



Information and coercive regulation: The impact of fuel mix information disclosure on states' adoption of renewable energy policy

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ABSTRACT

This study examines whether the publicly provided information performs the role of a procedural policy expediting the adoption of a more coercive and substantive regulation by heightening public awareness and political legitimacy. Under the assumption this role of procedural policy may be critical, especially for the policy with distributed benefits and concentrated costs such as the renewable energy policy, this study examined the relationship between mandatory disclosure of the fuel mix information of electric utilities and states' adoption of Renewable Portfolio Standards (RPS). Our event history analysis results show that existence of the mandatory information disclosure rule on fuel mix and greenhouse gas emissions significantly increases the probability of adoption of the coercive regulation (RPS). The findings indicate states' appropriate mix of policy tools could play a vital role in initiating high-resistance policy adoption.

1. Introduction

Climate change has been one of the central topics in global environmental discourse during the past several decades. However, despite various international and domestic efforts to reduce the fossil fuel particularly led by developed countries, the United States federal government has played a constrained role in adopting national-level, meaningful measures to control greenhouse gas emission (Byrne et al., 2007). As Rabe (2004) pointed out, this could be partly because any attempt to adopt climate change policies tends to face strong resistance by interest groups who have been exercising a substantial amount of political influence in regulation initiation processes such as oil and natural gas industries, although public awareness on the issue stays unwavering.

On the other hand, state governments in the United States have played an important role in climate change policy adoptions. The most prevalent climate change policy is the introduction of the Renewable Portfolio Standard (hereafter RPS). The RPS is setting a mandatory goal in which states' total electricity production should achieve a target fraction of the renewable energy sources by the specified timelines. Under the RPS, electric suppliers are required to increase their electricity generation from renewable energy sources (wind, solar, biomass and geothermal). Since the state of Iowa adopted the RPS for the first time in 1983, 29 state governments have adopted the RPS by 2010, despite the wide varieties in stringency levels and detailed designs.

Starting from the significance of the RPS as a primary climate change policy tool in the United States, this study tries to uncover the factors that influence states' adoption of the RPS. Particularly, this study focuses on the potential role of the publicly provided information as an accelerant for the adoption of the RPS. For the past several decades, attention has been on the role of information in environmental regulation not only for its firm standing regarding a citizen's fundamental right to know, but also for its further effects such as polluters' voluntary performance improvement (Kraft et al., 2011). Among various dynamics associated with information, this study examines the impact of electric utilities' fuel mix information disclosure on the adoption of a more coercive regulation (the RPS).

To explore the research question, this study first tried to evaluate the renewable energy policy based on the theoretical frames of "Politics of regulation" and "Mixed of policy tools," which was suggested by Wilson (1980) and Howlett (2005), respectively. According to the politics of regulation, the renewable energy policy can be classified into the policy type with distributed benefits and concentrated costs. This type of policy is more difficult to adopt because the high political resistances by direct cost-bearers are inevitable. Under this circumstance, other (but related) types of policy intervention (e.g. publicly provided information) might play a critical role in expediting adoption of the coercive regulation by heightening public awareness and political legitimacy. Howlett (2005) also divided policy tools into two types—procedural policy and substantive policy—and suggested the

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information provision as one of the procedural policy tools, which does not alter the final production of goods and services in society, but plays a role in the adoption of the substantive policy.

Focusing on this potential role of the information provision as a procedural policy in the high-resistance environment, this study examined whether or not the introduction of the information disclosure rule influenced the probability of adoption of a substantive policy, that is, mandatory renewable energy quota policy (the RPS). More specifically, this study explores the impact of the disclosure rule of electric utilities' fuel mix and greenhouse gas emission information on the RPS adoption, as well as the other impacts of internal determinants and external diffusion factors

A number of studies have tried to identify what factors lead to the adoption of the RPS. Some have found various internal determinants such as political, economic and social factors (Huang et al., 2007; Ciocirlan, 2008; Lyon and Yin, 2010), while other found some external diffusion factors such as vertical and horizontal diffusions (Chandler, 2009; Matisoff, 2008; Stoutenborough and Beverlin, 2008), although the results have shown mixed conclusions. Despite a substantial contribution of prior studies in identifying the determinants of the RPS adoptions, there have been limited attempts to explore the role of one policy tool for the adoption of another policy tool. Therefore, it might be worth visiting the possibility of the information disclosure as a procedural policy tool for further regulations to extend the environmental policy discussions.

The panel data on 49 states' RPS adoption pattern from 1993 to 2010 was collected along with each state's characteristics that might influence their RPS adoption. The event history analyses on information disclosure and RPS adoption patterns during the 18 years show that the existence of the mandatory disclosure rule, as well as the traditional internal determinants and external diffusion factors, significantly increases the probability of the RPS adoption.

1.1. Background – Renewable Portfolio Standards

The electricity sector in the United States is one of major contributors to greenhouse gas emission. It accounts for approximately 40% of carbon dioxide emissions and 30% of greenhouse gas emissions in the United States (Energy Information Administration, 2012). The bulk of these emissions generally result from massive fossil fuel power plants that generate the majority of electricity in the United States. Since the climate change became one of the major global issues, the total capacity of the renewable energy steadily increased from 89 million kilowatt-hours to roughly 139 million kilowatt-hours from 1991 to 2011. However, the fraction of renewable energy to total energy generation changed minimally from 12.15% to 13.23% during the same period (Energy Information Administration, 2012).

As the global concerns about climate change and its potential adverse effects grows, associated actors, including policy makers, scholars and environmental groups, have questioned heavy reliance on fossil fuel energy sources (Nordhaus, 2010). The discussions were later extended to other important concerns related to energy generation and production, including energy security (Li et al., 2009; Löschel et al., 2010), air pollution (Bollen et al., 2010) and fuel price volatility (Bolinger, 2009; Fuss and Szolgayová, 2010).

Under a growing consensus over the past decade that these issues might require government public policy solutions, state governments in the United States have shown leadership in the alternative energy policy arena (Rabe, 2006). In the absence of universal initiatives by the federal government to address climate change, the state governments have actively introduced a number of policy instruments to reduce greenhouse gas emissions. The RPS is one of the most popular policy instruments in state governments. Under RPS, state governments mandate electric utilities to produce a certain percentage of electricity from renewable energy sources by a pre-designed timetable.

From the late 1990s to 2010, 29 state governments have adopted

the RPS. For example, the Department of Energy Resources in Massachusetts adopted the RPS in 2000 that required all retail electricity providers in the state to utilize new renewable energy sources for at least 1% of their power supply by 2003; the required amount increased to 4% by 2009. One of the major elements of the RPS is states could reset the targeting renewable energy level once the original goal was achieved. This feature is expected to provide the continuous policy instrument to promote the development of renewable energy. By 2007, eleven states revised their RPS, most of which became more stringent (Wiser, 2008).

According to Wiser et al. (2007), since the 1990s, the RPS became the viable option for greenhouse gas control at the state-level. Its political feasibility can be found in the fact that its policy frame is incentivizing renewable energy, not taxing fossil fuel use, which leads to potential economic development and job creations (Rabe, 2006). However, as related literature also points out, the RPS is clearly a mandatory and regulatory form of policy, compared to other climate change policies such as cap and trade system or production incentives. Although its goal on the surface is an incremental increase of renewable energy use, it inevitably implies the mandatory reduction of fossil fuel with a specified timeline.¹ According to Bickers and Williams (2001), it is one of the most coercive forms of policy instruments—so called “public goods” type policy—which imposes a mandatory behavioral requirement to achieve a specific level of public goods. Because the RPS is more coercive than other possible policy instruments (e.g. voluntary agreement, information provision or taxing), various factors must be involved in the policy adoption process. From this standpoint, this study tries to analyze the RPS adoption as a result of other related policy instruments, as well as with the traditional policy adoption drivers.

2. Theoretical framework

2.1. Theory of policy innovation

To understand the dynamics of environmental regulation adoption of state governments, exploring the policy innovation theory seems to be worthwhile. It illustrates what kind of factors drive states to adopt innovative policies. Policy innovation can be defined as “a program or policy which is new to the states adopting it, no matter how old the program may be or how many other states may have adopted it” (Walker, 1969). The possibility that one state adopts one innovative policy is positively related to motivations to innovate, but negatively related to strength of objectors, and finally, positively linked to resources to overcome the opposite (Mohr, 1969; Berry and Berry, 1990). The theory of policy innovation involves two factors. The first is the internal determinants, such as state political, economic and social factors, while the second is regional diffusion factors, including horizontal diffusion (i.e. effect of neighboring states) and vertical diffusion (i.e. the influence of the upper-level governments) (Berry and Berry, 1990, 1992; Mooney and Lee, 1995; Mintrom, 1997).

A number of prior studies have explored motivations and drivers as well as obstacles in the RPS adoption dynamics, and have identified various factors related to the adoption. The findings of the previous studies are not entirely consistent, but these studies confirmed several key factors for the RPS adoption. For example, Lyon and Yin (2010) found local air pollution level, renewable energy potential of a state and political influence of renewable energy producers as significant factors.

¹ Other criticisms come from several points. First, having an RPS policy is not enough to significantly increase the percentage of renewable energy generation across states, at least given current RPS designs. Second, an RPS policy designed to increase the share of renewable energy generation will have limited ability to achieve multiple objectives simultaneously. Third, and closely related to this last point, RPS policies, as implemented at the state level, are also unable to prevent carbon leakage across state borders (Carley, 2011).

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