

Canadian Institute of Resources Law
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Wind Power and Renewable Energy in Alberta

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Abstract

In 2008, the Government of Alberta proposed a strategy addressing the challenge of climate change. One of the measures proposed in this strategy envisages greening of energy production by the introduction of more sustainable ways of its production and a simultaneous increase in the use of renewable sources of energy. Such sources include, but are not limited to, the energy derived from such natural phenomena as the sun, wind, and tides. This paper focuses on wind as an alternative source of energy for a number of reasons discussed in the paper. The paper seeks to describe the regulatory framework governing wind power plants in Alberta and to assess the framework's adequacy.

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1.0. Introduction

In 2008 the Government of Alberta proposed a strategy addressing the challenge of climate change.¹ One of the measures proposed in this strategy envisages greening of energy production by the introduction of more sustainable ways of its production and a simultaneous increase in the use of renewable sources of energy. Such sources include, but are not limited to, the energy derived from such natural phenomena as the sun, wind, and tides. This paper focuses on wind as an alternative source of energy for a number of reasons. Firstly, it is one of the cleanest of the renewable energy sources. Secondly, the wind regime in Alberta is particularly abundant compared to many other jurisdictions. Finally, using wind as a source of energy can help to achieve the goal of greening energy production by reducing greenhouse gas emissions, thus promoting the objectives set out in Alberta's 2008 Climate Change Strategy and helping to meet the continually growing demand for electricity in the province.

This paper seeks to describe the regulatory framework governing wind power plants in Alberta and assess the framework's adequacy.² The paper is organized as follows. A few preliminary comments about the nature of electricity and the main institutions regulating the electricity industry in Alberta are presented in Section 2. Section 3 reviews characteristics of wind as a source of energy. The regulatory framework governing wind power plants is outlined in Section 4. Section 5 analyses the adequacy of this framework, and Section 6 provides some concluding remarks.

2.0. Setting the Scene

2.1. Characteristics of Electricity

Electricity is a unique consumer product. The following characteristics of electricity attest to its uniqueness:

- It is final energy which uses primary energy sources as inputs and transforms them;³
- It is not storable in large amounts or at low cost;⁴

¹ Alberta Environment, online: Government of Alberta <<http://environment.gov.ab.ca/info/library/7894.pdf>> (*Climate Change Strategy*).

² Some of the principles described in this paper can potentially apply in the context of electricity generated from hydro or solar energy.

³ Some of the sources used to generate electricity include coal, natural gas, nuclear, wind, hydro and solar energy.

- It is not substitutable;⁵
- It is versatile in use;⁶
- It is produced in real time;⁷
- The demand for electricity depends on the time of day, weekday, season, geographic location, and weather;
- The supply must match the demand at all times and requires constant monitoring and backup sources of capacity;⁸ and
- Security and reliability of supply are critical.⁹

2.2. The Cycle

Before one can turn to the analysis of the regulatory framework, it is necessary to understand the stages of the electricity supply cycle. The supply cycle in Alberta may be described as follows:

Generation¹⁰ → Transmission¹¹ → Distribution¹² → Supply/Retail¹³

⁴ Electricity *per se* cannot be stored except as water in dams in hydro systems. Even when it is stored thus, it is typically capacity-constrained at the peak because the ability to withhold water in low-demand periods for release at high-demand periods tends to be very limited (except in a small number of countries). David M. Newbery, “Problems of Liberalising the Electricity Industry” (2002) 46 Eur. Econ. Rev. 919 at 923. Electricity is typically converted into some other form of energy and then stored.

⁵ Production and supply are multiple time-differentiated products.

⁶ For example, it can be used as light, heat, cooling, or motion power.

⁷ It is produced as demanded by consumers.

⁸ No power plant is 100 per cent reliable and backup is needed to ensure that demand will be met to a specified level of reliability. Godfrey Boyle, ed., *Renewable Electricity and the Grid: The Challenge of Variability* (London: Earthscan, 2007) at 67.

⁹ The economic cost in the event of disruptions can be significant. As a result of the power crisis in California in 2000-2001, a state of emergency was declared when the state’s two major utilities found themselves on the brink of bankruptcy and asked for state and federal help. Another cascading blackout took place in 2003 and paralysed the Northeast region of the United States and Ontario, thus affecting 50 million people in total.

¹⁰ The generation of electricity is measured in megawatts: 1 megawatt (MW) equals 1,000 kilowatts (kW) or 1,000,000 watts. The most prevalent sources of energy to generate electricity are nuclear, coal, and natural gas.

Alberta can be characterized as an “electricity island”¹⁴ because it is a relatively small and one of the least interconnected jurisdictions in Canada. Only inter-provincial connections exist at the moment and there are no direct international connections.¹⁵

2.2.1. Generation

Electricity in Alberta is primarily generated from coal (about 47 per cent) and natural gas (about 40 per cent). The generation mix also includes renewable sources such as hydro (7 per cent), wind (4 per cent), biomass (1.4 per cent), and fuel oil (0.1 per cent).¹⁶ Alberta’s development of electricity generation capacity prior to regulatory reform in the 1990s differs somewhat from the experience in other provinces in that the province itself did not take ownership of generation facilities, which was left to integrated private and municipal utilities (discussed further on below).

2.2.2. Transmission

Transmission is the heart of the electricity industry. If there is no infrastructure in place to deliver electricity, power generators cannot supply their product to the consumer. The finite nature of transmission capacity determines how much electricity can be delivered.¹⁷

¹¹ The generated electricity is transformed to higher voltage (at 138 kilovolts or higher) to be transmitted over long distances. Electricity is sent from generating plants over high-voltage transmission lines to local transformers. The process of transformation to higher voltage increases power flow and reduces transmission losses. Transmission losses due to resistance are unavoidable. Alberta Electric System Operator, online: AESO <<http://www.aeso.ca/transmission/281.html>>.

¹² Distribution companies use local transformers to reduce the voltage level at substations for distribution to consumers.

¹³ Retailers buy large blocks of energy, repackage it into offers and sell to the end use consumer through the regulated rate or direct sales agreements.

¹⁴ Andrew N. Kleit, ed., *Electric Choices: Deregulation and the Future of Electric Power* (Lanham: Rowman & Littlefield Publishers, Inc., 2007) at 93.

¹⁵ The Alberta Interconnected Electric System has transmission interconnections with British Columbia (0 to 750 MW) and Saskatchewan (0 to 150 MW). Alberta Electric System Operator, online: AESO <<http://www.aeso.ca/gridoperations/8757.html>>. Montana Alberta Tie Ltd. and TransCanada Corporation are working on establishing two international bi-directional connections.

¹⁶ Alberta Energy, online: Government of Alberta <<http://www.energy.gov.ab.ca/Electricity/682.asp>>.

¹⁷ An additional constraint is imposed by the laws of physics and the “loop flow” phenomenon. Electricity chooses the path of least resistance to travel from point A to point B. Since transmission systems are interconnected for reliability reasons, there is no guarantee that a load from point A will go directly to point B without passing through point C which can be remotely located. This unpredictability not only affects the transmission capacity of a third party but makes it difficult to calculate the exact transportation costs and devise an optimal pricing mechanism.

The availability of fair, open, transparent, and non-discriminatory access to the interconnected electric system (or the grid) is therefore essential for all power producers.

2.2.3. Distribution

Several investor- and municipally-owned electric distribution companies operate in Alberta.¹⁸ Geographic location determines the consumer's provider of the electric distribution service.¹⁹

In 2000 the Government of Alberta set up a regulated retail rate tariff for electricity to provide a degree of protection to small consumers.²⁰ During the transition period,²¹ owners of the electrical distribution system were required to offer customers who did not sign a contract with a retailer in their service area the option of purchasing electricity services in accordance with the owners' regulated rate tariff instead of from another retailer.²² The tariff had to be first approved by the then-existing Alberta Energy and Utilities Board.²³

Today, unless the owner of an electric distribution system delegates any or all of its duties,²⁴ the owner becomes the default retailer if the customer chooses the regulated rate tariff option. Regulated rate providers are specific to geographic location. Customers can choose from four regulated rate electricity providers depending on their location: City of Lethbridge, Direct Energy Regulated Services, ENMAX Power Corp., and EPCOR

¹⁸ AltaGas Utilities, ATCO Electric, City of Lethbridge, EPCOR Distribution Inc., ENMAX Power Corp., Fortis Alberta Inc., City of Medicine Hat Electric. Utilities Consumer Advocate, online: Government of Alberta <<http://www.ucahelps.gov.ab.ca/9.html>>.

¹⁹ "Electric distribution service" means the service required to transport electricity by means of an electric distribution system to customers or from distributed generation to the interconnected electric system but does not include the provision of electricity services to eligible customers under a regulated rate tariff. *Electric Utilities Act*, S.A. 2003, c. E-5.1, s. 1(1)(l.1).

²⁰ The tariff was set up pursuant to *Electric Utilities Act*, S.A. 1995, c. E-5.5, as am. by *Electric Utilities Amendment Act*, S.A. 1998, c. 13, s. 31.995(1)(k). The tariff applied to "eligible customers", including residential, farm, irrigation and persons whose annual consumption of electricity was less than 250 MWh. *Regulated Rate Option Regulation*, Alta. Reg. 45/2000. A modified version of the regulated rate tariff continues to apply today. *Regulated Rate Option Regulation*, Alta. Reg. 262/2005.

²¹ The "transition period" was defined as period beginning on 1 January 2001 and ending on 31 December 2005. *Regulated Rate Option Regulation*, Alta. Reg. 45/2000, s. 1(1)(e).

²² *Ibid.*, s. 6.

²³ *Ibid.*, s. 2(1).

²⁴ *Electric Utilities Act*, *supra* note 19, s. 104, *Regulated Rate Option Regulation*, Alta. Reg. 262/2005, s. 20.

Energy Corp./EPCOR Energy Alberta Corp.²⁵ The regulated rate is now approved by the Alberta Utilities Commission.²⁶

2.2.4. Supply/Retail

Consumers can choose either a regulated service or sign a contract with a competitive retailer. The Utilities Consumer Advocate, a department of the Government of Alberta, distinguishes between four categories of consumers: residential,²⁷ farm,²⁸ small industrial,²⁹ and large industrial.³⁰ The retail choices available to consumers tend to depend on the consumer category and their geographic location.

By way of an example, this paper takes a closer look at retail options available to residential consumers because one of the *Electric Utilities Act's* purposes explicitly refers to enabling “customers to choose from a range of services in the Alberta electric industry ... and to receive satisfactory service”.³¹ Residential consumers do not enjoy the same variety of choices as large industrial consumers.³² Three retailers, Alberta Energy Savings L.P., Direct Energy, and ENMAX Energy, provide their services in all geographic areas subject to the caveat that “competitive contracts may not be available in some areas of Alberta”.³³ Three more retailers provide their services in specific geographic areas only.³⁴

According to the Utilities Consumer Advocate, three choices are presently available

²⁵ Utilities Consumer Advocate, online: Government of Alberta <<http://www.utilitiesconsumeradvocate.gov.ab.ca/93.html>>.

²⁶ *Electric Utilities Act*, *supra* note 19, s. 103.

²⁷ Consumers that use energy in a residence for their daily lives. Utilities Consumer Advocate, online: Government of Alberta <<http://www.utilitiesconsumeradvocate.gov.ab.ca/80.html>>.

²⁸ Consumers that use energy for their rural residence and agriculture operations. *Ibid.*

²⁹ Consumers who are not residential or farm consumers and consume less than 250,000 kWh of electricity per year and/or less than 2,500 GJ of natural gas per year. *Ibid.*

³⁰ Consumers whose energy consumption is greater than 250,000 kWh of electricity per year and/or more than 2,500 GJ of natural gas per year. *Ibid.*

³¹ *Electric Utilities Act*, *supra* note 19, s. 5(e). “Customer” means a person purchasing electricity for the person’s own use. *Electric Utilities Act*, *ibid.*, s. 1(1)(h).

³² Utilities Consumer Advocate, online: Government of Alberta <<http://www.ucahelps.gov.ab.ca/183.html>>.

³³ Utilities Consumer Advocate, online: Government of Alberta <<http://www.utilitiesconsumeradvocate.gov.ab.ca/97.html>>.

³⁴ Battle River Rural Energy Limited, Rocky Rural Power Limited, and Southern Alta Rural Energy Division.

to customers interested in using alternative energy sources: making a contribution to offset some of the negative effects of conventional energy sources,³⁵ direct procurement,³⁶ and rewards redemption.³⁷ The choices available today are to some extent determined by the pre-reform environment and the ensuing restructuring process.

2.3. Electricity Sector Reform in Alberta

Two primary features distinguish the pre-reform environment in Alberta from most jurisdictions: ownership of assets prior to the reform and the average cost of distributed generation. With respect to ownership, the provincial government did not hold any electricity assets, which were owned by investors and municipalities.³⁸ With regard to the average cost of generation, lowering the cost of electricity was not a factor motivating the reform. Alberta did not have to address the issue of “stranded costs” because the pre-reform price of electricity was lower than the post-reform price. Instead, the reformers had to deal with the issue of “stranded benefits”.³⁹

³⁵ Alberta Energy Savings L.P. allows customers to offset some of the negative effects of everyday energy use by purchasing a participation level (from 20 to 100 per cent), in accordance with which the company injects into the electricity grid energy from wind or hydro power. The customer’s distribution company remains the same but Alberta Energy Savings L.P. becomes the supplier and provides billing services to the customer. Green Energy Company, online: Energy Savings Group <<http://www.energysavings.com/green-energy.html>>.

³⁶ The power is sourced from wind power facilities in Alberta and then injected into the grid on behalf of Bullfrog Power customers. All the power sourced meets the federal government’s Environmental Choice Program EcoLogo standard for renewable energy. The consumer’s distribution company remains the same but Bullfrog provides the customer with an additional bill for “greening” the power supplied (2 cents/kWh plus applicable taxes). Bullfrog Power, online: bullfrogpower <<http://www.bullfrogpower.com/home/abfaq.cfm>>.

³⁷ Customers that meet the EasyMax Rewards eligibility requirements can use the “Rewards” dollars toward Greenmax for no extra charge. One way of redeeming the accumulated dollars is by ensuring that ENMAX Energy secures 5000 kWh per year of renewable energy from an EcoLogo facility in Alberta. The customer continues to receive one monthly bill for electricity, gas, and renewable energy. Greenmax, online: ENMAX <<http://www.enmax.com/energy/res/greenmax/greenmax/greenmax.htm>>.

³⁸ Three integrated utilities, which engaged in generation, transmission, distribution and retail of electricity, accounted for approximately 90 per cent of the generation capacity. Two of these utilities were owned by investors (Alberta Power and TransAlta) and the third (EPCOR) was owned by the City of Edmonton. Kleit, *supra* note 14 at 92.

³⁹ The term “stranded costs” refers to the situation when the cost of post-reform generation is cheaper compared to pre-reform costs. The term “stranded benefits” means that post-reform generation is more expensive than it was before the restructuring process. The existence of “stranded costs” and “stranded benefits” raises important questions about fairness. For example, who should pay for the generators’ unrecoverable losses, i.e. who should bear the burden of the deficit associated with “stranded costs”? Conversely, who should profit from the gains accrued to generators, i.e. how should the surplus associated

One of the challenges facing the reformers was how to bridge the gap between the new (post-reform) and old (pre-reform) units. Two aspects in particular were potentially unfair: (1) the “stranded benefits” issue and (2) the discrepancy in market power between pre-reform and post-reform participants. It is against this background that in 1995 Alberta started the process of restructuring of the electricity industry under the *Electric Utilities Act*.⁴⁰ The reform sought to phase out averaging of generation costs by removing the generating units from regulated service and establishing a flexible framework that allowed pricing and investment decisions for electricity generation to be guided by market forces.⁴¹

To effect the transition the Government of Alberta introduced the Power Purchase Arrangement (PPA).⁴² The Power Pool Council established a separate financial account, known as the balancing pool, to manage the financial aspects of the PPAs.⁴³ The owners of the regulated generation units were required to auction their generation rights to the energy production for the remaining life of those plants.⁴⁴ These generation rights, or PPAs, were auctioned to private investors in 2000 and 2001.⁴⁵

The reallocation of generation rights through public auctions was the instrument for bridging the gap between the pre-reform and post-reform units. It was also necessary to establish several new entities to oversee and regulate the restructured electricity industry.

2.4. The New Institutions

The main entities entrusted with overseeing the proper functioning of the electricity industry in the province became the Power Pool Council, the Transmission Administrator, the Market Surveillance Administrator, and, later, the Independent System Operator and the Balancing Pool.

with “stranded benefits” be distributed? In Alberta’s case, post-reform wholesale prices were higher than pre-reform prices. This meant that existing generators continued to be profitable in the post-reform environment.

⁴⁰ *Electric Utilities Act*, S.A. 1995, c. E-5.5.

⁴¹ *Ibid.*, s. 6.

⁴² *Electric Utilities Act*, *supra* note 20, ss. 45.5- 45.7.

⁴³ *Ibid.*, s. 45.96, *Balancing Pool Regulation*, Alta. Reg. 169/99, s. 2.

⁴⁴ *Electric Utilities Act*, *ibid.*, s. 45.93.

⁴⁵ *Power Purchase Arrangement Auction Regulation*, Alta. Reg. 85/2000; *Power Purchase Arrangements Regulation*, Alta. Reg. 170/99; *Power Purchase Arrangements Regulation*, Alta. Reg. 140/2002.

2.4.1. Power Pool Council

The corporation known as the Power Pool Council was originally in charge of overseeing the wholesale power market.⁴⁶ In 2003 the functions of the Power Pool Council were reallocated among the Independent System Operator, the Market Surveillance Administrator, and the Balancing Pool.⁴⁷

2.4.2. Transmission Administrator

The ability to access the grid is essential to deliver electricity to the consumer. The Transmission Administrator became the sole provider of system access service.⁴⁸ In the post-reform environment, transmission remains a natural monopoly, and this requires ongoing regulatory oversight.⁴⁹ The Independent System Operator (or the Alberta Electric System Operator) became the successor of the Transmission Administrator after the two merged in 2003.⁵⁰

2.4.3. Market Surveillance Administrator

Originally the Power Pool Council was required to designate one of its members as the Market Surveillance Administrator.⁵¹ The statutory corporation known as the Market Surveillance Administrator was established later and an individual Market Surveillance Administrator is now appointed by the Minister.⁵²

2.4.4. Independent System Operator

As of 1 June 2003, the Independent System Operator, or the Alberta Electric System

⁴⁶ *Electric Utilities Act*, *supra* note 40, ss. 7, 9.

⁴⁷ *Electric Utilities Act*, *supra* note 19, s. 151.

⁴⁸ *Electric Utilities Act*, *supra* note 40, s. 23. The Electric Transmission Council, established pursuant to s. 18(1), appointed the Transmission Administrator pursuant to s. 21.

⁴⁹ Natural monopolies arise when “a single firm can satisfy the entire market demand for the range of goods or services at lower total cost than any other combination of firms.” David M.G. Newbery, *Privatization, Restructuring, and Regulation of Network Utilities* (Cambridge: Massachusetts Institute of Technology, 1999) at 27.

⁵⁰ *Electric Utilities Act*, *supra* note 19, s. 152.

⁵¹ *Electric Utilities Act*, *supra* note 20, s. 10.

⁵² The Energy Minister appointed the incumbent Market Surveillance Administrator pursuant to *Alberta Utilities Commission Act*, S.A. 2007, c. A-37.2, s. 39. The mandate of the Market Surveillance Administrator was originally established under *Electric Utilities Act*, *ibid.*, s. 42.

Operator (AESO), became the successor of the Power Pool Council and Transmission Administrator.⁵³ The AESO is a statutory corporation and is subject to the Alberta Utilities Commission oversight.⁵⁴

2.4.5. Balancing Pool

The Balancing Pool, a statutory corporation established in 2003,⁵⁵ assumed some of the functions of the Power Pool Council.⁵⁶ This agency manages certain generation assets, accounts and revenues arising from the transition to the post-reform environment.⁵⁷ Each year the Balancing Pool is required to forecast its revenues and expenses to determine whether any excess or shortfall of funds needs to be allocated to electricity consumers.⁵⁸

2.5. The Post-Reform Environment

As a result of the reform, the electricity industry in Alberta became restructured rather than deregulated, given that transmission and distribution continue to be regulated. The demand for electricity in the province is growing and it is expected that by 2027 Alberta's electricity consumption will double relative to the present level.⁵⁹ Enhancement of the capability of the electricity system in order to meet the growing demand for electricity is on the regulators' agenda. One of the measures contemplated by regulators entails strengthening the transmission system. To that end, the Government of Alberta introduced legislation in 2009 directed at upgrading the transmission system.⁶⁰

What will be the source of the additional generation capacity? One way to increase capacity and meet the growing demand is by increasing the share of renewable sources of energy in the generation mix. The possible role of wind as such a source is the focus of the remainder of this paper.

⁵³ *Electric Utilities Act*, *supra* note 19, s. 7.

⁵⁴ *Ibid.*, ss. 25-26.

⁵⁵ *Ibid.*, s. 75.

⁵⁶ *Ibid.*, s. 151.

⁵⁷ *Ibid.*, s. 85.

⁵⁸ *Ibid.*

⁵⁹ Alberta Energy, online: Government of Alberta <http://www.energy.alberta.ca/Org/pdfs/AB_Provincial_EnergyStrategy.pdf> (*Energy Strategy*).

⁶⁰ *Electric Statutes Amendment Act, 2009*, S.A. 2009, c. 44 (proclaimed in force December 9, 2009).

3.0. Wind Power in Alberta

Before one can analyze whether wind power is a feasible source to meet the growing demand for electricity in Alberta, it is necessary to briefly describe the characteristics of wind as a source of power.

3.1. Characteristics of Wind

Some of the salient features characterizing wind in Alberta are as follows:

- it is a recurring natural phenomenon;
- it is onshore;
- it is variable;⁶¹ and
- it is unevenly distributed geographically.

The AESO distinguishes between the following four wind regions in Alberta: South West, South Central, South East, and North. There are no operational facilities in the North.⁶²

3.2. The Mechanics of Wind Power

The process of generating electricity using wind turbines is as follows. The wind turbines, which vary in their capacity, sit at the top of towers. Wind turbines use no fuel

⁶¹ It is misleading to describe wind as an intermittent source. The Oxford Dictionary defines the term “intermittent” as something that ceases for a time, occurs at intervals, and is not continuous. This definition implies that something is either there or not. *Shorter Oxford English Dictionary*, 6th ed., s.v. “intermittent”. The key feature of wind power is changes in wind speed rather than its presence or absence. Boyle, *supra* note 8 at 71. Also, wind is always blowing somewhere in the province. Aggregation of wind power leads to smoothing of variability because some wind facilities may be ramping up while others are ramping down. By way of contrast, power from conventional plants is not variable but is subject to interruptions due to predictable events (such as scheduled maintenance) and unpredictable events (such as technical faults or *force majeure* circumstances). Thus, it is conventional power that is intermittent. To summarize, wind power is variable but not intermittent, and conventional power is not variable but intermittent. *Large Scale Integration of Wind Energy in the European Power Supply: Analysis, Issues and Recommendations*, online: European Commission Energy <http://ec.europa.eu/energy/renewables/studies/doc/wind_energy/2005_ewea_large_scale_integration.pdf> (Report).

⁶² Alberta Electric System Operator, online: AESO <http://www.aeso.ca/downloads/Weekly_Wind_Report_May_10_to_16_May.pdf>.

other than wind itself.⁶³ Mechanical power is created when the wind spins the blades of turbines. The mechanical power is used to turn a generator and produce electricity. The electricity is then carried through cables to transmission lines and into the grid or directly to the consumer.

The wind regime in Alberta is abundant and conducive to lower costs.⁶⁴ As of April 2009, the province had 521 MW of wind power connected to the grid, which constituted four per cent of installed capacity — or enough to serve over 500,000 homes.⁶⁵ Proposed generation projects include an additional 11,880 MW of wind power.⁶⁶

The table (Table 1) below demonstrates the location, capacity, and ownership of existing wind power plants in Alberta.⁶⁷

Table 1

Name of Wind Plant/Site	Date Installed	Turbines: quantity, manufacturer, capacity	Total Turbine Capacity (MW)	Owner	Location
Castle River Wind Farm	2000/01	15 x Vestas V47 660 kW	9.9000	TransAlta Wind	Castle River
Castle River Wind Farm	2001/01	44 x Vestas V47 660 kW	29.0400	TransAlta Wind	Castle River
Castle River Wind Farms (test)	11/1997	1 x Vestas V44-600 (600 kW)	0.6000	TransAlta Wind	Castle River, Cowley Ridge
Cowley Ridge	1993/1994	57 x Kenetech 375 kW turbines	21.4000	Canadian Hydro Developers	Cowley
Cowley Ridge North Wind Farm	2001/10	15 x Nordex 1,300 kW	19.5000	Canadian Hydro Developers, Inc.	Cowley

⁶³ The wind is powered by the sun. The uneven distribution of heat creates wind as warm air rises and cooler air descends to fill the void. Canadian Wind Energy Association, online: CWEA <http://www.canwea.ca/wind-energy/index_e.php>.

⁶⁴ Alberta has the largest capacity in Canada (523.97 MW). *Climate Change Strategy*, *supra* note 1.

⁶⁵ Alberta Energy, online: Government of Alberta <http://www.energy.alberta.ca/Electricity/pdfs/FactSheet_Wind_Power.pdf>.

⁶⁶ Alberta Energy citing the AESO. Alberta Energy, online: Government of Alberta <<http://www.energy.gov.ab.ca/Electricity/682.asp>>.

⁶⁷ Canadian Wind Energy Association, online: CWEA <http://www.canwea.ca/farms/wind-farms_e.php>.

Name of Wind Plant/Site	Date Installed	Turbines: quantity, manufacturer, capacity	Total Turbine Capacity (MW)	Owner	Location
Chin Chute Wind Farm	2006/11	20 x 1.5 MW GE	30.0000	Suncor/Acciona/ Enbridge	Chin Chute
Kettles Hill Phase I	2006/03	5 x Vestas 1.8 MW	9.0000	Enmax	Pincher Creek
Kettles Hill Phase II	2007/07	30 x Vestas V80 1.8 MW	54.0000	Enmax	Pincher Creek
Lundbreck	2001/12	1x Enercon E40 600kW	0.6000	Lundbreck Developments Joint Venture A	Lundbreck
Magrath	2004/09	20x 1.5 MW GE Wind	30.0000	Suncor, Enbridge, EHN	Magrath
McBride Lake	2003/06	114x Vestas 660 kW	75.2400	ENMAX, TransAlta Wind	McBride Lake
McBride Lake East	2001/12	1x Vestas V47 660 kW	0.6600	TransAlta Wind	Fort McLeod
Old Man River Project	2007/03	2x Vestas V80 1.8 MW	3.6000	Alberta Wind Energy Corp.	Pincher Creek
Sinnott Wind Farm	2001/11	5 x Nordex 1,300 kW	6.5000	Canadian Hydro Developers, Inc.	Pincher Station
Soderglen Wind Farm	2006/10	47 x GE 1.5 MW	70.5000	Nexen/Canadian Hydro Developers	Fort McLeod
Summerview Wind Farm	2002/04	1x 1.8MW	1.8000	TransAlta Wind	Pincher Creek
Taber Wind Farm	2007/09	37x Enercon E70 2.2 MW	81.4000	Enmax	Taber
Tallon Energy Project	2004/01	1x Lagerway 750 kW	0.7500	Tallon Energy	Pincher Creek
Taylor Project	2004/01	9x Kenetech 375 kW	3.3800	Canadian Hydro Developers, Inc.	Magrath
Waterton Wind Turbines	1998/11	1 x Vestas 600kW; 1998 — 2 x Vestas 600kW; 2000 — 1 x Vestas 660 kW; 2001 — 1 x Vestas 660 kW; 2002 — 1 x Vestas 660 kW	3.7800	TransAlta Wind	TransAlta Wind
Weather Dancer 1	2001/09	1x NEG-Micon 900 kW	0.9000	Epcor/Peigan Nation Reserve	Pincher Creek

3.3. Wind and Reliability

Reliability is often cited as the main concern associated with wind power. Is it a valid concern? It might be if one believes that the variable nature of wind exacerbates the inherently unstable nature of electricity or if one believes that a wind power plant cannot contribute to reliability at all because one cannot be certain that wind will be available at any specific time.⁶⁸ There is an alternative view of the matter, however. All power plants fail unpredictably once in a while and it is erroneous to single out wind as an unreliable source of power.⁶⁹ One should, however, draw a distinction between failures of conventional power plants and wind power plants.

When a fossil or nuclear power plant trips off the system unexpectedly, it happens instantly and with capacities of up to a thousand MW — that is true intermittency ... By contrast, wind energy does not suddenly trip off the system. Variations in wind energy are smoother ... The system will not notice the shut-down of a 2 MW wind turbine. It will have to respond to the shut-down of a 500 MW coal fired plant or a 1,000 MW nuclear plant instantly.⁷⁰

Wind power plants can contribute to reliability provided there is more than zero probability that wind will be available during peak periods of demand.⁷¹ Also, grid operators should not view wind in isolation from other sources in the generation mix; rather it should be viewed as part of the mix, factoring in the overall variability of demand and the variability of other power sources.⁷²

When viewed this way one can consider substituting some of conventional power plant capacity with wind capacity. The issue then becomes how much conventional power plant capacity can be removed from the system without compromising system security.⁷³ One possible answer to this question is offered next.

3.4. Wind and Variability

Wind is a variable source of power. Three sources of wind variability can be identified: “First, there is zero output below cut-in wind speeds; second, between cut-in and maximum output, varying wind speeds can cause large changes in output, although these would tend to be smoothed out with many turbines covering a wide area; and, third, the

⁶⁸ Boyle, *supra* note 8 at 76.

⁶⁹ *Report*, *supra* note 61 at 10.

⁷⁰ *Ibid.* at 9.

⁷¹ Boyle, *supra* note 8 at 76.

⁷² *Report*, *supra* note 61 at 8-9.

⁷³ Boyle, *supra* note 8 at 18.

turbine is switched off in storm conditions.”⁷⁴ The scenario when no wind is blowing at all is a rarity and may be ignored.⁷⁵ The wind is always blowing somewhere and capturing as much of it as possible can be achieved by dispersing wind turbines geographically.⁷⁶

Valuable lessons concerning management of wind variability and large-scale wind power integration can be learned from the European experience. The experience of Denmark, Germany and Spain in particular deserves attention because large-scale penetration⁷⁷ in Denmark and regions of Germany and Spain ranges from 20 to 40 per cent of consumption.⁷⁸ Denmark’s statistics are particularly impressive because it has the highest penetration of wind power globally. For example:

21% of total consumption was met with wind power in 2004. In the west-Denmark transmission system, which is not connected to the eastern part of the country, some 25% of electricity demand is met by wind power in a normal wind year and, on some occasions, the wind has been able to cover 100% of instantaneous demand.⁷⁹

Electricity systems can absorb low levels of wind penetration “with little or no noticeable impact.”⁸⁰ Up to 20 per cent of electricity demand can be met without posing any serious technical or practical problems to electricity systems.⁸¹ Penetration beyond the 20 per cent level may require some changes in power systems and their methods of operation.⁸²

It is not technical or practical constraints but the economic and regulatory rules that determine the upper limit of wind power penetration.⁸³ What are these regulatory rules in Alberta? It is these rules that will be reviewed now.

⁷⁴ *Ibid.* at 5.

⁷⁵ *Ibid.* at 10.

⁷⁶ An attempt to take advantage of this phenomenon is evident in the European Union where the creation of a trans-European sub-sea energy grid is being contemplated by adding electrical connections within the Member States and with non-Member States. This SUPERGRID would connect Europe, Northern Africa and the Middle East. *Report, supra* note 61 at 110-111.

⁷⁷ The European Wind Energy Association defines “wind power penetration” as the fraction of the gross annual electricity consumption that is covered by wind energy. *Ibid.* at 36.

⁷⁸ *Ibid.*

⁷⁹ *Ibid.* at 10.

⁸⁰ Boyle, *supra* note 8 at 201.

⁸¹ *Report, supra* note 61 at 9.

⁸² Both the British and Danish system operators have stated that “the limits to wind energy penetration are economic rather than technical.” Boyle, *supra* note 8 at 47, *Report, ibid.* at 9.

⁸³ *Report, ibid.* at 34.

4.0. The Regulatory Framework

The rules applicable to power plants can be grouped into two categories: those specifically designed for wind power plants and those applicable to power plants in general. Before each of these categories will be considered, however, two preliminary matters should be addressed. First, it is necessary to examine the policy initiatives, both at the federal and provincial levels, which shape the background for the rules that apply to wind power plants. Second, it is necessary to establish who can adopt measures regulating the activities of wind power plants.

4.1. Policy Initiatives

Initiatives have been launched by both the federal and provincial governments in support of alternative energy, including wind power. At the federal level, in January 2007, Prime Minister Stephen Harper unveiled the \$1.5 billion ecoENERGY fund to support renewable sources of electricity and heat. One of the components of this initiative, ecoENERGY for Renewable Power, entailed \$1.48 billion investment to boost Canada's supply of clean electricity from renewable sources, including wind power. The program was designed to "provide an incentive of one cent per kilowatt-hour for up to 10 years to eligible low-impact, renewable electricity projects constructed over the next four years, April 1, 2007 to March 31, 2011."⁸⁴ The ecoENERGY for Renewable Power Program outlines the conditions pursuant to which eligible recipients can obtain financial incentives towards qualifying projects. In general, these incentives are available to wind power plants with a total rated capacity of 1 MW or greater as long as certain conditions are met.⁸⁵

The ecoENERGY program proved extremely popular, so much so that the funding for it was used up by early 2010. One of the last recipients of funding under the program was for a wind farm project undertaken by Greengate Power Corp. in east-central Alberta.⁸⁶ Despite the success of the program — or perhaps because of the likely increases in federal funding that would be needed to continue supporting it — the 2010 federal budget tabled on March 4th effectively lets the initiative expire for lack of further funding. Nor

⁸⁴ ecoENERGY Initiative, online: Government of Canada <<http://www.ecoaction.gc.ca/ecoenergy-ecoenergie/power-electricite/index-eng.cfm>>.

⁸⁵ The terms and conditions are available online at ecoENERGY for Renewable Power Program, online: Government of Canada <<http://www.ecoaction.gc.ca/ecoenergy-ecoenergie/power-electricite/v2008/conditions-eng.pdf>>.

⁸⁶ T. Weis, "Federal Spending on Wind Farms a Smart Investment", Renewable Energy Blog (18 January 2010), online: Pembina Institute <<http://re.pembina.org/blog/74>>.

are there other new initiatives in the budget that would provide for funding support for new wind power projects — or indeed for renewable energy projects more generally.

With respect to provincial government initiatives within Alberta, electricity generation from renewable resources envisaged by the provincial government entails investments in the electricity infrastructure, conservation initiatives, and the new Micro-Generation Policy which will “allow Albertans to generate their own environmentally friendly electricity and receive credit for any power they don’t use and send into the electricity grid.”⁸⁷ These initiatives are discussed in more detail further on in this section.

4.2. Who Can Regulate the Wind Power Industry?

The Constitution does not specifically endow either the federal or provincial level of government with exclusive legislative powers in the sphere of renewable energy. Federal legislative authority to regulate wind power plants can be potentially derived from several heads of power listed in section 91.⁸⁸ Alberta’s authority to regulate wind power plants can be derived from several heads of power listed in section 92.⁸⁹ Thus federal and

⁸⁷ *Energy Strategy*, *supra* note 59.

⁸⁸ At least the following heads of power can be relied upon: the power to raise money by any mode or system of taxation (as for the ecoENERGY policy initiative) under subsection 91(3); the power to regulate trade and commerce under subsection 91(2); the power to regulate property under subsection 91(1A); the power to regulate Indians and lands reserved for the Indians in Alberta under subsection 91(24); patents and copyright under subsections 91(22) and 91(23), respectively; works and undertakings wholly situate in Alberta and which are for the general advantage of Canada or two or more provinces under subsection 92(10)(c); and peace, order, and good government of Canada under section 91.

⁸⁹ Some of the exclusive heads of power in the Constitution that can theoretically be invoked to achieve this goal include: the management and sale of the public lands belonging to Alberta under subsection 92(5); property and civil rights in Alberta under subsection 92(13), local works and undertakings subject to certain restrictions (the exclusive legislative authority of Alberta will not apply to works which “although wholly situate within the Province, are before or after their Execution declared by the Parliament of Canada to be for the general Advantage of Canada or for the Advantage of Two or more of the provinces” under subsection 92(10)(c); the incorporation of companies with provincial objects under subsection 92(11); the imposition of fine, penalty, imprisonment for enforcing any Alberta law provided the province enjoys exclusive legislative authority in the matter under Subsection 92(15); all matters of a merely local or private nature in Alberta under subsection 92(16); development, conservation and management of sites and facilities in the province for the generation and production of electrical energy under subsection 92A(1)(c); the export from the province to another part of Canada of the production from facilities in the province for the generation of electrical energy but such laws may not authorize or provide for discrimination in prices or in supplies exported to another part of Canada under subsection 92A(2) (subsection 92A(3) provides that nothing in subsection 92A(2) “derogates from the authority of Parliament to enact laws in relation to the matters referred to in that subsection and, where such a law of Parliament and a law of a province conflict, the law of Parliament prevails to the extent of the conflict.”); the raising of money by any mode or system of taxation in respect of sites and facilities in the province for the generation of electrical energy and the production therefrom, whether or not such production is exported in whole or in

provincial powers in this area overlap. Measures to regulate wind power facilities can be adopted at both levels of government, and implementation of certain measures requires coordination between them.⁹⁰

4.3. Federal Legislation

There are no federal legislative measures that directly regulate the activities of wind power plants. However, some federal statutes may have an indirect impact. For example, compliance with the *Canadian Environmental Assessment Act* will be required for projects where a federal authority (1) is the proponent of the project, (2) provides financial assistance to the proponent, (3) administers and disposes of the federal lands, and (4) issues an approval to enable a project.⁹¹ Compliance with the *National Energy Board Act*⁹² will be required to construct or operate an international power line or to export electricity.⁹³

4.4. Provincial Legislation

The provincial legislation can be analyzed by distinguishing the measures that specifically apply in the context of wind power plants and measures applicable to power generators in general. Each category is reviewed below.

4.4.1. Specific Regulatory Framework

Differential treatment of certain categories of wind power plants is envisaged under the *Small Power Research and Development Act* and the *Micro-Generation Regulation*. The Market & Operational Framework for Wind Integration developed by the AESO reflects the system operator's response to how wind power should be incorporated into the energy mix, thus affecting activities of wind power plants as well.

part from the province, but such laws may not authorize or provide for taxation that differentiates between production exported to another part of Canada and production not exported from the province under subsection 92A(4)(b) (as in the federal context, this power can be used to impose a financial burden or to provide incentives through tax credits or other forms of subsidization.); municipal institutions in the Province under subsection 92(8).

⁹⁰ For example, climate change initiatives or implementation of treaties where the subject matter falls partly under provincial jurisdiction.

⁹¹ S.C. 1992, c. 37, s. 5(1).

⁹² R.S.C. 1985, c. N-7, s. 58.1.

⁹³ *Ibid.*, s. 119.02.

4.4.1.1. *Small Power Research and Development Act*

The *Small Power Research and Development Act (SPRDA)*⁹⁴ established a program enabling small wind power producers to sell electric energy to public utilities. The *SPRDA* applies to small power producers who operate eligible power production facilities.⁹⁵ The term contracts were to last no less than 10 and no more than 20 years.⁹⁶ The maximum program capacity of the net supply to the grid was set at 125 MW.⁹⁷ Unless specifically provided to the contrary, nothing in the *SPRDA* or regulations under it exempted any person from compliance with any other enactment.⁹⁸

The *SPRDA* remains in force but this program is now closed.⁹⁹ Although the *SPRDA* is not applicable to new projects, it provided differential treatment by creating an exemption for some small wind power plants.

4.4.1.2. *Micro-Generation Regulation*

The *Micro-Generation Regulation*¹⁰⁰ established specific rules for small micro-generation¹⁰¹ and large micro-generation.¹⁰² Electric energy supplied by micro-generation units¹⁰³ is not generally required to be exchanged through the power pool.¹⁰⁴

⁹⁴ R.S.A. 2000, c. S-9.

⁹⁵ “Small power producer” is defined as the owner of an eligible power production facility. For the purposes of this paper the definition of “eligible power production facility” covers a power generator constituting a single power production facility that produces electric energy from wind, has a nameplate capacity of not more than 2.5 MW or more than 2.5 MW and is a pilot project within the meaning of the *Small Power Research and Development Regulation*, Alta. Reg. 336/88, and meets the other eligibility requirements under these Regulations. *Ibid.*, ss. 1(a)-(b).

⁹⁶ *Ibid.*, s. 12(2)(b).

⁹⁷ *Ibid.*, s. 4.

⁹⁸ *SPRDA*, *supra* note 94, s. 6.

⁹⁹ Alberta Energy, online: Government of Alberta <http://www.energy.alberta.ca/About_Us/996.asp>.

¹⁰⁰ Alta. Reg. 27/2008.

¹⁰¹ “Small micro-generation” means, subject to s. 3(3), generation of electric energy from a micro-generation generating unit with a total nominal capacity of less than 150 kW. *Ibid.*, s. 1(1)(n).

¹⁰² “Large micro-generation” means, subject to s. 3(3), generation of electric energy from a micro-generation generating unit with a total nominal capacity of at least 150 kW but not exceeding 1 MW. *Ibid.*, s. 1(1)(e).

¹⁰³ “Micro-generation generating units” is a generating unit of a customer that:

- i) exclusively uses sources of renewable or alternative energy,
- ii) is intended to meet all or a portion of the customer’s electricity needs,

Micro-generation units of wind power can contribute electricity into the grid provided they have given notice to the respective owner of an electric distribution system specifying the date when the proposed supply will commence.¹⁰⁵ Once it is established that a wind power generator meets the definition of the micro-generating unit, the distribution system owner is required to ensure that a bi-directional meter for net billing is installed at the customer's micro-generation site.¹⁰⁶ The owner is responsible for the costs of metering, meter data management and load settlement.¹⁰⁷

A micro-generator's retailer must provide net-billing to the micro-generator.¹⁰⁸ Unless a micro-generator and a retailer agree to different compensation, the prescribed rates of compensation will apply.¹⁰⁹ The *Micro-Generation Regulation* provides differential treatment by creating an exemption for some micro wind power plants. The main limitation of this legislative measure stems from the 1 MW capacity ceiling imposed on such operators.

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- iii) is, at the time of construction or installation of the generating unit, sized to the customer's load or anticipated load or a portion of it, as evidenced by a total nominal capacity of the generating unit that does not exceed the rating of the customer's service,
 - iv) has a total nominal capacity not exceeding 1 MW, and
 - v) is located on the customer's site or on a site owned by or leased to the customer that is adjacent to the customer's site;

Ibid., s. 1(1)(h). "Renewable or alternative energy" means electric energy generated from, among other sources, wind and includes electric energy generated from products having current EcoLogo certification and simultaneous generation of electric energy and production of thermal energy from the same fuel source, in which case the greenhouse intensity of the total energy produced must be less or equal to 418 kg per MWh. *Ibid.*, s. 1(1)(l).

¹⁰⁴ *Ibid.*, s. 6. Retailers are required to exchange through the power pool the power supplied by large micro-generators. *Ibid.*, s. 7(7).

¹⁰⁵ *Ibid.*, s. 2(1). The form of the notice is established by the Alberta Utilities Commission (AUC). If in the owner's opinion the customer does not meet the definition of a micro-generation generating unit, the owner may file a notice of dispute with the AUC. The AUC's decision is final. *Ibid.*, s. 2(4).

¹⁰⁶ *Ibid.*, s. 3(1).

¹⁰⁷ Micro-generators may also be required to reimburse the electric system owner for the extraordinary portion of the costs incurred due to safety considerations, technological complexity or any other reason. *Ibid.*, s. 4(3).

¹⁰⁸ *Ibid.*, s. 8(1). "Net billing" means subtracting electric energy supplied out of a customer's site during the billing period from electric energy supplied into the customer's site during the billing period, and calculating a net charge or credit to the customer based on the resulting net usage of electric energy during the billing period. *Ibid.*, s. 1(1)(j).

¹⁰⁹ *Ibid.*, s. 7(5).

4.4.1.3. Market & Operational Framework for Wind Integration

Additional capacity threshold was for a while imposed by the AESO. Based upon the findings of the studies conducted by the AESO in 2005-2006, the system operator established a temporary 900 MW threshold.¹¹⁰ As of 26 September 2007, this threshold was removed and replaced with the Market & Operational Framework For Wind Integration In Alberta.¹¹¹ The AESO Framework will remain in effect until the end of 2010, and the plans for future wind generation are scheduled to be completed in 2010.

Under this Framework, the basic premise for adding wind power is as follows: “If the System Operator receives a reasonable forecast of wind power generation, *then* the System Operator can establish operating plans to accommodate the forecast wind energy”¹¹² by using a number of mitigating measures. Wind power generators are required to bear the costs of wind forecasting.¹¹³

In sum, the regulatory framework specifically applicable to wind power plants consists of two legislative measures that accord differential treatment to some small and micro wind power plants. The AESO Framework seems to apply to all wind power plants without making any distinction in terms of their capacity. Where does it leave medium- and large-scale wind power producers? Since such operators are neither specifically exempt nor entitled to differential treatment, the general regulatory framework consisting of legislative enactments designed several decades ago for conventional power plants will apply.

4.4.2. General Regulatory Framework — Exemptions

Apart from the differential treatment of wind power plants established under the *SPRDA* and the *Micro-Generation Regulation*, differential treatment of certain categories of power generators is envisaged in the general regulatory framework, and under the *Electric Utilities Act* and *Hydro and Electric Energy Act* in particular. When applying the provisions of these statutes to wind power plants, one can classify them depending on whether the respective plants can or cannot rely upon statutory exemptions.

¹¹⁰ Alberta Electric System Operator, online: AESO <http://www.aeso.ca/downloads/MOF_Final_Sept26.pdf> (*AESO Framework*).

¹¹¹ *Ibid.*

¹¹² *Ibid.* (emphasis in the original).

¹¹³ *Ibid.* By way of contrast, forecasting expenses are borne by the transmission/distribution system operator in Germany and Denmark and by the electricity supplier in the Netherlands. *Report, supra* note 61 at 75.

The general regulatory framework establishes several exemptions upon which wind power plants can potentially rely. Firstly, unless the Alberta Utilities Commission (AUC) directs otherwise, self-generators¹¹⁴ are not required to obtain an approval to construct or operate a power plant,¹¹⁵ to obtain a permit to construct a transmission line or a licence to operate one,¹¹⁶ and to distribute electric energy on that property.¹¹⁷

Secondly, consumers can purchase electricity directly from a power producer under either a direct sales agreement or a forward contract.¹¹⁸ Exchanges under such contracts are not, however, exempt from the AESO rules.¹¹⁹

Thirdly, the AUC may exempt from all or any provision of the *Electric Utilities Act* the electric energy produced from and consumed by an industrial system and may impose conditions on the exemption.¹²⁰ Unless the AUC directs otherwise, the owner of an industrial system transmitting electric energy over land of which the owner of the industrial system is owner or tenant is exempt from the requirement to obtain a permit to construct a transmission line or to obtain a licence to operate it, provided that the electric energy is for the sole use by that industrial system.¹²¹

Finally, the AUC may make regulations and thus exclude a power plant, transmission line or electric distribution system from the application of any provision of *Hydro and Electric Energy Act*.¹²²

¹¹⁴ Self-generators are persons who generate, transmit, distribute electric energy or propose to do any of such activities solely for the person's own use. *Hydro and Electric Energy Act*, R.S.A. 2000, c. H-16, ss. 13(1), 16(1), 24(1).

¹¹⁵ *Ibid.*, s. 13(1).

¹¹⁶ *Ibid.*, s. 16(1)(a).

¹¹⁷ *Electric Utilities Act*, *supra* note 19, s. 2(b), *Hydro and Electric Energy Act*, *ibid.*, s. 24. This exemption does not absolve self-generators from the requirement to give notice to the Alberta Utilities Commission regarding the details of such operations. *Ibid.*, s. 13(2). Pursuant to the *Hydro and Electric Energy Regulation*, Alta. Reg. 409/83, s. 9, the notice requirement applies to self-generators whose generation capacity exceeds 500 kW.

¹¹⁸ *Electric Utilities Act*, *ibid.*, s. 19(1).

¹¹⁹ *Ibid.*, s. 19(2).

¹²⁰ *Ibid.*, ss. 117(1)(b) and 117(2), *Hydro and Electric Energy Act*, *supra* note 114, s. 13. "Industrial system" is defined in s. 1(1)(g) of the *Hydro and Electric Energy Act* and means "the whole or any part of an electric system primarily intended to serve one or more industrial operations of which the system forms a part and designated by the Commission as an industrial system."

¹²¹ *Hydro and Electric Energy Act*, *ibid.*, s. 16.

¹²² *Ibid.*, s. 5(1)(b). The *Hydro and Electric Energy Regulation*, Alta. Reg. 409/83 refers to small plants with generation capacity under 500 kW. It is not clear whether this category of power generators enjoys differential treatment due to incompatibility between section 11 of the *Hydro and Electric Energy Act* and

In sum, the general regulatory framework envisages differential treatment by creating exemptions, and thus imposing less stringent compliance requirements, for some eligible self-generators and industrial systems, and for direct sales from a power producer. Many wind power plants do not qualify for any of the exemptions provided for in the general regulatory framework.

4.4.3. General Regulatory Framework — In the Absence of Exemptions

If a wind power plant cannot rely on any of the exemptions listed above, it must comply with the generally applicable regulatory requirements. Such compliance includes, but is not limited to, obtaining the necessary approvals, permits and licences, providing the appropriate notices, and observing safety codes and other requirements. Some of the most salient features of the applicable regulatory requirements are outlined below.

4.4.3.1. Public Lands Act

Wind power generators need a land base to operate. Approximately 60 per cent of the province's land base is public land.¹²³ A person who occupies public land without authorization is deemed to be a trespasser.¹²⁴ Neither the *Public Lands Acts* nor the *Dispositions and Fees Regulation*¹²⁵ creates a separate category for dispositions for wind power plants. The agency of the Government of Alberta that manages the use of public lands, Sustainable Resource Development, does not view wind power operators as a distinct category for the purposes of obtaining public lands use authorizations.¹²⁶

section 15 of the *Hydro and Electric Energy Regulation*. The former requires generators to obtain an approval from the AUC to construct or operate a power plant; the latter exempts small power plants having a capacity of 500 kW or less by referring to one of the subsections of section 11 of the *Hydro and Electric Energy Act*. Section 11 of the *Hydro and Electric Energy Act* contains no subsections. A similar error precludes the applicability of subsection 15(2) of the *Hydro and Electric Energy Regulation* which exempts a pilot project under the *SPRDA*, *supra* note 94.

¹²³ Alberta Sustainable Resource Development, online: Government of Alberta <<http://www.srd.gov.ab.ca/lands/usingpublicland/default.aspx>>.

¹²⁴ *Public Lands Act*, R.S.A. 2000, c. P-40, s. 47(1). Additional compliance requirements may be imposed at the municipal level. The analysis of the regulatory requirements at the municipal level is beyond the scope of this paper. The appropriate municipal legislation should be consulted in order to establish what amounts to non-conforming use of land and what exemptions are available to wind power generators.

¹²⁵ Alta. Reg. 54/2000.

¹²⁶ Alberta Sustainable Resource Development, online: Government of Alberta <<http://www.srd.alberta.ca/MapsFormsPublications/Publications/documents/PublicLandsOperationalHandbook-Dec2004.pdf>>.

4.4.3.2. *Environmental Protection and Enhancement Act*

Wind power generators will be required to comply with the province's *Environmental Protection and Enhancement Act (EPEA)*¹²⁷ if a proposed activity meets the definition in subsection 1(a)¹²⁸ and falls within one of the categories that appear in the Schedule of Activities in the *EPEA*. Wind power plants do not appear as a separate category listed in this Schedule of Activities. However, such plants can potentially fall within the category of a plant for "any other industrial, manufacturing or processing purpose."¹²⁹ The construction, operation or reclamation of a transmission line is included in the Schedule of Activities.¹³⁰ The *EPEA*'s application is limited by the definition of the "transmission line" in the *Activities Designation Regulation*.¹³¹

Pursuant to section 5 of the *Activities Designation Regulation*, activities listed in Schedule 1 require an approval,¹³² activities listed in Schedule 2 necessitate a registration,¹³³ and activities listed in Schedule 3 call for providing notice.¹³⁴ Wind power

¹²⁷ R.S.A. 2000, c. E-12.

¹²⁸ "Activity" means an activity or part of an activity listed in the Schedules of Activities. *Ibid.*, s. 1(a).

¹²⁹ *Ibid.*, Sch. s. 2(ii).

¹³⁰ *Ibid.*, s. 5(a).

¹³¹ Alta. Reg. 276/2003, s. 1(2) provides that where a term defined in the *Environmental Protection and Enhancement Act* is used in the *Activities Designated Regulation*, "it has that defined meaning for the purposes of the Regulation except where this Regulation gives it a different meaning." The *Activities Designation Regulation* defines a "transmission line" as defined in the Act, and any infrastructure in connection with that transmission line, with a voltage of 130 kilovolts or more and in respect of which an environmental impact assessment report is required. *Activities Designation Regulation*, Alta. Reg. 276/2003, s. 2(3)(m).

"Transmission line" means a system or arrangement of lines of wire or other conductors and transformation equipment, wholly within Alberta, whereby electric energy, however produced, is transmitted in bulk, and includes:

- i) transmission circuits composed of the conductors that form the minimum set required to transmit the electric energy,
- ii) insulating and supporting structures,
- iii) substations,
- iv) operational and control devices, and
- v) all property used for the purpose of, or in connection with, the operation of the transmission line,

but does not include a power plant or electric distribution system as defined in the *Hydro and Electric Energy Act*. *EPEA*, *supra* note 127, s. 1(qqq).

¹³² *Activities Designation Regulation*, *ibid.*, s. 5(1).

¹³³ *Ibid.*, s. 5(2).

¹³⁴ *Ibid.*, s. 5(3).

plants appear to be excluded from the requirement to obtain an approval under subsection 5(1) of the *EPEA* because of the definition of a “power plant” (which is defined in the *Regulation* as a plant that produces steam or thermal electric power).¹³⁵ Wind power plants also seem to be excluded from the registration and notice requirements because Schedules 2 or 3 do not refer to such activities.

4.4.3.3. *Environmental Assessment*

The applicability of the environmental assessment process under the *EPEA* depends on whether an activity falls within the definition of “proposed activity”¹³⁶ by the “proponent”¹³⁷ and on whether that activity is classified as a mandatory¹³⁸ or as an exempted¹³⁹ activity. Wind power plants potentially fall within the definition of “activity” in subsection 1(a) and it is assumed that some of them will meet the definition of a “proposed activity”. Wind power generation is not designated as a mandatory or exempted activity.¹⁴⁰ The list of exemptions includes the construction, operation or reclamation of a transmission line,¹⁴¹ which may be applicable in the context of wind power plants. It is not clear whether wind power can constitute a component of activities which appear on the list of mandatory or exempted activities and whether the *Environmental Assessment (Mandatory and Exempted Activities) Regulation* applies to such activities or not.

The Director may exercise discretion and decide that the potential environmental impacts of a proposed activity require further consideration in the context of a mandatory or non-mandatory activity.¹⁴² The Environment Minister may exercise his/her discretion and require environmental impact assessment report notwithstanding the fact that a Director has not ordered one or the proposed activity has been exempted.¹⁴³

¹³⁵ *Ibid.*, s. 2(vv).

¹³⁶ This term is defined in the *EPEA*, *supra* note 127, s. 39(e).

¹³⁷ This term is defined in s. 39(d), *ibid.*

¹³⁸ *Ibid.*, s. 39(c) and *Environmental Assessment (Mandatory and Exempted Activities) Regulation*, Alta. Reg. 111/93, s. 1.

¹³⁹ *Environmental Assessment (Mandatory and Exempted Activities) Regulation*, *ibid.*, s. 2.

¹⁴⁰ *Ibid.*, Sch. 1-2.

¹⁴¹ *Ibid.*, Sch. 2, s. (a)(vi).

¹⁴² “Director” means, subject to section 42, a person designated as a Director by the Minister. *EPEA*, *supra* note 127, ss. 1(r), 43-44.

¹⁴³ *Ibid.*, s. 47.

4.4.3.4. Emissions

No direct atmospheric emissions are released during the operation of wind turbines. Wind turbines emit noise.¹⁴⁴ Noise emissions appear to fall within the definition of “substance” under the *EPEA*.¹⁴⁵ Release of such substances in excess of the expressly prescribed rate or where they may cause “significant adverse effect” is prohibited.¹⁴⁶ The *Substance Release Regulation* does not, however, specifically address the issue of noise emissions.¹⁴⁷

4.4.3.5. Natural Resources Conservation Board Act

The proposed activities of wind power plants may affect the natural resources in Alberta. As a result, such plants may be required to obtain an approval of the Natural Resources Conservation Board before commencing their activities. The *Natural Resources Conservation Board Act (NRCBA)*¹⁴⁸ provides that, notwithstanding any authorization granted, no person may commence a reviewable project unless the Board has granted an approval under the *NRCBA* in respect of the project.¹⁴⁹ The definition of reviewable projects does not include wind power plants as a separate category. Wind power plants can potentially fall within one of the following residual categories of projects which are subject to review: any other type of project prescribed in the regulations¹⁵⁰ and specific projects prescribed by the Lieutenant Governor in Council.¹⁵¹ The only regulation adopted thus far under the *NRCBA*, the *Rules of Practice of the Natural Resources Conservation Board Regulation*,¹⁵² is not relevant for the purposes of project approval of wind power plants.

The discussion above shows that, except for micro wind power generators, the regulatory framework treats activities of wind power plants as akin to those of

¹⁴⁴ Wind speed creates acoustic emissions consisting of a mechanical and an aero-acoustic components. Noise originating from mechanical components can be reduced and rarely poses problems. It is the acoustic noise from wind turbines that requires attention as it affects turbine installation near inhabited areas. Renewables for Power Generation, online: International Energy Agency <http://www.iaea.org/textbase/nppdf/free/2000/renewpower_2003.pdf>.

¹⁴⁵ *EPEA*, *supra* note 127, s. 1(mmm).

¹⁴⁶ *Ibid.*, ss. 1(hhh), 1(b), 1(t), 108-109.

¹⁴⁷ *Substance Release Regulation*, Alta. Reg. 124/93.

¹⁴⁸ R.S.A. 2000, c. N-3.

¹⁴⁹ *Ibid.*, s. 5(1).

¹⁵⁰ *Ibid.*, s. 4(e).

¹⁵¹ *Ibid.*, s. 4(f).

¹⁵² Alta. Reg. 77/2005.

conventional power plants. Is the virtually identical treatment of such distinct categories supportable? The discussion of this issue and one possible answer follow below.

5.0. Adequacy of the Regulatory Framework

In the absence of justification, the applicability of the same regulatory requirements in the context of two distinct categories — conventional power plants and wind power plants — would appear questionable. If so, the existing regulatory framework should be amended to extend differential treatment not only to micro-generators but to all other wind power generators as well, for the following reasons.

Firstly, the Alberta Department of Energy acknowledges that fairness is one of the criteria that should apply to all participants in the electricity industry. To that end, the Department recommended making rules to ensure that wind facilities are integrated into the interconnected system in a non-discriminatory and transparent manner.

The attributes of wind generation technology must be considered while maintaining fairness to all market participants. The ISO [Independent System Operator] will make rules to ensure that wind and other intermittent resources are able to participate fairly in the energy market. The rules will consider characteristics of wind generation so that wind may be properly accounted for in any reliability assessment.¹⁵³

Fairness requires not only non-discriminatory and transparent application of rules. It requires recognition of the unique attributes of wind power and accommodation of these special features in the Electricity Policy Framework and in the regulatory framework. Fairness therefore requires that differential treatment be extended to all wind power producers.

Secondly, the 2005 Electricity Policy Framework should be reconciled with the 2008 Climate Change Strategy which envisages greening of energy production.¹⁵⁴ Greening energy production involves a combination of actions designed to reduce greenhouse gas emissions produced from non-renewable sources and expansion of use of renewable sources, such as wind power.¹⁵⁵ To that end, the Government of Alberta contemplates further removal of barriers and consideration of incentives for expanding the use of renewable and alternative energy sources.¹⁵⁶ Accordingly, the 2005 Alberta Energy

¹⁵³ Alberta Department of Energy, online: Government of Alberta <<http://www.energy.gov.ab.ca/Electricity/pdfs/AlbertaElecFrameworkPaperJune.pdf>> (*Electricity Policy Framework*).

¹⁵⁴ *Climate Change Strategy*, *supra* note 1.

¹⁵⁵ *Ibid.*

¹⁵⁶ *Ibid.*

Electricity Policy Framework should be aligned with the 2008 Climate Change Strategy, which requires addressing existing inconsistencies between these two policy initiatives.

Thirdly, wind power should be given priority over power derived from non-renewable sources of energy because of wind power's socially beneficial effects. Some of these include: less environmental degradation, healthier living environment, diversity of energy sources, reductions in fuel usage which promotes security of supply and preserves the non-renewable resources that could be used in the future. The generation mix should not be driven solely by direct costs of production, because the value of electricity depends on the value that society attaches to at least the following factors: security of supply, social objectives, and environmental concerns. Not giving credit for socially beneficial effects of wind power means that an externality is not taken into account. Also, if more wind power is added into the grid, it would reduce the share generated by conventional power plants. Wind power should be accorded capacity credit for this displacement in the use of conventional fuel and other social costs.¹⁵⁷ Not according capacity credit means that wind power plants are required to bear a higher cost of regulatory compliance than conventional power plants.

Finally, the restructuring process in Alberta was motivated by the desire to enable consumers to choose from a range of services in the electric industry.¹⁵⁸ Due to geographic restrictions, small consumers do not have a meaningful opportunity to choose their electricity supplier today. Industrial consumers enjoy more freedom of choice in that regard. The absence of choice is even more pronounced when residential consumers prefer to buy energy procured from renewable sources of energy, as demonstrated by the available choices outlined above. One way to provide residential consumers with a more meaningful ability to select their source of power would be by assigning a specific target of wind power that would be generated, transmitted, distributed, and retailed in the province.¹⁵⁹ This set target, which should increase annually, would also provide wind

¹⁵⁷ Capacity credit can be defined as "the amount of conventional generating capacity that can be removed from a network due to the addition of renewable generating capacity, while maintaining the same level of security of supply." Boyle, *supra* note 8 at 67-68. Conventional power plant capacity can be replaced with another conventional plant capacity on a one-on-one basis. Wind power does not, however, replace the conventional plant capacity on a one-on-one basis. The ratio is derived statistically and depends on a number of factors. The methods of capacity credit calculations are beyond the scope of this paper. By way of reference, the addition of 25,000 MW of wind capacity resulted in retiring 4,500 MW of conventional power capacity. Boyle, *ibid.* at 22. An all-European value of wind power capacity credit at 20 per cent penetration is estimated to be between 12 and 15 per cent. The credit tends to decline as wind penetration increases. *Report, supra* note 61 at 130.

¹⁵⁸ *Electric Utilities Act*, R.S.A. 2000, c. E-5, s. 6(d.1), *Electric Utilities Act, supra* note 19, s. 5(e).

¹⁵⁹ For example, mandatory national targets for each EC Member State were set with the aim of achieving a 20 per cent share of renewable energy, which includes wind power, in the Community's gross final energy consumption by 2020. EC, *Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC Text with EEA relevance*, [2009] O.J. L.

power plants with a greater degree of confidence that they would be able to recover their investment and recurring expenses.

6.0. Conclusion

In the absence of a separate regulatory framework for renewable sources of energy, wind power plants are largely subjected to the same rules as conventional power plants. The exception created for micro-generators applies to a small number of wind power producers and is not sufficient to promote greater use of wind as an alternative source of energy in the province. Fulfilling the goals of Alberta's 2008 Climate Change Strategy requires taking additional steps towards differential treatment of all wind power plants. In order to achieve more meaningful differential treatment of wind power plants, the proposed above measures, such as giving priority to generation and consumption of energy derived from renewable sources, the introduction of capacity credit and the provision for an annually increasing target of the share of alternative energy in the generation mix, would be desirable. These measures would be in line with the normative aspirations outlined in the Climate Change Strategy. The proposed measures would also address presently existing policy inconsistencies and update the regulatory framework originally designed for large conventional power plants.

140/16. According to the Renewables Obligation Order in the UK, licensed electricity suppliers are required to procure a specific and annually increasing percentage of the electricity they supply from renewable sources, including wind, water, solar, and biomass. The target for 2009 is set at 9.7 per cent and rises to 15.4 per cent by 2016. *The Renewables Obligation Order 2006* (U.K.), 2006 No. 1004. Office of Public Sector of Information, online: UK Government <http://www.opsi.gov.uk/si/si2006/uksi_20061004_en.pdf>.

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