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The *Export* Question: Designing Policy for British Columbia *Electricity Trade*

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EXECUTIVE SUMMARY

When it brought in its *Clean Energy Act* in 2010, the Government of British Columbia (BC) included as a provincial energy policy objective the promotion of electricity exports from clean or renewable sources. The government sees electricity exports as being both a significant means of economic development for BC and an opportunity to reduce greenhouse gas (GHG) emissions in importing jurisdictions. Critics of the revised policy, however, are concerned about the environmental and social impacts of developing new a energy supply for export, and question the economic rationale for a net export policy.

This white paper examines both the opportunities and the risks that the expanded export of electricity presents for BC. The paper describes how BC's electricity trading works, summarizes electricity trade trends in the province, discusses the province's evolving policy towards electricity exports, examines BC's potential export market, and evaluates a range of issues tied to designing export policy.

While the government has declared its objective of seeing BC become a major net exporter of electricity, it has done so with insufficient public consultation, amidst much opposition, and in the face of considerable economic uncertainty. Expanded electricity exporting by BC could contribute substantially to provincial economic development, while also reducing GHG emissions in importing jurisdictions. Yet, the prospect poses significant economic, environmental and social risks. The market potential of BC electricity exports is highly uncertain, and some states, such as California, have policies that create particular challenges for BC's hydroelectric resources.

Significant gaps in the policy framework remain. The Act provides for two different types of export projects, one through the Integrated Resource Plan process, and one through the surplus created through the "self-sufficiency" requirement. The Act protects the ratepayer from the risks of the first, but not the second. In neither case does the Act protect taxpayers from subsidizing export projects. The Act provides little guidance on how stakeholders and the public will be involved in the planning process, and does nothing to address the gap in regional energy planning.

The government could address many of these concerns by articulating clear and comprehensive terms and conditions, in policy and regulations, to govern how electricity exports will be developed and managed in future. This white paper recommends the following:

1. The government should specify, through regulation, that it will only authorize export development if there are net economic, social and environmental benefits to the province.
2. The government should consider instituting mechanisms for revenue-sharing with local communities affected by large new energy development projects.
3. Upper limits should be set on the proportion of BC electricity that can be dedicated to the export market, so that electricity exports do not jeopardize the reliability of domestic supply.
4. Export contracts should be conditional on the importing jurisdiction having meaningful demand-side management (energy conservation and efficiency) to ensure overall GHG reductions.
5. All electricity exports should be based on a planning and approval process that fosters public legitimacy and promotes environmental, social, and economic sustainability in BC.
6. Province-wide long-term energy planning should be supplemented with a regional energy planning process to address the cumulative effects of multiple projects in the same region.

1. INTRODUCTION

The BC government's decision to expand electricity exports through the *Clean Energy Act* has intensified the controversy already ignited over BC's electricity policy as a result of a previous policy change. In 2002, the government declared that all new sources of electricity in the province (other than at Site C or connected to upgrades at existing facilities) had to be acquired from the private sector. That decision provoked a strong backlash from interest groups and members of the public concerned about the impact that increased private sector involvement in electricity generation would have on the environment, affected communities, and fair pricing.¹

The two issues – new electricity sources and producing electricity for export – have become indelibly linked in the minds of some groups, with many of those opposed to BC's electricity policy objecting to new sources of power being built by the private sector to supply the export market rather than to serve the needs of BC customers.

This white paper examines both the opportunities and the risks that the expanded export of electricity presents for BC. The paper has four main sections:

- a brief description of how BC's electricity trading works and a summary of electricity trade trends in the province;
- a discussion of the province's evolving policy towards electricity exports;
- a discussion of the factors influencing the potential export market for BC electricity; and
- an evaluation of a range of issues tied to designing export policy, along with recommendations for policy-makers.

This paper builds on the facilitated dialogue that took place at the FutureGrid forum hosted by the Pacific Institute for Climate Solutions (PICS) on June 15, 2010. At that forum, approximately 100 participants discussed and debated the question "Under What Conditions Should British Columbia Become a Major Exporter of Electricity?" The outcomes of that dialogue, and of subsequent discussions with stakeholders, inform the evaluation of policy principles and the ensuing recommendations, presented in the last part of this paper.

2. BC'S ELECTRICITY TRADE PICTURE: CONTEXT AND TRENDS

2.1 How Electricity Trading Works

BC's electricity system is connected to that of the United States (US) along the border with Washington State. There are two crossings: one in the Lower Mainland and the other in the Interior near Trail. The BC Hydro system is also connected to Alberta near Cranbrook. In recent years, BC's north-south electricity trade with the US has been about 10 times greater than its east-west trade with Alberta.²

In geographic scope, BC's electricity export market is determined by how the North American grid is organized. The reliability of the continent's electricity system is maintained and enforced by the North American Electric Reliability Council (NERC), which has nine regional coordinating councils. The largest of these is the Western Electricity Coordinating Council (WECC) made up of the provinces of Alberta and British Columbia, the northern portion of Baja California, Mexico, and the 14 western states in between. BC is able to flow its electric power to these WECC markets through its interconnections with Alberta and the United States.

Powerex is the subsidiary of BC Hydro created in 1988 to handle electricity trading. There are four kinds of trades:

1. BC trades for domestic needs: In this type of trade, Powerex buys electricity from Alberta or the US because BC Hydro is not generating enough to meet BC's domestic needs; it sells power to other jurisdictions when BC Hydro has excess supply.
2. BC trades for revenue: In this type of trade, Powerex buys electricity from Alberta or the US to take advantage of prices that fluctuate by time of day and season. This trading is conducted to make a profit for BC Hydro, not to meet domestic power needs.
3. Flow-through trades: In this type of trade, electricity is traded between Alberta and neighbouring American states. Because Alberta currently does not have transmission capacity to the US, this power flows through BC transmission lines, but it is not produced or used in BC.
4. Non-BC trades: In this type of trade, Powerex is authorized as an electricity trader in the US market, so it can buy and sell power between various US utilities – for example one in Oregon and another in California and Arizona – even though there is no flow of electricity across BC boundaries.

The BC electricity trade debate has largely been about whether the province is producing enough power on its own to meet the needs of BC consumers. As a result, the first type of trading – BC trades for domestic needs – is the most directly relevant to this trade debate. While there are no publicly available data that allow us to distinguish the relative magnitude of these different kinds of trades, Powerex officials have stated that the “BC trades for domestic needs” category is less than 10% of the total.³

It is important, however, to recognize that the province, and ratepayers, have benefited from this electricity trade. Both the 2002 and 2007 Energy Plans affirm a policy that BC Hydro ratepayers will benefit from electricity exports. In implementing this policy, the province decided that any net trade revenues above \$200 million in any fiscal year go to the government as BC Hydro's shareholder. Annual trade income amounts between zero and \$200 million

go to ratepayers, reducing BC Hydro's revenue requirement.⁴ If Powerex loses money (i.e. negative net income), the ratepayer is protected and the loss would come off the dividend payment to the province.⁵ Year to year variations in trade income are stabilized using a trade income deferral account. Given that trade income averages around \$180 million per year, rates are about six percent lower than they would be if the government kept all the net income. To do otherwise would mean that the customers who pay for the storage, generation, and transmission systems that create the export revenues would not benefit.

2.2 Patterns and Trends in the Trade

The Effect of Different Data Sources on the Trade Debate

The nature and source of the data typically cited to show whether BC is a net importer or a net exporter of electricity have complicated both the debate over BC's electricity policy, as well as analyses of patterns and trends in the province's electricity trade.

On the one side, the government and private power producers argue that BC Hydro has increasingly had to import power from other jurisdictions to meet provincial demand. This, they say, makes BC a net importer and shows that the province requires more sources of power. An example of evidence cited to support this claim can be found in a 2009 newspaper article, in which Steve Davis, then President of the Independent Power Producers Association of BC, says, "Prior to fiscal 2008, BC Hydro was a net importer of electricity for seven consecutive years."⁶

On the other side, critics of the government's energy policy argue that the province continues to be a net exporter of power. An example of evidence cited to back up this claim can be found in the same 2009 article, where the Western Canada Wilderness Committee's Gwen Barlee says, "According to BC Stats, the province has been a net exporter of electricity for seven out of the last 11 years."⁷

So, who is right? Which statement is true and supported by official electricity trade statistics? In fact, both statements are, depending on which source of data is used and how the amount of an existing electricity trade entitlement that BC has with the US is calculated and accounted for.

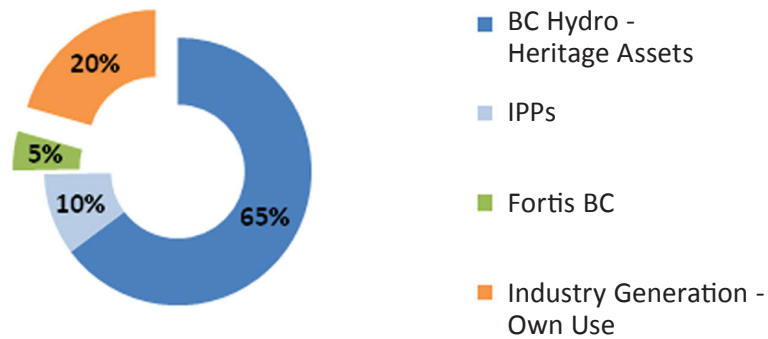
Data sources: BC Hydro vs. independent organizations – The main reason for the differences in claims about the electricity trade balance lies in whether one is using data from BC Hydro or data from third-party organizations such as BC Stats or Statistics Canada.

The BC Hydro data are based on BC Hydro's power system. BC Hydro is by far the largest power-generating body in the province and, being a Crown corporation, is the body over which the government has the most direct control. But it is not the only source of generation in the province, as shown in Figure 1 on page 8. There are three other types of players:

- Large industrial generators provide power for their facilities, and may have surplus power to put on the grid. The most notable of these are the two large smelters in the province: Rio Tinto Alcan in Kitimat and Teck in Trail. Industrial power generation has contributed about 20% of total BC electricity generation over the past five years.⁸
- Independent power producers (IPPs) contribute an additional 10% of generation, although when BC Hydro reports its figures, it includes IPPs in its definition of the "BC Hydro system."⁹

- Fortis BC is a privately owned utility that operates in the Kootenays. It accounts for about five percent of BC’s power generation.

Despite how it dominates our thinking about electricity in BC, the BC Hydro system (including IPPs) generates only about three-quarters of the province’s electricity. The data from BC Stats and Statistics Canada is more comprehensive because it includes those sources outside of the BC Hydro system.



Source: CAN SIM Table 127-002, Fortis Annual Reports (2004-2009), BC Hydro Annual Reports (2004-2009)

Figure 1: BC electricity generation by power producer (five-year average, 2005–2009).

The “Canadian entitlement” calculations – The second key complicating factor in the measurement of BC’s electricity trade balance is how the Canadian entitlement to downstream benefits of the Columbia River Treaty is counted. Under this treaty, BC agreed to build dams on the Canadian portion of the river to help the US with flood control. The province’s dams also increase the amount of energy that the US can get from its dams. In exchange, BC receives an entitlement of about 1,350 MW of power (compared to BC Hydro’s total capacity of about 11,280 MW).¹⁰ While this power is occasionally used within BC, Powerex frequently sells it in the US market and BC earns revenue without ever physically importing the electricity.¹¹

Some argue that this Canadian entitlement should be considered part of the domestic energy resource, since by treaty BC is entitled to that electricity for domestic use. If it were calculated that way, the province’s net trade balance would look more favourable. Important to recognize, however, is that there is no guarantee that the Columbia River Treaty will continue under its current terms after its minimum length of 60 years expires in 2024.¹² This means that BC may not be able to rely on the Canadian entitlement as a source of electricity in the long term.

In analyzing trends in imports and exports for this paper, we have chosen to use Statistics Canada data because it includes the BC Hydro system as well as sources outside of it.

BC’s Shift from Net Exporter to Net Importer of Electricity

Figure 2, which shows BC’s electricity balance of trade over the past 30 years, makes it apparent that before 2000, BC was in a strong net export position with electricity.¹³ The significant fluctuations in import and export levels over that time are also apparent. These fluctuations result from the changing conditions that can affect supply and demand from year to year, such as the amount of precipitation filling BC reservoirs, weather impacts on

demand for heating and cooling, economic activity in the commercial and industrial sectors, and the price of natural gas and electricity in importing jurisdictions.

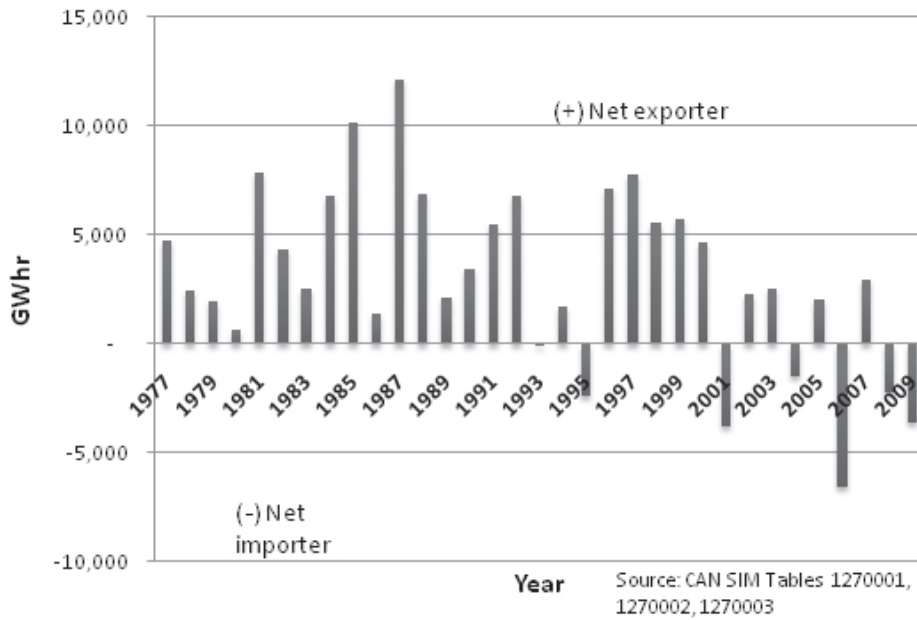


Figure 2: BC's electricity balance of trade, 1977-2009.

Over the past decade, but in particular over the past five years, the trade balance has deteriorated. As shown in Figure 3, BC has been in a net import position for three of the past five years (and four of the past six years). Since 2005, the province has consumed an average of two percent a year more power than it has produced.

However, if the additional 4,900 GWh/yr of electricity earned in BC through the Columbia River Treaty's Canadian entitlement were defined as a domestic resource, the trade gap in electricity would disappear, and the deficit of two percent over the past five years would be converted to a surplus of five percent overall.

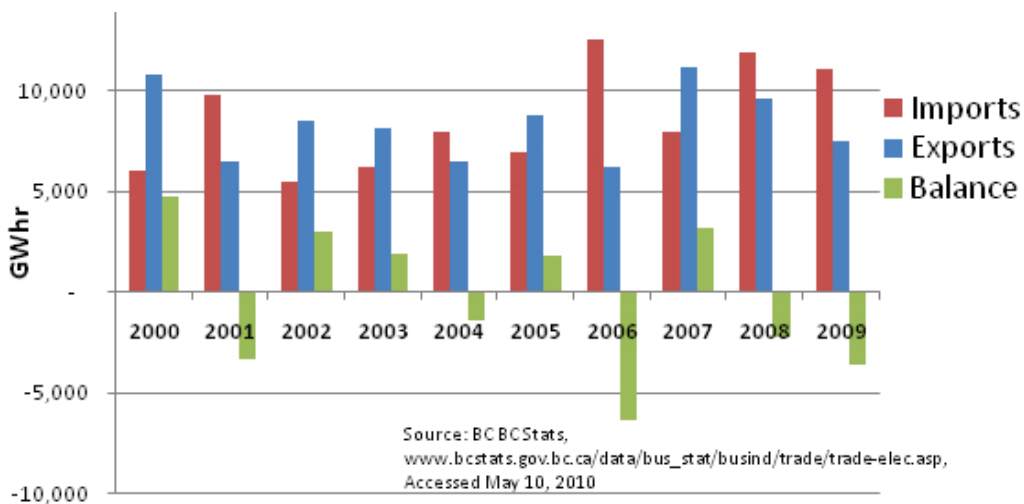


Figure 3: BC's electricity imports, exports, and trade balance, 2000-2009.

In Summary

Before this current decade, BC regularly produced more power than it consumed. Over the past five years, however, the province has shifted to consuming slightly more power than it produces, with BC Hydro having to import power to fill the gap. However, if the province were to have redefined the Canadian entitlement from the Columbia River Treaty to be a domestic source of supply, BC would have shown a modest excess supply available for export.

3. BC'S SHIFTING ENERGY POLICY CONTEXT

BC's energy policy in relation to electricity trade has undergone considerable shifts over the past several decades. Over that time, the core objective of policy has moved through three stages: cost-effective reliability, self-sufficiency, and now net export.

3.1 From Reliability to Self-Sufficiency to Export

Prior to 2007, policy was oriented towards providing “reliable, cost-effective electricity supply in an environmentally responsible manner.”¹⁴ During the 2000s, world events and the shifting balance between electricity supply and demand in the province gradually turned the focus to electricity self-sufficiency.

As the trade trends presented earlier in this paper show, BC had been a net exporter of electricity through the 1980s to late 1990s and right up until about 2005. As domestic demand continued to increase but no new capacity was installed, however, the trade balance deteriorated. That situation, combined with witnessing the electricity crisis in California in 2000 and 2001 (in which market manipulation by US trading companies, poor regulatory design in California, along with other factors, led to supply shortages and several utilities declaring bankruptcy¹⁵) dramatically alerted BC policy-makers to the importance of energy security.

The province's 2007 Energy Plan reflected this new concern and gave precedence to the objective of provincial self-sufficiency. The plan required that BC become self-sufficient in electricity by 2016, and that by 2026 it also have additional insurance of 3000 GWh/year. Critics have argued that this self-sufficiency policy, especially the way it has been defined, imposes substantial costs on the province beyond what would be necessary to ensure cost-effective reliable supply.¹⁶ When this self-sufficiency standard was implemented, the government specified that, in calculating the amount required for the province to be self-sufficient, BC Hydro had to assume “critical water conditions” – defined as meaning the most adverse water conditions in the historical record. The result of this conservative definition would be that in most years BC Hydro would have a substantial surplus of power available to export.

Thus, in effect, the province's self-sufficiency standard contained an implied export policy. However, because of the way it was interpreted at the time, it did not allow for BC Hydro to explicitly plan and make long-term contracts for the export market.

By the fall of 2009, the BC government had begun to focus more explicitly on the goal of going beyond self-sufficiency to becoming a net exporter of electricity. While there were earlier initiatives to foster electricity exports,¹⁷ the government's new vision of BC as a “clean energy powerhouse” established new priorities. This change in direction was first formally signalled in the August 2009 Speech from the Throne when the government proclaimed it would “take every step necessary” to become that powerhouse. The government also appointed the

Green Energy Advisory Task Force in the fall of 2009, giving it the mandate “to recommend a blueprint for maximizing British Columbia’s clean power potential, including a principled, economically-viable and environmentally-sustainable export development policy.”¹⁸ One of the four groups created within the task force was charged with exploring the potential export market for BC’s clean and renewable electricity.

3.2 The Export Opportunities and Risks Identified by the Green Energy Task Force

The task force’s report, released by the government in April 2010, was generally very optimistic about the benefits of pursuing electricity exports, especially given the increasing demand for low-carbon energy. The province’s most important asset, according to the task force, is its hydroelectric storage capacity that allows it to help its own and other jurisdictions cope with the fluctuations in power supply created by increasing reliance on intermittent sources of renewable power. BC is also in an advantageous situation because its peak demand is in the winter and the peak demand of its largest potential export market, California, is in the summer. This means that BC is likely to have excess power to sell to California when the state needs it the most.

The task force did, however, also identify risks of an export strategy. The report notes that policies in importing jurisdictions might not treat BC’s exports favourably; that there are significant financial risks, especially given the costs and lead time of building new transmission capacity; and that new technologies could emerge that would undercut BC’s competitive advantage.

To manage these risks, the task force recommended adopting a strategic approach to exports by increasing export market access, partnering with US entities to build requisite transmission capacity, increasing clean energy supply in BC through regular, predictable clean power calls, and investing in increases in electricity storage capacity.¹⁹

3.3 Explicit Authorization of Net Exports in the New Clean Energy Act

BC’s new *Clean Energy Act*, introduced in April 2010 and passed two months later, establishes an explicit net export policy.²⁰ The Act has five provisions directly relating to exports:

- First, the Act lays out 15 objectives for energy policy, with one dealing explicitly with exports. Under that objective, BC aims “to be a net exporter of electricity from clean or renewable resources with the intention of benefiting all British Columbians and reducing greenhouse gas emissions in regions in which British Columbia trades electricity while protecting the interests of persons who receive or may receive service in British Columbia” (Section 2(n)).
- Second, the Act requires that BC Hydro include planning for the export market in its new “integrated resource plan” (IRP) (Section 3).
- Third, if the government determines after receiving the IRP that it is in the public interest to do so, the Act gives Cabinet the authority to direct BC Hydro to acquire new sources of power for export and ensure the necessary transmission capacity for it (Section 4(1)(b)). Such decisions would not be subject to review by the British Columbia Utilities Commission (BCUC).
- Fourth, the BCUC, when it sets rates for BC Hydro, is prohibited from recovering the costs of the export projects authorized under a Section 4 determination of the govern-

ment after receiving the IRP. In other words, ratepayers should not be subsidizing the export contracts established under this provision.

- Fifth, the Act authorizes the government to develop a regulation to allow BC Hydro to engage in export contracts for the electricity planned for meeting the “self-sufficiency with reserve” obligation (Section 35(1), referring to Section 6(3)). By stating that the self-sufficiency obligation needs to be met “except to the extent that the authority may be permitted, by regulation, to enter into [export] contracts”, the Act in fact permits the export contracts established under this provision to override the “self-sufficiency with reserve” requirement. In other words, there are now two distinct avenues through which BC Hydro can develop new export contracts: (1) the IRP and (2) the surplus created by the conservative definition of self-sufficiency.

This distinction is important because the *Clean Energy Act* treats these two avenues quite differently. When pursued through the IRP, the export contracts need to meet a public interest test and need to insulate ratepayers from the costs of export projects. But neither of those provisions applies to an export contract developed with the self-sufficiency “surplus.”

The *Clean Energy Act* brings changes to BC electricity policy that will, indirectly, also affect export policy. The most significant change in the Act is a dramatic reduction in the scope of authority of the BCUC. Whereas the previous long-term electricity plan was reviewed and approved by the independent regulatory commission, the IRP will now be approved directly by Cabinet. (The projects, programs and contracts associated with implementing that plan will be subject to BCUC approval). A number of significant projects are also explicitly exempted from review by the commission.

In Summary

The primary objectives of BC electricity policy have shifted dramatically over the past several years. In 2007, the province shifted away from its established policy of cost-effective reliability to self-sufficiency with reserve. Just three years later, in 2010, the province shifted gears again to a new focus on becoming a “clean energy powerhouse” by pursuing net exports of electricity. In addition to adding the net export objective, the fine print of the *Clean Energy Act* authorizes using the “self-sufficiency surplus” for long-term export contracts as well. The rapid changes in policy and complex treatment of exports from the self-sufficiency reserve create uncertainty and confusion about the direction of BC electricity policy.

4. ESTIMATING BC'S ELECTRICITY MARKET POTENTIAL

The size of the potential market for BC electricity exports is influenced by three main factors:

- growth in electricity demand (load) in importing jurisdictions, which in turn is influenced by aspects such as the amount and composition of economic growth in those jurisdictions' own export markets;
- policies in importing jurisdictions, especially those policies related to GHG reduction and/or renewable generation; and
- price and availability of energy supply from competing jurisdictions.

All of these factors are not only interconnected, but also very difficult to predict, especially over the five-to-seven year planning horizons of new energy developments. For example, few would have predicted the discovery of massive quantities of shale gas in the past several years, which have transformed not only natural gas markets, but power markets as well. Because natural gas is a reliable and increasingly cost-effective substitute for coal-fired generation, this supply shift threatens the market for renewable power. Future export market prospects are therefore characterized by great uncertainty.

These three factors are discussed below.

4.1 The Influence of the Growth in Electricity Demand in Importing Jurisdictions

The size of the export market is determined in part by how much load growth will occur in importing jurisdictions, which in turn is largely driven by economic growth.

Both Canada and the US are experiencing slow to moderate economic growth since the beginning of the global recession in December 2007. According to the most recent projections by the non-partisan Congressional Budget Office, economic growth for the US as a whole is projected to average 2.9% over the next 10 years.²¹ The same trend is predicted for Canada. The Bank of Canada's July 2010 Monetary Report states that "the economic recovery in Canada is expected to be more gradual [than previously anticipated], with growth of 3.5 per cent in 2010, 2.9 per cent in 2011, and 2.2 per cent in 2012."²² This dampened growth will likely impact the amount of electricity required both domestically and in the WECC markets which in turn will influence the amount of surplus energy available for export and the demand for clean energy elsewhere.

The Influence of Policies in Importing Jurisdictions

BC electricity exports are most likely to occur through three different channels. First, as they are now, BC exports could simply go out to meet the supply needs of importing jurisdictions. Second, BC exports could go out to meet specific environmental requirements of importing jurisdictions. There are two potential types of such requirements: renewable electricity requirements, and GHG offsets. Both of these environmental requirements overlap significantly. Some importing jurisdictions may treat these as part of the same need, but others may view them as distinctly different – in which case they will emerge as distinct export market niches.

Most of the analysis performed to date focuses on the market opportunity potentially afforded by this second channel of the so-called "renewable portfolio standards" market.

4.2 Renewable Portfolio Standards

Both to reduce GHG emissions and to stimulate green jobs, a number of jurisdictions have adopted renewable portfolio standards (RPS), which require retail electricity suppliers to ensure that a certain minimum quantity of the energy they deliver comes from an eligible renewable resource. In the US, the District of Columbia and 29 states, including most WECC states, have passed RPS legislation and seven states have developed RPS goals. These policies are subject to change both in terms of the size of the target and the type of energy that can be used to meet it.

At present, a number of states (including California) define “renewable” to exclude electricity obtained from large dams. Under these provisions, BC’s “heritage assets” are not eligible at present to count towards meeting the renewable portfolio standards of many jurisdictions. California has a very aggressive set of targets for renewable electricity, requiring 20% renewable by 2010 and 33% renewable by 2020. BC wind projects would qualify. Hydro projects would seem to fit the bill, but to qualify in the California RPS market they must be less than 30 MW in size. Even more restrictive, the eligibility requirements prohibit the facility from “adversely impacting the instream beneficial uses or causing a change in the volume or timing of streamflow.”²³ Thus, unless California changes the eligibility requirements within its RPS, BC will be hard-pressed to market its hydro power, including potential new sources like Site C, to that state.²⁴

With several states setting such environmental standards, there is a strong possibility that the overwhelming majority of BC’s current supply mix might be accepted only by jurisdictions willing to take BC power regardless of whether it meets the definition of “renewable.” To meet RPS requirements, renewable energy is considered to include two elements: the physical electricity and the associated renewable energy certificate (REC). The REC “represents the property rights to the environmental, social, and other non-power qualities of renewable electricity generation.”²⁵ Producers of renewable electricity are permitted to sell their RECs bundled (i.e., with the electricity) or unbundled. If sold unbundled, the clean energy attributes of that electricity belong to the buyer, but the electricity generated is no longer considered clean or renewable.

The establishment and authentication of RECs in WECC is determined by the Western Renewable Energy Generation Information System (WREGIS), an independent organization that tracks renewable energy generation from WECC members and creates RECs. Each REC has a unique identification number to ensure that the green attributes of the generation source in question are not used by two or more entities (i.e., double counted). Any REC generated in BC and registered by WREGIS can then be used to meet RPS requirements in the WECC states.

BC’s electricity export potential in the RPS market depends on the number of RECs the province can create. Energy generated in BC by qualified renewable energy technologies is accepted by all the WECC states that have adopted RPS, but some of these states permit the use of bundled RECs only to achieve their RPS targets.²⁶

Table 1 summarizes the RPS goals of 11 of the WECC states as of May 27, 2010.²⁷

Table 1: Renewable portfolio standards (RPS) goals by WECC state

State	RPS Goal	Notes
Arizona	15% by 2025.	REC transfer permitted and counts toward RPS goal. Likely means unbundled RECS will be eligible.
California	33% by 2020.	Specifics of compliance program, including delivery requirements and how much of the portfolio can be met by unbundled RECs, is still under development.
Colorado	Investor-owned utilities: 30% by 2020; Electric cooperatives: 10% by 2020; Municipal utilities serving more than 40,000 customers: 10% by 2020.	Can be met with unbundled RECs.
Idaho	0	
Montana	15% by 2015.	Can be met with bundled RECs only. Geographic eligibility restrictions also apply.
New Mexico	Investor-owned utilities: 20% by 2020; Rural electric cooperatives: 10% by 2020.	Can be met with unbundled RECs generated anywhere in WECC states.
Nevada	25% by 2025.	Portfolio standard is not renewable standard, and can be met with a combination of renewables and efficiency.
Oregon	Large utilities: 25% by 2025; Small utilities: 10% by 2025; Smallest utilities: 5% by 2025.	Can be met with unbundled or bundled RECs. Unbundled RECs can represent only 20% of the largest utilities' renewable portfolio.
Utah	0	Has renewable goal but no standards.
Washington	15% by 2020	To qualify, the resource needs to be located in the Pacific Northwest or electricity generated from a renewable resource delivered into Washington state on a real-time basis without shaping, storage or integration services.
Wyoming	0	

Potential export market size based on estimated demand and RPS requirements

There are few publicly available studies on the potential market for BC electricity exports. The most detailed one that is available, however, was commissioned by BC Hydro for its 2008 Long Term Acquisition Plan. To project renewable energy demand in 2020, the study combined load growth estimates throughout the US component of WECC with state-level RPS requirements. The results are shown in Table 2.

Table 2: Projected increase in WECC “renewable” electrical energy demand

2020	US WECC			
	Total GWh Sales Forecast	Renewable Goal %	Target GWh	2008 Existing Renewable GWh
ID	29498	0%	0	1759
MT	13979	15%	2097	530
UT	41204	0%	0	661
CO	69031	20%	13806	3319
NV	52764	20%	10553	1627
CA	321679	33%	106154	26344
AZ	98720	10%	9872	172
NM	29751	15%	4463	878
Wy	21941	0%	0	809
WA/OR(1,2)	173226	17.5%	30356	7519
Total	851794		177301	43618

(1) The Existing Renewables for 2008 and total sales for Washington and Oregon are combined together
 (2) Average of renewable goal (15% WA and 20% OR)

The projections suggest that total renewable energy demand could reach 177,301 GWh/yr in 2020. Given the 43,618 GWh/yr existing renewable supply calculated for 2008, that leaves a gap in the supply of renewable energy supply of 133,683GWh/yr.²⁸

Competition for the RPS Market

While the projected gap in the WECC states between the estimated supply and demand for renewable energy is substantial, it is only one factor in BC’s potential export demand. BC will also be competing with other energy suppliers on both price and quantity, including home state producers who may have formal or informal advantages. The recent recession and subsequent slowing of the economy discussed earlier in the paper gave an indication of this effect, bringing about a reduction in energy prices.²⁹ The economic slowdown decreased energy prices across North America. In the US, natural gas prices declined by more than 50 percent from 2008 to 2009 while electricity demand decreased by 4.2%.³⁰ Prices for spot coal in the East and number two fuel oil in New York were also affected by the continental economic conditions as they fell by 40% and 42% respectively. Reductions in primary fuel costs led to lower wholesale electricity prices continent-wide. The combination of lower electric demand and lower fuel costs caused electricity prices to fall. The Federal Energy Regulatory Commission estimates that electricity prices declined by nearly 50% and “the majority of the drop in prices is attributable to the drastic decline in fuel prices.”³¹

Low prices for electricity throughout WECC reduces the competitiveness of BC’s supply, given both the additional costs of transmission associated with moving electricity southward and the substantial US subsidies now going to domestic wind and solar resources.³²

What fraction of the total potential RPS market BC can tap into is highly uncertain. One demand forecast commissioned by the Independent Power Producers of BC (IPPBC) in 2009 suggests that the province could capture 10% of the RPS market, but the rationale for that figure is unclear.³³

4.3 Available Supply and Transmission Constraints

For BC to be able to access these RPS markets, it must have eligible supply and the transmission capacity to get it to market. As noted earlier, this means that BC needs to generate electricity from eligible green energy projects which have been verified by WREGIS. In 2009, the Western Renewable Energy Zones (WREZ; a joint initiative between the Western Governors Association and the US Department of Energy) estimated that BC had the potential to develop 21,315 MW of renewable capacity, or 66,010 GWh/year of renewable energy (excluding large-scale hydroelectric generation).

The make-up of BC's potential green energy is shown in Figure 4 below. Production of wind energy is by far the most important growth area for renewable energy.³⁴ The remaining 35% of potential renewable energy capacity is made up of hydro (29%), biomass (4%), and geothermal (2%).

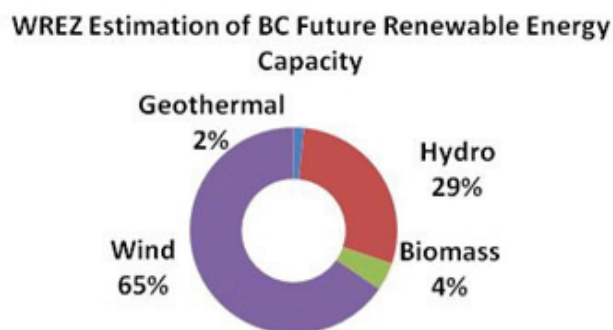


Figure 4: Estimate of BC's future renewable energy capacity (based on the Western Renewable Energy Zones [WREZ] Phase 1 report).

British Columbia is limited in the amount of renewable energy it can transmit to California and other WECC states because of constraints on the transmission interties to the US. At present, BC can flow, at most, 3,150 MW to the US, which is equivalent to approximately 27.6 TWh of energy annually if the maximum tie line capacity were to be reached for every hour in a year. In practice, however, the actual transfer capacity is often less than the maximum and can even be reduced to hundreds of megawatts during peak loads. As the IPPBC's 2009 report states, "[I]t is likely that existing transmission infrastructure and interties will need to be upgraded or expanded to better allow for the trade of surplus energy."³⁵

The transmission constraint is a fundamental issue. It is also addressed by the BC Green Energy Advisory Task Force which warned that "without new transmission capacity, BC will be unable to deliver significant renewable electricity to customers in California and other states. A new 500-kilovolt line would be a major undertaking, requiring billions [of dollars] in investment and numerous regulatory approvals; the long lead time for transmission (up to 10 years) compounds policy, technological and financial risks."³⁶

In Summary

There is potentially a large market for BC clean energy exports – notably electricity – and it has been estimated that BC has the resources that could enable it to expand supply for that market if it chose to do that. BC will face stiff competition in those markets, and some states currently have restrictive policies that would preclude most of BC’s hydroelectricity in their definitions of “renewable.” At the same time, the province’s domestic demand is also expanding. BC producers will therefore need to expand transmission capacity, especially as competition in export markets from other suppliers grows. Drawing an appropriate balance between the opportunities and risks of expanding electricity exports is therefore a challenging task for BC energy policy-makers.

5. KEY CONSIDERATIONS FOR DESIGNING BC’S ELECTRICITY EXPORT POLICY

The BC government’s shifting positions on the objectives of electricity policy and the export question have occurred without much of an opportunity for public debate. The Green Energy Task Force consisted of a variety of stakeholders, but the government released only a summary of the group’s recommendations and did not publicly release either the task force’s final report to government or the submission made by interested parties to the task force. The *Clean Energy Act* was debated in the provincial legislature for several days before passage, but the Opposition focused on high level issues and no section-by-section debate of the provisions of the bill was conducted.

In several of its public pronouncements, the government has set some conditions to guide decisions about whether or not to export power. In its 2009 Speech from the Throne, it suggested, for example, that an export policy should be “principled, economically-viable and environmentally-sustainable.”³⁷ The Act itself states that the intention of an export policy is that of “benefiting all British Columbians and reducing greenhouse gas emissions in regions in which British Columbia trades electricity while protecting the interests of persons who receive or may receive service in British Columbia.”

While the Act and the communication materials accompanying it support the net export objective, the legislation also requires Cabinet to determine that export opportunities identified in the IRP be “in the interest of British Columbians” before those opportunities are pursued.

And what might making these conditions more specific involve? What would a sound electricity export policy look like? These are the kinds of questions that the FutureGrid forum hosted in June 2010 by the Pacific Institute for Climate Solutions undertook to answer.

A Public Dialogue

The FutureGrid forum invited participants to engage in a broad dialogue about the opportunities and costs of BC becoming a significant exporter of electrical power. The proceedings were informed by a background paper on electricity trade issues in BC, which identified a range of issues in electricity export policy design. About 100 participants - including utility executives, power producers, policy experts, academic researchers, first nations and NGOs - joined in the facilitated dialogue to discuss the merits of six principles outlined in the background paper:

- Exports must be economically advantageous to consumers, communities, investors, and the provincial government.
- Exports must not jeopardize the reliability of domestic supply.

- Exports must demonstrably contribute to greenhouse gas reductions in importing jurisdictions.
- BC electricity policy must respect First Nations Rights and Title.
- Exports must be based on a planning and approval process designed to foster public legitimacy and promote environmental, social, and economic sustainability in BC.
- Exports must be reversible.

The discussion clearly ratified the importance of the first five of the principles. The sixth one on export reversibility was felt by many participants better addressed under the issue of domestic supply reliability (the second principle). Following that meeting, a much smaller follow-up workshop involving BC Hydro, Independent Power Producers, energy sector analysts and academic researchers was held in August 2010, to develop the (now five) design principles in more detail based on a range of considerations and issues.³⁸

The key considerations for policy design, by general principle area, are summarized below and include six recommendations for government.

5.1 Ensuring economic advantageousness

Electricity exports should make economic sense. One of the most divisive issues surrounding BC energy policy this decade has been whether private power producers are receiving de facto subsidies from BC ratepayers.³⁹ This concern has spilled over into the debate around exports. While the government and industry are very optimistic about the electricity export market, others are skeptical about whether BC will be able to produce new power for export markets at a cost that will be competitive.⁴⁰ The *Clean Energy Act* has responded to these concerns by protecting ratepayers from the costs of export contracts: the Act prohibits the BCUC recovering from ratepayers the cost of those export expenditures resulting from the IRP. Some customer groups are concerned that the government might increase its share of export revenues. In Quebec, for example, Hydro-Quebec's export sales do not reduce domestic rates: all export profits increase the dividend paid to the Quebec government.

In addition, two limitations affect this provision (leaving aside for now the complexities in implementing it):

- Recall that the *Clean Energy Act* authorizes two distinct channels for electricity exports: one through the IRP process, and one through the self-sufficiency surplus. The ratepayer protection provision applies to the first channel only.
- The provision explicitly protects ratepayers, but not taxpayers. It leaves open the possibility that the government might subsidize export development.

In our view, the government could work around both of these limitations by specifying, through regulation, that it will only authorize export development if there are net economic benefits to the province. In 1993, the electricity export policy of the government of the day did just that, declaring that its objective for long-term electricity exports was “maximizing net provincial benefits.” It stated, “In order to avoid financial risks falling on those who do not have a direct involvement in export sales, no export project will be subsidized by the province or by domestic ratepayers.”⁴¹ We believe that standard remains good public policy.

The open discussion about economic justifications for electricity exports produced two other suggestions: (1) that a type of “full cost accounting” that considers a full range of economic, environmental and social values be performed as part of examining the benefits and costs of exports; and (2) that local communities affected by development of the resource be engaged in discussing and planning for the economic and other benefits that new energy projects can afford.

Recommendation #1: The government should ensure that all electricity exports will yield net benefits to the province across the full range of economic, environmental and social values. To that end, the government should establish regulations that set clear net-benefit tests for all long-term export contracts.

Recommendation #2: The government should consider instituting mechanisms for revenue-sharing with local communities affected by large new energy development projects.

5.2 Safeguarding the reliability of domestic supply

Arguably the most important principle of electricity operations is the reliability of supply: everyone wants power available when it is needed. In order to ensure reliability, provincial energy planners will need to be certain that any export contracts will not undermine the ability of BC Hydro to meet its own customers’ needs. The province therefore must be confident that it will have a reliable surplus of energy over what is necessary to meet domestic demand.

This means that several significant uncertainties need to be managed. One is the seasonal and annual hydrological flows that influence the capacity of the province’s hydroelectric power. Another is the potential of demand-side management, which to date BC Hydro is successfully implementing. Although BC Hydro is confident it can meet more than 70% of new demand with conservation and efficiency, in our view that is a tall order and the province will need a contingency plan in case demand-side management is not as successful as planned. Another major uncertainty is the implication that broad societal fuel-switching to electricity from carbon-based fuels (gasoline and diesel in transportation; natural gas in heating) will have. BC needs to be confident that the province will have a reliable surplus even after accounting for the increased electricity demand expected to occur as fuel-switching increases to meet GHG reduction targets.

This reliability issue is tied directly to the economic issue. If unforeseen demand arises in BC, or something happens to existing sources of supply, the province might want to redirect power destined for export to the domestic market. One option would be to build this type of flexibility into export contracts. The disadvantage of that, however, is that there is a trade-off between the flexibility of a contract and the price it can command. Power planners are less concerned about the risk of insufficient power for domestic needs because they are confident they can purchase needed power on the “spot market.” They see the issue not as one of physical reliability but as one of financial risk because they may need to pay more on the spot market than they planned for. There are also environmental risks tied to reliability of supply: unexpected reliance on the spot market could result in the province increasing its consumption of electricity from GHG-emitting fuels.

All of these risks are more easily managed if the fraction of BC electricity supply dedicated to the export market remains modest. The *Clean Energy Act* provides no guidance on this issue, but the government could easily do so through policy or implementing regulations.

Recommendation #3: The government should ensure that electricity exports do not jeopardize the reliability of domestic supply by providing guidance on setting upper limits on the proportion of BC electricity that can be dedicated to the export market – whether through the integrated resource plan channel or the self-sufficiency surplus channel.

5.3 Contributing to greenhouse gas reductions in importing jurisdictions

Participants at the open discussion widely agreed that if BC was going to be exporting clean energy, it should ensure that the activity contributes to the reduction or mitigation of GHG emissions in importing jurisdictions.

Developing policies to do that will be a significant challenge, however. Our discussions revealed widely divergent views on this issue. One view is that clean power exports automatically contribute to GHG reductions because, by definition, they displace the possibility of the importing jurisdiction using polluting sources of energy to meet the same need. From this perspective, it would not be necessary to tie any environmental policy preconditions to electricity exports.

The opposing view is that without rigorous climate or energy conservation policies, importing jurisdictions may simply take BC clean power but continue to increase their use of carbon-emitting sources, such that BC's electricity exports would affect no meaningful contribution to GHG reduction. From this perspective, it would be imperative for BC to export clean energy only to jurisdictions that have climate or renewable energy policies in place. Other options suggested include: issuing export contracts only when the importing jurisdiction is purchasing certified renewable energy certificates (RECs) or GHG offsets; making exports conditional on the importing jurisdiction gaining membership in an international entity such as the Western Climate Initiative; and pursuing export contracts only with jurisdictions with which the province has a formal intergovernmental agreement stipulating that BC exports will displace more greenhouse gas intensive energy sources. After considerable discussion, the following recommendation received the most widespread agreement.

Recommendation #4: Before undertaking any electricity export contract, the government should satisfy itself that the importing jurisdiction has meaningful demand-side management in place.

5.4 Respecting First Nations rights and title

The Canadian Constitution, as interpreted by the Supreme Court of Canada, places a duty on all provincial and territorial governments to consult and accommodate First Nations when making decisions on resource development in their traditional territories. Given that both electrical generation and transmission involve having access to and across broad regions of the province, First Nations concerns relating to aboriginal and treaty rights must be addressed in land use planning and government authorizations that impact such rights and claims. A recent decision by the Supreme Court of Canada respecting BC Hydro, the BC Utilities Commission and the Energy Purchase Agreement with Rio Tinto Alcan confirms that energy decision-makers in BC Hydro and the government must meet their constitutional obligations to “consult and accommodate First Nations” when carrying out conduct on behalf of the Crown that will have impacts on the ground and potentially adversely affect aboriginal and treaty rights and claims.⁴²

There was consensus among participants in the open discussion that this concern was vital, but that energy projects for export raised no unique issues related to First Nations rights and title beyond those raised for energy projects for domestic use.

5.5 Fostering public legitimacy and promoting sustainability

One of the most persistent concerns among environmental critics of the provincial government's energy policy is that the planning and approval process for new resource projects was not sufficiently rigorous or well coordinated. These criticisms about process are directed at three levels:

- the individual project level – most individual projects are required to go through a provincial or federal environmental assessment process, but stakeholders seriously question the rigour of this process.
- the regional level – concerns have been raised about the absence of a regional scale planning process that could, among other things, establish thresholds for cumulative effects of multiple resource developments in the same area.
- the province-wide level – there is concern that BC lacks a coordinated mechanism with which to evaluate the best way to meet the province's energy needs at the least social, environmental, and economic cost.⁴³

The *Clean Energy Act* proposes some changes to the planning and approval process, but the legislation has not addressed critics' most significant concerns with the process. The Act clarifies that BC environmental assessments can address cumulative impacts (a legal requirement that already existed), but many stakeholders are concerned that project-specific assessments are an inherently limited approach to addressing cumulative effects. The new Act does nothing to address the middle, regional level that many feel is the critical level at which to examine the environmental sustainability of new energy projects. The Act does authorize a new provincial process for long-term planning: the "long-term acquisition plan" reviewed by the BCUC has been eliminated and replaced with the new IRP to be developed by BC Hydro and approved directly by Cabinet. The Act does not establish a consultation process, but does provide for the government to develop a regulation for this purpose.

Discussions at the forum of electricity exports highlighted the need for a transparent, inclusive, meaningful, timely, and comprehensive planning process for BC's electricity export initiative. Energy planning is a challenging political enterprise largely because impacts are separate from benefits in many cases. For example, the impacts of the resource development (say, construction of a new hydro facility or transmission line) are felt locally, while the energy produced is frequently delivered to distant markets. Having a legitimate planning process can help those who are negatively affected see the wider benefits.

Shifting the provincial objective from self-sufficiency to net exports significantly increases this political challenge. Now, rather than hoping that local communities will tolerate the development of local resources for the needs of the broader provincial community, the justification shifts to hoping that local communities will tolerate resource development to supply even more distant markets outside the province.⁴⁴

The fact that developing new electricity supplies for export will also come with environmental and social impacts, it is particularly important that a rigorous planning and approval process be in place that fosters the legitimacy of decision-making.

Recommendation #5: The government should ensure that all electricity exports are based on a planning and approval process that fosters public legitimacy and promotes environmental, social, and economic sustainability in BC.

Recommendation #6: The government should supplement province-wide long-term energy planning with a regional energy planning process to address the cumulative effects of multiple projects in the same region.

6. CONCLUSIONS

Expanded electricity exporting by BC could contribute substantially to provincial economic development while also reducing greenhouse gas emissions in importing jurisdictions. Yet, the prospect poses significant economic, environmental and social risks.

While the government has declared its objective of seeing BC become a major net exporter of electricity, it has done so with insufficient public consultation, amidst much opposition, and in the face of considerable economic uncertainty.

We believe that the government could address many of these concerns by articulating clear and comprehensive terms and conditions, in policy and regulations, to govern how electricity exports will be developed and managed in future.

Summary of Recommendations

1. The government should ensure that all electricity exports will yield net benefits to the province across the full range of economic, environmental and social values. To that end, the government should establish regulations that set clear net-benefit tests for all long-term export contracts.
2. The government should consider instituting mechanisms for revenue-sharing with local communities affected by large new energy development projects.
3. The government should ensure that electricity exports do not jeopardize the reliability of domestic supply by providing guidance on setting upper limits on the proportion of BC electricity that can be dedicated to the export market – whether through the integrated resource plan channel or the self-sufficiency surplus channel.
4. Before undertaking any electricity export contract, the government should satisfy itself that the importing jurisdiction has meaningful demand-side management in place.
5. The government should ensure that all electricity exports are based on a planning and approval process that fosters public legitimacy and promotes environmental, social, and economic sustainability in BC.
6. The government should supplement province-wide long-term energy planning with a regional energy planning process to address the cumulative effects of multiple projects in the same region.

ENDNOTES

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