Accounting for CO_2: The Enactment and Effects of the Regional Greenhouse Gas Initiative

by

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Dedication

To Mom, Dad, and Poppop Harris, I cannot thank you enough for all of the advice and support.

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Atmospheric concentrations of CO2 continue to rise, and the electrical industry is one of the largest sources of emissions. In the United States it has been difficult to enact CO2 policies for the electrical sector. A key exception is the Regional Greenhouse Gas Initiative (RGGI), which became the first mandatory CO2 policy when it was enacted in 2008. RGGI is a market-based cap and trade policy that allocates allowances through an auction, whose revenues are recycled to support energy efficiency. This research uses a combination of economic and institutional perspectives to describe and analyze how RGGI was enacted and the effects it is having on the electrical industry. Policymakers were able to enact RGGI because they used design features that minimized the policy's effect on the price of producing and purchasing electricity. This design has resulted in a consistently low CO2 allowance price, which has led many individuals and organizations in the region to claim the formal policy is ineffective. At the same time, these design features are also inducing a number of informal or cultural effects. In particular, RGGI's low allowance price makes it inexpensive for electrical companies and consumers to begin treating CO2 and the operation of CO2-emitting technologies as a controlled material and activity, which has allowed policymakers to strengthen future phases of the policy. RGGI has also recycled approximately $500 million dollars to energy efficiency initiatives. These funds are directly incentivizing the use of these technologies and practices, but they are also indirectly accelerating their diffusion by accentuating positive economic meanings and attenuating negative economic meanings. In doing so, these funds are helping electrical companies, consumers, and regulators see and value the economic and non-economic benefits energy efficiency provides, which is facilitating the diffusion of existing approaches and stimulating the emergence of new approaches. When RGGI's revenue recycler and cultural effects are accounted for it becomes clear the policy is having a significant effect that extends beyond its formal allowances and price signals.

Chapter 1: Introduction

Introducing the Research Project

In the United States electricity consumption as measured by total retail sales has grown from 255 billion kilowatt-hours (kWh) in 1949 to 3726 billion kWh in 2011 (U.S. Energy Information Administration, 2012a). To meet this demand the amount of generated electricity has increased from 296.1 billion kWh in 1949 to 4105.7 kWh in 2011 (U.S. Energy Information Administration, 2012b). Of this electricity, 2790.3 billion kWh or approximately 68% was produced with CO_2-emitting technologies, and in 2010 approximately 40% of the U.S.' anthropogenic CO_2 emissions came from the production of electricity (U.S. Energy Information Administration, 2012b; U.S. Environmental Protection Agency, 2012a). Due in part to these anthropogenic CO_2 emissions, the atmospheric concentration of CO_2 has increased from approximately 305 parts per million (ppm) in 1960 to 394.29 ppm in 2012 (Tans & Keeling, 2012). The increase in atmospheric CO_2 has helped to raise the global average surface temperature by more than 1°F and is making the oceans increasingly acidic (Intergovernmental Panel on Climate Change, 2007a, 2007b). To limit these detrimental changes the amount of CO_2 emitted by electricity-generating technologies and other sources needs to be controlled. Thus far, the U.S. has not ratified the only international CO_2-controlling policy. Plus, nearly every attempt to develop federal policies for electricity-derived CO_2 emissions has failed (Cohen & Miller, 2012). Within this context, the Regional Greenhouse Gas Initiative (RGGI) was enacted as a regional effort to control the electricity-derived CO_2 emissions from New England and Mid-Atlantic states. RGGI represents the first and longest-lived, mandatory policy for controlling electricity-derived CO_2 emissions in the U.S., and portions of its revenues are being recycled to support the use of energy efficiency. This research focuses on how RGGI was enacted and the effect it is having on how electricity is produced and consumed in the RGGI states. The remainder of this chapter introduces the context of the research project, the motivations behind it, and the goals it intends to achieve. The chapter concludes with an overview of the entire research project that outlines the remaining chapters.

Context and Motivations for the Research

The social impetus to stabilize and reduce global CO_2 emissions has emerged through shifts in how individuals and organizations interpret and use the physical material of CO_2 and the behavioral action of emitting CO_2 (Hulme, 2009; Schnaiberg, 1980; Scott, 2001). More specifically, this shift involves interpreting and using CO_2 as a socially and environmentally detrimental pollutant whose concentration in natural ecosystems needs to be controlled instead of as a benign, naturally occurring material (Hulme, 2009). Tangentially, this shift also involves interpreting the operation of CO_2-emitting technologies as a behavior that needs to be managed and controlled rather than one that should be uncontrolled and indefinitely increasing (Hulme, 2009; Schnaiberg, 1980).

When CO_2 and the operation of CO_2-emitting technologies are respectively interpreted and used as a controlled material and activity it changes how the industrial processes that emit CO_2 and the products and services that are created through these processes are viewed and utilized within industry and society (Hulme, 2009; Schnaiberg, 1980). In particular, treating CO_2 and the operation of CO_2-emitting technologies as controlled changes how electrical energy is produced and consumed, which in turn affects how current and future demand for it is met. Under earlier, uncontrolled interpretations of CO_2 and the operation of CO_2-emitting equipment, increasing electricity production was viewed as socially appropriate and desirable, which made consuming increasing amounts of electricity socially appropriate and desirable as well (Hirsh, 2002; Hulme, 2009; Schnaiberg, 1980). However, when CO_2 and the operation of CO_2-emitting technologies are interpreted as a material and activity that need to be controlled then producing increasing amounts of fossil fuel-based electricity is no longer the most appropriate or desirable way to meet current and future demand for electricity

(Hulme, 2009; Schnaiberg, 1980). Rather, under these new interpretations for CO_2 and the operation of CO_2-emitting technologies it is more desirable and appropriate to meet the demand for electricity by using existing electrical supplies more efficiently (Hulme, 2009; Schnaiberg, 1980; York, Witte, Nowak, & Kushler, 2012). This limits the amount of CO_2 that must be emitted to produce the electricity society demands.

The appeal of using energy efficiency technologies and practices that reduce electricity consumption, or demand-side resources, has fluctuated significantly since their initial emergence in the 1970s (York et al., 2012). Traditionally, electrical companies were not proactively deploying energy efficiency initiatives because the subsequent reduction in electricity consumption reduced the revenues and profits they could earn (Hayes, Nadel, Kushler, & York, 2011; York et al., 2012). Similarly, in the past many electricity regulators were reluctant to accelerate the deployment of energy efficiency initiatives when electricity supplies were inexpensive and abundant, and especially when doing so increased prices for consumers (York et al., 2012). The upfront costs associated with adopting energy efficiency technologies and practices also reduce consumers' internal motivation to use them to reduce the amount of electricity they consume (Jaffe & Stavins, 1994a; Zhao, Bell, Horner, Sulik, & Zhang, 2012). Together, the initial, uncontrolled interpretations of CO_2 and the operation of CO_2-emitting technologies and electrical companies', consumers', and regulators' limited interest in using energy efficiency made reducing electricity consumption on its own and to manage CO_2 emissions appear unnecessary, undesirable, and costly (Hayes et al., 2011; Hulme, 2009; Jaffe & Stavins, 1994a; Schnaiberg, 1980; York et al., 2012).

However, individuals and organizations in society are increasingly interpreting and using CO_2 and the operation of CO_2-emitting technologies as controlled. They are also increasingly interpreting the use of energy efficiency technologies and practices that reduce electricity consumption as a positive and valuable endeavor. These shifts are reflected in the emergence of proposals for CO_2-controlling policies, CO_2 monitoring and reporting requirements for emitting equipment, and energy efficiency standards (Cohen & Miller, 2012; U.S. Environmental Protection Agency, 2013; York et al., 2012). While promising, achieving the necessary reduction in global CO_2 emissions in the socially optimal timeframe requires accelerating the diffusion of these policies, operational practices, and initiatives.

One way to accelerate the development and deployment of CO_2-controlling policies and operational procedures is by helping individuals and organizations involved with emitting industries accept and become familiar with treating CO_2 and the operation of CO_2-emitting technologies as controlled (Brint & Karabel, 1991; Caronna, 2004; Fligstein, 1997). Similarly, the deployment and adoption of energy efficiency initiatives can be facilitated by helping electrical companies, consumers, and regulators see the value and benefits of using these technologies and practices to reduce electricity consumption (Brint & Karabel, 1991; Fligstein, 1997). This means that shifting how individuals and organizations interpret and use CO_2, CO_2-emitting technologies, energy efficiency initiatives, and electricity are critical steps for accelerating the diffusion of CO_2-controlling policies and the use of demand-side resources (Brint & Karabel, 1991; Caronna, 2004; Fligstein, 1997).

As organizations accept and gain practical experience with existing CO_2 policies their interpretations and uses of CO_2 and the operation of CO_2-emitting technologies are increasingly derived from treating them as a controlled material and activity instead of as uncontrolled (Lindblom, 1977; Scott, 2001). When organizations willingly accept these new meanings and use them to guide their operations it can also facilitate policymakers' efforts to strengthen existing and to develop new CO_2-controlling policies (Caronna, 2004). Likewise, creating new funds that reduce the upfront cost of adopting energy efficiency initiatives or that make deploying them a profitable activity can help electrical companies, consumers, and regulators see the economic benefits of using these technologies and practices (Fligstein, 1997). For economically rational individuals and organizations, these positive economic interpretations can then make other non-economic interpretations or benefits, such as limiting new construction, reducing CO_2, or improving customer satisfaction, more appealing as well (Blanchard, 2008; Scott, 2001). Together, the increasing salience of positive economic and non-economic meanings can motivate electrical companies, consumers, and regulators to actually deploy and adopt energy efficiency technologies and practices (Brint & Karabel, 1991). The increase in aggregate interest can help spur the diffusion of existing initiatives and also reveal innovative, new ways to reduce electricity consumption.

As the first mandatory CO_2 policy to be enacted in the U.S., RGGI represents an effort to shift the social meaning of CO_2 and the operation of CO_2-emitting technologies by setting a limit on the amount of CO_2 that can be emitted by generating technologies in the RGGI states (Fligstein, 1997; Lindblom, 1977). Furthermore, by recycling RGGI's auction revenues to support energy efficiency policymakers are also trying to shift how electrical companies, consumers, and regulators interpret the use of energy efficiency initiatives so they will want to deploy and adopt these technologies and practices (Brint & Karabel, 1991; Fligstein, 1997). Together, these two efforts represent an attempt to shift how individuals and organizations interpret the production and consumption of electricity so that increasing demand can be met by modifying consumption patterns instead of just by increasing the supply (Brint & Karabel, 1991; Fligstein, 1997).

By formalizing the newer, controlled meanings for CO_2 and the operation of CO_2-emitting technologies the presence of RGGI has the potential to change how individuals and organizations interpret and use this material and behavioral action (Brint & Karabel, 1991; Lindblom, 1977). These shifts may then facilitate policymakers' efforts to strengthen RGGI or to develop CO_2-controlling policies for other geographic or industrial realms (Caronna, 2004). Likewise, by making the adoption of energy efficiency initiatives a low or zero cost for consumers and regulators and the deployment of them a profitable activity for electrical companies RGGI funds have the potential to change how individuals and organizations interpret and use these technologies and practices. These shifts may then make these individuals and organizations more receptive to deploying and using demand-side resources, which may reveal new ways to market existing initiatives or new ways to reduce electricity consumption (Brint & Karabel, 1991).

Goals of the Research

The overarching goals of this research are threefold. The first involves determining how RGGI policymakers were able to enact the first CO_2-controlling policy when other attempts to enact regional or federal policies failed (Cohen & Miller, 2012). The second is to determine whether policymakers are shifting how individuals and organizations interpret and use CO_2, CO_2-emitting technologies, electricity, and energy efficiency initiatives by enacting RGGI (Fligstein, 1997). The third goal involves evaluating whether and how these shifts in meaning are helping to spur stronger or additional CO_2 policies, and facilitating the diffusion of existing energy efficiency initiatives or the emergence of new ones (Brint & Karabel, 1991; Caronna, 2004).

To address the first goal the research describes and analyzes the processes that RGGI policymakers used to select the design features ultimately included in the policy, as well as how these design features attracted support for its enactment. In terms of the second goal, the research uses a combination of surveys, interviews, and archival documents to identify whether and how the ongoing presence of RGGI is shifting how electrical companies and consumers interpret and use CO_2 and the operation of CO_2-emitting technologies. The information provided by the interviews and archival sources is also used to identify whether and how RGGI's revenue recycler is shifting how electrical companies, consumers, and regulators interpret the use of energy efficiency technologies and practices that reduce electricity consumption. For the third goal, the interviews and archival documents are used to understand whether and how shifting interpretations of CO_2 and the operation of CO_2-emitting technologies affect policymakers' ability to strengthen existing and to develop new CO_2-controlling policies. The interviews and archival documents are also used to describe whether shifting interpretations of energy efficiency technologies and practices affect how existing initiatives are marketed, the types of energy efficiency initiatives that are used, and how demand-side resources are integrated into wholesale electricity markets.

The Structure of the Remaining Chapters

To set up the overarching structure of this research project and to preview the upcoming content and topics a short summary of each of the subsequent chapters is presented. The second chapter describes the background information this research draws upon. This includes information about the structure and operations of the electrical system, such as the organizations, technologies, and regulations associated with the production of electricity. It also includes information about the demand-side of the electrical system, such as how electricity is consumed, the technological and operational practices associated with demand-side management, and their diffusion in the years preceding the enactment of RGGI. The presentation of this background material is used to show how increasing demand for electricity had been historically met by increasing the supply, as well how recently efforts are being made to meet demand by modifying consumption patterns (Hirsh, 2002; York et al., 2012). Next, the different ways that social behaviors, and specifically environmental affecting activities, can be controlled are described. These include formal mechanisms, such as command and control and market-based policies, and informal mechanisms, such as cultural cognitions, norms, and ideologies (Lindblom, 1977; Scott, 2001). The structure of these mechanisms and examples of each are presented along with the connections and relationships between them. Then the main international, national, and regional efforts to control CO_2 emissions, which predominantly employed market-based policies, are described. Extra attention is devoted to the background and initial operations of RGGI as it is the first and longest-lived example of a CO_2-controlling policy and the focus of this research. The proposed CO_2-controlling policies that failed to be enacted and the few that were are then used to identify design considerations for CO_2 policies that may facilitate their enactment.

The third chapter presents the theoretical framework this research is based on. It begins by expanding on the relationship that exists between formal and informal mechanisms for controlling behavior to show how all formal policies rest upon cultural controls, or the ways the materials and actions underlying a controlled activity are interpreted and used (Lindblom, 1977; Scott, 2001). This conceptualization is then used to situate the enactment and effects of formal policies as a pair of negotiations over how the materials and actions underlying the activity to be controlled can be interpreted and used (Bourdieu & Wacquant, 1992; Lindblom, 1977; Scott, 2001). The first negotiation revolves around whether policymakers can design and present a new formal policy so that its treatment of these materials and actions is aligned enough with individuals' and organizations' pre-existing interpretations and uses of them to be enacted (Bourdieu & Wacquant, 1992; Caronna, 2004; Fligstein, 1997; Lindblom, 1977). The second negotiation is based on whether an enacted, formal policy can change individuals' and organizations' cultural controls so they interpret and use the materials and actions underlying the controlled activity through the meanings conveyed by the formal policy (Bourdieu & Wacquant, 1992; Brint & Karabel, 1991; Lindblom, 1977). These concepts are grounded by applying them to show how the social meaning and use of CO_2, the operation of CO_2-emitting technologies, electricity, and energy efficiency initiatives emerge as the products of negotiations occurring across all industrial fields, and specifically within the field centered around the electrical industry (Bourdieu & Wacquant, 1992; DiMaggio & Powell, 1983). They are then used to frame the questions about the enactment and effects of RGGI this research project addresses. Then, the motivations driving the selection of these research questions are introduced. Next, two theoretical perspectives are described and presented as the conceptual framework for answering the research questions. This includes an economic perspective that defines how economically rational companies and consumers behave and suggests how they would respond to the creation of a market-based policy and to the emergence of new funds that incentivize the use of energy efficiency initiatives (Blanchard, 2008). Then an institutional perspective is presented to show how and why individuals and organizations participate in institutional negotiations and how they could react to the negotiating contexts underlying the enactment and effects of RGGI (Bourdieu & Wacquant, 1992; Scott, 2001). The two theoretical perspectives are then merged together and used to produce hypotheses about RGGI's enactment and effects.

The fourth chapter evaluates the research hypotheses about the enactment of RGGI. The presented data are drawn from the policymaker and stakeholder meetings where different design features were evaluated and then selected for the formal RGGI policy. The data are then analyzed to answer how policymakers were able to enact RGGI, and whether specific cap and trade design features helped facilitate its enactment.

The fifth chapter evaluates the research hypotheses about the effects of RGGI. The chapter draws on multiple data sources, which include: surveys and interviews from individuals working within regulated and non-regulated organizations in the region; newspaper publications that describe how individuals and organizations in the region interpret CO_2, the operation of CO_2-emitting technologies, energy efficiency initiatives, and the RGGI policy itself; and industry publications that show how electrical companies interpret and use CO_2, the operation of CO_2-emitting technologies, and energy efficiency initiatives. These data are then used to evaluate whether and how RGGI is shifting the ways individuals and organizations interpret and use CO_2 and the operation of CO_2-emitting technologies, and whether these changes are affecting the extension of existing and the development of additional CO_2-controlling policies. The data are also used to evaluate whether and how RGGI's recycled revenues are shifting how electrical companies, consumers, and regulators interpret and use energy efficiency initiatives that reduce electricity consumption, and whether these changes are affecting the deployment of or innovation in them.

The sixth chapter presents the conclusions of this research project. It begins by summarizing the analytical findings that emerged from the previous chapters. The chapter then identifies the implications of the findings as they relate to the design and enactment of new market-based policies, the use of a policy's informal or cultural effects, and the diffusion of energy efficiency initiatives that reduce electricity consumption. The extensions of this research's conceptual framework and findings and their limitations are then discussed. Lastly, the implications of the research's findings and their extensions and limitations are collectively used to identify promising areas for future research.

Chapter 2: Background Information

Introduction

RGGI targets and broadly impacts the electrical system, so this chapter begins by presenting an overview of how electricity is produced, delivered, and consumed. This includes: the technological systems used to produce and deliver electricity; the organizations that operate these systems; the markets and regulations that coordinate the use of these systems; and the basic principles of energy efficiency as a tool for electricity conservation. Next, a discussion of CO_2 and why CO_2 emissions need to be controlled is presented. After, three abstracted mechanisms for controlling individual and organizational behavior and the relationships between the different mechanisms are described. The three mechanisms include command and control policies, market-based policies, and cultural or informal controls (Lindblom, 1977). The three abstracted mechanisms are then grounded by applying them to discuss previous attempts to control CO_2 emissions. This discussion devotes extra attention to the history and operations of RGGI as it is the first and longest-lived CO_2-controlling policy in the U.S. Lastly, earlier attempts to control CO_2 emissions are used to identify critical considerations that can help facilitate the enactment of CO_2-controlling policies.

The Electrical System

Electrical energy cannot be easily stored in large quantities, so the supply of electricity has to approximately match demand (Casazza & Delea, 2009). The supply side of the electrical system is based on the generation, transmission, and distribution technologies used to produce and deliver electricity to consumers (Casazza & Delea, 2009). The demand side of the electrical system is based on the amount of electricity that consumers use to power technologies to produce the services they desire (Casazza & Delea, 2009). If the supply of electricity exceeds the demand, electrical companies or organizations have built and paid for equipment they are not using, which means they are losing money. If demand exceeds supply it can lead to brown- or blackouts that prevent consumers from using electricity to get the services they desire (Casazza & Delea, 2009). The evolution of the U.S.' electrical system has been largely driven by the need to match the electrical supply and demand (Casazza & Delea, 2009). Historically, the match between electrical supply and demand has been addressed by expanding the supply (Hirsh, 2002). Regulations that coordinate the operation of the electrical system have motivated electrical organizations to increase the amount of electricity they can produce and sell (Casazza & Delea, 2009; Hirsh, 2002). Increased consumer demand was met by expanding the electrical supply (Casazza & Delea, 2009; Hirsh, 2002). This approach has led to increasing amounts of electricity-derived CO_2. However, this paradigm is shifting; efforts are being made to match the electrical supply and demand by modifying the demand for electricity (Casazza & Delea, 2009; Hirsh, 2002). This specifically involves changing how consumers use electricity to get the services they desire (Eto, 1996). The goal is for demand to be met with existing supplies, instead of by expanding the supply.

Electrical Supply

The supply side of the electrical system is based on the coordinated operation of different electrical technologies. Generation technologies produce electricity, and transmission and distribution systems move it to consumers. The various organizations that can operate generation, transmission, and distribution systems are coordinated through a regulated monopoly or a wholesale market (Casazza & Delea, 2009). The technical structure of the electrical system and the rules for coordinating its use have evolved in an effort to meet current and projected demand (Casazza & Delea, 2009; Hirsh, 2002, 2003; Hughes, 1993).

Electricity is produced at generating facilities by first converting chemical, nuclear, or kinetic energy into mechanical energy via combustion, nuclear fission, or gravity (Casazza & Delea, 2009). This mechanical energy is then converted into electrical energy with an electrical generator (Casazza & Delea, 2009). The primary generating technologies used in the RGGI states are nuclear-powered steam turbines, natural gas-fired steam and gas turbines, coal-fired steam turbines, and hydro-electrical turbines (Edison Electric Institute, 2011). The other categories of generating technologies found in the RGGI states include oil-fired steam and gas turbines, and smaller amounts of biomass-fired steam and gas turbines, landfill gas turbines, wind turbines, and solar photovoltaics (Edison Electric Institute, 2011).

After production, electricity is delivered through transmission and distribution lines to end users, or consumers. Transmission and distribution functions are distinguished by the voltage of the electricity they deliver. Though some overlap exists, transmissions lines in the U.S. have voltages between 765 kilovolts (kV) and 115 kV, and distribution lines that connect to consumers have voltages between 169 kV and 120 V (Casazza & Delea, 2009). Electricity consumers ultimately pay for the electricity they consume as well as for its delivery through transmission and distribution systems, which is the cost of electrical service (Casazza & Delea, 2009).

Historically, generation technologies exhibited economies of scale, which made it cheaper to produce one unit of electricity with a bigger generator than a smaller one (Hirsh, 2003). For this reason, electricity has traditionally been produced with a smaller number of larger generators and then moved to the many locations where it is consumed (Hirsh, 2003). The alternative would be to use many more, but smaller generators located where electricity is actually consumed. Some electrical energy is lost when large amounts of electricity are moved over long distances. Loss is reduced when the electricity is transported at a higher potential energy, or voltage (Casazza & Delea, 2009). However, most electrical consumers only use lower voltages of electricity (Casazza & Delea, 2009). This is why a few higher voltage transmission systems bridge the longer distances between generation facilities and distribution systems, while more numerous, but lower voltage distribution systems are used to deliver electricity to consumers.

Building large generating facilities and extensive transmission and distribution systems is expensive, and a population of electricity consumers with unmet demand was often necessary to justify their construction (Hirsh, 2002; Hughes, 1993). Historically, this demand was guaranteed in three ways. Collections of electricity consumers built and operated their own generation, transmission, and distribution systems to meet their own demand (Co-op Systems) (Casazza & Delea, 2009). Cities, municipalities, or counties built and operated their own generation, transmission, and distribution systems to meet the demand found within their borders (Municipal Systems) (Casazza & Delea, 2009). Cities, municipalities, or counties gave investors exclusive access to a certain population of electricity consumers if they built and operated generation, transmission, and distribution systems (Investor Owned Systems) (Casazza & Delea, 2009). In the RGGI states most electrical systems are owned by private investors, but there are a few municipal systems, primarily in Massachusetts, and a very small number of co-op systems.

Under these approaches, the construction and operation of electrical systems were coordinated to restrict competition. Generation, transmission, and distribution technologies were too expensive to build unless a set amount of electrical demand could be guaranteed by restricting the number of organizations that could provide electricity and electrical service to a specific population of consumers (Hirsh, 2002; Hughes, 1993). When competition is restricted, one organization operates generation, transmission, and distribution systems and has an obligation to serve all the consumers within its defined operating area (Casazza & Delea, 2009). As there is no competition, the price that an organization can charge for producing and delivering a unit of electricity is set. The members of a co-op system and the government of a municipal system set the prices in their respective systems. Historically, investor owned systems have been granted a regulated monopoly, which meant that Public Utility Commissions (PUCs), groups of appointed electrical regulators, established the price these organizations could charge for producing and delivering electricity within their exclusive service area (Casazza & Delea, 2009; Hirsh, 2002).

The prices of electricity and electrical service are based on the fixed costs of the technological components and the variable costs associated with operating them (Casazza & Delea, 2009). The costs required to construct generation, distribution, and transmission equipment are fixed costs, while the costs required to produce and deliver one unit of electricity represent variable costs. Variable costs include the cost of purchasing and disposing the materials required to produce and deliver one unit of electricity, and the labor that carries out these activities. The prices that municipals and co-ops charge their customers include both these variable costs and a proportion of their total fixed costs (Casazza & Delea, 2009). In an investor owned system, the prices also include the variable costs and a portion of the total fixed costs, but they also include a return on the amount that was initially invested as fixed costs (Casazza & Delea, 2009; Hirsh, 2002). When an investor owned system is regulated as a monopoly it submits the prices it wants to charge for producing and delivering a unit of electricity to its PUC (Casazza & Delea, 2009). After evaluating these prices in a rate case, the PUC either allows them to be passed on to consumers or forces the organization to resubmit other prices (Casazza & Delea, 2009).

The fixed costs associated with producing and delivering one unit of electricity depend on how much electricity is produced and delivered with these technologies. As more electricity is produced and delivered through existing equipment, the fixed costs attributed to each unit of electricity go down (Hirsh, 2003). In co-ops and municipals the savings that come from maximizing the use of existing equipment are usually passed on to consumers in the form of lower prices (Casazza & Delea, 2009; Hirsh, 2003). In investor owned systems the savings that come from maximizing the use of existing equipment can also be used to reduce prices, but are most often passed onto the initial investors as an additional return on their investment (Casazza & Delea, 2009; Hirsh, 2003). In all three cases, organizations are motivated to maximize the amount of electricity they can produce and sell to consumers to reduce the fixed costs associated with producing each unit of electricity. The individuals running regulated investor owned systems are also motivated to spend more money to build new facilities because PUCs allow them to include a certain percentage return on every dollar they spend into the prices they charge for electricity and electrical service (Casazza & Delea, 2009; Hirsh, 2002). Pricing electricity and electrical service in this way encourages organizations to meet electrical demand by expanding the supply, which then in turns encourages consumers to use more electricity.

In the late 1970s and 1980s, some electrical consumers and PUCs became concerned that this method for producing and delivering electricity was encouraging investors to build excessive amounts of generation and transmission facilities because they could earn a return on each dollar they spent (Hirsh, 2002). The fixed costs of the new facilities were then passed on to consumers as higher prices for electricity and electrical service (Hirsh, 2002). In response, a number of states deregulated or restructured the coordination of their electrical systems away from regulated monopolies towards wholesale markets (Hirsh, 2002). States that restructured their electricity systems separated the operation of generation, transmission, and distribution systems, and wholesale electricity markets are used to coordinate their use (Casazza & Delea, 2009; Hirsh, 2002). When the electrical system is coordinated through wholesale markets multiple organizations are allowed to construct and operate generation technologies (Casazza & Delea, 2009). These include organizations that only own generation facilities, independent power producers (IPPs), and organizations that also own operationally distinct distribution systems (Casazza & Delea, 2009). In these restructured electrical systems, all distributors, or utilities, purchase the electricity they supply to their customers from wholesale markets (Casazza & Delea, 2009). In a restructured electrical system, distribution systems are still operated as regulated monopolies (Casazza & Delea, 2009). One utility is granted the exclusive right to provide electrical service to a set population of consumers, and they are obligated to serve all of the consumers within this area. The price they can charge for electrical service is set by PUCs through the aforementioned rate cases (Casazza & Delea, 2009). Restructuring the coordination of distribution systems would have been impractical as it would involve constructing expensive and redundant distribution lines to individual consumers.

Within restructured electrical systems, transmission systems deliver the electricity produced by multiple generating organizations to the different utilities that purchase it (Casazza & Delea, 2009). Based on how transmission technologies are used in restructured systems, conflicts of interest could arise if one organization operated both generation and transmission systems as it could prevent other generators from using its transmission lines to deliver their electricity to wholesale markets. In response to these potential conflicts of interest, the Federal Energy Regulatory Commission (FERC) created Independent Service Organizations (ISOs) to operate the transmission systems in states with restructured electrical systems (Casazza & Delea, 2009; Federal Energy Regulatory Commission, 2012a). ISOs are non-profit organizations that operate, but do not own, transmission systems to manage the wholesale selling of electricity by generating organizations and the wholesale purchasing of electricity by utilities (Casazza & Delea, 2009; Federal Energy Regulatory Commission, 2012a). In wholesale electricity markets generators submit bids to supply certain amounts of electricity at certain prices and at certain times to the ISO (Casazza & Delea, 2009). Utilities submit bids to purchase certain amounts of electricity at certain times to the ISO (Casazza & Delea, 2009). With this information, the ISO accepts enough bids for electricity to meet the projected demand at various points of time (Casazza & Delea, 2009). For a particular time period, bids are submitted according to price, from low to high. However, the price then paid for the delivered electricity is based on the price of the last bid needed to meet all the demand (Casazza & Delea, 2009). In organizing these processes, ISOs enable wholesale markets to set the price for the electricity produced in restructured systems.

With the exception of Vermont, the RGGI states have all restructured their electrical systems away from regulated monopolies to wholesale markets (U.S. Energy Information Administration, 2010). This means that RGGI states have IPPs and utilities with and without generation facilities. The RGGI states also have three connected ISOs: New England (NEISO), which also includes the regulated state Vermont; New York (NYISO); and the Pennsylvania, Jersey, and Maryland Interconnect (PJM), which also includes the RGGI state of Delaware and parts of the following non-RGGI states or districts: Illinois, Indiana, Kentucky, Michigan, North Carolina, Ohio, Tennessee, Virginia, West Virginia, and the District of Columbia (Federal Energy Regulatory Commission, 2012b, 2012c, 2012d).

When the electrical system is coordinated through wholesale markets, the match between electrical supply and demand continues to be achieved by modifying the supply. Increasing amounts of demand are met by accepting more bids for electrical supplies (Casazza & Delea, 2009). In wholesale markets, generating organizations are motivated to produce electricity at lower costs to make sure their bids are accepted and to make a greater profit from each unit they sell. However, because generating organizations can use independently operated transmission systems to sell their electricity to many different utilities, the amount they produce is not constrained by the demand of a specific population of consumers. This means that generating organizations will still be motivated to build new facilities as long as they have access to unmet demand through their ISO system. At the same time, utilities remain regulated monopolies that make money from building new distribution equipment and from delivering electricity to consumers (Casazza & Delea, 2009). This motivates utilities to deliver as much electricity as they can, which in turn maintains and expands the demand for electricity. Therefore, even when the electrical system is structured and coordinated through wholesale markets, organizations are still motivated to meet demand by expanding supply.

Electrical Demand

The end users of electricity, the consumers, are categorized according to their identity, how they use electricity, and how much they use. The main categories of consumers are residential, commercial, and industrial (Casazza & Delea, 2009). Other specialized classes of consumers include train transportation, agriculture, churches, and government entities (Casazza & Delea, 2009). Patterns of electricity usage vary amongst these groups of consumers. For example, residential consumers often use electricity to provide light, heating, or cooling; their use peaks in the early morning and in the early evening when people respectively depart for and arrive home from work (Casazza & Delea, 2009). Commercial electricity consumers use electricity to provide light, heating, cooling, and power, and their usage often peaks during normal working hours (Casazza & Delea, 2009). Lastly, industrial consumers primarily use electricity for power, and their usage can be constant if the facility operates twenty-four hours a day (Casazza & Delea, 2009). The amount of electricity that is used during different periods of time produces consumption patterns, or load profiles, that are specific to certain categories of consumers and uses of electricity (Casazza & Delea, 2009). Increasing numbers of electricity consumers and changes in how electricity is used, such as to provide computing power, create changes in the load profile. Historically, changes in the load profile were resolved from the supply side, or by constructing new generating facilities (Hirsh, 2002). However, beginning in the late 1970s and proceeding in fits and starts to the present, attempts have been made to accommodate changes in the load profile from the demand side, or by suppressing or modifying patterns of electricity consumption so they can be met with existing supplies (Hirsh, 2002; York et al., 2012).

The broad umbrella of demand-side management (DSM) or electricity conservation encompasses any technology or activity that can change the electricity consumption profile (Eto, 1996). The concept of and applications associated with DSM emerged in the 1970s in response to the oil crises, and their use grew throughout the 1980s (Hirsh, 2002; York et al., 2012). Following this wave of interest, the use of DSM declined during the 1990s as the electrical industry experienced the first phases of restructuring, which prompted electrical organizations to cut expenditures and reallocated responsibility for system reliability to ISOs (Hirsh, 2002; York et al., 2012). From this nadir, interest in and the use of DSM has accelerated through the 2000s to its current peak (York et al., 2012).

The two primary categories of DSM are direct DSM and energy efficiency. Direct DSM involves actually reducing the amount of electricity that end users consume (Eto, 1996). Under direct DSM, electricity consumers sign a contract with a utility, groups of utilities, an ISO, or an independent DSM company that allows them to reduce the amount of electricity delivered at a certain period of time in exchange for a financial payment (Eto, 1996; York et al., 2012). On the other hand, energy efficiency involves making better use of existing electrical supplies by stimulating technological or behavioral changes that modify how and when electricity is consumed (Eto, 1996; York et al., 2012). After energy efficiency technologies and practices are adopted, consumers use less electricity to produce the services they desire.

This research primarily focuses on energy efficiency; the subsequent discussion of electricity conservation will be limited to this topic. Historically, energy efficiency has been technologically driven. Most energy efficiency initiatives revolved around developing incentives or innovative sales channels to motivate electricity consumers to exchange their older and less efficient technologies for newer, more efficient ones (Eto, 1996). Recently, there is an emerging shift towards behavioral approaches to energy efficiency that change how consumers understand and use electricity (York et al., 2012). Behavioral approaches can also utilize newer, more efficient technologies, but the crux of the electricity savings are achieved by collecting more and more granular data about consumption patterns (Friedrich, Amann, Vaidyanathan, & Elliott, 2010). This information is then provided to consumers so they can better manage how and when they use electricity (Friedrich et al., 2010).

Before electrical systems were restructured, energy efficiency initiatives were funded by increasing the cost of electricity and electrical service through a rate case with a PUC (York et al., 2012). An electrical company would spend a certain amount of money on energy efficiency initiatives. Then it would build these costs along with the revenues that were lost from producing and selling less electricity into the prices for electricity and electrical service it submitted to its PUC in a rate case. After restructuring, electrical companies became more concerned about their costs and their ability to recover the money they spent on energy efficiency through rate cases, which depressed energy efficiency spending (York et al., 2012). In response, many states created system benefit charges to fund energy efficiency initiatives (York et al., 2012). System benefit charges were added to every electricity consumers' bill as a small increase in the price of electrical service. Utilities used the resources created by the charges to fund energy efficiency initiatives. In the late 1990s a number of state PUCs began to enact energy efficiency resource standards (EERS), which mandated that utilities meet a portion of their projected demand by reducing consumption (York et al., 2012). The additional costs that utilities incurred were recovered through rate cases with their PUCs; but unlike supply-side rate cases, PUCs did not allow utilities to earn a return on the funds they spent on energy efficiency initiatives (York et al., 2012). This began to change in the mid to late 2000's as PUCs began offering energy efficiency incentive programs (York et al., 2012). In an incentive program, a utility can earn a return on the funds spent on energy efficiency initiatives if they reduce electricity consumption by a certain amount; the specific return is often tied to the actual reductions achieved by the utility.

When significant amounts of electricity can be controlled in aggregate through electricity conservation practices it is possible to meet increasing demand by shifting existing consumption patterns across time and space instead of by building new facilities (American Council for an Energy-Efficiency Economy, 2012a). Collectively, the negawatts achieved through electricity conservation, or demand-side resources, can be thought of as a virtual power plant (VPP) (Lovins, 1989; Zurborg, 2010). Newly emerging FERC rules allow organizations involved with demand-side resources to bid them into some wholesale electricity markets along with supply-side resources (Federal

Energy Regulatory Commission, 2011). To participate in these markets organizations establish the cost required to save a unit of electricity from being consumed during a specific period of time and then bid these savings into electricity markets at this cost. The provision of negawatts reduces the megawatts of electricity needed to meet the projected demand, which allows both to be traded within a single market (American Council for an Energy-Efficiency Economy, 2012a; Federal Energy Regulatory Commission, 2011; Lovins, 1989). When demand-side resources can be priced in this way and electrical systems are coordinated to allow their use it encourages organizations to modify how electricity is consumed instead of just expanding the supply.

Carbon Dioxide (CO_2)

Anthropogenic, atmospheric emissions of carbon dioxide (CO_2) are produced when the solid or gaseous carbon found in fuels is converted to gaseous CO_2 by burning these fuels in the presence of oxygen to produce electricity or to run other industrial processes (U.S. Environmental Protection Agency, 2012b). CO_2 is a greenhouse gas (GHG); it absorbs and re-radiates solar radiation or heat (Intergovernmental Panel on Climate Change, 2007c). This process traps the heat radiated from the sun in the earth's atmosphere and prevents it from reflecting back out into space, producing a greenhouse effect (Intergovernmental Panel on Climate Change, 2007c). Within the earth's atmosphere, CO_2 is the most prevalent anthropogenic GHG, but water vapor, methane, ozone, sulfur hexafluoride, hydrofluorocarbons, and perfluorocarbons are also GHGs (Intergovernmental Panel on Climate Change, 2007d; U.S. Environmental Protection Agency, 2012b, 2012c). In addition to being the most pervasive anthropogenic GHG, CO_2 emissions also have a relatively long lifetime and can remain in the atmosphere for more than fifty years (U.S. Environmental Protection Agency, 2012b). For these reasons, the concentration of atmospheric CO_2 is often used as a barometer for the total amount of atmospheric GHGs and as a loose indicator of potential temperature increases.

Atmospheric concentrations of CO_2 are increasing. Within many countries, especially rapidly developing ones, the emission rate is accelerating. According to National Oceanic & Atmospheric Administration (NOAA) data recorded at the Mauna

Loa observatory in Hawaii, there were 394.29 parts of CO_2 per million parts of air (ppm) in July of 2012, which is up from approximately 305 ppm in 1960 (Tans & Keeling, 2012). Furthermore, the annual CO_2 emission rate is currently about 2 ppm per year, up from approximately .5 ppm per year in 1960 (Tans & Keeling, 2012). Leading atmospheric and climate researchers have identified 350 ppm as the safe ceiling of atmospheric CO_2 concentrations (Hansen et al., 2008). The most commonly known issue associated with higher concentrations of CO_2 revolves around its role as a greenhouse gas. As atmospheric concentrations of CO_2 and other GHGs rise increasing amounts of solar radiation are trapped in the atmosphere, which increases the average global temperature.

Upsurges in average temperature subject areas of the globe to higher local temperatures, but also make global temperature and weather patterns more volatile and extreme (Intergovernmental Panel on Climate Change, 2007e). These extremes can take the form of longer and more excessive heat waves and droughts, but can also lead to more extreme precipitation, whether rain or snow (Intergovernmental Panel on Climate Change, 2007e). The temperature changes can also affect both the functioning and the composition of ecosystems, such as by slowing the photosynthesis process or accelerating the glacial melt rate, or by affecting the geographic range that certain species can exist within (Intergovernmental Panel on Climate Change, 2007f). Certain ecosystem changes can also trigger feedback loops, where the initial shift then induces further changes. Feedback loops can revolve around GHG emissions, such as when increasing global temperatures cause terrestrial and aquatic sources of methane to thaw, releasing large amounts of this potent GHG gas into the atmosphere (Intergovernmental Panel on Climate Change, 2007f). They can also be temperature-based, such as when increasing global temperatures cause white ice to melt into grey slush or blue water. The shift from white snow and ice that reflect solar radiation to grey slush and blue water that absorb solar radiation traps more heat in the earth's atmosphere and further increases the average global temperature (Intergovernmental Panel on Climate Change, 2007f).

A second, but no less significant, problem caused by increasing concentrations of CO_2 is ocean acidification. Like all liquids, the ocean has a certain amount of hydrogen ions dissolved in it, and the amount of hydrogen ions dissolved in a liquid determines its pH (U.S. Environmental Protection Agency, 2012d). Pure water has a pH of approximately 7 and it is considered neutral, while liquids with a pH higher than 7 are basic and those with a pH under 7 are acidic. The earth's oceans, being saltwater, are slightly basic and have an approximate average surface pH of 8.1 (Intergovernmental Panel on Climate Change, 2007g). As a critical component of the global CO_2 cycle, oceans regularly absorb and release CO_2 from and into the atmosphere (Intergovernmental Panel on Climate Change, 2007g). Historically, the amount of CO_2 absorbed and released via the oceans was balanced. With higher concentrations of atmospheric CO_2, more CO_2 is being absorbed than released from the oceans (Intergovernmental Panel on Climate Change, 2007g). This increases the amount of positive hydrogen ions found in the oceans, which lowers the pH and effectively makes the world's oceans more acidic (Intergovernmental Panel on Climate Change, 2007g). In fact, the average surface pH of the world's oceans has declined by .1 pH since the Industrial Revolution (National Oceanic and Atmospheric Administration, 2012). This change may seem slight, but small shifts in the ocean's acidity can have extremely large and widespread effects, such as by dissolving the calcium that comprises the shells of krill or plankton, animals that occupy the lower rungs of aquatic food chains (Intergovernmental Panel on Climate Change, 2007g).

Mechanisms for Controlling Behavior

Within the broad category of social behaviors, an environmental-based behavior can be defined as any activity that involves transferring physical materials into, out of, or between different environmental ecosystems (Schnaiberg, 1980). Environmental-based behaviors, which include emitting CO_2 into the atmosphere, can be coordinated and controlled through a variety of formal and informal mechanisms, which are distinct in theory, but blur in practice (Lindblom, 1977). These mechanisms include formal tools, such as command and control and market-based policies, and informal tools, such as norms and cognitions (Lindblom, 1977; Scott, 2001). RGGI represents a market-based mechanism for controlling the CO_2 emissions produced by combustion-based electricity generators. It is a market-based mechanism because it caps the amount of CO_2 that can be emitted, allocates allowance rights for each ton of CO_2 that can be emitted, and establishes price signals for allowances through auction and trading systems (Lindblom, 1977, 2001). The price signals that arise from the auction and exchange of property rights coordinate and control how individuals and organizations use combustion-based, generating technologies that emit CO_2 (Demsetz, 1967; Lindblom, 2001).

Along with markets, command and control policies represent the other formal mechanism for controlling environmental-based behaviors: rules, regulations, or procedures dictating whether and how individuals and organizations can transfer materials into, out of, and between ecosystems (Lindblom, 1977; Schnaiberg, 1980). Command and control policies utilize direct authority to coordinate and control behavior by explicitly defining, monitoring, and enforcing how individuals and organizations can use specific practices and technologies to transfer specific amounts of a material between specific ecosystems (Lindblom, 1977). In the context of environmental behaviors, the controlling authority is most often the state, but individuals and organizations can directly control the use of materials, ecosystems, and technologies they privately own. Examples of how command and control mechanisms can be used to control electricity-derived CO_2 emissions include: limits on the amount of carbon-based fuels that can be extracted or used to produce electricity; limits on the amount of CO_2 that can be emitted by a specific type of generating technology; restrictions on what types of generating technologies can be used to produce electricity; and technological or operational requirements for using specific technologies to generate electricity. The specificity and monitoring requirements of command and control policies makes deploying them to control the CO_2 emitted by different organizations utilizing different generating technologies in different locations both costly and difficult (Lindblom, 1977).

Markets formally but indirectly control behavior (Lindblom, 1977). Markets formally control environmental-based behaviors by applying a price to a specific material, ecosystem, technology, or behavioral action associated with the environmental activity (Lindblom, 1977). This price signal then indirectly controls how individuals and organizations transfer materials into, out of, and between ecosystems (Lindblom, 1977; Schnaiberg, 1980). The price signals at the heart of market mechanisms can be created by taxing a material or behavioral action constituting an environmental activity or by creating a tradable asset that allows the holder to engage in a particular environmental activity (Stavins, 2003). The primary difference between the two types of market mechanisms revolves around how they are initially established and applied. A tax pre-sets the price signal to achieve a certain amount of environmental activities (Stavins, 2003). A cap and trade policy pre-sets the allowable amount of environmental activities and the exchange of property rights that enable the holder to participate in the activity then establishes the price signal (Stavins, 2003). As a mechanism for controlling environmental activities, taxes are more common in Europe while cap and trade systems have been more prevalent in the United States (Harrington & Morgenstern, 2007).

Diversity also exists within each category of market mechanism. With regard to CO_2, taxes can be applied to each unit of carbon-based fuels extracted or combusted or to each unit of CO_2 emitted (Stavins, 2003). Taxes can also be levied for using the ecosystems that carbon-based fuels are extracted from or for using the atmosphere as a sink for CO_2 emissions (Stavins, 2003). The purchase, operation, and disposal of CO_2-emitting technologies can also be taxed (Stavins, 2003). CO_2 cap and trade policies can be set at different stringencies and can be applied to the extraction of carbon-based fuels from ecosystems, the combustion of carbon-based fuels, or to the emission of CO_2 into the atmosphere (Stavins, 2003). The allowances that comprise the cap can be distributed for free, sold at a set price, or auctioned (Tietenberg, 2007). The allowances can be held by organizations extracting carbon-based fuels, emitting CO_2, or by anyone; allowable trades can be restricted to certain participants, volumes, geographic locations, temporal periods, particular market systems, or not at all (Tietenberg, 2007). Cap and trade systems also allow different amounts of allowances to be banked or borrowed at different periods of time, or not at all (Tietenberg, 2007). The initial cap can include varying "safety valves" that increase or withdraw the amount of allowances in the market (Tietenberg, 2007). Lastly, the revenues created when allowances are sold or auctioned can be transferred to the government or recycled to support other programs or endeavors (Tietenberg, 2007).

Taxes and cap and trade mechanisms can control CO_2 emissions through the creation and application of price signals because they both rest on the assumption of economic rationality (Lindblom, 2001). In other words, market mechanisms assume the individuals and organizations involved with extracting carbon-based fuels or emitting CO_2 are economically rational: increasing the economic cost of engaging in these activities reduces individuals' and organizations' desire to do so (Blanchard, 2008; Lindblom, 2001). As a pre-set price signal, a tax is directly applied to the extraction of carbon-based fuels, the emission of CO_2, or the use of CO_2-emitting technologies to limit individuals and organizations from participating in that specific activity. On the other hand, cap and trade policies pre-set a desired amount of extracted or emitted CO_2 and then divide this amount into individual allocations or property rights that enable the holder to extract or emit a certain amount of CO_2 out of or into specific ecosystems. When multiple buyers and sellers of these property rights create competitive conditions and share a common medium of exchange the ongoing exchange of these rights creates prices signals (Demsetz, 1967). These prices then inform individuals and organizations about whether and how they should be extracting or emitting CO_2 (Lindblom, 2001). In this way, both taxes and cap and trade mechanisms can control the CO_2 extracted or emitted by different individuals and organizations using different types of technologies in different locations (Lindblom, 2001). This is achieved without explicitly determining, monitoring, and enforcing whether and how individuals and organizations are transferring certain amounts CO_2 between specific ecosystems with different behaviors or technologies (Lindblom, 2001).

In addition to command and control and market-based policies, behavior can also be culturally or informally controlled through norms and cognitions (Lindblom, 2001; Scott, 2001). Norms and cognitions determine how individuals and organizations interpret and use the physical materials and behavioral actions that underlie the emission of electricity-derived CO_2 (Scott, 2001). These physical materials include the fuels extracted and combusted to produce electricity, the CO_2 emitted during the combustion process, the ecosystems fuels are extracted from and CO_2 is emitted into, and the technologies used to extract fuels from ecosystems or to deposit CO_2 into the atmosphere. The behavioral actions include the operation of technologies that extract fuels from ecosystems or that deposit CO_2 into the atmosphere, and the ways that consumers use fossil fuel-based electricity to produce the services they desire.

The distinction between normative and cognitive controls is liminal and often hinges on the formality and precision of the control. For the purposes of this research, the two components of this mechanism will be referred to as cultural or informal controls when both are referenced and normative and cognitive controls when they are referenced individually. Perfectly normative controls represent specifically defined, but non-mandatory norms and values that condition how individuals and organizations should interpret and utilize the physical materials and behavioral actions underlying the emission of electricity-derived CO_2 (Scott, 2001). Perfectly cognitive controls represent less precisely defined but extremely salient cultural ideologies and cognitions (Scott, 2001). These ideologies and cognitions determine how individuals and organizations understand and interpret their world, which then shape and enable how the physical materials and behavioral actions associated with electricity-derived CO_2 are understood and utilized (Scott, 2001). An example of the former would be industry or equipment standards or guidelines that suggest which and how physical materials should be used to safely produce as much electricity as possible. An example of the later would represent the only conceivable way of identifying and using physical materials. For instance, the emission of radioactive materials into the atmosphere through a combustion generator would be cognitively controlled if an individual or organization could never conceive of burning nuclear materials in a combustion generator to produce electricity. In the absence of formal mechanisms, these norms and cognitions control behavior by conditioning how individuals and organizations interpret and use physical materials and by positioning specific behaviors or activities as feasible or acceptable (Lindblom, 1977; Scott, 2001). However, the informality and imprecision of cultural controls limits policymakers' ability to directly implement and use them to bring about behavioral changes, as well as the range and scope of behaviors they can control (Lindblom, 1977).

The three mechanisms for controlling behavior are artificially delineated for descriptive ease. In practice, controls on social behavior often reflect different features of multiple mechanisms (Lindblom, 1977; Scott, 2001). For instance, the informality and imprecision of cultural controls means they are often combined with more formal and precise means of control, whether command and control or market-based (Lindblom, 1977). At the same time, the aforementioned difficulties associated with controlling large and diverse swaths of social behavior with command and control policies have prompted many states to deploy them in conjunction with market-based mechanisms (Lindblom, 1977). The application of market policies similarly depends on command and control mechanisms to apply the tax, to establish and secure the property rights being exchanged, and to monitor and regulate market participation to ensure that competitive conditions are present (Demsetz, 1967; Eggertsson, 1990).

Additionally, markets and command and control policies both rest upon cultural controls, or the specific meanings and uses of physical materials or behavioral activities the formal policy is trying to induce (Lindblom, 1977; Scott, 2001). Command and control policies often rest upon normative and cognitive controls that support the commanding authority's claims over physical materials, and that induce individuals and organizations to accept the authority's control over their activities (Dahl, 1971; Weber, 1946). Market mechanisms also depend on normative and cognitive controls (Lindblom, 2001). These controls condition individuals and organizations to voluntarily accept certain meanings, such as price signals, as an appropriate way to interpret and use physical materials (Fligstein & Dauter, 2007; Lindblom, 2001). Cultural controls also influence how individuals and organizations understand and participate in certain behavioral activities (Scott, 2001). For instance, a new tax has the potential to change the behavior of economically rational individuals or organizations because they interpret a specific activity according to the costs and revenues incurred or received from doing so. Markets also depend on cultural controls to constrain and enable how individuals and organizations behave to ensure the competitive conditions that produce price signals are present (Fligstein & Dauter, 2007; Lindblom, 2001).

The connection between formal and cultural mechanisms also influences whether and how a specific behavior is actually controlled. Markets and command and control policies formally control behavior by respectively defining certain types of environmental activities as allowed and by applying price signals to specific environmental activities or the use of particular materials, ecosystems, or technologies. However, in doing so, these formal policies also informally control behavior by stimulating changes in how individuals and organizations understand and utilize the physical materials and behavioral actions underlying the environmental activity, or the normative and cognitive controls that simultaneously control it (Lindblom, 1977; Schnaiberg, 1980; Scott, 2001). Formal policy mechanisms stimulate changes in cultural controls by highlighting alternative ways for individuals and organizations to interpret and utilize the physical materials and behavioral actions comprising the controlled activity. The degree to which the ensuing shifts in normative and cognitive controls continue to support the meanings embedded within an enacted, formal mechanism creates opportunities to strengthen the formal mechanism (Caronna, 2004; Lindblom, 1977).

Based on this perspective, the enactment and effects of a formal policy are not independent events occurring in isolation from these cultural controls. The pre-existing cultural controls that govern how physical materials and behavioral actions are interpreted and used influence whether and how formal policies can be enacted. Specifically, there must be alignment between pre-existing cultural controls and the meanings and interpretations embedded within a potential, formal policy (Caronna, 2004; Lindblom, 1977). For example, if a specific material and ecosystem were intrinsically valued for aesthetic purposes then it would be difficult to use a market-based mechanism to control the extraction of the material from the ecosystem. The cultural controls associated with the policy would be based on the extrinsic or monetary value of the material and ecosystem misaligning the pre-existing and proposed cultural controls. The need for alignment is especially pertinent when applying formal controls to an activity for the first time or when altering the type of formal control, such as from command and control to markets. Deploying new formal controls or changing existing ones makes the underlying cultural controls that also guide individuals' and organizations' involvement with the activity more salient. Ignoring, marginalizing, or failing to resolve the alignment between pre-existing cultural controls and the meanings and interpretations encapsulated within a formal policy can prompt individuals and organizations to interpret the meanings embedded within the policy and the policy itself as invalid, inappropriate, or illegitimate (Caronna, 2004; Lindblom, 1977). Perceived or actual misalignment between pre-existing cultural controls and the cultural controls associated with newly proposed formal policies can prompt individuals or organizations to reject or contest the enactment of formal policies (Bourdieu & Wacquant, 1992; Caronna, 2004).

A formal policy's ability to effectively control a specific type of activity is also partially derived from its ability to change how individuals and organizations interpret and use the physical materials and behavioral actions associated with the activity (Lindblom, 1977; Scott, 2001). If individuals and organizations continue using pre-existing cultural controls, versus those embedded in a formal policy, to interpret and utilize the materials and actions underlying the activity to be controlled then they may contest the policy (Bourdieu & Wacquant, 1992; Caronna, 2004). The actual act of contestation can include forcibly taking the power that the direct authority or market rests upon, at one extreme, to vocally protesting the controls while complying, at the other, with legal challenges, incomplete compliance, intentional non-compliance, and other acts falling in the spectrum between them (Meyer & Rowan, 1977). As an example, if individuals and organizations believe the materials extracted from a particular ecosystem are under divine control, it would be difficult for a secular state authority to effectively control the extraction of this material with a command and control policy. Its claims over the material and ecosystem would not be valid to these individuals and organizations. Actually using this form of command and control mechanism to control this specific behavior would require inducing individuals and organizations to interpret the material and ecosystem through alternative cultural controls, or as under state authority instead of divine authority. Failing to do so can lead individuals and organizations to intentionally misrepresent their involvement with the activity, to avoid compliance, or to try to repeal the policy. All of these dynamics limit the formal policy's ability to actually control individual and organizational behavior.

Misalignment between pre-existing and proposed or newly enacted cultural controls can emerge around both the physical materials and behavioral actions underlying the activity or the use of the policy mechanism itself (Caronna, 2004; Lindblom, 1977; Scott, 2001). Furthermore, the degree of misalignment can vary. For example, the ways that expensive or important technologies are interpreted and used can be especially sensitive to the misalignment brought about by proposing alternative cultural controls, even if they are not significantly different. Subsequently, the individuals and organizations that interpret or use the technologies through these pre-existing meanings may be more likely to contest the enactment of formal policies that encapsulate alternative cultural controls. Additionally, different types of individuals and organizations may perceive misalignment more readily than others (Caronna, 2004). For instance, the individuals and organizations who own certain technologies will be more likely to perceive misalignment around how their technologies are interpreted and used than non-owners. If certain individuals and organizations are more likely to perceive misalignment between their pre-existing cultural controls and the cultural controls embedded in a newly proposed policy, then their support is more critical for enacting the policy than individuals and organizations less likely to perceive misalignment. This means that enacting new formal policies to successfully control an environmental activity requires identifying which materials and behaviors are most sensitive to misalignment, and which individuals and organizations are most likely to perceive misalignment (Caronna, 2004; Lindblom, 1977).

Controlling CO_2 Emissions

The previously discussed, abstracted examples of mechanisms for controlling behavior are now grounded by using them to describe previous efforts to control CO_2 emissions in the U.S. In this treatment, the type of formal mechanism employed is presented first. Then the outcome of each attempt is described along with the design features that influenced this outcome. The most recent command and control-based attempt is presented first. It is followed by the more numerous market-based policies, beginning with the one designed to control global CO_2 emissions. Next, the few examples of tax-based policies proposed in the U.S. are described. They are followed by the more numerous examples of domestic cap and trade-based policies. Of the many cap and trade policies that were proposed, RGGI is described last and in the greatest detail as it is the primary focus of this research. The section concludes by using these examples to identify critical design features for market-based policies in general and cap and trade-based policies in particular.

Attempts to Control CO_2 Emissions

The main CO_2 command and control policy is based on the authority of the U.S. Environmental Protection Agency (EPA)(Cohen & Miller, 2012). Before CO_2 and other GHGs were classified as pollutants, the EPA did not have the authority to control these materials and was unable to enact command and control policies (Cohen & Miller, 2012). In 2007 the U.S. Supreme Court ruled that CO_2 and other GHGs are pollutants that can be regulated under the Clean Air Act, which obligated the EPA to control them (U.S. Supreme Court, 2007). This enabled the EPA to issue the Mandatory Reporting of Greenhouse Gas Rule (74 FR 56260), which includes the Greenhouse Gas Reporting Program (GHGRP) (40 CFR Part 98) (U.S. Environmental Protection Agency, 2013). The GHGRP does not control GHGs, but facilities that emit more than 25,000 metric tons of GHGs have had to monitor and report their emissions since 2010 (U.S. Environmental Protection Agency, 2013). However, even after this legal decision and the enactment of this rule, a number of states, members of Congress, and industry organizations challenged both the need to control GHGs and the EPA's authority to do so (Cohen & Miller, 2012). These contesting efforts involved legal challenges, new legislative policies, and attempts to reduce the resources of the EPA (Cohen & Miller, 2012). The EPA's ability to regulate GHGs and the command and control policies they have proposed to do so are still being challenged (Cohen & Miller, 2012). As of 2012 the EPA's ability to regulate CO_2 and GHGs as pollutants has been upheld (U.S. Court of Appeals: District of Columbia Circuit, 2012). This has allowed the EPA to propose a Carbon Pollution Standard for New Power Plants, which is a command and control-based mechanism that specifically defines the amount of CO_2 that a new generation facility can emit (U.S. Environmental Protection Agency, 2012e).

The Kyoto Protocol to the United Nations Framework Convention on Climate Change (UNFCC) is the most significant effort to control CO_2 emissions at a global scale (United Nations Framework Convention on Climate Change, 2012a). When the Kyoto Protocol was designed, thirty-seven industrialized countries (Annex 1) agreed to binding restrictions on the amount of CO_2 that individuals and organizations within each country could emit into the atmosphere (United Nations Framework Convention on Climate Change, 2012a). The Kyoto Protocol is a cap and trade market mechanism as it controls

CO_2 by mandating that Annex 1 countries reduce their emissions by a certain percentage from a historical point (United Nations Framework Convention on Climate Change, 2012a). Annex 1 countries can meet their emission reduction targets themselves, by trading emissions allowances, or by funding joint implementation projects in other Annex 1 countries (United Nations Framework Convention on Climate Change, 2012a). However, binding emission reductions were only applied to industrialized, Annex 1 countries, which did not include currently large but historically low emitters like China and India (United Nations Framework Convention on Climate Change, 2012a). The delineation between Annex 1 and non-Annex 1 countries necessitated an additional design feature, the Clean Development Mechanism, to facilitate trading between these two categories of countries (United Nations Framework Convention on Climate Change, 2012b). While the United States signed the Kyoto Protocol, it was never formally ratified by the U.S. Senate. The Kyoto Protocol was not ratified because members of the conservative movement, which includes conservative Congressmen and think-tanks, many of whom were funded by fossil fuel-based industries, actively contested its ratification (McCright & Dunlap, 2003). Many of these individuals and organizations believed that CO_2 is a benign, naturally occurring material and that ecosystems can absorb infinite amounts of CO_2 emissions without functionally changing (McCright & Dunlap, 2003). Others thought that controlling the U.S.' CO_2 emissions would be both unnecessary and economically harmful, especially if other large emitting countries did not have to control their emissions (Byrd & Hagel, 1997; McCright & Dunlap, 2003). These arguments and opposition motivated the Byrd-Hagel Resolution which was passed before the Kyoto Protocol was formalized to prevent the U.S. Senate from ratifying it (Byrd & Hagel, 1997).

At the national level, Congressmen have tried to enact a number of formal mechanisms to control CO_2 emissions. They proposed a variety of market-based mechanisms, which included cap and trade and tax-based policies. However, cap and trade policies were proposed much more frequently than taxes. None of these policies were successfully enacted.

In 2007 Representatives Larson and Stark proposed bills in the House of Representatives that taxed the production of carbon, such as the extraction of coal, oil, and gas, ultimately emitted into the atmosphere via combustion (Larson, 2007; Stark, 2007). The Stark bill (H.R. 2069) didn't specify how the tax revenue would be used, while the Larson bill (H.R. 3416) proposed recycling the revenue from this tax towards clean energy technologies and customer rebates (Larson, 2007; Stark, 2007). Both tried to pass similar carbon tax bills again in 2009 (H.R. 594 and 1337) (Larson, 2009; Stark, 2009). In 2009 Rep. Inglis also unsuccessfully proposed a carbon tax in H.R. 2380 (Inglis, 2009). Rep. Stark repurposed his carbon tax bill for the third time in H.R. 3242, but it was not enacted (Stark, 2011). As a whole Americans generally oppose new or higher taxes, which makes controlling CO_2 through tax-based policies unappealing as well (Lachapelle, Borick, & Rabe, 2012). As a result, these policies were not enacted because they created new taxes that would make producing and consuming fossil fuel-derived energy more expensive for everyone in the U.S., and because the conservative movement continued to sow doubt about the need to control anthropogenic CO_2 emissions (Lachapelle et al., 2012; McCright & Dunlap, 2010).

Americans' general distaste for taxes is also reflected in the quantity and the diversity of cap and trade-based market mechanisms proposed to control CO_2 emissions versus those that are tax-based. In 2006 Rep. Udall (H.R. 5049) and Rep. Waxman (H.R. 5642) proposed cap and trade policies (Udall, 2006; Waxman, 2006). H.R. 5049 set a mandatory cap on the amount of carbon-containing fuels that could be produced based on expected CO_2 emissions three years after enactment, incorporated safety valves, and gave 20% of allowances away for free, 20% to states to distribute, and 60% to the Federal Government to sell (Udall, 2006). H.R. 5642 set a mandatory cap on large sources of CO_2 at 2010 levels, established a schedule for reducing total emissions to 80% of 1990 levels by 2050, allowed the banking of credits, but did not determine an allocation method (Waxman, 2006).

During the 110th session of Congress between 2007 and 2008, a number of CO_2 cap and trade policies were proposed. These included another version of Rep. Waxman's proposal (H.R. 1590), as well as new proposals put forth by Rep. Markey (H.R. 6186), Rep. Doggett (H.R. 6316), Senator Lieberman (S.280), Sen. Sanders (S.309), Sen. Kerry (S.485), and Sen. Bingaman (S.1766) (Bingaman, 2007; Doggett, 2008; Kerry, 2007; Lieberman, 2007; Markey, 2008; Sanders, 2007; Waxman, 2007). Rep. Markey's bill capped the amount of CO_2 released by large emitters at 2005 levels by 2012, tightened the cap each year between 2012 and 2050, and recycled the revenues to support climate change, clean technology development, and consumer assistance (Markey, 2008). Rep. Doggett's bill broadly proposed that the Department of the Treasury create a CO_2 cap and trade program that used the revenues to address climate change and to help consumers cope with higher energy prices (Doggett, 2008). The Lieberman bill proposed a mandatory cap on all large emitters that restricted 2012 emission levels to those found in 2004, then tightened the cap to achieve 1990 emission levels by 2020, and 60% of 1990 levels by 2050 (Lieberman, 2007). It allowed banking and borrowing of allowances, but proposed an undetermined mix of freely distributed and auctioned allowances (Lieberman, 2007). Sen. Sanders' bill proposed that the EPA set a mandatory cap on CO_2 emissions at 2010 levels that would then be tightened to achieve 1990 levels by 2020, a 30% reduction from 1990 levels by 2030, a 60% reduction from 1990 levels by 2040, and a 80% reduction from 1990 levels by 2050, but did not specify how allowances should be allocated (Sanders, 2007). The Kerry bill capped the emissions from large emitters at 2010 levels, capped 2050 emissions at 65% of 2000 levels, allowed allowance banking, but left the allocation ratio between freely distributed and auctioned allowances undefined (Kerry, 2007). Lastly, Sen. Bingaman's bill proposed a mandatory cap on CO_2 emissions based on emission intensity that would be reduced by 2.6% each year between 2012 and 2021 and 3% annually beginning in 2022 (Bingaman, 2007). It included allowance banking, safety valves, and the following distribution of allowances: 50% given away for free; 10% auctioned; and 30% given to states (Bingaman, 2007).

In the 111th session of Congress between 2009 and 2010, three other CO_2 cap and trade policies were proposed. While none were enacted the House of Representatives did pass Rep. Waxman's American Clean Energy and Security Act of 2009 (H.R. 2454) (Waxman, 2009). This marked the first time either House approved a formal policy for controlling CO_2 emissions. In addition to H.R. 2454, Rep Doggett introduced another version of his bill (H.R. 1666), and Rep. Van Hollen also proposed a CO_2 cap and trade policy (H.R. 1862) (Doggett, 2009; Van Hollen, 2009). Rep. Doggett's bill introduced a mandatory cap on CO_2 emissions that would reduce total emissions from 6 billion tons in 2012 to 250 million tons in 2050 and included allowance banking and an auction-based allocation (Doggett, 2009). Rep. Van Hollen's proposal capped 2012 emissions at 2005 levels, progressively tightened the cap so that 2050 emissions would be 85% less than 2005 levels, established partial allowance auctions, and incorporated a revenue recycler that would use the auction proceeds to address climate change and to support affected consumers (Van Hollen, 2009). Rep. Waxman's H.R. 2454 proposed a number of broader changes to the U.S.' energy infrastructure in addition to controlling the CO_2 emissions associated with its use (Waxman, 2009). The cap and trade component of H.R. 2454 capped 2012 emissions at 97% of 2005 levels and progressively tightened the cap so that 2050 emissions would not be more than 17% of 2005 levels (Waxman, 2009). It allowed allowance banking and safety valves, established an 85-15% mix of freely distributed and auctioned allowances, and created a revenue recycling feature to support affected consumers and to address climate change (Waxman, 2009).

Many of the same arguments employed to prevent the ratification of the Kyoto Protocol and the enactment of tax-based CO_2 policies were also used to contest these cap and trade proposals. Specifically, individuals and organizations associated with the conservative movement and fossil fuel industries used a combination of ideological and economic arguments to prevent the enactment of these policies (Cohen & Miller, 2012; Pooley, 2011). From an ideological standpoint, the conservative movement continued to discredit the scientific position that increasing concentrations of CO_2 were anthropogenic and that increasing concentrations would negatively affect the functioning of environmental ecosystems (Cohen & Miller, 2012; McCright & Dunlap, 2010; Pooley, 2011). They then exploited the artificial scientific uncertainty that they induced to contest the enactment of CO_2 cap and trade policies (Cohen & Miller, 2012; McCright & Dunlap, 2010; Pooley, 2011). Their ideological arguments were also supported by economic arguments, which claimed that cap and trade policies were a new tax that would increase the price of producing and consuming fossil fuel-based energy for everyone in the U.S. (Cohen & Miller, 2012; Murray & Yeatman, 2010; Pooley, 2011). These economic arguments became even more salient as the American economy entered the recent economic recession (Cohen & Miller, 2012). Individuals and organizations associated with the conservative movement and the fossil fuel industry successfully used this combination of economic and ideological arguments to prevent any of these cap and trade proposals from being enacted (Cohen & Miller, 2012; Pooley, 2011).

The lack of a federal CO_2 policy encouraged individual and groups of states to try to control the CO_2 emitted within their borders themselves. These efforts initially manifested as regional aggregations of states who shared a common desire to begin controlling CO_2 emissions. These groupings included the Midwestern Greenhouse Gas Accord (MGGA), the Western Climate Initiative (WCI), and the Regional Greenhouse Gas Initiative (RGGI). Despite producing a set of draft recommendations in 2010, progress on the MGGA has ground to a halt as most of the participating states are no longer pursing it due to changes in state leadership (Center for Climate and Energy Solutions, 2012a). The WCI initially included Arizona, Montana, Utah, California, New Mexico, Oregon, and Washington, but due to changes in political leadership and diminishing support for regional cap and trade policies California is the only state still participating (Center for Climate and Energy Solutions, 2012b; Craig, 2011; Western Climate Initiative, 2012a). Despite this, the WCI, which includes a number of Canadian provinces in addition to California, intends to enact a cap and trade-based CO_2 policy in 2015 (Western Climate Initiative, 2012b).

In the meantime, California has moved forward with its own market-based CO_2-controlling policy, which rests on the authority of the California Air Resources Board (CARB) (California Environmental Protection Agency: Air Resources Board, 2012a). Initially proposed as the Global Warming Solutions Act of 2006, Assembly Bill (AB) 32 required the CARB to establish a policy for controlling the state's CO_2 emissions (California Environmental Protection Agency: Air Resources Board, 2012a). CARB proposed a cap and trade policy that included an allowance auction, but the implementation of this policy has been contested a number of times. The major acts of contestation included the defeated Proposition 23, which would have suspended AB 32 until the state's unemployment rate fell below 5.5%, and a failed legal challenge by the California Chamber of Commerce that sought to invalidate CARB's ability to auction CO_2 allowances (Grimes, 2012; Roosevelt, 2010). Both of these acts of contestation were based on the potential economic impacts of the policy: Prop. 23 claimed that AB 32 would eliminate jobs while the California Chamber of Commerce claimed that auctioning CO_2 allowances would effectively impose higher taxes on the state's businesses (Grimes, 2012; Roosevelt, 2010). Despite these challenges AB 32 was finally implemented in January of 2012 and the first auction occurred in November of that year (California Environmental Protection Agency: Air Resources Board, 2012b). The policy allows allowance banking, and includes a 507 million ton cap on the amount of CO_2 emitted by large sources in the state that is progressively tightened to 427 million tons in 2020 (California Environmental Protection Agency: Air Resources Board, 2012a). The policy initially gives 90% of the allowances away for free and auctions the remaining 10%, but the percentage of freely allocated allowances declines over time (Center for Climate and Energy Solutions, 2013). The AB 32 auction also includes a minimum price floor of $10, and the allowance price for the first auction was $10.09 (California Environmental Protection Agency: Air Resources Board, 2013; Center for Climate and Energy Solutions, 2013). AB 32 also includes three allowance reserves that enable regulated organizations to purchase allowances outside of the auction system for $40, $45, and $50 (Center for Climate and Energy Solutions, 2013). This reserve effectively functions as a price ceiling as a regulated organization would not bid more than $40 dollars in the auction because they can purchase an allowance at this price from the reserve.

The Regional Greenhouse Gas Initiative (RGGI)

The Regional Greenhouse Gas Initiative first went into effect in 2009, which makes it both the first and the longest-lived mandatory CO_2-controlling policy in the United States (Regional Greenhouse Gas Initiative, 2012a, 2012b). RGGI is a regional cap and trade market mechanism initially applied to control the CO_2 emissions produced by electrical generating facilities over 25 megawatts in Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Delaware, and Maryland (Regional Greenhouse Gas Initiative, 2012a). The historical background of RGGI can be traced to 2003, when then New York Governor Pataki began communicating with other Governors of New England and Mid-Atlantic states about developing a strategy to control CO_2 emissions (Regional Greenhouse Gas Initiative, 2006). Following these efforts, the Governors of Connecticut, Delaware, Maine, New Hampshire, New Jersey, New York, and Vermont came together in 2005 to formally create the Regional Greenhouse Gas Initiative (Regional Greenhouse Gas Initiative, 2011a). In doing so, the Governors of these states signed a Memorandum of Understanding (MOU), in which they all agreed to enact the first mandatory cap and trade policy for controlling the CO_2 that is emitted by electricity generating facilities (Regional Greenhouse Gas Initiative, 2011a). State level environmental and energy policymakers, known as the Staff Working Group (SWG), were tasked with designing the formal policy mechanisms of RGGI, but they actively structured the design phase to be open and transparent (Regional Greenhouse Gas Initiative, 2005). To achieve this inclusion and transparency, state policymakers actively consulted with different categories of stakeholders, such as generators, distributors, environmental non-governmental organizations (NGOs), consumers, and public interest groups, about the design of the policy and the potential implications of using various designs (Regional Greenhouse Gas Initiative, 2007). They also made nearly all the documents associated with the design process available to the public.

In 2006, the SWG delivered a draft Model Rule, which laid out the specifics of the market-based policy proposed as the foundation for RGGI (Regional Greenhouse Gas Initiative, 2008a). The draft Model Rule was made available for public comments for sixty days before it was released (Regional Greenhouse Gas Initiative, 2008a). This document described the policy features that would ultimately form the basis for RGGI, and to join RGGI a state had to enact them through its own governance structure (Regional Greenhouse Gas Initiative, 2008a, 2012c). The Model Rule specified that the cap on CO_2 emissions would be based on the region's historical emissions and that individual state allocations would be distributed according to the proportion of the region's historical emissions emitted by facilities in each state (Regional Greenhouse Gas Initiative, 2008b). In 2007, Massachusetts, Rhode Island, and Maryland joined RGGI (Center for Climate and Energy Solutions, 2012c). All of the participating states signed and enacted the Model Rule by 2008, and the first auction for CO_2 allowances was held in September of that year (Center for Climate and Energy Solutions, 2012c). Since then, four auctions have been held a year, one every three months (Regional Greenhouse Gas Initiative, 2012d).

According to the Model Rule, RGGI includes three compliance periods. The policy's first goal is to stabilize total emissions during the first two periods: 2009 to 2011 and 2012 to 2014 (Regional Greenhouse Gas Initiative, 2008b). The next goal is to reduce total emissions by 2.5% annually for a total reduction of 10% during the third period: 2015 to 2018 (Regional Greenhouse Gas Initiative, 2008b). The cap for the first compliance period was 188 million short tons of CO_2 and for the second it is 165 million short tons (Regional Greenhouse Gas Initiative, 2008b). At the end of the third period the cap would be 148.5 million short tons (Regional Greenhouse Gas Initiative, 2008b). The Model Rule also includes: provisions allowing the banking of allowances; specifications on what types of offsets are allowed, how many offsets are allowed, and how they are accounted for; rules and procedures for monitoring and measuring CO_2 emissions; and administrative guidelines for allowance trading (Regional Greenhouse Gas Initiative, 2008b).

State involvement with RGGI is voluntary, but to participate a state must enact the policy package prescribed in the RGGI Model Rule, which makes participation mandatory for eligible electrical facilities (Regional Greenhouse Gas Initiative, 2012c, 2012e). As state involvement with RGGI is voluntary, individual states can withdraw from the policy; doing so eliminates the formal, mandatory CO_2 controls applied to qualifying facilities within its borders. In the time since RGGI's initial enactment, the Governor of New Jersey successfully pulled his state out of the policy and kept it out despite state Congressmen's attempts to rejoin (New Jersey Today, 2012). The reason the Governor used to justify New Jersey's withdrawal was that the allowances were not expensive enough to significantly reduce emissions, which effectively made RGGI a new tax on electricity (New Jersey Today, 2012).

As each state establishes the legal basis for RGGI, each is free to choose how it wants to distribute its allocations. All the participating states have chosen to auction approximately 90% of their CO_2 allowances, and these allowances can be held by regulated or non-regulated entities (Regional Greenhouse Gas Initiative, 2012f). RGGI's allowance auctions include safety valves that allow regulated organizations to use increasing amounts of offsets, emission reductions that occur outside of the RGGI system, if certain price conditions are triggered as well as a minimum reserve allowance price (Regional Greenhouse Gas Initiative, 2008b). The safety valves have never been triggered, but the current period allowance price has been the reserve price for the last eight, out of a total of sixteen, auctions (Regional Greenhouse Gas Initiative, 2012d). Additionally, the states have also chosen to recycle approximately 80% of the auction revenues to programs that benefit the public, such as low income rate assistance, renewable energy development, and energy efficiency (Regional Greenhouse Gas Initiative, 2011b). Compared to other market mechanisms that have been and are being used to control environmental activities, RGGI's use of a nearly full auction with revenue recycling and a reserve price is unique.

The CO_2 cap for RGGI's first compliance period was based on the region's emissions from 2000 to 2004 (Regional Greenhouse Gas Initiative, 2009). It was set at 188 million short tons of CO_2 per year; however, the total amount of CO_2 emitted in the region in 2008 was only 153 million short tons, which made the initial cap very generous (Regional Greenhouse Gas Initiative, 2009). During this period, the RGGI states also experienced two external events that further reduced the amount of CO_2 emitted in the region. The first was the economic recession that hit the entire U.S. during this period, which reduced the demand for electricity and subsequently the need to run CO_2-emitting generation equipment (Stavins, 2012). The second event revolved around the falling price of natural gas that occurred as hydraulic fracturing, a new extraction technology, opened up new, non-conventional reserves, such as the Marcellus shale gas field that extends under parts of New York and Pennsylvania (Stavins, 2012). With large amounts of new natural gas supplies coming to market the price fell dramatically. Along with the newly enacted allowance price for CO_2, the presence of cheap natural gas prompted many generating organizations to accelerate the rate they were replacing older coal and oil burning facilities that were nearing the end of their useful lives with new natural gas burning facilities (Stavins, 2012). As the combustion of natural gas releases about half as much CO_2 as the combustion of coal and about a third as much as the combustion of oil, the accelerated replacement of coal and oil burning facilities significantly reduced the amount of CO_2 emitted in the region (U.S. Environmental Protection Agency, 2007).

The initial weakness of RGGI's emission cap and the subsequent suppression of the demand for CO_2 allowances pushed the current period allowance price to the reserve price for eight of the last sixteen auctions (Regional Greenhouse Gas Initiative, 2012d). Additionally, during the first compliance period more than a hundred million allowances were not sold (Regional Greenhouse Gas Initiative, 2012d). For the first two RGGI auctions only current period allowances were sold, while auctions three through twelve included current and future, the next compliance period, allowances (Regional Greenhouse Gas Initiative, 2012d). However, the price of future allowances had been at the reserve price for six of the twelve auctions they were offered, and the amount being sold was declining so RGGI officials decided to stop selling future period allowances in the second compliance period (Regional Greenhouse Gas Initiative, 2012d).

Through sixteen auctions just under four hundred million CO_2 allowances had been sold for the first compliance period and just under sixty million allowances had been sold for the second; these figures include those sold by New Jersey while they were still participating (Regional Greenhouse Gas Initiative, 2012d). Despite the ongoing oversupply of allowances, the reserve price enabled the auctions to generate nearly one billion dollars in proceeds (Regional Greenhouse Gas Initiative, 2012d). Of those billion dollars, approximately eight hundred million was used to benefit the public, with approximately 100 million dollars to stimulate the deployment of renewable energy technologies, approximately 150 million dollars to provide energy bill assistance, and approximately 500 million dollars to support energy efficiency (Regional Greenhouse Gas Initiative, 2011b).

As of this writing, RGGI is in the midst of the 2012-13 review period (Regional Greenhouse Gas Initiative, 2012g). The participating states are evaluating the impacts of the policy hitherto, and whether to adjust the cap and to re-evaluate the use of offsets going forward (Regional Greenhouse Gas Initiative, 2012g). Much like the initial creation process, the review process is designed to be open and transparent. The information and models policymakers are using to make their decisions have been presented to groups of stakeholders and the general public for comments (Regional Greenhouse Gas Initiative, 2012g).

Critical Considerations for Enacting CO_2-Controlling Policies

From the many CO_2 policies that were not enacted and the few that were, it is possible to identify a few critical considerations for designing and then enacting CO_2-controlling policies. To begin with, every proposed federal policy was contested by individuals and organizations associated with the conservative movement and the fossil fuel industry. Many of these individuals and organizations are ideologically opposed to CO_2-controlling policies due to their belief that increasing concentrations of CO_2 are not anthropogenic and that increasing concentrations of atmospheric CO_2 do not negatively affect the functioning of environmental ecosystems (McCright & Dunlap, 2010; Pooley, 2011). As all CO_2-controlling policies presume the connection between anthropogenic CO_2 emissions, atmospheric concentrations of CO_2, and changes in ecosystem functioning, is unlikely that a particular policy mechanism or design feature can eliminate these ideological concerns.

The other major argument used to contest the enactment of CO_2-controlling policies has been based on the potential economic impacts of the policies (Cohen & Miller, 2012; Pooley, 2011). Specifically, many individuals and organizations that produce or consume fossil fuel-based energy, which is nearly everyone in the U.S., are concerned that enacting CO_2-controlling policies would increase the cost of energy (Cohen & Miller, 2012; Pooley, 2011). They then believe that higher energy prices would have a detrimental effect upon the U.S. economy and make it uncompetitive with countries that do not have CO_2-controlling policies (Cohen & Miller, 2012; Pooley, 2011). In fact, ongoing and widespread concern about the economic impacts of CO_2-controlling policies makes the perceived costs of a policy a critical consideration for its enactment. The paramountcy of a policy's perceived economic effects is reflected in the “iron law of climate policy” (46) (Pielke, 2010). This posits that individuals and organizations are only willing to incur a certain amount of costs to control CO_2 emissions, even if they believe that emissions need to be controlled (Pielke, 2010). Following this 'iron law', CO_2-controlling policies perceived as having large economic costs will not be enacted even if the ideological opposition to them can be eliminated or circumvented (Pielke, 2010). Under the same argument, CO_2-controlling policies perceived to have low economic costs or potential economic benefits may be enactable even in the face of ideological opposition (Pielke, 2010). This would be possible if the low economic costs or potential economic benefits of a policy can attract enough support to render those who are ideological opposed irrelevant.

Based on the "iron law of climate policy" (46), the critical considerations for designing an enactable CO_2 policy primarily revolve around reducing the perceived cost of a policy and using the policy to create perceivable benefits (Pielke, 2010). This makes the stringency of a cap and trade policy a critical consideration as tight caps that are designed to significantly reduce emissions are likely to be perceived as too economically costly to actually enact. Similarly, features that can reduce or limit the perceived economic costs of a policy may facilitate its enactment. These features include safety valves that can release extra allowances if the allowance price exceeds a certain threshold or if the demand exceeds the available supply. Other design features that can limit the perceived economic impact of a cap and trade policy include price ceilings that limit how high allowance prices can rise and the inclusion of offsets that enable less expensive emissions reductions that occur at other locations or sectors to be counted towards the policy's requirements. Lastly, the revenues generated from selling or auctioning allowances represent a valuable resource that can be used to support various programs or initiatives that benefit individuals and organizations affected by the policy.

Chapter 3: Theoretical Frameworks

Introduction

This chapter expands on the connection between formal and informal or cultural mechanisms to discuss how the relationship between the two affects the enactment of new, formal CO_2-controlling policies and how both types of mechanisms influence individual and organizational behavior (Lindblom, 1977; Scott, 2001). The RGGI policy is then framed as a combination of formal and cultural mechanisms, leading to several research questions about the policy's enactment and its subsequent effects on how individuals and organizations produce and consume electricity. The motivations that prompted the selection of these questions are then identified and justified. Next, an economic framework and an institutional framework are presented. These two frameworks represent distinct conceptual lenses that can be used to analyze the enactment and effects of RGGI. In the last section of this chapter, insights from the two theoretical frameworks are combined to produce hypotheses about the research questions. The remaining chapters of this research use the data that were collected about the enactment and effects of RGGI to evaluate these hypotheses.

The Connection between Formal and Cultural Mechanisms for Controlling CO_2 Emissions

Given the pervasiveness of CO_2, its inherent role in ecological systems, and its lack of immediate toxicity, attention to and the desire to control CO_2 emissions are relatively recent phenomenon (Hulme, 2009; Intergovernmental Panel on Climate Change, 2007h). These have been driven by concerns over climate change, ocean acidification, and changes in ecosystem functioning

(Intergovernmental Panel on Climate Change, 2007i). Before these concerns were apparent to the general public, the emission of CO_2 was motivated by certain cultural controls. These cultural controls were based on how the physical materials and behavioral actions underlying the emission of CO_2 (Schnaiberg, 1980; Scott, 2001). In terms of physical materials these cultural controls were based on interpreting and using: CO_2 as a benign, naturally occurring material that does not affect human or environmental health in any concentration; the atmosphere and the oceans as self-regulating sinks that can absorb infinite amounts of CO_2 without functionally changing; and CO_2-emitting technologies as clean, safe, and desirable (Hulme, 2009; Schnaiberg, 1980). The cultural controls on behavioral actions were based on treating the operation of CO_2-emitting technologies and the consumption of fossil fuel-based electricity as socially beneficial activities that should be encouraged (Schnaiberg, 1980). With these cultural controls in place emitting more CO_2 to produce, and subsequently consume, more electricity was viewed as an appropriate and positive contribution to society, and individuals and organizations were encouraged to do so (Hirsh, 2002; Hulme, 2009; Schnaiberg, 1980).

As society has increased its understanding of how increasing concentrations of CO_2 can affect the functioning of different ecosystems there has been a growing desire to control the amount of CO_2 emitted into the atmosphere and oceans (Hulme, 2009). However, formal CO_2 controls, whether command and control or market-based, encapsulate certain meanings and uses of the physical materials and behavioral actions associated with CO_2 emissions (Lindblom, 1977; Schnaiberg, 1980; Scott, 2001). These meanings and interpretations are different from those that condition the use of these materials and actions when CO_2 emissions are not formally controlled (Lindblom, 1977; Schnaiberg, 1980; Scott, 2001). More specifically, proposing to control or actually controlling CO_2 emissions is based on interpreting and using: CO_2 as a material that is dangerous in certain concentrations; atmospheric and aquatic ecosystems as finite sinks that are susceptible to overloading; and CO_2-emitting technologies as less clean, safe, and desirable (Hulme, 2009; Schnaiberg, 1980). Formal CO_2-controlling policies are also based on treating the operation of CO_2-emitting technologies and the consumption of fossil fuel-based electricity as social activities that should be controlled and managed

(Schnaiberg, 1980). Under these cultural controls, increasing CO_2 emissions to produce and consume increasing amounts of fossil fuel-derived electricity would be positioned as deleterious to society, and individuals and organizations would be encouraged to limit their involvement with these activities (Hulme, 2009; Schnaiberg, 1980).

Enacting New Policies

Anthropogenic CO_2 emissions had not been historically controlled with formal mechanisms. As such, the development of many modern, fossil fuel-combusting industrial processes, such as the production and subsequent consumption of electricity, were predicated on the earlier meanings and uses of the materials and actions underlying the emission of CO_2 (Hirsh, 2003; Hughes, 1993; Schnaiberg, 1980). Industrial processes as a whole and the electrical system in particular are comprised of many interlinking, long-lived, and capital intensive technological systems (Casazza & Delea, 2009). This limits the degree that many individual components can be quickly replaced. Therefore, the cultural controls that were present when these systems were initially developed continue to influence how individuals and organizations understand and utilize the materials and actions underlying the emission of CO_2, even as alternative cultural controls have become increasing salient (Hughes, 1993; Johnson, 2007; Schnaiberg, 1980; Scott, 2001). This is especially true of CO_2-emitting technologies. The meanings and uses that supported their initial deployment have been conceptually cemented by their ongoing presence as debts to be repaid, sources of revenue streams, and vital cogs in the operation of electrical systems.

The predominance of these initial understandings and utilizations creates misalignment with the newer cultural controls that are embedded within recent proposals to formally control CO_2 emissions (Caronna, 2004; Johnson, 2007; Lindblom, 1977). The misalignment between the pre-existing and proposed cultural controls challenges the existing organizational and technological configurations of electricity producing and consuming industries (Caronna, 2004). Moreover, attempts to formally control CO_2 emissions represent direct and significant threats to the individuals and organizations whose economic health depends on freely emitting CO_2 into the atmosphere or using the electricity that is produced from doing so. As a result, many producers and consumers of fossil fuel-based energy contest the enactment of formal mechanisms that limit anthropogenic emissions of CO_2 or that make producing or consuming fossil fuel-derived electricity more expensive (Bourdieu & Wacquant, 1992; Pooley, 2011). Many of these individuals and organizations are part of old, powerful, and well-connected industrial networks and they have successfully contested the enactment of nearly every CO_2-controlling policy in the U.S. (Bourdieu & Wacquant, 1992; Cohen & Miller, 2012; McCright & Dunlap, 2010; Pfeffer & Salancik, 2003).

Formally and Informally Controlling Behavior

Anthropogenic CO_2 emissions had not been previously controlled with either command and control or market-based mechanisms. Individuals and organizations had been able to transfer unlimited amounts of CO_2 into the atmosphere, and they could do so for free. From this position, applying any formal market control increases the price of emitting CO_2. Increasing the price required to emit CO_2 into the atmosphere up from zero incentivizes economically self-interested individuals and organizations to reduce their involvement with this activity (Blanchard, 2008; Stavins & Whitehead, 1992). As RGGI formally employs the price signals created by capping, auctioning, and trading emission allowances to control CO_2 emissions, these price signals represent the policy's formal channel of influence (Demsetz, 1967; Lindblom, 2001).

The price signals that constitute the formal channel of influence are created by defining a total emissions cap, allocating tradable rights to each ton of CO_2, and enabling the auction and exchange of emission allowances (Demsetz, 1967; Lindblom, 2001). However, these actions are predicated on certain normative and cognitive interpretations of the physical materials and behavioral actions associated with CO_2 emissions (Lindblom, 2001; Schnaiberg, 1980; Scott, 2001). These meanings and uses differ from the normative and cognitive understandings that underpin these materials and actions when CO_2 emissions are not controlled (Lindblom, 1977; Schnaiberg, 1980; Scott, 2001). By enacting a formal CO_2 policy, policymakers are trying to highlight alternative ways for individuals and organizations to interpret and use the physical materials and behavioral actions underlying the emission of CO_2 (Fligstein, 1997; Lindblom, 1977; Schnaiberg, 1980). If individuals and organizations accept and support the formal policy they will interpret and use these materials and actions through the cultural controls the policy encapsulates. The normative and cognitive shifts that are induced by a formal policy represent an informal, or cultural, channel of influence (Lindblom, 1977; Scott, 2001).

When the cultural controls underlying the interpretation and use of physical materials and behavioral actions are identified it becomes clear that formal and cultural controls both influence individual and organizational behavior (Lindblom, 1977; Schnaiberg, 1980; Scott, 2001). Under this perspective, formal market policies can change behavior through two different, but related channels. They formally apply prices to the physical materials and behavioral actions associated with CO_2 emissions, and they modify how individuals and organizations interpret and use these materials and actions (Lindblom, 2001; Scott, 2001). Much like the distinction between the different controlling mechanisms, the two channels of influence are artificially separated for analytical ease. In practice, the two blend together. RGGI is a cap and trade-based market policy. Its cultural controls are based on interpreting and using CO_2 as a waste material that generators have to purchase an allowance to emit and the operation of CO_2-emitting equipment as a socially undesirable activity, which is only allowed with a purchased emission allowance. The price signal-based meanings that are embedded in the formal RGGI policy represent a set of values, norms, cognitions, and ideologies that can shape and enable how individuals and organizations interpret and use the physical materials and behavioral actions associated with the emission of CO_2 (Lindblom, 2001; Schnaiberg, 1980; Scott, 2001). However, delineating the formal and informal channels of influence acknowledges that the price-signal based meanings associated with a formal market policy are not automatically accepted as reality (Lindblom, 2001; Scott, 2001). Rather, these meanings must be interpreted and negotiated against other sets of meanings before individuals and organizations accept them as appropriate ways to guide their behavior (Berger & Luckmann, 1966; Bourdieu & Wacquant, 1992; Calhoun, 1993). The informal channel of influence is not included in many examples of policy analysis and evaluation; its effects are harder to identify and analyze than the readily observable and evaluable price signals and commands that characterize the formal channels of influence (Aldy, Krupnick, Newell, Parry, & Pizer, 2010; Lindblom, 1977). Despite these difficulties, the synergy that exists between the formal and cultural channels in shaping the effects of a formal policy, and the relevance of informal effects in extending or strengthening formal policies, makes a deeper understanding of them worthy of more nuanced and targeted analysis (Brint & Karabel, 1991; Caronna, 2004; Lindblom, 1977).

Research Questions about the Enactment and Effects of RGGI

When formal and cultural controls are viewed in tandem it becomes clear that the enactment and behavioral effects of formal policies are based on successfully changing how individuals and organizations interpret and use physical materials and behavioral actions (Scott, 2001). However, the economic and operational health of electrical companies and electricity consumers can be significantly impacted if the physical materials and behavioral actions associated with the emission of electricity-derived CO_2 are interpreted and used according to alternative cultural controls. The high stakes associated with changing the formal and cultural controls over the emission of CO_2 places individuals and organizations following different cultural controls, or preferring different types of formal controls on contending sides of a negotiation (Bourdieu & Wacquant, 1992; Pooley, 2011).

At the most basic level, the negotiation processes that characterize the enactment and subsequent effects of RGGI represent a power struggle (Bourdieu & Wacquant, 1992; Calhoun, 1993). More specifically, the negotiation represents individual and organizational efforts to control or to avoid control over the emission of (Calhoun, 1993). The negotiation also encompasses participants' efforts to accentuate different ways to interpret and use the physical materials and behavioral actions associated with CO_2 emissions as more or less desirable or appropriate that others (DiMaggio, 1988; Fligstein, 1997). Within these negotiation processes, individuals and organizations frame interpretations and uses of the proposed policy or the materials and actions associated with the emission of electricity-derived CO_2 as more appropriate than others (DiMaggio, 1988; Fligstein, 1997). Ultimately, they seek to induce individuals and organizations to accept a specific formal control, or a lack thereof, on the emission of CO_2 (Fligstein, 1997; Lindblom, 1977). They also want to change or maintain how CO_2-emitting technologies are operated and used to meet the demand for electricity (Brint & Karabel, 1991; Fligstein, 1997). When this distinction is considered, the overall process segments into a negotiation over the enactment of RGGI, a negotiation over how CO_2 and the operation of CO_2-emitting equipment should be interpreted and used, and a negotiation over how the demand for electricity should be met.

Enactment Research Questions

The enactment negotiation revolves around whether RGGI can be framed in alignment with pre-existing understandings and uses of the physical materials and behavioral actions associated with the emission of electricity-derived CO_2 (Bourdieu & Wacquant, 1992; Caronna, 2004; Fligstein, 1997). Or, whether pre-existing understandings and uses of these materials and actions can be reframed so that they align with the cultural controls embedded within RGGI (Caronna, 2004; Fligstein, 1997; Lindblom, 1977). Failing to achieve this alignment would limit policymakers' ability to enact RGGI, or restrict the policy's ability to effectively control CO_2 emissions over time (Caronna, 2004). Despite increasing concentrations of atmospheric and oceanic CO_2, it has been very difficult to enact market-based policies to control CO_2 emissions (Cohen & Miller, 2012; Intergovernmental Panel on Climate Change, 2007h). These difficulties suggest that there is significant misalignment between how electrical companies and consumers interpret and use the physical materials and behavioral actions underlying the emission of electricity-derived CO_2 and the interpretations and uses that are encapsulated in potential, market-based policies (Caronna, 2004; Lindblom, 1977).

Research Question 1: How were state policymakers able to enact RGGI?

Research Question 2: Did policymakers use innovative cap and trade features to help enact RGGI?

Effects Research Questions

After policy enactment, individuals' and organizations' understandings and uses of the physical materials and behavioral actions underlying the emission of electricity-derived CO_2 continue to be shaped by negotiation. However, in this negotiation individuals and organizations highlight different ways these materials and actions can be understood and utilized rather than whether and how a formal policy should be used to control them (Berger & Luckmann, 1966; Bourdieu & Wacquant, 1992; Fligstein, 1997). In this negotiation, the cultural controls embedded in the formal policy represents one of multiple ways for individuals and organizations to understand and utilize the materials and actions associated with the emission of electricity-derived CO_2 (Berger & Luckmann, 1966; Lindblom, 1977). RGGI's ability to change how individuals and organizations actually interpret and use CO_2 and the operation of CO_2-emitting technologies depends on whether they base their interpretations and utilizations on the cultural controls embedded in the formal policy versus alternative cultural controls (Lindblom, 1977; Scott, 2001). If electrical companies and consumers interpret and use CO_2 and CO_2-emitting technologies through RGGI's cultural controls they would treat CO_2 as a material that needs to be controlled and the operation of CO_2-emitting technologies as an action that needs to be managed. Furthermore, if electrical companies and consumers interpret and use CO_2 and the operation of CO_2-emitting technologies through RGGI's cultural controls it would be easier to enact stronger or more expansive formal CO_2 controls. This is because electrical companies' and consumers' newly shifted cultural controls would be more aligned with the cultural controls encapsulated within stronger formal policies (Caronna, 2004).

> **Question 3:** Did RGGI change how electrical companies and consumers interpret and use CO_2 and the operation of CO_2-emitting technologies, and did these changes affect attempts to develop stronger or additional CO_2-controlling policies?

In addition to its effects on the interpretation and use of CO_2 and the operation of CO_2-emitting technologies, RGGI also represents an attempt to change how electrical companies, consumers, and PUCs interpret the use of electricity. By recycling the revenues from the RGGI allowance auctions to support energy efficiency, the RGGI policymakers are involved in a negotiation over how the electricity that is produced by electrical companies is used to provide the services that consumers desire (Bourdieu &

Wacquant, 1992). Specifically, policymakers are using the RGGI funds to try to get electrical companies and PUCs to interpret and use energy efficiency initiatives that reduce electricity consumption as a better way to meet electrical demand than by building new supply resources (Brint & Karabel, 1991; Fligstein, 1997). Policymakers are also using the RGGI funds to try to get electricity consumers to interpret and use energy efficiency initiatives that reduce electricity consumption as a better way to get the services they desire than by consuming more electricity (Brint & Karabel, 1991; Fligstein, 1997). If electrical companies, consumers, and PUCs interpret and use energy efficiency initiatives through RGGI's cultural controls they would view using these technologies and practices to reduce electricity consumption as desirable. This would make producing and consuming increasing amounts of electricity unnecessary and undesirable. Additionally, if these individuals and organizations interpret and use energy efficiency initiatives that reduce electricity consumption as a positive and desirable endeavor it could facilitate innovation in, or the diffusion of energy efficiency technologies and practices. If electrical companies, consumers, and PUCs positively interpret the use of energy efficiency technologies and practices that reduce electricity consumption they would be more interested in expanding the use of them and more motivated to identify new approaches for reducing electricity consumption.

> **Question 4:** Did RGGI's revenue recycler help to change how electrical companies, consumers, and PUCs interpret and utilize energy efficiency technologies and practices, and did these changes influence innovation in or the diffusion of them?

Motivations for the Research Questions

Current concentrations of atmospheric and oceanic CO_2 have largely accumulated because CO_2 emissions were not traditionally controlled (Intergovernmental Panel on Climate Change, 2007h). Stabilizing and then reducing the concentration of atmospheric and oceanic CO_2 requires controlling individuals' and organizations' CO_2 emissions. However, controlling CO_2 emissions imposes significant costs on electricity producers and consumers, so policymakers have primarily proposed using market-based mechanisms to limit the economic impacts of achieving a certain reduction in CO_2 emissions (Baumol & Oates, 1988; Metcalf, 2009; Montgomery, 1972; Tietenberg, 1985).

For CO_2-controlling market policies, the paramountcy of economic and environmental factors have primarily prompted researchers to evaluate the implications of potential design features according to their economic or environmental effects (Aldy et al., 2010). Other criterion for evaluating different cap and trade design features revolve around their distributional effects on different types of individuals and organizations and their ability to induce different types and amounts of innovation (Aldy et al., 2010). This research extends this line of inquiry in a more pragmatic direction. Specifically, it analyzes the first mandatory CO_2 policy in the U.S. to identify how policymakers were able to enact the policy and whether certain design processes or policy features helped them do so. The results of this analysis can then inform future attempts to design enactable CO_2-controlling policies for other emitting sources or geographic locations.

Additionally, increasing attention is being devoted to the schedule for deploying CO_2-controlling policies (Brewster, 2010; Williams, 2012). Overall, it has proven difficult to enact CO_2 policies in general, though stronger, ideal policies have been much harder to enact, while weaker, less ideal policies are more politically feasible (Cohen & Miller, 2012; Pielke, 2010). There is thus increasing interest in how CO_2-controlling policies are deployed, and whether small steps, or initially weak policies, facilitate or impede policymakers' ability to strengthen, expand, or broaden future policies (Brewster, 2010; Williams, 2012). This research addresses this question by looking at whether the enactment of the first CO_2-controlling policy in the U.S. can change the cultural controls conditioning the emission of CO_2 in ways that can facilitate the enactment of further policies. This focus dovetails with existing research on incrementalism in CO_2-controlling policies in that it looks at how an initial policy can affect public opinion about future policies (Brewster, 2010). However, it diverges by focusing on how individuals and organizations involved with the electrical industry interpret and use the materials and behaviors associated with the emission of CO_2 instead of how the public understands the effects of greater CO_2 emissions, their preferences for stronger regulations, or the progression of industry and environmental coalitions (Brewster, 2010). The resulting findings can help policymakers leverage a policy's cultural channel of influence to bring about additional environmental policies and to improve individual and organizational environmental performance.

Energy efficiency technologies and practices can reduce the amount of money consumers spend on electricity and enable the demand for electricity to be met with fewer material inputs and less waste outputs (Eto, 1996). They also represent a relatively inexpensive and unobtrusive way to limit the CO_2 emissions produced by the electrical sector(York et al., 2012). Despite these benefits, the diffusion of these technologies and practices has been haphazard both overtime and across the country (York et al., 2012). A significant portion of the money raised through the RGGI auctions is being recycled to support energy efficiency in order to reduce the amount of electricity consumed in the region and to indirectly reduce the region's CO_2 emissions.

Recent research on the diffusion of energy efficiency technologies and practices highlights how limited incentives for reducing electricity consumption and the upfront costs required to reduce electricity consumption represent critical impediments to the diffusion of these technologies and practices (Hayes et al., 2011; Zhao et al., 2012). Furthermore, research on utilities' involvement with energy efficiency identifies how a lack of financial incentives limits their motivation to invest in these technologies and practices and to actually achieve reductions in electricity consumption (Hayes et al., 2011). Similarly, research on energy consumption demonstrates that consumers generally underestimate the amount they use and the amount they can save, and that the upfront costs required to achieve these savings represent a significant barrier (Attari, DeKay, Davidson, & Bruin, 2010; Zhao et al., 2012). This research builds on these findings to investigate whether and how the appearance of new funding sources affects the diffusion and development of energy efficiency technologies and practices. More specifically, it analyzes whether and how increasing amounts of energy efficiency funding, for both incentives and to reduce deployment costs, affects how electrical companies, consumers, and PUCs interpret and utilize energy efficiency technologies and practices. The research then looks at whether these changes influence the deployment of existing technologies and practices or the development of new ones. The subsequent findings can then be used to help accelerate the diffusion and development of energy efficiency technologies and practices.

Theoretical Frameworks for Analyzing the Enactment and Effects of RGGI

To answer the aforementioned questions this research analyzes the enactment and effects of RGGI through a combination of two theoretical frameworks. An economic framework is used to understand the enactment and effects of RGGI as a formal, market-based policy. An institutional framework is used to understand the negotiation processes associated with enacting RGGI and its subsequent effects on how individuals and organizations understand and utilize the physical materials and behavioral actions underlying the emission of electricity-derived CO_2 (Bourdieu & Wacquant, 1992; Scott, 2001). This section presents the nuances and conceptual trajectories of each framework and introduces how each can be used to understand the enactment and effects of RGGI. The insights that are drawn from the two frameworks are then combined and presented in the next section as hypotheses about the enactment and effects of RGGI.

Economic Framework

RGGI is a market-based policy. Its formal effects stem from the price signals it ascribes to CO_2 emission allowances by capping the total amount of allowances, auctioning them, and allowing organizations to exchange them (Demsetz, 1967; Lindblom, 2001). The resulting prices make transferring CO_2 into the atmosphere more expensive. These price signals inform and incentivize economically self-interested emitters to reduce their emissions, whether by restricting their operation of existing CO_2-emitting technologies, replacing existing technologies with low or zero CO_2 technologies, or capturing and storing CO_2 (Blanchard, 2008; Stavins & Whitehead, 1992). As RGGI formally influences individual and organizational CO_2 emitters through price signals, this suggests a need to analyze the policy through economic theory.

The discipline of economics is extremely diverse. It broadly includes microeconomics, how individual entities behave within a single market, and macroeconomics, how markets can be integrated into and affect society (Dimand, 2008;

Taylor, 2007). Within these two groupings a variety of economic sub-fields are distinguished by the empirical context they focus on, the underlying assumptions that guide their interpretations of individual and social behavior, and their intended goals or stated purposes (Backhouse & Medema, 2008). Economic analysis can be used to study businesses, financial markets, health care, education, law, politics, and environmental conditions, among other topics. In terms of underlying assumptions, mainstream, orthodox, or classical economics rests on the premise of rationality (Blanchard, 2008). Framed with physical items and prices, desired products and services represent "good" things and their prices or costs represent "bad" things; economically rational actors' behaviors and decisions are driven by getting the things they desire at the lowest cost (Blanchard, 2008).

Mainstream economics treats rationality as a goal in and of itself. It doesn't address whether and why individuals and organizations actually want certain things and not others (Blanchard, 2008). Attention to why individuals and organizations define items as desirable or not constitute the foundation of heterodox economics (F. Lee, 2008). Heterodox economics does not assume that individuals and organizations are automatically rational. Instead, heterodox economics views behavior as derived from historical and current social conditions, which can prompt individuals and organizations to behave in ways that may or may not be consistent with the assumption of rationality (F. Lee, 2008). The final distinction among economic sub-fields is between positive economics, which describes what is occurring, and normative economics, which suggests how things should be (Lipsey, 2008).

Overall, this research is situated across micro and macroeconomics, as RGGI's presence as a single market that individual organizations participate in is microeconomic, while its enactment and industry effects are macroeconomic. Furthermore, as this market was designed to price and reduce an environmental externality, the emission of CO_2 into ecosystems, it can be thought of as an example of environmental economics (Turner, Pearce, & Bateman, 1994). With regard to the underlying assumptions, the economic component of this research is based on orthodox or mainstream economics. More specifically, it treats all CO_2-emitting organizations, whether they are owned by investors, municipalities, or co-ops, as rational; they all want to maximize the revenues they can earn from producing electricity while minimizing the costs required to do so (Blanchard, 2008). This research also treats electricity consumers and PUCs as economically rational. Electricity consumers want to maximize the benefits they can achieve from using electricity while minimizing the costs required to do so (Blanchard, 2008). PUCs want to maximize the benefits that consumers can get from using electricity while maintaining or minimizing the costs they have to pay(Blanchard, 2008).

Finally, this research's application of economic theory is primarily positive, although some aspects of the concluding chapter do represent normative economic statements. In describing the observed effects of RGGI, this research represents an example of positive economics (Lipsey, 2008). However, the underlying motivations behind this research are driven by a desire to develop and expand CO_2-controlling policies and to stimulate the diffusion of and innovation in energy efficiency technologies and practices. This makes suggestions about doing so normative statements (Lipsey, 2008).

When this conceptualization of economic theory is brought to bear on RGGI it offers a way to think about how electrical companies and consumers react to RGGI's initially proposed and then enacted price signals. Based on the aforementioned definition of economic theory, higher prices for CO_2 allowances control CO_2 emissions better than low prices because they make emitting CO_2 more expensive (Stavins & Whitehead, 1992). Higher prices equate to more “bad” things, which means that economically rational emitters will react to the higher price signals by trying to reduce the amount they have to pay or by limiting the CO_2 that they emit to produce a unit of electricity (Blanchard, 2008; Stavins & Whitehead, 1992). At the same time, higher priced CO_2 allowances increase the price of electricity for consumers, and these increased costs represent “bad” things. Under the same definition of economic theory, higher electricity prices motivate consumers to use electricity more efficiently in order to reduce the costs they incur to get the services they desire (Blanchard, 2008).

This application of economic theory also suggests how electrical companies, consumers, and PUCs would react to the proposed and newly created resources generated by recycling RGGI’s revenues to support energy efficiency technologies and practices. When RGGI funding is allocated to create incentives that make reducing electricity consumption lucrative it increases the benefits of deploying energy efficiency technologies and practices, while maintaining or reducing the costs of doing so. This then motivates economically rational electrical companies to deploy increasing amounts of energy efficiency initiatives to (Blanchard, 2008). Similarly, when RGGI revenues are used to fund energy efficiency initiatives it decreases the costs of reducing electricity consumption while maintaining or increasing the benefits of doing so. This then motivates PUCs to enact further energy efficiency requirements, and encourages electricity consumers to adopt energy efficiency technologies and practices (Blanchard, 2008).

Institutional Framework

Although aspects of the institutional framework have previously been introduced, this section will aggregate these components and fill the conceptual gaps between them to establish a cohesive institutional framework. This research uses components of the institutional framework to describe the alignment between formal and cultural mechanisms for controlling social behavior, and the effects a formal policy can have upon norms and cognitions, or a policy's(Caronna, 2004; Lindblom, 1977; Scott, 2001). These applications situate the institutional framework as a method for identifying and analyzing changes in meaning (DiMaggio & Powell, 1991; Scott, 2001). These changes include how individuals and organizations interpret and utilize the physical materials and behavioral actions underlying a specific activity, as well as how they interpret and abide by the policies that are proposed or enacted to control it. RGGI has been defined as a regulatory or formal institution that encapsulates meanings and utilizations of the physical materials and behavioral actions underlying the emission of electricity-derived CO_2 (Lindblom, 1977; Schnaiberg, 1980; Scott, 2001). These meanings and uses diverge from the ones that had previously conditioned how individuals and organizations produced and consumed fossil fuel-based electricity (Hulme, 2009; Schnaiberg, 1980). RGGI's ability to change how individuals and organizations produce and consume fossil fuel-based electricity depends on both the price signals it formally creates and the informal normative and cognitive shifts it can induce (Lindblom, 2001; Scott, 2001). As the enactment and informal effects of RGGI revolve around changing how individuals and organizations interpret and use the items and actions underlying the emission of electricity-derived CO_2 it suggests analyzing the policy through institutional theory.

The underlying philosophy behind institutional theory is that while material items, such as CO_2 and CO_2-emitting technologies, and physical practices, such as the operation of CO_2-emitting technologies and the consumption of electricity, objectively exist, their meaning to individuals and organizations, or how they are interpreted and utilized, is socially constructed (Berger & Luckmann, 1966). The concept of social construction rests on the premise that individuals' and organizations' understandings and utilizations of materials and actions are not necessarily automatic, constant, or stable (Berger & Luckmann, 1966). Rather, it posits that individuals' and organizations' understandings and utilizations emerge through collective negotiations whereby different interpretations and uses are positioned as more appropriate ways to define and engage with reality than others (Bourdieu & Wacquant, 1992; DiMaggio & Powell, 1991; Fligstein, 1997). This process is also ongoing. Internal changes in the power and resource relationships between participants or external changes in the availability of resources, the composition of participants, or the salience of certain meanings can introduce different degrees and types of volatility into the negotiating processes (Brint & Karabel, 1991; Greenwood & Hinings, 1996; Hoffman, 1999; Scott, Ruef, Mendel, & Caronna, 2000).

Depending on the variability of the negotiating context and the networks of resources and power that tie negotiating participants together, the socially constructed meaning of a material or action can change quickly, dramatically, or both (Berger & Luckmann, 1966; Bourdieu & Wacquant, 1992). The social meaning of nuclear power plants represents one such example. Over a relatively short operational history, the dominant understanding and use of these technologies have jumped from a safe source of electricity too cheap to meter, to a highly dangerous energy source, to a safe source of CO_2-free electricity, back to a highly dangerous energy source. As the above example suggests, changes in the socially constructed meaning of material items and behavioral actions can have dramatic effects upon the individuals and organizations involved with them. These changes can transform economically and operationally valuable assets into potentially costly or dangerous liabilities.

Circling back to the social construction of meaning, cognitive, normative, and regulative institutions, or bundles of ideologies, norms, and laws, represent conceptual building blocks that individuals and organizations use to construct or to negotiate social meanings for physical materials or behavioral actions (Berger & Luckmann, 1966; Scott, 2001). However, the ways that individuals and organizations can interpret and utilize materials and actions are not predefined or inherently stable (Berger & Luckmann, 1966; White, 1992). They can be derived from a variety of individual and hybridized institutional positions, and the importance and visibility of different institutions changes over time (Berger & Luckmann, 1966; Scott, 2001; White, 1992). Fluctuations in the stability and importance of different institutional positions and the associated volatility in how physical materials or behavioral actions can be interpreted and used enable the aforementioned negotiation processes (Berger & Luckmann, 1966; Bourdieu & Wacquant, 1992; Calhoun, 1993). The potential to negotiate self-serving social meanings or to protect existing meanings from re-negotiation motivates participation in institutional negotiations (Bourdieu & Wacquant, 1992; Brint & Karabel, 1991). It also encourages individuals and organizations to try to frame certain institutional positions or interpretations as more appropriate ways of understanding and utilizing physical materials and behavioral actions than others (Fligstein, 1997). If the individuals and organizations initially subscribing to an institution can convince, coerce, or induce others to accept their meanings and interpretations, then these other individuals and organizations can use the propagated institutional meanings to define the materials and actions underlying the environmental activity or the activity itself for their own interests (Brint & Karabel, 1991; DiMaggio & Powell, 1991; Fligstein, 1997).

In the electrical industry, institutional negotiations over the meanings and uses of CO_2, the operation of CO_2-emitting technologies, energy efficiency initiatives, and the consumption of electricity are especially charged (Bourdieu & Wacquant, 1992). Treating CO_2 and the operation of CO_2-emitting technologies as a controlled material and action can make it more difficult or costly for electrical companies to use certain technologies and practices to produce electricity, and for consumers to use electricity to get the services they desire. Similarly, treating the use of energy efficiency initiatives that reduce electricity consumption as a desirable way to meet demand reconfigures the connection between the electrical supply and demand. These changes affect the profitability of the individuals and organizations that own generation equipment, the ongoing supply of electricity to the public, and how consumers use electricity. When RGGI is embedded into the institutional framework, the policy design process represents an effort by state policymakers to highlight different meanings for how individuals and organizations can understand and utilize the physical materials and behavioral actions underlying the emission of electricity-derived CO_2 (Fligstein, 1997; Scott, 2001). By enacting RGGI, state policymakers are also engaged in an institutional negotiation over the meanings and uses of CO_2, the operation of CO_2-emitting technologies, energy efficiency initiatives, and the consumption of electricity in an attempt to change how individuals and organizations produce and consume electricity (Bourdieu & Wacquant, 1992; Brint & Karabel, 1991).

RGGI is a policy for controlling and reducing electricity-derived CO_2 emissions. The meanings that policymakers are trying to highlight through its enactment are very similar to the meanings that many environmental-based organizations currently employ to understand and use the physical materials and behavioral actions underlying the emission of electricity-derived CO_2 (Fligstein, 1997). Based on this similarity, environmental-based organizations would not perceive very much misalignment between their pre-existing cultural controls and the ones encapsulated within the RGGI policy (Caronna, 2004; Lindblom, 1977). However, the meanings that policymakers are trying to highlight through the design and enactment of RGGI are different from the ones that many electrical companies, consumers, and PUCs had been using (Fligstein, 1997). Specifically, if electrical companies treat CO_2 and the operation of CO_2-emitting technologies as a controlled material and action it makes producing electricity more expensive. Similarly, if electricity consumers and PUCs utilize the meanings embedded within RGGI it increases the cost of consuming electricity. Electrical companies, consumers, and PUCs are economically rational so they would be especially sensitive to new meanings that make producing and consuming electricity more expensive (Blanchard, 2008; Scott, 2001).

The meanings that policymakers are trying to highlight through the design and enactment of RGGI create additional costs for electrical companies, consumers, and

PUCs (Fligstein, 1997). The higher costs associated with utilizing these meanings creates misalignment between the cultural controls that economically rational electrical companies, consumers, and PUCs had been using and the cultural controls underlying the formal RGGI policy (Blanchard, 2008; Caronna, 2004; Lindblom, 1977; Scott, 2001). If RGGI had a very tight emissions cap, then the costs associated with treating CO_2 and the operation of CO_2-emitting technologies as controlled would be higher and more misalignment would occur. The more misalignment that electrical companies, consumers, and PUCs perceive the more likely they are to contest the use of these meanings by contesting the existence of the policy itself (Bourdieu & Wacquant, 1992; Caronna, 2004).

Concurrently, by recycling a large portion of RGGI's auction revenues toward energy efficiency, policymakers are also involved in an institutional negotiation over how individuals and organizations interpret and use electricity and energy efficiency technologies and practices (Bourdieu & Wacquant, 1992). Policymakers are trying to change how electrical companies, consumers, and PUCs view and utilize electricity and energy efficiency practices and technologies, so that demand can be met by reducing consumption instead of by expanding the supply, which indirectly limits electricity-derived CO_2 emissions (Brint & Karabel, 1991). Electrical companies, consumers, and PUCs had previously interpreted the operation of CO_2-emitting generation technologies and the consumption of fossil fuel-based electricity as socially beneficial activities (Hirsh, 2002; Hulme, 2009; Schnaiberg, 1980). These pre-existing cultural controls motivated consumers to use more electricity, and encouraged electrical companies to meet this demand by producing and delivering increasing amounts of it (Hirsh, 2002; Schnaiberg, 1980). Under these cultural controls energy efficiency initiatives that reduced electricity consumption were interpreted by economically rational electrical companies as costs they incurred that did not result in additional profits or benefits (Blanchard, 2008; Hayes et al., 2011; Kushler, York, & Witte, 2006; Scott, 2001). Similarly, many economically rational consumers and PUCs interpreted energy efficiency technologies and practices that reduced the consumption of el(Blanchard, 2008; Jaffe & Stavins, 1994a; Scott, 2001; York et al., 2012; Zhao et al., 2012). Under these interpretations, economically rational electrical companies, consumers, and PUCs would not be motivated to deploy or use energy efficiency technologies and practices to reduce electricity consumption because they primarily understand the costs of doing so, and do not correctly interpret or value the benefits they can provide (Blanchard, 2008; Hayes et al., 2011; Jaffe & Stavins, 1994a; Kushler et al., 2006; Scott, 2001; York et al., 2012; Zhao et al., 2012).

However, by recycling the revenues from CO_2 auctions to fund energy efficiency spending, standards, and incentives, RGGI policymakers are trying to position the deployment and adoption of energy efficiency technologies and practices that reduce electricity consumption (Fligstein, 1997). Specifically, RGGI funds are being used to create incentives that make deploying energy efficiency technologies and practices to reduce electricity consumption a profitable activity. RGGI revenues are also being used to fund energy efficiency initiatives so that PUCs can encourage consumers to adopt energy efficiency initiatives without increasing the costs they have to pay. Electrical companies, consumers, and PUCs are economically rational, so would be less inclined to perceive the economically positive meanings for energy efficiency that RGGI policymakers are highlighting as misaligned (Blanchard, 2008; Caronna, 2004; Fligstein, 1997; Scott, 2001). This is because RGGI's funds enable electrical companies to collect new profits from reducing electricity consumption, allow PUCs to reduce electricity consumption without increasing prices for consumers, and let consumers get the services they want at a lower cost. The economically positive meanings for energy efficiency initiatives that policymakers are highlighting are also supported by the meanings encapsulated within the cap and trade component of RGGI (Fligstein, 1997). Namely, if the operation of CO_2-emitting technologies is treated as a socially detrimental activity that should not be indefinitely increasing then improving the efficient use of existing electrical supplies becomes more desirable and appealing. If electrical companies, consumers, and PUCs interpret the use of energy efficiency initiatives that reduce electricity consumption as an economically positive endeavor it could make other positive meanings for energy efficiency, such as their ability to reduce CO_2, more visible or appealing. The increasing salience of positive economic and non-economic meanings may then collectively motivate electrical companies, consumers, and PUCs to actually deploy and adopt energy efficiency technologies and practices to reduce electricity consumption.

Hypotheses about the Research Questions

The analytical perspectives encapsulated in the two theoretical frameworks are now combined to produce hypotheses about the enactment and effects of RGGI. Data about the enactment and effects of RGGI are presented in the subsequent chapters of this research. This information is used to test and evaluate these hypotheses. In this section, each of the hypotheses to be tested is preceded by the research question it attempts to answer and the insights from the two theoretical frameworks that inspired its formulation.

Enactment Research Questions and Hypotheses

Policymakers may be able to design enactable policies for uncontrolled environmental activities by aligning the cultural controls associated with the formal policy with the pre-existing cultural controls that condition how individuals and organizations interpret and use the physical materials and behavioral actions associated with the activity (Caronna, 2004; Lindblom, 1977; Schnaiberg, 1980; Scott, 2001). If policymakers can identify the pre-existing cultural controls held by the individuals and organizations that are most involved with or affected by a potential policy then they can design the policy to align with them (Caronna, 2004). If the individuals and organizations most involved or affected by a potential policy do not perceive significant misalignment between their pre-existing cultural controls and those embedded in the formal policy they will be more likely to support the enactment of the policy (Caronna, 2004; Lindblom, 1977).

> **Research Question 1:** How were state policymakers able to enact RGGI?
>
> **Hypothesis 1:** Policymakers structured the design process to reveal the meanings that electrical companies, consumers, and environmental organizations employed to understand and use the physical materials and behavioral actions associated with the emission of electricity-derived CO_2. They then chose design features that aligned with these pre-existing understandings and interpretations, and used models to demonstrate the alignment.

One way that policymakers may have reduced the misalignment associated with the enactment of RGGI was by appealing to the economic rationality of electrical companies and consumers. Economically rational electrical companies are inclined to interpret and use the physical materials and behavioral actions associated with the emission of electricity-derived CO_2 based on how they affect their costs and revenues (Blanchard, 2008; Scott, 2001). This means that policymakers should structure the design process to highlight the effects that potential policy designs have on the costs and revenues of electrical companies (Fligstein, 1997). Similarly, economically rational consumers are inclined to interpret the physical materials and behavioral actions underlying the emission of electricity-derived CO_2 through their effects on the price and availability of the services that are produced through the use of electricity (Blanchard, 2008; Scott, 2001). This means that policymakers should structure the design process to highlight the effects that potential policy designs have on the cost and availability of the services that consumers get from using electricity (Fligstein, 1997). When policies are designed in this way, electrical companies and consumers are likely to be more aware of how the formal policy features are aligned with the economic meanings they respectively hold, which would then make them more accepting of the policy (Blanchard, 2008; Caronna, 2004; Scott, 2001). Specifically, electrical companies would be more receptive to new policies that minimize the price and effort of compliance and that create new benefits for them. Similarly, electricity consumers would be more receptive to new policies that do not increase the price or decrease the availability of the electricity they use to produce the services they desire, or that result in additional, free benefits for them.

Research Question 2: Did policymakers use innovative cap and trade features to help enact RGGI?

Hypothesis 2: Policymakers used an intentionally weak cap, pre-existing compliance standards, and safety valves to minimize the costs and efforts of compliance, and their associated effects on the price of electricity. Policymakers used a revenue recycling feature and a price floor to create resources that benefit electricity companies and consumers.

Effects Research Questions and Hypotheses

Economically rational electrical companies are inclined to understand and interpret the materials and actions associated with electricity-derived CO_2 according to their effects on their costs and revenues (Blanchard, 2008; Scott, 2001). Economically rational electricity consumers are inclined to understand and use these materials and actions through their effects on the price and availability of the services that are produced by using electricity (Blanchard, 2008; Scott, 2001). In fact, these economic considerations are so important to these companies and consumers that they may be willing to accept new meanings for materials and actions if policymakers can convince them that the cost of using the meanings is low or nothing or if the economic benefit of using them is high (Blanchard, 2008; Fligstein, 1997; Scott, 2001). Following this argument, RGGI's low allowance price, use of existing compliance requirements, and revenue recycler would make electrical companies more willing to accept and use the meanings encapsulated in the policy because the cost of doing so would be low. Likewise, RGGI's low allowance price and financial support for energy efficiency initiatives would make electricity consumers more willing to accept the meanings embedded in the policy because the cost of using them is low and the potential benefits high. Furthermore, as electrical companies and consumers experience the low costs and benefits associated with treating CO_2 and the operation of CO_2-emitting technologies as controlled it can make them more willing to use these meanings, which would enable policymakers to enact stronger or more widespread CO_2 controls (Caronna, 2004).

> **Question 3:** Did RGGI change how electrical companies and consumers interpret and use CO_2 and the operation of CO_2-emitting technologies, and did these changes affect attempts to develop stronger or additional CO_2-controlling policies?

> **Hypothesis 3:** The limited costs and new resources associated with RGGI induced electrical companies and consumers to accept the new meanings embedded in the policy, which then created support for extending and tightening RGGI and for using auctions to control CO_2.

For economically rational electrical companies the inability to profit from the use of energy efficiency initiatives that reduce electricity consumption can make deploying these technologies and practices unappealing, which can then make other non-economic meanings or benefits less visible or desirable (Blanchard, 2008; Hayes et al., 2011; Kushler et al., 2006; Scott, 2001). Similarly, the upfront cost of deploying and adopting energy efficiency technologies and practices can make reducing electricity consumption through their use unappealing for PUCs and consumers, which can then make other non-economic meanings or benefits less visible or desirable for them (Blanchard, 2008; Jaffe & Stavins, 1994a; Scott, 2001; York et al., 2012; Zhao et al., 2012). If policymakers can remove the visibility or the salience of these negative economic meanings, it may make their positive, non-economic benefits more prominent and desirable to electrical companies, consumers, and PUCs. The ensuing shifts in how electrical companies, consumers, and PUCs interpret the use of energy efficiency initiatives that reduce electricity consumption can then make these individuals and organizations more willing to use existing approaches and more open to identifying or developing new approaches (Brint & Karabel, 1991).

> **Question 4:** Did RGGI's revenue recycler help to change how electrical companies, consumers, and PUCs interpret and utilize energy efficiency technologies and practices, and did these changes influence innovation in or the diffusion of them?

> **Hypothesis 4**: Reducing the first cost and creating incentives for energy efficiency initiatives that reduce electricity consumption made other ways to interpret these technologies and practices more visible and valuable. The positive economic meanings and the increasingly salient non-economic meanings made electrical companies, consumers, and PUCs more receptive to reducing electricity consumption, which helped facilitate the diffusion of and innovation in energy efficiency technologies and practices.

Chapter 4: The Enactment of RGGI

Introduction

Before California implemented AB 32 in January 2012, RGGI was the only mandatory CO_2 policy in the United States (California Environmental Protection Agency: Air Resources Board, 2012). When viewed alongside the many un-enacted domestic policies proposed during the mid to late 2000s, RGGI's initial enactment represents a political anomaly. This chapter explores its occurrence. The following analysis is directed by the two enactment research questions. Specifically, it focuses on how policymakers were able to enact the first mandatory CO_2 policy in the U.S., and whether specific cap and trade features facilitated this enactment.

The chapter employs the following structure to discuss and analyze the research questions. First, the empirical context of the RGGI design process and its connection to the policy's eventual enactment are discussed and used to review the hypotheses. Then the research methods used to collect the data are described. Next, data on policymakers' efforts to design and enact RGGI are presented. The data revolve around the approaches policymakers used to design the policy, the formal design features proposed, and how different stakeholders responded and reacted to these approaches and design features. The information is then used to analyze how RGGI came to be enacted and whether specific cap and trade features facilitated this enactment. The analytical section of this chapter first summarizes the presented information, and then uses it to evaluate the hypotheses posed about the enactment of RGGI.

The RGGI Design Process, Its Connection to Enactment, and Enactment Hypotheses

As introduced in the background chapter, the policymakers involved with RGGI aspired to make the design and implementation processes as inclusive and transparent as possible. Towards these ends, the state energy and environmental policymakers involved with RGGI, collectively known as the Staff Working Group (SWG), invited different categories of stakeholders to observe and participate in the policy's design. The main categories of stakeholders included: generating organizations; consumers; environmental organizations; public interest and legal organizations; energy efficiency organizations; and utilities (Chart 1). Other individuals involved in RGGI's design included academic, public, and private sector experts who were brought in to inform the SWG and stakeholders about the nuances of different environmental market designs and policy features. Over the course of three and a half years, the SWG, stakeholders, and acknowledged experts participated in twelve in-person meetings, during which different RGGI design features were discussed and evaluated as viable policy options (Chart 2).

The stakeholder-derived SWG recommendations that emerged from these meetings were fed to the state environmental and energy agency heads who leaned heavily upon them to finalize and implement RGGI's Memorandum of Understanding (MOU) and Model Rule. The presentations and conversations that transpired during the stakeholder meetings were recorded, transcribed, and made available to the public through RGGI.org, the organization created to oversee the policy. The specifics of this process and its role in influencing the enactment of RGGI were described by one of the experts who participated in the allocation component.

Allocations Expert: "… thinking back, I think it was the multi-stakeholder process and the diligence of the state staff, who were kind of like the judge and jury in a way. I mean they'd sit there and be so contemplative, and so thoughtful … every month they'd have two day meetings, and one day they'd have a closed meeting and one day they'd have an open meeting for public dialogue, every four weeks. And then in those open meetings they would have industry folks and everybody else coming in and saying, you know, if the topic is how allocation is going to occur, they would hear all this public dialogue about it and stuff, and then they would go to closed door and talk about it for a whole day at a snail's pace, but

> really think through every aspect of this issue until they had fundamentally convinced themselves that, by far, the best policy design was to take this bold, make this bold step and change the way that allowance programs have ever been implemented, and so it was really historic in that sense."

The SWG was responsible for designing a new, yet enactable policy to control the emission of CO_2 from electrical facilities in New England and Mid-Atlantic states. Given the dearth of pre-existing CO_2 policies at the time as well as the economic and ideological controversies over whether and how CO_2 should be controlled, the SWG needed to attract considerable support (Cohen & Miller, 2012; McCright & Dunlap, 2010). The categories of stakeholders whose support was most essential were electrical generators and consumers, which also included the public interest and legal organizations that advocated on their behalf. Generators' and consumers' support was critical because the policy would be applied to generators and would affect all categories of electricity consumers. More specifically, RGGI encapsulated an alternative way to interpret the operation of CO_2-emitting technologies and how they could be used to meet consumers' demand (Lindblom, 1977; Scott, 2001). The centrality of these actions to generators and consumers meant they would be the stakeholders most likely to perceive misalignment between their pre-existing cultural controls and the alternative ones embedded in the policy (Caronna, 2004; Lindblom, 1977). Based on this sensitivity, the SWG had to propose a policy that generators and consumers could both support.

Generating organizations owned and operated CO_2-emitting facilities and produced the CO_2 emissions that RGGI aimed to control. Furthermore, as a market-based policy, RGGI would directly affect the economic health of generators by making it more expensive for them to operate CO_2-emitting equipment to produce electricity(Lindblom, 2001). Due to these considerations, generating organizations were especially sensitive to the alternative meanings for CO_2 and the operation of CO_2-emitting facilities that the SWG was trying to highlight (Fligstein, 1997; Scott, 2001). The misalignment that generators could perceive between these meanings and their pre-existing cultural controls meant the SWG had to propose a policy generators could support (Caronna, 2004). The SWG needed the support of generators because many were large, powerful, and wealthy corporations that could put pressure on elected and appointed officials in support of or against various legislative and regulatory policies (Pfeffer & Salancik, 2003).

Consumers purchased the electricity produced by CO_2-emitting facilities to get the services that electrical energy provided. By making it more expensive to operate CO_2-emitting facilities, RGGI would directly affect consumers by modifying the price and the availability of the electricity they used to get the services they desired. Consumers would also directly experience these effects, whether in the form of price increases or blackouts. This meant that consumers, and by extension public interest and legal organizations, were especially sensitive to alternative meanings for CO_2 and the operation of CO_2-emitting technologies whose use affected the price and availability of the electrical supply (Scott, 2001). Due to potential misalignment, the SWG had to propose a policy that consumers, public interest, and legal organizations accepted (Caronna, 2004). The SWG needed the support of consumers because nearly every person and organization in the region used electricity from the grid, which made electricity consumers an extremely large, powerful, and well-connected, if somewhat diffuse, political constituency (Pfeffer & Salancik, 2003). When sufficiently united, electricity consumers, public interest, and legal organizations could mobilize a vocal and persistent opinion about the viability of policies that affected the electrical supply.

The SWG also needed the support of environmental organizations to enact RGGI. Environmental organizations were the stakeholders most concerned about changes in the concentration of atmospheric CO_2, as well as those most motivated to control and then reduce CO_2 emissions. RGGI represented an effort to control and reduce CO_2 emissions for the first time, so the alternative meanings and uses for CO_2 and the operation of CO_2-emitting equipment the SWG was trying to highlight were well aligned with the cultural controls held by environmental organizations (Caronna, 2004; Fligstein, 1997; Lindblom, 1977). However, the SWG had to make sure the policy they proposed remained aligned with these cultural controls (Caronna, 2004). To do so, the SWG had to demonstrate that RGGI would control and then reduce CO_2 emissions from the electrical industry and stimulate future reductions. Environmentalists' support for RGGI was important because they helped spearhead the development of CO_2-controlling policies, and because many considered them to be experts on socially and environmentally ideal emission rates and concentrations. At the same time, environmental organizations represented a smaller, weaker, and more diffuse constituency than generators and consumers, which made widespread environmentalist support less important than selective environmentalist support (Pfeffer & Salancik, 2003). This was also due to the fact that different environmental organizations supported different CO_2 reductions, which made it difficult to appease all of them. On the other hand, many environmental organizations just wanted any CO_2 policy to be enacted, which allowed them to support various policy options.

Other categories of stakeholders, such as utilities and energy efficiency organizations, were only indirectly affected by RGGI, and this limited the misalignment they could perceive between their cultural controls and those embedded in the policy (Caronna, 2004; Lindblom, 1977). As these categories of stakeholders were less likely to perceive misalignment they would be less likely to contest RGGI's enactment (Bourdieu & Wacquant, 1992; Caronna, 2004). For instance, utilities did not produce electricity, and while RGGI would increase the cost of the electricity they purchased, PUCs allowed these costs to be passed onto consumers (Casazza & Delea, 2009). Utilities could utilize the new meanings for CO_2 and the operation of CO_2-emitting technologies the SWG was trying to highlight without negatively impacting their profits (Fligstein, 1997). This meant they were unlikely to perceive these new meanings as misaligned with their pre-existing cultural controls (Caronna, 2004). Energy efficiency was not initially a part of the RGGI policy, which limited the misalignment that energy efficiency organizations could perceive. In fact, any misalignment they did perceive was due to energy efficiency's initial absence from the policy, but because RGGI was initially proposed as a CO_2 policy, this misalignment would not have prompted energy efficiency organizations to contest its enactment (Bourdieu & Wacquant, 1992; Caronna, 2004). However, if utilities and energy efficiency companies accepted the new meanings embedded in RGGI they could also help enact it by working to reduce the misalignment that generators and consumers could perceive (Caronna, 2004; Fligstein, 1997). One way they could help align the new meanings the SWG was trying to highlight with the cultural controls held by generators and consumers was to show how existing electrical supplies could be more profitability used to meet demand though energy efficiency initiatives (Caronna, 2004;

Fligstein, 1997). In this way, the support of utilities and energy efficiency organizations was useful but not essential.

As those most directly impacted by and desiring of a CO_2 policy, generators, consumers, and environmental organizations had to support the SWG's policy proposal for it to be enacted, especially because it would be the first mandatory CO_2 policy in the U.S (Pfeffer & Salancik, 2003). Additionally, the support of less critical stakeholders, such as utilities and energy efficiency organizations, was useful. They could help reduce the misalignment that generators and consumers could perceive, which would limit their desire to contest enactment (Bourdieu & Wacquant, 1992; Caronna, 2004; Fligstein, 1997). This reality motivated the SWG to invite different stakeholder groups to participate in the RGGI design process and to actually incorporate their opinions and perspectives about different designs into the enacted policy. The importance and influence of stakeholder involvement in RGGI's eventual enactment was described by the allocation expert participant.

Allocations Expert: "The RGGI process was amazing. I feel like the laws of gravity did not hold. I am surprised that they were able to come to an agreement, and implement it the way they did because there were so many cross currents going on, but the, and I think the reason that it happened, well a reason that it happened, was incredible, incredible persistence and diligence by the state staff. Because they were having … two day meetings every four weeks for years … Where basically everybody had to sign off on every point before they could take a step forward …"

The presentations, comments, and questions that occurred in the stakeholder meetings demonstrate how the SWG identified the pre-existing cultural controls held by different categories of stakeholders, and proposed different design features that aligned with them (Caronna, 2004; Fligstein, 1997; Lindblom, 1977; Scott, 2001) (Chart 2). Based on this process, the archival materials documenting the stakeholder design meetings can be used to describe how RGGI was enacted, even if the closed door discussions held by the SWG and the state agency heads about the actual enactment were not recorded. In fact, nearly all of RGGI's enacted Model Rule maps onto the recommendations that emerged from the stakeholder meetings.

Research on public participation in policy deliberations suggests that formal participation structures do not necessarily improve public satisfaction with policy outcomes (Lee, 2007). When this perspective is extended to policy enactment, it could be argued that the stakeholder meetings did not affect the enactment of RGGI and were merely a way to acknowledge, but not address, public comments (Lee, 2007). However, the nuances of the process suggest otherwise. First, in addition to the stakeholder meetings, RGGI's design process also included a traditional period for public comments, which was held after the MOU and Model Rule had been initially developed. Beyond their timing, the two had vastly different structures. The stakeholder meetings included numerous expert and stakeholder presentations about various policy design options, extensive conversations about the modeled effects of different policy designs, and face-to-face debates about stakeholder preferences for different design features. Alternatively, the public comment period only included stakeholders' written opinions about the nearly final MOU and Model Rule. Second, the archival materials documenting the stakeholder meetings trace the progression of RGGI from an unstructured political idea through various design options into a nearly final Model Rule. Many of RGGI's final design features, such as an allowance auction and revenue recycling to energy efficiency, were not initially considered viable policy options. Their eventual inclusion emerged from the stakeholder meetings. Third, the SWG also created opportunities for stakeholders to directly influence the enactment of RGGI by soliciting their opinions about the following questions: “What Comprehensive RGGI Design Package Do You Recommend the States Adopt and Why?” (SWG: 5/19/05); “What suggestions do you have to ensure the successful implementation of RGGI?” (SWG: 9/21/05); “What are your top 3 to 5 recommendations for the states in finalizing the model rule (other than the offsets component)?” (SWG: 5/2/06). Lastly, the SWG repeatedly informed stakeholders that the final policy design would be determined by the results of the micro- and macroeconomic models.

The models were critical components of the design process. They were designed and presented in the stakeholder meetings to show how different policy formulations aligned with the pre-existing cultural controls different categories of stakeholders held (Caronna, 2004; Fligstein, 1997). The models were used to demonstrate to electrical generators how different policy designs would impact the CO_2 allowance price and the overall economic health of the region. For consumers, utilities, public interest, legal, and energy efficiency organizations, the models depicted how different policy designs would impact the region's electricity prices, electrical reliability, and the economic health of the region. Lastly, the models also showed environmental organizations how different CO_2 reductions would affect the region's electrical system and economy.

Reflecting the importance of the models and stakeholders' involvement in determining RGGI's ultimate design, the SWG invited all categories of stakeholders to participate in the modeling processes and to help set their underlying assumptions. This was critical because models and their subsequent results could be interpreted as illegitimate and invalid if individuals and organizations did not accept the assumptions they were based on or think they accurately reflected the reality they inhabited. In order to ensure that different categories of stakeholders accepted the models and their results as valid, the SWG encouraged extensive deliberation about their use and assumptions throughout the stakeholder meetings. While not the exact same visualization tool, the use of economic modeling resembles the Structured Public Involvement approach for increasing stakeholder satisfaction with public decision-making processes (Bailey, Blandford, Grossardt, & Ripy, 2011). Both employ strategies that allow individuals and organizations to visualize the context and effects of different policy designs, or their alignment with pre-existing cultural controls (Bailey et al., 2011; Caronna, 2004). One effect of this approach was evident from a newspaper article that preceded the first RGGI auction. It described how RGGI's weak cap and predicted low allowance price aligned generators' pre-existing cultural controls about the use of CO_2-emitting equipment with the cultural controls underlying the policy, which then convinced generators to support its enactment (Caronna, 2004; Lindblom, 1977).

> "Reggie's [sic] organizers, including New York and New Jersey, will offer more permits than generators are likely to need during the program's first seven years. While that will initially reduce pressure to cut emissions, utilities have said that the strategy encouraged them to support the so-called cap-and-trade market by ensuring permit prices begin low."
> (http://www.bloomberg.com/apps/news?pid=newsarchive&sid=a7fmAZqdHrW0&refer=home; 9/23).

When utilizing RGGI's stakeholder meetings as a proxy for its eventual enactment, applying the theoretical frameworks to the stakeholder meeting data explains how the policy was enacted. At the most basic level, RGGI represented an attempt to highlight different ways for individuals and organizations to interpret and utilize the physical materials and behavioral actions underlying the emission of CO_2 (DiMaggio, 1988; Fligstein, 1997; Scott, 2001). This chapter tests the hypothesis that policymakers were able to enact RGGI because they positioned the new meanings they were trying to highlight in alignment with the pre-existing cultural controls held by the most critical categories of stakeholders (Caronna, 2004; Fligstein, 1997; Pfeffer & Salancik, 2003). More specifically, this chapter evaluates whether the SWG was able to enact RGGI by identifying how different categories of stakeholders interpreted and used these materials and actions, designing the policy to align with them, and then demonstrating this alignment through models (Bailey et al., 2011; Caronna, 2004; Fligstein, 1997; Scott, 2001).

This chapter also tests whether the SWG utilized innovative cap and trade design features to help enact RGGI. Electrical generators and consumers were two categories of stakeholders whose support was essential to enactment. Electrical generators have been defined as economically rational organizations who wanted to maximize their profits from producing and selling electricity (Blanchard, 2008). This meant they interpreted and used the physical materials and behavioral actions underlying the emission of CO_2 through their effects on their costs and revenues (Blanchard, 2008; Scott, 2001). Consumers, likewise defined as economically rational, wanted to maximize the benefits they could get from using electricity while minimizing the costs to do so (Blanchard, 2008). Consumers interpreted the physical materials and behavioral actions underlying the emission of CO_2 through their effects on the price and availability of the electricity they used to get the services they desired (Blanchard, 2008; Scott, 2001). Based on the degree to which economic concerns resonated with generators and consumers, policy designs that addressed these concerns would align with their pre-existing cultural controls (Blanchard, 2008; Caronna, 2004). This chapter evaluates whether designs that reduced the cost and effort of complying with the policy and its subsequent effects on the price of electricity reduced the misalignment that generators, consumers, public interest, and legal organizations could perceive, and thus enabled them to support the policy (Caronna, 2004). These design features included an intentionally weak cap, pre-existing compliance standards and equipment, and safety triggers that would lower the compliance costs if the allowance auction price exceeded certain thresholds. This chapter also evaluates whether the resources produced by combining a revenue recycler with a reserve price reduced the misalignment that generators, consumers, public interest, and legal organizations could perceive and thus enabled their support (Caronna, 2004).

Methodology

This chapter's data and analysis were drawn from the documents constituting the RGGI program design archive and from national newspaper and magazine articles that accompanied its initial enactment. The archival documents were analyzed to identify the types of stakeholders participating, their opinions on CO_2 policies in general, their positions on different design features, and the arguments they used to support or contest RGGI or specific design features. The information was drawn from over 400 separate documents that comprised over 1000 pages of data. For this chapter, the newspaper sources were drawn from the 'News and Updates' section of the RGGI website and represent a national perspective about the policy's initial enactment. Like the policy design documents, the newspaper sources were analyzed to identify the type of organizations that commented on RGGI and the arguments used to support or to contest the policy.

Information about the design of RGGI is presented in chronological order by stakeholder meeting. This ordering depicts the progression of strategies the SWG used to propose various policy designs, the arguments stakeholders used to support or contest various designs, and the subsequent inclusion or exclusion of design features. Textual passages from RGGI's program design archive are the primary data sources used in this section. They are prefaced by the date of the meeting in which the comment was made, and when available, the organizational affiliation of the speaker. In initial meetings, the organizational identity of the speaker was not always included in the accompanying documents, but those associated with later meetings included this information more frequently. Except for the SWG, textual passages are attributed to general organizational types, such as generator or public interest organization, instead of specific organizational names to maintain the anonymity of these individuals and organizations. The data at the heart of this chapter are available to the public and the research was not required to maintain the anonymity of these organizations; however, the data sources that form the basis of the next chapter were accessed and collected on the presumption of anonymity. As general organizational identifiers are more than sufficient for this chapter, they are used to keep the data and analysis chapters consistent.

RGGI Enactment Data

April, 2, 2004

RGGI was initially proposed by the governors of Mid-Atlantic and New England states in 2003, and on April 2, 2004, the SWG held the first stakeholder group meeting. To begin the meeting, the SWG asked stakeholders to respond to the following question: "If RGGI is successfully designed and implemented, what do you think would be a key indicator of success?" (SWG: 4/2/04). All twenty-four responses included at least one specific goal, but some contained multiple goals. The different goals that were identified reflected the desires of the various stakeholder groups participating in the process, and how they thought a CO_2-controlling policy could affect them.

The most common goals touched on reducing emissions (11), minimizing economic costs and impacts (8), and inspiring future policies (6) (4/2/04). Other, less commonly listed goals were based on maintaining system reliability (3) and stimulating the development and deployment of clean and renewable energy technologies (2) (4/2/04). The environmental goals rested upon making real reductions in CO_2 emissions, while the diffusion goals were based on linking up with existing policies and stimulating the development of additional policies. The economic goals were broader and included minimizing compliance costs, allowance prices, and the policy's effect on electricity prices in order to avoid the relocation of industry and the elimination of jobs.

Stakeholder (4/2/04): "High integrity policy, with real environmental benefits."

Stakeholder (4/2/04): “Simple, economically feasible.”

Stakeholder (4/2/04): “This system links up with other carbon cap and trade systems in the world...”

Stakeholder (4/2/04): “Maintain reliability of transmission.”

Stakeholder (4/2/04): “Achieve reductions in most cost effective manner, apply nationally.”

Stakeholder (4/2/04): “Environmental benefits, system reliability, not disadvantaging RGGI states, preserve jobs.”

Stakeholder (4/2/04): “Real cap with real reductions from current emitters, trading scheme that provides net environmental benefits. Equitable allocation of costs.”

Stakeholder (4/2/04): “Hitting carbon targets. Including energy efficiency as part of the goals, so net economic benefits are positive.”

During this meeting, the SWG also introduced the modeling systems that would guide RGGI's design. The two models included a microeconomic model (IPM) that depicted how different policy designs would affect the price of allowances and electricity, and a macroeconomic model (REMI) that indicated how different designs would impact the economic health of the region. The SWG then positioned the models as critical determinants of the policy's ultimate design. “The cap will be in relation to a 1990 base year emissions level, and ... modeling will be used to evaluate various cap options” (SWG: 4/2/04). In introducing these models, the SWG faced a number of questions from stakeholders. Reflecting the connection between the models and the final policy design and their concerns about the policy's effects, stakeholders asked about the models' outputs and the assumptions they would be based on. Once informed about the modeling systems and their involvement in policy formulation, “Stakeholders also expressed … interest in providing input throughout the modeling processes” (SWG: 4/2/04). Specifically, stakeholders wanted to improve the models' portrayal of the region's electrical system and economy. The SWG then concluded the meeting and “encouraged members of the Stakeholder Group to contact the SWG sub-group chairs to provide input at this junction … the SWG heard many Stakeholders request additional involvement, especially on modeling...” (SWG: 4/2/04).

Stakeholder (4/2/04): "Will the modeling be able to project plant closures and associated impacts on local communities and to include job losses?"

Stakeholder (4/2/04): "What modeling should be done to determine the impact of the program on energy reliability, fuel diversity and security?"

Stakeholder (4/2/04): "How will energy efficiency be accounted for?"

May 20, 2004

The second stakeholder meeting occurred on May 20, 2004, and focused on the emission cap, potential flexibility mechanisms, and the assumptions of the microeconomic model. To preface the discussion of cap size, the SWG brought in an expert on cap and trade policies. The SWG then asked stakeholders: "What factors should RGGI Staff Working Group consider in selecting caps to model (and ultimately to recommend?)" (SWG: 5/20/04). The critical factors stakeholders identified mirrored their initial goals for RGGI and demonstrated which policy effects each of them would be willing to accept. Stakeholders wanted a cap size that would minimize the economic impacts of the policy, facilitate the enactment of and linkup with other CO_2 policies, and maintain the reliability of the existing electrical system. Dovetailing with the discussion on cap size, the SWG then asked stakeholders: "What are the most important flexibility mechanisms for RGGI to include?" (SWG: 5/20/04). Almost all stakeholders indicated a desire for flexibility mechanisms and that they should be immediately available. Suggested examples included: credit banking; credit borrowing; offsets; caps on allowance prices; and allowing indirect emission reductions from energy efficiency.

Stakeholder (5/20/04): "Why do you assume that the initial cost of allowances would be low?"

Cap & Trade Expert (5/20/04): "Low prices are a result of the political reality of where the cap is likely to be set. Under the proposed McCain/Lieberman bill and the European trading program, costs are expected to be low. If allowances have a high price … it will be difficult for others to follow that example."

Stakeholder (5/20/04) "Caps shouldn't jeopardize the fuel diversity, reliability and affordability of electrical sources."

Stakeholder (5/20/04): "What cap will not result in competitive disadvantage for generators in RGGI states?"

Stakeholder (5/20/04): "If the cap is too aggressive, it will be harder for other regions to join later."

At this point, energy efficiency was not included under the proposed auspices of the policy. Despite this, energy efficiency-inclined stakeholders championed its benefits and inclusion in the policy. Support for energy efficiency also extended into subsequent conversations about the assumptions of the microeconomic model. Efficiency-inclined stakeholders then volunteered to join the SWG subgroup involved with modeling in order to accurately build energy efficiency features into the model.

Stakeholder (5/20/04): "Where do indirect emission reductions fit into the equation?"
Cap & Trade Expert (5/20/04): "They (indirect emission reductions) don't generally fit in. If the objective is reducing electricity use, this isn't the right tool. This tool is about making reductions in carbon."

Stakeholder (5/20/04): "Indirect emissions should be included. Energy efficiency [EE] programs do have substantial impacts on state electricity loads …"

Stakeholder (5/20/04): "How do you incorporate all of the data on energy efficiency programs and potential [into the model]?"
SWG (5/20/04): "Counting on you [individual and efficiency organization] to help."

Stakeholder (5/20/04): "[We] would like to see at least one [model] scenario where system builds efficiency resources along with increased generation resources."
SWG (5/20/04): "We would like to do that too."

June 24, 2004

During the June 24, 2004, meeting acknowledged experts in the allocation of allowances for environmental markets gave a presentation about allocation options. The presentation was then followed by stakeholder questions and statements about the distributions they preferred. The following statements reflected the economic concerns different categories of stakeholders held, their perceptions of the economic impacts of different allocation strategies, and how they affected their ability to support enactment.

The last statement also illuminated the outcomes that different stakeholder groups expected the policy to produce, and how they wanted to use allowances to achieve them.

Stakeholder (6/24/04): "There is concern over economics, especially for the business community, as ratepayers have seen electricity prices increase over recent years ..."

Stakeholder (6/24/04): "The effect of an auction is increasing energy prices significantly."

Stakeholder (6/24/04): "We need to figure out how to provide generators with allowances to stay whole without providing windfalls to generators."

Acknowledging the primacy of cost considerations and the difficulty of balancing this desire with the environmental goals of the policy, stakeholders highlighted energy efficiency's ability to bring about the desired emissions reductions while minimizing the economic costs of the policy. At the same time, stakeholders also recognized the inherent difficulties of inducing energy efficiency and building it into the policy. Efficiency-inclined stakeholders realized the results of the models would determine RGGI's final design. Different categories of stakeholders would be able envision the multiple economic benefits that energy efficiency could provide and be motivated to include it in RGGI if the models accurately depicted these effects. During a discussion about the assumptions of the models, stakeholders reiterated their support for building energy efficiency features into the models; however, correctly doing so remained difficult.

Stakeholder (6/24/04): "It's important to get into an allocation scheme and include resources for energy efficiency. The price impact is a major barrier to getting to RGGI goals. Energy efficiency is a major mitigation strategy of reducing price impacts and leakage."

Allowance Expert (6/24/04): "There is not much cost in demand reduction, as it enhances the program, but it's difficult to achieve in the real world because it is hard to design the institution to reward energy conservation … When we have allocated to conservation within the model it contributes importantly to helping achieve [the] overall goal of emission reductions. But how to build this institution in the real world is a challenge."

Stakeholder (6/24/04): "There's a link between the size of the cap, and the modeling process. Modeling will influence [the] size of the cap. If we limit modeling to neoclassical economic modeling, I fear that it will show huge price increases are needed to get desired emission reduction[s]. So necessary cap targets may look politically and economically impossible, imposing unfair costs to generators and the regional economy. [We] need to consider energy efficiency potential … we're missing a way to ensure the energy efficiency resource is fully captured in modeling, size of cap, and allocation."

Stakeholder (6/24/04): "Do you measure energy efficiency reductions as an input as opposed to a result?"

SWG (6/24/04): "There is an option to model it both ways, depending on what we decide. We expect to explore that."

Stakeholder (6/24/04): "Figure out a way to build energy efficiency in as a resource. We know we can meet growing demand with energy efficiency and renewables. Compare that cost to outcomes of what a cap gets us under various scenarios, to capture energy efficiency potential."

SWG (6/24/04): "REMI won't model how much energy efficiency will be adopted. Energy efficiency adopted is an input into the REMI model. REMI is not built as [an] energy oriented model, so it has limitations."

September 13, 2004

At the September 13, 2004, meeting the SWG and stakeholders continued talking about the assumptions of the economic models, but also conversed about compliance and enforcement features. The meeting also addressed the inclusion of offsets, or CO_2 reductions that occurred outside the policy's industrial or geographic scope, but counted as an allowance. Overall, significant attention continued to be devoted to the economic models, as the "modeling results are a key ingredient to cap determination. Modeling more than anything will help the SWG understand reductions that will play out" (SWG: 9/13/04). Befitting the importance of the economic models, stakeholders' involvement with them also increased. One member of the SWG stated that "the modeling process is progressing with Stakeholder input" (SWG: 9/13/04).

SWG (9/13/04): "We depend on Stakeholders and Resource Panelist feedback to … make sure we accurately represent everything in the model."

One major stakeholder concern voiced throughout the modeling discussion was the cost of the policy, and which stakeholder groups ultimately would incur it.

Apprehension about the policy's costs colored much of this meeting, and policy designs were evaluated according to the benefits they provided and costs they imposed upon different categories of stakeholders. Initially, it was difficult to balance the economic impacts that would be imposed upon generators and consumers. Generators wanted to minimize the new costs they would have to pay to operate their CO_2-emitting equipment. Consumers, public interest, and legal organizations wanted to prevent electricity prices from increasing, especially if generators would recoup the extra revenues as windfall gains from the policy.

Stakeholder (9/13/04): "Where in this analysis do you look at allocation of costs and benefits – who's paying and who's [sic] benefits? Where are the consumer burdens and economic benefits? Is there a stage where follow-up modeling will be available to measure those impacts?"

Stakeholder (9/13/04): "[We] want to evaluate who is getting windfalls and who is paying as we go along, as it may inform how we structure the rule."

Offsets expert (9/13/04): "I said offsets had the *potential* to allow for greater reductions at a lower overall program cost ..."

Despite these economic concerns, the underlying environmental focus of the policy made it difficult to present design features only according to their economic effects, especially when RGGI was viewed as model for future policies. Some environmentally-inclined stakeholders attempted to frame design features solely through their environmental effects. However, the economic implications of these design features, such as compliance and enforcement costs, could not easily be ignored. Even the SWG could not entirely isolate the environmental effects of potential designs from their economic considerations.

Stakeholder (9/13/04): "We've seen dynamic changes in offsets around world recently. We would like to ensure criteria and environmental integrity are set right, to ensure source reductions. This is a precedent for the country, not only for RGGI."

SWG (9/13/04): "We want to create offsets of high environmental quality but without onerous application and administration costs ..."

Stakeholder (9/13/04): "The need for an enforceable program may lead toward having contours around an offsets program, as there are limits to administrative resources to verify and enforce offsets."

The balancing act between environmental, economic, and practicality concerns was also evident in stakeholders' discussions about compliance and enforcement. With regard to monitoring CO_2 emissions, the Clean Air Act of 1990 had required electrical generators to report their emissions but had not defined a specific methodology (U.S. Environmental Protection Agency, 2008). This forced the SWG to develop a compliance protocol that regulated entities could use to monitor their emissions. Many of the proposed approaches hinged on applying the methodologies and technologies associated with NO_x and SO_2 emissions to CO_2. As systems for monitoring NO_x and SO_2 emissions were already in place, using the same practices and equipment for CO_2 would reduce both the compliance cost and effort for generators. However, some generators were even concerned about the economic costs of using traditional monitoring and compliance strategies.

Stakeholder (9/13/04): "Are there ways RGGI could piggyback on existing monitoring systems from NO_x or SO_x?"

Stakeholder (9/13/04): "Why is CO_2 reported with CEMs [continuous emission monitoring devices]?"
SWG (9/13/04): "Many companies have chosen to use CEMs because they need either a CO_2 or an O_2 monitor to calculate NO_x emissions rates to meet their Title IV NO_x requirements."

Stakeholder (9/13/04): "I'd suggest changing part 75 CEM to monitoring systems. Methodology is good enough for NO_x should be good enough for CO_2."

Generator (9/13/04): "CEM data used in NO_x and SO_x is a great way to go as long as installations have CEMs."

Generator (9/13/04): "Cost of CEMs is significant for small units … [Our organization] has 22 units in RGGI and no CEMs systems installed. Part of me would like verification at CEMs level, but [we] would have to retrofit all our units."

November 12, 2004

During the November 12, 2004, meeting the first runs of the microeconomic model were presented, and the macroeconomic model was described and its assumptions discussed. Afterwards, a stakeholder panel was convened to discuss the policy's cap size. In presenting the microeconomic model, one of the modeling consultants stated that, "The model is a cost minimization model, and set to optimize the system at least cost" (Modeler: 11/12/04). Following this central focus, stakeholders questioned how different cost and benefit assumptions were incorporated into the model. Cost considerations continued to be presented along with the policy's proposed environmental goals, but their respective prioritization reflected stakeholders' persistent focus on the policy's economic effects. This focus also highlighted how stakeholders' perceptions of the policy's costs would determine whether they could support its enactment.

Stakeholder (11/12/04): "You have internalized some transmission costs in renewable projects, but not others. I think you should consider this more carefully."

Stakeholder (11/12/04): "We need a 20% reduction from today's levels (similar to 1990) … There's a lot of uncertainty how we're going to achieve these results. Having a circuit breaker at a certain cost threshold makes sense to us, as we understand we can't break the bank trying to implement this."

Stakeholder (11/12/04): "Flexibility measures may make or break the program … Compliance flexibility or circuit breaker process is important."

As in earlier modeling discussions, the economic tilt of the discourse instigated a parallel conversation about energy efficiency's inclusion in both the models and the policy. Energy efficiency supporters continued to expound on the multiple benefits it could provide, including its abilities to stimulate economic growth and to reduce the costs of RGGI. However, capturing these benefits by actually expanding the use of energy efficiency remained difficult.

Stakeholder (11/12/04): "The model does not look at energy efficiency as a resource that the model may call upon. Perhaps this should be considered."

Stakeholder (11/12/04): "We need to build energy efficiency and renewables into RGGI ..."

Stakeholder (11/12/04): "For energy efficiency, consider how we can incentivize economically advantageous programs that make businesses more competitive, and reduce the costs of implementing RGGI."

Stakeholder (11/12/04): "Everyone recognizes [the] value of energy efficiency, but no one has come up with [the] perfect way to incorporate energy efficiency into the system."

The development of the macroeconomic model mirrored that of the microeconomic one. The modeling consultants, "will continue to involve Stakeholders in the process" (SWG: 11/12/04). A number of stakeholders then asked questions about the assumptions the model would be based on. Like previous conversations, stakeholders questioned the model's economic assumptions and inclusion of energy efficiency resources.

Stakeholder (11/12/04): "Are we making unrealistic assumptions on the amount of gas capacity we can add to the system?"

Stakeholder (11/12/04): "I suggest we revisit ... financing costs of new generation across the country."

Stakeholder (11/12/04): "I'm concerned that energy efficiency doesn't seem to be incorporated into the analysis."

Lastly, the SWG offered three generating stakeholders, one environmental stakeholder, and one large electricity consumer the opportunity to present their thoughts on three questions: "What are the major factors/principles that should be taken into consideration when setting the cap levels?; Where does this lead you in terms of recommending where the actual cap should be set?; How should the cap change over time, and what other cap-related mechanics do you think are important?" (SWG: 11/12/04). The comments that were made reflected the most important concerns of each stakeholder category, and revealed what perceived effects might prompt them to accept or contest the policy. With regard to setting the cap level, the generators and consumer indicated the policy should motivate broader CO_2 policies, minimize the economic impacts associated with enactment and compliance, and maintain the reliable functioning of the current electrical system. This contrasted with the purely environmental position held by the environmental stakeholder.

Generator (11/12/04): "Did RGGI pave the way towards a national program that includes multiple sectors and multiple GH [greenhouse] gases?"

Generator (11/12/04): "Develop a program that protects the electrical system reliability, fuel diversity and energy affordability needs of each control area (NYISO, NEISO and PJMISO) involved."

Generator (11/12/04): "Ensure the program design does not jeopardize the short and long term competitive position of the Northeastern United States."

Consumer (11/12/04): "Minimize the administrative burden and support a speedy implementation."

Generator (11/12/04): "Would the RGGI ratepayer agree that the effort was worth the price?"

Environmental (11/12/04): "Recent climate models and impact assessments show a stabilization target of appx. 450 ppm would help avoid the worst impacts [of climate change]."

Generators' responses to the latter two questions were aligned with their initial answers and suggested more conservative caps with more gradual enactment periods. The consumer also suggested the "cap should be gradually phased in to provide adequate time for transition...", but wanted to see the modeling results before committing to a specific figure (Consumer: 11/12/04). The environmental stakeholder pushed for a more immediate and aggressive policy schedule.

Generator (11/12/04): "Phase II [of RGGI]: HIGHLY AGGRESSIVE – PROBABLY NOT ACHIEVABLE [.] DEFINITELY NOT SUSTAINABLE."

Generator (11/12/04): "Initial phase recommendation. 2010: Stabilize emissions at current levels (equates to a regional ~7% reduction since 1990), with emissions grown in some manner to reflect load growth over the next 5 years."

Consumer (11/12/04): "Evaluate modeling and conservation impact/potential before determining if additional efforts are required."

Environmental (11/12/04): "Recent modeling shows 'wait-and-see' approach is <u>not</u> a viable near-term policy … Committing to meaningful early reductions (e.g., 'smooth' or 'aggressive' pathway) is our best insurance policy against uncertainty."

February 16, 2005

Much of the February 16, 2005, meeting focused on the updated microeconomic model runs. The microeconomic model was updated to show how different cap sizes would affect the region's emissions, electricity prices, and allowance prices. These model outputs reflected the policy outcomes that different categories of stakeholders were most concerned about. The modelers then described how different cap sizes would affect the region's emissions and electricity prices.

SWG (2/16/05): "Now that there are cap scenario results, the Stakeholder Group can have real discussions about this … It is important for Stakeholders to understand that we haven't made any decisions yet based on the modeling results."

Modeler (2/16/05): "[Modeling Consulting Organization] modeled 5%, 10%, 15% and 25% below 1990 by 2020. The caps implemented in the model assume a linear decrease from 2008 to 2020 and then maintain that level thru [sic] 2024. The 2008 starting point was based on an average of 2000 to 2002 RGGI unit emissions."

Modeler (2/16/05): "5% below 1990 Case is not binding due to banking of early allowances that represents the gap between the reference case projection in the early years and the starting cap level."

Modeler (2/16/05): "There is only a $2.48 rise in 2024 in wholesale electricity prices in the 25% reduction Case."

After the model was presented one stakeholder expressed concern that the 1990 emission figure was too high and using it as the baseline would limit overall reductions. The subsequent conversation highlighted the divide between environmental organizations and other categories of stakeholders, and the different outcomes they expected RGGI to produce. The conversation also illustrated that the potential weakness of the policy was identified relatively early in the design phase, and that the SWG was fully aware and accepting of it. This prompted environmental stakeholders to request more significant emission reductions be modeled.

Stakeholder (2/16/05): "Should look at actual emissions … we're not seeing emissions reductions …Using 1990 as a reference point, which was highly inflated due to a unique set of circumstances in NY in 1990, makes no sense. We should be looking at more significant reductions."

SWG (2/16/05): "The SWG recognized when we chose the starting point that it is higher than what emissions are currently."

Stakeholder (2/16/05): "Based on results we'd like to see more aggressive CO_2 policies modeled."

Environmental (2/16/05): "All environmentalists would likely support a more aggressive carbon policy than those modeled."

In response to stakeholders' earlier requests to build energy efficiency into the model, the next set of runs included a 15% emission reductions scenario with a 30% reduction in load growth. When the model included a reduction in load growth the amount of electricity-derived CO_2 emissions fell below the proposed cap and created an oversupply of allowances. The discussion of energy efficiency's role within RGGI continued into the next experts' presentation on environmental markets. However, doing so reignited the question about whether energy efficiency should be hardwired into the policy. While admitting to overlapping political responsibilities, the same market experts also acknowledged the multiple benefits that energy efficiency could provide, as well as the barriers that could prevent them from being achieved. The conversation then revealed potential strategies and approaches for building energy efficiency into the policy.

Modeler (2/16/05): "Turns out that when you reduce demand by this amount you end up with zero allowance prices and the cap is non-binding … this was meant as a rough proxy for increased end-use efficiency."

Stakeholder (2/16/05): "Many of us think that energy efficiency should be integral to RGGI and funded. Is it core or ancillary?"

Market Expert (2/16/05): "When I think of RGGI, I think of a regulatory program. That could just be me, but if it does not go beyond air regulators, that would be core."

Stakeholder (2/16/05): "You identified fuel diversity and fuel neutrality as one of the most important points … So if resource diversity is a core issue, how can energy efficiency not be core?"

Market Expert (2/16/05): "RGGI <u>success depends upon ability to develop non-traditional resources</u> (renewables, efficiency, and other distributed resources) ..."

Market Expert (2/16/05): "Market and regulatory <u>barriers persist</u> which inhibit reliance on these resources."

Market Expert (2/16/05):"need for additional <u>RGGI design issues to overcome these barriers</u> (e.g., allocations of credit to those resources) …"

Market Expert (2/16/05):"I can conceive of allowance mechanisms going to energy efficiency."

Market Expert (2/16/05): "need for other <u>policy remedies</u> (e.g., ISO transmission policy, ISO stand-by rates for alternative resources, system benefit charge enhancements) <u>to address barriers."</u>

Stakeholder (2/16/05): "There is a tremendous overlap between ISO and environmentalists, and their goals should be aligned."

April 6, 2005

The April 6, 2005, meeting included additional microeconomic model runs, stakeholders' opinions about the connection between the models and the policy, and an expert on allocation distributions. Reflecting the desires that were voiced by environmentally-inclined stakeholders, the modelers presented a scenario with a 35% emissions reduction. In response to the large economic impacts of this cap size, stakeholders requested more detailed cost information and more rigorous energy efficiency scenarios. Stakeholders' desire to include a more sophisticated treatment of energy efficiency in the models demonstrated that they and the SWG were increasing appreciative of its ability to reduce the economic impacts of the policy. To accommodate these and earlier requests, the modeling consultants drew on the expertise of an efficiency stakeholder, as the model was not built to include a sophisticated treatment of energy efficiency.

Modeler (4/6/05): "Under the 35% reduction case with a national program, the projected RGGI region electricity price is about 30% higher than [the] reference case in 2024 ..."

Stakeholder (4/6/05): "Do you consider DSM programmatic costs in modeling?"
Modeler (4/6/05): "No."

Stakeholder (4/6/05): "We should model a Reference Case with 0% load growth."

Stakeholder (4/6/05): "Have you considered a high efficiency run as opposed to a reference case run?"

Modeler (4/6/05): "Yes, we would expect to run high efficiency as a policy, perhaps a complementary policy."

Modeler (4/6/05): "On energy efficiency, we're looking at how to treat energy efficiency as a supply source. [Energy efficiency stakeholder] has worked up a block of prices and quantities so that energy efficiency can be treated in a way that costs and benefits are captured by the model. But this requires a lot of work, so it is taking a lot of time. At this point, we've just reduced demand by a simple fixed percentage."

The SWG then posed two questions to stakeholders: "Given what you know from modeling to date, what would be a reasonable approach to the cap, and why?; What additional modeling and analysis do you believe are needed to inform a final decision on the cap, and why?" (SWG: 4/6/05). The responses indicated that all categories of stakeholders accepted the use of the models, and that they wanted more design features built in and more scenarios modeled. Stakeholders also commented about the cost of the policy and wanted to see how different flexibility mechanisms could affect the economic outputs of the models.

Stakeholder (4/6/05): "We all have a list of things that we haven't discussed enough. If you are in need of a lot more runs can you ask [the] commissioners for more money to do more runs? We think a lot more runs need to be done."

Stakeholder (4/6/05): "Have you considered looking at a circuit breaker that would delay or reduce the cap if it is not working (e.g., allowance prices increase to unacceptable levels)?"

Energy efficiency-inclined stakeholders also reiterated their thoughts on its role in the policy and its potential environmental and economic effects. In doing so, they highlighted the various benefits that energy efficiency could provide to different categories of stakeholders. In particular, they emphasized energy efficiency's ability to reduce the economic effects that RGGI would impose on different categories of stakeholders, which could then enable them to support its enactment. These and earlier comments reflected a growing desire to merge CO_2 and energy efficiency policies. This position was further supported when, "[a SWG member] replied that our governors have been saying that [too]" (SWG: 4/6/05). An efficiency stakeholder then identified another stakeholder group that could also support merging energy efficiency with RGGI and presented a strategy for convincing them.

Stakeholder (4/6/05): "In selling this to the public, it's important to look at assumptions we're making about infrastructure development so people understand where rate impacts are coming from. I think that DG [distributed generation], DSM and energy efficiency will help address load growth over time, and that needs to be part of the calculus of doing this. Need to look at [a] scenario of zero load growth and impacts on emissions, capacity costs. Otherwise it will be hard for us to support."

Stakeholder (4/6/05): "If it can be shown that RGGI becomes cheaper if there's a mechanism to build in efficiency, we need to build in those mechanisms as discrete policy choices."

Stakeholder (4/6/05): "I agree we need a cap. But, how much of a cap can we afford? Some of the prices look scary. I see energy efficiency as the key for dealing with this puzzle so we see mitigation of price impacts."

Stakeholder (4/6/05): "The most obvious outcome of this process is some confirmation that the best possible outcome is a national carbon policy and energy efficiency. Maybe this should be the message coming from the northeast."

Efficiency (4/6/05): "Utility commissioners may find it helpful to see some of the energy efficiency implementation figures. For example, if a state is increasing SBC [special benefits charge. A charge placed on electrical customers' bills and how energy efficiency was traditionally funded] funds, it would be helpful to have some analytical back-up early on. If they can see there is an easier path to reach carbon reductions with lower rate increases by using an efficiency component than [sic] that would be a big help. [Energy efficiency stakeholder] is willing to do whatever they can to help provide the data."

Interest in building energy efficiency into the policy continued to grow. A number of efficiency inclined-stakeholders were adamant that the best way to attract further support for doing so was to build energy efficiency features into the models so the results could be used as evidence of its benefits. Another stakeholder also brought up how formally building energy efficiency into the policy could enable institutional changes in how efficiency programs and technologies were funded and deployed. The conversation then turned to a related issue, how to fund an increase in energy efficiency spending.

Efficiency (4/6/05): "The data [energy efficiency stakeholder] has looked at in existing programs is energy efficiency reduces load growth by 0.5-1% annually, and average load growth is about 1% annually. But what we need is an IPM run to show more quantitative data to say that's true."

Stakeholder (4/6/05): "If we think a regional [CO_2] program should include an efficiency component, we should present the two as intertwined, especially if it decreases the cost. One piece of analysis we haven't seen is if you get a different reduction in demand with efficiency market transformation programs."

Stakeholder (4/6/05): "I would like to see a scenario with zero load growth, choosing efficiency resources. How you pay for it is the question, maybe with allowances and other sources."

The stakeholder meeting then shifted as an allocations expert presented different allocation strategies. The expert presented three approaches: a historical, free allocation; an updated, free allocation; and an auction. These were evaluated according to their economic and distributional efficiencies. With regard to auctions, the expert did not specify where the revenues should be directed, but stakeholders were already thinking about how they could be used to address the economic concerns of different categories of stakeholders.

Stakeholder (4/6/05): "What percent of auction revenues would it take to completely compensate generators, and what's left for consumers?"

After the presentation stakeholder groups were given the opportunity to present their thoughts on the following question: "What should States take away from this study, and generally how should they approach allowance allocation?" (SWG: 4/6/05). The following discussion addressed the economic and distributional efficiencies of each approach. It also reflected the goals of different stakeholder groups and which potential policy effects they would be willing accept. However, many stakeholder groups were hung up on whether they were selecting on the basis of a regional policy or a national policy. Much of this conflict centered on the political and economic palatability of using auctions to distribute allowances, which at the time was a relatively uncommon approach.

Generator (4/6/05): "Allocation is the most important issue that will determine whether RGGI will expand to a national policy … Auctioning approach could be perilous, and that a historical allocation approach, potentially with long-term updating is best."

Stakeholder (4/6/05): "There is little on the table at national level for now, and we have a real opportunity to develop national policy and make program more saleable [sic]."

Stakeholder (4/6/05): "Will RGGI be a model for federal policy? We'll be waiting a long time for federal policy. Agencies should focus on regional policy."

Allocation expert (4/6/05): "If RGGI is to serve as a model for a national program, then the auction precedent is valuable."

Stakeholders also commented on the electrical, regulatory environment the policy would be applied in and the distributional consequences of different allowance allocations. In terms of regulatory environment, early cap and trade policies for NO_x and SO_2 emissions were designed for and enacted within regulated systems, whereas RGGI would exist in a restructured electrical system. The distributional effects of a particular design would determine which categories of stakeholders would be most affected by the policy, which would then influence whether they could support its enactment. Due to this, the allocation of allowances was viewed as a tradeoff between the economic concerns of generators and consumers.

Stakeholder (4/6/05): "When SO_2 and NO_x programs were created before restructuring in the northeast, wholesale markets were very different. We are no longer able to look at units and recapture windfall profits through the ratemaking process. The value of allowances is different under deregulation."

Stakeholder (4/6/05): "Some folks are comparing old allocation schemes under cost of service regulation to today under competitive pricing. Under competition, allocations should be to consumers, and we've let them slip away in the past. We need to figure out how generators do not obstruct this too much."

Public interest stakeholders played a large role in this discussion and advocated for consumer-friendly distributions and other strategies that limited the policy's economic impact on consumers. Some stakeholders even identified consumer costs as the economic impact that would determine whether they could support the enactment of the policy. Alternatively, generators claimed that using auctions would be economically detrimental and would negatively affect the reliability of the region's electrical system.

Public Interest (4/6/05): "Consumers should get the value of the allowances as they are paying for the program in terms of higher electricity prices."

Stakeholder (4/6/05): "We don't advocate auctions specifically, as long as there is a direct allocation to consumers."

Stakeholder (4/6/05): "This boils down to [the] implications of an auction: who benefits, and who gets harmed."

Stakeholder (4/6/05): "Main argument to kill or make this happen will be the program cost. Two ways to make the program cheap: 1. do nothing, 2. mitigate cost to consumers."

Generator (4/6/05): "Cap will have a 5-10% impact on financial result for generators. Auctioning allowances could have a significantly greater impact."

Generator (4/6/05): "Auction model will lead to negative effects in each of these areas: Places significant financial strain on units critical to maintain fuel diversity in the region."

Generators' economic claims were countered by both the allocation expert and a public interest stakeholder. They said generators would pass the costs of the allowances onto consumers whether they bought them or received them for free, and that giving generators free allowances would allow them to recoup economic gains that consumers ultimately paid for. The economic costs imposed on consumers continued to be viewed as a critical consideration that would determine whether RGGI could be enacted. This motivated stakeholders to suggest allocating allowances directly to consumers or to energy efficiency programs that would reduce the price they would pay for electricity. Public interest organizations then increased the aggressiveness of their requests, or argued for distributing more of the allowances to benefit the public. Stakeholders ended the discussion by asking for allocation scenarios to be built into the models, which further demonstrated their support for using the models and their trust in the results.

Allocation expert (4/6/05): "Firms charge consumers for using emission allowances, whether the allowances were received for free or at a cost."

Public Interest (4/6/05): "There is no 'economic efficiency' reason or 'equity' reason to give any allowances to generators. Consumers, who pay the price increases, should receive the proceeds of allowances sales. Generators, as a class, should not financially benefit from this program at the direct additional expense of consumers. In keeping with the new competitive markets for wholesale electricity, allowances should be sold through an efficient, transparent market for buying and selling allowances."

Stakeholder (4/6/05): "There are two ways to reduce the cost of a CO_2 cap and trade program … 1) Rebate proceeds of allowance sales back to the consumers that are paying the increased prices created by the program, thus reducing ... consumers' cost for any level of CO_2. 2) Invest a significant portion of the proceeds of allowance sales in strategies that will reduce the long-term impact of CO_2 reduction programs on energy prices, such as energy efficiency and clean energy programs."

Stakeholder (4/6/05): "[Public interest stakeholder] was asked why earlier he advocated 50% allocations to consumers, but now [is] advocating 100%. Why has his position changed?"
Public Interest (4/6/05): "That [allocations expert] helped us see that the generators as a whole come out neutral."

Stakeholder (4/6/05): "We would like more time to understand how this model works. You talked about doing modeling runs with allocations. We'd like to see those modeling runs before using results to set policy."

Stakeholder (4/6/05): "Our coalition needs time to see modeling runs with allocations built in."

The meeting concluded with the SWG's presentation of the initial framework for RGGI's MOU and Model Rule. The SWG then said they would present the stakeholder feedback to the state agency heads who would use them to determine the final policy design. One section that prompted further questioning was 'complementary energy policies'.

Stakeholder (4/6/05): "What is under the umbrella of complementary energy policies?"
SWG (4/6/05): "Energy efficiency is a major driving force."

SWG (4/6/05): "Whether or not and what to recommend in terms of energy efficiency policies."

May 19, 2005

The May 19, 2005, stakeholder meeting featured further conversations about the newly updated micro-and macroeconomic models, as well as a formal stakeholder discussion about RGGI's potential design. Before these topics were broached, the SWG reported the agency heads had made a number of decisions regarding the structure of RGGI. Paramount amongst these concerned the cap's baseline.

SWG (5/19/05): “We recommended setting the initial cap at current emissions. What constitutes 'current emissions' at the start of the program must be estimated because there is a time lag in receiving emissions data. We will have good data for the years leading up to 2004, but if the program launches at the start of 2009, there will still be a data gap. Certain adjustments needed to be made to our emissions data in determining the cap start points, based on how IPM projects emissions. We need to apply the results that come from the model using some analogy. 25% below 1990 is not a perfect projection of a stabilization case, but it is reasonable close – and probably a bit conservative.”

SWG (5/19/05): “If the decision is to start the cap at emissions levels at the time the program starts, then we will need to estimate what those levels will be. The most recent data we have are from 2000-2002 and the average annual emissions from RGGI units during that period was 143 million tons.”

Beyond demonstrating the SWG's justifications for using both historical emission figures and a conservative cap, the above statement also emphasized the role the models played in determining RGGI's ultimate design. Overall, the SWG stressed the need to find a cap size that, if not ideal, was at least acceptable to multiple categories of stakeholders. The update also touched on the use of auctions and complementary energy policies. Though various stakeholders had suggested giving allocations to consumers, this marked the first explicit mention of formally recycling auction revenues to benefit the public.

SWG (5/19/05): “We've had discussions on what cap you want and what cap others want – the trick is to find a middle ground.”

Stakeholder (5/19/05): “Did the issue of auctions come up in how states do their allocations?”
SWG (5/19/05): “We've been using the term 'public benefits allocations' and yes, it did come up.”

Another topic that sparked further conversation was the inclusion of complementary energy efficiency policies. However, the statements made about doing so demonstrated that integration issues between environmental and energy policies continued to exist. This reflected the prior disconnect between the two, but also potential opportunities. The SWG also commented on RGGI's scalability, given its emerging domestic uniqueness. Stakeholders remained concerned about the program's costs and whether flexibility mechanisms would be included. This focus reinforced the fact that stakeholders' support for enactment would hinge on the perceived economic impacts of RGGI.

Stakeholder (5/19/05): "I'm glad to see part of MOU is on complimentary [sic] energy policies."

SWG (5/19/05): "There is a legal dynamic regarding what has to be in the rule, what should be in the rule, and what should be in the rule but isn't ready yet. Some aren't appropriate for the program ... complementary energy policy is a moving target at this point, etc. Also, energy policies may not be within the purview of the environmental agencies."

SWG (5/19/05): "There are complementary policies that have been discussed that are not part of the model rule. Some things are outside the jurisdiction of the environmental agencies and we'll need to rely on our counterparts in other agencies. But we are not developing a separate model rule for energy policies at this time."

SWG (5/19/05): "Recommendations on Complementary Energy Policies: We are looking beyond public benefit allocation for potential complementary energy policies. It was unusual to have both environmental and energy regulatory agency heads all in one room. One focus is on the notion that there are real connections between this program and others ... RGGI might be used to leverage something greater in the area of energy efficiency."

SWG (5/19/05): "Link with other Trading Systems: Since there are no other domestic trading programs now we'd probably wait and take that up post - MOU - if opportunity for linking came up."

Stakeholder (5/19/05): "Will there be a sunset provision if there is a national program? The cost impact to constituents should be embodied in a circuit breaker."

Stakeholder (5/19/05): "Was there discussion about how the Agency Heads can communicate the potential costs and benefits to their constituents?"

The meeting then shifted to a discussion of the macroeconomic model, which portrayed RGGI's potential economic impact upon the adopting states. Specifically, “ 'impact' means the <u>difference</u> between how the economy performs in a given year in a reference scenario **and** a policy (carbon cap) scenario. Performance is gauged by changes in: Gross State (or Regional) Product, Employment, Personal Income” (Modeler: 5/19/05). The model also looked at the policy's effect on electricity and natural gas prices. The economic effects of weaker caps were found to be fairly small, but more significant emissions reductions, or tighter caps, had more significant economic impacts.

Modeler (5/19/05): “Economic impacts are small – generally well below one-tenth of 1% change in economic indicators.”

Modeler (5/19/05): “Impacts increase with cap size.”

Modeler (5/19/05): “Under the straight 25% and 35% caps, retail electricity prices rise with carbon allowance prices; the increases range from 1% to under 6%.”

As in earlier conversations about the microeconomic model, stakeholders questioned the assumptions of the macroeconomic model and suggested alternatives. These versions of the macroeconomic model also did not include energy efficiency features or their potential effects. The macroeconomic modeling experts stated that energy efficiency would be included in the next runs, and stakeholders had a number of thoughts about how to best do so.

Stakeholder (5/19/05): “Wholesale to retail ratios seem high. How do you deal with volatility particularly in gas? ... you might be overestimating retail gas prices.”

Stakeholder (5/19/05): “If we look only at the state level when averaging out, we miss some of the impact on regional [,] like downstate vs. upstate New York. Is there a way to look at sub-state areas?”

Stakeholder (5/19/05): “The later run that will include the energy efficiency scenario. Will that take into account the lower price impact if you have more efficiency ... ”

Stakeholder (5/19/05): “How are you planning to characterize inputs for energy efficiency and is there any way for the Stakeholders to have input and will this be done before July 6th?”

The microeconomic modeling experts then gave a quick update on their model. The newer version included an increasingly sophisticated treatment of energy efficiency, but stakeholders wanted this treatment to be improved even further. The attention that stakeholders devoted to the microeconomic model reflected the trust they had in its results, and the fact that these results represented the best estimate of the policy's potential economic impacts. However, one stakeholder did voice his concern about the amount of time and stakeholder attention that was devoted to the microeconomic model at the expense of the macroeconomic one. The SWG countered this claim and said that compared to the design of other environmental policies their use of modeling was quite extensive. This comment further reflected the central role that economic modeling played in the design of RGGI, as well as the relative novelty of using this approach to design environmental policies.

Modeler (5/19/05): "Working on energy efficiency runs with the assistance of [energy efficiency stakeholder] looking at what would happen if you add a carbon cap with energy efficiency reductions as a backdrop."

Stakeholder (5/19/05): "I'm very glad you are moving forward with energy efficiency modeling. I have some concerns that you are rushing to a decision in early July without the analysis on energy efficiency done. The three big arguments are: 1. Is it doing enough to solve the problem? 2. What's the impact on jobs? 3. What's the impact on cost of power? These factors need to be incorporated into the decision-making process."

Stakeholder (5/19/05): "I feel like I'm in Wonderland. Is this modeling all just for show? I'm confused and frustrated. We spent six months on IPM and one hour on REMI ... You have barely started the REMI modeling, but you are going to have this meeting in July with the Agency Heads."

SWG (5/19/05): "I challenge you to find an environmental process that's gone through this level of modeling at this stage in a rulemaking process. There has been a huge amount of modeling. You need to look at it according to other programs."

The meeting concluded with an open forum in which different stakeholders voiced their thoughts about the following question: "What Comprehensive RGGI Design Package Do You Recommend the States Adopt and Why?"(SWG: 5/19/05). The stakeholders were queried about the policy design they wanted to be enacted, so their responses indicated which designs and outcomes different categories of stakeholders could support. Generators and consumers reiterated their position that the economic impact of the final policy design would determine whether they could support its enactment. However, generators and consumers were concerned about different economic effects, which meant an enactable policy design would have to balance their respective concerns in order to address them both.

Environmental (5/19/05): "It has to be good for the states. We are trying to demonstrate a smart way to reduce CO_2 that will help the region, and help jobs … The package has to be good for consumers, as they will pay the price."

Generating (5/19/05): "The modeling suggest that the price increase is modest, but we should be careful to make sure that allowance prices don't skyrocket. We should have circuit breakers."

Public Interest (5/19/05): "What we're seeing is that the actual cost of achieving reductions is reasonable … We must focus on an appropriate role for this sector [electrical], which has extremely large sources that are regulatable [sic] and small costs."

Consumer (5/19/05): "It all comes down to business[es] and the consumer and how they will react."

Generating (5/19/05): "New England states were hurt by the CAIR [Clean Air Interstate Rule for NO_x and SO_2] because they were early movers. We have to use caution so we don't set ourselves up for similar damage in a national program by being too aggressive."

Consumer (5/19/05): "Don't make a decision about the cap until both IPM and REMI modeling are complete and you've looked at what the cost and regional results are when you include efficiency."

On the other hand, environmental organizations indicated the policy should actually reduce CO_2 emissions in the region. Other stakeholders also brought up another initial goal, that of inspiring other policies, but their opinions about expansion and the fate of RGGI following the enactment of a broader policy varied. Within this discussion, the most consensus emerged around the use of energy efficiency. Due to the many benefits that energy efficiency could provide, particularly its ability to reduce the economic impacts of the policy, all categories of stakeholders supported its inclusion in RGGI.

Environmental (5/19/05): "We agree that we have to have an emissions cap that goes down from current levels, not just from 1990 levels."

Environmental (5/19/05):"This is an experiment. We want to see actual CO_2 reductions in the region from [the] electric sector."

Environmental (5/19/05): "Our goal is creating momentum for an effective national program. We have to remember to step back and look at the goal."

Public Interest (5/19/05): "We need to make sure this package is replicable to other states."

Generator (5/19/05): "This needs to be a stepping stone to a national program, and once that end game is achieved, RGGI should go away."

Environmental (5/19/05): "If we reduce demand we can do this in a cheap way. Complementary energy programs and what we do with allowances is important … We should use allowances for energy efficiency and other clean energy technologies."

Consumer (5/19/05): "I would like to encourage incorporating energy side policies into this. We need demand-side reductions and energy efficiency. Reduced demand would be a positive outcome. Incentives for energy efficiency and demand side reduction could be included through the offsets program."

Generator (5/19/05): "Efficiency is the best way to keep costs down."

Efficiency (5/19/05): "Energy efficiency is a key tool in dealing with leakage. Public benefits allocation to energy efficiency will help pay for energy efficiency."

Public Interest (5/19/05):"This cap can reduce compliance costs through energy efficiency and that's unique."

Consumer (5/19/05): "Complementary energy policy will be a very important aspect of the program … We have to make sure to maximize energy efficiency."

Generator (5/19/05): "We strongly feel that if we fund energy efficiency programs it will help in terms of demand side."

Public Interest (5/19/05):"Energy efficiency should be hardwired into the cap as much as possible right at the outset."

September 21, 2005

In the September 21, 2005, meeting the SWG presented an update from their latest meeting with the state agency heads. Then the modelers presented their latest micro-and macroeconomic modeling runs. The meeting concluded with an open forum where stakeholders could voice their opinions about the latest RGGI designs. In addition to indicating that certain design features had not been decided, the agency head update included initial decisions on the size of the cap, the inclusion of a review period, the allocation method, and the portion of allowances allocated to benefit the public. The initial cap size that was selected was loose and the predicted allowance prices were low. This addressed the economic concerns of generators, although environmental and public interest stakeholders questioned the policy's ability to achieve significant emissions reductions.

SWG (9/21/05): "There will be a two phase cap with stabilization at approximately 150 million tons through 2015, followed by a 10% reduction by 2020 and a built-in review of the program in 2015 …"

Environmental (9/21/05): "You indicated that 150 million tons was approximately current emissions. When we've been looking at the data that doesn't appear to be where current emissions are. Could you quickly describe the discrepancy there. It seems like going from the mid-140's to the 150's, we're a little worried about that."

Environmental (9/21/05):"Our concern is that the cap really deliver change and actually have an allowance price."

Public Interest (9/21/05): "It's just that some of us who are looking at those one dollar allowance prices and thinking this is getting close to not having much impact …"

The discussion then shifted to the allocation method and the amount of allowances distributed to benefit the public. The SWG proposed giving 20% of the allowances to the public. "The idea was that every state, as part of its rulemaking or proposal to its legislature would have a 20% public benefit, no smaller, and some states have talked about doing more than 20%" (SWG: 9/21/05). Before opening this design feature to stakeholder discussion, the SWG acknowledged, "this is one of the more controversial aspects of the proposal" (SWG: 9/21/05); however, the amount and tone of stakeholder concern about the use and size of the public benefits fund was limited. Instead, stakeholders primarily asked clarifying questions, such as how and when it would be implemented.

The micro-and macroeconomic modeling experts then returned to present the latest runs. The microeconomic modelers indicated that new features were included to improve the model's realism. Additionally, the model now included a constant source of funding for energy efficiency programs. The more sophisticated treatment of energy efficiency had a significant effect. It predicted that larger amounts of energy efficiency funding would produce effects that benefited all categories of stakeholders. These benefits included reducing the economic impact of RGGI and limiting the need for additional transmission and distribution infrastructure.

Modeler (9/21/05): "The Package Scenario, based on the new RGGI Reference Case, which includes the following: End Use Efficiency – Technology costs, load shapes, load factors, and potential supply by sector are based on data provided by [energy efficiency stakeholder]. Program cost to implement measures are based on average of RGGI states' actual expenditures through 2005 to implement public benefit programs."

Modeler (9/21/05): "... in many of the forecasts we received, some of that funding, or some of those programs were continued for specific amounts of time and then essentially were dropped off. And what this does in the package case was continue those spending levels and the EE reductions resulting from those levels."

Stakeholder (9/21/05): "I think it gets back to the question of what the impact of the energy efficiency is – it's the critical factor."

Modeler (9/21/05): "When we looked at the impacts, about a third of the price reduction in terms of the allowance price was due to EE and two thirds due to bringing offsets in to the system. Together those lead to a reduction in the allowance price which results in the lessening of the power cost impact ..."

Modeler (9/21/05): "We don't address the distribution issues per say but it is addressed indirectly because of the EE and the lower load that therefore needs to be met and lower peak demand, you have less pressure to build."

The modelers then presented the revised macroeconomic model. Like the microeconomic model, a major change involved its treatment of energy efficiency. This was followed by a stakeholder request for larger amounts of energy efficiency funding to be included in the model. Efficiency-inclined stakeholders wanted to include larger amounts of energy efficiency funding in the model because they believed the results were accurate and wanted to use them to convince other stakeholders to include energy efficiency in RGGI.

Modeler (9/21/05): "... the big addition from May's presentation is the incorporation of how energy efficiency will affect the regional economies … The concept of the basic package was recast, so the underlying wholesale price changes, capacity addition predictions, and then the energy efficiency is all new material."

Stakeholder (9/21/05): "You've modeled the original policy package which has continued energy efficiency investment at historic levels, is that correct? But you haven't modeled the last IPM package with the doubled efficiency? Are you planning to do that?

Modeler (9/21/05): "Yes."

Stakeholder (9/21/05): "My concern is that the efficiency modeling has only really been completed in the last few weeks and that the commissioners got their first exposure to this in July with a set of data that was extremely weak when it came to energy efficiency. So for the Commissioners to make good decisions and to support the best conclusions in the MOU it is absolutely essential that the IPM and REMI runs be completed and be fully presented to the principals before they make any final decisions. You were just looking at the difference between extending the programs and not extending the programs rights? You weren't looking at any additional efficiency that might result from a program like this [RGGI], right?

Modeler (9/21/05): "Correct."

After the presentations, the SWG gave stakeholders the opportunity to respond to the following questions: "How fairly balanced is the RGGI SWG proposal, and what suggestions, if any, do you have for enhancing its balance?; What specific feedback do you have on key aspects of the RGGI design?; What suggestions do you have to ensure the successful implementation of RGGI?" (SWG: 9/21/05). Initially, all categories of stakeholders indicated their general satisfaction with both the proposed structure of the policy and the inclusive and transparent nature of the design process.

Environmental (9/21/05): "The program, as it's been modeled, is reasonable … Overall this is a positive proposal and we appreciate all the good work you've done."

Efficiency (9/21/05): "I've been through other processes before and rarely seen such public access, good analysis and really hashing through the tough issues."

Public Interest (9/21/05): "The question is really, does this proposal do the trick in terms of meeting the objectives of the RGGI process to begin with. We are optimistic because of the regional scope and where it is headed in the short term …"

Generator (9/21/05): "We are focused on how to make this work ..."

Public Interest (9/21/05): "Lots of good work has been done by the SWG and the modelers."

Generator (9/21/05): "We support the proposal as submitted. We think this is a cautious and good approach to start."

Environmental (9/21/05): "We want to commend the SWG and all the states that are participating in the program. Many in Maryland hope our state will be a full participant soon."

Legal (9/21/05): "We commend the SWG's work and hope this will become a model for the nation."

Generator (9/21/05): "We commend the SWG for the amount of work and thought that was put into this and generally support it."

Industry Group (9/21/05): "We commend the SWG for having such a public process and allowing others to observe."

Environmental organizations readily acknowledged the weakness of the proposed cap, and a number of them suggested tightening it. In response, generators and industry group stakeholders urged caution in doing so. The different opinions about the cap size reflected the divide between the positions held by environmental organizations and generators. It also demonstrated that the cap size would strongly influence whether generators could support the policy.

Environmental (9/21/05): "The current cap level is inflated above what has been modeled … Cap should be back at the 143/145 million ton range."

Environmental (9/21/05): "[There is] concern that the baseline is inflated. [This] creates [the] unfortunate perception that [the] program is not actually reducing emissions ..."

Environmental (9/21/05): "This program is very modest … it needs to be bigger than it is if we are to do what we came here to do."

Environmental (9/21/05): "Don't inflate baseline. Current emissions should be current emissions."

Legal (9/21/05): "You can structure this program with a tighter cap, a lower cap that provides greater benefits without significant harm to [the] public."

Generator (9/21/05): "The target which was set was judicious. We wouldn't support a substantial reduction at least at this time because we don't want to bet the economy or risk radical problems that could come if we pick too large a target."

Industry Group (9/21/05): "Don't set too restrictive a cap … Program should not punish generators ..."

Stakeholders as a whole continued to emphasize the need to minimize the economic impacts of the policy; however, individual categories of stakeholders were primarily concerned about how the policy affected their specific economic concerns. Generators were concerned about how the allowance price would affect their economic health. On the other hand, non-generating stakeholders were primarily concerned about increasing electricity prices and their effects on consumers. Furthermore, it remained difficult to identify policy designs that could address the economic concerns generators and consumers both held. Generators felt the design features consumers wanted would increase the costs they would have to pay to operate their equipment. Consumers felt generators wanted design features that would increase the price of electricity and allow them to reap windfall profits from the policy.

Generator (9/21/05): "There needs to be a circuit breaker if the load continues to grow or if allowance prices go to high."

Generator (9/21/05): "We believe if you really want [the] program to have integrity there should be a circuit breaker if load continues growing too fast or allowance prices go too high, to be able to step back, suspend it for a time, and tweak it."

Generator (9/21/05): "Eliminate the 20% EE set aside. We feel it is a tax imposed on fossil generators. It will increase the cost of program implementation ..."

Public Interest (9/21/05): "Right now there is too much deference to generators and not enough to the people who are buying their product either directly or indirectly through distributors. In order to for us to sell this product to the public we need to be able to look small customers, low income customers and large customers in the eye and tell them they are getting a fair shake ..."

Legal (9/21/05): "...the total consumer costs of this program should be kept to a minimum and that a windfall to the generators should be avoided."

Environmental (9/21/05): "We are trying to achieve reductions in the energy generating sector at little or no cost to consumers."

Consumer (9/21/05): "We want a circuit breaker in order to keep the price of electricity down in the Northeast."

Consumer (9/21/05): "The consumer sector, the industrial sector and commercial companies I represent are really concerned about the potential risks inherent in this proposal … The cost of electric power is a grave concern to us."

The positional divide between generators and consumers partially turned on whether or not generators would pass along the costs of the allowances to consumers. The divide was also apparent in how generating and non-generating stakeholders wanted the allocations to be distributed. Generators interpreted policy designs that gave more allowances to consumers as economically detrimental for them. While consumers felt that giving more allowances to generators would create new costs for them and enable generators to earn additional revenues at their expense.

Public Interest (9/21/05): "Whatever the price and cost of the allowances turns out to be, whether it's given away to the generators or sold or auctioned, that market price is going to be reflected in the price of energy, which means that, effectively, consumers pay 100% of the cost."

Legal (9/21/05): "Actually I think the concern is that more than 100% of the cost will be passed onto consumers."

Generator (9/21/05): "Certainly the price of allowances is going to be reflected in the wholesale prices. That doesn't mean that all of that is profit to the generators."

Distributor (9/21/05): "We are an electric T&D company. We are not a generator … and as I like to say, we're always at the sharp end of the stick in terms of energy increases … we hear it because we're the ones that send out the bills … we do think the bid prices will reflect the cost of the allowances whether they're sold or whether they're given away."

Efficiency (9/21/05): "There should be a larger public benefit. Increase the consumer program beyond the 20%."

Legal (9/21/05): "The 20% public allocations number needs to be raised."

Environmental (9/21/05): "Increase consumer allowance allocation to 50% instead of 25%."

Generator (9/21/05): "Public benefit fund should be less than 20%."

Despite these differences, all categories of stakeholders were able to agree on the value of energy efficiency and its role within the policy. Motivations and rationales for hardwiring energy efficiency into RGGI varied, but its many benefits enabled all groups of stakeholders to come together to support it. The consensus emerged because energy efficiency could provide benefits to all categories of stakeholders without hurting any one particular category. Widespread support for energy efficiency also revealed innovative approaches to using it and to building it into RGGI.

Efficiency (9/21/05): "There needs to be a doubled commitment to EE as part of the final RGGI package. EE doesn't automatically happen in the power sector within a Cap and Trade program, it's an indirect emissions reduction … so it has to be addressed explicitly."

Legal (9/21/05): "We need to show that this program addresses the very serious problem of global warming and pollution but does it in a way that produces a benefit people can get their arms around. A consumer allocation that produces a tangible benefit in terms of efficiency can advance the long-term goals of the program in terms of energy efficiency"

Public Interest (9/21/05): "We hope that as new information about the benefits of efficiency and its ability to both help meet the cap and lower the cost of the program comes out that that will reflect how the SWG thinks about the allowances and also about the equity issues."

Generator (9/21/05): "Capping load growth is very important."

Environmental (9/21/05): "Maximizing commitment to EE and renewable energy through the power of the allowance value helps a lot in dampening the risk of leakage getting out of control and undermine[ing] the program."

Efficiency (9/21/05): "Efficiency offers additional benefits to the RGGI program in its total goals. Both offsets and EE will help reduce leakage. Both will help reduce allowance prices or at least keep allowance prices down;

however EE does a lot more, on the margin, for energy prices in the region. It does a lot more for total economic benefits, as the REMI modeling showed us … EE is available and cost effective at ANY allowance price today… The problem is, if it can't be hardwired into the cap it's going to take this extra policy commitment on the margin to make it happen."

Generator (9/21/05): "It is true, however that all ratepayers would benefit to some extent, from the reduced cost of wholesale power because EE brings you down on the curve … it's also cost effective now but not being taken up ..."

Legal (9/21/05): "We need to foster systematic efficiency as a long-term solution."

Legal (9/21/05): "Under some ways of allocating the proceeds from [the] allowance distribution, there could actually be no costs of this program to the economy as a whole. The consumers can benefit from efficiency improvements that will result from use [of] the public benefit fund."

Efficiency (9/21/05): "MOU should focus on a resource acquisition approach to EE and specifically encourage states to set resource targets for efficiency. CT and NJ already going in this direction. This approach can actually give you the resources at lower costs … This has to go in parallel with and outside the cap, and will take some inter-agency cooperation.

May 2, 2006

The SWG spent the next eight months crafting the final structure of the policy. In accordance with this progression, the entirety of the May 2, 2006, meeting was devoted to stakeholder comments on the following questions: "What are your top 3 to 5 recommendations for the states in finalizing the model rule (other than the offsets component)?; What are your top 3 to 5 recommendations for the states in finalizing the offsets component?" (SWG: 5/2/06). Stakeholder comments strongly mirrored their earlier ones, and revolved around which policy features they wanted, which then reflected which policy outcomes they would be able to accept. Generators wanted self-benefiting allocations and argued against any feature that made the policy more rigorous, expensive, or difficult to comply with. Environmental stakeholders believed the cap was too loose and wanted to limit the use of safety triggers that further restricted the amount of reductions the policy would achieve. Consumers wanted design features that would limit the policy's impact on electricity prices.

Generator (5/2/06): "Cautions against 100% auction of allowances, reducing flexibility, making the cap tighter, making penalties tighter, and reducing the operation of safety valves."

Environmental (5/2/06): "Initial cap levels are too high – about 6% above the 2004 emissions. If you extrapolate from current trends you end up having a non-binding cap at the start of the program."

Environmental (5/2/06): "Strongly oppose the safety valve triggers for offsets."

Consumer (5/2/06): "... on behalf of 55 large industrial and commercial enterprises, as well as the Connecticut industrial alliance. These businesses are very concerned about the cost impacts of the program."

RGGI's tentative structure included an auction, and some stakeholders lobbied to use more of the auction revenues to benefit consumers and some even proposed auctioning all of the allowances. Energy efficiency and legal stakeholders seconded these opinions and argued that the auction revenues should be used to support energy efficiency because it would benefit multiple categories of stakeholders. Widespread stakeholder support for energy efficiency was also used to argue for bridging the gap between energy and environmental policies.

Environmental (5/2/06): "They want to see the use of funds evaluated through a screen of some sort, and to focus on lowering program costs to consumers."

Public Interest (5/2/06): "Concern about the use of public benefit funds. Funds should be spent in ways that maximize the value of the program to consumers."

Consumer (5/2/06): "Program should minimize the cost to consumers, and therefore the program should auction 100% of the allowances and rebate the costs on a per KWh basis to ratepayers."

Legal (5/2/06): "The allocation methodology should minimize the burdens on the public at large by auctioning off 100% of the allowances."

Efficiency (5/2/06): "Power sales go down when you invest in EE; Reducing energy consumption helps reduce emissions; Investments in EE result in net positive to the economy; Every customer class saves money with these investments."

Legal (5/2/06) "Resources should go to clean technology and energy efficiency. Auction revenues should also go in part to energy efficiency."

Legal (5/2/06): "[We] need to formalize cooperation between the energy regulators and environmental regulators."

May 31, 2007

The SWG spent the next year finalizing RGGI's Modal Rule and MOU. Following the nearly final policy structure, the May 31, 2007, meeting revolved around implementation and addressed the allowance auctions. The SWG brought in auctions experts to educate stakeholders about the designs and effects of different auction mechanisms, as well as to conduct research on different auction approaches. In doing so, the experts identified certain criteria the auction design should achieve. One desired effect was to promote competitive conditions. Another criterion embodied the position held by numerous categories of stakeholders, that the policy's economic impacts should be minimized and compliance streamlined.

Auction Expert (5/31/07): "Auction Research Criteria: Promote price discovery; guard against collusion and/or market manipulation; Promote efficiency (results in allowances being owned by those who value them the most); Be perceived as open, fair, and transparent."

Auction Expert (5/31/07):"Auction Research Criteria: Minimize price volatility; Promote a liquid allowance market; Minimize administration and oversight requirements and costs."

Reflecting the desired attributes, different auction designs were evaluated on their ability to induce efficient and competitive outcomes. The connection between an efficient market and lower abatement costs linked the proposed auction designs to the previously voiced stakeholder positions. Competitive markets also produced more revenues. One design feature aligned with both goals was a reserve price, or price floor. In introducing this design feature, the auction experts spoke to efficiency and competitive goals, as well as the need to minimize the economic impacts that would be imposed on stakeholders.

Auction Expert (5/31/07): "Efficiency is high if allowances are purchased by firms with the highest value for allowances (results in lowest cost carbon abatement)."

Auction Expert (5/31/07): "Revenue is high if the auction is competitive; firms are not able to collude to pay less than the market price."

Auction Expert (5/31/07): "Set firm reserve price: Very important element of auction design; Protects against collusion; May help to reduce volatility."

November 7, 2007

The specifics of the auction design were finalized at the November 7, 2007, stakeholder meeting when the auction experts presented the results of their experiments and their final recommendations. One critical design feature that emerged from this meeting was the inclusion of a reserve price. A second was the contingency bank. A contingency bank is a form of the safety trigger mechanism that was requested by numerous stakeholders. It enabled additional allowances to be released if the auction price exceeded a certain point. Together the contingency bank and the reserve price represented two sides of a price collar, which functioned to reduce the potential economic impacts imposed on both generators and consumers.

Auction Expert (11/7/07): "Recommendations: Reserve Price. Reserve price at each auction: Reserve based on recent market activity; minimum reserve price. No Allowances sold at prices below reserve price. A reserve price is essential to good design: clear support in auction design theory; ample evidence from actual auctions. Combined with contingency bank helps reduce costly price volatility."

September 25, 2008

The first RGGI auction was held on September 25, 2008, but prior to this RGGI.org released a number of information sheets. These described the policy, its potential environmental effects, and its anticipated economic effects. An excerpt from one of these information sheets underscored the role modeling played in establishing RGGI's ultimate design. It also demonstrated how the SWG was able to combine different design features to address the economic concerns held by generators and consumers. Specifically, the cap size and price triggers that restricted the allowance price would allow generators to continue earning profits from the operation of their equipment. Similarly, the cap size, price triggers, and revenue recycler limited the policy's effects on the price and availability of electricity. This would allow consumers to continue using the electricity produced by CO_2-emitting technologies to get the services they desired and they would not have to pay significantly more to do so.

> "Economic modeling projects that RGGI will have a very modest effect on electric rates, probably retail rate increases of between one and three percent; price triggers built into the program allow flexibility if electric rates should rise higher than predicated. In fact, consumer benefits from the strategic reinvestment of CO_2 allowance auction proceeds are expected to largely offset the direct effect of RGGI on retail electricity prices." (http://www.dnrec.delaware.gov/whs/awm/SiteCollectionDocuments/RGGI_Executive%20Summary.pdf)

Other design features reduced the compliance cost and effort even more. These features included allowance banking and other safety triggers that limited the costs that generators would have to pay to use their equipment. They also included generous compliance periods and monitoring and compliance guidelines that were largely derived from pre-existing requirements and regulations. Including these policy features reduced the work generators would have to do to abide by the policy, limited the costs of compliance, and gave them ample time to comply with the policy.

> "The Model Rule provides for the banking of allowances with no restrictions … banking should provide allowance price stability while providing an incentive to hedge future year emissions uncertainty." (http://www.rggi.org/docs/program_summary_10_07.pdf; pg. 6).

> "A stage-one trigger event occurs if the twelve-month rolling average CO_2 allowance price is equal or greater than … \$7 in 2005 prices. In the event that a stage-one trigger event occurs, CO_2 budget units will be able to expand their use of CO_2 offset allowances from 3.3% of their compliance obligation to 5% … A stage-two trigger event occurs if the twelve-month rolling average CO_2 allowance price is equal or greater to … \$10 in 2005 dollars. If a stage-two trigger event occurs: CO_2 budget units will be able to use CO_2 offset allowances to satisfy 10% of their compliance obligation; The compliance period will be extended to four years ..." (http://www.rggi.org/docs/program_summary_10_07.pdf pg. 7).

> "The emissions monitoring and reporting provisions contained in the Model Rule are primarily based upon the US EPA monitoring provisions at 40 CFR Part 75 … the physical equipment necessary to monitor emissions of oxides of nitrogen on an annual basis is also capable of monitoring for CO_2 mass emissions ..."(http://www.rggi.org/docs/program_summary_10_07.pdf; pg. 8).

> "The Model Rule provides for a three-year compliance period. This compliance period can be extended to four years in the event of a stage-two trigger event … This design component was included in lieu of allowance borrowing, as it allows for de facto borrowing within a three-year compliance period." (http://www.rggi.org/docs/program_summary_10_07.pdf; pg. 6).

The RGGI project sheets also depicted how the economic impacts of the policy were mitigated by setting the initial cap size so the amount of emissions reductions would be limited. The SWG's decision to minimize the economic effects of the policy instead of making deeper emission reductions reflected their need to attract the support of generators and consumers, even if it came at the expense of some environmental organizations. In order to enact RGGI, the SWG had to utilize a weak cap to reduce the cost that generators would have to pay to operate their equipment and to reduce the price that consumers would have to pay for the electricity that was produced with this equipment. In fact, RGGI's initial cap remained loose even after environmental organizations repeatedly identified its weakness throughout the design process.

> "This phased approach with initially modest emissions reductions is intended to provide market signals and regulatory certainty so that electricity generators begin planning for, and investing in, lower-carbon alternatives throughout the region, but without creating dramatic wholesale electricity price impacts and attendant retail electricity rate impacts." (http://www.rggi.org/docs/program_summary_10_07.pdf; pp. 2-3).

Analysis

The remainder of this chapter analyzes the information presented about the enactment of RGGI to evaluate the hypotheses. First, the previously presented information is briefly summarized. Then it is used to answer how RGGI came to be enacted, and whether particular design features for a cap and trade policy facilitated this enactment.

The strategies the SWG used to design RGGI attracted a diverse array of stakeholder support and ultimately facilitated its enactment. Stakeholder participation facilitated enactment because it allowed the SWG to identify how different categories of stakeholders interpreted and used the physical materials and behavioral actions associated with CO_2 emissions(Scott, 2001). With this information, the SWG understood the types of misalignment stakeholders could perceive between their pre-existing cultural controls and those encapsulated in different policy designs (Caronna, 2004; Lindblom, 1977). The SWG also ascertained whether the misalignment different categories of stakeholders could perceive would prompt them to contest the policy (Bourdieu & Wacquant, 1992; Caronna, 2004). The SWG leveraged this information to identify design features that would reduce the misalignment that multiple, critical categories of stakeholders could perceive because they had it while the policy was being crafted instead of afterwards (Caronna, 2004; Fligstein, 1997).

The conversations held during the stakeholder meetings revealed that generators and consumers primarily interpreted and used the physical materials and behavioral actions underlying the emission of CO_2 through economic meanings. Generators understood and used these materials and actions through their effects on their costs and revenues (Blanchard, 2008; Scott, 2001). Consumers interpreted these materials and actions based on the price they paid to get the services that electricity provided (Blanchard, 2008; Scott, 2001). Furthermore, the economic basis of these pre-existing cultural controls meant they could easily misalign with alternative meanings and interpretations whose use increased the price of producing and consuming electricity (Blanchard, 2008; Caronna, 2004; Scott, 2001). RGGI's effects on the price of producing and consuming electricity would determine whether generators and consumers perceived enough alignment between their pre-existing and the proposed cultural controls to support its enactment (Caronna, 2004). With these concerns in mind, the SWG reduced misalignment by identifying design features that minimized the economic impacts of the policy for generators and consumers (Caronna, 2004). The SWG then utilized economic models to portray the allowance price, the electricity price, and the economic health of the region under a policy with these design features. This enabled generators and consumers to see how RGGI's treatment of CO_2 and the operation of CO_2-emitting technologies would align with the ways they both interpreted and used these materials and technologies (Bailey et al., 2011; Caronna, 2004; Lindblom, 1977). Furthermore, generators and consumers were willing to accept the alignment predicted by the models because they actively contributed to their design, which led them to believe the results were legitimate predications of the policy's effects. Drawing on this legitimacy, the SWG used the results of the models to alleviate generators' and consumers' concerns about the economic impacts of the policy and to attract their support for it.

The SWG used the stakeholder-designed and-vetted models to identify the economic impacts of various policy designs and to communicate these effects to stakeholder groups. When the SWG built the proposed, weak cap sizes into the models the resulting low allowance prices convinced generators that purchasing CO_2 allowances through an auction would not make their generation equipment economically unviable. This reduced the misalignment that generators could perceive between how they interpreted and used their equipment and RGGI's treatment of them (Caronna, 2004; Lindblom, 1977). Likewise, when the SWG built an increase in energy efficiency spending into the models the results convinced consumers that controlling CO_2 emissions and the operation of CO_2-emitting equipment would not lead to significantly higher electricity prices. This reduced the misalignment that consumers could perceive (Caronna, 2004). The same modeling results also convinced generators, consumers, public interest, and legal organizations that controlling CO_2 and the operation of CO_2-emitting equipment with an auction-based cap and trade policy would not hurt the economic health of the region or impede the reliability of the electrical system. This further reduced the misalignment that these stakeholders could perceive (Caronna, 2004). These results emerged because the emission caps being considered and modeled were weak. Many environmental organizations perceived misalignment between their pre-existing interpretations of the atmosphere and RGGI's treatment of it because the potential cap sizes limited emission reductions and produced low allowance prices (Caronna, 2004; Lindblom, 1977). However, many environmental organizations also supported the meanings and interpretations for CO_2 and the operation of CO_2-emitting technologies embedded in the RGGI policy, so this misalignment did not motivate them to contest enactment.

With the stakeholder-designed economic models, the SWG identified design features that increased the alignment between the anticipated effects of the policy and how the most critical stakeholder groups interpreted and utilized the existing electrical system (Caronna, 2004). The SWG then attracted support for enactment by implementing design features that aligned with generators' and consumers' pre-existing cultural controls and that were not too misaligned with environmental organizations'(Caronna, 2004; Fligstein, 1997; Lindblom, 1977). The combination of a weak cap, allowance auction, price collar, and revenue recycler allowed generators, consumers, and environmental organizations to support enactment. Generators and consumers supported RGGI because its design minimized the costs of controlling CO_2 and the operation of CO_2-emitting equipment and created new resources that benefited them. Environmental organizations supported RGGI because it controlled CO_2 and the operation of CO_2-emitting equipment, even though the reductions it would achieve were relatively small.

Question 1: How Were State Policymakers Able to Enact RGGI?

RGGI was the first mandatory CO_2 policy enacted in the U.S., so it was not guaranteed that the SWG could design and enact a controversial new policy to regulate a previously uncontrolled environmental activity. The subsequent difficulties in enacting domestic CO_2-controlling policies outside of California made RGGI's enactment even more impressive (Cohen & Miller, 2012). Reviewing the initial hypothesis about this question, enacting a new, formal policy hinges on identifying how critical stakeholder groups understand and use the materials and actions underlying the activity and then selecting design features that align with them (Caronna, 2004; Lindblom, 1977; Pfeffer & Salancik, 2003; Schnaiberg, 1980; Scott, 2001). To test this hypothesis, the analysis answers how the SWG brought about this alignment.

The SWG intentionally structured RGGI's design process to be as inclusive and transparent as possible. To these ends, they invited numerous stakeholder groups to participate in nearly every stage of the design process. Stakeholder involvement ranged from helping to define the initial goals of the policy to contributing to the economic models to commenting on particular design features. The SWG preemptively developed the conditions that enabled alignment to occur by explicitly seeking out stakeholder participation from the beginning (Caronna, 2004). These conditions emerged when different categories of stakeholders were able to voice their impressions about different facets of the policy directly to the SWG, and then when their concerns were reflected in later meetings and design proposals. Based on these exchanges, stakeholders felt their perspectives and considerations were important and valuable to the policy's ultimate design.

Moreover, the SWG also induced stakeholders to speak candidly and freely about different policy designs by establishing a safe, inclusive, and open forum for public participation. This included generators that would potentially be regulated by the policy, and who could be antagonistic or uncooperative towards the individuals and organizations seeking to control their behavior. The transparency, inclusion, and respectfulness of the design process were critical components to achieving alignment (Caronna, 2004). Different stakeholder groups honestly revealed how they interpreted and used CO_2, the atmosphere, and most importantly, CO_2-emitting behaviors and technologies. In other words, the structure of the design process motivated stakeholders to reflect upon the ways they interpreted and used the materials and actions underlying the emission of CO_2 and to honestly convey them to both the SWG and other categories of stakeholders (Scott, 2001). From these exchanges, the SWG identified the pre-existing cultural controls different groups of stakeholders held and whether they aligned with the cultural controls encapsulated in different policy permutations(Caronna, 2004; Lindblom, 1977). The SWG then identified design features that minimized the misalignment that critical stakeholders, such as generators, consumers, and environmental organizations, could perceive (Caronna, 2004). These exchanges also enabled different stakeholders to learn about the cultural controls underpinning other stakeholders' positions, which revealed the misalignments they could perceive and design features that would mitigate them (Caronna, 2004; Scott, 2001).

Due to RGGI's inclusive design process, the SWG quickly learned how critical categories of stakeholders interpreted and used the materials and actions underlying the emission of CO_2. This allowed the SWG to understand the alignment, or lack thereof, between these meanings and they ones they were trying to highlight (Caronna, 2004; Fligstein, 1997). Generators largely interpreted and used the physical materials and behavioral actions underlying electricity-derived CO_2 through their effects on their cost and revenue streams (Blanchard, 2008; Scott, 2001). This positioned the new meanings for CO_2 and the operation of CO_2-emitting equipment the SWG was trying highlight by creating CO_2 allowances as new economic costs that affected generators' ability to earn profits from producing electricity. Alternatively, consumers and the public interest and legal organizations that represented their interests primarily interpreted these materials and actions according to their effects on the price and the availability of the electricity that consumers used (Blanchard, 2008; Scott, 2001). This positioned the new meanings for CO_2 and the operation of CO_2-emitting technologies the SWG was trying to highlight as a new burden on consumers that increased the price and affected the availability of electricity. Unlike generators and consumers, the pre-existing cultural controls that environmental organizations held were not primarily derived from economic considerations (Scott, 2001). Although many accepted and acknowledged that the pre-existing cultural controls that generators and consumers held were. Environmental organizations primarily interpreted the materials and actions associated with electricity-derived CO_2 through their effects on atmospheric concentrations of CO_2 (Scott, 2001). These meanings were very similar to the ones the SWG was trying to highlight through the enactment of RGGI (Fligstein, 1997). Both sets of cultural controls treated CO_2 allowances as a tool for restricting CO_2 emissions, in that the initial allocation defined the atmosphere as a finite sink, and their distribution controlled the operation of CO_2-emitting equipment (Scott, 2001).

The SWG was able to identify the misalignments that would prompt different categories of stakeholders to contest the policy, because the design process induced them to reflect upon their pre-existing cultural controls (Caronna, 2004; Scott, 2001). From this, the SWG saw that generators and consumers could perceive economically-based misalignment between their pre-existing cultural controls and those embedded in RGGI (Blanchard, 2008; Caronna, 2004; Lindblom, 1977; Scott, 2001). In other words, generators' and consumers' perceptions of RGGI's economic effects would influence whether they could support it. The SWG likely knew this beforehand as economic modeling was initially included in the design process, but explicitly and repeatedly hearing it from generators and consumers heightened its salience. The pervasiveness of the message also prompted the SWG to conduct a more thorough investigation of the policy's economic impacts as well as potential strategies to minimize them. The SWG included design features, such as a weak cap, that reduced the economic impact imposed on generators and consumers to minimize the economically-based misalignment they both could perceive (Blanchard, 2008; Caronna, 2004; Scott, 2001). The SWG included these features even though they limited the amount of CO_2 reductions the policy would achieve, and caused environmental organizations to perceive misalignment between the policy's treatment of the atmosphere and their pre-existing understanding of it (Caronna, 2004; Lindblom, 1977).

Based on the prominence of economic meanings within the pre-existing cultural controls of generators and consumers, micro-and macroeconomic models represented ideal design tools for RGGI (Blanchard, 2008; Scott, 2001). To begin with, the models dovetailed with generators' and consumers' pre-existing cultural controls. The models treated CO_2 emissions as a cost that was borne by generators that affected their ability to produce electricity at certain quantities at certain prices, which impacted the economic health of the region. The SWG based the RGGI design process on these models, instead of non-economic ones or alternative approaches, because they recognized the policy's economic effects on generators and consumers would determine whether they could support it.

Secondly, the models translated abstracted cap and trade design features into recognizable effects that were salient to generators and consumers. They did so by depicting the effects that various policy designs would have on allowance prices, electricity prices, and the region's economic health. Generators and consumers were able to use the models to envision the alignment, or lack thereof, between different policy designs and their pre-existing interpretations and uses of the materials and behaviors associated with electricity-derived CO_2 (Bailey et al., 2011; Caronna, 2004). From this, the SWG was able to identify potential misalignments while design features were being evaluated and before the specifics of the policy had solidified (Caronna, 2004). This offered opportunities to discard certain design features early in the process, such as a tighter cap, in addition to revealing new features not initially considered, such as an energy efficiency revenue recycler.

The SWG and stakeholders successfully used the economic models to experiment with different design features because their development and use were both inclusive and transparent. Models as a whole and economic models in particular do not automatically produce objective results. They rest upon a number of assumptions, and the choice of assumptions introduces subjectivity into the results they generate. This subjectivity offers opportunities to frame the models and their results as incorrect or unrepresentative of reality. If this view was widely held the models would not be considered appropriate tools for policy design. Within the context of RGGI's intentionally open design process, the SWG got stakeholders to accept the veracity of the models and their results by allowing them to join the modeling team that was hired, criticize the inclusion of certain assumptions, and suggest that additional ones be added.

The SWG ensured the models accurately reflected the world the stakeholders inhabited by allowing them to participate in the modeling process and to help set the underlying assumptions. More specifically, different categories of stakeholders helped to define the assumptions of the models and included the output parameters they were most concerned with. Due to this, the SWG was able to establish an initial alignment between the models' settings and stakeholders' pre-existing cultural controls before building in any of the more contentious policy features (Caronna, 2004). This allowed stakeholders to accept the models as appropriate tools for evaluating different policy designs. Beyond improving the realism of the models, soliciting a variety of stakeholder contributions also lent the results a certain legitimacy. If the SWG had treated the models as an unmodifiable black box, the results could have been contested as incorrect or unrealistic by any category of stakeholder. However, the SWG insulated themselves and the models from these arguments by incorporating a diverse array of stakeholder participation from the beginning. This approach enabled the results of the models to be treated as close to fact, and the SWG used them to convincingly portray the potential effects of various policy designs to different categories of stakeholders (Bailey et al., 2011; Fligstein, 1997).

The SWG used the stakeholder-designed and-vetted economic models to assuage different categories of stakeholders' concerns about the impacts of the policy. Doing so reduced the misalignment that generators and consumers could perceive between their pre-existing cultural controls and those encapsulated in RGGI (Caronna, 2004; Lindblom, 1977). The SWG used the models to alleviate generators' concerns about how different policy structures would affect CO_2 allowance prices. When the model included the proposed cap sizes it indicated the resulting allowance prices would be low. This outcome reduced the misalignment that generators could perceive (Caronna, 2004). When allowance prices are low generators would be able to continue using and earning profits from their existing, CO_2-emitting facilities. Additionally, after larger amounts of energy efficiency spending were built into the model, the results indicated the allowance prices would be even lower and there would be systemic improvements in reliability and congestion. Generators contributed to the development of the models so the results were sufficiently credible to align their pre-existing interpretations and utilizations of CO_2-emitting technologies with RGGI's treatment of them (Caronna, 2004; Lindblom, 1977).

The SWG used the same modeling results to assuage consumers' and public interest and legal organizations' concerns about how RGGI would affect electricity prices, system reliability, and the economic health of the region. The results of the models indicated the proposed cap sizes would minimally impact the region's electricity prices, system reliability, or economic health. Furthermore, when the SWG increased the energy efficiency funding included in the models the results predicted a net positive impact due to stabilized electrical prices, improved system reliability, and more robust economic growth in the region. The results reduced the misalignment that consumers, public interest, and legal stakeholders could perceive between their pre-existing interpretations of CO_2-emitting technologies and those embedded in the policy (Caronna, 2004; Lindblom, 1977). When the proposed cap sizes were combined with larger amounts of energy efficiency funding the resulting low allowances prices would not impede generators' ability to use existing fossil fuel facilities to reliably and cost effectively meet the region's demand. Consumers would be able to continue using electricity to produce the services they desired, and they would not have to pay more to do so. Consumers, public interest, and legal organizations participated in the development of the models, so the results were legitimate enough to align their pre-existing interpretations and uses of CO_2-emitting technologies with those of RGGI (Caronna, 2004; Lindblom, 1977).

In some ways, the misalignment that could be perceived by environmental stakeholders was both the easiest and hardest to resolve and was not significantly influenced by the models. Environmental organizations approached this process with the goal of regulating CO_2 emissions for the first time. If the SWG proposed a policy that limited the misalignment that generators and consumers could perceive, then environmental organizations would achieve their goal(Caronna, 2004). However, the SWG's best option for reducing the misalignment that generators and consumers could perceive was to design RGGI with a weak cap that did not produce high allowance prices. The inclusion of a weak cap caused environmental organizations to perceive misalignment between the policy's treatment of CO_2 and the atmosphere and their pre-existing interpretations of them (Caronna, 2004; Lindblom, 1977). They did not believe that RGGI's cap size would significantly reduce the region's emissions. Despite environmental organizations' vocal but not strident opinion about the emission cap, they were willing to accept or ignore this misalignment. Environmental organizations appeared willing to accept the misalignment that resulted from using a weak cap because it reduced the misalignment that generators and consumers could perceive, which allowed them to support RGGI (Caronna, 2004). Environmental organizations were still able to support the enactment of RGGI despite the misalignment they perceived because the misalignment was directional instead of contextual. More specifically, environmental organizations' pre-existing interpretation of the atmosphere as a finite sink for CO_2 was aligned with RGGI's treatment of it, but they diverged around how much CO_2 the atmosphere could safely accept (Caronna, 2004; Lindblom, 1977). By using a weak emissions cap, the SWG exploited environmental organizations' tolerance for directional misalignment to increase the alignment that generators and consumers perceived (Caronna, 2004; Fligstein, 1997). This enabled all three categories of critical stakeholders to support the enactment of RGGI.

The structure and processes the SWG used to design RGGI revealed how different categories of stakeholders interpreted and used the materials and actions underlying the emission of electricity-derived CO_2 (Scott, 2001). Due to this, the SWG was able to propose a policy that aligned with the pre-existing cultural controls generators, consumers, and environmental organizations held (Caronna, 2004; Fligstein, 1997). The alignment these critical stakeholders perceived between their pre-existing cultural controls and those associated with RGGI enabled them to support the policy, which then facilitated its enactment (Caronna, 2004; Pfeffer & Salancik, 2003).

Question 2: Did Policymakers Utilize Innovative Cap and Trade Features to Help Enact RGGI?

Over the past thirty years, cap and trade policies have been used to control a variety of environmental activities, and most existing and proposed policies to control CO_2 emissions employ them (Freeman & Kolstad, 2007). In practice, a variety of cap and trade designs have been deployed to control different environmental activities at different scales and with different degrees of stringency (Tietenberg, 2007). Despite their pervasiveness, it is still difficult for policymakers to enact cap and trade policies to control CO_2 emissions, but certain design features may facilitate their efforts (Cohen & Miller, 2012). Reviewing the initial hypothesis associated with this question, the SWG attracted support for RGGI by limiting the economic and operational costs of compliance and their subsequent effects on the price of electricity, and by using the auction revenues to create new resources. The design features that produced these effects included: pre-existing monitoring and compliance requirements; a weak cap; an allowance auction; an allowance price collar; and a revenue recycler that supported energy efficiency. The collective inclusion of these design features limited the economically-based misalignment that different categories of stakeholders could perceive between their pre-existing cultural controls and those underlying RGGI (Blanchard, 2008; Caronna, 2004; Lindblom, 1977; Scott, 2001). In order to evaluate this hypothesis, the analysis identifies the innovative cap and trade features RGGI included and how they reduced the misalignment that generators, consumers, environmental, energy efficiency, public interest, and legal organizations could perceive (Caronna, 2004).

RGGI's weak cap was innovative because it was intentionally put into place to facilitate enactment. The previous analytical section presented how RGGI was intentionally designed to minimize its economic impacts. The initial weakness of the cap was both a critical and known component in mitigating perceived economic impacts. Furthermore, over the course of the design meetings, environmental organizations repeatedly commented about the weakness of the cap, and that current emission levels were already below it. Yet the initially proposed and weak emissions cap remained in place.

While a weak cap's ability to significantly reduce CO_2 emissions is rightly questioned, it did represent an effective tool for reducing the misalignment that generators and consumers could perceive between their pre-existing cultural controls and those embedded in a new policy (Caronna, 2004; Lindblom, 1977). The benefit of a weak cap was especially apparent when the SWG attempted to enact a new policy to control CO_2 emissions for the first time. The misalignment that economically rational generators and consumer could perceive when a new formal policy was proposed to control CO_2 emissions would be mitigated by making compliance inexpensive, and by limiting the policy's effects on the price of producing and purchasing electricity (Blanchard, 2008; Caronna, 2004; Scott, 2001). Furthermore, any additional misalignment that emerged from using a weak cap instead of a stronger one would likely only be perceived by environmental organizations(Caronna, 2004). As described in the previous analytical section, the lack of existing CO_2 policies motivated environmental organizations to overlook this misalignment if doing so resulted in an enactable policy.

Along with making compliance inexpensive, policy designs that made compliance easy also reduced the misalignment that generators could perceive between their pre-existing cultural controls and those of the policy (Caronna, 2004). Expanding compliance periods and designing the monitoring and reporting requirements so they could be met with pre-existing or established equipment and procedures made compliance both easier and less expensive for generators. In designing RGGI, the SWG asked generators about the types of equipment and procedures they were using to manage other emissions. The SWG then selected CO_2 monitoring and compliance strategies that piggybacked on top of these. By giving generators ample time to utilize their pre-existing skills and equipment to manage their CO_2 emissions, the SWG reduced the misalignment they could perceive between their pre-existing interpretations and uses of CO_2 and RGGI's treatment of it (Caronna, 2004; Fligstein, 1997; Lindblom, 1977).

Putting aside the intentionally weakened cap and use of established monitoring requirements, the most innovative features of RGGI revolved around its distribution strategy. RGGI pioneered a number of innovative cap and trade features by using a nearly-full auction to distribute allowances whose prices were bound by a reserve price and various safety triggers and whose revenues were then recycled. On their own, these features did not lead to the enactment of RGGI. However, when combined with the aforementioned weak cap, their collective effects did significantly reduce the misalignment that critical stakeholders could perceive, which then facilitated the enactment of RGGI (Caronna, 2004; Pfeffer & Salancik, 2003).

Prior to RGGI, auctioning most of the allowances associated with a cap and trade policy had been political anathema. During the RGGI design process, generators expressed concern about purchasing most of their allowances through an auction. They thought it would make it much more expensive to produce electricity, which would then increase the price for consumers. However, alternative distribution strategies that minimized the economic costs imposed on generators, such as giving allowances away for free, enabled CO_2 emitters to reap windfall profits from the policy. Consumers, public interest, legal, and environmental organizations perceived significant misalignment between their pre-existing interpretations of CO_2 and policy designs that allowed generators to profit from emitting CO_2 (Caronna, 2004). Non-generating stakeholders interpreted CO_2 emissions as a benign, naturally-occurring material or as a pollutant needing regulation. Neither of these pre-existing cultural controls involved treating CO_2 as a material that generators should be rewarded for emitting. If allowances were given to generators then RGGI would inherently position CO_2 emissions as a new revenue stream for them.

Each of these distribution strategies caused a critical category of stakeholder to perceive misalignment between their pre-existing cultural controls and those encapsulated in these particular policy designs (Caronna, 2004; Lindblom, 1977). In fact, during the RGGI design meetings it was initially difficult to find a policy design that could fairly balance the economic costs imposed upon generators and consumers. However, because the SWG had a good understanding of the pre-existing cultural controls held by different categories of stakeholders, they could re-position the allocation of allowances in a way that satisfied generators and consumers (Fligstein, 1997). Specifically, the SWG was able to address the concerns of both generators and consumers by combining a weak cap with a nearly full allowance auction. When the proposed cap sizes were built into the model, they demonstrated that auctioning the allowances associated with a weak cap resulted in low allowance prices. These findings reduced the misalignment that generators could perceive between their pre-existing interpretations and uses of CO_2-emitting equipment and RGGI's treatment of them (Caronna, 2004; Lindblom, 1977). When allowance prices were low, generators could continue using and earning profits from the operation of their CO_2-emitting technologies. The combination of a weak cap and a nearly-full auction also reduced the misalignment that consumers, public interest, and legal organizations could perceive (Caronna, 2004). The resulting low allowance price allowed generators to continue using their CO_2-emitting technologies to ensure a reliable and cost effective supply of electricity, but prevented them from directly profiting from their CO_2 emissions. Lastly, the use of an auction did not prompt environmental organizations to perceive any misalignment between their pre-existing cultural controls and those underlying RGGI, because the auction both priced and controlled CO_2 emissions (Caronna, 2004).

When the SWG supplemented RGGI's allowance auction with a price collar it further reduced misalignment. In particular, a reserve price was an especially critical feature when combining an auction with a weak cap. Without it, the oversupply of allowances would quickly depress the price to zero. Having a nearly zero auction price for allowances equated to giving them away for free. Environmental stakeholders who believed that CO_2 emissions need to be priced at some level, and non-generating stakeholders who did not view CO_2 emissions as a new revenue stream for generators, would perceive misalignment with a policy design that gave allowances away for free (Caronna, 2004).

The SWG also included a number of safety triggers that allowed generators to use increasing amounts of offsets if the auction price exceeded certain thresholds. Offsets enabled emission reduction requirements to be achieved outside the auction system, at a potentially lower cost. The use of offsets also indirectly expanded the supply of allowances and pushed down their price. Due to these considerations, the offset safety triggers effectively functioned as a price ceiling. For generators concerned about the price they would have to pay to emit CO_2 and for consumers, public interest, and legal organizations who wanted to avoid electrical price spikes and reliability concerns, safety triggers reduced misalignment (Blanchard, 2008; Caronna, 2004). The safety triggers capped the amount that generators would have to pay to operate their CO_2-emitting technologies, which then guaranteed readily available and reasonably priced electricity supplies for consumers. Different categories of stakeholders supported opposing sides of the price collar. Including one side and not the other would have caused some stakeholders to perceive misalignment between their pre-existing cultural controls and those associated with RGGI (Caronna, 2004). However, by including both sides of the price collar in the policy, the SWG was able to reduce misalignment altogether (Caronna, 2004). For generators and consumers concerned about operating costs, electricity prices, and reliability concerns, reasonably set reserve prices represented a fair trade for safety triggers. On the other hand, environmental organizations and energy efficiency organizations concerned about an oversupply of allowances or the amount of revenue for recycling were willing to trade moderate safety triggers for a reserve price.

The SWG was further able to address the concerns of all categories of stakeholders without alienating any individual category by combining a price restricted auction with a revenue recycling mechanism that incentivized energy efficiency. A large portion of RGGI's potential auction revenues were initially earmarked for energy efficiency. When energy efficiency organizations built a corresponding increase in energy efficiency spending into the models, the results demonstrated that benefits would accrue to all categories of stakeholders. The predicted benefits further reduced the misalignment that all categories of stakeholders could perceive between their pre-existing cultural controls and those underpinning RGGI (Caronna, 2004).

For generators, the benefits of recycling auction revenues to energy efficiency were twofold. First, in suppressing the demand for electricity, energy efficiency would reduce the amount of CO_2 emitted in the region, which would then suppress the demand for and the price of CO_2 allowances. Like those associated with a weak cap and safely triggers, the lower allowance price that would be induced by energy efficiency spending reduced the economically-based misalignment that generators could perceive (Blanchard, 2008; Caronna, 2004; Scott, 2001). They could continue using and earning profits from the operation of their CO_2-emitting technologies. Second, if existing electrical supplies were used more efficiently, generators and utilities would not have to spend time and money constructing new generation, transmission, and distribution capacity. Once RGGI explicitly supported a more efficient and cost effective use of the existing electrical system, its cultural controls became more aligned with how generators and utilities interpreted and utilized their own systems (Blanchard, 2008; Caronna, 2004; Lindblom, 1977; Scott, 2001).

Consumers, energy efficiency, public interest, and legal organizations were also attracted to the reliability and economic benefits of energy efficiency. Higher electricity prices and supply disruptions that led to brown-or blackouts would be minimized by suppressing demand. Suppressing demand for electricity would also reduce the need to expand transmission and distribution capacity, which would further limit rate hikes and legal and permitting issues. Jobs would also be created and economic health improved by increasing the efficient use of existing electrical supplies. By recycling RGGI's revenues to energy efficiency, the SWG was able to exploit its many benefits to reduce the misalignment all categories of stakeholders could perceive without increasing the misalignment that any individual category could perceive (Caronna, 2004).

The concerns energy efficiency organizations held were the easiest to address. Hardwiring complementary policies that targeted energy efficiency into RGGI was enough to reduce the misalignment they could perceive (Caronna, 2004). Increasing the use of energy efficiency also ensured that existing generation, transmission, and distribution technologies would more reliably and cost-effectively meet the region's electrical demand. This benefit reduced the misalignment that consumers, public interest, and legal organizations could perceive between their pre-existing cultural controls and those underlying RGGI (Caronna, 2004; Lindblom, 1977). Lastly, increasing energy efficiency spending would create jobs and spur further economic growth, which reduced the economically-based misalignment that all categories of stakeholders could perceive (Blanchard, 2008; Caronna, 2004; Scott, 2001). Recycling auction revenues towards energy efficiency ensured that controlling CO_2 emissions and the operation of CO_2-

emitting technologies would not eliminate jobs or put the region at a competitive disadvantage.

To ensure that RGGI would be enacted the SWG had to design a policy that generators, consumers, and environmental organizations could all support. To attract their support the SWG had to design a policy aligned with their pre-existing cultural controls (Caronna, 2004). This task was complicated by the diversity of pre-existing cultural controls these categories of stakeholders held. This initially made it difficult to identify policy formulations that limited the misalignment that generators and consumers could both perceive (Caronna, 2004). However, by building certain design features into RGGI the SWG was able to align the cultural controls underpinning the policy with the pre-existing ones held by all categories of stakeholders without prompting any individual category to perceive significant misalignment (Caronna, 2004; Fligstein, 1997; Lindblom, 1977). Specifically, by combining a weak cap, an allowance auction, a price collar, and a revenue recycler the SWG was able to design RGGI so that all categories of stakeholders could support its enactment. Individually, many of these design features caused individual groups of stakeholders to perceive misalignment, but by combining them the SWG reduced the misalignment that all categories of stakeholders could perceive between their pre-existing cultural controls and those associated with RGGI (Caronna, 2004; Fligstein, 1997; Lindblom, 1977). This resulted in a policy design that was acceptable to generators, consumers, environmental, public interest, and legal organizations and their collective support enabled RGGI to be enacted.

Chart 1 : Categories of Stakeholders

Categories of Stakeholders

Stakeholder Category	Connection to RGGI	Influence on Enactment
Generators	• Source of CO_2 emissions • Owners/operators of CO_2-emitting equipment • RGGI changes the price of producing electricity	• Directly regulated by RGGI • Widespread support critical
Consumers	• Use the electricity produced by CO_2-emitting equipment • RGGI affects the price of consuming electricity	• Directly affected by RGGI • Widespread support critical
Public Interest & Legal Organizations	• Want to protect consumers and the economic competitiveness of the region • Want to limit higher electricity prices • Want to limit electricity disruptions	• Represent the interests of those directly affected by RGGI • General support critical
Environmental Organizations	• Most desiring of CO_2 policy • Want to begin controlling CO_2 emissions	• Most desiring of CO_2 policy • General support critical
Energy Efficiency Organizations	• Want to use energy efficiency to reduce CO_2 • Want to use RGGI revenues for energy efficiency	• Most desiring of complementary energy efficiency component • Support is beneficial, but not critical
Utilities	• Primary connection between generators and consumers • Convey electricity prices to consumers	• Indirectly influenced by RGGI • Support is beneficial, but not critical

Chart 2 : Stakeholder Working Group Meeting Timeline

Stakeholder Working Group Meeting Timeline

Meeting	Date	Topics Discussed	Empirical Outcomes	Theoretical Outcomes
1	4/2/2004	• Policy goals • Use of models	• RGGI should reduce CO2, minimize costs, and spur more policies • Models influence policy design • Stakeholders help design the models	• Pre-existing cultural controls (PECCs) identified • Models used to demonstrate mis/alignment • Models designed to reflect PECCs of stakeholders
2	5/20/2004	• Cap Size • Flexibility mechanisms • Assumptions of micro model	• Cap should minimize costs, connect with other policies, and maintain reliability • Stakeholders want flexibility mechanisms • Build energy efficiency into the model	• Pre-existing cultural controls (PECCs) identified • Alignment between stakeholders' PECCs and policy feature evaluated • Models designed to reflect PECCs of stakeholders
3	6/24/2004	• Allowance allocation • Use of energy efficiency • Assumptions of micro model	• Allocation has to address the concerns of consumers and generators • Policy should include energy efficiency component • Build energy efficiency into the model	• Alignment between generators' and consumers' PECCs and policy feature evaluated • Alignment between energy efficiency organizations' PECCs and policy feature evaluated • Models designed to reflect PECCs of stakeholders
4	9/13/2004	• Assumptions of models • Compliance & enforcement • Flexibility mechanisms	• Stakeholders more involved with the models • Use existing compliance requirements and equipment • Include features that lower costs, but identify how they affect different stakeholders and CO2 emissions	• Models designed to reflect PECCs of stakeholders • Alignment between generators' PECCs and policy feature evaluated • Alignment between stakeholders' PECCs and policy feature evaluated
5	11/12/2004	• First run of micro model • Assumptions of macro model • Cap size • Stakeholder opinions	• Cost minimization model, but build in more energy efficiency features • Build energy efficiency into the model • Set cap to minimize costs, maintain reliability, and spur more policies • Generators want to minimize compliance costs • Consumers want to minimize electricity price hikes • Environmental organizations want tighter caps	• Models used to demonstrate mis/alignment • Models designed to reflect PECCs of stakeholders • Pre-existing cultural controls (PECCs) identified • Alignment between generators' PECCs and policy feature evaluated • Alignment between consumers' PECCs and policy feature evaluated • Alignment between environmental organizations' PECCs and policy feature evaluated
6	2/16/2005	• Micro model runs • Use of energy efficiency	• Weak caps produce low allowance prices and slightly higher electricity prices • Environmental organizations want stronger caps modeled • Strategies for building energy efficiency into RGGI discussed	• Models used to demonstrate mis/alignment • Models designed to reflect PECCs of stakeholders • Alignment between stakeholders' PECCs and policy feature evaluated
7	4/6/2005	• Micro model runs • Use of energy efficiency • Stakeholder opinions about allowance allocation	• Stronger caps increase the costs of the policy • Stakeholders want more runs and a better treatment of energy efficiency • Strategies for building energy efficiency into RGGI, and how to fund it • Allocation has to balance the economic concerns of generators and consumers • Generators can't get free allowances • Allocation should minimize electricity price hikes • Auctions will be expensive	• Models used to demonstrate mis/alignment • Models designed to reflect PECCs of stakeholders • Alignment between stakeholders' PECCs and policy feature evaluated • Alignment between generators' and consumers' PECCs and policy feature evaluated • Alignment between non-generating stakeholders' PECCs and policy feature evaluated • Alignment between consumers' PECCs and policy feature evaluated • Alignment between generators' and consumers' PECCs and policy feature evaluated

Chart 2 Cont. : Stakeholder Working Group Meeting Timeline

Stakeholder Working Group Meeting Timeline

Meeting	Date	Topics Discussed	Empirical Outcomes	Theoretical Outcomes
8	5/19/2005	• Initial policy features	• Cap size has to please multiple stakeholders	• Alignment between stakeholders' PECCs and policy feature evaluated
			• Cap is based on historical emissions and is weak	• Selection of sufficiently aligned design feature
		• Use of energy efficiency	• Energy efficiency will be built into RGGI if possible/allowable	• Selection of sufficiently aligned design feature
		• Micro and macro model runs	• Weaker caps have smaller macro-economic effects	• Models used to demonstrate mis/alignment
			• Improve treatment of energy efficiency further	• Models designed to reflect PECCs of stakeholders
		• Stakeholder opinions about design options	• Consumers want to minimize electricity price hikes	• Alignment between consumers' PECCs and policy feature evaluated
			• Generators want to minimize compliance costs	• Alignment between generators' PECCs and policy feature evaluated
			• Environmental organizations want tighter caps	• Alignment between environmental organizations' PECCs and policy feature evaluated
			• All stakeholders want to include energy efficiency in RGGI	• Alignment between stakeholders' PECCs and policy feature evaluated
9	9/21/2005	• Update from state agency heads	• The cap is going to be weak and it will make allowance prices low	• Selection of sufficiently aligned design feature
			• Some allowances are going to be given to the public	• Selection of sufficiently aligned design feature
		• Micro and macro model runs	• Energy efficiency has positive impact, build funding sources into the models	• Models used to demonstrate mis/alignment
		• Stakeholder opinions about design options	• All stakeholders satisfied with initial policy and design process	• Alignment between stakeholders' PECCs and policy feature evaluated
			• Environmental organizations want tighter cap	• Alignment between environmental organizations' PECCs and policy feature evaluated
			• Consumers want to minimize electricity price hikes	• Alignment between consumers' PECCs and policy feature evaluated
			• Generators want a policy that minimizes compliance costs	• Alignment between generators' PECCs and policy feature evaluated
			• Generators can't get free allowances	• Alignment between non-generating stakeholders' PECCs and policy feature evaluated
			• Give allowances to the public	• Alignment between consumers' and public interest organizations' PECCs and policy feature evaluated
			• Use allowances to support energy efficiency	• Alignment between stakeholders' PECCs and policy feature evaluated
10	5/2/2006	• Stakeholder opinions about Model Rule	• Generators want free allowances, and a weak and easy policy	• Alignment between generators' PECCs and policy feature evaluated
			• Environmental organizations want tighter caps	• Alignment between environmental organizations' PECCs and policy feature evaluated
			• Consumers are worried about electricity prices	• Alignment between consumers' PECCs and policy feature evaluated
			• More allowances should be given to the public	• Alignment between consumers' and public interest organizations' PECCs and policy feature evaluated
			• Use auction revenues to fund energy efficiency	• Alignment between stakeholders' PECCs and policy feature evaluated
11	5/31/2007	• Implementation	• Auctions need to be competitive to minimize prices	• Alignment between stakeholders' PECCs and policy feature evaluated
		• Auction design	• A reserve price should be used	• Selection of sufficiently aligned design feature
12	11/7/2007	• Auction design	• The auction will include a reserve price and safety triggers	• Selection of sufficiently aligned design feature
Model Rule & MOU	9/25/2008	• Model Rule & MOU	• A historical and weak cap is used to limit allowance prices	• Selection of sufficiently aligned design feature
			• The auction includes a price collar: reserve price and safety triggers	• Selection of sufficiently aligned design feature
			• RGGI uses pre-existing compliance requirements and equipment	• Selection of sufficiently aligned design feature
			• Auction revenues are recycled to support energy efficiency	• Selection of sufficiently aligned design feature

Chapter 5: The Effects of RGGI

Introduction

After nearly four years in existence and eighteen allowance auctions, RGGI is the longest running, mandatory CO_2-controlling policy in the United States (Regional Greenhouse Gas Initiative, 2012a, 2012b). Due to RGGI's presence, regulated and non-regulated organizations in New England and Mid-Atlantic states have been the first, and until AB 32's recent enactment, the only organizations in the U.S. to be directly affected by a mandatory CO_2 policy that creates new resources for energy efficiency (California Environmental Protection Agency: Air Resources Board, 2012a). This chapter explores the effects RGGI is having on these individuals and organizations. The following analysis is directed by the two effects research questions. Specifically, it focuses on whether RGGI is changing how individuals and organizations interpret and use CO_2, the operation of CO_2-emitting equipment, electricity, and energy efficiency technologies and practices. The analysis is then extended to identify whether these changes are affecting the development of additional CO_2 policies or innovation in or the diffusion of energy efficiency technologies and practices.

The chapter proceeds as follows. First, the operations of RGGI to date and the ways that different individuals and organizations can be affected by the policy are described and used to preview the hypotheses to be tested. Then the methodologies used to collect the data are discussed. Next, data about RGGI's effects on the electrical industry are presented and analyzed. Beyond its cap and trade component, RGGI's most influential design feature is its revenue recycler. As the majority of RGGI's auction revenues are being recycled to support energy efficiency, this chapter analyzes the effects that are being induced by this new funding source along with those that are being brought about by the cap and trade component of the policy. Data about RGGI's CO_2 allowances are presented and analyzed first. They are followed by a second section that presents data and analysis about RGGI's energy efficiency revenue recycler.

The CO_2 allowance and energy efficiency data are based on regulated and non-regulated organizations' interpretations and opinions about RGGI, CO_2 emissions, CO_2-emitting technologies, electricity, and energy efficiency. Presented data were also collected from popular and industry publications that describe the relationship between CO_2 emissions and the electrical system and that discuss the development and use of energy efficiency technologies and practices. Lastly, data from the 2012-13 RGGI review meetings are also included in this chapter. In the CO_2 allowance section, multiple data sources are aggregated together to analyze whether RGGI is shifting individual and organizational interpretations of CO_2 and the operation of CO_2-emitting technologies. In the energy efficiency section, the data sources are combined to evaluate whether RGGI is shifting individual and organizational interpretations of electricity consumption and energy efficiency technologies and practices. The chapter concludes with a short analytical section that combines the insights that emerged from each of the two lines of inquiry.

RGGI's Current Operations, Affected Organizations, and Effects Hypotheses

As introduced in the background chapter, RGGI's initial cap size was based on the region's historical emissions and was set at 188 million short tons of CO_2 (Regional Greenhouse Gas Initiative, 2009). However, in the year before RGGI became operational regulated organizations in the region only emitted 153 million short tons of CO_2 (Regional Greenhouse Gas Initiative, 2009). Due to the difference between the two emission levels, there was and continues to be an oversupply of emissions allowances. Furthermore, during RGGI's first years of operations two external events reduced the amount of CO_2 emitted in the region, which made the oversupply of allowances even larger. The first event was the economic recession that began in the mid to late 2000s (Stavins, 2012). The recession suppressed the demand for electricity in the region, and prompted generators to restrict the operation of their CO_2-emitting equipment, which led to lower CO_2 emissions (Stavins, 2012). The second event revolved around the emergence of increasingly inexpensive natural gas supplies (Stavins, 2012). Newly applied hydraulic fracturing extraction technologies opened up non-conventional reserves of natural gas and the expanded supply caused prices to fall (Stavins, 2012). When situated alongside the newly enacted allowance price for CO_2, the emergence of increasingly inexpensive natural gas supplies prompted many generators to accelerate the replacement of older coal- and oil-fired facilities that were nearing the end of their operational lives with new natural gas-fired facilities (Stavins, 2012). The combustion of natural gas releases about half as much CO_2 as the combustion of coal and about a third as much as the combustion of oil so the transition from oil- and coal-fired facilities to natural gas-fired facilities reduced the amount of CO_2 emitted in the region (U.S. Environmental Protection Agency, 2007).

RGGI's initial cap size and the CO_2 reductions that were brought about by these external events resulted in an oversupply of emission allowances. As of the end of 2012, this oversupply has pushed the current period allowance price to the reserve price for the last eight, out of a total of sixteen, RGGI auctions (Regional Greenhouse Gas Initiative, 2012d). However, even with this oversupply, the presence of a reserve price has enabled RGGI auctions to raise over 1 billion dollars to date (Regional Greenhouse Gas Initiative, 2012d). Of these billion dollars, approximately 500 million have been allocated to support energy efficiency (Regional Greenhouse Gas Initiative, 2011b). Given RGGI's design, its effects upon individuals and organizations in the region primarily stem from the CO_2 allowances it creates and prices, and from the resources it creates and distributes to support energy efficiency. The effects that are being induced by RGGI's CO_2 allowances are evaluated through the first hypothesis to be tested, while those associated with the energy efficiency revenue recycler are evaluated through the second.

The Effects of RGGI's CO_2 Allowances

Generators who operate qualified CO_2-emitting electrical facilities in the RGGI states have to purchase an emission allowance for every ton of CO_2 they want to emit. This means that RGGI's emission allowances are having the greatest effect on generating organizations. However, other individuals and organizations in and outside the region are also being affected to lesser degrees by RGGI's emission allowances. These include the consumers that purchase electricity, because the price they pay now includes the price of the CO_2 allowances. They also include policymakers inside the region that are working to extend or strengthen RGGI, and policymakers outside the region that are working on CO_2 policies for other geographic or industrial sources. Different policymakers are observing and evaluating the effects the price and availability of allowances are having on generators and electricity supplies because RGGI represents the first mandatory CO_2 policy that utilizes a nearly-full allowance auction. Within the region, these evaluations and observations are informing policymakers' efforts to strengthen and to extend RGGI. Policymakers outside the region are also using them to ascertain the viability of including allowance auctions in other geographically or industrially distinct CO_2 policies.

Historically, generators and consumers had primarily interpreted CO_2 as a benign, naturally occurring material and the operation of CO_2-emitting technologies as a clean, safe, and desirable activity (Hirsh, 2002; Hulme, 2009; Schnaiberg, 1980). Under these meanings, generators could freely emit as much CO_2 as they wanted and their use of CO_2-emitting equipment was not constrained by the amount of CO_2 they released. However, by enacting RGGI, policymakers are trying to highlight alternative meanings and uses for CO_2 and the operation of CO_2-emitting technologies (Fligstein, 1997). More specifically, policymakers deployed RGGI to get individuals and organizations to interpret and use CO_2 as a dangerous material that needs to be controlled and the operation of CO_2-emitting equipment as a less clean, safe, and desirable activity that needs to be controlled (Fligstein, 1997). The difference between the two sets of meanings is significant because it directly impacts how generators use their equipment to produce the electricity that consumers demand.

As a market-based policy, RGGI affects how generators use their CO_2-emitting equipment to produce electricity because they now have to purchase an allowance for every ton they emit (Lindblom, 2001). In other words, using the meanings for CO_2 and the operation of CO_2-emitting technologies that RGGI encapsulates creates new costs for generators that affect their ability to use their equipment to meet the demand for electricity. Generators have been defined as economically rational. In the context of this research, this means generators primarily interpret and use the physical materials and behavioral actions associated with electricity-derived CO_2 emissions according to their effects on their costs and revenues (Blanchard, 2008; Scott, 2001). Accordingly, generators are inclined to interpret CO_2 emission allowances, and the alternative meanings for CO_2 and the operation of CO_2-emitting equipment that underlie them, as new costs that decrease the revenues they can earn from producing electricity (Blanchard, 2008; Scott, 2001). Furthermore, as economically rational organizations, generators are motivated to reduce the costs they have to pay to produce electricity in order to maximize the revenues they can earn (Blanchard, 2008). In fact, the formal effects of the RGGI policy hinge on this response, as its ability to reduce CO_2 emissions is based on generators' rational reaction to new allowance prices (Blanchard, 2008; Lindblom, 2001). The higher the allowance price the greater the motivation to reduce CO_2 emissions (Stavins & Whitehead, 1992).

However, because generators primarily interpret physical materials and behavioral actions through their effects on their costs and revenues, they can view new meanings whose use increases the cost of producing electricity as illegitimate or invalid (Blanchard, 2008; Scott, 2001). Under this perspective, higher priced CO_2 allowances and more costly CO_2 compliance requirements make it more expensive for generators to use the meanings for CO_2 and the operation of CO_2-emitting technologies underlying the policy. The higher the cost of using these meanings the more likely generators would contest their use by contesting the existence of RGGI (Bourdieu & Wacquant, 1992). In reality, RGGI's low allowance prices and easy compliance requirements make it inexpensive for generators to use the new meanings encapsulated within the policy. Generator's interpretations are primarily influenced by the costs and revenues associated with using different meanings, so they would be more accepting of these new meanings and the policy that is conveying them because the cost of using them is low (Blanchard, 2008; Lindblom, 1977; Scott, 2001). Similarly, RGGI's use of a revenue recycler allows generators to benefit from using the new meanings embedded in the policy, so they would be even more inclined to accept their use and to support the policy they underlie (Blanchard, 2008; Lindblom, 1977; Scott, 2001). It does not cost generators much to use the new meanings for CO_2 and the operation of CO_2-emitting equipment associated with RGGI so they would be more willing to accept them and to use them to describe and organize their operations (Blanchard, 2008; Scott, 2001).

Consumers of electricity have also been defined as economically rational. This means consumers primarily interpret the physical materials and behavioral actions underlying CO_2 emissions through their effects on the price and availability of the electricity they use to produce the services they desire (Blanchard, 2008; Scott, 2001). Based on these pre-existing cultural controls, consumers are inclined to view CO_2 allowances and the alternative meanings for CO_2 and the operation of CO_2-emitting technologies associated with them as new regulations that impact the price and availability of electrical supplies (Blanchard, 2008; Scott, 2001). If the use of these new meanings drastically increases the cost or restricts the availability of electricity then consumers would be more likely to contest their use by contesting the existence of RGGI (Blanchard, 2008; Bourdieu & Wacquant, 1992; Scott, 2001).

In practice, consumers would be willing to interpret CO_2 and the operation of CO_2-emitting equipment through the meanings encapsulated in RGGI because the low allowance price ensures that doing so does not affect the price or availability of electricity supplies (Blanchard, 2008; Scott, 2001). Similarly, RGGI's revenue recycler would also allow consumers to support the meanings underlying RGGI because its use is stabilizing the price and improving the availability of electrical supplies in addition to creating other consumer benefits (Blanchard, 2008; Scott, 2001). Consumers can benefit from using the meanings embedded in the RGGI policy so they would be more accepting of their use and supportive of the policy that is conveying them (Blanchard, 2008; Lindblom, 1977; Scott, 2001).

This research does not assume the policymakers observing RGGI and its effects on generators and consumers are motivated by economic rationality. Rather this research posits that if policymakers are monitoring RGGI they are involved with the extension of RGGI or the development of other existing or potential CO_2 policies. However, much like the initial enactment of RGGI, policymakers' ability to enact new or to strengthen existing CO_2 policies is predicated on generators' and consumers' support for them. If generators and consumers accept the new meanings for CO_2 and the operation of CO_2-emitting technologies, and by extension RGGI, they would be more willing to support stronger or additional CO_2 policies (Caronna, 2004). This chapter tests the hypothesis that RGGI's low compliance costs and newly created resources are inducing generators and consumers to accept the new meanings embedded in the policy and the policy itself (Blanchard, 2008; Lindblom, 1977; Scott, 2001). It then extends this analysis to evaluate whether generators' and consumers' support for a CO_2 cap and trade policy with a nearly-full auction is affecting the extension of RGGI and the development of additional CO_2 policies.

The Effects of RGGI's Energy Efficiency Revenue Recycler

By creating new funds that are being allocated to support energy efficiency, RGGI's revenue recycler is affecting electrical companies, consumers, electricity regulators or PUCs, and energy efficiency organizations. With regard to electrical companies, utilities deliver the electricity consumers use and are the main source of information about electricity consumption (Casazza & Delea, 2009). They are also the primary propagator of energy efficiency information, programs, technologies, and rebates (York et al., 2012). Due to their involvement with the diffusion of energy efficiency technologies and practices, utilities are being affected by the creation of new energy efficiency resources. Consumers utilize the electricity utilities provide and they adopt and use energy efficiency technologies and practices, which means they are also being affected by new energy efficiency resources. Electricity regulators or PUCs implement energy efficiency requirements and incentives and determine the costs and revenues that utilities incur or receive from the deployment of energy efficiency initiatives (Casazza & Delea, 2009; York et al., 2012). PUCs' role in determining the use and economic viability of energy efficiency technologies and practices means they are also being affected by new energy efficiency resources.

Despite their obvious connection to new energy efficiency resources, energy efficiency organizations are only indirectly being affected by them. Energy efficiency organizations are not being directly affected by RGGI's new energy efficiency resources for a number of reasons. First, unlike utilities, consumers, and PUCs, energy efficiency organizations are not tied to a particular geographic location (Casazza & Delea, 2009). This means they can choose whether they operate in RGGI states, and thus whether and how they are affected by these new resources. Second, by definition energy efficiency organizations already appreciate the benefits energy efficiency technologies and practices can provide and unlike many generators and consumers are already motivated to increase the use of them (Hayes et al., 2011; Jaffe & Stavins, 1994a; Kushler et al., 2006; Zhao et al., 2012). This limits the degree that new energy efficiency resources could change how these organizations are interpreting and using these technologies and practices. Third, energy efficiency organizations are not directly regulated by PUCs (Casazza & Delea, 2009; York et al., 2012). This means that energy efficiency standards are not applied to them and their revenues are not determined in rate cases. Instead, utilities typically hire energy efficiency organizations to help their customers reduce their electricity consumption, which then enables the utility to achieve its efficiency requirements (York et al., 2012). The utility then pays the energy efficiency organization according to the savings it achieves. Due to the relationships between utilities, PUCs, consumers, and energy efficiency organizations, the effects that new energy efficiency resources are having upon energy efficiency organizations are first mediated by their effects on utilities, consumers, and PUCs. In other words, new energy efficiency resources are affecting utilities, consumers, and PUCs, and the subsequent shifts in how these individuals and organizations interpret and use energy efficiency initiatives are then affecting energy efficiency organizations. Energy efficiency organizations regularly communicate and interact with electrical companies, PUCs, and consumers, and this relational position enables them to directly observe how these individuals and organizations are interpreting the use of energy efficiency technologies and practices (York et al., 2012). This research draws upon the expertise of energy efficiency organizations to help identify the effects that new energy efficiency resources are having on utilities, consumers, and PUCs.

Historically, generators, consumers, and PUCs viewed the production of fossil fuel-based electricity as a socially beneficial activity that should be encouraged (Hirsh, 2002; Hughes, 1993; Schnaiberg, 1980). This led generators, consumers, and PUCs to interpret the consumption of fossil fuel-based electricity as a socially beneficial activity that should be encouraged as well (Hirsh, 2002; Hughes, 1993; Schnaiberg, 1980). Under these meanings, the best way to meet consumers' demand for electricity was by expanding the supply (Hirsh, 2002). However, by enacting RGGI and recycling its revenues to energy efficiency, policymakers are trying to emphasize alternative meanings and uses for electricity and energy efficiency technologies and practices (Fligstein, 1997).

More specifically, policymakers deployed RGGI to get individuals and organizations to interpret and use electricity as an energy source whose production and consumption should not be continuously increasing (Brint & Karabel, 1991). As part of this, policymakers are trying to shift how individuals and organizations interpret energy efficiency technologies and practices so demand can be met by reducing electricity consumption instead of just by expanding the supply (Brint & Karabel, 1991; Fligstein, 1997).

Electrical companies or utilities have been defined as economically rational, which means they interpret and use electricity and energy efficiency initiatives according to the profits they can earn from them (Blanchard, 2008; Scott, 2001). Traditionally, utilities could not earn profits from reducing electricity consumption (Hirsh, 2002; Kushler et al., 2006). This meant they interpreted energy efficiency initiatives that reduced electricity consumption as unprofitable expenditures, which made their use unappealing (Blanchard, 2008; Kushler et al., 2006; Scott, 2001). Furthermore, because utilities considered energy efficiency initiatives unprofitable and undesirable endeavors they were less likely to appreciate or value the other benefits they can provide, such as their ability to reduce CO_2 emissions or to limit the construction of new supply resources (Blanchard, 2008; Kushler et al., 2006; Scott, 2001). However, RGGI is creating new resources that are being used to make reducing electricity consumption through energy efficiency initiatives a profitable activity for utilities. Once utilities view reducing electricity consumption through energy efficiency as a profitable activity they would be more inclined to interpret the deployment and adoption of energy efficiency technologies and practices favorably (Blanchard, 2008; Hayes et al., 2011; Scott, 2001). This would then make the other benefits that energy efficiency technologies and practice can provide more valuable. As utilities come to appreciate the different benefits that energy efficiency technologies and practice can provide they would be more motivated to actually deploy them to reduce electricity consumption.

Electricity consumers have also been defined as economically rational, which means they interpret and use electricity and energy efficiency initiatives through the costs they have to pay to get the services they desire (Blanchard, 2008; Scott, 2001). Traditionally, consumers had to pay the upfront cost of adopting energy efficiency technologies and practices, either directly by purchasing them or indirectly by paying system benefit charges (Hirsh, 2002; Jaffe & Stavins, 1994a; York et al., 2012). Under this approach, energy efficiency technologies and practices represented an additional upfront cost that consumers had to pay to get the services they desired, which made adopting them to reduce electricity consumption unappealing (Blanchard, 2008; Jaffe & Stavins, 1994a; Scott, 2001). Moreover, because consumers interpreted energy efficiency initiatives as undesirable new costs, they were less inclined to perceive the benefits they can provide, such as their ability to reduce CO_2 and to provide the services that consumers desire with less electricity (Blanchard, 2008; Jaffe & Stavins, 1994a; Scott, 2001; Zhao et al., 2012). However, RGGI is creating new resources that are being used to reduce the upfront costs that consumers have to pay to reduce their electricity consumption through the use of energy efficiency technologies and practices. Once it is free or inexpensive for consumers to reduce their electricity consumption through energy efficiency initiatives they would be more inclined to interpret the use of them favorably (Blanchard, 2008; Jaffe & Stavins, 1994a; Scott, 2001; Zhao et al., 2012). This would then make consumers more aware and appreciative of the other benefits that energy efficiency technologies and practices can provide. As consumers become more aware and desiring of the different benefits energy efficiency initiatives can provide they would become more interested in actually adopting them to reduce the amount of electricity they are consuming.

Electricity regulators or PUCs determine the price consumers pay for electrical service (Casazza & Delea, 2009). In this role, they try to limit rate hikes and supply disruptions to minimize the price consumers have to pay to get the services they desire from using electricity (Casazza & Delea, 2009). As a result, PUCs can also be defined as economically rational. More specifically, PUCs interpret electricity and energy efficiency initiatives through their effects on the costs consumers pay to get the services they desire (Blanchard, 2008; Scott, 2001). Traditionally, energy efficiency initiatives have been funded by applying a small system benefit charge to each consumers' electricity bill (York et al., 2012). This meant that PUCs primarily interpreted energy efficiency initiatives as a new cost imposed on consumers (Blanchard, 2008; Scott, 2001). When electricity supplies were inexpensive and readily available the upfront cost associated with deploying energy efficiency initiatives limited PUCs' desire to accelerate the diffusion of them (York et al., 2012). Furthermore, when PUCs primarily interpreted energy efficiency initiatives as upfront costs they would be less inclined to view and value the other benefits energy efficiency can provide, whether saving consumers money over time, limiting new construction, or reducing CO_2 emissions (Blanchard, 2008; Scott, 2001). However, parts of RGGI's revenues are being recycled to reduce the upfront costs that PUCs have to impose on consumers to fund energy efficiency initiatives. Once PUCs view reducing electricity consumption through energy efficiency as an activity that does not impose new costs on consumers they would be more inclined to interpret the use of these technologies and practices favorably, even when electricity is inexpensive and readily available (Blanchard, 2008; Scott, 2001). This would then make the other benefits energy efficiency initiatives can provide more visible and valuable to PUCs. As the benefits energy efficiency technologies and practices can provide become more apparent to PUCs, they would be more motivated to accelerate the diffusion of them in order to reduce electricity consumption.

This chapter tests the hypotheses that the new resources being created by RGGI make the many benefits of energy efficiency more visible and valuable to generators, consumers, and PUCs. More specifically, it evaluates whether these resources are making consumers and PUCs more receptive to reducing electricity consumption through energy efficiency technologies and practices by reducing the upfront costs of adopting or deploying them. It also evaluates whether these resources are making utilities more receptive to reducing electricity consumption through energy efficiency by making the deployment of these technologies and practices profitable endeavors. These analytical positions are then combined to analyze whether changing consumers', utilities', and PUCs' interpretations of energy efficiency technologies and practices affects the diffusion of and innovation in them (Brint & Karabel, 1991).

Methodology

This chapter analyzes whether and how enacting a new formal policy for an uncontrolled environmental activity is affecting how regulated and non-regulated individuals and organizations interpret and use the physical materials and behavioral actions underlying CO_2 emissions. Part of the data included in this chapter was directly collected, through surveys and interviews, from regulated and non-regulated individuals and organizations in the region. Another type of data included in this chapter was drawn from newspaper and industry publications. The industry publications depict how organizations involved in the electrical sector, both generators and utilities, view the physical materials and behavioral actions associated with CO_2 emissions. The newspaper publications include the perspectives of consumers, PUCs, and electrical companies in the region, and show how they view these materials and activities, as well as RGGI itself. These data sources are used to ascertain how these individuals and organizations had been interpreting and using these materials and actions and whether and how the enactment of RGGI is changing them.

Multiple types of data were collected. Data were collected from a variety of different organizations in order to provide a regional and an industry analysis of RGGI, and to identify how the policy is affecting different types of individuals and organizations. Additionally, the diversity of data types and data sources allowed points or findings that came up in the archival analysis or interviews to be triangulated for verification and accuracy. The variety of data types also enabled the initial archival analysis to inform the content of the surveys and interviews, and their results were then used to refine the codes used in the archival analysis. Within the surveys and interviews, it is possible that participants exaggerated or misrepresented their organization's environmental culture and activities to inflate their image or to impress the researcher; however, three considerations make this type of response unlikely. First, the topics covered revolved around the treatment of CO_2 emissions, RGGI, CO_2 monitoring equipment, and energy efficiency programs and initiatives. As many organizations actively discussed and promoted their environmental efforts in corporate reports, newspapers, and websites, significantly distorting their interpretations and initiatives would have been both difficult and somewhat transparent. Second, the surveys and interviews were introduced and conducted under the promise of anonymity, which limited the benefits that could accrue to organizations from misrepresenting their responses, as well as their motivations for doing so. Lastly, popular and industry publications and the RGGI review process often reference the largest organizations in the region and their environmental activities by name, which created opportunities to confirm the accuracy of responses through further triangulation.

In terms of the changes that are occurring within the electrical industry, survey and interview participants had even less ability and motivation to distort their responses. First, given that all the survey and interview data were collected under the promise of anonymity, it is unlikely that respondents over-or under-reported the emerging and novel practices and initiatives they are undertaking. Second, the electrical industry is a large and interconnected system that exhibits technical and geographic redundancies. This means that even if some organizations were withholding or exaggerating information about their newest initiatives, other similar, but technologically or geographically distinct organizations could also be engaging in them more openly and honestly. To this end, survey and interview responses about changes in the electrical system were confirmed by asking multiple respondents about an emerging technology or practice and then comparing their responses for accuracy. Finally, certain electrical industry publications are specifically tasked with identifying and reporting on new technical and procedural innovations. Their coverage of these subjects enabled survey and interview responses to be further triangulated, and this offered an additional check on possible exaggerated claims.

To evaluate the effects of RGGI, the names and types of organizations owning generation facilities in the RGGI states were identified by combining the data found in the RGGI.org database of regulated facilities with the OneSource Global Business Browser and company websites. Next, environmental or sustainability personnel in these organizations were identified through the OneSource Global Business Browser, company websites, and personal phone calls. Once identified, a short survey (Appendix A) about their companies' involvement with CO_2 emissions and emission allowances was electronically mailed to these individuals. The survey was accompanied by an information letter that described the scope and goals of the research, the type of data being collected, how it would be used, the IRB approval codes, as well as the anonymity policies of the research. The survey also asked whether the individual would be willing to participate in a follow-up interview. Thirteen surveys were completed and emailed back. The responses came from a variety of different generating organizations, including several of the largest in the region. A number of survey questions and comprehensive responses to them are presented in the following data sections. Questions that address the analytical topics covered in the section and clear or detailed responses to them were selected for presentation.

Many individuals replied that they preferred to discuss the questions during a phone interview rather than filling out the survey. The resulting interviews and follow-up interviews from the returned surveys revolved around the companies' involvement in CO_2 monitoring and management, compliance with RGGI, and other environmental or sustainability initiatives that touched on CO_2 emissions. Particularly, demand-side management was often brought up as a strategy for reducing CO_2 emissions and improving environmental performance. At the end of the interviews the respondents were asked if they could recommend other individuals within or outside their organization who would be willing to talk about their involvement with CO_2 emissions, their impressions of RGGI, or their involvement with demand-side management. This snowball approach illuminated a number of individuals and organizations that were associated with RGGI, the region's electrical system, and CO_2 emissions, but were not regulated emitters. These included companies involved with renewable energy, transmission, distribution, demand-side management, and energy efficiency, as well as NGOs, research agencies, environmental agencies, and policy think tanks. An introductory letter was then sent to individuals in these organizations asking if they would be willing to be interviewed for this research project. This letter was accompanied by the aforementioned project information sheet. Following these interviews, the same snowball approach was applied to identify additional individuals and organizations for interviews.

Overall, 51 interviews were conducted with individuals associated with the New England and Mid-Atlantic electrical systems (Chart 3). 48 interviews were conducted on the phone, two were conducted in person, and one involved a series of email exchanges. The interviews ranged from 15 minutes to one and a half hours and averaged approximately 30 minutes. The participants were asked if the interview could be recorded and if direct quotations could be used in the research. All but two agreed to these conditions. Those two allowed notes to be taken of the conversation, but not direct quotes. All of the recorded interviews were transcribed, and they and the conversational notes were coded by content with Nvivo qualitative software. Various quotations from these interviews are included in the following data sections. Quotations that address the analytical topics covered in this chapter in a clear and detailed fashion were selected for presentation.

An archival search was also conducted to provide both a regional and an industry perspective. A regional perspective, which includes the views held by regulated and non-regulated electrical companies, consumers, and PUCs in the region, was achieved by collecting articles from newspapers from two large cities under the auspices of RGGI, New York City and Boston. These sources depict a regional perspective because they cover the major events that are affecting the inhabitants of these cities, states, and region, such as the enactment of RGGI. Furthermore, these newspapers' coverage of CO_2 emissions and energy efficiency initiatives primarily draws upon and reflects the opinions and impressions of the companies, consumers, and PUCs that reside within the region.

ProQuest historical records of *The New York Times* from January 1988 to December 2010 and Access World News historical records of the *Boston Globe* from the same range of dates were searched for articles that include text on CO_2 emissions and the electrical industry. 1988 was chosen because this was the year the Intergovernmental Panel on Climate Change (IPCC) was created, which helped to establish the initial connection between CO_2 emissions and global climate change (Intergovernmental Panel on Climate Change, 2012). Within the archival sources, articles that contain one of these terms (CO_2, climate change, greenhouse gases, global warming, RGGI, carbon cap, carbon tax, or carbon policy) and one of these terms (electricity, electrical generation, or electrical industry) were collected. During this search it became clear that these filters were not picking up all of the articles referencing RGGI, so a separate filter for only RGGI articles was applied to the *New York Times* and *Boston Globe*. This search included articles from January 1988 to October 2012, a period which includes the first four full years of RGGI auctions. All of the articles were then imported into Nvivo and coded. The CO_2 specific set of newspaper articles was first coded according to the technologies each article mentions and then by the meanings or arguments that were used to describe these technologies (Chart 4). The RGGI specific articles were coded according to the meanings or arguments that were used to describe the policy (Chart 5).

An industry perspective was achieved by collecting articles from electrical industry journals and a green energy internet publication. The industry journals and time periods searched include: *Power Systems (PS)*, from 1988 to 2010; *Power Engineering Review (PER)*, from 1988 to 2002; and *Power and Energy Magazine (PEM)*, from 2003 to 2010. *PER* ended publication in 2002, and *PEM* was first published in 2003. As these journals explicitly dealt with the electrical sector, articles that mention CO_2, climate change, greenhouse gases, global warming, RGGI, carbon cap, carbon tax, or carbon policy were collected. For *PS* and *PER* only abstracts are available for the entire range of dates, though complete articles are available for *PEM*. The abstracts and articles identified in the search were then coded in Nvivo according to the types of electrical technologies and topics they discuss, and then by the characteristics used to describe or define them (Chart 6). Additionally, *Green Tech Media (GTM)*, a leading green energy internet publication, was monitored every day from November 2010 to December 2011 for articles that describe innovation in and around the energy efficiency space. These articles were also imported into Nvivo and were coded with the industry journal codes.

The codes that were selected and utilized are specific to particular sources and topics. This means that some codes are applied to a large number of articles while others are only applied to a few. In particular, the industry journals published approximately 100 to 200 articles per year, of which one third to one half were usually devoted to administrative topics, such as industry events, awards, leadership profiles, and book reviews. The significance of the effects that are illuminated by a code applied to a relatively small number of articles in an individual year may be limited. However, analyzing the chronological pattern of articles that reference a particular code can reveal significant effects even if the raw number of articles referencing a particular code at one particular period of time is relatively small. For instance, a code that is only applied to a few articles in one particular year may appear insignificant, but if these are the only articles that include the code over a period of years then their appearance represents a significant change in coverage or attention. In fact, some of the topics that are presented in the following data sections were not referenced for many years, but then were discussed much more frequently. Due to these patterns, shifts in the number of articles referencing a code over time can reflect significant effects even if the number of articles referencing a particular code in an individual year is relatively small.

Lastly, over the course of 2012-13 RGGI has been undergoing its first review period. Similar to the initial design process, the documents from the meetings comprising this review period have been made available to the public via RGGI.org. These documents were analyzed to identify the types of organizations participating in the review and the topics being reviewed. These topics include organizations' impressions about RGGI's performance thus far, their opinions about whether the policy should continue, and if so, whether and what types of changes should be made. Like those associated with the surveys and interviews, passages from these meetings that address the analytical topics covered in this chapter in a clear and detailed manner were selected for presentation.

Introducing RGGI's Effects

The data presented in this chapter are separated into two sections, which are each followed by a corresponding analytical section. The first data and analysis section focuses on CO_2 allowances and RGGI, while the second looks at RGGI's energy efficiency revenue recycler. Both sections employ similar structures. The archival data that were collected from newspapers and industry journals are presented first to situate RGGI's effects within the broader regional and industrial context they are occurring within. The information drawn from the aggregated archival documents focuses on the number of articles that include a particular technology or descriptive code over time. For CO_2 emissions and RGGI, these data sources depict how the relationship between CO_2 emissions and the electrical system was presented in newspaper articles and industry journals prior to and following the enactment of RGGI. These articles also show how individuals and organizations in the region have interpreted and reacted to the RGGI policy itself. For energy efficiency technologies and practices, the archival sources demonstrate how newspaper and industry journal articles that connect CO_2 emissions and electricity had been depicting the use of energy efficiency technologies and practices prior to and following the enactment of RGGI.

After these trends are presented, individual and organizational-level information about RGGI, CO_2 emissions, and energy efficiency are presented to determine whether and how individuals' and organizations' interpretations and uses of these topics are shifting. In the CO_2 and RGGI section, survey and interview data focus on consumers' and organizations' interpretations and uses of CO_2 emissions and the operation of CO_2-emitting technologies. In the energy efficiency section, survey, interview, and industry publication data about electrical organizations', consumers', and PUCs' uses and impressions of electricity and energy efficiency technologies and practices are described. In both sections, textual passages are the main data sources that are presented. Per the research's anonymity conditions, generic identifiers, such as environmental employee for a generator, are used to define the individual and organization being referenced.

The two data sections then return to a broader regional and industry perspective. For the CO_2 and RGGI section, this perspective addresses RGGI's regional and industry effects and its extension and contestation. The data are drawn from interviews, newspaper articles, and the RGGI 2012-13 review meetings, and include textual passages from these sources. In the energy efficiency section, an industry perspective is used to identify changes in the use of energy efficiency technologies and practices, the types that are deployed, and their integration into broader electrical systems. This data include textual passages from interviews as well as from articles that were published in industry publications. The interview data in these sections are described with generic identifiers, while the archival data include the source that published it and the date when it was published.

Data and Analysis about CO_2 Allowances and RGGI

This section presents and analyzes data about the effects the creation and distribution of RGGI's CO_2 allowances are having on individuals and organizations. Archival data that describe regional and industrial interpretations and uses of CO_2 and the operation of CO_2-emitting technologies are presented first. They are followed by survey and interview data that describe whether and how RGGI is changing individual and organizational interpretations and uses of CO_2 and the operation of CO_2-emitting technologies. Next, data that describe the regional and industrial implications of RGGI, including efforts to extend and contest the policy, are presented. Following, the information is analyzed to answer whether RGGI is changing how electrical companies and consumers interpret and use CO_2 and the operation of CO_2-emitting technologies, and then if these changes are affecting attempts to develop stronger or additional CO_2 policies.

Regional and Industry Level Data about CO_2 and RGGI

Articles from *The New York Time*s and *Boston Globe* depict how electrical companies and consumers in the region interpret CO_2 emissions and RGGI. The newspaper archival sources show that individuals and organizations in the region are increasingly connecting CO_2 emissions with the electrical system. Furthermore, the increasing coverage in the region is well aligned with the enactment and ongoing presence of RGGI. This pattern shows that electrical companies and consumers in the region are increasingly identifying CO_2 emissions as a byproduct of producing electricity, and that RGGI accentuated this awareness even further. The number of articles in industry journals that reference CO_2 emissions has fluctuated over time. However, *PEM's* and *PS's* coverage of CO_2 emissions has increased, and this does map onto the development, enactment, and presence of RGGI. The pattern demonstrates that electrical companies had been historically aware of CO_2 emissions and their association with the electrical system, but their attention to the connection between the topics varied significantly. This suggests that electrical companies were not consistently treating CO_2 and the operation of CO_2-emitting technologies as controlled but that they are now doing so more frequently.

Figure 1

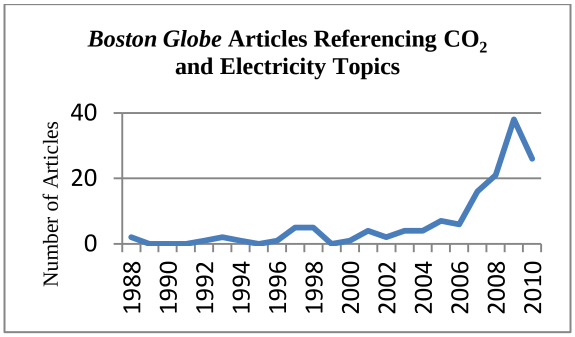


Figure 2

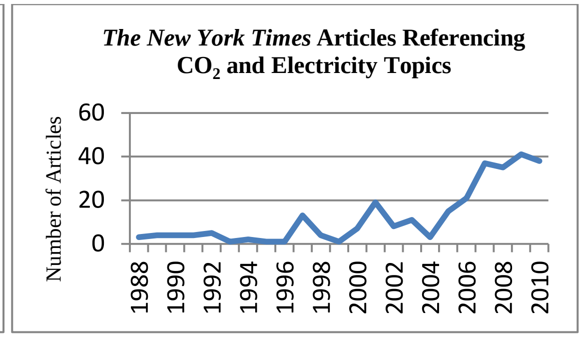


Figure 3

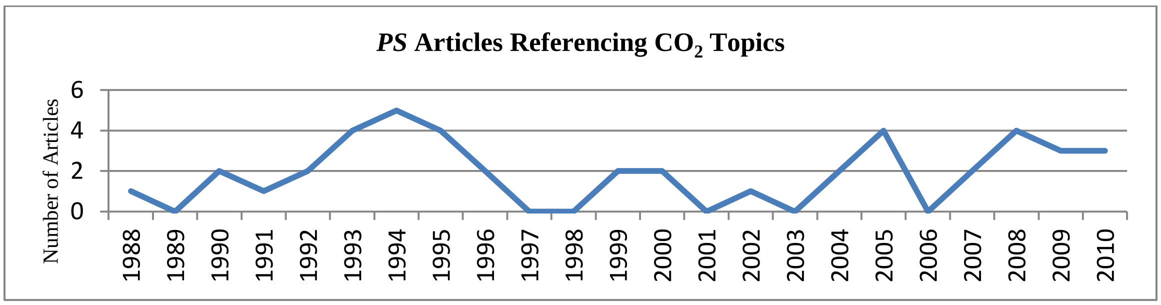


Figure 4

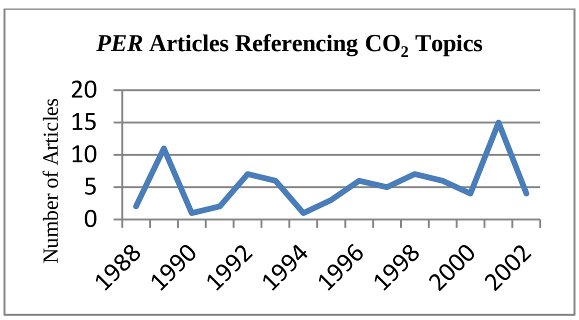
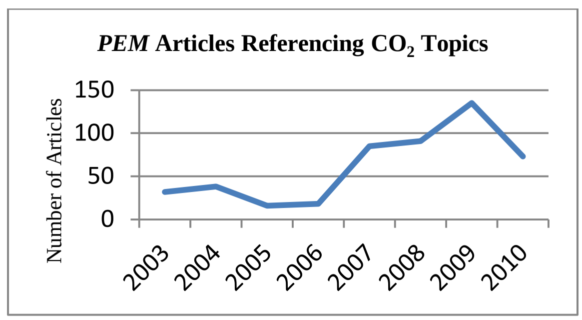


Figure 5



In the RGGI region, newspaper articles that address the CO_2 emissions associated with the electrical system increasingly describe generation equipment according to their CO_2 emissions. This trend is apparent for both emitting technologies, such as natural gas and coal facilities, and for non-emitting technologies, such as nuclear plants and wind turbines. This shows that electrical companies and consumers in the region are increasingly interpreting the operation of generation technologies according to the CO_2 emissions they do or do not release.

Figure 6

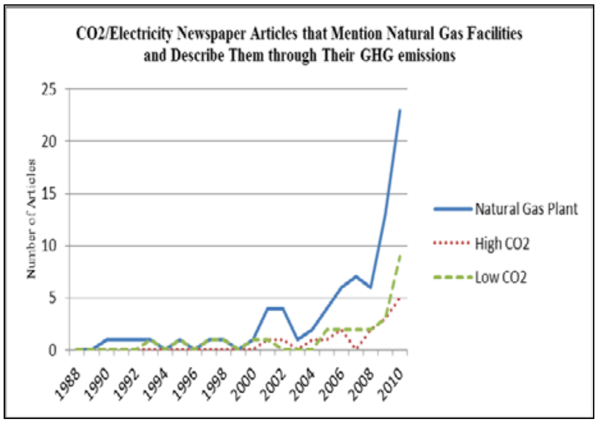


Figure 7

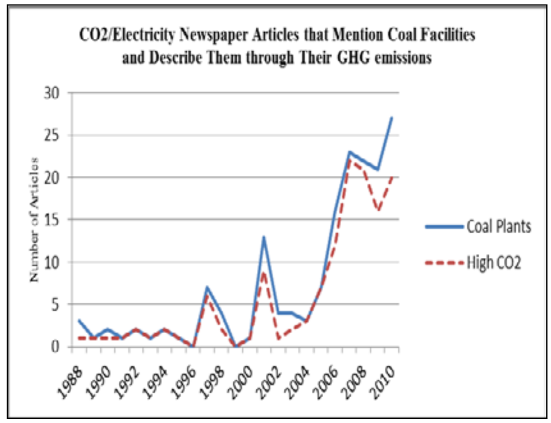


Figure 8

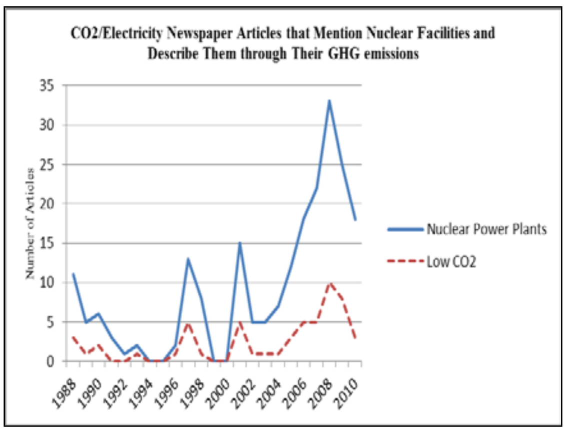
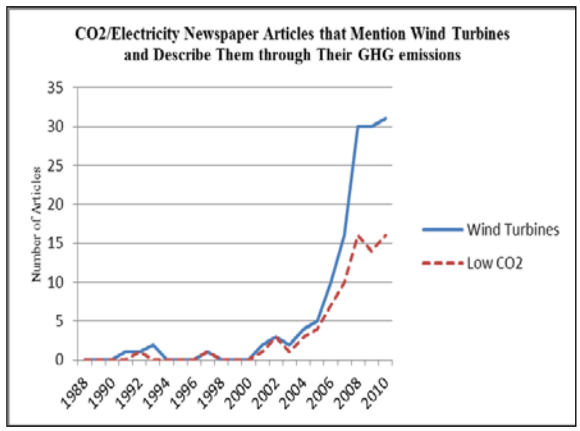


Figure 9



The New York Times and *Boston Globe* articles also depict how the electrical companies and consumers inhabiting the region view the RGGI policy. Articles that reference RGGI peaked during its design and initial enactment and have gradually tapered off. The same coverage pattern is also visible in articles that contain arguments in favor of and against RGGI. However, the number of articles that contain arguments against RGGI has declined at a much faster rate than the number of articles that contain arguments in favor of it. When articles in favor of and against RGGI are directly compared it is clear that positive references to RGGI outweigh negative references. This shows that individuals and organizations in the region primarily have a positive impression of the policy and its treatment of CO_2 emissions and the operation of CO_2-emitting technologies. The arguments used against RGGI have also shifted over the course of the policy's existence. Prior to implementation, these arguments primarily touched on the potential costs of the policy and their impact on the region's economic competitiveness. After RGGI was enacted these arguments declined, and a different argument, that the policy was weak, was used more frequently.

Figure 10

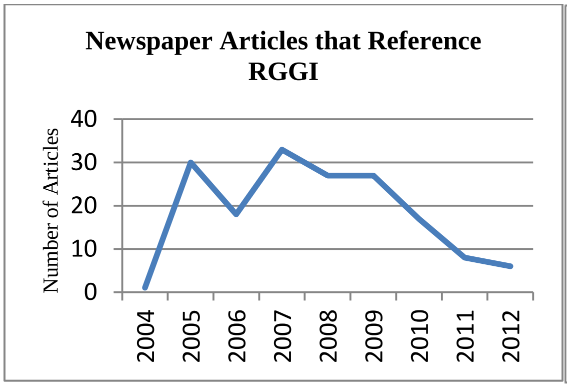


Figure 11

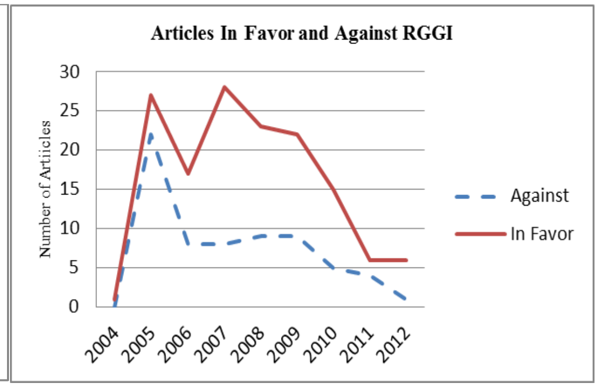


Figure 12

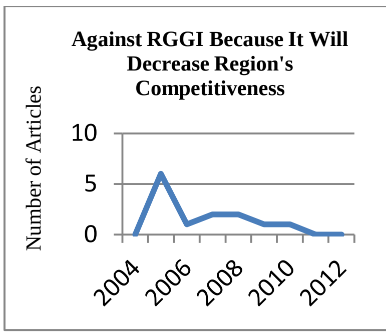


Figure 13

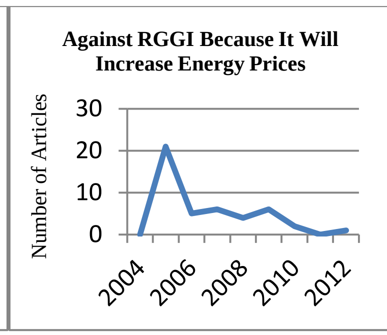
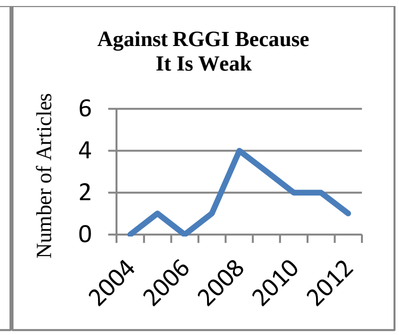


Figure 14



These results indicate that electrical companies and consumers in the RGGI region had thought the policy would be economically detrimental, but that after experiencing its operations their concerns were alleviated. In fact, the emergence of the new argument against RGGI demonstrates that electrical companies and consumers are willing to treat CO_2 and the operation of CO_2-emitting technologies as controlled and that they are amenable to stronger CO_2-controlling policies. To gain a more focused perspective about how individuals and organizations in the region perceive RGGI and how they are being affected by the policy, individual and organizational level data that was collected through surveys and interviews are now presented.

Individual and Organizational Level Data about CO_2 and RGGI

To evaluate RGGI's effects on individuals and organizations in the region, surveys were sent to individuals working for regulated generators to identify whether and how its passage is affecting them. Many of these surveys led to follow-up interviews. The surveys included a variety of questions about CO_2 emissions, monitoring methodologies, and emissions trading, some of which are not relevant to the line of analysis this section addresses. Similarly, the interviews touched on a broad array of electrical and environmental topics and only a portion of their content are pertinent to this analytical focus. Questions and statements that reflect regulated individuals' and organizations' interpretations and treatments of CO_2, the operation of CO_2-emitting technologies, and CO_2 allowances and that were answered or described in a clear and detailed manner are presented as data in this section.

All respondents reported their organizations are monitoring their CO_2 emissions, but they varied in how long they had been doing so. Some organizations indicated they had been monitoring their CO_2 emissions prior to RGGI. However, their reasons for doing so varied. Others indicated that RGGI prompted them to begin monitoring their emissions or to utilize more sophisticated procedures. These responses indicate that some electrical companies had been interpreting CO_2 as a controlled material, but that the enactment of RGGI standardized this interpretation for electrical companies throughout the region.

Figure 15

Surveys: How long have CO_2 emissions been managed (measuring and/or attempting to reduce or minimize)?		Org.'s treatment of CO_2 and CO_2-emitting tech.
Emissions Compliance	"The CT DEP [Department of Environmental Protection] has required GHG [Greenhouse Gases] information as part of its Emission Statement process for four years."	Was treating CO_2 as a controlled material
Env. Strategy	"Our baseline accepted and verified with the EPA Climate Leaders [a voluntary program] is from 2001."	Was treating CO_2 as a controlled material
Env. Analyst	"CO_2 emissions have been managed since commencement of operation for each facility."	Was treating CO_2 as a controlled material
Env. Manager	"Since RGGI required reporting in 2009."	Is now treating CO_2 as as controlled material
Env. Manager	"Since 2009."	Is now treating CO_2 as as controlled material
Manager	"I believe that installation of CEMs took place around 1993. However ... these monitors were used for boiler performance and not to minimize CO_2 emissions. With the upcoming REGGI [sic] requirements, the CEMS will now be used to help minimize CO_2."	Is now treating CO_2 and the operation of CO_2-emitting tech. as a controlled material and action

The surveys also asked which individuals are tasked with collecting information about CO_2 emissions and which individuals and departments receive this information. Overall, environmental-based employees are tasked with identifying the amount of CO_2 released by their facilities. These employees then pass this information to various individuals and departments within their organization, including high-level executives and individuals involved in strategy. These responses show that treating CO_2 as a controlled material is becoming more pertinent to electrical companies' overall operations, not just to their environmental departments.

Figure 16

Surveys: What individual positions or departments receive information related to the emission of CO_2?		Org.'s treatment of CO_2 and CO_2-emitting tech.
Emissions Compliance	"The Air Compliance Manager and Director of Environmental Affairs and Development share emissions information with [Organization's name] President ..."	Executives treating CO_2 as controlled
Env. Strategy	"Data is reported and consolidated by the Environmental Engineers at the Site Level ... Data is consolidated and verified at the Corporate Level ..."	Executives treating CO_2 as controlled
Env. Analyst	"Engineering Manager, Treasury Department, Accounts Receivable, Power Plant Operations."	Business and technical employees treating CO_2 as controlled
Env. Manager	"All plant staff are given monthly updates of plant performance of [sic] which CO_2 emissions are discussed."	All employees treating CO_2 as controlled

Respondents were also asked why they chose to select and then use specific types of CO_2 measurement methodologies and monitoring equipment. Almost all respondents indicated that regulatory requirements are the primary consideration, but reliability and cost were also mentioned. More specifically, respondents indicated that federal greenhouse gas reporting and acid rain programs dictate which monitoring equipment they use.

Figure 17

Surveys: What considerations are used to select measurement methodology and monitoring equipment?		RGGI's treatment of CO_2 and CO_2-emitting tech.
Env. Manager	"GHG CEMS equipment has been selected based on EPA criteria and requirements."	Existing equip. and skills can control CO_2 and tech.
Env. Strategy	"Regulatory requirements."	Existing equip. and skills can control CO_2 and tech.
Env. Engineer	"Must meet regulations such as 40 CFR 75 or other EPA approved methodology."	Existing equip. and skills can control CO_2 and tech.
Plant Manager	"Federal regulations drive what is used. Beyond that, we look for equipment that has the highest reliability and most cost effective."	Existing equip. and skills can control CO_2 and tech.
Env. Coordinator	"Regulatory requirements."	Existing equip. and skills can control CO_2 and tech.

Respondents were also specifically asked if the passage of RGGI affected the choice or use of these technologies. They indicated that RGGI requires modifications to existing equipment, additional reports, or that it is not a consideration. These responses demonstrate that organizations can get the information they need to control CO_2 and the operation of CO_2-emitting technologies through existing programs and procedures, and that they do not have to develop or acquire new skills or equipment.

Figure 18

	Surveys: Did the passage of RGGI affect the considerations used to select measurement methodology and monitoring equipment? If so how?	RGGI's treatment of CO_2 and CO_2-emitting tech.
Env. Strategy	"The information which must be reported for the sites to which is [sic] applies is the same as that which is reported for the EPA Acid Rain Program (Part 75), thus this information is simply reported again to the RGGI program."	Easy to control the operation of CO_2-emitting techs.
Env. Analyst	"No."	Easy to control the operation of CO_2-emitting techs.
Env. Engineer	"NO, just added more paperwork and cost."	Easy to control the operation of CO_2-emitting techs.
Env. Manager	"Changes to CEMS, additional RATA [relative accuracy test audit] testing, additional monitoring and reporting, and additional cost ($2.86/ton of CO_2)."	Easy to control the operation of CO_2-emitting techs.
Plant Manager	"No. We will continue to use the installed CEMs for the RGGI reporting."	Easy to control the operation of CO_2-emitting techs.
Env. Coordinator	"It required reporting and dictated how to report."	Easy to control the operation of CO_2-emitting techs.

During the subsequent interviews respondents were asked whether RGGI is affecting their operations and if so how. Even though their organizations are controlling CO_2 emissions and the operation of CO_2-emitting technologies, these individuals indicated the policy's impact upon their operations is relatively insignificant. In following up on why they felt this way, many regulated entities attributed RGGI's limited operational impact to the low allowance price, to the ease of purchasing allowances, and to the relatively simple monitoring requirements. The most significant impact identified is that the enactment of RGGI requires additional paperwork to be completed.

Figure 19

Interviews with Regulated Organizations: RGGI's Perceived Formal Effects and The Treatment of CO_2 and CO_2-Emitting Technologies		
Env. Employee: Investor Owned	Use of existing equipment and procedures makes controlling the operations of CO_2-emitting technologies easy	"We haven't really done anything special to comply with that [RGGI]. We already had programs, procedures and systems in place to deal with that. We didn't do anything special."
Emissions Compliance: Investor Owned	Use of existing equipment and procedures makes controlling the operations of CO_2-emitting technologies easy	"The addition of CO_2 monitoring was very minor. We just added a calculation to the software and then include it in our yearly calibration checks."
Env. Employee: Municipal	Low allowance prices make controlling CO_2 inexpensive	"Well, RGGI [prices] was never really that high ... I'm not sure if it is pennies per megawatt used or whatever."
Env. Employee: Municipal	Low allowance prices make controlling CO_2 inexpensive	"It's [RGGI allowances] not really, that's not really a big cost right now to us."
Compliance Supervisor Investor Owned	Easy compliance requirements make controlling CO_2 easy	"[CO_2] reporting is very minor workload ..."
Operations Employee: Municipal	Low allowance prices and easy compliance requirements make controlling CO_2 easy and inexpensive	"We just go out to the auction and buy the credits that we need ... there hasn't been a lot of competition in the auction ... The auction itself might take twenty minutes, depending on how many different bids I'm putting in. "
Env. Employee: Municipal	Monitoring emissions and allowances make controlling CO_2 a responsibility	"It [RGGI] created more paper work. I mean it's just more paperwork, more and more paperwork."

Individuals and organizations involved with the region's electrical system, but that are not regulated were also interviewed. In their responses they implicitly acknowledge that RGGI is controlling CO_2 emissions and the operation of CO_2-emitting technologies, but also highlight RGGI's limited impact. These individuals attributed the lack of impact to RGGI's low allowance price.

Figure 20

Interviews with Non-Regulated Organizations: RGGI's Perceived Formal Effects and The Treatment of CO_2 and CO_2-Emitting Technologies		
Fellow: Env. Think Tank	Low allowance prices make controlling CO_2-emitting technologies inexpensive	"The allowance price is now binding at, you know, a whopping $1.86 ... That has had very little significance for investment in generation decisions ..."
Associate Director: Energy Policy Group	Low allowance prices make controlling CO2 inexpensive	"RGGI was started and the price of emissions never got very high."
Env. Director: Electrical Industry Group	Low allowance prices make controlling CO_2 easy and inexpensive	"Utilities don't really quibble because, you know, it's [RGGI allowance] not a huge, you know, sort of payment, if you will, at the end of the day."
Electricity Trader: Energy Trading Group	Low allowance prices make controlling CO_2-emitting technologies easy	"The reality is that it [CO_2 price] only marginally increases their [generators] costs, like it doesn't really change anything in terms of how often they get picked up in the system or how often they are running ..."

Even with RGGI's perceived limitations in affecting the operation and selection of CO_2-emitting technologies, regulated entities indicated a growing familiarity with and acceptance of controlling CO_2 emissions and the operation of CO_2-emitting technologies, and specifically by purchasing CO_2 allowances. As part of this, regulated entities described how they are developing more expertise with allowance auctions. They also talked about cultivating the capabilities required to integrate CO_2 allowances and allowance auctions into their organizational activities. Lastly, regulated organizations described how information about CO_2 emission allowances is being transmitted to various departments and used in corporate strategy. These findings indicate that individuals throughout electrical organizations are treating CO_2 and the operation of CO_2-emitting technologies as controlled. They also show that these meanings are influencing how these individuals understand their operations despite the perceived weakness of the policy.

Figure 21

Interviews with Regulated Organizations: RGGI's Perceived Informal Effects and The Treatment of CO_2 and CO_2-Emitting Technologies		
Env. Engineer: Investor Owned	Collecting CO_2 information helps the organization treat CO_2 as controlled	"We might have been reporting on that [CO_2 emissions] prior to RGGI but certainly with RGGI that raised the level of awareness quite a bit."
Env. Manager: Investor Owned	Diffusing CO_2 information throughout the organization helps different employees treat CO_2 as a controlled	"They will glean the information that they need to report under for CO_2 and that information is taken, and is forwarded on to accounting, asset management, trading people that are responsible for managing the credit side of it."
Env. Strategy: Investor Owned	Including CO_2 information in strategy makes treating CO_2 and CO_2-emitting technologies as controlled more relevant for the organization	"Our company has this whole business strategy surrounding the reduction and abatement of greenhouse gas emissions ... So being responsible for that GHG inventory, I do spend a lot of my time making sure we're getting quality data from all of the operating companies, and that we're able to manage that data and get it into the reports and formats that we need."

In both surveys and interviews, regulated generators and non-regulated distributors also described their equipment and how they are using them through their CO_2 emissions. In the surveys, some generators answered survey questions about managing CO_2 emissions with responses that touch on the production efficiency of existing equipment. Other generators also linked the production efficiency of existing equipment to CO_2 emissions during the interviews. When generators improve the production efficiency of their equipment less fuel needs to be combusted to produce one unit of electricity, which means less CO_2 is emitted per unit of electricity produced. By describing improvements in production efficiency through their effects on CO_2 emissions generators demonstrate that they are treating CO_2 and the operation of CO_2-emitting equipment as a material and action that are managed and controlled. These statements also show that these organizations are using CO_2 emissions as an indicator of efficiency and that they are operating their equipment in ways that minimize CO_2 emissions.

Figure 22

Surveys and Interviews with Electrical Organizations: How CO_2 Information and New Meanings for CO_2 and CO_2-Emitting Technologies are Used		
Compliance Supervisor: Investor Owned	Treating CO_2 and CO_2-emitting technologies as controlled changes how employees understand operations	"In the early, in the late 1990s, and the early 2000s, things were relatively stable. As people became aware of climate change ... we've started looking at things that we just weren't, we never thought about before."
Plant Manager: Investor Owned	Treating CO_2 and CO_2-emitting technologies as controlled changes how employees understand generation technologies and fuels	"Now we've actually been able to improve all of our emissions over the last couple of years because. we have essentially converted our units. These three steam units that I am talking about, the two smaller units were at one time coal fired units, and then they were converted over to number six oil and natural gas."
Env. Engineer: Distribution	Treating CO_2 as controlled changes how employees understand non-generation equipment	"We modeled the emissions for our fleet, environmental gets directly involved with that, we get the fuel consumed, the type of fuel it is, whether it is gasoline or biodiesel, the miles driven, and we'll calculate carbon dioxide along with other pollutants ... Same with buildings ..."
Env. Strategy: Investor Owned	Treating CO_2 and CO_2-emitting technologies as controlled changes how employees understand energy efficiency	"We call that customer abatement and it's the efforts that we are taking to help our customers be more efficient and reduce their greenhouse gas impacts. So it's definitely included as part of our [Company Strategy Name] , and it is something that is looked at all the time as part of our whole corporate, overall carbon strategy. "
Sustainability Director: Investor Owned	Treating CO_2 and CO_2-emitting technologies as controlled changes how employees evaluate production efficiency	"Yes, we measure our GHGs. We also have energy efficiency initiatives that will result in greater energy generation per ton of GHGs emitted."
Env. Strategy: Investor Owned	Treating CO_2 as controlled creates a new way to motivate employees and a new lever for changing employee behavior	"Other greening ... opportunities, we try to relate it back to carbon just so that we have, sort of, a single focus that people can relate to, and something that we can measure against. We try to tend to relate it back to carbon reduction because it helps people put it into perspective, if you are trying to have a single program and motivate employees to be involved ... it's definitely something that people keep in mind when they are trying to put together a project that's going to improve efficiency or, you know something that would be important to their department, they try to relate it back to the overall [Company Strategy Name] carbon strategy and show how they will be contributing to that abatement of the CO_2 footprint ... "

Customer-facing companies, those with and without generation facilities, also connected demand-side energy efficiency to CO_2 emissions in surveys and interviews. This indicates that electrical organizations are aware of the relationship between CO_2 emissions and electricity consumption, and that they are trying to manage their CO_2 emissions by reducing electricity consumption. Especially progressive organizations also described how they use CO_2 emissions as a lever to get individuals to think more about the organizations' overall environmental performance, even as it relates to non-generating electrical equipment and procedures. These responses show that electrical companies are increasingly interpreting CO_2 and the operation of their CO_2-emitting equipment as controlled. They also show that the use of these meanings is shifting how individuals throughout the organization understand the different facets of their operations.

Regional and Industry Data about CO_2 and CO_2-Controlling Policies after RGGI

To identify how these organizational changes are affecting regional and industrial acceptance for controlling CO_2, the operation of CO_2-emitting technologies, and for using CO_2-controlling policies, regional and industrial archival and interview data are presented. These data sources depict how RGGI's overall effects are changing how regulated and non-regulated organizations in the region and organizations associated with the electrical industry view CO_2 emissions, the operation of CO_2-emitting technologies, and the use of CO_2-controlling policies. More specifically, they show how RGGI's initial operations are prompting these organizations to accept controlling CO_2 and the operation of CO_2-emitting technologies and to view the use of CO_2-controlling policies more favorably. The data sources also depict how RGGI's initial operations are influencing how policymakers outside the region and country view auction-based cap and trade policies. In particular, they demonstrate that the initial operations of RGGI are causing policymakers to reconsider the viability of using auction-based cap and trade policy designs to control CO_2 emissions and the operation of CO_2-emitting technologies.

According to the most recent Pew global warming survey, Americans increasingly believe the earth is warming (Pew Research Center, 2012). Furthermore, in the *PEM* industry publication, articles that reference CO_2 topics increasingly identify climate change as a driver of industry changes. These sources support the notion that consumers and electrical companies increasingly see CO_2 emissions and climate change as an issue that will have to be addressed. It is unlikely that a regional policy like RGGI has been able to significantly influence national and industry-wide interpretations to this degree. However, the number of extreme weather events that have recently affected the U.S. does seem to have increased Americans' awareness of and concern about CO_2

emissions and global climate change (Natural Resources Defense Council, 2013; Pew Research Center, 2010, 2012). When positioned against this backdrop, the ongoing presence of RGGI as a relatively inexpensive CO_2 policy does appear to be attracting industry support for controlling CO_2 emissions and the operation of CO_2-emitting technologies.

Figure 23

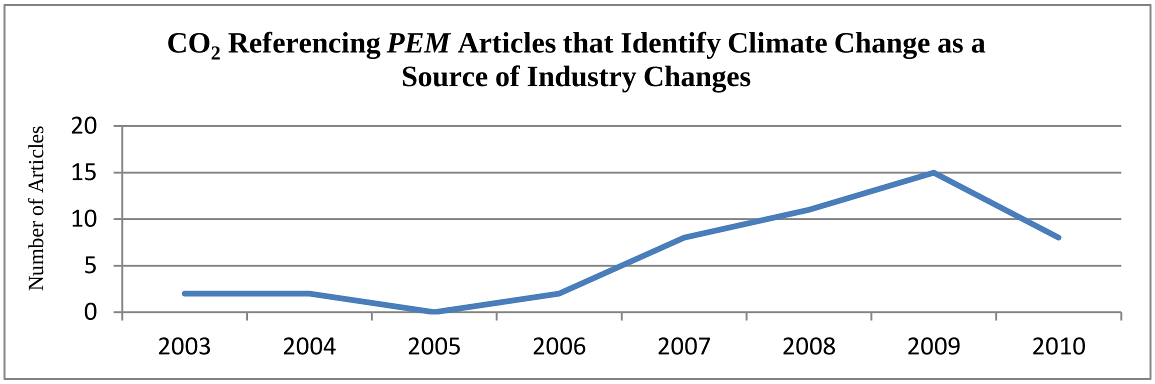


Figure 24

Interview with a Regulated Organization: RGGI's Perceived Industry Effect and The Treatment of CO2 and CO2-Emitting Technologies		
Env. Engineer: Investor Owned `	Industry is more willing to treat CO_2 and CO_2-emitting technologies as controlled	"I think this whole area of greenhouse gases and climate change is obviously been gaining momentum. It has kind of stalled lately because of economic factors but my guess is that it will be revived again, and there is still quite a bit of inertia even now, so I think clearly that is going to be an issue that we deal with going forward."

Additionally, RGGI's revenue recycler allows individuals and organizations in the region to directly benefit from controlling CO_2 emissions and the operation of CO_2-emitting technologies. While system benefit charges have long been used to support energy efficiency and The American Recovery and Reinvestment Act of 2009 (TARRA) created new resources for energy efficiency, recycling RGGI's revenues towards energy efficiency is increasing the amount of money New England and Mid-Atlantic states can spend on energy efficiency even further (U.S. Department of Energy, 2012; York et al., 2012). With these resources, the region's already strong commitment to energy efficiency is being accentuated even more. Moreover, the effects of the increase in energy efficiency spending are retaining existing, and attracting additional, support for both RGGI and energy efficiency. The RGGI funds are suppressing allowance prices and stabilizing electricity prices, which limits the overall economic impact of the policy, or even makes it a net positive.

Figure 25

Interviews and Archival Documents: RGGI's Perceived Regional and Industry Effects and Treatments of CO_2 and CO_2-Emitting Technologies		
New York Times: 4/2/2009	Industry more experienced with controlling CO_2 and CO_2-emitting technologies by purchasing emission allowances through auctions	" 'For many power producers, RGGI (pronounced reggie) serves as a useful introduction to carbon trading', said Milo Sjardin ... 'The essential role of RGGI is to set up the infrastructure of carbon trading in the United States and get companies familiar with the concept of carbon prices,' he said. 'It's been very successful at that end.'"
Green Tech Media: 6/17/2011	Consumers see that controlling CO_2 and CO_2-emitting technologies doesn't have to hurt the economy	"On a dollar-for-dollar basis, RGGI is a winner across the board, with ratepayers benefiting from investments in energy efficiency and other clean technology programs that provide $3 to $4 in savings for every $1 invested, thereby sparking local economies."
Fellow: Env. Think Tank	Consumers see that controlling CO_2 and CO_2-emitting technologies doesn't have to increase electricity prices	"It [RGGI] has also led to several hundred million dollars of revenue for the states for their energy efficiency programs, and then to complete the circle those energy efficiency programs have clipped energy demand and probably caused there to be an undetectable change in retail electricity prices. Because at the same time that costs of supply have gone up incrementally because of this small allowance price on CO_2 emissions the, there has been this, you know, associated reduction in demand because of the investments in energy efficiency that serve to push back down the price."
Fellow: Env. Think Tank	Policymakers see that controlling CO_2 and CO_2-emitting technologies through an allowance auctions is viable	"The whole allocation thing was a huge innovation by RGGI, and ... the auction design was very good and became a model, and you actually saw in the Waxman-Markey proposed legislation, paragraphs that looked like they were cut from whole cloth, you know out of RGGI material, that found its way into the Waxman-Markey design ... I know firsthand that folks in Brussels looked at what was happening in RGGI very closely and did not think that it was possible to do what RGGI was doing, that is to hold an auction for a major share of the emission allowances, and it really caused a rethink in Brussels about what could be done ... the culture, the regulatory culture and the business culture at the time, didn't perceive that [an auction] as being in the realm of possibility. And over the, over a six year period these, this accepted wisdom turned 180 degrees and that, and RGGI had an enormous role in that."

In fact, the ongoing presence of an economically beneficial CO_2 policy appears to be facilitating regulated and non-regulated individuals' and organizations' willingness to control CO_2 and the operation of CO_2-emitting technologies. Specifically, the policy is changing how policymakers and electrical companies in and out of the region feel about purchasing the right to emit CO_2, and is making CO_2 allowance auctions a more viable policy tool. RGGI also offers policymakers involved in the design of CO_2 policies, both in and out of the region, an opportunity to learn more how allowance auctions function in the real world. Namely, they can work without creating large economic costs or logistical concerns. These insights are now being applied to the design and implementation of other CO_2-controlling policies.

Data about the Contestation and Extension of RGGI

Due to the small economic costs being imposed and economic benefits being created by RGGI, generators in New England and Mid-Atlantic states generally view RGGI as a tolerable nuisance. It slightly increases the cost of producing electricity with fossil fuels and creates additional administrative duties and responsibilities, but neither of these consequences is significant enough to prompt widespread or adamant contestation of the policy. In fact, the two major examples of contestation were relatively isolated events that occurred within individual states, and neither contested controlling CO_2 or the operation of CO_2-emitting technologies. One revolved around a desire to re-evaluate a particular facet of the allocation approach and the other was largely attributed to the political ambitions of the state's governor. In the former, an independent power producer sued the state of New York to receive free allowances because they had a pre-existing contract with a utility that prevented them from passing on the costs of purchasing allowances in the price of electricity. This lawsuit was settled through a three-way agreement between the state, the independent power producer, and the utility that allowed the RGGI costs to be accounted for. The latter case involved the current governor of New Jersey, Chris Christie. Governor Christie withdrew New Jersey from RGGI in 2011 in spite of opposition from state legislators. Christie's rationale for leaving the program was that RGGI was not effectively reducing the state's CO_2 emissions enough, although newspaper articles attributed his actions to potential presidential ambitions.

Figure 26

Archival Documents: Main Ways RGGI and Its Treatment of CO_2 and CO_2-Emitting Technologies Have Been Contested		
New Jersey Withdrawals From RGGI: New York Times 5/27/2011	Gov. contested RGGI because the policy was not doing enough and because of political ambitions, but did not contest treating CO_2 and CO_2-emitting technologies as controlled	"Gov. Chris Christie said Thursday that New Jersey would become the first state to withdraw from a 10-state trading system, the Regional Greenhouse Gas Initiative, declaring it an ineffective way to reduce carbon dioxide emissions ... Opponents were quick to ascribe political motives to the governor's decision, given that Mr. Christie is seen as a possible Republican candidate in the 2012 presidential race ... the governor asserted that New Jersey was succeeding in reducing its carbon dioxide emissions not because of the multistate program, known as RGGI (pronounced Reggie), but because it is relying more on natural gas and less on coal to fill its energy needs. 'RGGI does nothing more than tax electricity, tax our citizens, tax our businesses, with no discernible or measurable impact upon our environment,' Mr. Christie said."
New Jersey Tries to Rejoin RGGI: The Record [North Jersey] 5/23/2012		"In a legislative do-over, the state Assembly is set to vote Thursday on a bill that would require New Jersey to rejoin a nine-state program designed to reduce greenhouse gas emissions."
Generator Sues New York State: Bloomberg BNA 12/24/2009	IPP contested RGGI because it couldn't include the allowance price in its electricity price, but did not contest treating CO_2 and CO_2-emitting technologies as controlled	"Indeck's main claim was that, under the RGGI regulations, it was unable to pass through the costs for purchasing carbon emissions allowances because it was obligated to a long-term fixed-price contract for electricity with Con Edison ..."
		"Under the terms of the settlement, Con Edison will pay the cogeneration plants for costs they incur in purchasing carbon dioxide emissions allowances at RGGI auctions."

Beyond these isolated and somewhat self-serving acts of contestation, electrical companies and consumers in the region generally have an ambivalent, if not somewhat positive, view of RGGI. Electrical companies' and consumers' growing acceptance with controlling CO_2 and the operation of CO_2-emitting technologies in general and through auctions in particular, is evident from the 2012-13 RGGI review documents. During the review, electrical generators and environmental organizations came together to release a number of joint statements expressing their support for RGGI. Similarly, consumers and businesses, including many involved with the region's electrical system, also indicated their support for continuing RGGI. Although electrical companies and consumers in other states have not attempted to bring their states into RGGI, stakeholders in the region want to extend the policy, and their support is nearly unanimous. In fact, the meetings and discussions held during the 2012-13 review period primarily revolved around how much the subsequent cap will be tightened and the modeling assumptions used to determine it, not whether the policy would remain in place. The modeled cap reductions (106, 101, 97 and 91 million tons), which represent the range of possible caps being considered for the next phase of RGGI, are also much lower than the initial cap, even after accounting for New Jersey's approximately 20 million tons of emissions (RGGI Staff Working Group, 2012).

Figure 27

Archival Documents: Stakeholder Support for Extending RGGI and Its Treatment of CO_2 and CO_2-Emitting Technologies		
Generators and Env. Organizations RGGI Review 5/31/2011	Generators and environmental orgs. support additional controls on CO_2 and CO_2-emitting technologies	"We, the undersigned electric industry companies and environmental non-profit organizations, would like to take this opportunity to provide these joint comments. We write to offer our support and congratulations on the first two years of the Regional Greenhouse Gas Initiative (RGGI), the leading mandatory carbon reduction program in North America ..."
Generators and Env. Organizations RGGI Review 12/12/2012	Generators and environmental orgs. support additional controls on CO_2 and CO_2-emitting technologies	"The Pace Energy and Climate Center convened a group of electric generators, utilities and environmental organizations to develop this set of joint recommendations to the states participating in RGGI. The Dialogue aims to support the states as they consider ways to preserve and improve RGGI in the 2012 program review."
Consumers RGGI Review 12/14/2011	Consumers support additional controls on CO_2 and CO_2-emitting technologies	"We are companies that believe strong clean energy and clean air policies create jobs and stimulate economic growth. The Regional Greenhouse Gas Initiative (RGGI) shows that market-based programs can reduce greenhouse gas (GHG) emissions while boosting our economy and improving energy security, and we encourage you to support and strengthen RGGI going forward."
Consumers RGGI Review 12/2011	Consumers support additional controls on CO_2 and CO_2-emitting technologies	"The Regional Greenhouse Gas Initiative (RGGI) is a groundbreaking, first-in-the-nation partnership by ten states that demonstrates the effectiveness of carefully designed and implemented market based climate programs. As member states of RGGI undertake the comprehensive 2012 Program Review, the undersigned stakeholders endorse principles and highlight potential reforms that will build on the success of RGGI to date and deliver greater environmental and economic benefits in the future."
Utility New York Times 1/27/2012	Utility supports additional controls on CO_2 and CO_2-emitting technologies	"'My hope is that it [RGGI] will be strengthened because we need to address greenhouse gas emissions, but we need to do it in a responsible way so it doesn't impact utility customers, especially in this economy,' said Bob Teetz, vice president of environmental services for National Grid, an electrical and gas company."

Analysis of the Data about CO_2 Allowances and RGGI

State policymakers designed and enacted RGGI to control the amount of CO_2 emissions electrical generators are emitting into the atmosphere. The enactment of RGGI makes generators purchase allowance rights to emit a ton of CO_2 into the atmosphere rather than doing so for free. By creating and distributing CO_2 allowances, RGGI encapsulates alternative ways for generators and consumers to interpret and utilize CO_2 and the operation of CO_2-emitting technologies. More specifically, policymakers enacted RGGI to try to shift generators' and consumers' interpretations and uses of CO_2 away from an uncontrolled, unvalued waste stream to a controlled and valuable asset (Fligstein, 1997). Policymakers are also trying to shift how generators and consumers interpret and use the operation of CO_2-emitting technologies to include an understanding that this action needs to be restricted (Fligstein, 1997). The new meanings policymakers are trying to highlight through the enactment of RGGI are very different from the pre-existing cultural controls that generators and consumers had been using to interpret and utilize CO_2 and the operation of CO_2-emitting technologies. This means that even after RGGI was enacted generators and consumers would not necessarily accept these meanings as legitimate. If generators and consumers did not accept these meanings as legitimate they would contest the use of them by contesting the existence of RGGI (Bourdieu & Wacquant, 1992). The continued existence and functioning of RGGI hinges on the willingness of generators and consumers to accept these new meanings as legitimate and to utilize them to interpret and use CO_2 and the operation of CO_2-emitting technologies for themselves (Caronna, 2004).

When looking at the formal effects of RGGI, the data suggest the policy is having a relatively insignificant effect on the region's electrical industry. The initial weakness of the cap and unaccounted-for external events, such as falling natural gas prices and an economic recession, are constantly pushing the allowance price to the reserve price (Regional Greenhouse Gas Initiative, 2012d). The resulting low allowance price represents a minor cost for generators. In fact, generators and other non-regulated organizations in the region do not see it as high enough to drastically change generators' operations or the composition of the region's electrical system. The interpreted insignificance of the policy is further accentuated by RGGI's monitoring requirements. The same equipment and procedures that are being used to monitor SO_2 and NO_x emissions have been repurposed to address CO_2 emissions. This is prompting regulated organizations to view RGGI's monitoring and reporting requirements as simple but redundant exercises that merely create more administrative responsibilities.

However, when the data are reinterpreted to analyze the policy's informal effects, or changes in how generators and consumers interpret and use CO_2 and the operation of CO_2-emitting technologies, they suggest that RGGI's low allowance price is having a more significant effect. Generators and consumers have been defined as economically rational. In the context of this analysis, this means that generators interpret and use the physical materials and behavioral actions associated with CO_2 emissions through their effects on their costs and revenues (Blanchard, 2008; Scott, 2001). Consumers interpret these materials and actions through their effects on the price and availability of the electricity they use to get the services they desire (Blanchard, 2008; Scott, 2001). The economic basis of generators' and consumers' pre-existing cultural controls explains why many attribute RGGI's lack of impact to its low allowance price (Blanchard, 2008; Scott, 2001). However, the economic inclination of generators and consumers also means they would be more inclined to support policy structures or outcomes that make it inexpensive or economically beneficial to use the new meanings the policy is conveying (Blanchard, 2008; Lindblom, 1977; Scott, 2001).

Generators are willing to use the new meanings for CO_2 and the operation of CO_2-emitting equipment RGGI encapsulates because the initial allowance price was designed to be low and because it continues to be low. Low allowance prices do this because they make it inexpensive for generators to use the new meanings associated with the policy. Due to the economic basis of their pre-existing cultural controls, generators are willing to interpret and use CO_2 as a controlled material whose emission requires an allowance because the cost and effort of doing so are low (Blanchard, 2008; Scott, 2001). Likewise, generators are willing to interpret and operate their CO_2-emitting equipment in ways that minimize emissions because doing so does not require adding new components or impede their ability to profit from the production of electricity. These claims are supported by the survey and interview data, as regulated generators' dismissive, but not oppositional, attitude towards RGGI suggests a willing, though less than enthusiastic, acceptance of these new meanings.

The survey and interview data also demonstrate that regulated generators are interpreting and treating CO_2 emissions as a controlled material whose emission into the atmosphere requires an allowance. Generators are developing experience with CO_2 allowance auctions, and information associated with the auctions, such as emissions levels and allowance prices, is being circulated throughout the organization and beyond its traditional realm of environmental departments. The archival, survey, and interview data also show that regulated organizations are monitoring the emissions associated with generation and non-generation equipment, interpreting the equipment according to their emissions, and then using them in ways that minimize emissions. Furthermore, these meanings are not just being used by environmental employees, but by individuals throughout the organizations, including those involved with strategy. These efforts suggest that the meaning of CO_2 as a controlled material and the meaning of CO_2-emitting equipment as technologies whose operation needs to be controlled are becoming more broadly legitimate to different types of employees within electrical companies throughout the region.

Generators do not necessarily desire the new meanings for CO_2 and the operation of CO_2-emitting equipment that RGGI highlights, but because the economic cost of using them is so low they are tolerable (Blanchard, 2008; Scott, 2001). Moreover, because these meanings are tolerable, generators are less motivated to devote time and resources to contesting them by contesting the existence of the policy (Bourdieu & Wacquant, 1992). This position is evident from the regional newspaper coverage of RGGI and the documents describing the RGGI review meetings, both of which indicate support for the policy and its continuation. Generators' acceptance of the meanings embedded within RGGI is also apparent from the ways the policy was contested. In New York, the generator was willing to treat CO_2 as a controlled material and to accept controls on the operation of CO_2-emitting equipment, but contested the policy because it had to pay more to use its equipment than other generators. Similarly, Governor Christie did not pull New Jersey out of RGGI because he thought CO_2 emissions from electrical facilities should not be controlled, but because he thought RGGI was not actually controlling them, or because of his personal political ambitions. Even after this occurred, there was still support for RGGI within New Jersey, as state legislators unsuccessfully tried to rejoin the policy. In both of these cases, the contestation was less about utilizing the new meanings and uses for CO_2 and the operation of CO_2-emitting technologies underlying RGGI, and more about how individuals or organizations, whether a generator or governor, wanted to leverage these new meanings to benefit themselves.

Consumers are willing to use the new meanings for CO_2 and the operation of CO_2-emitting technologies underlying RGGI because the allowance price has been consistently low and because much of the auction revenues are earmarked for their benefit. Low allowance prices and revenue recycling to energy efficiency ensure that generators can continue using their CO_2-emitting technologies to produce reliable and reasonably priced electricity supplies for consumers. This means the new meanings for CO_2 and the operation of CO_2-emitting technologies are being used without significantly increasing the price that consumers pay or restricting their ability to use electricity to achieve the services they desire. RGGI's recycled auction revenues are also being used to reduce the upfront costs that consumers would pay for energy efficiency technologies and practices. This means that consumers receive economically appealing benefits by accepting the use of the new meanings for CO_2 and the operation of CO_2-emitting technologies embedded in RGGI. Consumers are willing to interpret CO_2 as a controlled material and the operation of CO_2-emitting technologies as a controlled activity because doing so does not significantly affect the price or the availability of the electricity they consume and because it produces economic benefits for them (Blanchard, 2008; Scott, 2001). In fact, consumers' support for these meanings has been reinforced as they experienced the lack of costs and emerging benefits of RGGI over the course of the first eighteen allowance auctions. Generators' and consumers' growing acceptance of these meanings can be seen in the region's newspapers. The number of articles that connect CO_2 and electricity topics increased after the enactment of RGGI, and both emitting and non-emitting electrical technologies are increasingly being described through their CO_2 emissions.

Additionally, newspaper coverage of the RGGI policy also suggests the new meanings for CO_2 and the operation of CO_2-emitting equipment the policy encapsulates are becoming more acceptable to consumers and generators, and perhaps are on the verge of being taken for granted. Coverage of RGGI peaked during its design and enactment and gradually tapered off as the policy became more mature. This pattern implies, and the survey and interview data support, that RGGI is becoming just another environmental policy that does not warrant excessive amounts of attention or coverage. The reduction in RGGI coverage suggests that consumers and generators in the region have grown so accustomed to CO_2 allowance auctions and to the new meanings for CO_2 and the operation of CO_2-emitting technologies that underlie them that they no longer need to be discussed as thoroughly. Additionally, the number of articles that contain a positive reference to RGGI has been consistently larger than the number of articles that contain a negative reference, and this has held true even as the overall coverage declined. Furthermore, the arguments used against RGGI have also shifted over the course of the policy's life. The two main arguments initially used to contest RGGI, that it would increase electricity prices and reduce the region's economic competitiveness, implied that CO_2 emissions and the operation of CO_2-emitting equipment should not be controlled. However, as RGGI and the use of these new meanings have not produced these effects, generators and consumers are less motivated to contest the legitimacy of these meanings or the policy, and the use of these contesting arguments declined. The newer argument against RGGI, that the policy is weak, is supported by the underlying understanding that CO_2 emissions and the operation of CO_2-emitting technologies need be controlled, and that RGGI is just not controlling them enough. This shift further supports the claim that generators and consumers in the region are increasingly interpreting CO_2 emissions as a controlled material and the operation of CO_2-emitting technologies as an activity that needs to be restricted. It also suggests, and the RGGI review data confirms, that generators and consumers in the region are more accepting of CO_2- controlling policies and are amenable to stronger or more expansive controls**.**

Generators' and consumers' acceptance of RGGI and its associated meanings for CO_2 and the operation of CO_2-emitting technologies are also affecting how stakeholders and policymakers inside the region interpret the use of CO_2-controlling policies. It is also affecting how stakeholders and policymakers outside the region interpret the use of nearly-full CO_2 allowance auctions. Generators and consumers inside the region had been concerned that using nearly-full allowance auctions would increase electricity prices and cause reliability issues, which would hurt the economic competitiveness of the region, especially if other regions did not enact similar policies. However, as the ongoing operations of RGGI have not brought about these effects, generators and consumers in the region are supportive of the policy and appear amenable to more stringent controls. The acceptance validates a cap and trade CO_2 policy that includes an auction as a viable policy tool, and allows policymakers to consider stronger variations of it. This can be seen from the nearly unanimous support for continuing RGGI, and from the fact that all of the extensions being considered include a tighter emissions cap.

Outside of the region and the country, emissions auctions and especially nearly-full auctions have also been viewed as political anathemas. Generators and consumers have been concerned about auctions' effects on the price and availability of electricity supplies. As a result of these fears, policymakers did not actively consider full or nearly-full allowance auctions as viable policy tools they could utilize to control CO_2 emissions. However, generators and consumers in the RGGI states are supporting the policy and accepting the new meanings embedded in it. This support is prompting policymakers outside of the RGGI region and the U.S. to reconsider the viability of using partial or nearly-full allowance auctions to control CO_2 emissions. In particular, the use of allowance auctions was included in the failed Waxman-Markey bill, but also in the newly enacted California cap and trade policy (California Environmental Protection Agency: Air Resources Board, 2012a; Waxman, 2009). An allowance auction is also being considered for the newly revitalized WCI and has recently been incorporated into the existing European Union CO_2 Emissions Trading System (European Commission, 2011; Western Climate Initiative, 2012c).

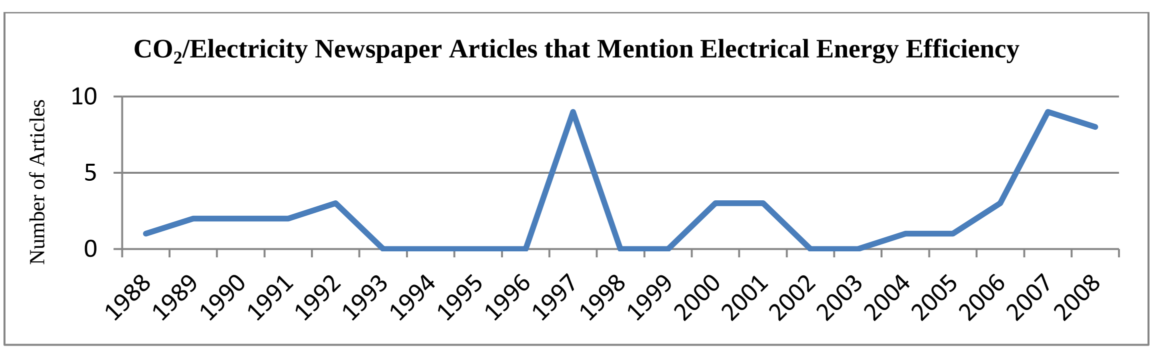
Data and Analysis about RGGI's Energy Efficiency Revenue Recycler

This section presents and analyzes data about the effects RGGI's energy efficiency revenue recycler is having on electrical companies, consumers, and PUCs. Data that describe how these individuals and organizations had been interpreting the use of electricity and energy efficiency technologies and practices are presented first. They are followed by data that depict how PUCs, electrical companies, and consumers interpret and use electricity and energy efficiency technologies and practices after the creation and allocation of RGGI's energy efficiency funds. Lastly, data about innovative approaches to marketing existing energy efficiency initiatives, reducing electricity consumption, measuring reductions in electricity consumption, and integrating demand-side resources into electrical systems are discussed. Then, the presented information is analyzed to answer whether RGGI is changing how electrical companies, consumers, and PUCs interpret and use energy efficiency technologies and practices, and if these changes are influencing innovation in and the diffusion of them.

Energy Efficiency in the Region before RGGI

Electrical companies, consumers, and PUCs in New England and Mid-Atlantic states had been aware of the connection between CO_2 emissions, electricity, and energy efficiency initiatives before RGGI, but their attention to this relationship fluctuated. This can be seen in the pattern of newspaper articles from *The New York Times* and *Boston Globe* that connect CO_2 and electricity topics and reference energy efficiency. The number of articles connecting these three topics increased at times during the 1990s and 2000s, but the coverage was not maintained. Furthermore, between these spikes in interest coverage of the three topics often ceased completely. The 1997 spike in coverage overlaps with design and adoption of the Kyoto Protocol, which drew considerable attention to CO_2 emissions, global climate change, and different strategies for reducing CO_2 emissions, including energy efficiency initiatives (United Nations Framework Convention on Climate Change, 2012a). The more recent spike in coverage occurred during the late 2000s when a number of proposed federal CO_2 policies, as well as the initial development of RGGI brought CO_2 and global climate change back into the public discourse (Cohen & Miller, 2012; Pooley, 2011).

Figure 28



The chronological progression of *Boston Globe* and *The New York Times* articles referencing energy efficiency suggests that utilities and consumers in the region were not consistently motivated to use technologies and practices that reduce electricity consumption to manage CO_2. The next two sections explore why electrical companies and consumers would not be self-motivated to deploy and adopt energy efficiency initiatives.

Energy Efficiency for Electrical Companies

The electrical companies comprising the electrical industry had been aware of the relationship between CO_2 emissions and energy efficiency. In fact, *PER* industry articles reference the two topics together as far back as 1989. Even with this early awareness, electrical companies' attention to the relationship between CO_2 and energy efficiency topics fluctuated significantly. The pattern of *PEM* articles that reference CO_2 and energy efficiency topics still exhibits some volatility, although it is less than what is found in the earlier *PER* publication. After 2006, more industry articles reference CO_2 and energy efficiency topics than ever before, but of late the number of articles that do so is declining. However, the number of articles referencing these topics in 2010 is just slightly below the maximum number of articles that referenced them in the past.

Figure 29

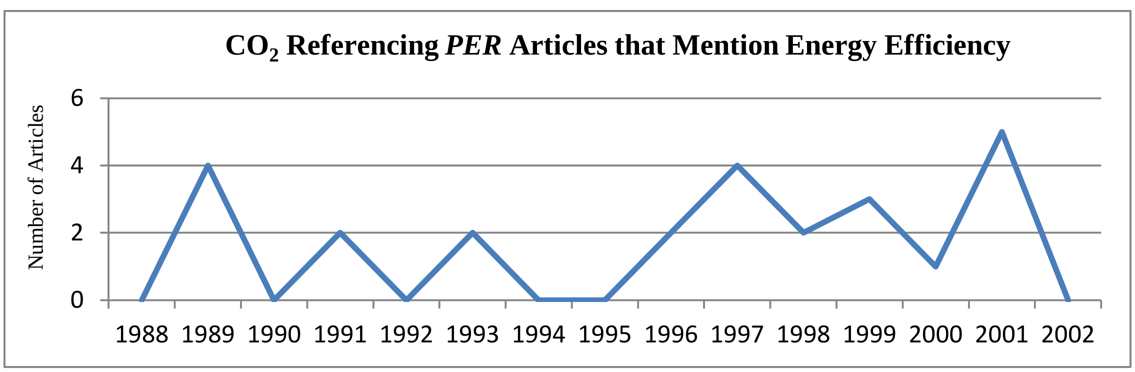
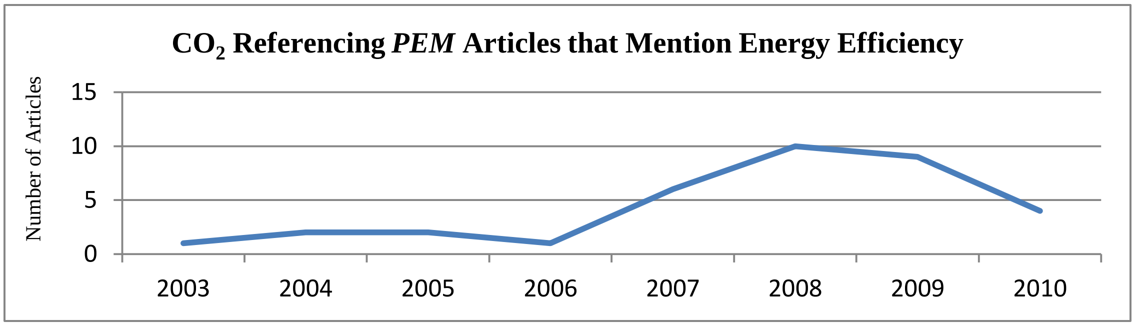


Figure 30

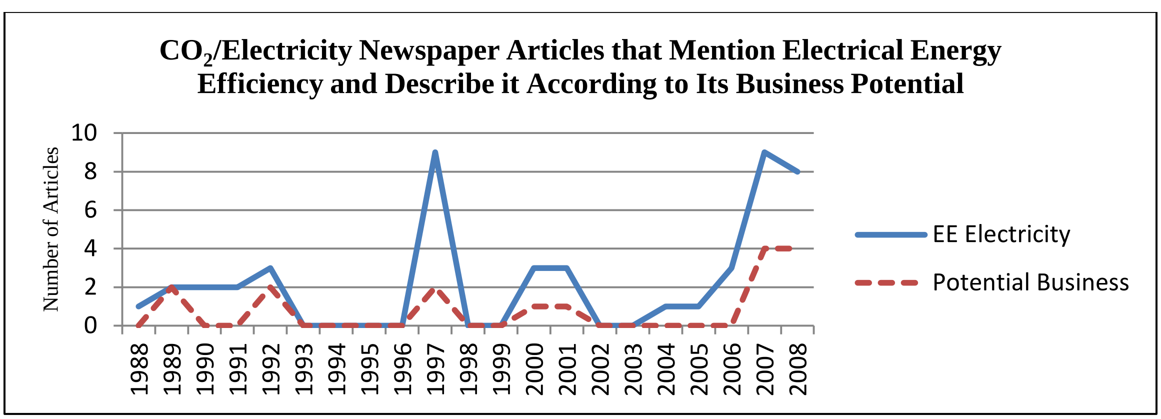


Electrical companies had not been self-motivated to deploy energy efficiency technologies and practices that reduce electricity consumption to manage CO_2 emissions because doing so limits their revenues and costs them money to implement (Hayes et al., 2011; Kushler et al., 2006). An individual working in energy efficiency in the region stated that electrical companies are not concerned with end use energy efficiency unless they are pressured by regulators. The interview highlights that utilities are willing to deploy energy efficiency initiatives that reduce electricity consumption if regulators enact requirements, but that companies are not proactively doing so.

Figure 31

Interview: Utilities' Involvement with Energy Efficiency When There Is Less Funding		
Business Development: Energy Efficiency Company	Utilities are not self-motivated to deploy energy efficiency when it is not a profit source	"I mean the utilities are only going to really do what the regulators and/or the legislators require them, from an efficiency point of view ... from a utility standpoint is just simply, the regulator tells us we need to meet this much energy efficiency, let's find out exactly what that means ... how we meet that in, you know, in a way that disrupts the rest of our operations in as small a means as possible ..."

Figure 32



One reason why electrical companies would not be self-motivated to use energy efficiency initiatives that reduce electricity consumption to manage CO_2 emissions is because they could not earn a profit from doing so (Kushler et al., 2006). This can be seen when the line graph depicting the number of newspaper articles referencing CO_2, electricity, and energy efficiency in the region, is expanded to include the number of these articles that describe energy efficiency as a potential business opportunity. Until the late 2000s, energy efficiency was only occasionally described as a potential business within these articles. This meant there were limited opportunities in the region to profit from using energy efficiency initiatives that reduce electricity consumption. Without these available opportunities or energy efficiency requirements, electrical companies are not motivated to use energy efficiency initiatives that reduce electricity consumption to manage CO_2 emissions even though they are aware of this benefit.

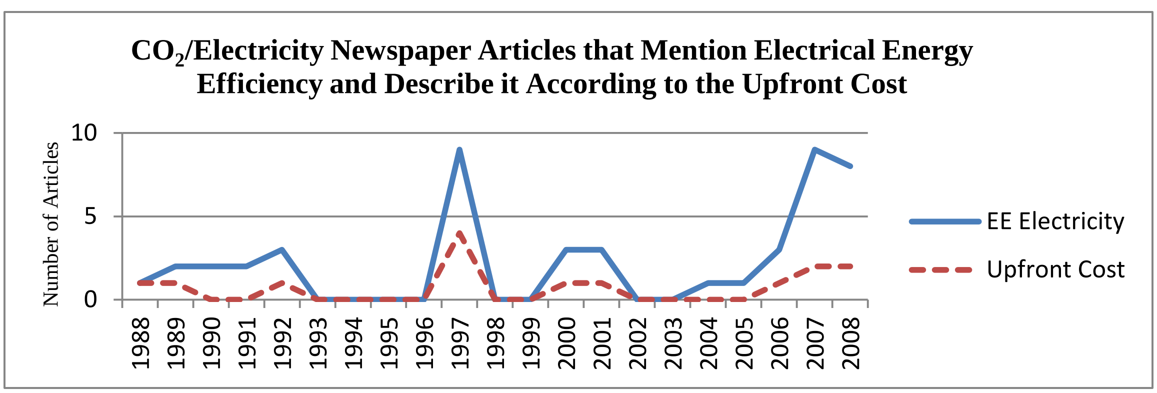
Energy Efficiency for Consumers

Many consumers of electricity also do not appear to be self-motivated to adopt energy efficiency technologies and practices that reduce electricity consumption to manage CO_2 emissions (Jaffe & Stavins, 1994a; Zhao et al., 2012). Both interviews and industry publications identify cost considerations as the primary barriers to adoption. These include the upfront cost of purchasing new equipment or implementing new practices, as well as a lack of motivation that arises due to low electricity and energy costs (Jaffe & Stavins, 1994a; Zhao et al., 2012). It is also apparent that existing understandings of electricity consumption and energy efficiency technologies and practices make their use seem unappealing or unnecessary. These positions are reinforced by utilities' behaviors, which make it difficult for consumers to become aware of their consumption patterns, how to reduce them, and how these reductions can be funded. However, energy efficiency organizations, and the clean energy industry publication, state that consumers would be more receptive to adopting energy efficiency initiatives if doing so is easy or free.

Figure 33

Interviews and Archival Documents: Consumers' Involvement with Energy Efficiency When There Is Less Funding		
Green Tech Media: 12/14/2011	Consumers don't adopt energy efficiency because they want to avoid new costs	"The problem with energy efficiency is how to pay for it upfront. Even if the payback for lighting upgrades or HVAC improvements pay off in less than a year, many companies still can't get the financing, or don't want to spend the money."
Business Development: Energy Efficiency Company	Consumers don't adopt because they want to avoid new costs and don't see the benefits	"It [energy efficiency] needs to be, at least initially, free, it needs to be simple, and it needs to be easy."
Green Tech Media: 8/11/2011	Consumers don't adopt because they want to avoid new costs and don't see the benefits	"Consumers remain unconvinced of the value of energy efficiency, in part due to skewed perceptions of its true cost."
Env. Engineer: Municipal System	Consumers don't adopt because they don't see the benefits	" ... when electricity and gasoline are cheap people aren't thinking as much about them unfortunately, and... it's harder to promote those [energy efficiency] programs and get them going or keep them going. So I guess what I'm saying is that it is only important when it affects their pocket book ..."
Green Tech Media: 10/13/2011	Consumers don't adopt because they want to avoid new costs and don't see the benefits	"People have no clue about how to save energy or where to go for accurate information ... most Americans don't have the money or inclination to pay upfront for upgrades, even if the payback would come in two years."

Figure 34



For the inhabitants of the RGGI region, nearly all of whom are consumers, the upfront cost of adopting energy efficiency technologies and practices is a significant concern (Jaffe & Stavins, 1994a; Zhao et al., 2012). This can be seen when the line graph depicting the number of articles referencing CO_2, electricity, and energy efficiency in the region is modified to include the number of these articles that describe energy efficiency as an upfront cost. Within the articles that reference CO_2, electricity, and energy efficiency topics many also describe energy efficiency initiatives according to their upfront costs. When consumers interpret energy efficiency technologies and practices as upfront costs, they are less motivated to adopt them to reduce their electrical consumption or to reduce their CO_2 footprint even if they are aware of these benefits. The next section identifies how PUCs can use new energy efficiency funds to encourage utilities to deploy and consumers to adopt energy efficiency initiatives.

Energy Efficiency for PUCs

As the organizations involved with implementing and funding energy efficiency programs, PUCs are familiar with energy efficiency technologies and practices (York et al., 2012). In practice, PUCs' desire to improve the efficient use of existing electrical supplies can be low when electricity supplies are readily available and inexpensive and can be countered by their simultaneous need to minimize price increases for consumers (York et al., 2012). However, pro-efficiency stakeholders, such as energy efficiency organizations, legislators, industry groups, environmentalists, and consumers, are directing PUCs' attention to the benefits energy efficiency can provide even when electricity is inexpensive and readily available. These benefits include the potential economic savings and CO_2 reductions that can be achieved by using energy efficiency technologies and practices to reduce electricity consumption. Pro-efficiency stakeholders may have been able to do this because the RGGI design and enactment meetings included a comprehensive economic analysis of energy efficiency' costs, benefits, and effects on CO_2 emissions. As groups of stakeholders in the region express their support for energy efficiency initiatives, regulators are becoming more receptive to using them and appreciative of their benefits.

Figure 35

Interviews: PUC's Involvement with Energy Efficiency When It Imposes New Costs on Consumers		
Business Development: Energy Efficiency Company	PUCs are reluctant to increase the use of energy efficiency because they don't want to increase prices for consumers and they don't see the benefits	"Regulators hate to like, you know, approve a rate increase or something ... many times the regulators are just implementing legislation that's been passed ... for example all the, all the energy efficiency portfolio legislation that's been passed ... the reason that they're [regulators] doing this [increasing energy efficiency requirements] is because they are forced to by the legislature. But also, you know, they also want to make rate payers happy basically, so a lot of this is just to make them happy as well. Or at least, not make the actual ratepayers happy; make the stakeholders, environmental groups, and everybody else happy."

Figure 36

Interviews: PUC's Involvement with Energy Efficiency When It Does Not Impose New Costs on Consumers		
Strategy: Energy Efficiency Company	PUCs appreciate the benefits and want to increase the use of energy efficiency	"These are numbers [potential electricity savings] that, when utility commissions see, they realize, wow, you know, this is very powerful, this is saving a lot of money for our constituents, and this is, you know ... this approach is actually moving the needle in terms of, you know, abatement of greenhouse gases, and so on ... people are really paying attention and people are giving us a warm welcome at a lot of these public utility commissions, and they want, you know, they want to find ways to, you know, to allow utilities to run these programs at a larger scale."
Director: State Research and Development Agency	PUCs appreciate the benefits and want to increase the use of energy efficiency	"We do see the cost effectiveness and the, you know, the relative benefits outweighing costs with energy efficiency investments. We're going to set a new target goal of 15 percent of our electricity is going to come from energy efficiency by the year 2015."

PUCs have been able to implement new energy efficiency requirements, standards, and incentives without increasing electricity rates because increasing amounts of funding are becoming available. Funding for energy efficiency comes from traditional system benefit charges and new sources such as TARRA and RGGI (U.S. Department of Energy, 2012; York et al., 2012). Instead of billing consumers, PUCs are using these new resources to fund the energy efficiency initiatives electrical companies have to undertake to comply with energy efficiency standards (York et al., 2012).

Figure 37

Interviews and Archival Documents: The Connection Between RGGI, Energy Efficiency Funds and Standards		
Fellow: Env. Think Tank	RGGI is creating new funds for energy efficiency	"[RGGI] raised, you probably know the number now, what is it 950 million dollars it has raised, more than that. That has, that has been funneled into energy efficiency and strategic energy planning at the state level, and the region. That's a lot of money. That's a lot of light bulbs."
Energy Efficiency: Municipal	RGGI is creating new funds for energy efficiency	"There is a reluctance to charge customers to create [energy efficiency] programs because, obviously, they don't want to increase customer's bills. So there is that focus on the municipal end and, but there is also in [RGGI state], in the Northeast, we have this thing called the Regional Greenhouse Gas Initiative (RGGI), and a lot of those revenues flow to the state, and in [RGGI state], I believe it is 80% of its revenues have to flow to energy efficiency programs."
Green Tech Media: 8/20/2011	A RGGI state has the strongest energy efficiency standard	"Massachusetts overtook California with its aggressive Green Communities Act, which was passed in 2008. The initiative, which ACEEE called 'the most aggressive EERS [Energy Efficiency Resource Standard] in the nation,' calls for a 2.4 percent savings in electricity sales and 1.5 percent for natural gas in 2012."
Business Development: Energy Efficiency Company	RGGI states are at the forefront of energy efficiency standards	"I mean usually there is [sic] a couple commissions that are leaders, you know, CA is always a leader, some of the east coast states, and then the other ones eventually follow ..."

The American Council for an Energy Efficiency Economy (ACEEE) compiles annual lists of states' involvement with energy efficiency initiatives. RGGI states occupy a number of the top ten spots on the latest list and are allocating significant financial resources to support energy efficiency (Foster et al., 2012). RGGI states' commitment to energy efficiency is evident from both the raw sums of money, the percentage of utility revenues spent on energy efficiency, and their use of energy efficiency requirements, standards, and incentives (American Council for an Energy-Efficiency Economy, 2012b; Foster et al., 2012). With this money electrical companies or energy efficiency organizations are reducing the first cost barrier for consumers, through both incentives and education. The money also allows PUCs to create incentives for electrical companies that exceed their energy efficiency requirements. The next two sections illuminate how these financial resources are motivating electrical companies and consumers to deploy and adopt energy efficiency technologies and practices that reduce electricity consumption.

Figure 38

State	ACEEE 2012 EE Rank	2011 EE Budget (Millions)	% of Statewide Utility Revenues	EE Standard or Requirement	EE Performance Incentive
ME	**25**	**$22.8**	**1.59%**	**Yes**	**No****
NH	**18**	**$25.6**	**1.59%**	**No**	**Yes**
VT	**5**	**$40.7**	**5.64%**	**Yes**	**Yes**
MA	**1**	**$453.0**	**5.77%**	**Yes**	**Yes**
RI	**7**	**$54.2**	**5.34%**	**Yes**	**Yes**
CT	**6**	**$138.3**	**2.83%**	**Yes**	**Yes**
NY	**3**	**$1,073.2**	**4.69%**	**Yes**	**Yes**
DE	**27**	**$3.3**	**0.25%**	**Yes**	**No**
MD	**9**	**$156.4**	**2.05%**	**Yes**	**No****
NJ	**16**	**$225.0**	**2.05%**	**Yes***	**No*****

***Not Binding ** In development or just approved ***Eliminated in 2011**
Sources: ACEEE 2012 State Energy Efficiency Scorecard and ACEEE State Energy Efficiency Database.

Energy Efficiency for Consumers after First Costs Are Removed

Portions of RGGI's recycled revenues are being used to reduce the adoption cost of energy efficiency technologies and practices. When the first cost barrier can be removed, whether through funding or education, consumers are more receptive to the use of energy efficiency technologies and practices. More specifically, after the fiscal costs and cognitive obstacles are eliminated consumers are more likely to view reducing electricity consumption through energy efficiency as a viable solution to their problems. These problems include macro issues, such as their CO_2 emissions, or micro issues, such as their energy costs or personal comfort. This change can be seen in the region's newspaper coverage of CO_2, electricity, and energy efficiency topics. When 2009 and 2010, the first two full years of RGGI funding, are added to the graph the number of articles referencing CO_2, electricity, and energy efficiency topics almost doubles. The number of articles that reference the upfront cost of energy efficiency also falls to zero. In interviews individuals involved with energy efficiency also described how consumers are more receptive to energy efficiency and appreciative of its many benefits after the first cost barrier is removed. Once it is removed, energy efficiency organizations are able to utilize a broader array of arguments and approaches to help consumers actually reduce their electricity consumption.

Figure 39

Interviews: Consumers' Involvement with Energy Efficiency When There Is More Funding		
Director: State Research and Development Agency	Consumers are more willing to adopt energy efficiency when it is no longer interpreted as an upfront cost	"What we're hoping to do is influence the marketplace from the upstream all the way through the downstream ... so the retailer is actually educating the consumer on their energy use, on what kind of energy purchases they can make, and even though certain energy efficiency may come at a higher upfront cost ... operating energy efficiency equipment over the life of the equipment will reduce an overall lower cost to the consumer because of the energy savings that will be realized over time ... You know, consumers understand that once, once they're educated, but unfortunately, without that kind of engagement and education consumers will tend to look to that first cost barrier, first cost barrier is one thing that our programs are designed to try to get around."

Figure 40

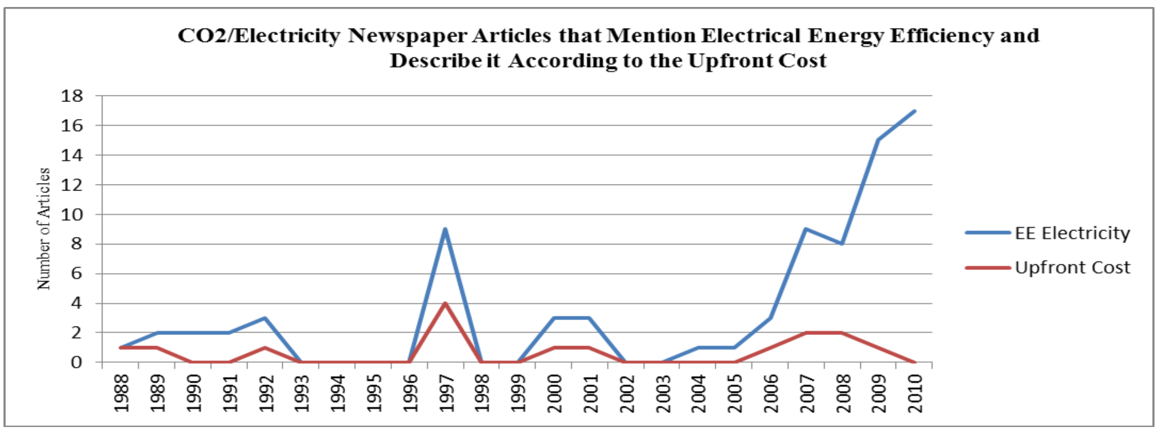


Figure 41

Interviews: Consumers' Interpretations of Energy Efficiency's Benefits After Cost Issues Have Been Removed		
Business Development: Energy Efficiency Company	Once consumers stop interpreting energy efficiency as an upfront cost they are better able to see the other benefits it can provide	"Any efficiency program should be free, it should be easy, and it should be rewarding, it should give people a choice about what they want to do, to save energy, help them with those choices, give them incentives about saving energy overall ... it [energy efficiency] needs to be valuable to them, right. And that value can take a lot of different forms, it can take a form of them just feeling good about themselves, it can take a form of them feeling more comfortable in their homes, because of their insulation, it could be valued because they have lower energy bills, it could be valued because they entered a lottery and get a lot of kick out seeing if they've won every week."

Energy Efficiency as a Business Opportunity for Electrical Companies

PUCs are also using energy efficiency funds, such as those provided by system benefit funds, TARRA, and RGGI, to create incentives for electrical companies (U.S. Department of Energy, 2012; York et al., 2012). These incentives make reducing electricity consumption through the use of energy efficiency initiatives a lucrative endeavor. Energy efficiency incentives enable electrical companies to earn a return on the money they spend on energy efficiency initiatives. This return is comparable to the one that PUCs allow utilities to earn from constructing new transmission and distribution equipment that can deliver larger amounts of electricity. These incentives make reducing electricity consumption through energy efficiency efforts more appealing to eligible organizations. They also motivate ineligible organizations, such as municipal systems, to try to become eligible. Additionally, energy efficiency organizations and industry groups are also working with PUCs to identify and implement new ways to make reducing electricity consumption through the use of energy efficiency initiatives a profitable business opportunity.

Figure 42

Interviews: Utilities' Involvement with Energy Efficiency When They Can Earn Revenues From Using It		
Manager: Energy Efficiency Company	Utilities are more interested in deploying energy efficiency when they can interpret it as a profit source	"There are very generous incentive programs for utilities to actually, you know, perform, implement energy efficiency. So once they, once you got it out of, out of your, affecting your revenue it became, in terms of negatively, it really has become a very positive revenue stream for them. "
Energy Efficiency: Electrical Industry Group	Utilities are more interested in deploying energy efficiency when they can interpret it as a profit source	"We work with a lot of state commissions and utilities to describe different business models that support energy efficiency ... that's kind of where performance incentives come in, where you can actually ... have some goals and then have a reward for the utility to hit those goals, and usually the performance incentives are kind of in the same range as, as the rates of return for, on capital assets. And that's sort of where you make energy efficiency sort of equal or on par to investments in generation assets ... some utilities say, wow, I can actually make money off this [energy efficiency], and make good money off this ..."
Energy Efficiency: Municipal	Utilities are more interested in deploying energy efficiency when they can interpret it as a revenue source	"... that is another source of funding that we are trying to work on and that effort entails developing a plan, and saying to the state that 1) you don't have jurisdiction over us, but we have an energy efficiency plan that should meet the requirements of getting this RGGI funding."

When electrical companies can view the reductions in electricity consumption induced by energy efficiency initiatives as a source of profits they are more willing to interpret their use as a solution to other problems they are experiencing. These problems include CO_2 emissions, siting concerns for new power plants, and low customer engagement or satisfaction. This response can be seen from the interviews as well as from the regions' newspaper coverage of CO_2, electricity, and energy efficiency topics when 2009 and 2010 data are included. As indicated, the number of articles referencing CO_2, electricity, and energy efficiency almost doubled during this period, but within these articles energy efficiency is also described as a business opportunity much more frequently than it ever had been.

Figure 43

Interviews: Utilities' Appreciation of Energy Efficiency's Benefits After It Is Profitable		
Principal: Energy Efficiency Company	When utilities view energy efficiency as a profit source they want to use it to meet demand	"It's [energy efficiency] certainly being pushed by the utilities anyway. It's more convenient that way to make their consumers more efficient than build generation under uncertain legislation of a carbon market."
Energy Efficiency Manager: Municipal	When utilities view energy efficiency as a profit source they want to use it to meet demand and to save money	"It's more beneficial, more cost effective to be more efficient with what energy we have now and find a solution that way, instead of relying on creating new generation and just being less efficient with it, I guess that's really the bottom line. The costs for creating new generation outweigh, are vastly more than just being more efficient with what we have."
Strategy: Energy Efficiency Company	When utilities view energy efficiency as a profit source they want to use it to improve customer satisfaction	"We've actually measured, in a test and control fashion, an increase in customer satisfaction, overall customer satisfaction with the utility in places where we have this program running ... And more and more this is coming up, if not the primary reason, certainly a close second, a secondary motivation for utilities to do this [use their energy efficiency program]."

Figure 44

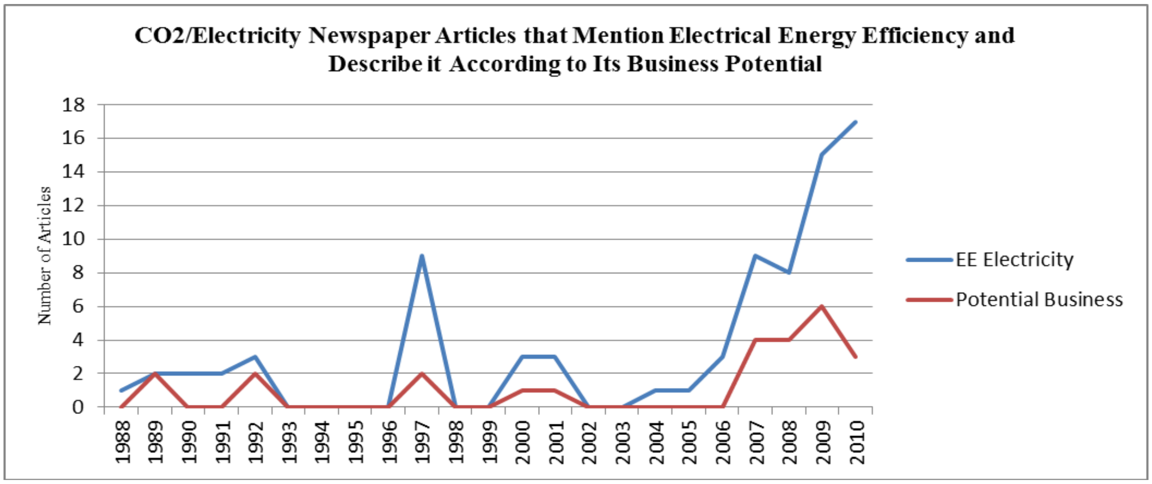


Figure 45

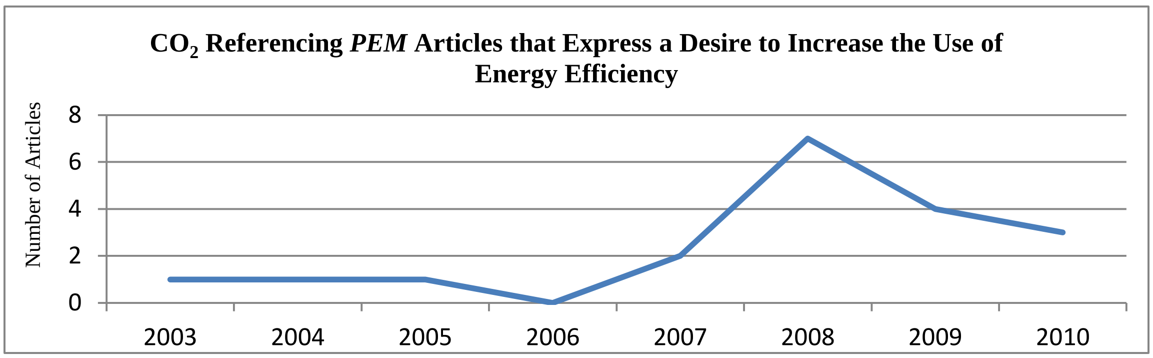
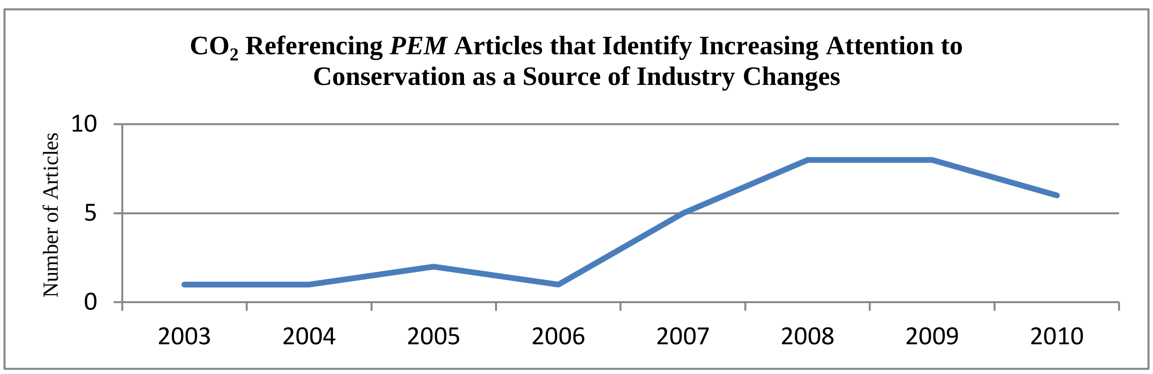


Figure 46



Electrical companies' increasing interest in reducing electricity consumption through the use of energy efficiency initiatives to manage their CO_2 emissions is also evident at the industry level. This makes sense because energy efficiency funds are being used to create performance incentives around the country (Foster et al., 2012). Furthermore, the increasing industry-wide appeal of using energy efficiency initiatives to reduce electricity consumption and CO_2 emissions is also triggering a number of innovations in the presentation and design of these initiatives, and in how demand-side resources are integrated into electrical systems. The next section illuminates a number of these innovations and describes how utilities', consumers', PUCs' increasing desire to reduce electricity consumption through energy efficiency initiatives are facilitating their emergence.

Energy Efficiency Innovations

Increasing amounts of energy efficiency funding are empowering PUCs to expand the use of energy efficiency requirements, standards, and incentives (Foster et al., 2012; York et al., 2012). This money is being used to reduce the first cost of adopting energy efficiency initiatives for consumers and to make reducing electricity consumption through the deployment of these initiatives profitable for electrical companies. After the first cost of and lack of profits associated with reducing electricity consumption are addressed, it is easier for consumers and electrical companies to recognize and appreciate the benefits of adopting and deploying energy efficiency initiatives, including their ability to reduce CO_2. These positive interpretations are prompting electrical companies and consumers to actually deploy and adopt energy efficiency technologies and practices that reduce electricity consumption. In fact, increasing amounts of funding, requirements, and interest for using energy efficiency initiatives are spurring a number of energy efficiency innovations within and beyond the RGGI region (Foster et al., 2012; York et al., 2012). These innovations include new strategies for incentivizing a more efficient use of electricity, novel energy efficiency technologies and practices, improvements in how reductions in electricity consumption are evaluated and measured, and changes in how energy efficiency resources are integrated into electrical systems. To begin with, the aforementioned performance incentives represent a new and innovative way to make reducing electricity consumption through energy efficiency a profitable activity. These potential profits are motivating electrical and energy efficiency organizations to expand the use of energy efficiency technologies and practices.

Figure 47

Interviews: Innovation In How Energy Efficiency Initiatives Are Deployed		
Business Development: Energy Efficiency Company	Energy efficiency initiatives motivate utilities and energy efficiency orgs. to deploy energy efficiency	"Now what's interesting is the paradigm for that model, which essentially still exists today, has taken a pretty big, has undertaken a pretty big shift, in the last five or six years, and that's basically from a, a model that revolves around just giving the utilities money, a sort of set amount of money, and asking them to spend that wisely, versus, having measurable goals of energy savings that they have to meet in as cost effective a manner as possible, and then there's generally incentives, both positive and negative, for meeting or not meeting those goals.

Larger amounts of energy efficiency resources also enable PUCs to implement new and to strengthen existing energy efficiency standards and requirements for utilities (Foster et al., 2012; York et al., 2012). To meet these new requirements and to capture the new performance incentives, utilities are scaling up their involvement with and deployment of energy efficiency initiatives. Some electrical companies are developing these initiatives themselves, while others are soliciting requests from the expanding population of pure energy efficiency organizations. Electrical companies and energy efficiency organizations can profit from reducing electricity consumption through the use of energy efficiency initiatives, so they are expanding the use of existing initiatives and searching for new types of energy efficiency technologies and practices. In particular, these organizations are working to identify and develop new ways to reduce electricity consumption at lower costs.

Figure 48

Interviews: Innovation In Energy Efficiency Initiatives and In How They Are Deployed		
Business Development: Energy Efficiency Company	Energy efficiency standards motivate utilities and energy efficiency orgs. to identify new ways to reduce electricity consumption and to deploy them	"When we started we saw a lot more RFPs [requests for proposals] that we're very, very product focused, and said, you need to have this product, selling this product, blah, blah, blah, as we've gone on we're seeing a lot more RFPs, which are, are frankly a lot better, which are saying, here is our goal, how do you meet our goal ... when you are under this performance basis, they can say, hey here's the market price of you delivering to me a verified energy saving, go out and do it however you want, basically. And then you're like, okay, great, so I can go out and experiment."

This search has led to two broad energy efficiency innovations. The first is that energy efficiency programs are being redesigned to be more accessible to consumers and more aligned with how they actually perceive and use electricity. More specifically, energy efficiency organizations are learning about consumers' behaviors, how they interpret energy efficiency technologies and practices, and how they interact with the provider itself in order to bring about further reductions in electricity consumption. Due to the technical nature of the electrical system and the associated culture of electrical companies, it has been difficult for them to identify and resolve these issues themselves. This is facilitating the emergence and expansion of pure energy efficiency organizations that are working to bridge the gap between the utility and the consumer.

Figure 49

Interviews: Innovation In How Energy Efficiency Initiatives Are Designed and Marketed		
User Engagement: Energy Efficiency Company	Re-designing energy efficiency to be consumer friendly makes it easier for them to adopt them	"A lot of this energy stuff is so dense, just pulling that out and … actually making it easy to read, and understandable by like human beings, has been probably the biggest thing we have done. It sounds like so simple, but, you know, I can't tell you how many times I've talked to users where they are like, oh I know the energy company has information on this, but I just can't read it … electricity stuff is not a technical issue, you know, it's now getting to the point of, like this is a behavioral and human, human interaction issue. And if you look at the staff of the utility companies, there is not a single person that does that on their staff. Which is, you know, really indicative of what, how they approach their programs."
Clean Energy Innovation: Env. Regulator	Re-designing energy efficiency to be consumer friendly makes it easier for them to adopt them	"The big thing there was just making people aware of how much energy they are using, and how, and getting them to feel that they were either a very efficient building or not, and making them move towards it. So it was a lot of, you know, just basic data, like getting people to understand that they need to look at their bills."
Strategy: Energy Efficiency Company	Re-designing energy efficiency to be consumer friendly makes it easier for them to adopt them	"The one thing that's remained consistent is that we really believe, like sort of broader strategy and philosophy has been of creating solutions that work for the average consumer."

The second, and related, innovation leverages a more in-depth understanding of consumer behavior to reduce electricity consumption through informational and behavioral programs. Much of the innovation in this area is being driven by pure energy efficiency organizations that are looking for the cheapest and easiest ways to reduce electricity consumption. Instead of replacing existing technologies with more efficient versions of the same technologies, these companies are collecting, analyzing, and diffusing information about electricity consumption to get consumers to change their behaviors. The initial results of these efforts are extremely promising, and because they are informational, and not technological, they can be scaled out or amplified quickly and inexpensively.

Figure 50

Interviews: Innovation In How Electricity is Conserved		
Editor: Energy Media	When utilities want to deploy energy efficiency they are more willing to try behavioral approaches	"You are going to have the hardware light ones come in, there is a company called [Energy Efficiency Company] that does the whole behavioral, kind of encouraging people to reduce their consumption, and showing them ways how they can save money. Those are going to be big, because they are very cheap for the utilities to adopt them, and they are getting about average household consumption reductions [of] 2-3%."
Director: State Research and Development Agency	When utilities want to deploy energy efficiency they are more willing to try behavioral approaches	"[Agency]'s very much engaged in these behavioral approaches ... sort of playing on consumer, on human decision making patterns and consumer decision making triggers and trying to utilize those behavioral patterns as a means of getting consumers to become more aware of their energy choices and then engage in the energy choice."
Strategy: Energy Efficiency Company	When utilities want to deploy energy efficiency they are more willing to try behavioral approaches and when consumers want to adopt energy efficiency they are more willing to change their behavior in response to information	"Traditionally, the energy efficiency community has been almost exclusively focused, I would just say exclusively focused on, what they call, installed, quote unquote, installed measures, which are things that you can put inside the homes, physical things, that, that actually change the constitution of your house. And those were the things that count as energy efficiency ... What we've done is essentially introduced a new notion, which is using information only, you can actually get, engage people and motivate them to change their behavior in a permanent way, and ... sort of the fundamental premise is that behavior, not just the installed measures, is an integral part of energy efficiency, one cannot go without the other ... You can really, just using information only, really help people become more aware, ... and then make small changes that makes their behavior more energy efficient."

Electrical companies are increasingly interested in deploying energy efficiency initiatives because they can profit from their use, and consumers are increasingly willing to adopt these technologies and practices when they are free or inexpensive (Hayes et al., 2011; Zhao et al., 2012). As a result, the amount of energy efficiency resources that are being created by expanding traditional technological approaches and instigating new behavioral approaches is rapidly expanding (Foster et al., 2012; York et al., 2012). The increasing presence of demand-side resources in the electrical system is also driving a number of innovations (Foster et al., 2012; York et al., 2012). These innovations can be broadly classified as integration innovations, in that they revolve around integrating larger amounts of energy efficiency resources into ISO systems and wholesale electrical markets. The most significant innovation simply involves a better understanding of the reductions in electricity consumption that energy efficiency technologies and programs are able to achieve. While this may seem like a simple exercise, electrical companies have had little incentive to actually measure the reductions in electricity consumption they are achieving, and to do so with a high level of rigor. One of the main measurement innovations involves the use of experimental design. Energy efficiency organizations deploy a particular initiative to a treatment population of consumers. They then compare the resulting changes in electricity consumption with the amount of electricity consumed by a control population that did not receive the initiative.

Figure 51

Interviews: Innovation in How Energy Efficiency Is Evaluated, Measured, and Verified (EMV)		
Business Development: Energy Efficiency Company	When utilities, PUCs, and consumers are more involved with energy efficiency better EMV methods are needed	" ... so the only way to actually measure what is going on is to use real billing data, with a treatment versus a control, which is what, which is what we do, a few others are starting to do that as well, but it's still relatively rare, and that's what, that's what we're really pushing for in the industry. That if you want to make this real, you have to use real billing data, and you have to have a treatment versus a control."

The increasing amount of demand-side resources that are appearing in the region is also prompting ISOs to develop plans for integrating these resources into their long-term system plans (Foster et al., 2012; York et al., 2012). Reductions in electricity consumption, or demand-side resources, are fundamentally different from traditional supply-side resources, in both their consistency and their availability (American Council for an Energy-Efficiency Economy, 2012a). ISOs have to change how they value and account for demand-side resources in order to use larger amounts of them to meet current and expected electrical demand. This need is further driving the development of more rigorous measurement and evaluation approaches. ISOs cannot use demand-side resources to assure long-term electrical availability if they do not have an accurate understanding of the size and availability of these resources. As better evaluation methods are emerging, ISOs are gaining confidence that demand-side resources will be available and that their estimated size is correct. This then allows ISOs to utilize larger amounts of demand-side resources to meet current and projected demand.

Figure 52

Interviews: Innovation in How Energy Efficiency Is Evaluated, Measured, and Verified (EMV)		
Director: State Research and Development Agency	When utilities, PUCs and consumers are more involved with energy efficiency, and when it is used to meet demand more rigorous EMV approaches are needed	"Now that we're at the fifteen percent [energy efficiency requirement], the ISO is very much engaged in trying to ensure they have an understanding of how much of that efficiency they can reliably look to in their system planning activities ... We've shifted a little bit to that, to get a higher level of rigor standard in our evalu – methodology, so that when we quantify the savings we're doing it at, at what we call a 90-10 confidence level, so at the end of our evaluation we're 90 percent confident that the result of our evaluation is within ten points of, of providing the efficiency, the quantified efficiency savings that are being demonstrated from the evaluation results ... So if [the agency], for instance, said we had a 100 kilowatt hours of energy efficiency in this year, the [ISO] would say, okay, well at, you know, at a lower level of rigor we're actually going to count maybe thirty percent of, of those kilowatt hours for our system planning purposes. Now, in our talks with the ISO, given our higher levels of rigor and program structures, they are now looking to adopting upwards of seventy percent of those efficiency savings as, as real, and as part of the demand profile, so, so that is, you know, a very significant change in the way, you know, our system planning is, is accounting for energy efficiency ..."

Lastly, the increasing presence of accurately measured demand-side resources is also driving changes in the wholesale electricity markets that are found in the region (American Council for an Energy-Efficiency Economy, 2012a; Federal Energy Regulatory Commission, 2011; Foster et al., 2012; York et al., 2012). In particular, ISOs in the region are starting to allow demand-side resources that are created by reducing electricity consumptions through the use of energy efficiency initiatives to be bid into wholesale electric markets, just like supply-side resources. The inclusion of demand-side resources in wholesale markets represents a significant innovation, and the presence of this type of market is encouraging other ISOs to explore similar structures (American Council for an Energy-Efficiency Economy, 2012a; Federal Energy Regulatory Commission, 2011). However, the increasing use of demand-side resources in wholesale markets and the growing number of electrical regions that include this market structure are also driving further changes in how reductions in electricity consumption are evaluated and measured (American Council for an Energy-Efficiency Economy, 2012a; Federal Energy Regulatory Commission, 2011; Foster et al., 2012). Many of the proposed changes are being evaluated at a national level and are currently informing how other ISO regions evaluate demand-side resources on their own and as part of wholesale electricity markets (Federal Energy Regulatory Commission, 2011).

Figure 53

Interviews: Innovation in Energy Efficiency's Inclusion in Wholesale Electricity Markets		
Manager: Energy Efficiency Company	As utilities and PUCs deploy more energy efficiency and consumers adopt them, DSM resources need to be incorporated into wholesale markets	"2006-7, was the first time that the ISO decided to set a market up that included, what we call ODR, other demand resources, they had had a market that included demand response, and that sort of opened the door, in some ways, to energy efficiency in general and, so that was a, you know, and it still is a, was a pioneer market that we developed in the east here ... we're a not trivial portion of the market now if you consider [Company Name] as a plant, I think we are the second largest bidder, the second largest participant in the [ISO] market from [RGGI state], second only to [Nuclear Plant Name]."
Business Development: Energy Efficiency Company	As utilities and PUCs deploy more energy efficiency and consumers adopt them, DSM resources need to be incorporated into wholesale markets	"If you look at the New England forward capacity market, they have some efficiency [resources] ... So the real key in this, and this is sort of getting fought in the FERC [Federal Energy Regulatory Commission], it's getting fought in the different regional transmission organizations is, is what is the methodology going to be for having demand resources be on the same page as supply, and that principle hasn't been stated by FERC. So it's, this is in motion ..."

Analysis of the Data about RGGI's Energy Efficiency Revenue Recycler

By recycling the revenues from RGGI's CO_2 allowance auction to support energy efficiency, state policymakers are using the policy to modify electricity consumption patterns. Meeting increasing demand for electricity by modifying consumption instead of by expanding the supply reduces the emission of electricity-derived CO_2. It also improves system reliability and limits the need to build and pay for new generation, transmission, and distribution equipment. Increasing demand for electricity was historically met by expanding the supply (Hirsh, 2002). When CO_2 was viewed as a benign, naturally occurring material and the operation of CO_2-emitting equipment was interpreted as a clean, safe, and desirable activity increasing electricity consumption was considered both appropriate and appealing (Hirsh, 2002; Hulme, 2009; Schnaiberg, 1980). However, when CO_2 is viewed a pollutant that needs to be controlled and the operation of CO_2-emitting equipment is interpreted as a less clean, safe, and desirable activity then increasing electricity consumption is considered less appropriate and appealing (Hulme, 2009; Schnaiberg, 1980). Under these meanings and uses of CO_2 and the operation of CO_2-emitting equipment reducing consumption by using electricity more efficiently is considered appropriate and appealing (Hulme, 2009; Schnaiberg, 1980; York et al., 2012). In fact, intertwined with their efforts to shift the meaning and use of CO_2 and the operation of CO_2-emitting equipment, state policymakers are using RGGI's revenues to try to shift how electrical companies', consumers', and PUCs' interpret the use of electricity (Fligstein, 1997; Scott, 2001). Specifically, they are trying to get these individuals and organizations to view the use of energy efficiency technologies and practices that reduce electricity consumption as an appealing endeavor, in the hope they will actually deploy and use them to reduce consumption (Brint & Karabel, 1991; Fligstein, 1997).

Electrical energy cannot be readily stored, so the available supply has to match up with the demand (Casazza & Delea, 2009). Due to this characteristic, improving the efficient use of electricity requires changing the supply- and demand-sides of the system. Electricity consumers can modify their consumption patterns by changing the technologies they power with electricity and how they use these technologies (Casazza & Delea, 2009). Utilities, those with and without generation facilities, determine the available electrical supply and are the main, but increasingly not only, source of information about electricity consumption and distributors of energy efficiency technologies and practices (Casazza & Delea, 2009; York et al., 2012). PUCs also affect the use and adoption of energy efficiency technologies and practices because they implement energy efficiency standards and requirements for utilities and then determine the costs and revenues these companies incur or receive for them (Casazza & Delea, 2009; York et al., 2012). Given utilities', generators', and PUCs' respective roles in shaping consumption patterns, all of them have to see value in and the benefits of reducing electricity consumption through the use of energy efficiency in order for it to occur.

Electrical utilities have been defined as economically rational, which means they interpret and use electricity and energy efficiency initiatives through the profits they can earn from them (Blanchard, 2008; Scott, 2001). As utilities could not traditionally earn profits from reducing electricity consumption through the use of energy efficiency they were not proactively deploying these technologies and practices to manage demand or CO_2 emissions (Hayes et al., 2011; Kushler et al., 2006). This is evident from both the interview data and from the industry publications. The pattern of *PER* and *PEM* articles that reference energy efficiency and CO_2 topics shows that electrical companies had been aware of, but were not always attentive to the relationship between electricity consumption and CO_2 emissions. A similar, but less consistent pattern is also found in the number of articles that connect CO_2, electricity, and energy efficiency topics in the region's newspapers. Within this coverage energy efficiency is rarely described as a potential business opportunity. These findings suggest that electrical companies were aware of energy efficiency's benefits, such as reducing CO_2 emissions and limiting new construction, but their inability to profit from reducing consumption suppressed the salience of these benefits and limited their internal motivation to achieve them. This is consistent with economically rational behavior. Electrical companies would not proactively reduce electricity consumption through the use of energy efficiency initiatives because they could not profit from doing so (Blanchard, 2008). In fact, electrical companies' inability to interpret and use energy efficiency initiatives as a profitable activity appears to produce an anchoring effect (Blanchard, 2008; Scott, 2001). This anchoring effect marginalizes the other positive ways electrical utilities can interpret the use of energy efficiency initiatives. When electrical companies cannot interpret the use of energy efficiency technologies and practices that reduce electricity consumption as a profitable activity, the positive benefits they provide become less relevant. This then prevents utilities from proactively deploying energy efficiency technologies and practices.

Consumers have also been defined as economically rational, which means they interpret electricity and energy efficiency initiatives according to the price they pay for the services electricity provides (Blanchard, 2008; Scott, 2001). Historically, increasing electricity consumption was considered appropriate and appealing, while energy efficient technologies and practices represented new upfront costs for consumers (Hirsh, 2002; Hughes, 1993; Jaffe & Stavins, 1994a; Zhao et al., 2012). This meant many consumers were not interested in reducing their electricity consumption, especially if they had to pay new upfront costs to do so (Jaffe & Stavins, 1994a; Zhao et al., 2012). This is evident from the interviews and the industry and newspaper publications. Interviews and industry publications identify the first cost of energy efficiency technologies and practices as a direct barrier that prevents consumers from adopting them, as well as a conceptual barrier that inhibits them from understanding and valuing the other benefits they provide. The newspaper articles also demonstrate that inhabitants of the RGGI region, almost all of whom are consumers, had been aware of the connection between CO_2, electricity, and energy efficiency. However, the fluctuations in the coverage pattern suggest that consumers' attention to the connection between these topics and their appreciation of energy efficiency's ability to reduce CO_2 emissions has varied over time. In fact, within this coverage just under half of the articles describe energy efficiency according to its upfront costs. This suggests that the upfront cost of adopting energy efficiency technologies and practices overshadows their potential benefits, including their ability to reduce CO_2 emissions and to provide the services that consumers desire with less electricity. So even when consumers are aware of the connection between electricity consumption and CO_2, their appreciation of energy efficiency's ability to reduce emissions and their desire to act on it can be low when doing so requires an initial upfront cost. This is consistent with economically rational behavior. Consumers would not be interested in reducing their electricity consumption through the use of energy efficiency initiatives because doing so creates new costs for them (Blanchard, 2008). In fact, consumers' fixation on the upfront costs of energy efficiency technologies and practices appears to produce a shadow effect (Blanchard, 2008; Scott, 2001). This shadow effect masks the positive ways that consumers can interpret and use energy efficiency initiatives. When consumers interpret energy efficiency initiatives as upfront costs, the other benefits they provide become less apparent. This then prevents consumers from proactively adopting energy efficiency technologies and practices.

Electricity regulators or PUCs have also been defined as economically rational. In this case, this rationality means that PUCs interpret electricity and energy efficiency initiatives according to the costs that consumers pay to get the services they desire (Blanchard, 2008; Scott, 2001). Energy efficiency initiatives had traditionally been funded through system benefit charges that were placed on every consumer's electricity bill (York et al., 2012). This meant that PUCs would be reluctant to expand the use of energy efficiency initiatives when electricity is inexpensive and readily available, even if they wanted to, because doing so would increase the price that consumers pay for electrical service (York et al., 2012). Moreover, PUCs' focus on minimizing the costs that consumers pay for electricity and electrical service also influences how they interpret the use of energy efficiency technologies and practices. In fact, the upfront cost of funding energy efficiency initiatives produces a shadow effect that makes their benefits less visible to PUCs as well, and it is especially pronounced when electricity is inexpensive and readily available. This shadow effect then restricts PUCs' ability and desire to expand the use of energy efficiency technologies and practices.

The upfront cost of deploying and adopting energy efficiency initiatives is partially being addressed by RGGI. Recycling the policy's auction revenues creates additional resources that are being used to fund energy efficiency initiatives in New England and Mid-Atlantic states, and that are not based on increasing the cost of electrical service. When RGGI revenues are combined with existing system benefit funds and the newly allocated TARRA funds they are collectively changing how PUCs interpret energy efficiency technologies and practices by removing a shadow effect (U.S. Department of Energy, 2012; York et al., 2012). With this newly available pool of resources, regulators do not have to interpret the deployment of energy efficiency initiatives as a cost that is imposed on consumers. Once this shadow effect is removed, other meanings or benefits of energy efficiency, such as its ability to reduce CO_2 emissions, become more visible and salient. This is particularly true in the presence of RGGI and because these meanings are being reinforced by pro-efficiency stakeholders in the region. Initially, the positive meanings and benefits of energy efficiency may not have been sufficient to overcome PUCs' reluctance to fund energy efficiency initiatives by increasing the cost of electrical service, especially when electricity was inexpensive and readily available (York et al., 2012). However, PUCs are becoming more aware and appreciative of the benefits energy efficiency provides because the upfront deployment costs are being alleviated by new energy efficiency funds (Foster et al., 2012; York et al., 2012). This can be seen in the interviews and from the ACEEE energy efficiency report card. The report specifically shows the number of RGGI states occupying top spots in the rankings, the funds allocated and spent by RGGI states on energy efficiency, and that all RGGI states except New Hampshire have energy efficiency standards or requirements (Foster et al., 2012).

The emergence of RGGI funds is also changing how consumers interpret energy efficiency technologies and practices by eliminating a shadow effect. When energy efficiency funds are raised without increasing electricity rates, they can be used to directly reduce the upfront cost of these technologies and practices through rebates and incentives, but also to remove it as a potential concern through education. Once consumers no longer view energy efficiency as an upfront cost, it is easier for them to envision and understand how energy efficiency can benefit them, such as by reducing CO_2 or by enabling them to consume less electricity to get the services they desire. This can then motivate consumers to actually change their consumption patterns by adopting energy efficiency technologies and practices. After RGGI revenues became available to fund energy efficiency in late 2008, the number of newspaper articles connecting CO_2, electricity, and energy efficiency topics almost doubled. Furthermore, these articles describe energy efficiency as an upfront cost much less frequently in 2009 and not at all in 2010. Interviews with energy efficiency organizations also demonstrate that consumers are more likely to understand the many benefits that energy efficiency technologies and practices provide and be motivated to act upon them once they are made cost free and user friendly. This supports the notion that removing the relevance of a dominant negative meaning, in this case the cost of adopting energy efficiency technologies and practices, can make other meanings, such as energy efficiency's ability to reduce CO_2, more visible. Once consumers interpret energy efficiency technologies and practices in a number of positive ways, or when they understand the different benefits they provide, it becomes easier for utilities and energy efficiency organizations to help consumers adopt them. By framing energy efficiency initiatives as solutions to consumers' problems, whether climate change or comfort, instead of as a new cost, utilities and energy efficiency organizations are motivating consumers to adopt these technologies and practices and to actually reduce the electricity they consume (Brint & Karabel, 1991; Fligstein, 1997).

Utilities could not traditionally profit from the deployment of energy efficiency technologies and practices that reduced electricity consumption, and this created an anchor effect that marginalized the other ways they could interpret the use of them (Hayes et al., 2011; Kushler et al., 2006). This anchor effect prevented utilities from proactively deploying energy efficiency initiatives to reduce electricity consumption even though doing so could help them achieve other goals, such as reducing CO_2 emissions or avoiding new construction. However, the implementations of energy efficiency performance incentives, which are partially funded through RGGI's revenue recycler, are changing how utilities interpret the use of energy efficiency technologies and practices. Specifically, the creation of performance incentives enables utilities to interpret the deployment of energy efficiency initiatives that reduce electricity consumption as a profitable and viable business opportunity. Once electrical companies are able to view the use of energy efficiency initiatives that reduce electricity consumption as a business opportunity it facilitates their ability to interpret it according to other positive meanings. In this way, RGGI funds are changing how utilities interpret the use of energy efficiency initiatives by eliminating an anchor effect. Making the deployment of energy efficiency initiatives profitable accentuates the dominant way utilities had been interpreting the use of these technologies and practices and makes other positive meanings more appealing (Blanchard, 2008; Scott, 2001).

This effect can be seen in the region's newspaper articles, industry articles, and in the interviews. In the region's newspapers the number of articles that connect CO_2, electricity, and energy efficiency more than doubled after RGGI funds became available. Furthermore, these articles describe energy efficiency as a business opportunity much more frequently than past articles. Within the *PEM* industry journal, the number of articles linking CO_2 emissions with a desire to increase the use of energy efficiency initiatives also grew in the late 2000s after the use of incentives became more common (York et al., 2012). In the same industry publication, the number of articles referencing CO_2 and identifying attention to electricity conservation as a source of industry change also increased once energy efficiency incentives became more widely used (York et al., 2012). The interviews also support the notion that getting electrical companies to view the deployment of energy efficiency technologies and practices as a profitable activity helps them to see and value the other benefits they provide. The interviews specifically show that once electrical companies interpret energy efficiency technologies and practices as a profit source they are more inclined to view their use as a solution to their other problems, such as CO_2 emissions, siting new facilities, and low consumer engagement. Once electrical companies interpret energy efficiency in a variety of ways, or when they value the many benefits of reducing electricity consumption, they are more willing to deploy existing approaches and more open to exploring novel approaches. This is then motivating utilities to reduce electricity consumption themselves, or to work with energy efficiency organizations that are developing new methods for reducing electricity consumption.

A significant portion of the funds that are being used to support energy efficiency initiatives in the region are coming from RGGI's auction revenues. This means the different benefits that are emerging from the use of these funds are creating further support for RGGI, as well as for indirectly managing CO_2 emissions through the use of energy efficiency. When new resources are used to reduce the upfront costs of adopting energy efficiency initiatives and to create performance incentives for their use, it changes how electrical companies, consumers, and PUCs interpret the consumption of electricity. These funds do so by accentuating or suppressing the dominant economic meanings these individuals and organizations had been using to understand the use of electricity and energy efficiency technologies and practices (Blanchard, 2008; Scott, 2001). For consumers and PUCs, RGGI funds are helping to reduce the salience of the first cost meaning which is increasing the visibility of energy efficiency's other benefits, such as reducing CO_2 emissions and more efficiently providing the services that consumers desire. For electrical companies, RGGI funds are helping to elevate a profit-generating meaning for energy efficiency. This is making the other benefits that energy efficiency provides more prominent, such as reducing CO_2 and avoiding new construction, and is increasing utilities' appreciation of them. In other words, RGGI's revenues are directly incentivizing the use of energy efficiency technologies and practices by creating financial rewards and removing first cost barriers. However, in doing so these funds are also indirectly expanding the use of energy efficiency initiatives by making non-economic meanings for them more salient and valuable to electrical companies, consumers, and PUCs. The increasing salience and value of positive economic and non-economic meanings are motivating these individuals and organizations to actually deploy or adopt energy efficiency initiatives to reduce electricity consumption.

The ACEEE's evaluation of the energy efficiency requirements and initiatives occurring in the RGGI states indicates that utilities, consumers, and PUCs are becoming more receptive to reducing electricity consumption through the use of energy efficiency technologies and practices (Foster et al., 2012). As part of this, utilities and energy efficiency organizations are developing and deploying new approaches to help consumers reduce the amount of electricity they are consuming. Key amongst these innovations is energy efficiency initiatives that are specifically designed to appeal to the electricity consumer. This focus on consumers' attitudes and behaviors is driving changes in how energy efficiency programs are marketed to consumers and the types of initiatives that are being developed. More specifically, utilities and energy efficiency organizations are developing informational and behavioral energy efficiency strategies that exploit consumers' ideological and behavioral tendencies to reduce the amount of electricity they consume. However, unlike traditional technological approaches to energy efficiency, reducing electricity consumption through the use of information and behavioral modifications requires the active support of utilities, consumers, and PUCs. It would be much harder, if not impossible, to utilize informational and behavioral programs if utilities and PUCs are not interested in identifying new ways to reduce electricity consumption and if consumers are not actually interested in reducing the amount of electricity they use. Due to these considerations, the emergence of increasingly innovative and sophisticated energy efficiency strategies appears to be driven by utilities', consumers', and PUCs' increasing desire to actually use energy efficiency initiatives to reduce electricity consumption. Electrical companies, consumers, and PUCs want to use energy efficiency initiatives that reduce electricity consumption because the new funds are helping them become increasingly aware and appreciative of the benefits they provide.

The increasing appeal of energy efficiency to utilities, consumers, and PUCs in the RGGI states is expanding the amount of energy efficiency resources that are being developed within the region, and this is driving a number of integration innovations (Foster et al., 2012; York et al., 2012). These integration innovations constitute systemic modifications that allow larger amounts of demand-side resources to be included in the region's electrical systems. They include more sophisticated measurement methodologies and markets for energy efficiency resources. As larger portions of the region's electricity demand are met with demand-side resources, regulators, ISOs, electrical, and energy efficiency organizations all need a better understanding of the degree to which electricity consumption is actually being reduced (Foster et al., 2012; York et al., 2012). This is prompting all of these entities to refine existing and to develop new evaluation and measurement methodologies, so that the savings can be included in regional plans, be used to meet requirements and standards, and be eligible for performance incentives. In particular, many organizations are developing measurement methodologies that are based on experimental design and include treatment and control populations. Under this approach a particular energy efficiency initiative is diffused to the treatment population and not to the control. After running the initiative for a certain amount of time the organization implementing the program would compare the electricity consumed by the treatment and control populations to determine the actual reductions the initiative is achieving.

Similarly, increasing amounts of energy efficiency resources are also driving changes in how these resources are included in the region's wholesale electrical markets (Federal Energy Regulatory Commission, 2011; Foster et al., 2012; York et al., 2012). The most significant change is the development of single wholesale markets that combine traditional supply resources with demand-side resources. Within such a market, organizations stimulating reductions in electricity consumption are able to bid these negawatts into wholesale markets based on the cost of achieving them (American Council for an Energy-Efficiency Economy, 2012a; Federal Energy Regulatory Commission, 2011; Lovins, 1989). The provision of negawatts reduces the amount of megawatts the

ISO has to source to meet the demand for electricity at a particular period of time, which allows supply- and demand-side resources to be incorporated into a single wholesale market (American Council for an Energy-Efficiency Economy, 2012a; Federal Energy Regulatory Commission, 2011; Lovins, 1989). It is important to note that the industry interviewees presented these changes as ongoing paradigmatic shifts within both the region and industry that are occurring but are not yet complete. This makes markets for energy efficiency resources and more sophisticated measurement methodologies innovations in progress.

The Connection between the Effects of RGGI's CO_2 Allowances and Revenue Recycler

The two data and analysis chapters highlight the importance of economic considerations to electrical companies, consumers, and PUCs. Electrical companies, those with and without generation facilities, primarily interpret the physical materials and behavioral actions underlying electricity-derived CO_2 according to their effects on their costs and revenues (Blanchard, 2008; Scott, 2001). Consumers and PUCs primarily interpret these materials and actions according to their effect on the price and availability of electrical supplies (Blanchard, 2008; Scott, 2001). Policymakers identified the central role that economic considerations occupy in electrical companies' and consumers' pre-existing cultural controls and designed RGGI to align with them (Blanchard, 2008; Caronna, 2004; Scott, 2001). In particular, they included a weak cap, a price collar, and pre-existing monitoring and compliance requirements to reduce the economic costs the new CO_2 allowances would create. They also included an energy efficiency revenue recycler so the policy would produce positive economic impacts. Beyond facilitating RGGI's enactment the implementation of these design features are also producing a number of effects. However, because RGGI's low allowance price is limiting the policy's formal effects, the most significant of these effects are informal and revolve around how individuals and organizations interpret and use CO_2, the operation of CO_2-emitting technologies, electricity, and energy efficiency initiatives. In fact, the effects identified in this chapter are primarily emerging because RGGI's limited formal effects are producing significant informal or cultural effects.

RGGI's design makes it inexpensive or economically beneficial for generators, consumers, and PUCs to use the new meanings for CO_2, the operation of CO_2-emitting technologies, electricity, and energy efficiency initiatives the policy encapsulates. As it is inexpensive or economically beneficial for these individuals and organizations to use these meanings they are willing to, and by doing so they support the existence of the policy (Blanchard, 2008; Caronna, 2004; Scott, 2001). One design feature that is heavily influencing the cost of using the meanings embedded in RGGI is the energy efficiency revenue recycler. The new energy efficiency funds the recycler is creating are being used to help utilities, consumers, and PUCs see and appreciate the benefits that reducing electricity consumption through energy efficiency provides. As these individuals and organizations are becoming more aware and appreciative of these benefits they are becoming more interested in actually deploying and adopting these technologies and practices to reduce electricity consumption. The increasing use of energy efficiency initiatives that is occurring suppresses the demand for electricity, which limits price hikes and reliability issues, but also limits the price of CO_2 allowances (Foster et al., 2012). Due to these effects, generators can continue to profit from using their CO_2-emitting equipment and consumers can continue to get the services they desire from using electricity without paying more for them. In other words, the increasing amount of energy efficiency resources that are emerging are reducing the cost and increasing the benefits of using the new meanings of CO_2 and CO_2-emitting technologies for electrical companies and consumers (Blanchard, 2008; Foster et al., 2012; Scott, 2001).

Electrical companies and consumers are willing to use the new meanings associated with RGGI and in doing so they express their support for the existence of the policy, which then ensures increasing amounts of energy efficiency funds become available. As more funds are allocated to expand the use of energy efficiency initiatives the benefits of reducing electricity consumption through their use become even more visible and valuable to the individuals and organizations inhabiting the region. This would then motivate utilities, consumers, and PUCs to expand the deployment and adoption of energy efficiency technologies and practices even more. The appearance of these resources would further suppress the price that consumers pay for electricity, and the costs that electrical companies pay to operate their equipment. These effects would then make it even cheaper for electrical companies and consumers to use the new meanings embedded in RGGI, which would create further support for the policy and additional funds for energy efficiency (Blanchard, 2008; Caronna, 2004; Scott, 2001). In this way, RGGI's two types of informal effects are interacting together and producing positive feedback. The interaction of the two informal effects is increasing support for the formal policy, which then leads to additional informal effects.

Appendix A:

Electrical Survey

Name:

Organization:

Title/Position:[1]

Managing CO_2 emissions

- Does your organization manage (measuring and/or attempting to reduce or minimize) CO_2 emissions?

- What department(s) is tasked with managing CO_2 emissions?

- Which individual positions are tasked with managing CO_2 emissions?

- How many people are involved with the management of CO_2?

- What individual positions or departments receive information related to the emission of CO_2?

- Does one central department manage emissions at all facilities? Or does each generation facility have its own emissions department?

- How long have CO_2emissions been managed?

[1] **This information is for data management. No names will be included in the analysis, and the organization's name will be replaced with a pseudonym.**

- What method and equipment is used to manage CO_2 emissions?

- Was this method and equipment always used? If not, what methods and equipment were used?

- What considerations are used to select a measurement methodology and monitoring equipment?

- Did the passage of RGGI affect these considerations? If so how?

- Did the passage of 40 CFR Part 98 (EPA Greenhouse Gas Reporting Program) affect these considerations? If so how

CO_2 Emissions Trading

- Is your organization involved with any form of CO_2 emission trading? If so, please describe.

- What individual positions or departments are involved with CO_2 emissions trading?

- How many people are involved with CO_2 emissions trading?

- What individual positions or departments receive information related to CO_2 emission trading?

Follow-up Interview

- Would you be willing to participate in a follow up interview?

- If you are interested in participating, please suggest a few convenient times and whether you would prefer to talk via phone or in person.

Chart 3: Information about Interview Data

Information About Interview Data				
Interview Number	Organizational Role	Industry Position	Focus within the Org.	Secondary Focus within Org.
1	President	Electrical Distributor	Operations	NA
2	Principal	Energy Efficiency Organization	Strategy	Sales
3	Associate Director	Policy Organization	Energy Innovation	NA
4	Associate Director	Policy Organization	Energy Innovation	NA
5	Consultant	Consulting Organization	Renewable Energy	NA
6	Director	Consulting Organization	Renewable Energy	Strategy
7	Engineer	Municipal System	Operations	Environment
8	Manager	Municipal System	Energy Efficiency	Account Management
9	Policy Adviser	Environmental Organization	Climate	Energy Innovation
10	Manager	Independent Power Producer	Environmental	Compliance
11	Director	Independent Power Producer	Environmental	Sustainability
12	Vice President	Municipal System	Engineering	Environment
13	Manager	Municipal System	Demand Side Management	Energy Efficiency
14	Director	Investor Owned System	Policy	Environment
15	Analyst	Planning Organization	Energy and Climate	NA
16	Counsel	Legal Organization	Environmental	Energy
17	Manager	Industry Group Organization	Energy Efficiency	NA
18	Manager	Industry Group Organization	Energy Efficiency	NA
19	Director	Industry Group Organization	Climate	Environmental
20	Vice President	Energy Efficiency Organization	Strategy	Operations
21	Director	Energy Efficiency Organization	Customer Relations	NA
22 (Two People)	Deputy Director	Energy Efficiency Organization	Policy	NA
22 (Two People)	Manager	Energy Efficiency Organization	Policy	NA
23	Manager	Demand Side Management Organization	Operations	Customer Relations
24	Policy Adviser	Government Organization	Environmental	Innovation
25	Manager	Investor Owned System	Environmental	Strategy
26	Engineer	Investor Owned System	Energy Efficiency	NA
27	Director	Consulting Organization	Operations	NA
28	Scientist	Investor Owned System	Environmental	Operations
29	Manager	Independent Power Producer	Environmental	Operations
30	Editor	Energy Media	Environmental Technology	NA
31	Manager	Independent Power Producer	Environmental	Compliance
32	Analyst	Independent Power Producer	Environmental	Operations
33	Principal	Project Development Organization	Strategy	Operations
34	Director	Municipal System	Energy Efficiency	Demand Side Management
35	Engineer	Municipal System	Environmental	Operations
36	Associate	City Government	Environmental Technology	Environment
37	Vice President	Project Development Organization	Strategy	Operations
38	Supervisor	Independent Power Producer	Environmental	Operations
39	Manager	Independent Power Producer	Operations	Environment
40	Developer	Independent Power Producer	Project Development	Renewable Energy
41	Analyst	Independent Power Producer	Environmental	Operations
42	Director	Industry Group Organization	Communications	NA
43	Communications	ISO	Operations	NA
44	Analyst	Energy Research Agency	Environmental Technology	Operations
45	Vice President	Energy Efficiency Organization	Strategy	Operations
46	Coordinator	Municipal System	Environmental	Operations
47	Engineer	Utility	Environmental	Operations
48	Fellow	Energy Research Agency	Environmental	Operations
49	Trader	Energy Trading Organization	Trading	NA
50	Manager	Energy Co-op	Operations	NA
51	Manager	Original Equipment Manufacturer	Business Development	NA

Chart 4: Codes Applied to CO_2/Electricity Articles

Examples of the Codes Applied to CO2/Electricity Newspaper Articles	
Technology Codes	Technology Description Codes
Solar Photovoltaic	Low Greenhouse Gases
Nuclear Plant	High Greenhouse Gases
Coal Plant	Uses Less Fossil Fuels
Wind Turbine	Uses More Fossil Fuels
Electrical Energy Efficiency	Lower Operating Cost
Natural Gas Plant	Higher Operating Cost
Transmission & Distribution	Less Air Pollution
Carbon Capture	More Air Pollution
Hydro Plant	Upfront Cost
Oil Plant	Transmissions and Distribution Issues
Fuel Cell	Technology Doesn't Work
Demand Side Management	Potential Business
Smart Grid	Power Variability

Chart 5: Codes Applied to RGGI Articles

Examples of the Codes Applied to RGGI Newspaper Articles	
In Support of RGGI	Against RGGI
Money For Energy Efficiency	Increases Electricity Prices
Spurs Innovation	Decreases Region's Competitivness
Will Be Cheap with Energy Efficiency	Weak
Business Opportunity	Won't Work
Experience With CO2 Trading	Grid Reliability Issues

Chart 6: Codes Applied to Industry Journals

Examples of the Codes Applied to the Industry Journals	
First Level Code	**Second Level Code**
Industry Change	Climate Change
	Attention to Conservation
	Transformation of Grid
Transmission and Distribution	System at Capacity
	Improve Reliability
Energy Efficiency	Increase the Use of
	Reduce Greenhouse Gases
	Upfront Cost
	Behavioral Change
	Potential Business
CO2	Atmospheric Emissions
Coal Plant	High Greenhouse Gases
Demand Side Management	Reduces Peak Demand
	Limits New Construction
Natural Gas Plant	Low Greenhouse Gases
	Provides Peak Power
Renewable Energy	Low Greenhouse Gases
	Grid Integration Issues
	Power Variability
Smart Grid	Accommodate New Energy Sources
	Information Enabled

Chapter 6: Conclusions

Introduction

This chapter concludes the research by tying the main analytical findings together and discussing how they and the research's conceptual framework can be applied to other contexts. The chapter begins by briefly summarizing the main analytical points presented in the previous chapters. It then discusses the implications of the analysis as they relate to controlling environmental activities and to improving environmental behavior. In particular, the research findings are applied to the design and enactment of environmental policies, the use of a policy's informal effects, and the diffusion of energy efficiency initiatives that reduce electricity consumption. This chapter normatively addresses these topics and utilizes the research findings to identify strategies or approaches that can help bring them about or improve the use of them (Lipsey, 2008). After, potential extensions of the research's theoretical framework and findings and the limitations to these extensions are identified. Lastly, the chapter illuminates a few promising areas for future research.

In February 2013 policymakers concluded RGGI's first review period (Regional Greenhouse Gas Initiative, 2013). During the review, generating, consuming, and environmental stakeholders in the region expressed their support for the policy. The Staff Working Group (SWG) policymakers leveraged this support to formally extend the policy to 2020 and to tighten the emissions cap for the upcoming 2014 compliance year from 145 million short tons of CO_2[1] to 91 million short tons, an approximately 40% reduction (Regional Greenhouse Gas Initiative, 2009, 2013). Based on RGGI's recent extension and increasing stringency, this chapter explores how the research framework

[1]This figure does not include New Jersey's approximately 20 million tons of CO_2 emissions (Regional Greenhouse Gas Initiative, 2009).

and findings can be applied to help develop additional environmental policies and to help improve individual and organizational environmental performance.

Summary of the Analysis

Economically rational electrical companies and consumers primarily understand and use the physical materials and behavioral actions underlying electricity-derived CO_2 emissions through economic meanings (Blanchard, 2008; Scott, 2001). Electrical companies primarily interpret these materials and actions through effects on costs and revenues; their willingness to accept alternative meanings depends on the costs and revenues that accrue from using them (Blanchard, 2008; Scott, 2001). Consumers primarily interpret these materials and actions according to their effects on the price and the availability of the electricity they use to get the services they desire (Blanchard, 2008; Scott, 2001). Their willingness to accept alternative meanings is based on whether and how their use affects price or availability (Blanchard, 2008; Scott, 2001).

For both electrical companies and consumers economic meanings are dominant, and this dominance manifests in two ways. First and most obviously, electrical companies and consumers primarily understand and use the physical materials and behavioral actions associated with the production and consumption of electricity through economic meanings (Blanchard, 2008; Scott, 2001). Second, these economic meanings also mediate whether electrical companies and consumers accept or reject alternative interpretations and uses of these materials and actions. More specifically, electrical companies and consumers appear willing to accept alternative interpretations for these materials and actions if their use results in small or negligible economic costs or positive economic benefits. For instance, companies and consumers accept treating CO_2 as a controlled material and the operation of CO_2-emitting technologies as a controlled activity and are changing their behavior to reflect the use of these meanings because RGGI's design makes doing so easy, inexpensive, and economically beneficial.

The salience of economic meanings to both electrical companies and consumers makes them extremely valuable levers for shifting interpretations and behaviors (Blanchard, 2008; Brint & Karabel, 1991; Fligstein, 1997; Scott, 2001). However, this same salience also makes electrical companies and consumers especially sensitive to the costs associated with using new meanings, and if they perceive the cost of using new meanings to be too high they will contest their use (Blanchard, 2008; Bourdieu & Wacquant, 1992; Scott, 2001). In fact, the SWG spent large portions of the RGGI design process identifying which economic meanings were most relevant to different stakeholder groups and then evaluating how different design features would align with the pre-existing cultural controls, or dominant economic meanings, held by these stakeholders (Caronna, 2004; Lindblom, 1977). The SWG then demonstrated, with economic models, that the proposed policy's treatment of CO_2 and CO_2-emitting equipment would not drastically increase the price of producing or purchasing electricity. They also used these models to show how the policy's revenue recycler would create resources that benefit electrical companies and consumers. These modeling exercises enabled electrical companies and consumers to see how the policy's interpretations of CO_2 and the operation of CO_2-emitting technologies were aligned with their pre-existing, economically-based cultural controls (Bailey et al., 2011; Blanchard, 2008; Caronna, 2004; Lindblom, 1977; Scott, 2001). Due to this perceived alignment, electrical companies and consumers were willing to support the enactment of RGGI (Caronna, 2004).

Furthermore, now that RGGI is in place, its consistently low allowance prices and recycled revenues make it inexpensive and economically beneficial for electrical companies and consumers to use the meanings for CO_2 and CO_2-emitting technologies encapsulated in the policy. As a result, electrical companies are willing to treat CO_2 and the operation of CO_2-emitting technologies as controlled, to diffuse these meanings throughout their organizations, and to modify how they produce electricity to reflect the use of these meanings. Similarly, as RGGI's treatment of CO_2 and CO_2-emitting technologies does not negatively affect the price or availability of electricity supplies and leads to beneficial investments in energy efficiency, consumers are also willing to accept the use of these meanings. In fact, when individuals and organizations primarily interpret materials and actions through the costs and benefits they impose, then the costs and benefits of using different meanings can be more important than their actual content (Blanchard, 2008; Scott, 2001). This reaction can be seen from the RGGI context.

Electrical companies and consumers accept and use the new meanings for CO_2 and the operation of CO_2-emitting technologies that RGGI conveys because doing so produces new benefits and does not result in significantly higher costs.

RGGI's revenue recycler also exploits the economic inclination of electrical companies', consumers', and PUCs' pre-existing cultural controls to accelerate the diffusion of energy efficiency initiatives that reduce electricity consumption (Blanchard, 2008; Brint & Karabel, 1991; Scott, 2001). More specifically, RGGI's auction revenues are being recycled to reduce the upfront cost of deploying and adopting energy efficiency initiatives for PUCs and consumers, and to make their deployment profitable for electrical companies. In doing so, these funds are accentuating or suppressing the dominant economic meanings these individuals and organizations hold, which then makes other non-economic meanings increasingly visible and valuable. Once electrical companies can interpret the deployment of energy efficiency technologies and practices that reduce electricity consumption as a source of profits, they become more willing to value the other benefits they provide. This then facilitates electrical companies' ability to interpret energy efficiency as a solution to other issues they are experiencing, whether CO_2 emissions, siting concerns, or low customer satisfaction. The newly salient combination of positive economic and non-economic meanings motivates electrical companies to change their behavior by actually deploying energy efficiency initiatives to reduce electricity consumption.

Electricity consumers and PUCs are similarly affected by new energy efficiency resources. Once these individuals and organizations stop interpreting the adoption of energy efficiency initiatives that reduce electricity consumption as a new upfront cost, they can better envision the other benefits they can provide. This then enables consumers and PUCs to view energy efficiency as a solution to other problems they are experiencing, whether CO_2 emissions, electricity costs, or personal comfort. The newly salient combination of positive economic and non-economic meanings affects behavior by prompting PUCs to accelerate the deployment of energy efficiency technologies and practices and by encouraging consumers to actually adopt them. As electrical companies, consumers, and PUCs become increasingly interested in and develop experience with using energy efficiency technologies and practices, new consumer-focused approaches for marketing existing initiatives and new behavioral and informational initiatives are emerging (Foster et al., 2012; York et al., 2012). Additionally, electrical companies', consumers', and PUCs' growing support for deploying and adopting energy efficiency initiatives that reduce electricity consumption is driving the creation of increasing amounts of demand-side resources (Foster et al., 2012; York et al., 2012). Their appearance is stimulating further innovations in how these resources are evaluated, measured, and integrated into wholesale electricity markets (York et al., 2012).

Finally, RGGI's ability to leverage the economic biases of electrical companies, consumers, and PUCs to shift how these individuals and organizations interpret and use CO_2, CO_2-emitting technologies, electricity, and energy efficiency initiatives is also producing a positive feedback effect (Blanchard, 2008; Brint & Karabel, 1991; Fligstein, 1997; Scott, 2001). The feedback effect is driven by RGGI's energy efficiency revenue recycler. Accelerating the diffusion of energy efficiency initiatives that suppress the price of electricity and CO_2 allowances makes it even cheaper for individuals and organizations to modify their behavior to reflect the new meanings for CO_2 and CO_2-emitting technologies associated with RGGI. As the cost of using these meanings declines, electrical companies and consumers are more willing shift their behavior to reflect their use, and by doing so they express support for the policy. Their support for the policy ensures that energy efficiency funds will continue to be generated and made available for recycling. The use of these funds can further suppress the price of electricity and the need for and price of CO_2 allowances, which then make it even cheaper for electrical companies to base their behavior, or how they produce of electricity, on controlling CO_2 and the operation of CO_2-emitting technologies. In this way, the interaction of the two informal effects RGGI induces generates positive feedback that retains existing and attracts additional support for both the policy and for using energy efficiency to reduce electricity consumption. Together, RGGI's formal design features and their informal effects allow the policy to reduce CO_2 emissions and electricity consumption without creating significant economic costs or reliability concerns for the region.

Implications of the Research Findings

The analytical findings of this research have a number of potential implications. These primarily touch on: the design and enactment of new, environmental, market-based policies; the use of a policy's informal effects; and the diffusion of energy efficiency initiatives, which includes organizational and systemic implications. The following sections explore these implications. They do so by mining the research findings for normative suggestions that can help improve the design and enactment of new environmental policies, facilitate appreciation for and the use of a policy's informal effects, and accelerate the diffusion of energy efficiency initiatives (Lipsey, 2008).

Designing New, Enactable, Mandatory, Market Policies to Control Environmental Activities

The SWG utilized a number of strategies to help design and enact the first, mandatory cap and trade policy for controlling CO_2 emissions in the U.S. Their approaches and the process and design features they included can inform future efforts to design new, enactable, mandatory market-based policies for previously uncontrolled environmental activities. In terms of process, the SWG allowed different categories of stakeholders to participate in nearly every facet of the policy's design and made extensive use of economic models to portray the potential outcomes of different policy designs. These efforts enabled the SWG to identify design features, such as a weak cap, an allowance auction, a price collar, and an energy efficiency revenue recycler, that critical categories of stakeholders could all support. By designing a policy critical categories of stakeholders could support, the SWG ensured RGGI would be enacted (Pfeffer & Salancik, 2003).

In order to design an enactable policy for a previously uncontrolled or informally controlled environmental activity, policymakers need to identify how different categories of stakeholders interpret and use the various materials and behavioral actions underlying the activity. The most comprehensive method, and the one used to design RGGI, involves inviting all stakeholders to participate in the policy design meetings and soliciting their thoughts about the goals of the policy, indicators of success, and outcomes to avoid. Other approaches include surveying or interviewing different categories of stakeholders about these topics prior to the design meetings or inviting representatives from different stakeholder categories to comment on these topics during the design meetings. When a new policy is designed through these processes policymakers can identify the misalignment that critical categories of stakeholders could perceive between their pre-existing cultural controls and the meanings and interpretations underlying different policy options (Caronna, 2004; Lindblom, 1977). Additionally, when critical stakeholders are economically rational, policymakers need to specifically identify which economic meanings or effects are most important to different categories of stakeholders (Blanchard, 2008; Scott, 2001). This information allows policymakers to identify the range of potential outcomes that would prompt different stakeholders to contest the enactment or ongoing presence of the policy, or which policy outcomes they must avoid. Policymakers can then use this information to identify policy components and combinations of components that produce effects that can attract the support of critical stakeholders and prevent them from contesting enactment.

Policymakers should also make extensive use of economic models when designing a market-based policy for an uncontrolled environmental activity that will affect economically rational stakeholders. As part of this process, policymakers should use the pre-existing cultural controls held by stakeholders to help define the underlying assumptions of the models and the policy effects that stakeholders are most concerned about to set the output parameters. Policymakers can then use the models to convincingly demonstrate the potential effects of various policy iterations to stakeholders in order to build support for a particular design (Bailey et al., 2011).

The modeling processes the SWG used to develop RGGI represent a fairly new approach for designing an environmental policy. As such, soliciting critical stakeholders' opinions about the models' assumptions, and designing the models to depict the conditions most relevant to them, was difficult and time consuming. In the future, policymakers should develop standardized procedures to educate stakeholders about the functions and limitations of economic models prior to their use, and to identify and integrate stakeholders' modeling preferences in a timely and organized fashion. Doing so would speed up and improve the transparency of the modeling processes and potentially make the results more convincing or legitimate. Furthermore, even though RGGI primarily drew upon economic models, other modeling approaches, such as those that depict complex systems, may be complementary and could provide a richer and more nuanced perspective. This approach would be especially valuable when policymakers are attempting to create and enact a new formal policy to control an informally or uncontrolled environmental activity.

In terms of designing an enactable, mandatory, new policy to regulate economically rational individuals or organizations, policymakers need to identify where the economic concerns held by different categories of stakeholders overlap, or what potential economic outcomes are acceptable to many of them. With this information, they can then identify individual or combinations of policy features that produce economic effects that fall within this tolerable range. This would reduce the economic misalignment that multiple categories of critical stakeholders could perceive between their pre-existing cultural controls and the meanings underlying the new policy, which would then make them more willing to accept and support its enactment (Blanchard, 2008; Caronna, 2004; Lindblom, 1977; Scott, 2001).

After identifying the primary economic concerns of generators and consumers, the SWG utilized three design features to mitigate the policy's effect on the price of producing and purchasing electricity. In particular, they minimized the perceived economic impacts associated with an auction-based cap and trade policy by making the initial cap level loose. The SWG also cushioned the potential economic effects by coupling the allowance auction with protective safety valves and by creating recoupable benefits through a price floor and revenue recycler. These features can inform the design of other environmental policies. However, the price collar and revenue recycler are more broadly applicable, while an intentionally weak cap or tax should be applied more selectively.

Price floors and ceilings can be used to create concrete boundaries around the range of potential outcomes that multiple categories of stakeholders will accept. They provide a guarantee that the policy's economic effects will fall within the tolerable range of outcomes, which reduces the misalignment that stakeholders could perceive and facilitates their initial and ongoing support for the policy and its enactment (Caronna, 2004). Furthermore, as the floor and ceiling components of a price collar typically appeal to different categories of stakeholders, their initial levels and threshold triggers that modify their levels can be jointly set to appeal to as many stakeholders as needed. Lastly, when combined with a revenue recycler, a price floor guarantees a certain amount of beneficial resources will be created.

A revenue recycler is an extremely versatile policy tool that can reduce the misalignment that multiple categories of stakeholders could perceive. It can also attract support for the enactment of a new formal policy. The resources it generates can be used in various ways to create new benefits for the stakeholders that would be affected by a policy. Ideally, the new resources would be used to create benefits for multiple categories of stakeholders, although their application can also be more focused if the support of an individual stakeholder group is essential. RGGI's revenue recycler is especially effective because it is being used to accelerate the diffusion of energy efficiency initiatives. Improving the efficient use of existing electrical supplies reduces the demand for electricity, which mitigates the policy's economic impacts on generators and consumers by respectively suppressing the price of CO_2 allowances and electricity. Furthermore, the energy efficiency funds the recycler produces directly create new benefits for consumers and generators. These funds reduce the cost consumers would have to pay to adopt energy efficiency technologies and practices and allow for performance incentives that enable electrical companies to profit from their deployment.

Recycling a policy's revenues to incentivize a more efficient use of the material or energy source underlying or driving the controlled environmental activity effectively reduces a policy's economic impact on multiple categories of stakeholders. It also simultaneously makes the policy a source of new benefits for multiple categories of stakeholders. Improving the efficient use of the material or energy source underlying a policy reduces the new economic costs the policy imposes on the organizations that produce or extract it and on the consumers that use it. For producing organizations, incentivizing end use efficiency reduces the demand for the material or energy source without reducing the organization's revenues. As a result, organizations can restrict their involvement with the detrimental environmental activity associated with the extraction of the material or the production of the energy source without losing revenues, which limits the economic impact imposed by the policy.

For consumers, funding end use efficiency reduces the amount of the material or energy they need to use to get the benefits they desire without imposing new costs. This then curtails the total cost consumers have to pay to get the benefits they desire and limits the overall economic impact of the policy, even if it increases the price of an individual unit of the material or energy source. Recycling policy revenues to support technological innovations that reduce waste or educational programs that change consumption patterns may similarly reduce the economic impacts a policy imposes upon multiple categories of stakeholders. To exploit these potential benefits, policymakers need to keep the use of a revenue recycler in mind when they initially solicit information about stakeholders' pre-existing cultural controls. Doing so can help them identify where stakeholder interests overlap and potential ways to use the revenues to address the concerns of multiple stakeholder groups.

The mechanics of a price collar and revenue recycler should be tailored to a specific context, but the base design features can be included in many types of environmental policies. This is because both can minimize a policy’s perceived economic impact without severely weakening its ability to control behavior. However, in certain situations policymakers should propose an intentionally weak market policy to facilitate its enactment even if the direct behavioral changes it can induce are relatively limited. The remainder of this section identifies the conditions where policymakers should and should not consider proposing an intentionally weak market policy, as well as the indicators they can use to determine the political and environmental context they are working within.

To determine the political context they are working within, policymakers should identify whether and how similar policies have succeeded or failed in the past. Additionally, they should identify the arguments used in support of or against these policies, the type and amount of supporters and opponents, and their current and potential resources. Policymakers should also identify the characteristics of the environmental activity they are trying to control. This includes: whether the activity is immediately detrimental or toxic; whether it is driven by one or multiple behaviors; whether the environmental activity can be addressed quickly with one policy or over time through multiple policies; whether or not controlling the activity requires complementary technical or infrastructure changes; and whether individuals are already engaging in the activity or if it is a potential activity that could occur in the future.

Once policymakers identify the political and environmental context they are working within, they can then determine whether they should propose an intentionally weak market policy. For instance, when previous attempts to enact a policy to control a specific environmental activity have repeatedly failed or when enactment is perceived to be very difficult, then policymakers should considering proposing a weak market policy to facilitate its enactment. Tangentially, when opponents pre-emptively mobilize against the idea of a policy before it is even proposed or when they have deployed economic arguments against previous enactment attempts, then policymakers should also consider proposing a weak market policy. Furthermore, if there are few existing supporters but many potential ones, policymakers can use the enactment of a weak market policy to draw out their support for future iterations.

Policymakers should also consider proposing an intentionally weak market policy when the activity to be controlled exhibits certain characteristics. For example, when the environmental activity is not imminently harmful or toxic then policymakers have the option of deploying an initially weak policy to build support for stronger iterations, instead of trying to enact a stronger, but more politically contentious version first. Similarly, when the environmental activity is widespread and affected by a number of different social behaviors, such as CO_2 emissions, then policymakers should consider using a weak market policy as a way to begin controlling the activity. In such examples, the proposed policy represents only the first of many steps that need to be made in order to control the environmental activity. In other words, when the policy represents the foundation for broader political, technical, or infrastructure changes then policymakers should consider proposing a weak market policy in order to create momentum and support for subsequent stages. Developing this positive momentum, via the enactment of a weak market policy, is even more important when time is a pressing consideration for making all of the aggregate changes.

Furthermore, when multiple behaviors underlie the environmental activity, proposing to control one behavior through a weak market policy is not necessarily ineffective if the policy revenues are used to indirectly affect other behaviors. This is most evident from RGGI's revenue recycler which is indirectly reducing the region's emissions by stimulating the use of energy efficiency initiatives that reduce electricity consumption. Lastly, when policymakers are trying to control an existing environmental activity, rather than pre-emptively controlling a potential activity, they should consider proposing an intentionally weak market policy. Individuals and organizations are more likely to perceive misalignment between the pre-existing and proposed cultural controls underlying an environmental activity they are already involved with than between those underlying an activity they are thinking about undertaking (Caronna, 2004). As the perception of misalignment can motivate contestation, policymakers should consider proposing an initially weak market policy when they attempt to formally control an existing environmental activity for the first time (Caronna, 2004).

On the other hand, policymakers should not propose intentionally weak market policies when similar policies have been successfully enacted in the past or when they are extending or expanding existing policies. Similarly, when potential opponents are not organized, do not have readily available resources, and are not using economic arguments to contest the idea or enactment of a policy then proposing a weak market policy may not be necessary. This is especially true when well-funded supporters of the policy already exist and are motivated to fight for the policy's enactment. Additionally, when the environmental activity is immediately toxic it may be easier and more effective for policymakers to enact an initially strong policy rather than a succession of increasingly stronger ones. Policymakers should also consider this approach when the environmental activity is driven by one behavior that can be immediately controlled with a single policy and does not require significant, complementary technical or infrastructure changes. Lastly, if policymakers are trying to enact a policy to prevent a future environmental activity from occurring they should propose a strong iteration. Individuals and organizations would be less likely to perceive misalignment between pre-existing and proposed cultural controls because they are not currently involved with the activity. In this context, policymakers would not have to facilitate enactment by using a weak market policy to induce economically-based alignment because stakeholders would already be less inclined to perceive misalignment.

Appreciating and Utilizing Policies' Informal Effects

The enactment and ongoing operation of RGGI's formal design features produce a number of informal effects. The informal or cultural effects reflect shifts in the meanings individuals and organizations employ to interpret and use CO_2, the operation of CO_2-emitting technologies, electricity, and energy efficiency technologies and practices (Scott, 2001). Changing the meanings that individuals and organizations use is not the same as changing their behaviors, but the two are highly intertwined. This is due to the fact that social behaviors reflect the meanings that individuals and organizations employ to interpret and use the materials and actions constituting the behavior (Schnaiberg, 1980; Scott, 2001). Expanding on this relationship, as individuals and organizations accept new meanings for materials and actions it changes how they use or participate in them, producing behavioral changes (Brint & Karabel, 1991; Scott, 2001). So individuals' and organizations' willing acceptance of new meanings leads to behavioral changes whether or not they are consciously making the connection between meanings and behaviors. When individuals are unconsciously making the connection, participating in the behavior can reveal the use of these new meanings, or can help individuals make sense of the new meanings, even though they are already using them (Scott, 2001; Weick, 1995). Within this research changes in meaning were identified by asking individuals and organizations in surveys and interviews about their awareness and use of new meanings, such as whether and how they are controlling CO_2 and the operation of CO_2-emitting technologies. These statements were then analyzed to ascertain how the use of these new meanings is influencing behavioral changes. More specifically, the connection between new meanings and behaviors was identified through the behaviors that individuals and organizations mentioned when queried about the new meanings. The connection between new meanings and behaviors was also revealed when individuals and organizations discussed new behaviors that are predicated upon the use of the new meanings, and when they used the new meanings to explain behavioral changes.

From the surveys and interviews it is possible to see how individuals' acceptance of new meanings prompted conscious and unconscious behavioral changes. For instance a number of survey respondents made unsolicited comments about improving production and end-use efficiency when asked to comment about their efforts to control CO_2 emissions. Other respondents explicitly made the connection between treating CO_2 as a controlled material and improving production and end-use efficiency during interviews. These responses indicate that these individuals and the organizations that employ them are changing how they produce electricity as a result of treating CO_2 and the operation of CO_2-emitting technologies as controlled. In fact, by working to minimize the amount of CO_2 that must be emitted to produce one unit of electricity, these individuals and organizations are now using CO_2 emissions as a new indicator of behavioral efficiency. Treating CO_2 as an indicator of behavioral efficiency means that individuals and organizations are shifting their behavior to accommodate the new control-based meanings for CO_2 and CO_2-emitting technologies whether they are consciously aware of it or not.

Within the interviews, individuals also described how their organizations are using the new control-based meanings for CO_2 and CO_2-emitting technologies to explain behavioral changes and as levers to stimulate future behaviors. For example, individuals working within electrical companies described technological and operational changes through their effects on CO_2 emissions, such as by discussing a change from oil to natural gas burning facilities as a method for controlling CO_2. By making sense of their behavior through the use of these meanings, or by using these new meanings to explain their behavior, these individuals demonstrate how the use of the new meanings affects their understanding of past behaviors, which then inform how they behave in the present and future (Brint & Karabel, 1991; Scott, 2001; Weick, 1995). The influence of these new meanings on existing and future behaviors is also evident from interviews that were conducted with individuals working within especially progressive electrical organizations. In these interviews, individuals discussed how treating CO_2 and the operation of CO_2-emitting technologies as controlled is becoming a long-term strategic imperative as well as a motivational lever that their organization is using to shift employees' future behaviors. In other words, these organizations are using the new control-based meanings for CO_2 and CO_2-emitting technologies to inform and explain their existing behaviors, as well as to determine and bring about their future behaviors.

These shifts in meaning, and their subsequent behavioral effects, are affecting the development of additional CO_2-controlling policies (Brint & Karabel, 1991). Electrical companies and consumers increasingly interpret and use CO_2 as a controlled material and the operation of CO_2-emitting technologies as a controlled activity. Electrical companies' acceptance of these meanings is stimulating a number of behavioral changes in the ways they evaluate, structure, and use their electricity-producing operations. These behavioral changes and the increasing acceptance of the new control-based meanings for CO_2 and the operation of CO_2-emitting technologies they reflect facilitate policymakers' ability to extend and strengthen RGGI. This is because it is easier for policymakers to control CO_2 and the operation of CO_2-emitting technologies more rigorously once companies and consumers have accepted the use of these meanings and have modified their behavior to reflect their use.

Furthermore, electrical companies increasingly interpret the use of energy efficiency technologies and practices that reduce electricity consumption as a source of profits, and the acceptance of this meaning motivates companies to change their behavior by deploying larger amounts of them (Foster et al., 2012; Hayes et al., 2011; York et al., 2012). The behavioral change can be seen from interview responses that describe how electrical companies are increasingly using energy efficiency initiatives to address other issues they are experiencing, whether CO_2 emissions, building new facilities, or low consumer engagement. Likewise, electrical consumers and PUCs interpret the use of energy efficiency initiatives as a new upfront cost less frequently, and this is motivating them to change their behavior by accelerating the deployment and adoption of these technologies and practices (Foster et al., 2012; York et al., 2012). The behavioral change can be seen in the ACEEE's energy efficiency report card, which depicts the RGGI states' focus on and use of energy efficiency initiatives (Foster et al., 2012; York et al., 2012). Collectively, electrical companies', consumers', and PUCs' increasing interest in deploying and adopting energy efficiency technologies and practices is stimulating new types of initiatives, improvements in how they are marketed to consumers, and innovations in how demand-side resources are measured and valued in electricity markets (Federal Energy Regulatory Commission, 2011; Foster et al., 2012; York et al., 2012).

A formal policy's ability to shift how individuals and organizations interpret and use materials and actions is an underappreciated aspect of policy design and evaluation (Lindblom, 1977). Based on the role these informal effects play in the enactment of additional policies and as determinants of behavior, policymakers should develop a better understanding of the relationship between formal and cultural controls (Brint & Karabel, 1991; Caronna, 2004; Lindblom, 1977; Scott, 2001). In particular, they should be more attentive to how different formal design features affect the meanings that individuals and organizations employ to interpret and use the materials and actions underlying the controlled environmental activity because changes in meaning are intertwined with behavioral changes (Schnaiberg, 1980; Scott, 2001). This appreciation is valuable because it may be easier or less contentious to bring about a desired behavioral change by inducing informal effects than by trying to enact an ideal formal policy. More specifically, under certain conditions it may be easier and more effective to control an environmental activity for the first time by enacting a series of weaker formal policies whose informal effects gradually allow for more rigorous controls than by trying to initially enact one ideal, formal policy.

With these informal effects in mind, the low price signals associated with a loose cap or a weak tax are not always detrimental or counterintuitive when a market-based policy is designed for and applied in particular political and environmental contexts. Intentionally designing a new environmental policy to have weak price signals makes it easier and less expensive for individuals and organizations to begin interpreting and using the materials and actions underlying the activity through the new meanings the policy highlights (Fligstein, 1997). In fact, the appeal of using the new meanings embedded in a policy can be accentuated even further with a revenue recycler that makes their use economically beneficial (Fligstein, 1997). Economically rational individuals and organizations are more willing to accept the use of new meanings and to change their behavior to reflect their use if doing so is not difficult or expensive (Blanchard, 2008; Scott, 2001).

As individuals and organizations use these new meanings to inform their behavior they express support for the policy that conveyed them. The support can insulate a new policy that controls an environmental activity that had not been formally controlled from contestation. It can also facilitate policymakers' ability to strengthen or expand the policy. Alternatively, if policymakers wanted to skip these steps to try to initially enact a strong policy with high price signals, it would make it more expensive and difficult for individuals and organizations to begin using the new meanings the policy encapsulates. The initial cost and effort associated with changing their behavior to reflect the use of these new meanings can make economically rational individuals and organizations less willing to use the meanings, which can then motivate them to contest their use by contesting the policy (Blanchard, 2008; Bourdieu & Wacquant, 1992; Scott, 2001). Therefore, in certain contexts it may be easier and more effective for policymakers to control an environmental activity for the first time by exploiting the informal effects induced by an initially weak, but progressively stronger formal policy than by trying to enact one ideal, formal policy.

Policymakers also need to develop a better appreciation of the relationship between formal and cultural controls because the two can complement each other to produce more widespread or significant effects. This is particularly true when a policy includes a revenue recycler that creates new resources or benefits for affected stakeholders. These resources can directly incentivize individuals and organizations to use certain technologies or to engage in certain activities, such as deploying or adopting energy efficiency technologies and practices. However, these resources can also shift how individuals and organizations interpret the use of these technologies and practices in ways that make their adoption or deployment more appealing (Brint & Karabel, 1991; Fligstein, 1997). This is especially true when financial resources are allocated to economically rational individuals and organizations. The pre-existing cultural controls of economically rational individuals and organizations are heavily informed by economic meanings (Blanchard, 2008; Scott, 2001). Based on this influence, recycling revenues to make the use of certain technologies or practices more lucrative can accentuate a dominant, positive economic meaning, a source of profits (Fligstein, 1997). These resources can also be used to make the use of these technologies and practices less costly, which can attenuate a dominant, negative economic meaning, a new upfront cost (Fligstein, 1997). More specifically, once economically rational individuals or organizations interpret the use of a particular technology or practice as a profit source or once they stop interpreting it as a new cost, other positive, non-economic meanings can become more visible and valuable (Blanchard, 2008; Scott, 2001). As individuals and organizations begin interpreting the use of a technology or practice through multiple positive meanings, or when they appreciate the different types of benefits it can provide, they become more motivated to change their behavior by actually using it. In this way, the informal effects a policy induces can complement its formal design features to bring about more significant behavioral or technological changes.

Finally, policymakers who understand and appreciate the connection between formal and cultural controls can attempt to shift regulated and non-regulated individuals' or organizations' pre-existing cultural controls in anticipation of a new or extended policy (Fligstein, 1997; Lindblom, 1977; Scott, 2001). For example, before a policy design process begins, policymakers could preemptively communicate with individuals and organizations about how easy, inexpensive, and beneficial it would be to use the new meanings. Conveying this information before the policy design process begins may make stakeholders' pre-existing cultural controls more permeable to new meanings, which could then encourage them to support the idea of the policy, to participate in its design, or to be more open to various design features (Brint & Karabel, 1991; Caronna, 2004; Fligstein, 1997). Additionally, when a policy is being strengthened or expanded to other geographic or industrial realms, policymakers can identify the organizations whose behaviors best reflect the use of the new meanings and develop case studies around their approaches for compliance. These cases can then be diffused to other organizations regulated by the policy or to those that may be regulated in the future. The cases can demonstrate how easy and inexpensive it is for organizations to base their behaviors on the use of the new meanings. Similar case studies about the benefits a revenue recycler produces can also be developed and diffused to individuals who may be regulated in the future. These cases can depict the multiple benefits that accrue to different stakeholders from the use of the revenue recycler, or the different ways the technology or practice it supports can be interpreted. The depiction can attract additional support for the policy and make deploying or using the technology or practice more appealing. Overall, preemptively trying to shift individuals' and organizations' pre-existing cultural controls can facilitate their alignment with the new meanings underlying a policy, and make them more willing to use these new meanings to interpret and inform their current and future behaviors (Brint & Karabel, 1991; Caronna, 2004; Fligstein, 1997; Lindblom, 1977; Scott, 2001).

Strategies For and the Implications of Accelerating the Diffusion of Energy Efficiency Initiatives

By reducing the upfront costs of and creating performance incentives for energy efficiency, RGGI's revenue recycler is changing how electrical companies, consumers, and PUCs interpret the use of these technologies and practices. Specifically, by suppressing negative economic meanings and by elevating positive economic meanings these resources are making other non-economic meanings about the use of energy efficiency initiatives more visible and appealing. Together the accentuated or attenuated economic meanings and the increasingly salient non-economic meanings make electrical companies, consumers, and PUCs more receptive to developing new and using existing energy efficiency technologies and practices (Brint & Karabel, 1991; Hayes et al., 2011; York et al., 2012; Zhao et al., 2012). Given how new funds directly and indirectly accelerate the deployment and adoption of energy efficiency initiatives, electrical companies, consumers, and PUCs should be working with policymakers to identify new ways to create and allocate energy efficiency funds (Foster et al., 2012; York et al., 2012). Furthermore, existing and newly developed approaches for raising funds should be actively diffused beyond the traditional energy efficiency hot spots of the Northeast, U.S. and California. This is especially important because improving the efficient use of electricity represents one of easiest and most cost effective ways to reduce CO_2 emissions (York et al., 2012).

One important effect of RGGI's revenue recycler is that it raises new funds for energy efficiency without charging consumers, which is helping to change how they interpret the use of these technologies and practices. In order to maintain this effect, larger amounts of energy efficiency funds need to be raised without significantly increasing the costs for consumers. One potential strategy builds on the RGGI policy by recycling the revenues raised through other environmental policies applied to the electrical industry. These funds could be raised by collecting a portion of the sale or exchange price paid for NOx or SO_2 emission allowances or a portion of the fines levied for violating various air, water, or waste disposal policies. Other funding sources could be based on implementing a new tax or permitting fee levied on the construction of new fossil fuel-based generation facilities or their interconnection with ISO systems.

Portions of these funds should be used to expand existing and to develop additional educational programs about energy efficiency. Some current energy efficiency initiatives include an educational component that informs consumers about the benefits of adopting energy efficiency practices and technologies that reduce electricity consumption, but these efforts need to be expanded. The strong shadow effect created by the perceived cost of adopting energy efficiency initiatives makes it difficult for consumers to appreciate their benefits and suppresses their motivation to change their behavior by adopting these technologies and practices, even if the actual adoption cost is low (Jaffe & Stavins, 1994b; Zhao et al., 2012). Programs that empower retail salespeople, as described by an interviewee, to talk about the actual costs and benefits of more efficient electrical technologies when consumers come to purchase them should be expanded and strengthened. Furthermore, relevant information about the actual costs and benefits of reducing electrical consumption through the use of energy efficiency should be presented to young adults at schools and universities to curtail the emergence of a shadow effect at an early age. Finally, existing efforts by industry groups, energy efficiency companies, and PUCs to accelerate the use of informational and behavioral energy efficiency initiatives should be expanded, perhaps through the previously described case studies. Policymakers can help accelerate the diffusion of these informational initiatives by establishing standardized evaluation, measurement, and verification methods, and procedures for bidding demand-side resources into wholesale electricity markets.

However, the increasing use of energy efficiency initiatives is prompting a number of changes in how electricity is produced, transmitted, marketed, and consumed and these are having widespread effects on the organizations that produce and deliver electricity and the broader electrical system (Foster et al., 2012; York et al., 2012).

Encircling these changes is the shifting conceptualization of electrical energy (Goldman, Reid, Levy, & Silverstein, 2010; Treadway, 2012). Making the use of energy efficiency initiatives that reduce electricity consumption a profitable activity for electrical companies and a low or zero cost commitment for consumers is shifting the conceptualization of electricity away from a commodity that is delivered towards a service that is provided (Goldman et al., 2010). When reducing electricity consumption represents a viable business opportunity, electrical companies are less concerned with selling or delivering units of electricity to consumers, and more interested in minimizing the cost required to provide the services that consumers desire, such as heat, cooling, light, or power (Goldman et al., 2010). This can motivate electrical companies to improve the production and delivery efficiency of existing facilities as they can stretch their profit margin by providing the services that consumers desire with decreasing amounts of electricity. At the same time, when energy efficiency initiatives are provided for free or at low cost, consumers are more willing to reduce their total consumption levels, especially when doing so does not impede their ability to get the services they desire.

In response to these shifts existing electrical organizations need to develop or acquire new skills. These skills include: acquiring a better understanding of how consumers view electricity, energy efficiency technologies and practices, and the electrical organizations themselves; fusing communications technologies into the electrical system so that both companies and consumers have a better idea of how electricity consumption levels ebb and flow over time and in response to various initiatives; and analyzing and translating large amounts of production and consumption data into viable and appealing service offerings (Goldman et al., 2010). These shifts are also creating space for new organizations to emerge and expand, such as energy efficiency, direct DSM, and evaluation, measurement, and verification organizations. These organizations challenge electrical companies' previously monolithic position as the sole provider of electrical service, electricity information, and energy efficiency initiatives, and make the ecosystem of organizations involved with the electrical sector increasingly diverse (Casazza & Delea, 2009). Lastly, the increasing presence of demand-side resources is also driving changes in broader electrical systems as PUCs, ISOs, and federal regulators are exploring new ways to integrate these resources into ISO system plans and wholesale electricity markets (Federal Energy Regulatory Commission, 2011; Foster et al., 2012; York et al., 2012). In particular, these issues reveal new venues for institution negotiations as different types of individuals and organization are now trying to position various measurement and evaluation methodologies as the best way to quantify demand-side resources and value them in electricity markets (Bourdieu & Wacquant, 1992; Fligstein, 1997; York et al., 2012).

Extensions, Limitations, and Areas for Future Research

The findings of this research reveal a number of interesting implications about the design and enactment of environmentally-focused market policies, the use and value of a policy's informal effects, and the diffusion of energy efficiency technologies and practices. These implications suggest how the research's conceptual framework and findings can be applied to other empirical contexts. This section explores these potential extensions and discusses their limitations. It concludes by integrating the research's findings with these extensions to identify promising areas for future research.

Extensions

This research employs a conceptual framework that combines aspects of institutional and economic theories. When used in tandem these two frameworks offer a unique and valuable perspective for analyzing market-based policies, including those applied to control environmental activities. More specifically, their combination illuminates insights about the social processes underlying the design and enactment of a market-based policy, the ways its deployment can shift the meanings that individuals and organizations employ to interpret and use materials and actions, and how these shifts in meaning affect behavior (Brint & Karabel, 1991; Fligstein, 1997; Scott, 2001). These uses make combinations of institutional and economic theories valuable for studying the creation of a new market-based policy, the application of an existing market-based policy to control social activities in other geographic or industrial realms, and the informal, social effects induced by these policies.

For instance, this research identifies how the enactment of a market-based policy can exploit economically rational individuals' and organizations' inclination to interpret materials and actions through economic meanings to make other non-economic meanings more or less salient (Blanchard, 2008; Fligstein, 1997; Scott, 2001). In particular, economically rational individuals and organizations appear willing to accept and to use new ways to interpret materials and actions to inform their behavior as long as doing so is inexpensive or economically beneficial (Blanchard, 2008; Brint & Karabel, 1991; Scott, 2001). The cost of using the new meanings encapsulated in a formal policy can be minimized or made positive by designing the policy to produce weak price signals or by recycling the revenues to benefit affected stakeholders. When these informal effects are accounted for they reveal that market-based policies have broader and more widespread social effects that extend beyond their formal economic implications. Acknowledging formal policies' informal effects also creates another criterion for evaluating the viability and value of different policy designs. For example, RGGI demonstrates how, in certain contexts, policy designs that intentionally induce weak price signals can be more useful and can have more significant effects than a traditional economic evaluation would predict. In this way, combining economic and institutional theories offers policymakers and researchers a more revealing approach for analyzing and evaluating the design, enactment, and effects of market-based policies.

Additionally, combinations of economic and institutional theories also offer a unique perspective for analyzing environmentally-hued institutional negotiations in general and those associated with the enactment of a market-based policy in particular (Bourdieu & Wacquant, 1992). Environmentally-flavored institutional negotiations have been presented as individual or organizational efforts to highlight alternative ways to interpret and use physical materials, natural ecosystems, and behavioral actions that transfer materials between and across ecosystems (Bourdieu & Wacquant, 1992; Fligstein, 1997; Schnaiberg, 1980). This research reveals that certain interpretive frames can make newer environmental-based meanings for physical materials and behavioral actions more salient to individuals and organizations (Fligstein, 1997; Scott, 2001). This salience increases their willingness and desire to accept and use these meanings to guide their behavioral involvement with the environmental activity (Brint & Karabel, 1991; Scott, 2001). In particular, policymakers or other institutional entrepreneurs can induce economically rational individuals and organizations to interpret and use the physical materials and behavioral actions underlying an environmental activity in a specific way by demonstrating how the cost of using the meanings is low or how their use can produce new benefits (Blanchard, 2008; Fligstein, 1997; Scott, 2001). The interpretive connection that economically rational individuals and organizations make between positive economic and non-economic meanings illuminates how the enactment of a market-based policy can be used as strategic tool in an institutional negotiation (Blanchard, 2008; Bourdieu & Wacquant, 1992; Fligstein, 1997; Scott, 2001). More specifically, it shows how policymakers can build certain design features into a market-based policy so the new environmental meanings underlying it are also framed in an economically positive way (Fligstein, 1997; Lindblom, 1977). When economic and environmental meanings are positioned to be mutually inclusive they can collectively become more salient to a broader range of individuals and organizations than either could be individually. As many modern individuals and organizations exhibit at least some economic rationality, conceptual frameworks that combine institutional and economic perspectives are an appealing approach for analyzing environmental-based institutional negotiations and especially those that involve the enactment of a new market-based policy (Blanchard, 2008; Bourdieu & Wacquant, 1992; Scott, 2001).

Limitations

The combination of economic and institutional perspectives this research draws upon can be used to analyze and evaluate the informal effects of a market-based policy and different types of institutional negotiations (Bourdieu & Wacquant, 1992; Scott, 2001). The findings of the research can also be applied to help design and enact market-based policies and to help encourage the diffusion and acceptance of environmentally beneficial interpretations and uses for physical materials and behavioral actions. However, there are limitations to these applications, as the framework and findings are more relevant in some contexts than others.

The findings of this research can be used to help design and enact new market policies to control environmental activities. However, they are most pertinent for designing and enacting mandatory market policies implemented to control environmental activities not formally controlled in the past. The findings of this research suggest that in certain political and environmental contexts policymakers should design a new, mandatory, market-based policy to have weak price signals or to create new benefits in order to attract support for its enactment and ongoing presence. However, if new markets are voluntary and not mandatory, then policy designs that produce weak price signals may not produce these effects. In the case of new, voluntary markets, low or weak price signals may limit economically rational individuals' and organizations' desire to join and participate in the market (Blanchard, 2008). This would be due to the low perceived value of the new market asset. Low price signals indicate the asset created and exchanged within a new market policy is not particularly valuable. The lack of perceived value would limit economically rational individuals' and organizations' desire to voluntarily purchase the asset or to use the new meanings for materials and actions the policy is trying to highlight to guide their behavioral involvement with the activity (Blanchard, 2008; Lindblom, 2001; Scott, 2001). For example, if a new, voluntary CO_2 market policy has weak price signals then economically rational individuals and organizations would not see the benefit of buying CO_2 allowances or interpreting and using CO_2 and the operation of CO_2-emitting technologies as controlled (Blanchard, 2008; Scott, 2001). This perception would then limit their desire to voluntarily change their behavior to reflect the use of the new meanings underlying the policy.

Additionally, if a new market policy for a particular environmental activity is mandatory, but the materials and behaviors underlying the activity had already been controlled through a formal policy, then intentionally designing the policy to produce weak price signals may not be necessary or effective. If individuals and organizations have already become accustomed to interpreting the materials and actions underlying the new policy as controlled then policymakers do not necessarily need to assist their adoption by making their use inexpensive (Fligstein, 1997). In such a case, policymakers would want to exploit individuals' and organizations' willingness to interpret these materials and actions as controlled to design and propose a strong policy. As these individuals and organizations would have already been interpreting and using the material and behavior as controlled, they would perceive less misalignment between their pre-existing cultural controls and the cultural controls encapsulated in a strong policy, which would facilitate its enactment (Caronna, 2004; Lindblom, 1977).

The findings of this research can also be used to help make environmentally beneficial meanings for materials and actions more salient to different types of individuals and organizations. However, they may be most relevant for institutional negotiations that occur in institutional fields centered around industrial processes that palpably abut natural eco-systems (Bourdieu & Wacquant, 1992; DiMaggio & Powell, 1983). These industrial processes include extractive industries, such as mining, harvesting, and fishing, and those that directly deposit waste streams into environmental sinks, such as industries that produce air or water pollution they specifically dispose of. For instance, this research identifies how individuals and organizations are more willing to accept and use newer environmental meanings to inform their behavior when the cost of using them is low or when their use produces new benefits. However, in institutional fields that do not directly abut natural eco-systems, such as service industries or product assembly, individuals and organizations may be less willing to change their behavior to reflect the use of environmentally beneficial meanings even if the costs of doing so are low or the benefits are high (DiMaggio & Powell, 1983; Scott, 2001). For individuals and organizations associated with these types of institutional fields, environmentally beneficial meanings for materials and actions may be less broadly salient because their behavior does not directly involve the use of these materials or actions (DiMaggio & Powell, 1983; Scott, 2001). In this case, the disconnection between the industrial process and the environmental activity may make individuals and organizations associated with the industry indifferent to how the materials and actions underlying the activity are interpreted and used. This indifference would make environmentally beneficial meanings less salient even if their use is framed to be economically inexpensive or beneficial (Fligstein, 1997; Scott, 2001). For instance, it may be hard to get an organization assembling manufactured components into finished products to interpret the materials and actions used to make the components through environmental meanings by making their usage cheap. The difficulty would arise because these materials and actions are only indirectly associated with the organization’s behavior.

Areas for Future Research

The conceptual framework for this research and the findings that emerged reveal implications for designing and enacting new market-based policies and for exploiting their various informal effects to improve environmental performance. Even after accounting for their limitations, this research's framework and findings can be applied to analyze and evaluate other environmental-based market policies and how the connection between economic and non-economic meanings can be used as a strategic tool for institutional negotiations (Bourdieu & Wacquant, 1992; Fligstein, 1997). In fact, doing so reveals a number of promising areas for future research. These areas include further research on the effects of CO_2-controlling policies, RGGI, the design and enactment of environmental-based market policies, and the diffusion of energy efficiency technologies and practices.

To begin with, the conceptual framework and methodology used to evaluate the design and effects of RGGI can be used to study California's recently enacted CO_2 policy, the European Unions' existing CO_2 policy, as well as any other newly enacted CO_2 policy (California Environmental Protection Agency: Air Resources Board, 2012a; European Commission, 2010). The enactment and effects of these policies extend beyond the scope of this research project, but it would be valuable to conduct a similar analysis of them in order to compare their design features and effects with those employed and induced by RGGI. The comparative analysis could reveal whether certain policy design features are more or less appealing to electrical companies, consumers, or regulators with different geographic, industrial, or ideological characteristics. It could also reveal whether these traits make different types of individuals and organizations more or less receptive to accepting and using new environmentally-based meanings to inform their behavior. The potential findings could be used by policymakers to design or refine CO_2 policies so the new meanings for materials and behaviors underlying them are more broadly appealing or more appealing to a specific type of company, consumer, or regulator (Fligstein, 1997; Lindblom, 1977; Scott, 2001).

With regard to RGGI, Governor Christie partially justified his decision to withdraw New Jersey from the policy on the basis that it was too weak to bring about a significant reduction in emissions. Based on this reaction to weak price signals, is there a tipping point where weak price signals switch from being a shield that can protect a newly enacted policy from contestation to a potential weapon that attracts and allows opponents to contest it? If weak price signals can bring about these opposing informal effects either simultaneously or sequentially then how can policymakers best deploy and then modify price signals to ensure initial and ongoing support for a market-based policy that controls an environmental activity for the first time?

The SWG was able to enact RGGI and to protect it from significant contestation by designing it to have weak price signals and so that its revenues are recycled to programs that benefit affected stakeholders. Can the enactment of other market-based policies, for CO_2 or other uncontrolled environmental activities, be facilitated by designing the initial policy to have weak price signals and a stakeholder benefitting revenue recycler? If so, how can multiple modeling approaches, such as economic and complex system models, best be used to help stakeholders envision the potential effects? For example, policymakers may be able to enact, market-based CO_2 policies for other geographic or industrial sources by diffusing information about the economic and systemic effects imposed by existing CO_2 policies and the potential economic and systemic effects that could be imposed by potential policy designs before the process begins. These informational resources could include case studies from the RGGI region that demonstrate the ease, limited costs, and potential benefits associated with controlling CO_2 and the operation of CO_2-emitting technologies. They could also include clearly presented output figures from existing economic or complex system models and information about how stakeholders can help set the input and output parameters for new models. If stakeholders receive this information before the policy design process begins and can participate in the process, would they be willing to support the enactment of potentially stronger policies?

Most market-based policies to date have not included a revenue recycler. However, it represents a valuable design feature that can attract support for a new policy, as well as a way to accentuate or attenuate dominant economic meanings, which can then make individuals and organizations more willing to accept and use other non-economic meanings. Can recycling market policies' revenues to support other endeavors, beyond energy efficiency, produce similar or greater political and institutional effects? If so, how else could a revenue recycler be used? Furthermore, are the political and institutional effects associated with the inclusion and operation of a revenue recycler amplified when more funds are available? In particular, how can different emissions caps be combined with different types of revenue recyclers in order to attract the most support for a new policy, create the most revenues, or bring about the most significant environmental improvements?

Within and beyond the RGGI region, attention to and the diffusion of energy efficiency initiatives that reduce electricity consumption is increasing (Foster et al., 2012; York et al., 2012). However, many of the initial opportunities are fairly easy and inexpensive, while improving the efficient consumption of electricity even further will be harder and more expensive (St. John, 2012). Can additional resources for recycling help maintain or accelerate the diffusion rate of energy efficiency initiatives? Can the allocation of these resources be improved or refined so as to bring about more specific behavioral changes in specific populations of electricity consumers?

Similarly, the allocation of new energy efficiency funds is making negative economic meanings for energy efficiency initiatives less salient for consumers and PUCs, and positive economic meanings for energy efficiency initiatives more relevant for electrical companies. These institutional changes in turn make positive non-economic interpretations of energy efficiency initiatives more visible and valuable. Are there other ways to frame the use of energy efficiency initiatives that appeal to both electrical companies and consumers? How could these meanings be integrated with or supported by energy efficiency resources in order to accelerate the diffusion and innovation rate for energy efficiency technologies and practices?

Collectively, the increasing visibility and value of positive economic and non-economic meanings for energy efficiency initiatives are motivating individuals and organizations to change their behavior by deploying and adopting these technologies and practices in greater numbers (Foster et al., 2012; York et al., 2012). The increasing use of demand-side resources is changing the industrial constitution of electrical systems by shifting the conceptualization of electrical energy away from a commodity that is delivered towards a service that is provided (Foster et al., 2012; Goldman et al., 2010; York et al., 2012). Is it easier for existing electrical organizations to develop the skills needed to thrive in this emerging operational context internally or by acquiring an outside contractor or pure energy efficiency company? How can electrical companies best develop the social, organizational, and technical capabilities needed to cultivate these skills internally? What challenges arise when an existing organization attempts to integrate the new social, organizational, and technical capabilities it receives from an acquisition or by bringing in an outside contractor? The shifting conceptualization of electrical energy away from a commodity towards a service accompanies and stimulates a number of large-scale changes in the electrical industry, many of which are creating space for new organizational types, such as energy efficiency organizations, to emerge and expand (Goldman et al., 2010; York et al., 2012). What will the technological and organizational configuration of the electrical industry look like in the future? How will these changes affect future attempts to control electricity-derived CO_2 emissions?

Concluding Thoughts

The Regional Greenhouse Gas Initiative represents an important environmental policy that has been falsely interpreted as ineffective. Its initial cap size was set above the region's actual CO_2 emission level, creating an oversupply that has consistently pushed the allowance price to the reserve price floor. In fact, RGGI's low allowance price often prompted individuals working within regulated and non-regulated organizations in the region to claim the policy was having, at best, a minor influence on the region's electrical system. The reaction is consistent with economic rationality. Regulated organizations perceived RGGI's low allowance price to be an almost trivial new cost. This minimized their need and desire to drastically restructure their operations to reduce their CO_2 emissions, which led individuals in regulated and non-regulated organizations to interpret the policy as relatively insignificant (Stavins & Whitehead, 1992).

However, when the entire scope of the formal policy mechanism and its informal effects on regulated and non-regulated organizations are taken into account, it becomes clear that RGGI's overall impact extends beyond the limited formal effects attributed to its low allowance price. RGGI pioneered an innovative new design feature for market-based policies by recycling a majority of its auction revenues to support energy efficiency, and these funds are being used to develop increasing amounts of demand-side resources (Foster et al., 2012; Regional Greenhouse Gas Initiative, 2011b; York et al., 2012). Furthermore, the resulting energy efficiency funds and RGGI's low allowance price are also shifting how individuals and organizations in the region interpret and use CO_2, the operation of CO_2-emitting technologies, electricity, and energy efficiency initiatives. These informal effects are facilitating policymakers' ability to develop new and strengthen existing CO_2 policies, and are making energy efficiency initiatives that reduce electricity consumption more appealing to electrical companies, consumers, and PUCs (Brint & Karabel, 1991; Caronna, 2004). A revenue recycler is a novel design feature for market-based policies, and policies' informal effects are not often identified or analyzed (Lindblom, 1977). Neither recycled revenues nor informal effects are typically used as an indicator or evaluator of a policy's effects (Aldy et al., 2010; Lindblom, 1977). However, when they both are, it clarifies how the effects of a market-based policy can extend beyond the assets and price signals it creates.

Even though the price of an individual CO_2 allowance is low the collective sale of millions of allowances is generating significant revenues. By recycling these revenues, RGGI's policymakers found a way to fund needed investments in energy efficiency without increasing the price of electricity for consumers and without imposing significant new costs on electrical companies. These resources are being used to reduce the upfront cost of deploying and adopting energy efficiency initiatives for PUCs and consumers, and to make the deployment of these initiatives lucrative for electrical companies. In doing so, these funds are also shifting how electrical companies, consumers, and PUCs interpret the use of electricity and energy efficiency initiatives so they perceive reducing electricity consumption through the use of these technologies and practices as appealing (Brint & Karabel, 1991). The perceptual shift motivates electrical companies, regulators, and consumers to change their behavior by developing and adopting demand-side resources that limit the need to construct and operate new CO_2-emitting generating equipment (Foster et al., 2012). In addition to directly reducing emissions through its cap and trade component, RGGI also indirectly reduces emissions through its revenue recycler. As a result, RGGI is achieving greater than anticipated environmental benefits, along with the other economic and systemic benefits that emerge from improving the efficient use of existing electrical supplies.

On the surface RGGI's low allowance prices do not appear to be changing the operation or systemic configuration of the region's electrical system. However, the low allowance prices make it easy and inexpensive for regulated and non-regulated organizations in the region to begin interpreting CO_2 as a controlled material and the operation of CO_2-emitting technologies as a controlled activity. This in turn makes it easy and inexpensive for electrical companies to use these meanings to shape their behavior, or how they produce electricity. As RGGI is the first mandatory CO_2-controlling policy in the U.S. these informal effects represent a significant shift from how organizations had been interpreting and using this material and action (Hulme, 2009). By intentionally designing RGGI to produce weak price signals, policymakers have been able to induce regulated and non-regulated organizations to willingly accept and use these new meanings for CO_2 and CO_2-emitting technologies to guide their behavior instead of contesting them (Fligstein, 1997; Scott, 2001). Furthermore, over the course of RGGI's first phase, these organizations have become more familiar with these new meanings and have experienced the low costs and economic benefits of basing their behavior on them firsthand. Regulated and non-regulated organizations' increasing acceptance of and willingness to use these meanings has enabled policymakers to extend RGGI and to tighten the cap for upcoming phases (Caronna, 2004; Regional Greenhouse Gas Initiative, 2013). In other words, policymakers have been able to leverage RGGI's informal effects to bring about a stronger formal policy that probably would not have been politically viable had it been initially proposed as the first CO_2-controlling policy.

Lastly, the two types of informal effects RGGI induces are interacting to produce positive feedback. The feedback makes it increasingly inexpensive to treat CO_2 and the operation of CO_2-emitting technologies as controlled, and increasingly worthwhile to treat the deployment and adoption of energy efficiency initiatives as an appealing endeavor. This is because the increasing use of demand-side resources suppresses the price of electricity and CO_2 allowances, which makes it even less expensive for organizations to base their behavior on treating CO_2 and the operation of CO_2-emitting technologies as controlled. As organizations accept and use these meanings they express support for RGGI. The support ensures the creation of increasing amounts of energy efficiency funds, which facilitates electrical companies', consumers', and PUCs' ability to positively interpret the use of energy efficiency initiatives even further. In these ways, RGGI's informal effects create further support for both the policy and for using energy efficiency initiatives that reduce electricity consumption to manage CO_2 emissions. The importance and value of these informal effects means they significantly affect efforts to use formal policies to control social behaviors (Lindblom, 1977; Scott, 2001). This makes acknowledging and addressing the relationship between formal design features and informal effects a crucial consideration for designing new policies and for evaluating existing ones, as well as a promising area for additional research.

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