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Assessing and managing regulatory risk in renewable energy: Contrasts between Canada and the United States

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ABSTRACT

A challenge for energy firms when considering new investments is to balance expected financial gains against potential risks. However, while investment opportunities in different jurisdictions are often straightforward to identify, the policy or regulatory risks for investors are more difficult to accurately ascertain. Here, I provide a novel conceptual framework for how firms can assess regulatory risk that focuses on the institutional processes governing policy-making. Risks are lower – and policies will subsequently be more stable – in jurisdictions where regulatory agencies have greater autonomy from politicians and where policies are formulated through more 'rigid' policy-making processes. The contrasting development patterns of renewable energy policies in Ontario and Texas offer support for the framework. I further develop strategies for how firms can successfully manage regulatory risks in different types of environment.

1. Introduction

As governments in many countries are seeking massive levels of new investment in renewable energy sources – and competing for infrastructure investment by geographically mobile multinational developers – firms in the renewable energy sector have unprecedented opportunities to grow their businesses (Lewis and Wiser, 2007). A challenge for renewable energy firms, however, is that while investment opportunities in different jurisdictions are relatively straightforward to identify, the potential risks for investors are more difficult to accurately ascertain: the relatively recent adoption of large scale 'green' energy programs means there is little historical experience from which firms can learn about the behavior of different governments and inherent policy risks. Yet, investing in renewable energy is a risky endeavor for several reasons: First, given the relative cost disadvantages of wind and solar power generation compared to traditional fossil fuel sources, the commercial viability of renewable energy relies heavily on supportive regulatory regimes and financial subsidies. Shifting government fiscal priorities or changes in public support for green energy may thus lead to reversal, modification or even abandonment of once favorable renewable energy regulations after they have been implemented. Second, energy technologies themselves are developing, for instance in solar power, carbon gasification and tidal energy, which has the potential to change the cost ranking of renewable energy technologies and hence appropriate subsidy levels. Third, the geographically dispersed nature of renewable energy projects can elicit strong NIMBY resistance, creating pressure on local governments to deny approval requests. In a young industry, judging these risks and balancing expected rewards is thus a challenge for renewable energy firms when assessing the attractiveness of alternative jurisdictions for their investments.

In this paper, I develop a novel conceptual framework for how renewable energy firms can determine regulatory risk levels in a jurisdiction, and especially within developed country markets which investors may assume are low risk *ex ante*. While a large number of studies have found that regulatory uncertainty and policy instability act as a barrier to renewable energy investment, the managerial literature provides almost no guidance on how firms can assess potential risks before entering a jurisdiction (Barradale, 2010; Luthi and Prassler, 2011; Nemet, 2010). Here, I build on the political risk literature to focus on *regulatory risk* – the risk that regulatory agencies will change policy decisions. I argue that the institutional structure of regulatory agencies in the energy sector, and the degree of autonomy from elected political institutions, affects the level of regulatory risk since more autonomous regulators are more likely to resist political pressures. I also argue that the nature of policy-making processes through which renewable energy policies are formulated and implemented additionally affects the subsequent risk of change: Policies that are 'hard-wired' in legislation are more difficult to modify than policies that are set by agency or ministerial orders. Based on these dimensions, I establish a typology of regulatory environments that vary in the extent of regulatory risk. I further outline strategies for how firms can successfully compete in each type of environment.

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I find support for my arguments and predictions in two detailed case studies that document the contrasting development of the renewable energy industry in two of the largest jurisdictions in North America: the state of Texas in the U.S. and the province of Ontario in Canada. Each jurisdiction was an early mover in its country to adopt major commitments to build new renewable energy power generation capacity: in 1999 Texas enacted a Renewable Portfolio Standard (RPS) that led to a target of 5880 MW of capacity by 2015, and in 2003 the Ontario government announced a target of 2700 MW by 2010. However, while by 2010 renewable investment in Texas had far surpassed the 2015 goal, investment levels in Ontario had barely reached 50% of the initial target set in 2003. What accounts for such divergent investment trajectories, and the notable failure of Ontario to attract renewable energy firms to the province? While a variety of economic, social and environmental factors may explain the divergence in investment in these jurisdictions, I argue that one contributing factor is the higher level of regulatory risk in Ontario: Regulatory risks in the province are exacerbated by a regulatory agency that is tightly controlled by the Minister of Energy; and in a single chamber parliamentary system the Minister has considerable ability to determine, and revise, renewable energy policy. The government also relied on Ministerial directives to agencies rather than legislation to establish renewable energy capacity targets and tariff policies, which enabled successive Ministers to repeatedly change the direction and pace of policy after 2003. Major aspects of renewable policy exhibited significant instability and unpredictability since inception. Surveys of renewable energy firms have found that policy instability is a major factor that accounts for why investment levels in Ontario have fallen short. In Texas, by contrast, the institutional structure of the Public Utilities Commission insulates it from political exigencies; and the hard-wiring of the RPS standard in legislation has led to considerable regulatory stability (despite more than 25 proposed bills in the legislature that have attempted – but failed – to modify or repeal the standard since 1999). Both factors reduce the risks for renewable energy firms in Texas, thereby encouraging investment in long-lived, sunk renewable energy assets.

In the next section of the paper I outline a framework for assessing regulatory risk in a jurisdiction. Although parsimonious, it captures two central factors that contribute to differing levels of risk. The following sections illustrate the predictions of the framework by contrasting the development of the renewable energy sector, and the risks for investors, in Texas and Ontario. The final section concludes with a discussion of how firms can successfully compete using integrated market and non-market strategies in different types of regulatory environment.

2. Assessing regulatory risk

Global policy attention has focused on reducing carbon emissions from the single largest industrial source of pollution, power generation, as climate change and environmental degradation concerns have become increasingly salient for governments around the world (REN21, 2010; Vogel, 2003). To help achieve Kyoto Protocol and national energy policy objectives, governments have sought to stimulate private capital investment and technological progress in low carbon sources of generation such as wind, solar, and biogas in order to reduce reliance on traditional fossil fuels; and not just for pollution abatement reasons but also increasingly for national fuel supply security reasons. Governments have established ambitious green energy targets that imply rapid and substantial growth in renewable generation infrastructure. For instance, in 2009 the Chinese National Energy Administration more than tripled its wind capacity goal for 2020 from 30 GW to 100 GW. The European Union countries collectively aim for 20% of generation to be sourced from renewable fuels by 2020. Countries have adopted a variety of policies to encourage new investment – mandatory sector capacity targets, fuel-specific feed-in tariffs, R&D subsidies, tax concessions, and so forth (REN21, 2010).

The magnitudes of investment in the renewable energy sector both at national and global levels have been substantial. During 2009, despite a severe economic recession, more than $150 billion was invested globally – more than was invested in new fossil fuel capacity that year and 44% more than the level in 2007 (REN21, 2010). Global wind power capacity increased by 70% during the same period. In 2009 the U.S. allocated $1.6 billion in the American Recovery and Reinvestment Act to help double the supply of renewable energy.

However, despite governments' current policy intentions and the wealth of opportunities for renewable energy firms to grow their businesses, investing in the renewable energy sector is a risky prospect.

2.1. Industry characteristics affecting regulatory risk

Utility infrastructure assets – including in renewable energy – are especially susceptible to direct or indirect regulatory expropriation of investor financial returns relative to other industries (Holburn and Spiller, 2002; Levy and Spiller, 1994). Utility assets tend to be geographically specific investments with few alternative uses. The bargaining position of private owners *vis-à-vis* government thus diminishes once investments are completed. Utility technologies such as wind farms are also characterized by high fixed costs and low marginal operating costs. Policy-makers may therefore *ex post* reduce regulated rates or investor returns through other policy changes knowing that owners will continue to operate as long as marginal operating costs are covered. Further, the services provided by the utility sector are broadly consumed by the general public, who frequently regard them as essential services to which they have 'natural rights'. Pricing of utility services hence becomes highly politicized, providing an opportunity for governments to curry short-term favor with voters by restricting rates or rate increases.

Renewable energy firms are subject to specific regulatory risks. Although renewable energy technologies are developing, wind and other renewable fuels remain more expensive to produce on a levelized basis than conventional forms of power generation, making dedicated subsidies or other policy supports necessary for investment (Schilling, 2009). Yet governments must balance competing political pressures and stakeholders in designing energy policies; changing economic or political priorities may lead governments to reduce the scale of previous commitments to renewable generation, as has been the case in Spain where the government, facing a budget shortfall, cut solar power subsidies in 2010.[1] In the state of Virginia in the U.S., the regulatory authority denied approval of a power purchase contract between a local utility and a renewable energy firm arguing that "the ratepayers of Virginia must be protected from costs for renewable energy that are unreasonably high".[2] Technological progress itself can engender regulatory reform: reductions in the costs of specific renewable technologies may prompt governments to subsequently revise and modify their subsidy policies, favoring newly emerging 'winners' at the expense of less economic 'losers'. Similarly, developments in traditional fossil fuel extraction

[1] *New York Times*, July 29, 2010, Europe slashes low-carbon energy subsidies as budgets shrink.

[2] Virginia State Corporation Commission, Case PUE-2009-00102, Order Denying Application of Appalachian Power Company.

technologies (e.g., shale gas) can radically alter the market attractiveness of other fuel sources.

Local resident and activist opposition to renewable energy projects have proved to be another major source of regulatory uncertainty in some jurisdictions. Unlike new fossil fuel or nuclear plants which are often sited in proximity to existing plants – where they have already achieved a measure of local acceptance or support – wind, solar and biogas installations are generally located in 'inexperienced' communities. In the U.K., local councils have frequently denied permitting requests for wind farms after intense lobbying by residents concerned about the potential impact on house prices, land values and human health (Pollitt, 2010).

Thus, renewable generators face substantial regulatory risks as do traditional utilities. Direct expropriation of renewable energy firms is unlikely due to the adverse reputational consequences for a host government. The more relevant risk is of indirect expropriation whereby more subtle *ex post* changes in regulations – such as imposing additional permitting requirements, delaying development approvals or levying new taxes on non-domestic content – can impact the economics of a single project or phased sequence of multiple projects. Like other utilities, renewable energy developers are exposed to these risks given the lengthy (and uncertain) period of time in which environmental, siting and grid connection permits are obtained. Developers must make significant upfront capital commitments – e.g., in ordering equipment – during this period but before power purchase contracts are finally signed. Should public policy change in this time frame, cash flows and profits can be negatively affected.

Developers' assessments of extant regulatory policies for renewable power in a jurisdiction, as well as their expected stability in the future, thus play a central role in *ex ante* investment decisions. As Blanco (2009) comments on the policy environments that encourage investment in wind energy, "… the best policy measure by far consists of creating a stable policy framework".

2.2. Institutional characteristics affecting regulatory risk

Within the renewable energy sector, regulatory risks naturally differ between jurisdictions. Academic research on the antecedents of regulatory risk has lagged that on political risk which has a long history of scholarship (Knack and Keefer, 1995; Holburn and Zelner, 2010). Two related streams of research, however, provide conceptual insight into why some jurisdictions exhibit stability in regulatory policies while others display unpredictability and inconsistency over time.

The first stresses the extent to which regulatory agencies operate *autonomously* from elected politicians in their decision-making (Cubbin and Stern, 2006; Edwards and Waverman, 2006). More autonomous regulators are better able to rely on their professional judgment in implementing policies in accordance with principles established in enabling legislation. For instance, a common principle in many OECD countries is that utilities be allowed to earn a 'reasonable' return on their investments, though regulators often have discretion in determining what constitutes 'reasonable'. By contrast, less independent regulators are more sensitive to the preferences of elected politicians – who control agency appointments, budgets, oversight hearings, and so on – since reprisal is more likely if regulatory decisions drift too far from politicians' preferred points. While politicians may generally prefer to not interfere with regulators, short term political pressures, which may arise unexpectedly, can create strong incentives to intervene in regulatory policy – especially on major issues that permit discretion – on an *ad hoc* basis.

A variety of institutional arrangements can constrain the ability of political actors to arbitrarily intervene in regulatory affairs, making the assessment of regulatory autonomy a complex, multi-faceted dimension that requires an analysis of macro- and micro-level institutions. Appointment mechanisms are one dimension. Regulators who are part of multi-member commissions and who are appointed for staggered, fixed terms that do not coincide with political election cycles will be able to operate relatively independently, being less individually exposed to potential threats of non-reappointment. Administrative procedures that require regulators to conduct public hearings, permit testimony by stakeholders and to rationally justify their decisions on factual evidence all enhance independence from political intervention. Professional qualification requirements for regulators and the availability of sufficient financial and staff resources also promote greater autonomy in decision-making. As Edwards and Waverman (2006) document, there is considerable variation among European countries on these regulatory attributes. According to their measure, German and Irish utility regulators exhibited greater independence than those in Belgium and Finland in 2003.

At the macro-institutional level, the structure of political checks and balances, and of the judiciary, can implicitly shape regulatory behavior (Holburn and Spiller, 2002). In a presidential system where legislative power is divided between an executive and multiple legislative chambers – as in the U.S. at the federal and state levels – the threat of legislative override of agency decisions is less credible, thereby strengthening agency autonomy. In parliamentary jurisdictions such as the U.K., on the other hand, the alignment of executive branch and legislative branch power in the majority party facilitates the passage of legislation, creating an incentive for regulatory agencies to pay close heed to politicians' views. Independent courts can also provide an appeal mechanism for agencies or affected stakeholders, the presence of which can pre-empt government intervention in agency affairs.

Regulatory autonomy is thus enhanced in jurisdictions where stronger institutional constraints limit elected politicians from arbitrarily interfering in regulatory decision-making.

A second area of research related to regulatory risk is over the nature of *policy-making processes* through which public policies are specified (Tiller and Spiller, 1999). Renewable energy policy objectives and details may be established through several distinct processes: by legislative enactment of new bills, by agency rules or orders, or by executive branch orders or directives to agencies. Jurisdictions vary in the usage of each of these mechanisms. Take renewable energy capacity targets as an example. In the state of Minnesota, the government established a renewable portfolio standard (RPS) in legislation in 2007 with a goal of 25% by 2025. Likewise, in Germany, the *Renewable Energy Sources Act, 2000* states: "[t]he purpose of this Act is […] at least to double the share of renewable energy sources in total energy consumption by the year 2010". In Arizona and New York, on the other hand, capacity targets have been established by regulatory agency rulings (by the Arizona Corporation Commission and the New York Public Service Commission), without the need for legislative action.[3] The U.K. government has relied on a series of 'Renewable Obligation' orders by the Secretary of State rather than legislation to set renewable energy goals.[4] In 2002, it ordered a target of 10% by 2010.

Such policy processes differ in the degree to which they are flexible or rigid. Enacting legislation is generally a lengthy process, requiring multiple readings and chamber debates. Scarce committee time must be allocated to conducting public hearings, proposing bills, and reviewing amendments. Securing final approval by a legislative majority may also require a process of bargaining and making compromises with pivotal legislators. Consequently, legislation is a

[3] For a summary of U.S. state renewable energy policies see www.dsireusa.org.

[4] Office of Gas and Electricity Markets. 2011. Renewables Obligation: Annual Report 2009–2010.

relatively rigid policy-making process since it insulates policy against rapid change, thereby reducing regulatory risks. In jurisdictions with multiple legislative chambers and a separate executive, and with divided political party control, legislation is even more difficult to enact or amend than in a single-chamber system.

By contrast, executive orders or decrees are considerably more flexible, exposing policy specified in this way to a greater likelihood of future modification or reversal. As long as the executive authority remains within the scope of enabling legislation, executive orders can typically be initiated without warning or public consultation, and do not require the approval of the legislature. Regulatory risks are especially acute when policies are made by such orders. In the U.K., although the Secretary of State has a duty to consult affected parties, 'Renewable Obligation' Orders were originally issued in 2002 and then subsequently modified in 2004, 2005, 2006, 2007, 2009 and 2010.[5] Renewable capacity targets were revised in 2005 and 2009.

Regulatory agency rules and orders represent an intermediate degree of flexibility and hence risk for investors. Agencies operate under administrative procedures designed to ensure that rule-making is transparent, reasoned and responsive to stakeholder concerns (McCubbins et al., 1989; McCubbins and Schwartz, 1984). Rules of due process prevent agencies from making arbitrary or capricious decisions and also limit the risk of capture by organized special interests. The burden of administrative due process varies across countries though is especially extensive in the United States. While this has led to charges that policy-making has become "ossified", it contributes towards a more predictable policy environment (McGarity, 1992).

Combining the two dimensions of *regulatory autonomy* and *policy-making process* leads to an organizing typology of regulatory risk as displayed in Fig. 1.

Jurisdictions with flexible policy-making processes and less autonomous regulators will be associated with greater risks of policy change. In these types of environment, governments are able to update energy policies and introduce policy innovations more rapidly. By comparison, jurisdictions with greater regulatory autonomy and more rigid policy processes will exhibit more stable – i.e., lower risk – policy than jurisdictions where regulators are more tied to political institutions and where policy instruments exhibit less long-term commitment. In these types of jurisdiction, regulators are less exposed to short-term political forces and, even so, policies are more difficult to modify.[6] For renewable energy firms and investors, regulatory risks increase the cost of capital. All else equal, investment levels will thus tend to be lower in higher risk jurisdictions and governments may struggle to achieve their policy targets at reasonable cost.

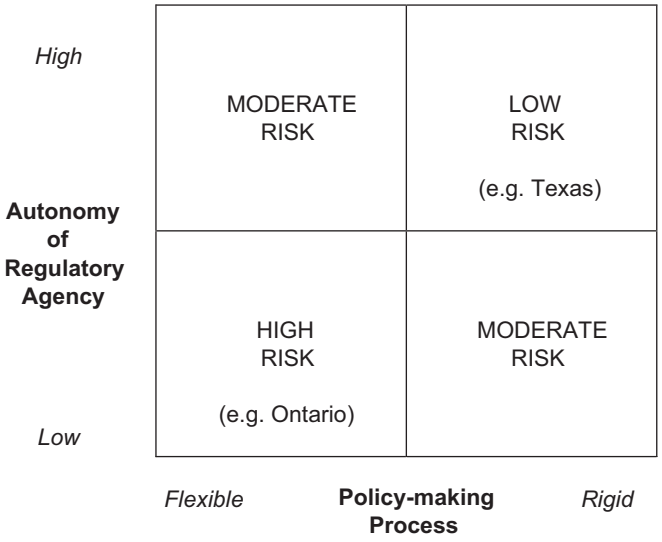

Fig. 1. Assessment of regulatory risk.

3. Renewable energy investment in Canada and the United States

The development of the renewable energy sector in the state of Texas in the United States and in the province of Ontario in Canada provides a dramatic contrast of differing regulatory risks for investors in two modern, prosperous countries that are typically deemed low business risk environments. Evidence from two case studies does not constitute conclusive support for the conceptual framework in the previous section, though it does provide insights consistent with its predictions.

Both jurisdictions were among the first in their countries to announce targets for achieving new renewable energy capacity (Ferguson-Martin and Hill, 2011; Yatchew and Baziliauskas, 2011; Zarnikau, 2011).[7] These represented significant new market opportunities for renewable energy firms since Texas is the second largest state (by population) in the United States, and Ontario is the largest province in Canada. In 1999, Texas enacted legislation that required electric utilities in the state to source at least 2880 MW of renewable capacity by the year 2009, rising to 5880 MW by 2015 (equivalent to approximately 6% of total installed capacity). In Ontario, following the election of a new majority party in 2003, the Liberal government announced its goal of achieving 1350 MW of new renewable capacity in the province by 2007, increasing to 2700 MW by 2010 (equivalent to approximately 7.5% of installed capacity). Each jurisdiction adopted a range of grant, tax, and other financial incentives to encourage private sector investment in wind, solar and other renewable fuel power projects in order to meet capacity targets.

Yet, despite the similar policy goals of two of the biggest markets in North America, the investment performance of the two jurisdictions has diverged over the last 10 years. In Texas, investment in wind power exceeded the overall 2009 renewables capacity target three years early; and by 2010 investment had surpassed the 2015 target, reaching more than 10,000 MW of capacity – 160% of the 2015 target (see Fig. 2).[8] Such significant investments made Texas the largest state for wind power capacity in the United States in 2010.

In marked contrast Ontario has largely failed to meets its policy targets or to replicate the investment boom in Texas. By the end of 2007, the year of the government's first target, new renewable capacity had reached only 472 MW or 35% of the target. Even after a further three years investment still had not met the 2007 target. Further, at the end of 2010 the level of installed capacity was barely at 48% of the government's 2010

[5] While the House of Commons and House of Lords are technically required to approve draft Orders by resolution, it is exceptionally rare for approval to be denied. The last time such an order was rejected by the House of Commons was in 1969 (House of Commons Information Office, Factsheet L7, May 2008).

[6] An example of 'Moderate Risk' in the lower right quadrant of Fig. 1 might include policies or rate decisions promulgated by the Ontario Energy Board (OEB). The OEB operates under administrative rules of due process and, unlike the OPA, the OEB is not subject to extensive Ministerial directive authority, thereby reflecting a relatively rigid policy-making process. Yet the OEB's autonomy is limited by the nature of the appointments process for OEB board members and also by the absence of political checks and balances in the Ontario polity.

[7] Further details on Texas's financial incentive policies for renewable energy are at www.dsireusa.org.

[8] Data on annual state renewable energy capacity is available from the Energy Information Administration.

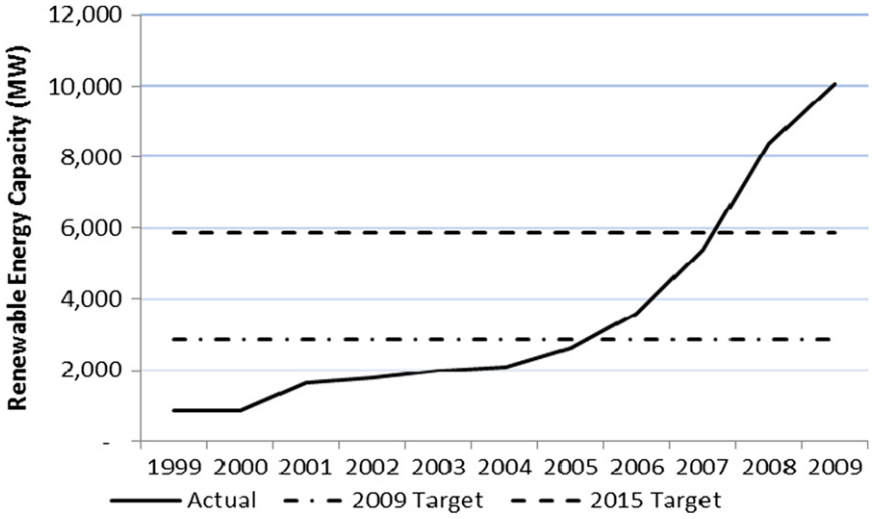

Fig. 2. Texas renewable energy capacity targets and investment.

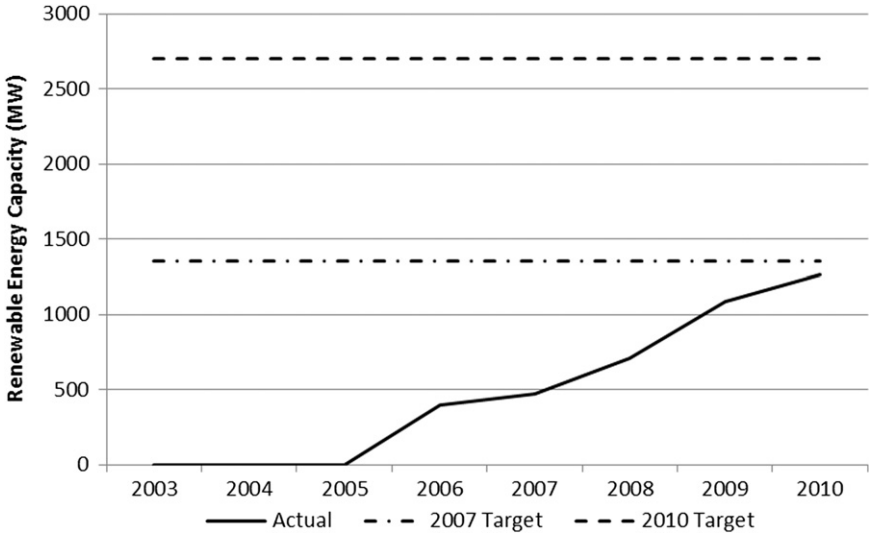

Fig. 3. Ontario renewable energy capacity targets and investment.

target (see Fig. 3). Absolute levels of investment were also significantly lower in Ontario than in Texas: five years after each jurisdiction's initial policy announcement (1999 in Texas, 2003 in Ontario), renewable power capacity was equivalent to 40 MW per million capita in Ontario as opposed to 80 MW per million capita in Texas.

What explains these differing patterns of investment – the apparent success of Texas in attracting major private investment in its renewable power sector, and the failure of Ontario to reach its espoused goals? Research suggests that a broad range of environmental, economic, social and political variables can account for differential investment performance.[9] All else equal, jurisdictions with greater natural resource endowments, greater wealth, stronger macroeconomic growth, and more ideologically-supportive citizens are more likely to attract higher levels of renewable investment. The availability of, and fair access to, transmission grid infrastructure is also especially pertinent for the renewable energy sector since populated centers (the demand for electricity) are not necessarily located near windy areas. In both Ontario and Texas, technical studies found that the natural environmental potential for renewable energy capacity was greater than total system electricity demand, implying that this

[9] A potential explanation could simply be that prices paid for wind energy were greater in Texas than in Ontario. Although it is difficult to accurately compare rates for renewable power sources across jurisdictions on an equivalent basis, the structure of the power purchase contracts in Ontario was regarded as being highly favorable for developers: With a lengthy duration and government-backed purchase guarantee, financing risks were lower than in other settings with private or investor-owned utilities, implying a lower cost of capital. Nonetheless, preliminary estimates suggest that prices paid to wind developers in Ontario were not lower than prices in Texas. Ontario's renewable energy competitive procurement processes yielded average rates of approximately $0.08/kW h for projects due to be operational in 2007 while the feed-in tariff established in 2007 paid $0.11/kW h for wind power projects. In Texas, the average price paid to wind developers for projects completed from 2006 to 2009 was $0.03/kW h while that for projects in the Great Lakes region – which is more comparable to the natural environment in Ontario – was $0.06/kW h (Wiser and Bolinger, 2009, Wind Technologies Market Report, Lawrence Berkeley National Laboratory). Even after adjusting these rates for federal renewable energy production tax credits, rates paid in Ontario appear to have been higher than in the United States. However, further analyses that incorporate construction cost differences are required before drawing firm conclusions about the magnitude of rate differentials and project returns between Ontario and Texas.

should not have been a constraint in either region.[10] Nonetheless, governments can strategically select public policies to offset any inherent locational disadvantages in order to achieve their renewable energy investment goals – implying that the public policy environment is likely to be particularly pivotal in attracting private investment. Some statistical research has indeed found that policy factors are significant drivers of renewable energy investment while economic factors are less so (Shrimali and Kniefel, 2011). Both Ontario and Texas adopted major policy instruments that studies indicate are associated with favorable investor responses in other jurisdictions: Ontario implemented the first feed-in tariff in North America with generous rates for producers; and Texas created an RPS and renewable energy credit market that complemented the federal-level Production Tax Credit incentive. Jurisdictions that have adopted these policy measures have typically outperformed non-adopters (Alagappan et al., 2011; Carley, 2009).

Here, I do not attempt an exhaustive analysis that seeks to identify all the differences between Texas and Ontario, on economic, environmental and other dimensions that may collectively account for specific investment levels in renewable energy. Rather, I focus in depth on one aspect, regulatory risk and policy instability, that academic research identifies as being especially influential (Fabrizio, 2010). Although risk and instability are regularly cited as deterring investment, few studies have examined the underlying causal factors from either theoretical or empirical perspectives. I argue that elevated regulatory risk in Ontario, as compared to Texas, is one contributing factor to Ontario's relatively low level of renewable energy investment.

4. Regulatory risk in Ontario

4.1. Regulatory autonomy

At first blush, outside observers might conclude that regulatory agencies in Ontario's energy sector have a substantial degree of autonomy from political pressures. The two primary agencies, the Ontario Energy Board and the Ontario Power Authority, each have sizeable budgets and professional staff; they operate under administrative rules of procedure and conduct hearings in which industry stakeholders participate before final rulings or orders are made; the courts provide an avenue for appeal – all of which provides a veneer of security for the sector that policy will be fashioned in a reasoned, independent manner. However, despite these trappings of professionalism, regulatory governance in Ontario is less insulated from political control than in the United States, exposing the energy sector to a greater degree of regulatory risk (Hrab and Trebilcock, 2005; Holburn et al., 2010; Wyman, 2008).

A contributing factor is the broader institutional environment in which provincial energy policies are formulated. Unlike in the United States, where checks and balances distribute political authority among multiple institutions, government in Canadian provinces is organized in a single-chamber parliamentary system. The majority party, which forms the Cabinet, controls both legislative and executive functions of government. Ministers, who are appointed by the provincial Premier, have considerable power since they are able to introduce legislative proposals to the Assembly, and they also oversee the operations of administrative or other state agencies. In this sense, political power is especially concentrated at the provincial level, even compared to the federal level in Canada where the Senate can act as a legislative check on the House of Commons.

In Ontario's energy sector the Ontario Power Authority (OPA) is the administrative agency that has direct responsibility for the implementation of renewable energy policy in the province. Since the 2004 *Electricity Restructuring Act* which created the OPA, the OPA has been tasked with forecasting Ontario's energy demand, developing an overall strategic plan for conservation, generation and transmission, and awarding long-term contracts to private generators to secure sufficient capacity. Although the OPA is a separate administrative agency, the Minister of Energy, who has oversight, is able to exert a considerable degree of control over the OPA's decision-making through (i) initiating policy directives, (ii) controlling budgets and senior staff appointments, as well as by (iii) initiating new legislative proposals.

Policy directives are an especially powerful way for the Minister to shape regulatory policies. They do not require either legislative approval or public consultation, implying they can be implemented without warning and at short notice. As long as the Minister remains within the scope of power defined in relevant legislation, in this case mainly the 1998 *Electricity Act*, affected stakeholders have no judicial recourse. The Minister of Energy has accrued the ability to issue directives to the OPA on a broad range of energy policy issues (which I describe in more detail below).

Second, ministerial control over agency actions can be exerted through the appointments process. The OPA's board of directors is appointed by the Minister and "shall hold office at pleasure for an initial term not exceeding two years".[11] Since the first term is limited to only two years and reappointments are the prerogative of the Minister, the Minister can replace dissenting Board members within a relatively short time horizon – creating a strong incentive for OPA board members to account for the preferences of the Minister in their decisions.[12]

Third, in a single-chamber legislative system, the government can readily introduce and enact new legislation to correct agency decisions that stray too far from the minister's ideal or else to limit the agency's authority. The credible threat of potential override creates a further incentive for the agency to make policies that are consistent with the minister's preferences, even if agency staff disagree. Changes in government following political elections also increase the chance that new legislation or directives will chart a new course in regulatory policy.

In sum, the structure of regulatory governance creates a tight coupling between agencies and political institutions which inhibits agencies from establishing policy in an independent manner. Given the politically-sensitive nature of the sector, regulatory policy is thus exposed to risks of political intervention if elected politicians choose to pursue short-term political goals.

4.2. Policy-making process

Regulatory risks are further exacerbated in Ontario due to the reliance on policy processes that permit rapid policy change. Renewable energy policy in Ontario has been determined largely by a series of ministerial directives to regulatory agencies and

[10] See the "Texas Renewable Energy Resource Assessment" conducted by the State Energy Conservation Office; and "Ontario Wind Integration Study" commissioned by the Ontario Power Authority at http://archive.powerauthority.on.ca/Storage/50/4536_D-5-1_Att_2.pdf.

[11] *Electricity Act*, S.O. 1998, c. 15, Sched. A., s. 25.4(5).

[12] Ministers themselves are appointed by the Premier without any obligation to obtain approval from a committee or governing body, and may be replaced at any point. This flexibility in political leadership is visible in Ontario's succession of Ministers of Energy over the past two administrations. The Premier of Ontario named four different members of the provincial parliament to the position between 2003 and 2008, and combined the Minister of Energy with the Ministry of Infrastructure in 2008. Given the short-term nature of appointments, ministers have an incentive to be sensitive to policy views of the Premier.

through subsequent agency orders. Major dimensions of policy – renewable capacity target planning, feed-in tariff programs, and capacity procurements – have all been initiated and controlled by the Minister of Energy through directives issued to the Ontario Power Authority.[13] For instance, under Section 25.30(2) of the 2004 *Electricity Restructuring Act*, the Minister can specify through directives the long-term renewable capacity targets included in the OPA's long-term planning forecast. Even though the OPA must review the long-term plan periodically, Section 25.30(1) further allows the Minister to order a review at any point in time. The Minister thus sets renewable power targets and retains the flexibility to revise them at will.

Renewable energy pricing is also subject to political control. Under the *Green Energy Act* which received Royal Assent in May 2009 the Minister's directive powers were significantly and explicitly expanded. The Minister can dictate whether a competitive or non-competitive procurement process will be used, and also the pricing and economic factors used by the OPA (s. 25.32(4.3)). The Minister has the power to direct the OPA to design a feed-in tariff scheme. Furthermore, the Ontario Energy Board (OEB) is prohibited from making decisions independently of existing government policies on certain issues. Its mandate requires the OEB to promote the use and generation of electricity from renewable energy sources in a manner "consistent with the policies of the government of Ontario".[14]

Many directives have related to the procurement of new generation capacity. For instance, in 2009 the Minister instructed the OPA to procure electricity generated from a specific proposed 'energy-from-waste' facility with a purchase rate set at 8 cents/kW h. Other similar directives have required the OPA to contract for specific amounts of MW capacity, for specific generation technologies, with specific parties or types of provider, in specific geographic locations, and in specific time periods.

In 2010, the Minister of Energy issued 11 directives to the Ontario Power Authority, reflecting a high degree of political intervention in agency decision-making. In total, various Ministers issued 46 directives between 2005 and 2010, and a further 9 letters containing requests to the OPA. The reliance on directives reflects the fact that major components of renewable energy policy have not been included in legislation. The two central energy-related legislative bills enacted since 2003 – the Electricity Restructuring Act (2004) and the Green Energy Act (2009) – mainly adjusted the organizational structure of regulatory agencies in the industry and their respective scopes of authority. Legislation has not included, for instance, details of major policy objectives such as long-term renewable capacity, as has been the case in various states in the U.S.

4.3. Regulatory risk and policy instability

The combination of concentrated political control over sector agencies in a single ministry and of ultra-flexible policy mechanisms creates an environment of high regulatory risk in the industry. Major dimensions of renewable energy policy may be readily modified at the discretion of an individual minister by initiating directives to agencies or even simply by proposing to do so. Changes over time in ministerial policy preferences, which may occur in response to the appointment of new ministers, unanticipated sector-specific shocks and events, or to organized stakeholder pressures can thus lead to rapidly shifting agency decisions.

The development paths since 2003 of feed-in tariff programs and of renewable energy capacity targets have both exhibited extreme policy instability – i.e., regulatory risk. The first feed-in tariff program was initially implemented in November 2006 following a directive from the Minister to the OPA (Rowlands, 2007). However, it was subsequently suspended by the OPA, acting under the oversight of a different Minister, less than two years later in May 2008. The program had largely failed to attract its target audience of small developers, instead attracting large scale commercial developers who divided up large projects into smaller sub-components to qualify for the contracts. Unanticipated transmission constraints had also emerged in some regions. Nonetheless, after lobbying by the biogas industry, the Minister directed the OPA to reinstate the tariff program solely for biogas projects in January 2009.[15] Then, in late 2009, the Minister directed the OPA to create and implement an entirely new feed-in tariff program with new (and higher) rates for all renewable energy fuel sources.[16] After public criticism that the announced tariffs were too generous to developers, the tariffs were abruptly reduced by 20% (from 80 cents/kW h) for ground-mounted solar projects in mid 2010.[17] Then in early 2011 the feed-in tariff program was suddenly abandoned entirely for off-shore wind projects.[18]

The lack of policy stability and long-term commitment is apparent too in the continual shifting of long term capacity targets. Original renewable energy targets were established for the years 2007 and 2010 through Ministerial public announcements in 2003 after the government was elected to office (Rowlands, 2007). These targets were shortly effectively sidelined when the Minister issued a request to the OPA in 2005 to develop a long term generation supply mix plan containing renewable fuel targets for 2015, 2020 and 2025.[19] However, legislation governing the planning process ensured that its time horizon was relatively short since it was to be reviewed every three years and potentially sooner if required by the Minister. The OPA was ordered to proceed with its long term supply mix recommendations in 2006 but with renewable capacity targets for only 2010 and 2025.[20] Yet this plan was halted in 2008 when a different Minister subsequently issued a directive to 'revisit' the renewable power targets with a view to increasing them.[21] In 2010 another new Minister initiated and implemented a new long term energy supply plan. The plan dropped the previous 2025 target and instead included a new target of 10,700 MW of renewable capacity by 2018.[22] Thus, in contrast to many U.S. states where targets are 'hard-wired' into legislation and hence remain relatively stable over time, long-term renewable energy

[13] For a full list of directives see http://www.powerauthority.on.ca/about-us/directives-opa-minister-energy-and-infrastructure.

[14] *Green Energy and Green Economy Act*, S.O. 2009, Sched. D, s. 1.

[15] Directive to Ontario Power Authority on January 23, 2009, available at http://www.powerauthority.on.ca/sites/default/files/page/8659_Jan_23,_2009.pdf.

[16] Directive to Ontario Power Authority on September 24, 2009, available at http://www.powerauthority.on.ca/sites/default/files/page/15420_FIT_Directive_Sept_24_09.pdf.

[17] Ontario Power Authority press release on July 2, 2010 available at http://www.powerauthority.on.ca/news/new-price-category-proposed-microfit-ground-mounted-solar-pv-projects.

[18] Government press release on February 11, 2011 available at http://news.ontario.ca/ene/en/2011/02/ontario-rules-out-offshore-wind-projects.html.

[19] Letter to the Ontario Power Authority from the Minister of Energy on May 2, 2005, available at http://archive.powerauthority.on.ca/Storage/12/743_Minister_Letter_to_OPA.pdf.

[20] Directive to Ontario Power Authority on June 13, 2006, available at http://www.powerauthority.on.ca/sites/default/files/page/1870_IPSP-June13,2006.pdf.

[21] Directive to Ontario Power Authority on September 18, 2008, available at http://www.powerauthority.on.ca/sites/default/files/page/7831_Ministry_Directive_PSP_Sept_18_08.pdf.

[22] The Minister of Energy publicly announced a new long-term energy plan in November 2010 and subsequently issued a directive to the Ontario Power Authority on February 17, 2011 to implement it (see http://www.powerauthority.ca/sites/default/files/new_files/IPSP%20directive%2020110217.pdf).

Table 1
Development of Ontario's renewable energy policies.

Year	Energy Minister	Feed-in tariffs for renewable energy	Renewable capacity targets	Renewable capacity procurement
2004	Dwight Duncan		• Government announces targets for 1350 MW of renewable energy capacity by 2007 and 2700 MW by 2010	• Ministry initiates procurement of 300 MW
2005	Dwight Duncan	• Minister directs Ontario Power Authority to develop feed-in tariff program	• Minister requests Ontario Power Authority to recommend targets for new renewable energy capacity by 2015, 2020 and 2025	• Minister announces 200 MW RfP for projects less than 20 MW • Minister directs Ontario Power Authority to procure 1000 MW for projects greater than 20 MW
2006	Donna Cansfield	• Ontario Power Authority implements feed-in tariff program		• Ontario Power Authority postpones 200 MW RfP announced in 2005
	Dwight Duncan		• Minister directs the Ontario Power Authority to create a long term energy plan that includes renewable capacity targets of 2700 MW by 2010 and 15,700 MW by 2025	
2007	Dwight Duncan	• Minister directs Ontario Power Authority to modify feed-in tariff program to include small hydro projects in northern Ontario		• Minister directs Ontario Power Authority to procure 2000 MW of projects greater than 10 MW to become operational by 2015, and to initiate the first tranche of RfPs by year's end for 500 MW
2008	Gerry Phillips	• Feed-in tariff program suspended		
	George Smitherman		• Minister suspends long term energy plan; directs the Ontario Power Authority to increase renewable energy capacity targets	
2009	George Smitherman	• Minister directs Ontario Power Authority to re-instate feed-in tariffs for biogas projects only • Minister directs Ontario Power Authority to create new feed-in tariff program		• Minister directs OPA to include specified domestic content requirements, varying by renewable source in feed-in tariff contracts
2010	Brad DuGuid	• Ontario Power Authority announces new feed-in tariff program and rates • Feed-in tariff rates reduced for ground-mounted solar power • Feed-in tariff program abandoned for off-shore wind	• Minister announces a new long term energy plan that includes new renewable energy capacity target of 10,700 MW for 2018. Previous 2025 target dropped	

planning in Ontario has proceeded in a more piecemeal, unpredictable fashion.

Table 1 summarizes these policy developments.

A succession of different Ministers of Energy explains some of the motivation for continual policy churn. Even though the Liberal Party remained in government since 2003 under the leadership of the same Premier and with a sizeable parliamentary majority, the Premier appointed a new Minister of Energy approximately every 12 months. Ministers are likely to have different views on policy priorities for the sector and the pace of reform, creating an additional source of policy risk for stakeholders: Between 2003 and 2010 each Minister either introduced a major new policy initiative or else abandoned a predecessor's policy.

The cumulative impact of repeated policy 'flip-flopping' on the renewable industry in Ontario has been profound. During late 2008, a survey of renewable energy firms active in Canada and internationally found that policy stability consistently rated as one of the worst aspects of doing business in Ontario (see Table 2). One CEO was quoted as saying that his board considered Mexico to be more stable. Another CEO publicly compared political uncertainties in Ontario to those in African countries.[23] However, the survey also revealed that policy stability in a jurisdiction was one of the most important factors for firms in deciding where to locate their investments – providing insight into one reason why the Ontario government has struggled to achieve its desired levels of renewable energy capacity.

5. Regulatory risk in Texas

5.1. Regulatory autonomy

In the United States, state renewable energy policies are implemented by state-wide administrative agencies, Public Utility Commissions (hereafter 'PUCs') which have statutory authority to monitor utility performance, to approve infrastructure investments and contracts with independent renewable energy

[23] *Toronto Star*, June 17, 2011, Samsung hasn't received one cent from Ontario.

Table 2
Survey results of wind energy firms.
Source: Holburn et al., 2010.

Importance rank	Factor	Importance of factor in wind firms' location decisions	Assessment of Ontario	Ontario assessment rank
1	Natural wind conditions	4.56	2.50	=9
2	Stability of the policy environment	4.38	2.09	14
3	Availability of transmission capacity for the foreseeable future	4.33	2.14	=11
4	Presence of a long-term government target for wind power	4.14	2.91	=5
5	Transparency of the PPA bidding and award process	4.07	3.19	2
6	Ease of obtaining grid connection approval	4.07	2.32	=11
7	Ease of obtaining development approvals from municipalities	3.93	2.29	13
8	Ease of obtaining environmental assessment approval	3.90	2.41	=9
9	Length of the PPA	3.72	3.33	1
10	Coordination between all government-related agencies	3.69	1.59	15
11	Ease of obtaining rights to land	3.62	2.91	=5
12	Costs for construction, engineering and technical services	3.44	2.95	4
13	Government investment subsidies or tax incentives	3.34	2.45	8
14	Availability of engineering and construction expertise	2.41	3.14	3
15	Proximity to equipment manufacturers and suppliers	1.96	2.91	7
	Average (N=29 completed surveys)	3.70	2.61	

providers, and to set retail rates. In Texas, as in other states, the PUC enjoys a relatively broad degree of decision-making independence, a position that reflects the deliberate historical shift of authority that began in the early part of the twentieth century away from politicized municipal-level regulation (Troesken, 1997).

PUCs generally operate in institutional environments where legislative power is divided among an executive (state governor) and a bicameral legislature (House and Senate) so they normally have autonomy to determine regulatory policy without the threat of legislative override or overwhelming political interference. In Texas, the Governor's office and Senate have been controlled by the Republican party since 1999 though control of the House has been more volatile – a Democrat majority from the 1990s until 2003 was followed by small Republican majorities. Unified Republican control since 2003 thus has some potential to credibly constrain PUC autonomy though enacting legislation in the U.S. is a lengthy and uncertain process.

PUC commissioner appointments mechanisms help insulate PUC decision-making from immediate political influence. The Texas PUC is headed by three commissioners, each of whom is appointed in a staggered manner by the Governor with the consent of the Senate for six year terms, thereby extending beyond gubernatorial terms. Commissioners may not be removed except for specific cause.

In addition to these structural safeguards, commissioners are protected procedurally by extensive requirements specified in the Texas Administrative Procedures Act which governs the proceedings of state agencies.[24] Decisions must be rationalized on the basis of evidence and 'findings of fact'; meetings are held in public; stakeholders are permitted to participate and provide testimony in hearings; and *ex parte* communications with commissioners in contested matters are prohibited. Such requirements restrict the scope for, and the ability of commissioners to respond to, external political or stakeholder pressures. In the event of disputes, PUC decisions may also be appealed to the state Court of Appeals and ultimately to the state Supreme Court on the basis of statutory or constitutional grounds, providing a further check on arbitrary action.

The combination of multiple legislative veto points, administrative controls, and independent judicial review in Texas thus tends to insulate status quo regulatory policies and the interests of stakeholder groups from dramatic reform. In such relatively credible regulatory governance environments, the risks of opportunistic regulations being implemented are substantially reduced.

5.2. Policy-making process

Unlike in Ontario, major aspects of renewable energy policy in Texas have been concretely specified in legislation. In June 1999, the legislature passed the Texas Electric Restructuring Act (Senate Bill 7) which included a renewable portfolio standard with mandated goals as follows:

> *It is the intent of the legislature that … cumulative installed renewable capacity in this state shall total… 2,880 MW by January 1, 2009* (SB 7, Section 39.904(a)).

When it became clear that Texas would exceed its original RPS goal before 2009, the government enacted legislation in 2005 (Senate Bill 20) that established a renewable capacity target for 2015 of 5880 MW, including a 500 MW target from renewable sources other than wind, and a goal for 2025 of 10,000 MW.

The two legislative acts also instructed the PUC to design related aspects of renewable energy policy, including utility-level renewables targets, a renewable energy credit trading program, and geographic renewable energy zones within the state for priority transmission infrastructure development. The PUC subsequently instituted public hearings and administrative procedures before issuing final orders to implement each of these policies.[25]

Rates paid for renewable power are determined through the normal administrative process governed by the PUC. Under this approach, utilities seek *ex post* PUC approval for their own investments in renewable power generation assets or for competitively procured contracts with independent renewable power

[24] The Texas APA is available at http://www.statutes.legis.state.tx.us/Docs/GV/htm/GV.2001.htm.

[25] Texas PUC Orders relating to renewable energy are listed at http://www.puc.state.tx.us/rules/subrules/electric/.

producers. The PUC reviews utility rate applications and conducts hearings during which other parties may contest the utility, to ensure they meet the standard of prudence, failing which they can be disallowed and excluded from final rates charged to consumers. The onus lies on the utilities to provide evidence that demonstrates their investments in, or procurement of, renewable energy have been prudently managed. Although PUCs typically are able to use some discretion in their rulings, the extent is limited due to the potential for appeals to state courts. The evolution of constitutional interpretation implies that utilities are allowed to earn a fair return on their investments.[26]

The institutional mechanisms through which renewable policies are specified in Texas provide for greater policy certainty for investors than in Ontario for two main reasons. First, major objectives, notably long-term renewable capacity targets, are hard-wired in legislation; modifying or repealing targets thus requires the successful introduction and passage of new legislation, which depends on achieving the agreement of the executive and voting majorities in both the state House and Senate. In Ontario, capacity targets are instead set by Ministerial directives to the agency which may be readily issued by the Minister at any time. Further, it is notable that the renewable energy legislation in Texas did not confer any additional executive authority on the governor to determine aspects of renewable energy policy. By contrast, the 2009 Green Energy Act in Ontario significantly extended the Minister's scope of directive powers to, inter alia: "direct the OPA to undertake any request for proposal…[for] renewable energy sources", "specify that the OPA is to use a competitive or non-competitive process", and "set out the goals relating to domestic content".

Second, the process for determining renewable energy pricing is governed by legally-established procedures in Texas. Administrative procedures contain safeguards for the parties involved including the potential for court appeal and judicial reversal, which prevent rates being set by the PUC in an arbitrary fashion. The emphasis in Ontario, however, is again on enabling direct political control of renewable energy pricing. The Green Energy Act permits that "The Minister may direct the OPA to develop a feed-in tariff program…in consideration of such factors and within such period as the Minister may require" and that "the Minister [may] specify the pricing or other economic factors to be used…by the OPA".

In sum, renewable energy policy mechanisms are as rigid in Texas as they are flexible in Ontario, creating a relatively more certain policy environment for renewable firms in Texas.

5.3. Regulatory risk and policy stability

Renewable energy policies in Texas have remained stable since their initiation in 1999. The RPS target for 2009 was neither modified nor repealed in the ten year period after being established in SB 7. The 2015 and 2025 RPS targets have similarly remained unaltered since being set by SB 20 in 2005. There were no executive orders issued to the PUC.

Such stability reflects in part the original political consensus that was achieved for renewable energy policy in 1999. While a Republican Senator, David Sibley, authored SB 7 its co-authors included five Democrats and three Republicans. The original proposal specified a substantially more aggressive target – 5% of installed generation capacity from renewables by 2007 – that was subsequently reduced in an amendment to 3% by 2009 following extensive public hearings in the Senate. The House, which at the time was controlled by the Democrat party, conducted additional hearings and further modified the RPS to its final form. This achieved overwhelming bi-partisan support. Similar consensus was reached for SB 20 which was introduced in early 2005 when it became clear that Texas would rapidly exceed its original RPS goal. SB 20 achieved almost unanimous support in the Senate and a large vote majority in the House.

The development of broad political agreement – which reflects the operation of multiple checks and balances in the legislative process – helped to insulate renewable energy policy against external pressures and shocks after 1999. Between 1999 and 2011, more than 25 bills were introduced into either the Senate or House that sought to modify or repeal the RPS goals, but which were ultimately not enacted.[27] For instance, HB 2910, introduced by Gallego (D) and Swinford (R) in April 2003, called for an RPS of 13,400 MW by 2019. SB 1423, introduced by Huffman (R) in March 2009, called for a target of 3000 MW of non-wind capacity by 2025. A further seven bills proposed to influence renewable energy pricing, for example by capping the price of renewable energy credits or by designing fuel-specific incentive payments. The majority of these and other proposals were stalled in committee; none of them passed both chambers of the legislature. Nor was it simply a case of Republican-controlled committees stalling Democrat-introduced bills – approximately 40% of these unsuccessful bills were authored or co-authored by Republicans.

A further threat to renewable policy came from the impact of electricity industry restructuring and retail rate deregulation which commenced in 2002. An unexpected electricity shortage in 2005, emerging capacity shortfalls, and spiking wholesale and natural gas prices, all contributed to an increase in retail electricity rates of 70% from 2002 to 2008 (Kang and Zarnikau, 2009). In a state with a prominent oil industry, renewable energy could have been positioned as a scapegoat responsible for rising prices and ultimately a victim of policy flux.

The stable regulatory environment in Texas, supported by an institutional framework that creates long-term, credible policy commitments, has contributed to massive private sector investment in renewable energy. In 2009, Texas ranked as the sixth largest jurisdiction in the world in terms of wind energy capacity.[28] While investors are assured of a reasonable return on prudent investments, this does not result from high prices paid for renewable power: rates paid to wind developers in Texas are the lowest in the country at approximately three cents/kW h (Wiser and Bolinger, 2009). Spillover benefits from renewable power generation policies are also apparent in the development of a clean energy technology supply chain in Texas. Analysis by the Pew Charitable Trust ranked Texas third nationally in clean energy venture capital from 2006–2008 (attracting $716 million), fourth in clean energy patents and second in number of renewable energy jobs.[29] By contrast, Ontario struggled to attract clean energy technology investment by major multinationals in the province, ultimately leading the government to mandate (through a ministerial directive) domestic content requirements in 2009 of 50% for wind projects and 60% for solar photo-voltaic projects.[30]

[26] In 1898, the Supreme Court ruled in *Smyth v. Ames* that "what the company is entitled to ask is a fair return upon the value of that which it employs for the public convenience." The Supreme Court subsequently elaborated on the concept of fair return and stated that "the return to the equity owner should be commensurate with returns on investments in other enterprises having corresponding risks." (*Federal Power Comm. v. Hope Natural Gas Co.*, 1944, 320 U.S. 591).

[27] Information on bills with an impact on the renewable energy sector is available through the Texas legislature website at http://www.legis.state.tx.us/.

[28] Global Wind Energy Council, 2009. The top five jurisdictions were the United States, Germany, Spain, China and India.

[29] Pew Charitable Trusts. 2009. *The Clean Energy Economy.*

[30] Directive to Ontario Power Authority on September 24, 2009, available at http://www.powerauthority.on.ca/sites/default/files/page/15420_FIT_Directive_Sept_24_09.pdf.

6. Managing regulatory risk

Firms that accurately identify the extent and sources of regulatory risk will exhibit superior organizational performance in the long-run. Understanding regulatory risk in a jurisdiction enables firms to tailor both their market and non-market strategies accordingly (Baron, 1995; Delmas and Marcus, 2004; Kolk and Pinkse, 2005).

6.1. Low regulatory risk environments

In low risk environments (upper right quadrant of Fig. 1) where regulatory agencies maintain autonomy and politicians are constrained from easily changing energy policies, the primary focus for firms is in managing their relationships with the agencies responsible for policy implementation. Since agency decision-making is governed by due process requirements and evidence-based reasoning, firms should participate in public hearings and provide comprehensive testimony to support their policy views. Firms need to persuasively demonstrate compliance with agency decision criteria as well as with procedural rules. Doing so becomes more important when proposed regulations are contested by opposing organized interest groups – such as consumer advocates – who may provide their own evidence for alternate regulatory policies. In contested situations, enlisting the participation of supportive interest groups (e.g., suppliers in the value chain), or recognized independent experts, can further increase the weight of information in the firm's favor that the agency must consider in its decision-making. Firms that develop a reputation with the agency for providing credible and reliable information will be more successful in achieving their preferred regulatory outcomes.

While the main objective for firms in these environments is to create a trusting relationship with regulators, they also need to be cognizant of the benefit of maintaining some political support as well. Even relatively autonomous regulators do not operate entirely in a political vacuum; regulators who understand the firm has political support will thus be more likely to rule in their favor.

6.2. High regulatory risk environments

Excessive risk may deter some firms from investing in a particular country or region. Yet this need not be the case for all firms. Indeed, existing research finds that certain types of firm prefer to locate in jurisdictions where political and regulatory risks are actually *higher*, since they have developed the capabilities to successfully operate in such environments (Holburn and Zelner, 2010).

So what strategies allow renewable energy firms to prosper in relatively risky jurisdictions (lower left quadrant of Fig. 1)? First, in any regulated industry, firms still need to manage their relationships with regulatory agencies as per above. However, when agencies are less autonomous or policies are more flexible, it also becomes critical for firms to *cultivate the support of pivotal politicians* who are able to directly shape sector policy. Political campaign contributions, where permitted, can enable firms to gain access to politicians and possibly even to sway political decisions. Building organized coalitions of supportive interests is another way to gain the attention of politicians and to advance policy agendas. Direct engagement with energy ministers and advisory staff through lobbying efforts will ensure that the firm's interests are voiced in key policy-making arenas. Large firms may have the scale to justify hiring dedicated government relations staff to represent their positions, while smaller firms are more likely to rely on industry associations to advocate collectively on their behalf. Lobbying can help firms protect themselves against adverse policy changes by alerting politicians to the full negative consequences for the industry of any reforms proposed by other stakeholders.

A second broad method for firms to mitigate regulatory risks is to adjust their market-based strategies such that their *business creates political value* as well as economic value. Politicians will ascribe political value to the business actions of firms that improve their and/or their party's re-election prospects. For instance, local employment or domestic sourcing guarantees create opportunities for politicians to claim political credit and 'good news' media reports. These types of promises are particularly valuable for politicians in marginal constituencies; firms may thus strategically locate some of their business operations in constituencies where they are able to generate greater political support, even at the expense of additional economic costs. Similarly, employing labor represented by politically-influential unions can also achieve political support for the firm's preferred public policies – the benefits of which in a high risk environment may outweigh the marginal cost of paying union wage rate premiums. The goal here is for firms to identify opportunities within their market strategy that create high political value but at low economic cost to the firm.

Finally, a third approach for managing high risk environments is to strategically select technologies and contractual instruments that limit exposure to adverse policy changes. Firms may utilize generic rather than jurisdiction-specific technologies where feasible, even if doing so implies greater costs, as a hedge against policy changes before power purchase contracts are signed.[31] An additional strategy is for firms to use contracts to hard-wire policy commitments, an approach that is valuable when contracting with governments. As an example, in 2010 Samsung Corporation, a diversified industrial conglomerate headquartered in South Korea, negotiated an individual power supply contract with the government of Ontario to generate $7 billion worth of new wind and solar energy over a 20-year period. The contract also included a commitment by Samsung to invest in renewable energy technology manufacturing facilities in the province – enabling the government to claim credit for creating 'green jobs' – and agreement by the government to provide more than $400 million in subsidies to Samsung. Such contracts permit firms to protect themselves against future political or regulatory discretion, and to use the courts – which typically maintain a high degree of independence in OECD countries – to arbitrate any disputes that arise. A drawback, however, is that governments may be unwilling to negotiate individual firm-level contracts when industry-level policies already exist (e.g., feed-in tariffs), except for the largest firms.

The combination of market and non-market strategies helps reduce downside regulatory risk for renewable energy firms. But more flexible policy environments also create opportunities for firms to improve their performance by initiating or advocating for new policies that are favorable to the firm or broader industry. In this sense, firms with superior non-market capabilities and strategies may be able to outperform their peers that are operating in lower risk environments where policies are less flexible.

7. Conclusion

For renewable energy firms considering where to locate their next investment, there is a multitude of industry journals and

[31] An example of this approach is the use of diesel-fueled power generation units mounted on floating barges which may be moved to different urban locations (providing there is water access) to meet changing demand needs.

reports that offer rankings of jurisdictions based on various measures of 'attractiveness'.[32] Such rankings generally emphasize market size and growth, and the generosity of government financial subsidies for renewable energy. A careful assessment of regulatory risk, however, is almost always absent. Yet this is a critical dimension for managers in making informed long-term investment decisions. In this article, I provide a framework for risk analysis that focuses on the independence of regulatory agencies from political actors, and the degree of credible policy commitment. Both factors fundamentally affect the likelihood that regulatory policies will either withstand or yield to future external shocks or pressures, and hence remain stable over time. Diagnosing the causes of regulatory risk also generates insights into how firms can successfully manage their regulatory environments.

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[32] An example is Ernst and Young's Renewable energy country attractiveness indices, Annual Report.