Policy Risk and Private Investment in Ontario's Wind Power Sector[i]

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Abstract

Even though governments may adopt favourable regulatory policies for renewable power generation, their ability to encourage private sector investment depends also on the presence of regulatory governance institutions that provide credible long-term commitments to potential investors. In the case of Ontario we contend that, despite large market potential and comparatively strong regulatory incentive policies, weak regulatory governance is one factor that has accounted for the challenges in attracting and implementing large scale private investment in power generation at a reasonable cost. We find empirical support for our arguments in a unique survey of 63 wind power firms that assessed private sector opinions about the investment environment for renewable energy in Ontario. Compared to a range of factors, firms rated the stability of regulatory policy among the weakest aspects of Ontario's business environment. However, policy stability ranked among the most important factors in firms' assessments of the attractiveness of alternative jurisdictions in their location decisions. Subsequent interviews revealed that firms have responded to this risk in Ontario by explicitly pricing it into wind project financial models – implying higher wind power prices for ratepayers – and by directing investment funds to other jurisdictions. We argue that policy stability in Ontario may be improved by devolving greater decision-making authority to regulatory agencies in the energy sector and by strengthening their institutional independence.

Key words: renewable energy, wind power, regulation, policy stability, Canada

1. Introduction

Over the past decade, several factors have converged to make wind energy a popular electricity supply option with policy-makers around the world. The growing political saliency of climate change, high oil and gas prices and the lure of 'green collar' jobs have contributed to a proliferation of policy efforts aimed at encouraging wind power development. The Canadian province of Ontario, one of the most populous jurisdictions in North America, joined the trend in 2004 when a newly-elected government directed one of its agencies to initiate a procurement process for renewable energy that resulted in 355 MW of wind energy power purchase agreements (PPAs) being awarded to private developers. This policy action was the first of several measures aimed at explicitly greening the province's electricity supply by, among other things, shutting down coal-fired generation and introducing the first feed-in tariff for renewable generation in North America.

However, unlike the experiences of other jurisdictions such as Germany and Texas where initial wind power investment goals were not only met but exceeded (Jacobsson and Lauber, 2006; Langniss and Wiser, 2003), Ontario's performance has fallen short of stated objectives. The initial government target for 1350 MW of new renewable energy generation capacity to be operational by 2007 was missed: by January of 2008, only 522 MW of renewable capacity were operational, or 39% of the original target (Ontario Power Authority, 2008a). Furthermore, even though 1310 MW of wind capacity were contracted in competitive procurements during 2004 and 2005, only 54% was operational by the end of the first quarter of 2009, after the final commercial operation deadline (October 31, 2008) had passed; other projects were either delayed or cancelled (Ontario Power Authority, 2009a).

In this paper, we examine the factors that account for such mixed investment performance in the wind power industry in Ontario. While we consider the natural environment and operational conditions, such as regional labour and components supply, we focus our attention on the regulatory environment. Given the relative cost disadvantage compared to traditional fuel sources, renewable power technology investments depend significantly on supportive regulatory regimes.

We distinguish between regulatory *policies* – which include tariff levels, incentive pricing schemes, financial subsidies, connection rights and so forth – and regulatory *governance*, which consists of the decision-making processes and administrative, legislative and executive institutions that determine specific policies (Holburn and Spiller, 2002; Levy and Spiller, 1994). Strong regulatory governance regimes consist of expert agencies that operate largely independently of direct political control, but under procedural requirements that safeguard the rights of stakeholders. Such regimes can provide credible assurances to industry and stakeholders that policies will not change in an arbitrary or unpredictable fashion, for instance in response to new political or economic pressures, after investments have been made. Weak regulatory governance, on the other hand, is characterized by a more politicized policy-making process where elected ministers, for instance, rather than agencies, have greater control over regulatory policies. In this type of environment, it is more difficult to achieve credible commitment to future investor protection, heightening perceptions of regulatory risk. As the time frame for investor returns lengthens – 20 years is not uncommon in infrastructure projects – the impact of regulatory governance in the assessment of the overall regulatory regime becomes more central. Since wind developers typically make around 80% of capital outlays during the first two years of projects, unexpected delays in generating revenue can significantly impact project returns, implying that long-term, predictable revenues are important for motivating investment (Blanco, 2009).

Here we argue that even though governments may adopt favourable regulatory policies for renewable power generation, their ability to encourage private sector participation will be limited by the presence of weak regulatory governance institutions. A comprehensive public policy approach to renewable energy reform thus requires an integrated assessment of regulatory policies and regulatory governance regimes. In the case of Ontario we contend that, despite large market potential and comparatively strong regulatory incentive policies, weak regulatory governance is one factor that has accounted for the challenges in implementing large scale private investment in power generation at a reasonable cost. The 2009 *Green Energy Act*'s amendments to the legislative framework have exacerbated governance weaknesses by increasing the scope of ministerial control.

The rest of the paper is organized as follows. The following section provides a brief overview of Ontario's wind energy performance while section 3 assesses the nature of regulatory governance in the province from a conceptual perspective. The fourth section presents the results of a survey of wind developers' perceptions of the regulatory and operational environments for the wind industry in Ontario. Section 5 considers implications of our analysis for private developers and policy-makers. Section 6 concludes.

2. Wind Power Investments in Ontario

a. Renewable energy investment targets

In 2003, shortly after being elected to office, the new Liberal government publicly announced renewable power targets for Ontario, although the targets were not legislated: five percent of total provincial electricity capacity by 2007 (1,350 MW) and ten percent (2,700 MW) by 2010 (MoEI, 2004). In 2006, as part of its Supply Mix Directive to the Ontario Power Authority (OPA), the Minister dropped the 2007 target, maintained the 2010 target and issued a new target for 2025. These targets formed the basis for the Integrated Power System Plan (IPSP), an exercise aimed at providing a long-term roadmap for the Ontario electricity sector, including renewable energy. In September 2008, a new Minister suspended the IPSP process, which had been launched in 2006, ordering the Ontario Power Authority to recommend, among other things, new renewable energy targets. In practice, official targets have thus proved to be short-term rather than long-term planning goals.

b. Policy instruments

In order to achieve its renewable power objectives, the government has relied on two main policy instruments implemented by the OPA: competitive procurement auctions and feed-in tariffs. Under both programs, long-term PPAs were awarded to private sector developers by the OPA, which served as the government counterparty.

The competitive auction model, termed the Renewable Energy Supply (RES) program, sought to acquire a pre-determined amount of wind capacity at the lowest possible cost and was targeted at large commercial developers. RES procurement rounds were initiated by the Minister through a directive to the OPA – and, before the OPA's creation, to the Ministry of Energy – rather than by the OPA itself. Developers with successful bids were awarded 20-year PPAs with partial inflation indexation. Although bids had to meet certain minimum criteria to move through to the auction phase, price was the primary selection criterion used by the OPA (OPA, 2008d). The first two RES rounds were implemented in 2004 and 2005, and contracted, respectively, for 395 MW and 975 MW of renewable energy capacity. A third RES auction for 200 MW was

also announced in 2005 but later abandoned. A new third round was launched again in 2007 and completed in January 2009.

The feed-in tariff approach, originally termed the Renewable Energy Standard Offer Program (RESOP), was launched in November 2006. The target audience for the program was small-scale developers and, accordingly, imposed an upper size limit of 10 MW per project (OPA, 2006). In contrast to the RES process, all RESOP applications that met the eligibility criteria could in principle be approved and awarded a PPA (*Ibid)*. Successful developers had three years to bring a contracted project into commercial operation, failing which they simply lost their contract without penalty or additional costs. If developers could invoke *force majeure,* that deadline could be pushed back to eight years. Although contracted energy costs were higher under the feed-in tariffs than under the RES auctions, the RESOP feed-in tariff program was expected to nurture the development of a home-grown, firm-level base of renewable energy capabilities within the province. It was also anticipated that the transaction costs of administering the RESOP program would be lower than for the RES program. In mid-2008, RESOP was suspended and a new feed-in tariff program was introduced for renewable energy projects in 2009, awarding projects different rates based on fuel, size and other characteristics.

c. Policy performance

The government's initial renewable capacity targets established in 2003 provide one benchmark for assessing these programs' performances, since operational deadlines for the 2004 and 2005 RES procurements were set for 2007 and 2008, respectively. By this measure, investment levels have fallen substantially short of initial expectations. At the end of the first quarter of 2009, approximately 880 MW of new renewable capacity was in operation, accounting for roughly 2.6% of total installed generation capacity in Ontario – approximately 65% of the 2003 target of 1350 MW by 2007 (IESO, 2008; OPA, 2009a). Wind power accounted for 80% of all renewable capacity in operation (OPA, 2009a). [ii]

Investments under the RESOP feed-in tariff program also substantially missed expected capacity levels. By the time it was halted in May 2008, RESOP had awarded contracts for nearly 1500 MW of renewable energy capacity (OPA, 2008b). The OPA announced in October 2008 that 10 RESOP wind projects accounting for 12% of RESOP wind capacity under contract had been cancelled, although it did not comment on the reasons behind the cancellations (OPA, 2008c). By the first quarter of 2009, contracted RESOP capacity amounted to 1412 MW, and the OPA predicted that nearly 1000 MW of this total would become operational by the end of 2009 (OPA, 2009a). However, by the end of the fourth quarter of 2009, stated contracted RESOP capacity was revised to 1017 MW with only 188 MW, or 13% of the original contracted amount, having reached commercial operation (OPA, 2009b). The OPA did not provide reasons for the low levels of operational capacity relative to earlier targets or the 28% reduction in total contracted capacity. Yet due to the lack of performance guarantees in RESOP contracts, the OPA did not have any recourse if PPA holders decided not to bring contracted projects into commercial operation.

Additionally, renewable energy investment levels in Ontario were relatively low compared to the levels achieved by U.S. states that had enacted Renewable Portfolio Standards: between 1999 and 2007, 23 states adopted legislation specifying targets for renewable energy capacity. In the years since adopting RPS targets, these states added, on average, 40 MW per 1 million state population of new wind capacity each year.[iii] Ontario, by comparison, added approximately 13 MW per 1 million population of new wind capacity annually during the 5-year period until the end of 2008.

Beyond installed capacity relative to targeted amounts, another measure of policy performance is the price paid to attract private sector investment in renewable energy. All else equal, lower energy rates improve the competitiveness of commercial and industrial consumers as well as the disposable incomes of residential consumers. Although it is difficult to compare rates for renewable power sources across jurisdictions on an equivalent basis, the structure of the PPA contracts in Ontario was regarded as being highly favourable 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 debt or equity capital.

Nonetheless, preliminary estimates suggest that prices paid to wind developers in Ontario were not lower than prices in the U.S. OPA information reveals that the RES I and II procurement processes yielded average rates of C$0.08/kWh and C$0.08639/kWh, respectively, while RESOP paid C$0.11/kWh for wind power projects.[iv] Table 1 shows a comparison of these rates with those in the U.S. for projects with similar commercial operation dates. After adjusting for exchange rates and federal renewable energy tax incentives, rates for RES I projects with 2006 and 2007 operation dates were somewhat higher than in the U.S. 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 elsewhere.

This brief history of wind power development in Ontario indicates that policies directed at the sector did not achieve significant levels of new capacity in the initial expected timeframe. The government failed to meet its own targets, despite implementing two new specific policy instruments designed to attract private sector investment. While permitting processes have proved to be one source of hold-up, we argue that a weak regulatory governance regime in Ontario has limited the ability of recent renewable energy policies to achieve their objectives.

3. Regulatory Governance

a. Regulatory governance frameworks[v]

Levy and Spiller (1994) argue that regulation is a "design" problem with two parts: regulatory governance and regulatory incentives. Regulatory governance refers to the mechanisms constraining regulatory discretion and resolving conflicts resulting from those constraints while regulatory incentives are specific rules dictating aspects such as renewable energy pricing and grid connection rights. Regulatory governance frameworks that provide a credible commitment to safeguard the interests of both potential investors and customers, particularly when unexpected events create political pressure to shift the balance of power among competing stakeholders, are best suited to attracting the levels of long-term private capital necessary for securing an adequate and reliable supply of electricity. Weak regulatory governance institutions, however, offering few or no credible assurances against direct or indirect expropriation of private property, have difficulty in encouraging private investment.

Credibility in regulatory governance arises from the structure of the jurisdiction's political, legal and social institutions. The crucial issue is to what extent the structure and organization of these institutions impose constraints upon governmental action. The range of formal institutional mechanisms for restraining governmental authority include: the explicit separation of powers between the legislative, executive and judicial branches; a written constitution that both limits the legislative power of the executive and is enforceable by the courts; two legislative houses elected under different voting rules; an electoral system calibrated to produce either a proliferation of minority parties or a set of parties whose ability to impose discipline on their legislators is weak; and a federal structure of power, with strong decentralization even to

the local level. Utility regulation is likely to be more credible in countries with political systems that constrain executive discretion. Credibility is often achieved at the expense of flexibility, however. The same mechanisms that make it difficult to impose arbitrary changes in the rules may also make it difficult to enact rules in the first place, or to efficiently adapt the rules in the face of changing circumstances.

Legislative and executive institutions may also limit a country's regulatory governance options. In some parliamentary systems, for example, the executive has substantial control over both the legislative agenda and legislative outcomes. In such countries, if legislative and executive powers alternate between political parties with substantially different interests, specific legislation may not be a viable safeguard against administrative discretion, since changes in the law could follow directly from a change in government. Similarly, if the executive has strong legislative powers, administrative procedures and administrative law alone cannot constrain the executive, who will tend to predominate over the judiciary in the interpretation of laws. In this case, administrative procedures require some base other than administrative law. The regulatory challenge for policy-makers therefore lies not just in designing regulatory incentive structures that encourage economically efficient utility operation but also in designing regulatory governance frameworks that constrain the political and administrative actors who have ultimate jurisdiction over the industry. However, designing regulatory institutions that are *flexible* enough to make balanced policy decisions in response to unanticipated events but that are also *rigid* enough to insulate policy from political pressures is a difficult task. Appendix 1 provides a brief overview of how the United States has approached the regulatory design problem.

b. Regulatory governance of renewable energy in Ontario

In contrast to the United States, where multiple checks and balances confer a degree of autonomy on Public Utility Commissions, regulatory governance in Ontario is less insulated from political control, exposing the utility sector to a greater degree of direct political intervention (Hrab & Trebilcock , 2005; Wyman, 2008). The Ontario Energy Board (OEB), which has primary responsibility for regulating the electricity sector, operates under the oversight of the Ministry of Energy and Infrastructure (MoEI). Since 1998, additional expert agencies have been created with specific mandates, including the Ontario Power Authority, the Conservation Bureau, the Electrical Safety Authority and the Ontario Electricity Financial Corporation. The Independent Electricity System Operator manages the wholesale electricity market and was established in 1998. Electricity transmission and generation functions are conducted by separate state-owned entities, Hydro One and Ontario Power Generation. With multiple agencies either regulating or operating the industry, administrative responsibilities and capabilities are thus relatively fragmented. The risk that policy goals are not successfully implemented increases in fragmented structures since close inter-agency cooperation and coordination are required.

While the OEB oversees the broader electricity sector, the Ontario Power Authority has had a more direct role in the implementation of renewable energy policy. Since the *Electricity Restructuring Act, 2004*, the OPA has been tasked with forecasting Ontario's energy requirements, developing an overall strategic plan for conservation, generation and transmission, and awarding long-term contracts to private generators to secure sufficient capacity (Wyman, 2008). The OPA has thus administered Ontario's RES and RESOP procurements.

Although both the OPA and OEB are separate administrative institutions from the Ministry of Energy and Infrastructure, the Minister is able to exert a considerable degree of control over their decision-making through initiating directives and by making agency appointments. We discuss each in turn.

First, OPA policy-making is subject to policy directives issued by the Minister, which require no legislative approval.[vi] So long as the Minister remains within the scope of power defined in relevant legislation, in this case mainly the *Electricity Act*, affected stakeholders have no judicial recourse. Under sections 25.2(5) and 25.32(4), the Minister has the authority, as approved by Cabinet, to control by directive the OPA's process for procuring renewable energy – determining specifically both the magnitude and timing of procurements. In addition, under section 25.30(2), the Minister can specify, through directives, the long-term renewable capacity targets included in the OPA's long-term planning forecast, the IPSP. Even though the OPA must review the IPSP 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.

Under the *Green Energy Act (GEA)*, which received Royal Assent in May 2009, the Minister's legal powers were significantly and explicitly expanded. The Minister can dictate whether a competitive or non-competitive procurement process will be used (s. 25.32(4.2)) and select the pricing and economic factors used or achieved by the OPA (s. 25.32(4.3)). The Minister may also direct the OPA to establish measures facilitating the participation of aboriginal people and groups, in order to facilitate renewable energy development. Furthermore, amendments to the 1998 *Ontario Energy Board Act* explicitly limit the ability of the OEB to make decisions independently of existing government policies on certain issues. Its modified mandate, under s. 1.1, now requires the OEB to promote electricity conservation, demand management and the use and generation of electricity from renewable energy sources in a manner "consistent with the policies of the government of Ontario".[vii]

Second, ministerial control over agency actions can also 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".[viii] Since their 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.[ix] In contrast, appointment procedures in the U.S. and U.K. afford regulatory agencies in the utility sector greater independence from political bodies: Public Utility Commissioners in U.S. states are typically appointed for fixed, overlapping 5 year terms, longer than the terms of office for state governors and House representatives (usually 4 years and 2 years, respectively). In the U.K., members of the Gas and Electricity Markets Authority (the equivalent of the OPA or OEB) are appointed for up to 5-year terms by the Secretary of State.

The ability of a single minister to exert political control, subject to Cabinet approval, over central aspects of renewable energy policy-making outside the legislative process has fundamental consequences for the development pattern of regulatory policy over time. In particular, direct political control puts at risk the long-term stability and credibility of policy since key dimensions may be 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 or to sector-specific shocks and events, can thus lead to rapidly shifting agency decisions. In Ontario, the repeated revisions of long-term renewable capacity targets and of policy instruments such as RES and RESOP illustrate how sensitive regulatory policy can be to political forces in such an institutional regime.

Original renewable energy targets were established through Ministerial public announcements in 2003 after the government was elected to office. These targets were shortly effectively dropped when the Minister issued a directive to the OPA in 2005 to develop the Integrated Power System Plan (IPSP) containing

specific fuel targets, including for renewable sources of energy. However, legislation governing the IPSP ensures that its time horizon is relatively short since it is to be reviewed every 3 years and potentially sooner if "required by the Minister or the Board".[x] The OPA was ordered to proceed with its supply mix advice, which contained renewable capacity targets, in 2006 but it was halted in 2008 when a different Minister exercised his discretion by directing the OEB to suspend its formal review of the IPSP while the OPA was directed to "revisit" some of its renewable power targets with a view to increasing them (MoEI, 2008). By January 2010, official renewable capacity targets had still not been formally approved. 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 planning in Ontario has proceeded in a more piecemeal, unpredictable fashion.

Choices over policy instruments have also been subject to unexpected alterations. The RES procurement process, which depends on initiation by the Ministry rather than the OPA, has lacked a transparent schedule, creating uncertainty about the pace and magnitude of future renewable capacity development. The initial third RES procurement of 200 MW of small-scale clean power, for instance, was announced by the minister in July 2005 (MoEI, 2005). However, after the OPA announced in late November of that year that the Ministry of Natural Resources had delayed completion of its Waterpower Site Release, it delayed the release of the final RFP and submission due date. Ultimately on March 10, 2006, developers' submissions were postponed indefinitely, effectively cancelling the RFP.[xi]

The other main renewable energy policy instrument, the feed-in tariff, experienced similar unanticipated reversals. The RESOP feed-in tariff was initially implemented in November 2006 following a directive to the OPA but then was subsequently suspended by the OPA, acting under the oversight of a different Minister, less than two years later in May 2008. The RESOP program had largely failed to attract its target audience of small developers, instead attracting large scale commercial developers who divided up large projects into 10MW sub components in order to be eligible for RESOP contracts. Nonetheless, after heavy industry lobbying, the Minister directed the OPA to reinstate RESOP solely for biogas projects in January 2009. In late 2009, the Minister directed the OPA to create and implement an entirely new feed-in tariff program for all renewable energy fuel sources. The *Green Energy Act* further permitted the Minister to determine the magnitude of the tariffs in the program, making pricing an explicitly political decision.

In summary, the presence of key policy-making authority in the ministry, coupled with the ability to issue directives without extensive stakeholder or public consultation, establishes a relatively weak regulatory governance regime. Regulatory goals and policies are susceptible to revision in response to shifting party political priorities, lobbying by organized stakeholder groups or to changes in the general economic climate which may alter consumers' willingness to pay for a green energy premium in their rates. The tenure of individual ministers in the Ministry has also been exceptionally brief: since 2003, the average ministerial tenure period has been approximately 12 months, further exposing renewable energy policy to another source of uncertainty. Proclamations about long-term policy goals and intentions, either by agency heads or ministers, thus lack credibility since they may be modified in the future with relative ease. Table 2 summarizes how ministerial directives and announcements have shaped the development of renewable energy policy since 2004.

4. Survey Analysis of the Regulatory Environment in Ontario

In order to further assess our contention that the regulatory governance regime is relatively weak in Ontario, we conducted a survey of wind developers' perceptions of different dimensions of the regulatory and operational environments in the province. We implemented an internet-based survey during September and

October 2008 of the population of firms active in the Ontario and/or Canadian wind power markets. We identified 63 firms (utilities, independent power producers, and wind project developers) using multiple sources of information, including membership records from the Canadian Wind Energy Association, Ontario Power Authority databases, internet media searches and through our own direct conversations with Canadian and international wind power firms. Of the 63 firms we surveyed, 42 (67%) were headquartered in Canada and 21 were headquartered abroad (or their parent companies were). Approximately half of the firms (46%) were either publicly-listed or subsidiaries of publicly-listed companies. We received 29 complete survey responses, equating to a response rate of 46%. Of the 29 firms that responded, 20 (69%) were Canadian and 12 (41%) were publicly-listed or subsidiaries of public companies – a similar profile to the overall population of firms on these dimensions. The median respondent firm had between 100 and 500 MW of wind power capacity in operation or under contract, typical of firms in the industry. More than 75% of respondents had direct experience in Ontario's wind power market, either holding a PPA with the OPA or else having participated in a bid for a PPA. 55% had experience in the rest of Canada, 31% in Europe, 21% in the United States and 14% in other regions.

We asked firms two questions that provide the data for our discussion here: first, to score the level of importance of 15 different factors in their decision to become active in a particular wind power market; and second, to score their assessment of these factors in Ontario. The 15 factors consist of specific aspects of (a) the operational environment, (b) regulatory policies for wind energy, and (c) regulatory governance (see Table 3 for details). [xii]

a. Factors affecting the attractiveness of jurisdictions for wind power developers

The second column of Table 4, which reports aggregated Importance (1 being not important and 5 essential) and Ontario Assessment scores (1 comparing very unfavourably and 5 comparing very favourably) for the three broad categories above, indicates that firms put greater weight, on average, on regulatory policies and regulatory governance than on the operational environment in their assessments of jurisdictions. Since governments are able to strategically adjust regulatory policies and the regulatory environment to compensate for weaknesses in operational or market conditions to attract investment, firms are likely to scrutinize the policy environment carefully. The finding that firms rate regulatory governance dimensions on the same level as specific regulatory policies is consistent with our argument that regulatory governance is a critical aspect in private sector decisions about where to locate investments.

Table 5 provides a more detailed version of Table 4 with the results for each factor underlying the three broad dimensions. While we are cautious about drawing definitive conclusions on any single factor given the limited population and respondent sample sizes, we note there is a large numerical spread in Importance scores, ranging from a low of 1.96 to a high of 4.56 (on a scale of 1 to 5) in the third column, indicating an approximate rank order of different factors.[xiii] We note several salient patterns. First, regulatory governance dimensions ranked near the top: "Stability of the policy environment" and "Presence of long-term government target for wind power" ranked 2nd and 4th respectively – higher than specific regulatory policies such as the "Length of PPAs" (9th) and "Government investment subsidies or tax incentives" (13th). This suggests that potential investors look beyond immediate policy conditions to those that are likely to obtain in the future. Given the long-term, sunk nature of investments in the wind power sector, it is not surprising that firms prefer jurisdictions in which governments make long-term policy commitments that are perceived as being stable. Second, with the exception of "Natural wind conditions" which rated as the single most important factor, operational factors such as the cost and availability of inputs in the region ranked at or near the bottom.

Third, project permitting and assessment factors generally ranked as being more important than operational factors. In the course of interviews with developers and IPPs, we found that post-PPA permitting delays represent a significant risk to project returns. Because PPAs typically have a finite duration (e.g. 20 years), the faster projects can become operational and generate cash flows, the greater the expected returns. Costs and cash outflows are heavily front-loaded for wind projects so delaying the generation of positive cash flows can significantly reduce internal rates of return. Thus, policy risks are exacerbated if activist NIMBY groups or communities successfully erect local development roadblocks, despite central government intentions of promoting investment. During an interview, a representative from a large global wind developer with operations in Ontario and several other jurisdictions commented:

> "There are a lot of different layers to a project of that scale, and permits and approvals form some of those layers. For projects to come in on time and on budget, all the layers have to move forward together as planned and if one of them stops moving, than the whole project can get stuck. […] Permitting delays cause project managers a lot of anxiety."

b. Attractiveness of Ontario as a jurisdiction for wind power investment

The fourth column of Table 5 reports firms' assessments of Ontario's performance on each of the 15 dimensions. The average score of 2.61 across all dimensions suggests that Ontario compares marginally less favourably to other jurisdictions (a score of 3 would put Ontario on par with other jurisdictions in which respondents had experience).

Regulatory policies concerning PPAs with the OPA rated as the strongest aspects of the policy environment in Ontario, with the length of the PPA and transparency of PPA bidding judged to be equivalent or more favourable than in other jurisdictions. This result is in line with our discussions with developers who generally viewed Ontario's regulatory incentives for wind power in a positive light. A representative from the U.S. division of a global wind IPP commented that:

> "For wind development, the strength of your revenue and the quality of your off-taker matter a lot. In Ontario, your off-taker is a crown corporation [the OPA]. In the U.S., unless you get a contract from an investment-grade utility, financing can be a problem. So in Ontario you don't have that problem."

In general, Ontario scores relatively well on operational conditions: with the exception of the natural wind environment which ranked below average, other operational aspects such as construction costs and labour availability scored above average. The significant size of the market was also perceived as being a positive feature. As one developer without a PPA in Ontario noted:

> "We view the Ontario market as a very attractive market. We think there is a lot of potential – with the coal plant retirements and the new Minister of Energy increasing the IPSP wind power targets. And Ontario is where the load is. So yes, we very much want to be active in Ontario."

In contrast to operational and regulatory policy issues, the assessment of the regulatory governance regime in Ontario was considerably less favourable. The bottom-ranked three factors were all governance aspects. "Stability of the policy environment" ranked 14th, "Coordination between government-related agencies" 15th and "Ease of obtaining development approvals" 13th. Each rated less favourably on average than other jurisdictions.

The low rating for policy stability is consistent with the 'start-stop' history of competitive procurements and the feed-in tariff programs, as well as with the halting long-term industry planning process, driven in part by the frequent succession of energy ministers and new directives. Concerns about policy risks were often expressed during our interviews with firms. One senior executive at a global independent power producer with operations in the U.S. and Europe commented:

> "I would say Ontario is one of the highest risk jurisdictions in North America and it's definitely not for the faint of heart. In comparison to some of the places where we do business in the U.S. I would say it's terrible. The probability of project success is one of the lowest."

A representative from a Canadian-based utility expressed similar views:

> "Our board considers Ontario a risky jurisdiction. Ontario! […] in fact, Mexico is more stable. So yes, it's a concern, we consider the province to be a risky jurisdiction to invest in."

Difficulties with "[e]ase of obtaining development approvals", which received the third lowest score, were also seen by interviewed developers and IPPs as being closely connected with policy risks. Local opposition groups appear to have utilized the lack of a centralized planning process or guidelines in Ontario to pressure municipal politicians into enacting local rules that effectively rendered projects unviable or delayed zoning applications. A representative from a large international IPP with activities in Ontario told us the following:

> "For municipalities, what will often happen is that out of 3000 people, five are opposed. But those five are able to use all kinds of administrative and planning measures to block projects."

The presence of a long-term government target for wind power rated more favourably than other dimensions of the governance environment. This may have reflected the government's repeatedly stated commitment to renewable energy even without enshrining it in legislation.

Overall, while we are not able to undertake a comprehensive statistical analysis of the factors driving wind investment, the survey and interview results are consistent with our expectation that regulatory governance is an important issue for private sector developers in their location decisions, and that the governance regime in Ontario presents policy risks, stemming both from the absence of a provincial-level, stable policy framework and from locally-enacted road blocks. We find a marked juxtaposition between the ranking of Importance and Assessment factors. Ontario fares especially poorly on the three factors that wind power firms rated as being the most important in their location decisions – stability of the policy environment, availability of transmission capacity and natural wind conditions – providing some insight into why installed capacity has not met government targets. Future research may more precisely identify the reasons for Ontario's mixed performance than is possible here, for instance by statistically testing data on investment patterns and regulatory governance in a large sample of jurisdictions that includes Ontario.

5. Implications for Renewable Energy Developers and for Policy Reform

a. Investment levels

A widely held belief among firms that emerged during our interviews was that Ontario was a wind market with significant potential. Moreover, the PPA with the OPA was noted as conferring on Ontario an

important advantage over many U.S. jurisdictions. However, perceptions of regulatory risk have led to caution in investment plans. Although no firms stated they would stay out of Ontario entirely, representatives from two international IPPs, one with operations in Ontario and the other without, told us that, given a constrained pool of capital, Ontario would not rank among the top North American jurisdictions where their firms would chose to deploy that capital. A representative from a U.S.-based IPP with wind operations in different parts of Canada qualified the Ontario market as a "U.S. Production Tax Credit hedge", stating that his firm would seriously look at Ontario only if the PTC expired.[xiv] Ontario would thus likely attract higher levels of investment, especially from globally active firms, if perceived policy risks were lower.

b. Procurement bid pricing

An alternative reaction for wind developers is to incorporate expected policy risks into *ex ante* financial assessments and to adjust bid prices during procurement exercises accordingly. A representative from a large utility with wind operations in various parts of the country told us that his company's board of directors viewed Ontario as a risky jurisdiction, and that a premium was being priced into project valuation models. A Canadian IPP with operations in Ontario and the rest of the country shared the following:

> "For the first time in RES III, we've had to price in these risks. In RES I we definitely did not. But for RES III, we thought: 'Ok, how much have we spent on those permit delays, on dealing with communities, etc', and we included that in our pricing. It's very back of the envelope, but it's definitely priced."

c. Lobbying and government relations

Given the central role of the Minister in formulating and revising renewable energy policy, a further implication for developers is to devise lobbying and government relation strategies. Continual engagement at the ministry, through meetings with key staff advisors and Ministers, and through the sharing of expertise and information with the Ministry, will ensure industry interests are voiced in pivotal policy-making arenas. The 2009 ministerial directive reinstating RESOP for biogas projects is one example of how industry lobbying, in this case of both the Premier's and Minister's offices, was instrumental in safeguarding firms' interests. Participation in agency consultations provides further voice in discussions about policy options and agency recommendations to the Minister. 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 such as the Canadian Wind Energy Association to advocate collectively on their behalf. In each case, such activities create additional costs for developers that will lower investment returns from productive assets unless incorporated into *ex ante* procurement bids.

The enhanced need for developing strong political relations is likely to act as a barrier to out-of-province and foreign developers since such firms typically do not have pre-established connections and are less familiar with the political environment. Conversely, in-province firms, or those with strong political connections, will have an advantage over the less well connected.

d. Regulatory reform

Improving policy stability and thereby reducing regulatory risk may be achieved by undertaking reforms in the regulatory governance structure rather than in specific policies – e.g. in the institutional processes by which policies are formulated and implemented. Reforms that 'hard wire' policy commitments would reduce the degree of political discretion that underlies observed aspects of policy instability. One option would be to enshrine specific policies in legislation. Even though the majority party in the Legislature controls the legislative agenda, the legislative process provides opportunities for public debate and consultation that are not required for ministerial directives. Extensive consultation has the benefit of reducing the risk of policy errors since multiple parties have an opportunity to provide information on policy consequences and alternatives that may not have been anticipated by the sponsoring Ministry. Enacting legislation also demands time and resources from the initiating parties, implying that once enacted, legislation is not easily reversed or modified. Specific long-term renewable power capacity or electricity generation sector emissions targets would be candidates for legislation, as has been the case in many U.S. states.

A second approach to stabilizing policy over time would be to strengthen agency independence from political control, as has been the practice in other jurisdictions such as the U.S. and U.K. that have also encouraged private sector investment in the utility sector. Further policy decision-making authority could be conferred on the OPA or OEB, subject to administrative procedural requirements, but without the need for explicit ministerial initiation or approval. For instance, the authority to establish a renewable capacity procurement schedule – including magnitude and timing of contracts – could be delegated solely to the OPA rather than permitting the Minister to control such actions through directives. Independence from political pressures would be further enhanced by reforming appointment processes: lengthening terms of appointment to fixed five year periods, and staggering the appointments of board members would insulate the OPA or OEB from immediate political exigencies.

6. Conclusion

Ontario, like other North American and international jurisdictions, has sought to increase the share of its electricity supply mix provided by renewable energy resources, especially wind. Like many other governments, Ontario policy-makers have opted to leave the development of the wind power portfolio to the private sector by incenting investment through specific regulatory programs. However, while the provincial strategy has ostensibly been successful in initially generating a high degree of private interest, headline data about contracted wind capacity masks underlying regulatory governance problems that have ultimately led to project and program cancellations and delays and, ultimately, lower investment levels than initially anticipated. We expect that without reforms in regulatory governance, the province will struggle to meet its renewable power capacity objectives at a reasonable cost to the ratepayer – especially given the strong competition for renewable assets, technologies and investments from U.S. states where utilities have legally binding obligations to fulfill Renewable Portfolio Standards.

Existing research on renewable power policy largely focuses on the relative performance of different regulatory incentive tools, most often pitting feed-in tariff systems against competitive auction models. However, based on insights provided by Holburn and Spiller (2002) and Levy and Spiller (1994), we argue that, as with other utility industries, wind power investors are also concerned with regulatory governance and the future stability of extant policies. Here we conduct a unique industry survey that provides some of the first empirical support for the proposition that utility investors are as concerned about regulatory governance as they are with specific regulatory policies. Although the survey is limited by its sample size, the survey results, and the interviews with wind power developers and IPPs, together provide supportive evidence for our arguments in the context of the regulatory regime in Ontario: despite favourable operational and market

conditions, unstable policy and weak credibility have held back some investment and pushed up procurement bid pricing. These governance problems have ultimately led the Ontario government to compensate with the introduction of stronger regulatory incentives, such as increased tariff prices and an enlarged feed-in tariff program, in order to achieve its policy objectives.

Our analysis leads us to conclude that Ontario would benefit by formalizing its wind energy strategy through legislation that reforms regulatory governance. First, long-term targets for renewable fuel capacity levels or carbon emissions from power generation should be legislated and the ability of the Minister to revise such targets restricted. Second, agencies such as the Ontario Power Authority or Ontario Energy Board, rather than the Minister, should have independent authority to set key dimensions of policy such as procurement schedules and rates paid to owners of renewable generation assets. Doing so will reduce the risk that policy development is especially sensitive to political pressures, thereby increasing the attractiveness of Ontario as a location for wind power investments. This conclusion is consistent with Blanco's (2009: 1380) statement that "the best policy measure by far [for reducing capital finance costs] consists of creating a stable policy framework, which improves the prediction of income streams for a wind farm".

Besides considerations of low carbon electricity generation, the success of a wind energy policy can have positive industrial development ramifications. As noted by the U.S. Department of Energy's office of Energy Efficiency and Renewable Energy, there have been growing investments in wind manufacturing capacity in the U.S. since 2006 (EERE, 2008). The ability to incent investment in wind power generation can therefore stimulate additional investment in the industry supply chain, creating further economic growth. While a full analysis of the factors affecting location decisions for wind turbine manufacturing firms is beyond the scope of this paper, we note that some of the jurisdictions that have attracted significant manufacturing spin-offs from their wind energy strategies, such as Germany and Texas, have established stable regulatory frameworks based in comprehensive legislation and specific commitments to renewable capacity targets. Thus, while we argue that formalizing provincial wind energy strategy through legislation would strengthen the investment environment for generators, additional investment within the industry supply chain in the province could also follow. We leave detailed investigation of this issue for future research.

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Table 1: Comparison of Rates Paid to Wind Energy Developers in U.S. and Ontario[xv]

Commercial Operation Date	U.S. rate paid for wind energy (US$/kWh avg) (# of projects)	Ontario Renewable Energy Supply (I) contracts (C$/kWh avg)	Ontario Renewable Energy Supply (II) contracts (C$/kWh avg)	Ontario Renewable Energy Standard Offer Program contracts (C$/kWh)
2006	0.048 (14)	0.08	0.08639	0.11
2007	0.045 (21)	0.08	0.08639	0.11
2008	-	-	0.08639	0.11

Source: authors' compilation

Table 2: Changes in Ontario Renewable Energy Policies

Year	Minister	Renewable Energy Capacity RfPs	Feed-in Tariffs	Renewable Capacity Targets
2004	Dwight Duncan	• Ministry initiates procurement of 300 MW (RES I)		• Government documents (e.g. RES I RfP) outline targets for 1350 MW of renewable energy capacity by 2007 and 2700 MW by 2010
2005	Dwight Duncan	• Minister announces 200 MW RfP for projects less than 20 MW • Minister directs OPA to procure 1000 MW for projects greater than 20 MW (RES II)	• Minister directs OPA to develop new feed-in tariff program (RESOP)	• Minister requests OPA to recommend targets for new renewable energy capacity by 2015, 2020 and 2025 while taking into account existing targets for 2007 and 2010
2006	Donna Cansfield	• OPA postpones 200 MW RfP announced in 2005	• Minister directs OPA to implement RESOP	
	Dwight Duncan			• Minister directs the OPA to create the Integrated Power System Plan with the explicit goal of increasing renewable capacity by 2700 MW by 2010 and 15700 MW by 2025
2007	Dwight Duncan	• Minister directs OPA to procure 2000 MW of projects greater than 10MW to become operational by 2015, and directs the OPA to initiate a first tranche of RfPs toward that goal by year's end for 500 MW (RES III)	• Minister directs OPA to modify RESOP program to include small hydro projects in northern Ontario	
2008	Gerry Phillips		• OPA suspends RESOP	
	George Smitherman			• Minister directs the OPA to "revisit" its IPSP targets with a view to increasing the use of renewable energy
2009	George Smitherman		• Minister directs OPA to re-instate RESOP for biogas projects only	
	George Smitherman		• Minister directs OPA to create new feed-in tariff program	

Source: authors' compilation

Table 3: Survey Questions for Wind Energy Firms

"How does your company rank the following criteria when deciding whether to become active in a wind market: (1) Not Important; (2) Somewhat Important; (3) Important; (4) Very Important or (5) Essential?"

"How does Ontario compare to other jurisdictions where your company has been active in wind power development based on the following criteria? (0) Not Applicable; (1) Very Unfavourably; (2) Somewhat Unfavourably; (3) Roughly the Same; (4) Favourably; (5) Very Favourably." "Not Applicable" responses were not counted toward the average scores.

Operational Conditions

1. Natural wind conditions
2. Local availability of engineering and construction expertise specific to wind power
3. Proximity to equipment manufacturers and suppliers
4. Costs for construction, engineering and technical services

Regulatory Policies

5. Level of government investment subsidies or tax incentives for wind power generation
6. Length of the PPA
7. Availability of transmission capacity for the foreseeable future
8. Transparency of the PPA bidding and award process

Regulatory Governance and Process

9. Stability of the policy environment
10. Presence of a hard long-term government target for wind power
11. Coordination between all government-related agencies involved in grid connection, environmental assessments, PPA processes, development and other permits
12. Ease of obtaining grid connection approval
13. Ease of obtaining environmental assessment approval
14. Ease of obtaining development approvals from municipal governments and local communities (including First Nations groups)
15. Ease of obtaining rights to land

Table 4: Summary of Survey Results

Category	Average Importance Score	Average Ontario Assessment Score
Regulatory governance and process	3.96	2.36
Regulatory policies	3.87	2.78
Operational conditions	3.07	2.88

Standard deviations in parentheses

Source: authors' compilation

Table 5: Survey Results

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*	

Source: authors' compilation

Appendix 1: Regulatory Governance of the Utility Sector in the United States

In the United States, the country with the longest history of private ownership in the utilities sector, the regulatory solution that emerged in the electricity industry during the beginning of the twentieth century was to move regulation one step up from local politics. Regulatory authority over electric distribution utilities was moved away from politicized municipal environments and toward state-wide independent administrative agencies (state Public Utility Commissions, hereafter "PUCs") with statutory authority to monitor utility performance and to set final rates. Since PUCs normally operate in systems where legislative power is divided among the executive and two legislative chambers, they generally have substantial autonomy to determine regulatory policy without the threat of legislative override or overwhelming political interference. While PUCs operate under broad statutory objectives ("reasonableness" is the typical criterion for rate levels) and have the power to disallow imprudent or anti-competitive managerial behaviour, their decisions cannot be made in an arbitrary fashion. First, the evolution of constitutional interpretation ensures that utilities are allowed to earn a fair return on their investments. Second, due process requirements enshrined in states' Administrative Procedure acts also ensure that PUC rulings must be based on the facts and evidence of the case (Vanden Bergh, 2000). In the event of disputes, utilities are able to challenge the PUC on both statutory and constitutional grounds in state and federal courts which, given the nature of judicial appointments, normally operate independently of the political establishment (Spiller and Vanden Bergh, 2003). In the electricity sector, a second level of protection against local opportunistic behaviour resides in that wholesale electricity generation markets, given the interconnection across states of transmission grids, are regulated at the federal rather than at the state level. Given their independence and nation-wide range of interests, federal agencies are less able to be manipulated by local or state officials. Private investors thus have some assurance that regulatory policy will be protected from immediate political pressures as well as from agency arbitrariness.

Implementing regulatory reforms at legislative and administrative levels in the U.S. is frequently a difficult and lengthy exercise, lending considerable weight to status quo policies. First, as a result of the nation's federal structure, as well as of its separation of political powers, legislative policy changes require the agreement of multiple institutions, all of which are subject to judicial review. Thus, in the presence of divergent interests it can be difficult to find mutually preferable new proposals. Consequently, drastic changes in regulatory policy – those that entail a redistribution of wealth among competing interest groups – are difficult to implement as the losing coalition will lobby against adoption. Thus, when political interests are fragmented, dramatic legislative proposals tend either to be rejected or else subsequently moderated.

Second, while the U.S. system of political checks and balances insulates interest groups against unfavorable *legislative* reforms, the logic of political delegation also ensures that regulatory agencies do not rapidly implement substantial policy changes against the wishes of their political principals through *administrative* means. A variety of governance mechanisms are used to safeguard against rapid administrative decision making which may distort legislators' preferences. Legislators undertake committee hearings, appointments of officials are reviewed, and agencies are subject to administrative procedures and due process requirements that provide interest groups with a role in decision-making procedures. Thus, even if the threat of legislative override is not credible, agency decisions cannot drift too far too fast from the status quo.

The combination of multiple legislative veto points, administrative controls and independent judicial review in the U.S. tends to insulate status quo public 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.

Appendix 2: Detailed Survey Results

a) Importance of Factors in Wind Firms' Location Decisions

Rank	*Factor*	*All Firms*	*Firms with PPAs In Ontario Only*	*Firms with PPAs Outside of Ontario Only*	*Firms with PPAs In & Outside of Ontario*	*Firms with no PPA*
1	Natural wind conditions	4.54 (0.51)	4.71 (0.52)	4.57 (0.53)	4.50 (0.53)	4.33 (0.58)
2	Stability of the policy environment	4.38 (0.73)	4.50 (0.76)	3.88 (0.83)	4.60 (0.52)	4.67 (0.58)
3	Availability of transmission capacity for the foreseeable future	4.32 (0.72)	4.43 (0.52)	4.00 (0.82)	4.30 (0.82)	5.00 (0.00)
4	Presence of a long-term government target for wind power	4.14 (0.99)	4.38 (0.74)	3.88 (1.25)	4.40 (0.70)	3.33 (1.53)
5	Transparency of the PPA bidding and award process	4.07 (0.92)	4.13 (0.83)	3.75 (1.04)	4.10 (0.99)	4.67 (0.58)
6	Ease of obtaining grid connection approval	4.07 (0.78)	4.38 (0.74)	3.88 (0.83)	3.90 (0.88)	4.33 (0.58)
7	Ease of obtaining development approvals from municipalities	3.93 (0.80)	4.00 (0.53)	3.75 (0.89)	4.00 (0.94)	4.00 (1.00)
8	Ease of obtaining environmental assessment approval	3.90 (0.77)	3.75 (0.71)	4.00 (0.76)	4.00 (0.94)	3.67 (0.58)
9	Length of the PPA	3.72 (1.07)	4.13 (1.13)	3.50 (0.93)	3.90 (0.99)	2.67 (1.16)
10	Coordination between all government-related agencies	3.69 (0.97)	3.63 (1.30)	3.38 (0.52)	4.10 (0.99)	3.33 (0.58)
11	Ease of obtaining rights to land	3.62 (0.98)	3.13 (1.13)	3.75 (1.04)	4.00 (0.82)	3.33 (0.58)
12	Costs for construction, engineering and technical services	3.46 (0.99)	3.57 (1.19)	3.14 (1.21)	3.60 (0.52)	3.33 (1.53)
13	Government investment subsidies or tax incentives	3.34 (1.08)	3.75 (1.04)	3.38 (1.06)	3.10 (0.88)	3.00 (3.00)
14	Availability of engineering and construction expertise	2.36 (0.78)	2.14 (0.71)	2.57 (0.98)	2.20 (0.63)	2.67 (1.16)
15	Proximity to equipment manufacturers and suppliers	1.93 (0.77)	2.14 (0.99)	1.43 (0.53)	2.10 (0.57)	2.00 (1.00)
Sample Size		*29*	*8*	*8*	*10*	*3*

Source: authors' compilation

b) *Assessment of Ontario on Location Factors*

Rank	*Factor*	*All Firms*	*Firm with PPAs In Ontario Only*	*Firms with PPAs Outside of Ontario Only*	*Firms with PPAs In & Outside of Ontario*	*Firms with no PPA*
1	Length of the PPA	3.33 (0.66)	3.80 (0.84)	3.17 (0.75)	3.22 (0.44)	3.00
2	Transparency of the PPA bidding and award process	3.19 (1.03)	3.50 (0.58)	3.17 (0.75)	3.30 (1.16)	1.00
3	Availability of engineering and construction expertise	3.14 (0.71)	3.20 (0.45)	3.33 (0.82)	3.00 (0.82)	3.00
4	Costs for construction, engineering and technical services	2.95 (0.38)	3.00 (0.00)	2.83 (0.41)	3.00 (0.47)	3.00
5	Ease of obtaining rights to land	2.91 (0.68)	3.40 (0.55)	2.83 (0.41)	2.80 (0.79)	2.00
6	Hard long-term government target for wind power	2.91 (1.11)	3.00 (1.22)	2.50 (1.38)	3.10 (0.99)	3.00
7	Proximity to equipment manufacturers and suppliers	2.91 (0.53)	2.60 (0.55)	2.83 (0.41)	3.00 (0.47)	4.00
8	Government investment subsidies or tax incentives	2.45 (0.80)	2.40 (1.14)	2.00 (0.89)	2.70 (0.48)	3.00
9	Natural wind conditions	2.50 (0.74)	3.00 (0.71)	2.17 (0.75)	2.40 (0.70)	3.00
10	Ease of obtaining environmental assessment approval	2.41 (0.80)	2.80 (0.45)	2.33 (0.52)	2.20 (1.03)	3.00
11	Ease of obtaining grid connection approval	2.32 (1.04)	2.60 (1.34)	2.67 (0.52)	2.10 (1.10)	1.00
12	Availability of transmission capacity for the foreseeable future	2.14 (0.83)	2.20 (0.84)	1.67 (0.82)	2.40 (0.84)	2.00
13	Ease of obtaining development approvals from municipalities	2.29 (1.06)	2.00 (1.14)	2.67 (0.82)	2.20 (1.32)	2.00
14	Stability of the policy environment	2.09 (0.97)	1.80 (1.10)	2.50 (0.84)	2.10 (0.99)	1.00
15	Coordination between all government-related agencies	1.59 (0.85)	1.40 (0.55)	2.00 (0.89)	1.50 (0.97)	1.00
Sample Size[16]		*22*	*5*	*6*	*10*	*1*
Average		*2.63 (0.82)*	*2.71 (0.71)*	*2.59 (0.75)*	*2.64 (0.87)*	*2.33*

Source: authors' compilation

[i] We are grateful for helpful comments and feedback on the paper received from many individuals, including Peter Bettle, Jan Carr, Don Dewees, Neil Levine, George Vegh, Mark Winfield, Glen Wright and Michael Wyman. Financial support for this research was generously provided by the Ontario Centre of Excellence for Energy.

[ii] The shortfall in eventual operational capacity installed in Ontario contrasts with the initial high levels of developer interest, driven in part by the significant market potential, at the time of the RES auctions in 2004 and 2005. In total, ten PPAs were initially awarded under RES I for about 395 MW of renewable capacity, and nine PPAs were awarded under RES II for about 975 MW of renewable capacity. The OPA reported that RES I and II received 41 and 22 bids, respectively, for over 1,000 and 2,000 MW of renewable power, making both auctions oversubscribed (Global Power Report, 2004; 2005). RES III awarded six contracts for a total of 492 MW of wind, although the OPA did not release the final number of bids. RESOP, for its part, awarded nearly 1,500 MW of PPAs across all renewable fuels between November 2006 and May 2008, although the program initially targeted only 1,000 MW over a ten year period (OPA, 2008b). The difference between capacity awarded and actually installed is accounted for by substantial project cancellations, delays and withdrawals. Of RES I wind capacity contracted, 14% (50 MW) was cancelled by developers before the operational deadline. Out of RES II wind capacity contracted, 19% (177 MW) was cancelled and 40% (379 MW) was delayed beyond the commercial deadline. Opposition from local anti-wind groups, who lobbied against land-use permits at the municipal level, may have contributed to some developers' decisions to abandon planned projects. Difficulties in obtaining approvals from government agencies were also reported as accounting for some of the delays.

[iii] Calculations based on data available from U.S. Department of Energy (2008) and DSIRE (2008).

[iv] Although the RES average rates are those for all renewable fuels (weighted by MW), wind PPAs accounted for 96% of MW capacity.

[v] This section draws on Holburn and Spiller (2002).

[vi] See *Ontario Energy Board Act,* S.O, 1998, c. 15, Sched. A., s. 27(1) and *Electricity Act,* S.O. 1998, c. 15, Sched. A., s. 25.32(7).

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

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

[ix] 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.

[x] *Electricity Act*, S.O. 1998, c. 15, Sched. A, 25.30(1).

[xi] The postponement notice was posted on the website www.ontarioelectricityrfp.ca on March 10, 2006 but was subsequently removed along with the entire website in the fall of 2008.

[xii] We extensively tested the survey questions before full implementation with pre-trials on several industry experts from industry associations, wind power developers and academia.

[xiii] In Appendix 2 we provide more detailed survey results which include responses for different subsets of the respondent sample as well as standard deviations. Due to the limited sample size and small ordinal answer scale on the survey questions, we do not attempt to ascertain statistical significance of the survey results.

[xiv] The PTC is a U.S. Federal-level incentive for wind power projects that awards a tax credit per unit of wind power produced. Historically, cycles of PTC renewals and expirations have caused a boom-and-bust cycle in wind installations.

[xv] This table was produced with information drawn from a database of 128 wind power projects installed between 1998 and 2007 (8,303 MW or 55% of wind capacity installed during that period across the US) (EERE, 2008). Figures are U.S. national averages.. The prices are those paid to the project owner based on facility commercial operation date, and are thus effectively busbar energy prices. Prices generally include interconnection costs, as is the case in Ontario. In order to make raw U.S. and Ontario rates comparable we implemented the following adjustments: first, we added federal incentives of U.S. $0.02 Production Tax Credit to U.S. rates and CAD $0.01 ecoENERGY credits to Ontario rates, each adjusted to reflect the post-tax benefits (assuming a

corporate tax rate of 35% in the U.S.). Second, we converted these adjusted rates into Canadian dollars using average daily exchange rates for 2006 and 2007 (88 and 93 cents). We excluded any potential value of renewable energy credits that may accrue to developers.

[16] The difference between the respondent numbers in this and the previous table is explained by respondents who answered "Not Applicable" to questions on this part of the survey.