers of the state; direct subsidies, suppression of rivals, subsidies and complements, or price-fixing (4-6). The primary manner for achieving these powers is legislation and the larger the industry, the greater the cost to obtain the favorable legislation. In exchange, the industry is expected to produce votes and resources (12).

Jean-Jacques Laffont and Jean Tirole's *The politics of government decision-making: A theory of regulatory capture* further supports the foundational research on the topic, exploring the tensions between regulatory bodies and the regulated community. They too cast aside the view that regulatory agencies are "benevolent maximizers of social welfare" focusing instead on RCT. Through statistical modeling they conclude "interest-group politics can be apprehended in a tractable agency framework."

While public regulation does not always serve the public good, industry's influence over the regulator is not always seen as a net detriment to society, according to Laffont and Tirole

(10, 17). Other researchers, including Croley, found "The administrative process constrains agencies with poor regulatory proposals, as well as empowers agencies to do what is socially beneficial" (267). In fact, Stigler himself states, "When an industry receives a grant of power from the state, the benefit to the industry will fall short of the damage to the rest of the community." (10) Failure to do so will empower the opposition party thereby reducing the influence over those currently in control.

2.4 Climate of Capitulation Theory

Thomson further explores RCT as it applies to Virginia's environmental policy in *Climate of capitulation: An insider's account of state power in a coal nation* (2017). She presents a multi-case design study exploring three air pollution permit decisions from 2002 to 2010 during her term as a member of the Virginia's Air Pollution Control Board – a citizen regulatory board with environmental regulatory decision-making power. She details the forces which constrained or enhanced the board's actions regarding two coal plant permits – one at Potomac River Generating Station in Alexandria and another at the Virginia City Hybrid Energy Center in Wise County. Similarly, she details the influences exerted on the board in assessing dust from coal

trucks and related health hazards in the community of Roda in southwest Virginia.

Thomson finds these cases cannot be fully explained using RCT, which she argues is "not universally applicable to air pollution policy processes in Virginia." (91). Rather, she argues, the situation regarding the relationship between regulators and the regulated community in Virginia, as witnessed during her Air Board tenure, requires more nuance.

> *As such, I have adopted the term 'climate of capitulation' to describe the persistent tendency by elected politicians and [Department of Environmental Quality] staff members and mangers to yield to the regulated community's preferences, whether those preferences were explicitly stated or merely anticipated. In a climate of capitulation, powerful business interests are often able to constrain the political agenda and receive favored treatment in the environmental policy arena. Civil servants shrink from taking action that displeases polluting companies, not because those civil servants are unethical but because of longstanding, enforced understandings and patterns of behavior.* (93-94)

The forces involved in a 'climate of capitulation' can take many forms. Thomson characterizes the forces involved in Climate of Capitulation Theory (CCT) along three dimensions of power. The first, public expression of power, involves overt incentives or punishment, such as campaign donations. The second, hidden coercion, is seen through mobilization of bias through the use of information and expertise to control agenda setting and prevent policy options unfavorable to the regulated community.

The third, invisible coercion, describes the unconscious shaping of policy through institutional or cultural factors developed over long periods of time. (110, 111)

Thomson further argues this CCT subset of RCT applies in each of the 13 southeastern United States. Relying both on her first-hand knowledge and extensive understanding of Virginia's environmental and political landscape, as well as an analysis of "cultural inclinations and institutional weaknesses" of other top coal consuming and producing states, she argues that "these deeply imbedded tendencies, which stand outside of partisanship or public opinion and are likely to foster resistance to reducing air pollution from electrical generating facilities, complicates the Clean Air Act's shotgun marriage between the [Environmental Protection Agency] and the Southern states with respect to their shared responsibilities for reducing power plant air pollution." (17, 143).

2.5 Research Method/Methodology

While the works on DIT, RCT and CCT provide the framework for this exploratory work, additional interviews with the entities involved in the development of CVOW help provide definition for the three theories interplay in this project. The research also helps provide additional context to allow analytical generalizations to be further divined from the theories.

The single-case study design methodology employed in this study is laid out in Robert Yin's *Case study research: Design and methods.* Yin's work details the processes necessary to ensure internal and external validity in case study research. It provides key guidelines to adhere to when the research scope is limited to a single case and relies upon in-depth interviews and historical documents. A single-case study research design provides an exploratory method to answer the sorts of in-depth "how" or "why" questions in ways that experimental, survey, historical or archival analysis research methods cannot address (37). It is especially appropriate given the lack of controls and contemporary nature of the events in this study (49).

This study will build on the foundations of environmental policy detailed in Norman Vig and Michael Kraft's *Environmental policy: New directions for the twenty-first century* and Walter Rosenbaum's *Environmental politics and policy.* The research in these two books gives a comprehensive overview of the domestic energy policy landscape both prior to Thomson's tenure on the Virginia Air Control Board and the development of the CVOW project, as well as in the years following.

To fully understand CCT requires a background on RCT. A series of studies on the topic of regulatory capture have providing confirmation of Stigler's RCT. Jean-Jacques Laffont and Jean Tirole's *The politics of government decision-making: A*

theory of regulatory capture provides the foundational research on the topic, exploring the tensions between regulatory bodies and the regulated community. However, we should also take into account other studies presenting alternative views. Case studies must consider alternative perspectives to challenge the assumptions of the research and bring to light other propositions to inform the case-study (328). As Yin states:

> *These perspectives may be found in alternative cultural views, different theories, variations among the stakeholders or decision makers who are part of the case study, or some similar contrasts (329).*

To provide greater context, I bring in countervailing research, such as Steven Croley's *Regulation and public interests: The possibility of good regulatory governance* which offers a qualified defense of the effectiveness of regulatory government. Oksan Baylugen and Jeffrey Ladewig (2016) also challenge RCT by arguing clean energy reforms are often slowed by political constraints.

By gathering publicly available primary source data from federal and state agencies, as well as semi-public material made available by Dominion Energy, historical data from grey sources such as media releases and reports, combined with long-form interviews with key individuals in both the regulatory and the regulated communities, the study helps better assess the forces and policy decisions, internal tensions and approaches toward

state and federal regulation which allowed the project to reach its current phase.

Interviews with key stakeholders provide both the perspective of the regulated community and the regulator. Interviews with federal and state regulatory authorities provide insight into the primary regulatory bodies involved in the CVOW project, while interviews with Dominion Energy and Ørsted Energy will allow for an understanding of the regulated community and industry's interests at play in the project.

Chapter 3: Analysis and Discussion

3.1 Diffusion of Innovation and Virginia's Offshore Wind Adoption

DIT provides a strong explanation for offshore wind growth in the United States and for the CVOW project in particular. The project's inception can be traced to 2012, when the federal government auctioned off parcels off the East Coast for potential development. At the time, there were no active offshore wind projects and the opportunity to be on the bleeding edge of the domestic offshore wind industry was so fraught with risk that few were willing to wade in. The market was still on the flat, pre-incline time horizon of DIT's signature S-curve, but there were early signs that the zero-carbon resource would provide the relative advantage over existing fossil fuels, become increasingly compatible with the values and norms of Virginians and benefit from the lack of complexity, prospects of trialability and advantages of observability needed to accelerate the rate of adoption.

These shifts occurred as the process went through the five steps defined by RCT in the innovation-decision process:

1. knowledge
2. persuasion
3. decision
4. implementation
5. confirmation

Knowledge of commercial offshore wind as an energy resource dates back to 1991 in Europe when Denmark began operating the word's first offshore wind farm with 11 turbines operating at a capacity of just under 5MW. (Olsen & Dyre, 1993). In the United States, development can be traced to a "regulatory regime established in 2009" in the United States," according to Respondent 2, a senior official at a federal regulatory authority. In Virginia, the concept really began to take hold in the subsequent years as BOEM began to discuss plans to auction off lease areas for development up and down the East Coast. At the time, it was clear that the innovative solution did not have the right mix of the elements needed for adoption: relative advantage, compatibility, complexity, trialability and observability.

"There was not a lot of interest to dive in and so you had a combination of the ability for somebody to grab that lease area and grab it at a fairly low cost," explains Respondent 3, an official for Ørsted Energy. The world's largest offshore wind developer was not a player in the U.S. market at the time of the options but has since been named the engineering, procurement and construction contractor for the CVOW pilot project. Dominion Energy, the largest utility in Virginia with 2.5 million customers, won the rights to develop the 113,000 acre site for $1.6 million in a federal lease auction in September 2013. It

was only the second commercial lease auction following the 164,750 acres in the Northeast won by Deepwater Wind New England LLC for $3.8 million. In contrast to the 2013 auction, a recent auction in 2018 drew $405 million for 390,000 acres, a per-acre cost more than 70 times higher than what Dominion Energy paid for the CVOW lease area.

At what now seems like a bargain, Dominion Energy was able to secure an area that is "very attractive" for offshore wind development, according to Respondent 3. "The wind blows more consistently and more predictably in an area where you can still use the type of technology that makes it as economic as possible, which is the in-ground monopile foundations."

Furthermore, the project's geography allowed it to avoid two key barriers which could prove challenging for others; visual impacts and conflicts with other marine uses. "You could go so far out and still be in reasonably deep or shallow water, it eliminated a lot of the resistance that there would have been from the people along the shore, particularly the Virginia Beach people. So, at 27 miles they won't even be able to see them out there. And so that was a big part of it," explained Respondent 4, a senior engineer at Dominion Energy.

A cohort of supporters from the environmental advocacy, private and public sectors came together to begin the next step in the process, persuading the broader public to adopt this

innovative solution to economic growth and environmental stewardship. The group included local officials from Virginia Beach, Norfolk and Accomack City; state officials from DEQ, DMME, Department of Natural Resources and others; as well as federal officials from BOEM, the National Oceanic and Atmospheric Administration, National Park Service, Coast Guard, Fish and Wildlife Service, and more. The public entities were joined by private interests such as Dominion Energy and Apex Wind Energy, environmental activists including Sierra Club, Nature Conservancy, Chesapeake Climate Action Network and Southern Environmental Law Center; as well as trade groups like the Virginia Maritime Association and many others.

Having already persuaded the Navy, localities impacted and the shipping and other maritime industries of the relative advantages of offshore wind, DMME was able to secure the lease area for the research project and named Dominion Energy the Designated Operator for the project in 2012. With the CVOW pilot project scheduled to go into service this year, we will see the implementation phase of the process followed by confirmation. Should both be successful, we should see the innovation become mainstream in Virginia with the potential for further diffusion across other parts of the United States.

Their efforts were aided because adoption would come in the form on an authority innovation-decision. As referenced earlier,

these types of decisions generally have the fastest rate of adoption and ease the steps of implementation and confirmation. In this case, the authority with power to make the decision lied in the hands of a relative few, including DMME, BOEM and Dominion Energy. Moving from knowledge to confirmation required shifts in the perception of offshore wind, including that it had a relative advantage over the existing options. This evolution occurred over the course of the past 10-15 years. As a result of economic and regulatory factors, the level of certainty in the innovation has increased, the risk has decreased, and the adoption rate has increased.

The project benefitted from some existing support for the project in the Hampton Roads area, which has historically been oriented toward marine industries. Respondent 5, an official at a federal regulatory authority, counted the successful engagement with others, as well as the areas pre-existent inclination for marine industry as factors demonstrating congruence between the project and values. "There was a lot of interest in the stakeholders from Virginia and from the ports in the Hampton Roads area who are very supportive of finding an area which fits because it fits their businesses. They are a maritime community, but more of an industrial maritime community than a recreational or commercial fishing community."

Shifts in the political climate and in views of environmental stewardship provided a greater degree of compatibility between the emergent technology and the societal norms, values and the needs of Virginians. The efforts at persuasion took time to take hold but increasingly led to cohesion among the key parties as a result of public policy support, advances in the global market and the leveling off of onshore wind adoption, according to Respondent 4. "You had the gradual pressure to start to develop renewable energy, and offshore wind was one of them. And, I think, things came to a head there where it's like, 'All right, we can do this. The Europeans have been doing it and we should do it.' And particularly in the east coast or in the eastern part of the United States, the resistance against onshore wind is so high that offshore wind was probably going to be the only viable place to do it, except for some very small areas."

Respondent 2 pinpoints the period where the shift in the domestic offshore wind industry occurred.

> *This market, this whole industry changed dramatically two or three years ago when the industry realized that this is where we're going for the future. And that's why these leases have gone through such substantial amounts of money because there's great potential here. And not just as an add on to our sources of energy, but as a very, very fundamental component of the energy mix that we have that this is in the east.*

The rate of adoption was further aided by the familiarity with offshore research and commerce – not only because it provided compatibility, but also reduced the perception of risk with this type of "experimental" endeavor. This type of reduction of complexity is another key characteristic defined by DIT. Siting, construction and operation of offshore wind turbines is a complex task, and was particularly complex at such an early stage in the U.S. industry, but the proclivity created through historical familiarity with marine construction in Hampton Rods made for greater ease of understanding and use. Respondent 1 explained the transferable nature of the skills involved:

> *From a workforce standpoint and from a manufacturing standpoint the fact that we have the largest and most sophisticated maritime workforce in the nation is a huge benefit. I tell people that what we do in Hampton Roads is large-scale maritime steel. It doesn't matter whether it's an aircraft carrier, a wind turbine or a submarine, that's what we do down there. It's all the same thing. And so, that's giving us a huge leg up as far as training workforce and things like that. It's almost like we almost don't need to train them we just need to about double the size of them.*

Trialability also came into play with the CVOW pilot project, as the research lease allowed for a limited buildout of just two turbines to further reduce uncertainty and perceived risk.

The idea of a small, research-driven project was anachronistic to the U.S. offshore wind industry, but provided Dominion Energy with a unique opportunity "basically to test the technology and support the activities that the Dominion lease

would be getting into on a much larger scale," explained Respondent 3. Respondent 5 agreed:

> *I think that starting with the two turbines really gave folks a primer into what the process would be so they're more informed as we start talking more turbines. And now, it's interesting that there was no middle ground. It wasn't a two to 75 [turbines]. It's my understanding that they're anticipating somewhere around 220, the largest contiguous commercial wind project in the world right next to the smallest.*

In fact, Dominion Energy cited the lessons learned in the CVOW pilot project when it announced it was moving forward with full development on the lease area for the commercial project just three months after construction began on the first two turbines (Dominion Energy, 2019). Respondent 5 believes that was "the driver for the research lease from its inception" saying the goal was not to test "hurricane stability or the economics of the project, but the Virginia research lease really tested the federal agencies' process."

As the pilot project goes into operation, it will provide additional observability of offshore wind in action in the United States. This fifth component factoring into adoption rates will likely speed acceptance of offshore wind resources domestically, according to Respondent 3.

> *I think the value of having large-scale turbines in federal waters installed and spinning in the U.S. is going to be really, really important for the industry at large in seeing that this is real, that these things are happening… The industry is going to be looking to*

> *the CVOW project and pointing at that and saying, 'Look, it's here. These things are spinning, they're working.' That is going to help the industry apply continued pressure to move forward on these larger projects. So, maybe CVOW won't ever get the due it's deserved but these [turbines], in all likelihood, will be spinning for 18 months to two years before any other project is installed on federal waters and that is a net benefit to the industry.*

One last point to make, which will be further elaborated upon below, is the degree to which normative changes accelerated offshore wind adoption in Virginia. Just as Rogers and Kincaid found varying rates of family planning adoption due to normative variances in the study of Korean villages, the shifting perceptions and norms around environmental issues in Virginia impacted the five characteristics detailed in DIT resulting in more advantageous outcomes for the CVOW and commercial-scale offshore wind projects.

3.2 Regulatory Capture Theory as Applied to CVOW

The clearest evidence that market factors alone, as described by DIT, cannot provide a complete explanation for CVOW is the description provided by Respondent 1 of how the political climate in the project's early years challenged Virginia's offshore wind development.

> *Just mostly having Republican controlled houses, a more conservative mindset [was a barrier]. Coal is still a very important factor in our economy, but it used to be that you couldn't be elected governor of Virginia without an approval from the coal lobby and*

> *that's not true anymore. So, as we've seen the reduction of coal, you've also seen the reduction in coal's power. As a result, you've got Virginia being not as heavily controlled by fossil fuels as previous generations.*

Certainly, this comment supports DIT. For example, it speaks to compatibility and alignment with the norms and values of the social system. However, by layering in RCT we can get a better understanding of the power dynamics at play. What Respondent 1 describes speaks directly to the core of RCT; the ability of a powerful lobby supported by an entrenched political structure to capture the regulator and suppress rivals in exchange for producing votes and resources.

It also presents an explanation of how Virginia was able to shift to renewable energy sources despite RCT, specifically through the weakening of the coal lobby as a result of market factors. This is explored by Baylugen and Ladewig (2017) who find "pro-renewable policies often generate opposition from fossil-fuel companies, fossil-fuel-intensive industries and large utilities that fear losing profits and market share." (51) Industry allies with the state and acts a "veto player" to serve as a political constraint to renewable energy expansion. However, as the industry's power is weakened and political constraints fall, adoption rates of renewable energy accelerate. (53)

To understand how RCT applies in Virginia, we examine through the work of Thomson how energy policy at the state level was politically constrained by these forces during her term on Virginia's Air Pollution Control Board. She details the tools of power -- economic strength, campaign finance contributions, information, technical-legal expertise, citizen voice and agenda setting – used by the regulated community to undermine the board and influence the state legislature and governor. She cites three specific cases in her research; the Mirant power plant in Alexandria, the Virginia City Hybrid Energy Center in Wise County and an issue involving high dust levels stirred up by coal truck traffic in Roda. (Thomson, 12-14). In each, she claims the Virginia DEQ favored the regulated community or that the Air Pollution Control Board was politically restricted.

In the Mirant power plant case, Thomson shares how state officials created "procedural and substantive obstacles" to the citizen board's recommendation for a stringent air permit, while lawmakers "undercut the Board." In the end, she found the Air Pollution Control Board "did not hold all of the cards. Rather, the Board's powers were contingent, constrained by deeply rooted political and economic understandings in Virginia." (25) In some cases, regulators used inaction as a way to favor the regulated community, citing what one staff member of the DEQ told a Joint

Legislative Audit and Review Commission about fear of retribution for regulatory enforcement:

> *Few of my colleagues believe the agency is being steered toward environmental protection. Too many times we have been instructed to back down from a protective stance so that permittees will not be upset… Agency procedures have been tossed out when a permittee challenges them, simply to keep the permittee happy. There is no spine. So long as I do as I am instructed, I do not think my job is at risk. (28)*

Further, Thomson recounts efforts by Mirant's attorneys and the CEO of electric utility Pepco to get the governor to intervene on behalf of the regulated community in opposition of the regulator. There were also efforts to pass legislation that would dilute the citizen board's power by expanding membership or transferring their authority to the DEQ. (29)

She reported similar concerns in Wise County, where 46-percent of the economy depended on the coal industry in 2005, and where Dominion Energy was seeking an air permit for a coal and wood-fired power plant. The construction of the plant came with legislative support in the way of a 2004 bill not only enabling a new coal plant but also declaring it "in the public interest." While the plant would create 800 construction jobs and $5 million in annual tax revenue and also consume waste coal that was polluting rivers and streams, environmental advocates saw the plant "as a public health, environmental and economic liability." (47)

Thomson cites both federal and state policy making as political constraints upon the Air Board. The U.S. Environmental Protection Agency had not declared carbon dioxide a pollutant under the Clean Air Act, making it unclear whether the Board could limit carbon dioxide emissions. At the state level, legislation passed by the General Assembly allowed the expansion of the Air Pollution Control Board. The board grew concerned if they refused the permit, the governor would appoint two newly required members and replace one departing member with citizens who would favor industry and defer to the captured regulator instead of the citizen Board. (48)

The new members were seated before the Board took on a petition by the Sierra Club to establish fugitive dust regulations after concerns about health and safety from trucks along mining routes in the town of Roda. In this case, there were no overt legislative or regulatory actions which prevented the board's vote. Rather it was more a lack of concern or action that Thomson saw as resulting from industry's influence.

There are signs of RCT at play in each of the three cases that Thomson chose in her study. She points to several factors which enable the regulated community to gain favor over the regulator; lax campaign finance laws, a traditionalistic political culture and a part-time legislature. (20) These factors haven't changed significantly since her 2017 study, nor

has the RCT framework, so it is worth exploring how RCT explains the CVOW project.

In the CVOW project, we also see concerns over industry influence manifested along the lines elaborated in RCT and, in some respects, it resembles actions described in Thomson's case studies. Specifically, we see coalition building involving the regulated community and the regulator, as well as examples of legislation which enables the project and directs the regulator. The significant distinction between RCT in these cases and the CVOW project is the way in which favor for industry impacts winners and losers in the outcome.

As previously discussed, a project of the complexity and scale of the CVOW pilot project and possible furtherance into commercial build requires a significant coalition of support. So, it is not surprising that the regulated community and regulators would both provide input to ensure feasibility for long-term goals. In this case, the alignment between the parties goes beyond participation in fact-gathering and extends to a close working relationship on a project with billions of dollars at stake.

Respondent 5 says the coordination between state, federal, private industry and other key stakeholders was an intentional effort from 2008 to 2012 aimed at consensus building prior to the lease auctions. "It was more the stakeholder agencies that

are on our task forces informed BOEM's decision. And we cleared all the red flags with the applicable task force members, and in 2012, determined that we had enough information to make the decision to go forward with that commercial competitive lease. And we had interest from industry as well."

An expansive 134-member stakeholder process led by BOEM prior to auction was able to ensure the viability of the research area -- an area Respondent 3 calls "one of the most de-conflicted areas that we have in the U.S." However, it took work to get agreement among all parties in defining the area involved. Respondent 5 notes that the area is near Oceana Naval Base, the largest such facility in the world and one which "provides its own constraints." Respondent 1 puts it more plainly: "You don't sneeze in Hampton Roads without Naval permission."

By ensuring the Navy, commercial fisherman and shipping industries were all included in the stakeholder dialogue, the area was optimized for offshore wind development. An example Respondent 3 provides is how the northwest corner of the lease area "is actually shaved off and that is because of commercial shipping interests needed an extra buffer." Additionally, Respondent 5 says the decision to go forward with lease auctions in 2012 was largely the result of having enough information to

make a decision, which resembles the process of diffusion detailed in DIT of knowledge, persuasion and decision.

The shift from information gathering and governmental process to decision and industry action came simultaneously in 2015 when BOEM awarded the lease area to DMME, which named Dominion Energy as the Designated Operator. Virginia Offshore Wind Technology Advancement Project or VOTWAP, as the project was then named, was still not a guaranteed success. Challenges would follow, including navigating federal and state permitting without any precedent to work from. Also, of note was the difficulty Dominion Energy had in securing a developer at a cost which the company felt was prudent. The lengthy search resulted in delays which led the U.S Department of Energy to withdraw $40 million in federal funds over fears the project would miss a 2020 operational date. Interviews with state and federal regulatory authorities, Dominion Energy and Ørsted Energy all revealed a degree of difficulty endured in CVOW which was unlike anything other domestic offshore wind projects have since faced. As Respondent 3 explained:

> *It was the first [lease area] that BOEM had ever done, the first one that BSEE (Bureau of Safety and Environmental Enforcement) had ever done, the first one that a lot of these federal agencies had ever done. So, the out of the ordinary risks were having an entity walk with hand in glove with the federal agencies as they create regulatory frameworks to evaluate future projects.*

To date, the CVOW pilot project remains the only fully permitted project in U.S. federal waters. Respondent 5 explains the difficulty on the federal regulatory authority's part in trying to ensure it was proceeding in a manner that would set a process for future projects.

> Before the research plan was approved, the federal government had never issued a project easement to an offshore wind farm. We wrote it from a blank page, but now people know what a project easement looks like. We had the requirements to submit a construction and operation plan, but nobody knew what the table of contents included. So, we would do a research activities plan, followed the same, showed people what was going to be required, and they could use that as a reference point. Although projects would change, nobody knew what the bar was until we approved the research activities plan.

This sort of freehand regulatory exercise resulted in delays and duplication, according to Respondent 4.

> *They would review the environmental stuff even though US Fish and Wildlife and EPA were going to do that. So, it was sort of an extra step there that from our point of view wasn't necessary. You had people in BOEM, say, reviewing the historic resources evaluations and coming up with totally different questions than the national historic resources organizations and the state organizations. It was extra work that from my point of view wasn't necessary, because we already had organizations whose job was to look at that stuff.*

Given the unique circumstances at play in permitting and development, it's unclear whether the collaboration and consensus building employed was a necessity or an example of the regulated community and regulator operating in close

coordination bred by sympathetic relationships characteristic of RCT.

Virginia's offshore wind industry, including the CVOW pilot project and the proposed commercial-scale project being developed by Dominion Energy, benefitted by legislation passed by the General Assembly and policy decisions by the governor to further the industry on multiple occasions.

While several pieces of legislation have helped encourage the exploration and development of offshore wind in Virginia, two have been the most significant in spurring the CVOW pilot and the commercial project. After Dominion Energy selected Ørsted Energy for the CVOW pilot in 2017 and indicated it was committed to completing the project by 2020, legislation was introduced to provide policy support for the pilot and subsequent commercial project. Senate Bill 966, also known as the Grid Transformation & Security Act of 2018, deemed 5,000 MW of solar and wind in the public interest. When the SCC approved the CVOW pilot project later in 2018, it made clear it was following the directives in the sweeping energy policy bill, stating (SCC, 2018):

> *The Commission concluded that the offshore wind project 'would not be deemed prudent [under this Commission's] long history of utility regulation or under any common application of the term." However, the Commission ruled, as a matter of law, that recent amendments to Virginia laws that mandate that such a*

project be found to be "in the public interest" make it clear that certain factual findings must be subordinated to the clear legislative intent expressed in the laws governing the petition.

The second piece of legislation is the Virginia Clean Economy Act just signed by the governor which went further than the 2018 bill in declaring 5,200 MW of offshore wind by 2035 in the public interest. It also directed construction by Dominion Energy of one or more utility-owned and operated offshore wind facilities between 2,500 and 3,000 MW in capacity and declared those projects be in the public interest and presumed costs were reasonably and prudently incurred so long as they fit certain prescribed guidelines dictating procurement, cost and timing. The legislation also includes participation in the Regional Greenhouse Gas Initiative and a Renewable Portfolio Standard, both of which effectively subordinate any remaining primacy of fossil-fuels and accelerate their displacement by renewable energy sources.

Public policy support for offshore wind development has also been directed by Gov. Northam during his term in office. In 2018, as the SCC was weighing Dominion Energy's petition to build the CVOW pilot, the Virginia Energy Plan called for 2,000 MW of offshore wind to be deployed by 2028. The following year, Gov. Northam issued Executive Order 43 which set a goal of 100-percent carbon-free electric generation by 2050 and up to 2,500 megawatts of offshore wind by 2026. Two days later, Dominion

Energy proposed their 2,600 megawatt offshore wind project saying it was "rising to the challenge" set by Gov. Northam. (Dominion Energy, 2019)

This level of support from the governor and General Assembly, facilitated by Democrats holding the governorship and a majority in the House of Delegates and Senate, provide strong indicators to regulators about the policy choices of the Commonwealth and further assured regulatory approval of future petitions by the regulated community. "Dominion was waiting on the governor and we finally had to get the right governor and the right set of people to put it forward," explained Respondent 1.

However, this is not a strict enactment of conventional views of RCT as posed by Stigler. First, Stigler acknowledges regulators are inherently susceptible to capture and not "maximizers of social welfare," so the mere perception of alignment or coordination to the benefit of the regulated community is not a de facto example of RCT in action. Second, RCT explains how industry uses its influence to benefit itself, usually financially, at the public's expense. With respect to Virginia energy policy this would traditionally be conceived as utilities and fossil-fuel lobbies influencing legislation to direct regulatory favor of projects that increased their economic pursuits at the peril of the environment.

Instead, the CVOW pilot and commercial project are exemplary depictions of something quite different. The regulated community is able to secure through the influence of powerful allies in the legislative and executive branches of the state advantage for projects which are beneficial financially, but also provide positive normative outcomes for the public and the environment.

Croley raises the possibility of this type of beneficial regulatory action in the face of otherwise challenging market forces. He argues legislators and regulators are not simply acting on behalf of industry, but on behalf of societal goals which industry can help achieve. In so doing, regulators are not simply providing favor to the regulated community due to their undue influence. Instead, regulators are acting on behalf of a broader public interests. (267)

Baylugen and Ladewig's examination of the politics involved in expansion of renewable energy found policy factors, such as financial incentives, renewable portfolio standards, and price-fixing, were key to enabling adoption. "Even though the exact combination of policies varies from one country to another, policy promotion makes a difference in the renewable energy performance of countries." They found renewable energy adoption benefited when political constraints decreased, and government support increased. (62) We see this shift taking

place in Virginia and the potential for further displacement as offshore wind gains greater adoption, as Respondent 3 explained:

> *From an environmental standpoint, I think the prospect of offshore wind being a major displacer of fossil generation in the Northeast and the mid-Atlantic I think is potentially significant. It will never be a dispatchable resource that can be leaned on fully, but it can be a major driver in large scale de-carbonization and a lot of it is due to displacement of fossil generation not just adding a load on top.*
>
> *In the mid-Atlantic, maybe a little bit different but the more offshore wind we can get, the less there is a need for new natural gas plants. So, I do think it can be an aid in driving large scale de-carbonization in the fuel mix as a fossil displacing mechanism. From an environmental benefit standpoint, I think it does have tremendous potential.*

As renewables displace fossil fuels, the influence of the latter industry wanes and the former gains greater policy support and subsequent adoption rate acceleration. Certainly, DIT provides an explanation for the acceleration of offshore wind adoption, but the policy support provided allows regulatory forces to prevent market failure and ensure positive outcomes for the public.

3.3 Climate of Capitulation Theory Seen Through CVOW's Lens

CCT provides another, largely complementary, view of RCT as it pertains to CVOW. It provides greater definition around the factors which create opportunity for RCT in Virginia energy policy and more directly explains the dimensions of power

through which they are executed. However, it also shows how RCT is not applicable across the spectrum of policy actors and actions in the Commonwealth's dialogue around environmental issues.

The CVOW project provides an opportunity to revisit Thomson's research and add additional context. Interviews reveal additional variables at the level of the normative orientation of most of the RCT scholarship. They also provide insight into whether Dominion Energy's actions can be seen as another example of an administrative and legislative apparatus that lies wholly in the thrall of the regulated community, as is often the case in RC theory (Thomson, 92).

The degree to which this alignment was an evolution as the project moved along the innovation-decision process is unclear. At the outset, the cadre of supporters included the regulated community, environmental groups and the maritime industry. However, there is disagreement over the level of support in those early stages for the project at the state level and the degree to which state and the regulated community were aligned. Both officials at the federal regulatory authority believed there was a high degree of compatibility driving this project in all sectors from the outset. Respondent 5 felt that support was apparent at the federal and state level as demonstrated by the

task force engagement of the project. Respondent 2 echoed this sentiment even more strongly.

> *The effort is all focused on having all of those players at the table working together, which I think is what we've done successfully with regard to this project because the state through DMME, the power company through Dominion, the federal government through BOEM, and this coordination with other federal agencies have all worked together to make this project come about. I think it is and it hopefully will continue to be a real success story. All of those parties that you mentioned are basically players in all of these projects that go on here and elsewhere, and coordination amongst all of them so that all needs can be accommodated is critical to the success of the project.*

However, Respondent 4 made clear the company was not entering the project with a forgone conclusion of its success, saying it was instead "an experiment" for the company. "We were looking at it, we were going to see whether it was doable. And Department of Energy had some grant funding that was being contributed to help with that." Respondent 1 indicated apprehension at the state level as well, and a lack of alignment toward offshore wind deployment between the private and public sector as a cause for forestalling an increase in the rate of adoption. She stated that "Dominion was waiting on the governor and we finally had to get the right governor and the right set of people to put it forward."

The change in leadership came in 2014 when Democrat Terry McAuliffe took office succeeding Republican Bob McDonnell as

Governor of Virginia. Democrats maintained the governor's mansion with the election of Ralph Northam in 2018. Their power was further consolidated when Democrats took control over both houses of the Virginia General Assembly in the November 2019 elections. With single-party control over the Senate, House of Delegates and Governorship for the first time in 27 years efforts to ensure development of offshore wind gained even more momentum.

This was proved out to some extent when Dominion Energy supported the enabling legislation passed by the General Assembly in 2018 declaring the project in the public interest and again in 2020 when the new democratic majority in the General Assembly passed enabling legislation for the larger commercial scale project. This can be seen as a first face display of power growing out of the utility's strong position as the leading corporate political donor in the state and a part-time legislature that ranks low on a scale of professionalism (94).

Dominion Energy's pursuit of the federal lease area off the coast of Virginia Beach can be viewed as a use of the second dimensions of relational power -- an effort to keep other options off the table and control the agenda. Securing the only lease area off Virginia's coast precludes any other entity from participation in offshore wind development. Further, state

partnership aligns the regulated community -- Dominion Energy -- with those who have direct impact over the regulator through legislation. With state support for offshore wind development and exclusive rights to the area involved Dominion Energy has a degree of de facto regulatory approval.

Thomson makes a point to differentiate CCT from RCT by pointing out that RCT "is not universally applicable to air pollution policy processes in Virginia" citing a great deal of leadership and action by legislators and policy actors in support of public health and the environment. RCT links outcomes of regulatory processes to the intents and actions of the regulated community over a sustained period of time. (90). Thomson's multi-case study is a "mixed bag" in this respect. Further, she rejects the construct in RCT of wholesale corruption because it fails to recognize "public officials can and do seek to serve the public interest." (93)

CCT, on the other hand, is simply a "persistent tendency by elected politicians and DEQ staff members and managers to yield to the regulated community's preferences." Industry is the constraining force in the environmental policy arena, though Thomson argues this is not because of unethical politicians but systemic weaknesses including weak campaign finance laws, a traditionalistic political culture and a part-time legislature.

(102) Whether ethics or construct are to blame, norms remain at the core of CCT.

The challenge in applying CCT here is that, like all cases, the CVOW project doesn't come with clear normative winners and losers. Dominion Energy stood to gain financially by pursuing an environmentally beneficial project, but they also bore a great deal of risk. Building a fossil-fuel plant and on offshore wind project are vastly different exercises, not only in terms of construction, but also in terms of regulatory hurdles, according to Respondent 4:

> *We don't normally deal with offshore stuff. So, the National Marine Fisheries, whales, all that stuff is not something we're used to dealing with. So, I'd say that was a risk or a regulatory hurdle that we dealt with that was not normal. Dealing with the [federal agencies], particularly BOEM, was a regulatory hurdle. They are an organization that we just historically have never dealt with under whatever name they were going by. And that was that was a difficult process, I think. We didn't have a relationship with them or a working knowledge with them, and they didn't have a strong working knowledge of how to go about it either. And I think in particular, BOEM was doing a much more thorough, even extreme regulatory oversight.*

The state stood to gain by having Dominion Energy take on the project not only because it allowed furtherance of stated policy objectives to advance renewable deployment, but also because it transferred risk from the public to the private sphere. Respondent 5's description of the benefits and challenges associated with the state entering into the lease reveals the

manner in which Dominion Energy was able to assume that relieve the state of risk while still providing benefit:

> *The federal agency's jurisdiction stops at three miles offshore, and then the state has jurisdiction under the Submerged Lands Act, so then the state owns the lease. [The Commonwealth has] to ask themselves for a state permit. I would say that probably helped. And they then pick the landing point at Camp Pendleton, which is a state military base, which is not accessible to the public, which limited impacts to public beaches.*
>
> *So, I think that the state itself may have had some benefits, but then you have to counter that with the state has a higher threshold for environmental reviewing compliance then maybe a commercial entity would. So, they are accountable. So, I think that having partnered with Dominion as their operator, they could promote it in the public interest.*

The federal government stood to gain by having Dominion Energy take on the risk, in much the same way that the state did. Respondent 2 says Virginia boasts a "world-class market, world-class winds and a buildable environment" as fundamentals for a successful project. The experience provided by the CVOW pilot will help other projects up and down the East Coast because they will now have an established framework, both in terms of regulation and construction. Respondent 3 provides one further example the company experienced in its work on the project:

> *All of the electrical standards that the turbine was being built to were European standards, but they have to fit in with the US regulatory construct. So, we had a ton of back and forth with the federal agencies about how that can happen -- how we can build something in Europe that is going to be done to European standards*

> *but making sure that it complies with the US regulatory standards… The hurdles were literally being put into place while you were trying to overcome them at the project. So, that creates a lot of risk in knowing timing of when this stuff is going to get approved and knowing that the feds are going to be comfortable with taking the industry's word for [the standards].*

Finally, the public at large in Virginia stood to gain as well with the additional zero-carbon resource, economic development through the project and related industry jobs, and displacement of fossil-fuels resulting in better environmental outcomes.

The case is unlike the Mirant, Wise and Roda cases in Thomson's study in this normative respect and, therefore, provides another lens through which to gain contextualizes CCT. It provides an alternative explanation for how the regulated community can exercise influence to pursue outcomes that are not solely for their own gain and instead align with public norms.

Conclusion

While it would have been difficult just a decade ago to predict the domestic growth of offshore wind and, particularly, the role Virginia appears poised to play in that expansion, this study helps provides greater understanding of the factors that enabled this to transpire. DIT demonstrates how innovative solutions can diffuse through a social system, and how adoption rates can accelerate based on market and societal factors. Meanwhile, RCT and CCT explain how the regulated community through faces of power can exercise influence over the regulator to effect outcomes.

Applying these theories to the domestic offshore wind industry as a whole, and to CVOW in particular, provides an explanation of how these various factors converged in Virginia to bring these developments to pass. In the case of CVOW, CCT and RCT help explain the role industry has served in bringing the project to fruition, while DIT can explain the role industry played in accelerating the diffusion of the idea through the social system.

Several key factors contributed to the development of the CVOW pilot project, including the global growth of the offshore wind industry, falling offshore wind prices allowing its levelized cost of energy to be more competitive with other fuel sources, changing representation in the Virginia General

Assembly, and shifts in the public perception of environmental concerns.

DIT provides a clear explanation of the domestic offshore wind industry's growth and allows for better understanding of how CVOW fits within that framework. We find an industry that is still in the high sloped end of the S-curve through the acquisition of knowledge, persuasion and decision-making steps of DIT. CVOW mirrors that trend and also demonstrates how changing perceptions of its relative advantage, compatibility, complexity, trialability and observability have accelerated the rate of adoption in Virginia – much in the same way the domestic offshore wind industry has matured. As the pilot project goes into service later in 2020, it stands to reason these elements will continue to positively influence perception in a manner which will continue to hasten adoption rates in Virginia and beyond through the implementation and confirmation phases of the innovation process.

An examination of solely market-based factors without regard for regulatory factors would be incomplete, as would the inverse. By bringing in RCT and CCT to the exploration of the CVOW project we allow for a fuller knowledge of the key influences which brought this project to bear. While CVOW does include several of the issues raised in RCT or CCT those theories do not fully explain the project's development. In

fact, the CVOW project appears to run contrary to other key elements of the CCT and by extension, RCT. Thomson's arguments would indicate Virginia's entrenched power structure would make the success of a project such as CVOW unlikely. Dominion Energy is bucking the status quo in this undertaking, which is atypical of a traditionalistic political culture (101). If, as Thomson argues, "the regulated community's incentives are to minimize costs and to pressure decision makers in the legislature and in the executive branch to write lenient standards" largely for the benefit of industry, then CVOW goes against the key objective of RCT and runs contrary to expected outcomes of CCT (149). In this case, the powerful electric utility appears to be using its favor with regulators to pursue, at great risk and expense, an environmentally beneficial project which would be in the public good.

Therefore, the research reveals an alternative view of CCT in which the regulated community's influence over the regulator, as exhibited in the use of these dimensions of power, advances an agenda aligned with public norms in a way unlike the three cases selected by Thomson in her research.

Additional research may show whether the regulated community is, in some instances, well-suited to take on the role of an accelerant to innovation. The regulated community often is familiar with navigating the policy sphere to exercise the

influence needed for self-beneficial regulatory outcomes and could be uniquely positioned to build coalitions to persuade pursual of innovative solutions.

This is particularly true in authority innovation-decisions due to the relatively few, powerful actors able to diffuse a decision through a social system. The value the regulated community brings to innovation is not only the power to persuade, but also a perceived lower risk and complexity based on its established record of success. These factors can lead to higher rates of adoption and greater diffusion.

As Rogers stated, "In a centralized diffusion system, decisions about such matters as when to begin diffusing an innovation, who should evaluate it, and through what channels it will be diffused, are made by a small number of officials and/or technical experts at the head of a change agency." (7) Policy makers are often key players in the small but critical group of decision makers are and their views must be informed through those with expertise.

As the domestic offshore wind industry continues to mature and Virginia continues its efforts to stake a leadership position in the industry, DIT, RCT and CCT will continue to be useful in explaining the dynamics between the regulated community and the regulator in successfully diffusing this innovative solution through a once unlikely social system.

Study Limitations

Just as Thomson's research was limited to a multi-case study design based on three specific policy-making decisions faced by the Virginia Air Pollution Control Board, my research is necessarily constrained to a single-case study design focused on CVOW. I am not so bold as to assume this research proves or disproves the impacts of DIT, RCT or CCT in Virginia's energy policy arena. This study is a natural experiment and the conclusions herein cannot be generalized nor are they amenable to replication.

This research may, however, provide a better understanding of the need to examine both market and regulatory forces when applying these theories. I am hopeful this study will allow further discussion around how the dynamics exposed in this project could play out in future environmental policy discussions in Virginia and whether they foreshadow changes in the CCT and RCT environments described in research to date.

I also hope there will be further research along these lines. Greater context on the applications of DIT, RCT and CCT is of interest to me personally, both in my current role at Dominion Energy and as a citizen with an interest in sustainability

I also hope this single-case study research will help answer the tough "how" or "why" questions about the growing

offshore wind industry in the United States, the potential for a Virginia offshore wind hub and the changing dynamics in the environmental policy arena in the Commonwealth.

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Appendix: Virginia's Offshore Wind Key Dates

2006 – The Virginia General Assembly passed Senate Bill 262 which created the Virginia Coastal Energy Research Consortium. The group provided study, research and information for the Commonwealth on coastal energy issues, including the research and development for future offshore wind resources in Virginia.

2009 - The Virginia General Assembly established the Mid-Atlantic Offshore Wind Energy Infrastructure Development Compact with Delaware, Maryland, New Jersey and New York to coordinate development of offshore wind projects. The law was repealed in 2011 in Virginia as no other states had passed the compact.

2009 - BOEM forms a 134-member Virginia Intergovernmental Renewable Energy Task Force to identify the location for leasing and development of offshore wind energy. It included local, state and federal agencies, as well as the Virginia Port Authority, NASA Wallops Flight Facility, and branches of the U.S. military. Their efforts led to the Virginia's Wind Energy Area.

2010 – Republican Bob McDonnell is sworn in as governor of Virginia.

2010 - The Virginia General Assembly created the Virginia Offshore Wind Energy Development Authority to support development of the offshore wind industry and in the federal waters off Virginia's coast. The Authority coordinates and supports development of the offshore wind industry in the Commonwealth.

2010 – The Virginia Coastal Energy Research Consortium issued its final report identifying potential offshore wind resources capable of providing 10-percent of Virginia's annual electricity demand.

2012 – BOEM awards funding for an offshore wind demonstration project to DMME and Dominion Energy to pursue the Virginia Offshore Wind Technology Advancement Project, consisting of two 6 MW wind turbines on the 2,135-acre research lease site.

2013 – The Virginia DMME submits a research lease application to BOEM for VOWTAP.

2013 – BOEM published a request for competitive interest for the Virginia offshore wind research lease area in response to DMME's

application, but no interest surfaces. BOEM published a Determination of No Competitive Interest clearing the way for DMME to submit plans to build VOWTAP.

2013 - The Virginia DMME and BOEM contracted with private geo-data firm Fugro to conduct a regional geophysical survey across Virginia's Wind Energy Area in furtherance of a safe, economic and responsible future commercial development in Virginia's waters.

2014 – Democrat Terry McAuliffe is sworn in as governor of Virginia.

2014 – BOEM published its environmental assessment of the proposed wind energy research activities off Virginia.

2015 – BOEM announced it executed the first wind energy research lease in US. Federal waters with DMME, which named Dominion Energy to be the Designated Operator.

2015 - DMME submitted a Research Activities Plan to BOEM for VOWTAP detailing the proposed location, schedule and related information for the project.

2015 - Gov. Terry McAuliffe's administration released a comprehensive analysis of Virginia's capabilities to attract supply chain companies supporting installation of offshore wind energy. The Virginia Offshore Wind Port Readiness Study analyzed the readiness of Virginia's ports and commercial shipyards to accommodate nearly a dozen manufacturing and construction activities

2015 – BOEM published a revised environmental assessment for VOWTAP and issued a Finding of No Significant Impact.

2015 - DMME, BOEM and the Virginia Coastal Zone Management Program began collaborating with the recreational and commercial fishing sectors on identifying fishing impacts, mapping key fishing areas and creating best management practices around the offshore wind area.

2016 – BOEM approved the Research Activities Plan submitted by DMME for VOWTAP.

2016 – The U.S. Department of Energy withdraws $40 million in funding for VOWTAP after schedule delays led Dominion Energy to say it couldn't guarantee the project would be in operation by

2020. Dominion Energy says the delays were caused because quotes from developers came in to high to make the project economically feasible to build.

2017 – Dominion Energy includes development of VOWTAP in its Integrated Resource Plan submitted to the Virginia State Corporation Commission (SCC) calling for the 12 MW project to be online as early as 2021.

2017 - Dominion Energy announces Danish offshore wind developer Ørsted will help it build the two-turbine research pilot project renamed Coastal Virginia Offshore Wind project (CVOW) for operation by late 2020. It also says the CVOW research project will provide key learnings to apply toward a potential large-scale commercial development of 2,000 MW in an 112,800-acre commercial wind site which Dominion Energy has leased from BOEM.

2017 – Dominion Energy submits its Research Activities Plan revision to BOEM, which is required because of advances in technology since its initial approval.

2018 – Democrat Ralph Northam is sworn in as governor of Virginia.

2018 – The Virginia General Assembly passes and Governor Ralph Northam signs Senate Bill 966, also known as the Grid Transformation and Security Act of 2018 (GTSA). One component of the law deems 5,000 MW of utility-scale solar and wind energy generation to be in the public interest.

2018 – Governor Ralph Northam's administration issued a Request for Proposals seeking offshore wind industry expertise to help attract the offshore wind supply chain. DMME awarded the contract to BVG Associates, which issued a report later that year on ways to removing regulatory and statutory barriers.

2018 - The U.S. Army Corps of Engineers approved the Port of Virginia's plans to make deeper, wider channels to allow for two-way traffic of ultra-large containerships.

2018 - The Virginia Beach City Council adopted a resolution supporting offshore wind development off Virginia's coast.

2018 - Dominion Energy filed a prudency petition with the Virginia SCC for the CVOW project. It asked for approval to construct the turbines and related grid infrastructure. Pre-construction ocean floor mapping begins.

2018 – The Virginia Energy Plan released by Gov. Northam recommends committing to a goal of full development of the offshore wind lease area. In addition to setting a path for 2,000 MW of offshore wind by 2028, the plan calls for workforce development and regional collaboration with neighboring states.

2018 - The Virginia SCC approved Dominion Energy's prudency petition for CVOW. The final order directly cites the GTSA as the reason the project qualifies as being in the public interest.

2018 - The Norfolk City Council adopted a resolution supporting offshore wind development off Virginia's coast.

2018 - The Hampton Roads Planning District Commission adopted a resolution supporting offshore wind development off Virginia's coast.

2019 - The Newport News City Council adopted a resolution supporting offshore wind development off Virginia's coast.

2019 - The Chesapeake City Council adopted a resolution a resolution supporting offshore wind development off Virginia's coast.

2019 – BOEM announced the approval of the Research Activities Plan revision for CVOW, securing the final major approval for Dominion Energy to begin construction.

2019 – Onshore construction begins on CVOW with work to lay a half-mile conduit along the sea floor to a grid connection point at a substation near Camp Pendleton.

2019 – BOEM issued a no objection determination to the Facility Design Report and Fabrication and Installation Report submitted by Dominion Energy in partnership with Ørsted and turbine manufacturer Siemens Gamesa Renewable Energy.

2019 – Gov. Northam issued Executive Order 43, which set a goal of up to 2,500 megawatts of offshore wind by 2026 and 100-percent carbon-free electric generation by 2050.

2019 – Dominion Energy filed an interconnection agreement with PJM, the regional transmission organization, to build 2,600 MW of wind energy in the federal wind lease area off Virginia by 2026.

2020 – Newly elected officers are sworn in giving Democrats a majority in both the House and the Senate. With Democrat Ralph Northam continuing his term as Governor, Democrats hold control of the governorship and General Assembly for the first time since 1993.

2020 – Dominion Energy selected Siemens Gamesa Renewable Energy as the preferred turbine supplier for its large-scale commercial offshore wind project and indicated it was preparing to submit its Construction and Operations Plan to BOEM. Ocean survey work is slated to begin later in 2020.

2020 – Dominion Energy cited offshore wind as a key component of its commitment to net-zero carbon emissions by 2050.

2020 – The Virginia General Assembly passed the Clean Economy Act, which declared 5,200 MW of offshore wind by 2035 in the public interest. It also directed construction by Dominion Energy of one or more utility-owned and operated offshore wind facilities between 2,500 and 3,000 MW in capacity and declared those projects be in the public interest and presumed costs were reasonably and prudently incurred so long as they fit certain prescribed guidelines dictating procurement, cost and timing. The legislation also included participation in the Regional Greenhouse Gas Initiative and a Renewable Portfolio Standard.