The Political Economy of Clean Energy Trading in Western North America

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Overview

This paper explores transnational influence in the context of multi-level governance by examining electricity trade in North America. In particular, the paper focuses on the link between policies for electricity trading and policies for reducing greenhouse gases. While the paper will adopt a broad Canada-US regional focus, it will pay particular attention to two jurisdictions: British Columbia and California.

It examines the governance of two key functions: the reliability of the interconnected electricity grid, and efforts to reduce greenhouse gases by increasing reliance on renewable sources of electricity generation. The reliability of the electricity system in North America is regulated by a complex multi-level system that includes quasi-governmental multilateral entities. The reliability of Western North America's electricity system is maintained by the Western Electricity Coordinating Council (WECC) made up of the provinces of Alberta and British Columbia and 14 western states. Despite the significance of these governance arrangements, they have not been adequately addressed by political scientists.

While federal governments have been relatively inactive at addressing the climate crisis, subnational jurisdictions have been far more active. A number of jurisdictions in WECC have policies in place to reduce greenhouse gas emissions, the most stringent of which are California. Due to its vast hydroelectric resources, British Columbia produces significant quantities of carbon-free electricity, and is implementing policies to expand its supply for export. Despite its dire need to reduce GHG emissions from electricity production, current California rules disqualify that vast majority of BC resources because they come from "big dams".

This paper will examine these overlapping policies issues from the perspective of multilevel governance. The primary purpose is to categorize the governance relations in each area by their degree of international integration, assess how that level of integration has changed over time, and consider the risks and benefits of the observed levels of integration for the interests of provinces involved. The paper begins with a brief theoretical overview on integration and multi-level governance, and then outlines the two policy challenges. Patterns and trends in cross-border electricity trade are examined. After an analysis of the institutional structure of utility regulation in the two countries, the paper examines the integration dynamics involved with the development of mandatory reliability standards and then renewable portfolio standards. The conclusion develops a summary conceptualization of these complex new multi-level governance mechanisms.

Theoretical Framework: Integration and Multi-level Governance

The core theoretical issues here are the causes and consequences of different patterns of multi-level governance. In particular, how much integration of governance has occurred in the electricity sector, and how has it mattered? There are various typologies of policy integration. For example, Hoberg et al (2002) distinguish four distinct causes of policy convergence: parallel domestic pressures, emulation,

[1] This paper greatly benefit from the excellent research assistance of Stephanie Taylor.

economic integration, and international legal agreements. They draw these distinctions to emphasize the fact that growing similarity in policies across countries is not necessarily a result of international constraints.

Gattinger and Hale (2010) present a continuum of policy relations that moves from conflict to independence to harmonization. The movement towards harmonization can proceed in four different ways:

- *parallelism*, similar to Hoberg et al's first two categories;
- *coordination*, where countries consider each other's interests while pursuing their own distinct policies
- *collaboration*, where countries share information and expertise in pursuit of common objectives
- *harmonization,* where countries develop common policy frameworks.

As Gattinger (2010) clarifies, harmonization can be pursued either through bi-*lateral* mechanisms of two countries working on specific agreements, or bi-*national*, where a joint mechanism is established with authority. As we will see, the regulation of electricity reliability has evolved into a distinctive mixed model.

Working from an economic perspective, and focusing specifically on electricity, Pineau and colleagues (2003) have examined electricity integration along three dimensions:

- Infrastructure integration – the total capacity of a jurisdiction's interconnections with others relative to its total capacity
- Commercial integration -- extent of trade with other jurisdictions and difference in price levels across jurisdiction
- Regulatory integration -- the extent to which regulatory policy is coordinated across jurisdictions, equivalent to harmonization in the Gattinger and Hale framework and international legal agreements in the Hoberg et al framework.

This paper will use a combination of these typologies to place two different policy functions in these different categories and see how they've change over time. Pineau et al's first two categories (infrastructure and commercial integration) will be assessed briefly. More time will be spent assessing the issue of regulatory integration and examining its complexities.

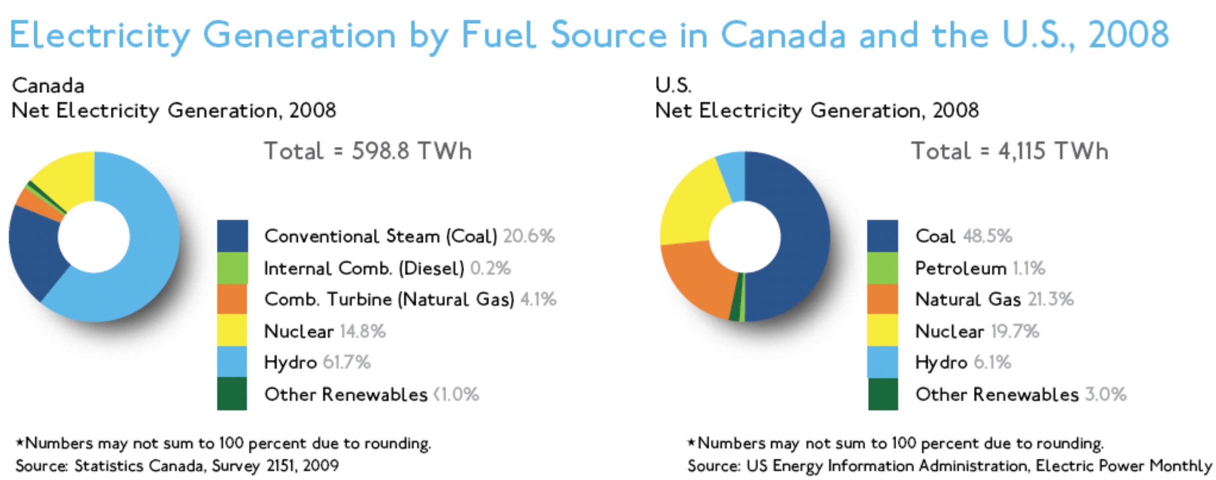
The Policy Challenges

Electricity is an essential service in modern life, and North Americans have become accustomed to expect almost perfect system reliability. Electricity systems are one of the most significant and complex socio-technical systems of industrial and post-industrial society (Bijker et al 1989). But they are also a significant source of environmental problems, ranging from local and regional air pollution, water pollution, and land use conflicts. Greenhouse gas emissions are one of the most significant environmental impacts. Electricity generation is responsible for 39% of carbon dioxide emissions in the United States, although only 16% in Canada due to the significant role played by hydropower here.[2]

[2] US figure from http://www.epa.gov/climatechange/emissions/downloads11/US-GHG-Inventory-2011-Executive-Summary.pdf. Canadian figure from http://www.climatechange.gc.ca/default.asp?lang=En&n=72A588AB-1

In both Canada and the US, electricity systems were principally designed at the scale of sub-national jurisdictions of provinces and states. Those jurisdictions remain the core organizing and governance unit for electricity. Over time, however, industry and regulators increasingly saw benefits to integration through electricity trade. Integrating electrical grids across jurisdictional lines was a cost-effective way of improving system reliability, as the risk of outages was spread across a larger number of sources. There were also other economic benefits to trade. Some jurisdictions, such as Quebec and British Columbia, have historically had surplus power they could gain from exporting, and many US states found importing that power less expensive and controversial than building new sources of power in their own jurisdictions. Those reliability and economic arguments have been the primary impetus for increasing integration among jurisdictions (Pineau et al 2003).

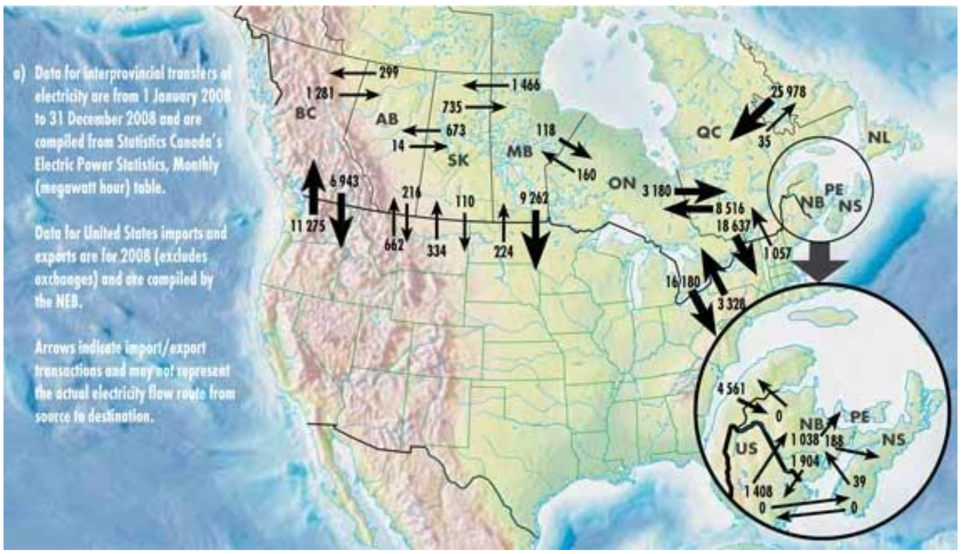
More recently, however, there is an increasing environmental logic behind integration. Electricity trade may be a potential contribution to reducing greenhouse gas emissions in jurisdictions with carbon-intensive electricity system. For example, British Columbia’s 2010 Clean Energy Act declared a new policy objective to become a net exporter of electricity with the intention of “benefiting all British Columbians and reducing greenhouse gas emissions in regions in which British Columbia trades electricity” (Hoberg and Sopinka 2011). Initiatives by US state governments to reduce greenhouse gases have the potential to increase opportunities for Canadian clean energy exports. Figure 1 shows that Canada has a much larger fraction of non-fossil fuel power at its disposal. Nearly half of US electricity production is from coal, whereas over 60% of Canada’s is from hydroelectricity.



These benefits and opportunities from increased trade come with increases risks, however. Sub-national jurisdictions will be increasingly vulnerable to influence from outside their border. Access to US markets requires Canadians to comply with US and international trade rules, and this may involve changes to provincial policy that are dictated or strongly influenced by US policies. One scholar has expressed grave concerns about increasing Canadian integration into US electricity markets, referring to US pro-competition initiatives as “imperialist regulation” (Cohen 2007). The main objective of this paper is to examine how increased Canadian involvement in electricity trade with the US influences domestic Canadian policy and operations.

Electricity Trade Patterns

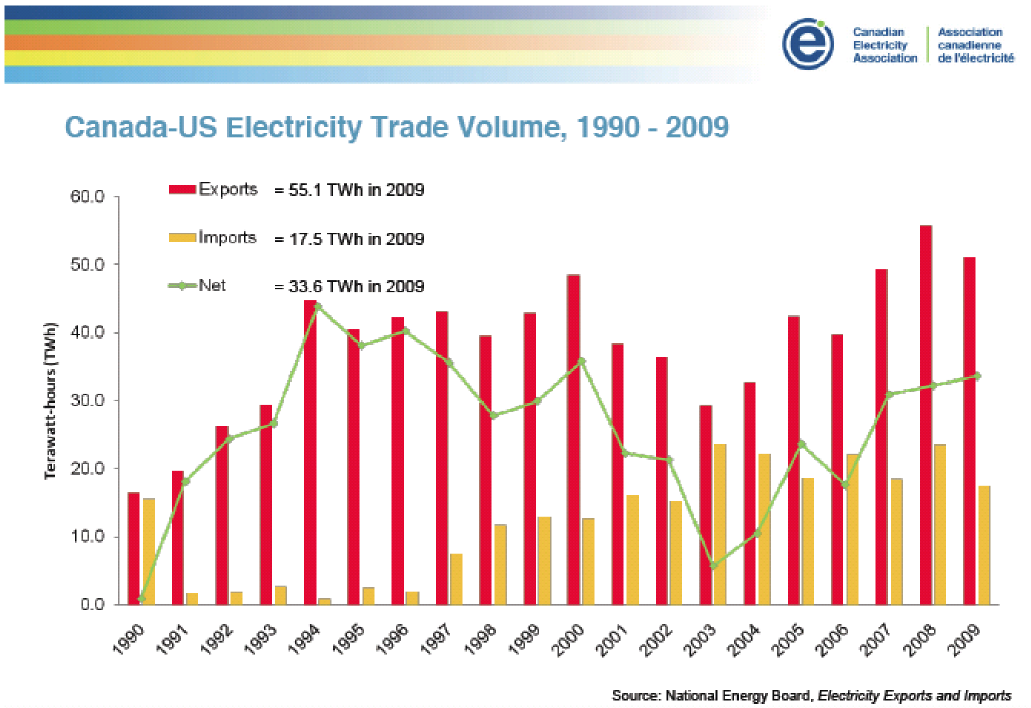
Electricity flows across jurisdictional boundary are displayed in Figure 2, a map from the National Energy Board that shows interprovincial trade within Canada and international trade between Canada and the United States. This figure reveals two very important trade patterns. First, north-south, international flows are, with one exception, significantly greater than interprovincial flows. The exception is Quebec and Newfoundland-Labrador, resulting from the massive long term contract Quebec has from generation in Labrador from the Churchill project. Otherwise, international flows dominate interprovincial flows. For example, trade between British Columbia and the US is ten times that of trade across the BC-Alberta border. Overall, international flows are 1.5 larger than interprovincial flows (and if the Churchill project is taken, 60% of all interprovincial trade, international flows are 3.7 times larger than interprovincial flows) (Carr 2010, 1). Second, while there are substantial flows in both directions, Canada is a significant net exporter of electricity to the United States, largely as a result of significant exports from Manitoba, Ontario, and Quebec (BC and Alberta are both net importers). As a whole, in 2009, Canada exported 34,000 GWh of electricity more than it imported, which is about 6% of domestic generation in Canada.[3]



Source: National Energy Board

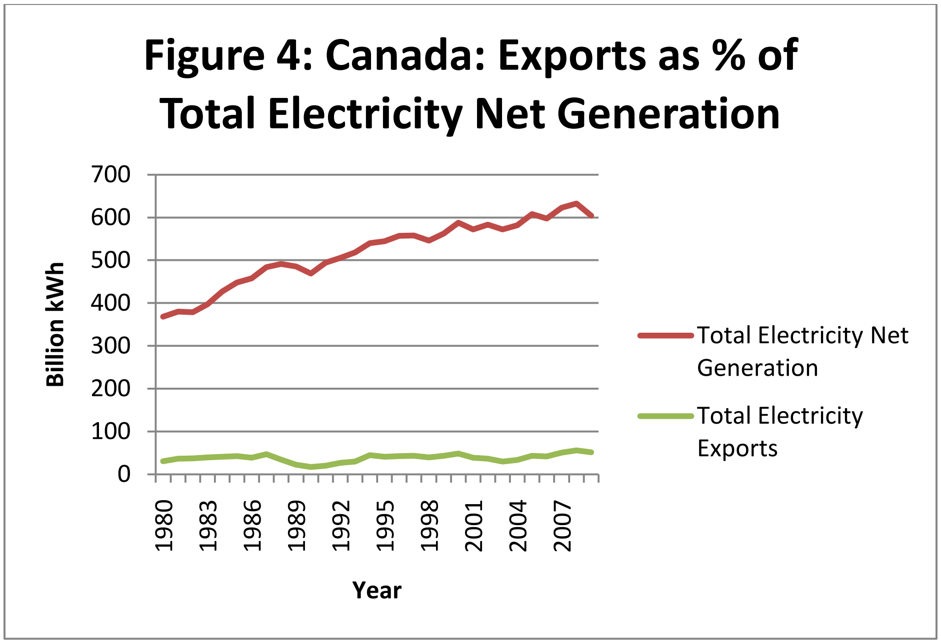
Figure 3 show trends in Canada-US electricity trade. There was a significant increase in Canadian exports in the early 1990s, a dip in the mid 2000s, and then recovery to record levels by 2008. Over the past decade, there is no significant trend towards integration; that appears to have occurred prior to the late 1990s. While net exports peaked in 1994, total trade has trended upwards as Canadian imports of US electricity increased during the 2000s.

[3] Statistics on generation and trade can be found at http://www.electricity.ca/industry-issues/electricity-in-canada/industry-data.php



Source: Canadian Electricity Association
http://www.electricity.ca/media/Industry%20Data%20July%202010/Canada-US%20Electricity%20Trade%20Volume%201990%20-%202009.pdf

If we examine Pineau's et al dimensions of infrastructure and commercial integration, we can see that US-Canada integration is relatively significant, although it is about half as intensive as it is within Canada. In terms of infrastructure integration, interties between Canada and the US in 2000 represent 17% of total Canadian capacity, and 2.5% of American capacity (Pineau 2003, 1469). Within Canada, this measure of infrastructure integration is 30% (Pineau 2007). In terms of commercial integration, electricity exports were 8.5% of Canadian generation in 2000, and 1.4% of US generation, although the US figures are much higher in states bordering on Canada (Pineau 2003, 1471). These international figures compare to the interprovincial measure of 15% (Pineau 2007). Figure 4 shows long term trends in Canadian exports to the US and total Canadian generation. Despite some fluctuation over time, the export percent was the same in 2009 as it was in 2000 (8.5%). We now turn to issue of regulatory integration being driven by concerns about system reliability and environmental protection.



Comparative Governance of Electric Utilities in Canada and the US

Electric utility ownership and governance reflects broader patterns of governance in Canada and the US on two core dimensions. First, while there is diversity of ownership in both provinces, the US is dominated by a private ownership model, and Canada is dominated by a public ownership model. Private, investor-owned utilities in the US operate in 49 of 50 states, and represent 42% of generation and 66% of final sales to customers. Federal, state and local public utilities account for 12 percent of generation, and about 16 percent of retail sales (Energy Information Administration 2007). In Canada, provincial government ownership is the dominant form, although private, investor owned utilities play a significant role in Alberta and Nova Scotia and a small role in British Columbia.[4] Private utilities constitute 19% of installed capacity (Statistics Canada 2007).

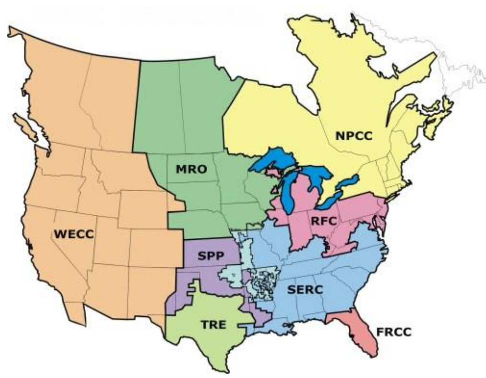
Second, the more centralized federation in the US is also reflected in electricity governance. In the US, a federal regulatory agency, the Federal Energy Regulatory Commission, regulates interstate sales of electricity, and since 2005, also plays a role in regulating system reliability (described below). In Canada, the National Energy Board regulates international trade in electricity, but leaves interprovincial trade up to bilateral relations between the provinces. As we will see, this creates a significant difference in governance of reliability.

Multi-level governance for electricity reliability

Electric utility regulation for reliability has evolved into a classic instance of multilevel governance. Subnational state and provincial governments have been and remain the core regulatory authority for electric utilities. Since the 1960s, as electricity flows increased across subnational and national borders, there has been an increasing shift of authority relations in both Canada and the United States.

[4] http://www.electricity.ca/about-cea/public-and-investor-ownership.php?searchresult=1&sstring=ownership#wb_34

The balance between public and private authority over electricity reliability has been directly affected by a combination of dramatic focusing events and US policy initiatives. Historically, reliability standards were developed by utilities, private or government owned, operating in subnational jurisdictions. The first major change in governance occurred in the wake 1965 as a result of a massive blackout in New York. Federal and state regulators began considering mandatory reliability standards for utilities, but those initiatives were deflected by the emergence of industry self-regulation through the National Electric Reliability Council. Established in 1968, NERC emerged as a private standard-setting body governed by its members. NERC has nine regional unit (see map). The name was later changed to reflect Canadian involvement and, subsequently, its status as a non-profit corporation. It is now officially the North American Electric Reliability Corporation, but retains the origins acronym.



Map of NERC Regions
http://www.eia.doe.gov/cneaf/electricity/chg_str_fuel/html/fig02.html

The second major development was a significant policy initiative of the US federal government, through its federal regulatory agency the Federal Energy Regulatory Commission, to increase competition in the electricity sector beginning in the mid-1990s. This initiative was based on the premise that while electricity transmission and distribution were justifiably considered natural monopolies, electricity generation was not. As a result, the structure of vertically integrated utilities that combined all three functions was challenged. The theory was that efficiencies could be gained by increasing competition in the electricity generating sector. Doing, so, however required that equal access be given to the transmission grid. To pursue this objective, FERC created requirements for an “open access transmission tariff.” In order the trade within the system, participating jurisdictions had to provide “reciprocity,” requiring that each jurisdictions make their own transmission systems open to other suppliers.

Because of the prior commercial integration of many utilities across jurisdictions, this effort to create a more competitive electricity market had significant implications for utility governance. Many US states changed the structure of their utility sector to attempt to benefit from this. Canadian provinces responded as well, although not consistently (Carr 2010, 8; Doern and Gattinger 2003, 88-8). British Columbia separated a new transmission entity, the British Columbia Transmission Corporation, out of its Crown utility, BC Hydro. In contrast, Quebec did not change its utility structure (Cohen 2007). Initially, the new FERC rules appeared destined to undermine Canadian provincial regulatory autonomy because it proposed that control of transmission be transferred to bilateral “regional transmission authorities.” This initiative was abandoned, however, largely a result of resistance from US state regulators (Cohen 2007).

The transition to a more competitive electricity market with active trading in wholesale power was challenging in some places. For example, manipulation of energy markets by unscrupulous trading entities such as Enron contributed to an electricity crisis in California in 2000-01, resulting in multiple blackouts and bankruptcy of one of the state's largest utilities (Weare 2003). That event highlighted the tension between an increasingly deregulated electricity market and the requirement for active coordination to ensure system reliability.

While the California crisis was alarming, it was not until an even more widespread system failure occurred in the Summer of 2003 that meaningful policy action was fostered. The blackout of August 14, 2003, covering eight Northeastern states and Ontario and affecting some 55 million people, revealed widespread system vulnerabilities and forced concerted bi-national US-Canada investigations and significant regulatory action in the US. The US and Canadian federal government collaborated on a U.S.-Canada Power System Outage Task Force to produce a report on the causes of the event and recommendations for how to respond. The core recommendation was that the NERC system of voluntary self-regulation was insufficient: "compliance with reliability rules must be made mandatory with substantial penalties for non-compliance" (U.S.-Canada Power System Outage Task Force 2004).

The New Era of Mandatory Reliability Regulation

The US Congress responded with the US Energy Policy Act of 2005 that required the Federal Energy Regulatory Commission supervise the development of mandatory reliability standards.[5] The main mechanism provided in the Act was for FERC to certify an "electric reliability organization" (ERO) to develop and submit these standards to FERC for approval. NERC applied for, and was granted, certification to perform this role. The core regulatory instrument was transformed from self-regulation to mandatory government regulation, but in a manner that still gave a central role to the pre-existing private standard-setting organization.

According to NERC, there are 83 mandatory reliability standards in place.[6] One of the most important standards is the "contingency reserves" NERC standards in place in WECC, and approved by FERC and the BCUC. The standard requires that adequate generating capacity be maintained at all times to avoid interruptions in service in the event of a failure of one or more system components. The standard requires that a utility maintain contingency reserves that are about 6% of the electricity demand (load) or the size of the single largest unit in the system, whichever is larger.[7] There are advantages of joining other jurisdictions in a "reserve sharing group." Because the risk of outages is spread across a larger number of facilities, the contingency reserve requirements are lower. For example, BC is part of the Northwest Power Pool, a collaboration of utilities in the US Pacific Northwest, British Columbia, and Alberta. This power pool brings in yet another cross-border collaborative mechanism.

These new reliability standards created something of a governance dilemma for the more decentralized Canadian federation. While Canadian governments were represented as were members of NERC, the organizations standards lacked legal force until they were adopted by regulators with appropriate jurisdiction in Canada. The National Energy Board became the ERO for international power lines, but not interprovincial power lines (NEB 2008). In British Columbia, the government amended legislation to give

[5] Section 1211 of the US Energy Policy Act of 2005 http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=109_cong_bills&docid=f:h6enr.txt.pdf
[6] http://www.nerc.com/page.php?cid=1|7
[7] http://www.nerc.com/files/BAL-002-WECC-1_Final.pdf

this power to the provincial regulatory agency, the British Columbia Utilities Commission. NERC standards between mandatory in BC because they are adopted as such by the provincial regulatory commission.

The resulting multi-level governance framework is a somewhat unusual combination of private-standard setting, bi-lateral and bi-national arrangements. The NERC standards govern the entire region, but they were given legal force by national and, in Canada's case, subnational jurisdictions.

Renewable Portfolio Standards

Many jurisdictions are using a niche-market regulatory instrument called a "renewable portfolio standard" (sometimes referred to as "renewable energy standarads") as part of a suite of policies to reduce greenhouse gas emissions (Jaccard 2005, Chapter 7). The adoption of these standards by many US states creates a potential market opportunity for exports of clean Canadian electricity, but those opportunities are determined by specific design features of the standards. Their adoption has created new sources of interdependence between Canada and the US. Canadian government and industry associations have had to turn to more active lobbying of US states. More importantly, a new bilateral governance mechanism has emerged to regulate what counts as "renewable" in these standards.

Background on RPS in the United States[8]

A majority of US states have renewable portfolio standards in place. As of April 2011, 32 states have RPS or Alternative Energy Portfolio Standards; another six have voluntary standards (Pew Centre on Global Climate Change, 2011). The first Renewable Portfolio Standard (RPS) was enacted in 1983, when Iowa passed the Alternative Energy Production law, which required investor-owned utilities to purchase a certain amount of new renewable energy (Lyon and Yin, 2010). In 1994, Minnesota required one in-state energy provider to purchase specific amounts of wind and biomass energy as part of a legal settlement over management of radioactive waste. This was not, strictly speaking, an RPS, though it laid the foundation for Minnesota's 2003 RPS program, which applies to most other utilities (Wiser et al, 2005). Renewable portfolio standards picked up steam in 1995, when California began explicitly investigating the details and design structure for an RPS. Ultimately, California postponed adoption until 2002, though in the mean time interest groups became advocates for the idea (Wiser et al, 2007).

Over time, RPS policies have moved from being components within general electricity restructuring legislation into stand-alone legislation (Wiser et al, 2007). Though legislation is the preferred method of enacting RPS, outliers exist: Arizona and New York brought their RPS policies in through regulatory channels, while Colorado and Washington's RPS policy began as ballot initiatives. Initially, RPS targets approached various renewable technologies in a roughly equal manner; recently, however, there has been a trend toward classification systems for different types of renewable energy and technology-specific quotas (Rabe, 2006). RPS policies have proven to be quite robust, with virtually all changes to RPS legislation seeking to strengthen requirements, rather than weaken them (Wiser et al, 2007). There is a pattern of low targets for RPS in the early years of program implementation, moving to more stringent goals, often in the double digits (Rabe, 2006). California and New York lead the nation, the former with its just-ratified target of 33 percent by 2020 and the latter with a 25 percent by 2013 target. Furthermore, it is becoming increasingly common to complement RPS programs with other state-level policies aimed at promoting renewable energy (Rabe, 2006).

[8] This section was originally drafted by research assistant Stephanie Taylor

Renewable portfolio standards have been adopted for a variety of motivations. In addition environmental benefits such as reduced greenhouse gas emissions and emissions of other, more local air pollutants, states have also used RPS for economic development purposes. For example, in his message signing the latest version of California's RPS law, Governor Jerry Brown made it clear that climate concerns were only part of the motivations for the policy:

> This bill will bring many important benefits to California, including stimulating investment in green technologies in the state, creating tens of thousands of new jobs, improving local air quality, promoting energy independence, and reducing greenhouse gas emissions. It will ensure that California maintains its long-standing leadership in renewables and clean energy (Brown 2011).

According to Cory and Swezey, a "key rationale" for RPS policies is the economic and employment benefits derived from in-state generation of renewable energy (Corey and Swezey, 2007). This has led some states to place restrictions on the amount of out-of-state or out-of-region renewable energy that will be eligible for its RPS program. Some states offer incentives for in-state generation, either directly through RPS legislation or through complementary policies; these incentives include extra compliance credit for local facilities, minimum quotas for customer-owned facilities, rebates, tax incentives, public funding and net metering. Minimum quotas have been most popular for solar energy, usually as a means of promoting the growth of a sector that would otherwise be uncompetitive in a market setting (Cory and Swezey, 2007). This was the case in Nevada, which first enacted RPS legislation in 1997, in large part due to the existence of a solar energy facility in the state (Rabe, 2006). During the Michigan legislature's debate on RPS, explicit mention was made of the employment benefit of RPS policy, with one government report stating that, by 2020, an RPS would create 88,000 incremental person-years of employment (Lyon and Yin, 2010). Economic factors also figured prominently in the ballot initiative campaign that ultimately led to the implementation of an RPS policy in Colorado (Rabe, 2006). Texas, on the other hand, appears to have been motivated by a convergence of factors, including a restructured electricity market, high electricity and fossil fuel consumption, and its potential as a renewable energy powerhouse (Rabe, 2006).

In a quantitative analysis designed to explain patterns of RPS adoption, Lyon and Yin found that "neither local environmental benefits nor economic benefits of job creation seem to be driving forces for RPS adoption" (Lyon and Yin, 2010). Several factors that were found to promote RPS adoption included in-state renewable generating potential, a restructured electricity market, a small proportion of natural gas as a generating fuel, the number of Democrats in the state legislature, and well-organized interest groups representing renewable energy industries (Lyon and Yin, 2010).

Studies on the implementation of renewable portfolio standards have yields mixed results. A 2007 study went so far as to say "[t]he actual record of state implementations [of RPS] has been largely symbolic. Only one state with a binding RPS requirement is currently in compliance with its own program" (Michaels, 2007). However, this negative finding has been challenged by a more sophisticated econometric analysis by Yin and Powers. They conclude that "on average, RPS policies have had a significant and positive effect on in-state renewable energy development," although only if designed to prevent credit going to out-of-state sources (Yin and Powers, 2010).

Are RPS a Significant Export Opportunity for Canadian Provinces?

The RPS market would see at first blush to be a promising market opportunity for Canadian power exports, especially from hydropower resources. This was certainly a main source of motivation for British Columbia adding a net export objective to its electricity policy in 2010 (Hoberg and Sopinka 2011). But this promise is not as great a was first believed, as we can see by looking at the policy design of California's standard. California represents 60% of the potential renewable energy in the Western US (Hoberg and Sopinka 2011, 16).

There are two types of restrictions the limit opportunities for BC to benefit from California's RPS: what counts as renewable, and whether out of state sources can be used. First, there is the manner in which "renewable" is defined. Large hydro resources are excluded. Smaller, run-of-river sources could quality, but only if they are less than 30 MW in size (a very small facility). In addition, the eligibility requirements prohibit the facility from "adversely impacting the instream beneficial uses or causing a change in the volume or timing of streamflow." Without significant changes to California's eligibility requirements, BC's access to California's RPS market will be limited. The BC government, including Premier Campbell, and BC independent power producers have lobbied California extensively in an effort to improve the eligibility of BC resources. Thus far, all they were able to accomplish is a provision added to the law requiring the California Energy Commission to study BC run-of-river hydroelectric facilities in relation to eligibility requirements (Padilla 2011). BC massive carbon-free "big hydro" resource is apparently not on the table for consideration for eligibility.

BC is not the only province with this concern, and California is not the only state with restrictive eligibility requirements. According to the Canadian Electricity Association, the industry trade group, "Canadian power exports present an effective and environmentally preferable solution for U.S. retailers looking to satisfy RES obligations. CEA seeks [renewable electricity standards] language that is inclusive of Canadian exports, including output from large hydropower facilities."[9]

The second constraint on trade in RPS is the requirement that many states, including California, have that required most of all of the RPS requirements to be met by in-state facilities. Market opportunities for BC exports clash directly with many states' desire to use RPS requirement to grow their own clean energy sectors (Yin and Powers 2009).

New Transnational Governance for Renewable Energy

The design of state-level RPS's have created a new interjurisdictional governance mechanism. Facilities demonstrate compliance with the rules by showing the required number of "renewable energy certificates" to regulators. These RECs, as they have become known, have become a tradeable commodity – that is what makes the RPS a market-oriented regulatory instrument. The question is how does a facility get certified as renewable, and the market for RECs monitored? A new institution has emerged to fill in this void: the Western Renewable Energy Generation Information System (WREGIS). WREGIS certifies and tracks RECs for the Western Electric Coordinating Council region The Western Renewable Energy Generation Information System (WREGIS) is governed by a Western Electricity Coordinating Council (WECC) board committee (the WREGIS Committee) comprised of seven appointed and elected representatives: three elected Industry Participants (including at least one generator participant and one load serving entity participant); one appointed representative from the California Energy Commission; one appointed representative of the Western Governors' Association; and one

[9] http://www.electricity.ca/industry-issues/economic/canada-u.s.-affairs.php

elected representative of the WECC participant states/provinces. The elected representatives are chosen by members of the Stakeholder Advisory Committee (SAC).

The WREGIS Committee is responsible for evaluating, establishing and enforcing operating budgets, usage fees, operating rules, policies, and program extensions and modifications. The SAC is an autonomous body comprised of industry and state/provincial representatives and responsible for advising the WREGIS Administrator and the WREGIS Committee on the implementation and operation of the WREGIS program (WREGIS, 2009).

WREGIS was developed in response to policies set by the California Legislature and the Western Governors' Association (WGA) to develop and implement a system tracking renewable energy generation. Negotiations for the establishment of WREGIS began in 2003; the first official meeting of WREGIS was in January 2004 and its Charter was approved by WECC in December 2004. The permanent WREGIC Committee (within WECC) was convened in January 2006. WREGIC went online and began accepting Account Holder registration in June 2007; the first certificates were issued in June 2008 (California Energy Commission, 2008). WREGIS is housed at the Western Electricity Coordinating Council (WECC) in Salt Lake City, Utah.

All of the power and authority of the WREGIS Committee derives from the WECC Board and is subject to WECC Bylaws. The California Energy Commission contract with WECC provides financial "backstop" support for WREGIS at WECC until the earlier event of the system becoming entirely self-sustaining through user fees or the contract expiration on March 30, 2011. Under this contract, the Energy Commission has veto power over the motions, actions, and decisions of the Committee (WREGIS, 2009).

WREGIS creates its own certificates; a single certificate represents all "Renewable and Environmental Attributes" from one MWh of electricity generation from a WREGIS-registered renewable energy generating unit. Certificates imported from a compatible registry and tracking system may be converted to WREGIS certificates. For the purposes of WREGIS, a renewable generating unit includes any such facility that is defined as renewable by any of the states or provinces in WECC (WREGIS, 2010). Generating unit registration and certificate creation is conducted by WREGIS administrative staff, which is overseen by the WREGIS Director (WREGIS, 2010).

Because it has been in operation for such a short time, the implications of WREGIS for electricity policy governance are uncertain. Like NERC and WECC, it is emerging as a hybrid public-private entity whose standards require authoritative status through their recognition by pre-existing legal authorities with regulatory jurisdiction. It reflects a deepening of integration within the region fostered by efforts of states to move away from greenhouse-gas intensive sources of electricity generation. While RECs are certified in principle to be used in all member jurisdictions, in practice many members don't allow the use of RECs from out of the state. The design feature at present is a significant drag on renewable portfolio standards as an integrating force.

Conclusions

Integration of Canada-US electricity systems is not new, but it has intensified over the past decade as a result of two important dynamics. First, concerns about system reliability, heightened by the restructuring of electricity markets and especially the massive system failure in the summer of 2003, have increased the extent of regulatory integration through an unusual and complex governance mechanism. The US Congress enacted a law requiring mandatory reliability standards. The US regulatory agency turned to the pre-existing private standard setting body for policy development, and then gave those reliability standards the force of law by adopting them through the formal regulatory process. Canadian utilities expecting to continue or enhance trading with the US needed to comply, but Canada's unusually decentralized federation lacked an institution to adopt the standards nationally. Instead, the standards were adopted by provincial regulators.

The second dynamic has been increasing concerns in US states about controlling greenhouse gases, and the adoption of standards requiring utilities to increase their reliance on renewable sources of power. The adoption of these standards by many US states creates a potential market opportunity for exports of clean Canadian electricity. A new bilateral governance mechanism has emerged to regulate what counts as "renewable" in these standards. But state policies to privilege in-state jobs over cost-effective renewable energy development has tempered the integrative potential of these developments to date.

These new mechanisms do not represent new bi-national institutions with binding regulatory authority, but a bi-national hybrid public-private standard setting body whose output is given force of law by domestic regulatory authorities. While not quite a fully functioning bi-national regulatory authority, this deeper integration of regulatory regimes has resulted in complete policy harmonization across jurisdictions on reliability standards. The implications of these convergent standards for Canadian provincial electricity policy and operations will be explored in more detail in future work. Much less harmonization has occurred in renewable electricity policy.

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