A Triple Legacy for Future Generations:

British Columbia's Potential as a Renewable Green Energy Powerhouse

A Research Report

Prepared by B.C. Citizens for Green Energy

March 8, 2010

www.greenenergybc.ca

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A Triple Legacy for Future Generations:

British Columbia's Potential as a Renewable Green Energy Powerhouse

Executive Summary

British Columbia is widely recognized as having a natural abundance of renewable green energy resources. However, this natural abundance is currently going virtually untapped as are the economic and environmental benefits that developing them could bring to our province.[1]

Renewable green energy is something our American neighbours need to help meet their renewable energy and climate change goals, and that puts British Columbia in the driver's seat for a change and lets us turn the tables in our trading relationship.

Québec and Manitoba are already making substantial amounts of renewable electricity available to their neighbouring provinces and states and generating considerable revenue for their people. If British Columbia's green energy potential was harnessed, it would likewise generate considerable revenue for the citizens of British Columbia—potentially enough to wipe out our province's debt and eventually replace the revenue now raised through the provincial sales tax.

Based on several widely available estimates, British Columbia's potential for generating renewable green electricity could easily be equal to the current 10,259 megawatts of

[1] When you consider British Columbia's immense green energy potential, it is shameful that BC Hydro has become a net importer of predominantly coal-fired and gas-fired electricity from places like Alberta in recent years. BC Hydro's 2008 Annual Report states that, "prior to fiscal 2008, BC Hydro was a net importer of electricity for seven consecutive years due to average or below average system water conditions every year." BC HYDRO 2008 ANNUAL REPORT (for the period April 1, 2007 through March 31, 2008) page 67. And although fiscal 2008 was "an exceptional inflow year, with inflows well above normal," BC Hydro projects fiscal 2009 will see a return to "average inflow conditions" and an expectation that "BC Hydro will once again be a net importer of electricity." http://www.bchydro.com/etc/medialib/internet/documents/info/pdf/info_annual_report_2008.Par.0001.File.info_annual_report_2008.pdf

As well, BC Hydro serves 95 per cent of B.C.'s population—as noted in BC Hydro's 2009/10–2011/12 Service Plan—and BC Hydro's status as a net importer of electricity can be taken as fairly representative of the current state of affairs in British Columbia (BC Hydro Service Plan 2009/10–2011/12, page 9). Eighty-eight per cent of BC Hydro's approximately 1.8 million customer accounts are residential, with the remainder being either commercial or industrial. Each of these three groups consumes roughly one third of the total electricity supplied by BC Hydro. (http://www.bchydro.com/etc/medialib/internet/documents/info/pdf/service_plan.Par.0001.File.service_plan_2009-10-2011-12.pdf).

clean, renewable generating capacity available from BC Hydro's hydroelectric dams, and potentially two to three times as much if not more.

By tapping into this abundance of green energy, it is conceivable that revenues in the range of $4.3 Billion per year (as can be seen in Table 1 below) could potentially be realized by the people of British Columbia when the various public revenue streams from British Columbia's green energy are brought together: i.e., revenue from the various licenses, taxes and fees that independent green energy producers pay, the net income from BC Hydro/Powerex as the shaping and exporting entity for British Columbia's renewable green energy, and the carbon credits, offsets and other green attributes inherent in renewable energy sources which are potentially worth $30 to $40 per megawatt-hour on top of the value of the green energy itself (see pages 47 to 59 for detailed calculations).

Table 1: Potential yearly revenue to the people of British Columbia from green energy resources

Revenue Source	Revenue Potential
Potential direct revenue return to the people of British Columbia through licenses, taxes and fees	$790 million
Potential net revenue through BC Hydro/Powerex	$ 560 million
Potential revenue from carbon credits, carbon offsets and other green attributes of British Columbia's renewable energy	$2.9 billion
Total potential yearly revenue to the people of British Columbia	**$4.3 Billion**

If the $4.3 billion in potential green energy revenue accruable to the people of British Columbia, or a significant portion of it, was diligently applied to paying down British Columbia's $27 billion taxpayer-supported debt, British Columbia's provincial debt could conceivably be paid off in 15 years or less.[2]

[2] According to the September Budget Update 2009/10 – 2011/12 from the British Columbia Ministry of Finance, British Columbia's total provincial debt (which includes commercial Crown corporation debt) stood at close to $40 billion and is forecast to increase to $52.8 billion over the next three years.[2] Close to $27 billion of British Columbia's

And if British Columbia was debt-free like Alberta, the $2.2 billion we currently spend to service our provincial debt could be spent instead on vital public services like health care and education. For example, the $2.2 billion we currently spend servicing the province's debt would be enough to build six 300 bed hospitals similar to the new Abbotsford Regional Hospital and Cancer Centre.[3]

As Alberta Premier Ralph Klein said when he announced the elimination of Alberta's debt in 2004, leaving a debt-free province is "an amazing gift to the future" and one that would pave the way to eventually eliminating the need for a provincial sales tax in British Columbia.[4]

And in addition to the $4.3 billion direct green energy pay back to the people of British Columbia every year that could be used to pay down our provincial debt, there would also be billions of dollars in other economic benefits as well as the creation of thousands of much-needed jobs.

The millions of megawatt-hours of renewable green energy that British Columbia could potentially generate each year would also have a immense positive impact on greenhouse gas reduction efforts through the avoidance of millions of tonnes of harmful greenhouse gas emissions in western North America from coal-fired electricity generation—not to mention the billions of dollars and the human misery and dislocation that unchecked global climate change would cost us all.[5]

British Columbia's ambitious 2020 greenhouse gas reduction target of 33 per cent shows that our province is serious about climate change and serious about reducing greenhouse gas emissions.[6] But clearly we have more to offer to the battle against global climate change given British Columbia's immense potential for generating renewable green energy. Climate change and greenhouse gas emissions do not recognize international or provincial boundaries, and the overriding environmental

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$40 billion provincial debt is taxpayer-supported debt and $13 billion is the self-supported debt of crown corporations like BC Hydro.

[3] http://www.partnershipsbc.ca/files/project-abbotsford.html

[4] "Klein declares Alberta's debt retired," CTV.ca (Jul. 13 2004) http://www.ctv.ca/servlet/ArticleNews/story/CTVNews/1089644515172_85053715/?hub=TopStories

[5] Renewable clean electricity avoids 0.9 metric tonnes per megawatt-hour in greenhouse gas emissions from coal-fired generation. For gas-fired generation, the conversion factor is 0.36 metric tonnes per megawatt-hour of avoided greenhouse gas emissions per year.

[6] British Columbia's ***Greenhouse Gas Reduction Targets Act*** calls for greenhouse gas emissions in British Columbia to be reduced by 33 per cent compared to 2007 levels by 2020, even while British Columbia's population is projected to increase to more than 5 million people by 2020—nearly a million more people than 2007. Given that total greenhouse gas emissions in British Columbia in 2007 were 67.3 million tonnes, and given that unchecked provincial emissions would result in a rise in British Columbia's emissions to 78 million tonnes per year by 2020, achieving the 33 per cent reduction set out in the ***Act*** means that greenhouse gas emissions in British Columbia must be reduced to less than 46 million tonnes provincially per year by 2020. That's a total of 32 million tonnes of greenhouse gases that have to be avoided each year in British Columbia by 2020 in order to achieve the province's 33 per cent reduction target (**see Appendix 1**).

benefits of tapping into British Columbia's enormous potential to generate renewable green energy to help other jurisdictions should be readily apparent and cannot be ignored.

Unlocking British Columbia's immense green energy potential would allow us to leave an incredible triple legacy for future generations: namely, a secure supply of clean, renewable electricity, a substantial reduction in the devastating impacts of global climate change, and elimination of the provincial debt and eventually even the provincial sales tax (PST).

The new Clean Energy Act and the comprehensive strategy to put British Columbia at the forefront of clean energy development announced in the February 9, 2010 Speech from the Throne (see Appendix 6) hold great promise and show that the province is moving in the right direction with respect to unlocking British Columbia's green energy potential. However, BCCGE's hope is that the province will go even further and faster in implementing an effective export policy and encourage new investments in green energy production in British Columbia so that we can realize our province's potential to be the pre-eminent green energy powerhouse in North America.

Given the amazing triple legacy that British Columbia's vast green energy resources could provide to future generations, why would we not pursue the export opportunities available to us and why would the people of British Columbia not support doing so?

"British Columbia's abundance of renewable clean energy puts us in the driver's seat for a change and lets us turn the tables in our trading relationship with the Americans"

Bruce Sanderson, co-spokesperson, B.C. Citizens for Green Energy

A Triple Legacy for Future Generations:

British Columbia's Potential as a Renewable Green Energy Powerhouse

Introduction: Forging a Triple Legacy for British Columbia

There are few who would dispute that British Columbia has the potential to be the preeminent renewable green energy powerhouse in western North America. Clean, renewable green energy is a natural resource that British Columbia is widely recognized to have in great abundance with extensive wind, hydro, geothermal, biomass, wave and tidal energy resources.[7]

However, British Columbia's potential to be a renewable green energy powerhouse is currently going completely untapped—and the benefits of our province's natural abundance going unrealized—even as the devastating impacts of global climate change become more and more readily apparent each day.

And paradoxically, BC Hydro, which serves 95 per cent of B.C.'s population, has become a net importer of electricity from places like Alberta where most of the electricity is generated by burning coal which releases millions of tonnes of greenhouse gases and other pollutants into the atmosphere.[8]

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[7] On CKNW's The World Today Weekend with host Sean Leslie on January 30, 2010, the NDP's Energy Critic, John Horgan, acknowledged that British Columbia has "an embarrassment of riches in terms of our opportunities for green energy." To be precise, Horgan stated: "...As most of your listeners will know, we do have an embarrassment of riches in terms of our opportunities for green energy, but the challenge is getting those up and operating. What's the cost going to be? Who's going to pay for it?"

[8] BC Hydro's 2008 Annual Report states that, "prior to fiscal 2008, BC Hydro was a net importer of electricity for seven consecutive years due to average or below average system water conditions every year." BC HYDRO 2008 ANNUAL REPORT (for the period April 1, 2007 through March 31, 2008) page 67. And although fiscal 2008 was "an exceptional inflow year, with inflows well above normal," BC Hydro projects fiscal 2009 will see a return to "average inflow conditions" and an expectation that "BC Hydro will once again be a net importer of electricity." http://www.bchydro.com/etc/medialib/internet/documents/info/pdf/info_annual_report_2008.Par.0001.File.info_annual_report_2008.pdf.

As well, BC Hydro serves 95 per cent of B.C.'s population, as noted in BC Hydro's 2009/10–2011/12 Service Plan, and BC Hydro's status as a net importer of electricity can be taken as fairly representative of the current state of affairs in British Columbia (BC Hydro Service Plan 2009/10–2011/12, page 9). Eighty-eight per cent of BC Hydro's approximately 1.8 million customer accounts are residential, with the remainder being either commercial or industrial. Each of these three groups consumes roughly one third of the total electricity supplied by BC Hydro. (http://www.bchydro.com/etc/medialib/internet/documents/info/pdf/service_plan.Par.0001.File.service_plan_2009-10-2011-12.pdf).

This is a shameful situation for British Columbia to be in given our province's vast green energy resources. Not only do we need to stop the flow of dirty power into our province from places like Alberta, we need to go a step further and join provinces like Québec and Manitoba that are already making substantial amounts of clean, renewable electricity available to their neighbouring provinces and states and contributing significantly to continent-wide greenhouse gas reduction efforts.

Renewable electricity is a resource just like any other we have in this province and there is a great demand for it. As many have noted, we export our lumber products and we export our non-renewable minerals and metals. Why, then, should we not export the clean, green, renewable electricity that nature has so amply blessed us with?

> *"If we can generate excess green energy in B.C., a province blessed with so much potential for renewable energy production, we could export that energy to Alberta or the U.S. and displace energy production from highly-polluting coal-fired electricity plants..."*
>
> ***Andrew Weaver (lead author for the Nobel Prize-winning Intergovernmental Panel on Climate Change and professor and Canada Research Chair at the University of Victoria) Opinion-editorial in the Oak Bay News—April 28, 2009***

Green energy exports have the potential to generate significant revenue for the people of British Columbia, revenue that could be used to help pay down and eliminate the province's debt and eventually even replace the revenue now raised through the provincial sales tax. Renewable energy exports from Québec and Manitoba are already generating considerable revenue for the people of Québec and Manitoba.

And Alberta, which has no debt or provincial sales tax, has shown very powerfully how eliminating provincial debt and dispensing with a provincial sales tax can be accomplished by capitalizing on an abundant natural energy resource—the only difference being that Alberta will run out of oil one day whereas British Columbia's renewable energy resources are limitless so long as the wind blows, the sun shines, the tides change, the rain and the snow keep falling and filling our rivers and streams, and the earth's core remains hot.[9]

[9] As is widely known, Alberta does not have a provincial sales tax, and they do not have any provincial debt either owing to the considerable wealth their non-renewable energy resources have provided over the past several decades.

The purpose of this B.C. Citizens for Green Energy research report, therefore, is to a) quantify British Columbia's potential for generating renewable green energy, and b) provide a measure of the potential revenue that could conceivably be generated for the people of this province with an aim to leaving a triple legacy for future generations—namely, a secure supply of clean, renewable electricity, a substantial reduction in the devastating impacts of global climate change, and elimination of the provincial debt and possibly even the provincial sales tax (PST).

Eliminating British Columbia's Debt: A Legacy for Future Generations

According to the September Budget Update 2009/10 – 2011/12 from the British Columbia Ministry of Finance, British Columbia's total provincial debt (which includes commercial Crown corporation debt) stood at close to $40 billion and was forecast to increase to $52.8 billion over the next three years.[10] Close to $27 billion of British Columbia's $40 billion provincial debt was taxpayer-supported debt and $13 billion was the self-supported debt of crown corporations like BC Hydro (see Table 2 below).[11]

Table 2: British Columbia Provincial Debt—September Budget Update 2009/10 – 2011/12

Provincial Debt – $ millions (Source: Table 4.6 2009/10) p. 124

	Year-to-Date to June 30			
	2009/10			Actual
	Budget	Actual	Variance	2008/09
Total taxpayer-supported debt	**27,323**	**26,672**	**(651)**	**25,161**
Total self-supported debt	**10,851**	**13,033**	**2,182**	**8,993**
Total provincial debt	**38,174**	**39,705**	**1,531**	**34,154**

[10] *September Budget Update 2009/10 – 2011/12 (September 1, 2009 British Columbia. Ministry of Finance)* http://www.bcbudget.gov.bc.ca/2009_Sept_Update/bfp/Budget_and_Fiscal_Plan_Sept_2009.pdf. "Total provincial debt, which includes commercial Crown corporation debt, is forecast to increase over the next three years to $52.8 billion by 2011/12, primarily reflecting additional investment in improving and expanding British Columbia's hydro generation assets and the construction of the Port Mann bridge."

[11] http://www.bcbudget.gov.bc.ca/2010/bfp/2010_Budget_Fiscal_Plan.pdf p. 170

According to the latest budget estimates, presented on March 2, 2010, the provincial debt for 2010/11 is forecast to rise to nearly $48 billion with the taxpayer-supported portion estimated increasing to nearly $34 billion.[12] By 2012/13, the taxpayer-supported portion of British Columbia's total debt alone is forecast to increase to over $38 billion, almost as much as the total $40 billion provincial debt as of September 2009.[13]

Although a significant amount of British Columbia's debt, as can be seen in Table 3 below from the September Budget Update 2009/10 – 2011/12, relates to capital expenditures on important infrastructure like schools, hospitals, roads and bridges—all of which have enduring, long term value—provincial debt still needs to be paid for through one means or another including the cost of servicing the debt.[14]

Table 3: British Columbia Taxpayer Supported Debt

From: Table 1.18

		Budget Estimate		Plan	Plan
	Budget	Actual	2009/10	2010/11	2011/12
Taxpayer-supported debt					
Provincial government direct operating debt	**7,408**	**6,455**	**8,250**	**10,071**	**10,512**
Other taxpayer-supported debt (mainly capital)					
Education	8,755	8,682	9,387	10,008	10,403
Health	3,945	3,757	4,115	4,786	5,303
Highways and public transit	6,916	6,765	7,618	8,376	9,075
Other	717	787	1,223	1,743	1,986
Total other taxpayer-supported debt	**20,333**	**19,991**	**22,343**	**24,913**	**26,767**
Total taxpayer-supported debt	**27,741**	**26,446**	**30,593**	**34,984**	**37,279**
Total self-supported debt	**9,252**	**11,568**	**11,489**	**13,227**	**15,225**
Total provincial debt	**37,743**	**38,014**	**42,332**	**48,461**	**52,754**

[12] http://www.bcbudget.gov.bc.ca/2010/bfp/2010_Budget_Fiscal_Plan.pdf p. 170

[13] *September Budget Update 2009/10 – 2011/12 (September 1, 2009 British Columbia. Ministry of Finance)* http://www.bcbudget.gov.bc.ca/2009_Sept_Update/bfp/Budget_and_Fiscal_Plan_Sept_2009.pdf. "Taxpayer-supported debt is forecast to increase to $37.3 billion by 2011/12, reflecting the significant infrastructure investments planned over the next three years that will benefit future generations of British Columbians, and the forecast deficits over the next three fiscal years."

[14] British Columbia's tax revenue comes from Personal and Corporate income tax, Sales, Tobacco and Property taxes. British Columbia also receives Natural resource revenues in the form of royalties, permits and fees from our Forests, Natural gas and other natural resources. Additional sources of provincial revenue include Medical Services Plan premiums and Post secondary education fees. The Province also receives Health and social transfer contributions from the federal government and revenue from Commercial Crown corporations including BC Hydro, BC Liquor Distribution Branch, BCLC and ICBC.

With the singular exception of Alberta, no provincial government in Canada has attained debt-free status in recent memory except British Columbia which did so in 1959 under Premier W.A.C. Bennett—Bennett famously marked the occasion by shooting a flaming arrow into a barge filled with cancelled government bonds floating on Okanagan Lake.

Although Alberta Premier Ralph Klein was far less theatrical in his presentation of Alberta's debt-free status, in July 2004 he proudly announced that Alberta's final $3 billion in debt would be paid off by the end of the fiscal year on March 31, 2005 officially making Alberta a debt-free province. A decade earlier, Alberta's debt had been $22.7 billion. Premier Klein appropriately described Alberta's debt-free status as "an amazing gift to the future."[15]

Alberta's debt-free status—and the reserves Alberta has been able to set aside—have also positioned Alberta to weather the impacts of the recent global economic downturn and the first recession Alberta has faced since 1986.[16]

The steady reduction of Alberta's debt was made possible by revenues generated from Alberta's enormous non-renewable petroleum resources. Being debt free has allowed the Alberta government to save around $1.5 billion annually in debt servicing costs, dollars that Alberta has been able to redirect to important priorities like healthcare, education, tax cuts, savings and infrastructure.

"What's wrong with B.C. actually being a leader in clean, green energy, and selling power to somewhere like California...? What is wrong with that?"

Guest Host Michael Smyth – CKNW's Christy Clark Show, August 28, 2009

[15] "Klein declares Alberta's debt retired," CTV.ca (Jul. 13 2004)
http://www.ctv.ca/servlet/ArticleNews/story/CTVNews/1089644515172_85053715/?hub=TopStories

[16] The Alberta government had originally projected a deficit of $2.163 billion for 2009-10 which rose to a projected $6.877 billion. But thanks to the debt elimination measures Alberta has taken over the past 16 years, Alberta has $18.3 billion in short term savings set aside which are helping to offset the province's current deficit. Alberta also has retained its "Triple A" credit rating and remains the only province where total financial assets exceed total liabilities.[16] Alberta is also notable for being the only province in Canada that does not have or need to have a provincial sales tax.

According to British Columbia Ministry of Finance estimates in the September Budget Update 2009, British Columbia's provincial debt servicing costs are currently more than $2.2 billion per year.[17] If British Columbia was debt-free like Alberta, the money we currently spend to service our provincial debt could be spent instead on vital services like health care and education.

For example, the $2.2 billion we currently spend servicing the province's debt would be enough to build six 300 bed hospitals similar to the new Abbotsford Regional Hospital and Cancer Centre.[18]

Manitoba Hydro plans to greatly increase its exports of clean, renewable electricity and is targeting to have 10,700 gigawatt/hours per year available for export by 2023/24

Province of Manitoba News Release – January 29, 2008

If $2.2 billion was freed up from servicing British Columbia's debt costs each year it could almost fund the entire $2.5 billion being spent on capital investments in British Columbia health care facilities over the next three years, including key projects like: the new 500 bed Royal Jubilee Hospital in Victoria; the new full-service Kelowna Cardiac Centre and expansion of Kelowna General Hospital; construction of a new patient care tower at Vernon Jubilee Hospital (with a new emergency department and new operating rooms); the redevelopment of Surrey Memorial Hospital and the new $239-million Surrey Outpatient Hospital; construction of a replacement hospital and new residential care facility in Fort St. John; and construction of a new Northern Cancer Centre in Prince George.[19]

Likewise, the $2.2 billion we spend each year servicing our provincial debt could completely cover the $1.5 billion cost of the Ministry of Education's Seismic Mitigation Program making British Columbia's schools safer in the event of an earthquake—with $700 million to spare for other education needs.[20]

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[17] http://www.bcbudget.gov.bc.ca/2009_Sept_Update/estimates/Estimates_Sept_2009.pdf. p. 5.

[18] http://www.partnershipsbc.ca/files/project-abbotsford.html

[19] http://www.gov.bc.ca/fortherecord/capital/ci_healthcare.html?src=/healthcare/ci_healthcare.html

[20] http://www.bced.gov.bc.ca/capitalplanning/seismic/

The $2.2 billion British Columbia spends every year servicing our provincial debt could even pay most of the $2.46 billion cost of the new Port Mann Bridge currently under construction, including the upgrades to 37 km of Highway 1 on either side of the bridge.[21]

And as Alberta has forcefully demonstrated, unlocking the revenue potential of a vast natural resource like British Columbia's clean, renewable energy can be a potent alternative to raising provincial revenue through sales and income taxes—which in British Columbia currently generates between $4.5 billion to $5 billion dollars for the province each year (see Table 4 below).

Table 4: Provincial Revenue from Sales Tax and Personal Income Tax

Table A7 Revenue by Source – 2005/06 to 2011/12

($ millions)	Actual 2005/06	Actual 2006/07	Actual 2007/08	Budget 2008/09	Estimate 2009/10	Plan 2010/11	Plan 2011/12
Taxation revenue							
Personal income	5,838	6,905	6,956	6,093	5,681	5,927	6 ,205
Sales	4,367	4,714	5,072	4,958	4,847	5,555	6,056
Total revenue	**35,958**	**38,478**	**39,800**	**38,328**	**37,608**	**38,845**	**41,072**

Given the energy and revenue generating potential of British Columbia's vast green energy resources, and the triple legacy it could provide for future generations, why would we not pursue the export opportunities available to us and why would the people of British Columbia not support doing so?

Québec's Ambitious Renewable Electricity Export Plans

Québec offers an excellent example of the path British Columbia should be following with respect to our abundant green energy resources and the revenue potential they have for the people of our province. Hydro-Québec has been exporting clean electricity to Ontario since the early 2000s, and to various markets in the American northeast since 1999. These exports have provided the province of Québec with a major source

[21] http://www2.news.gov.bc.ca/news_releases_2005-2009/2009OTP0024-000155.htm. The Port Mann-Highway 1 project is also expected to create 8,000 jobs.

of revenue. In 2008, for example, Hydro-Québec's exports totalled $1.9 billion, accounting for 8 percent of Hydro-Québec's revenues and 32 percent of its net income of $977 million.[22]

The clean, renewable electricity Hydro-Québec supplies to the American northeast and Ontario has also helped to substantially reduce greenhouse gas (GHG) emissions in north eastern North America. Since 2001, Québec's electricity exports have prevented more than 30 million tonnes of GHGs from being emitted into the atmosphere—a significant contribution to the battle against global climate change and roughly equivalent to the amount of GHGs that would be created in a year by 7,870,000 cars.[23]

> *"I personally don't care if renewables are built by Martians. We need to get it done right but we need to get it done"*
>
> ***Tzeporah Berman – "Backlash Against the Green Economy in BC," March 19, 2009***

In light of the key environmental role that Québec's electricity exports play in the battle against climate change, along with the substantial financial benefits these electricity exports bring to the people of Québec, Hydro-Québec is taking major steps to greatly increase its hydroelectric generating capacity and its electricity exports. As set out in the Québec government's energy strategy, unveiled in May 2006 under the title ***Using Energy to Build the Québec of Tomorrow***, Hydro-Québec's Strategic Plan 2009-2023 calls for substantial increases in clean, renewable electricity to be supplied to New England and New York as well as increased energy interchanges with Ontario.[24]

In accordance with Québec's renewable energy objectives, Hydro-Québec signed a letter of understanding in December 2008 with the two main power distributors in New England, Northeast Utilities and NSTAR (the largest Massachusetts-based, investor-owned electric and gas utility), for a 1,200-Megawatt power transmission line project

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[22] http://www.hydroquebec.com/publications/en/strategic_plan/pdf/plan-strategique-2009-2013.pdf
Hydro-Québec Strategic Plan 2009–2013. p. 32.

[23] http://www.hydroquebec.com/publications/en/strategic_plan/pdf/plan-strategique-2009-2013.pdf
Hydro-Québec Strategic Plan 2009–2013. p. 25. (Note: According to the B.C. Climate Action Plan, three million tonnes of CO2 equivalent is roughly equivalent to the greenhouse gas emissions created by 787,000 cars per year (p. 19-20. B.C. Climate Action Plan) http://www.livesmartbc.ca/attachments/climateaction_plan_web.pdf

[24] Using Energy to Build the Québec of Tomorrow: Québec Energy Strategy 2006-2015
http://www.mrnf.gouv.qc.ca/english/publications/energy/strategy/energy-strategy-2006-2015-summary.pdf

between Québec and southern New Hampshire.[25] In approving this transmission line's financing structure in May 2009, Federal Energy Regulatory Commission (FERC) Chairman Jon Wellinghoff noted that the project "provides access to clean, low-cost energy for consumers in a region of the country that has tight constraints on electricity supplies" where people would otherwise be forced to make use of dirty coal and gas-fired sources to generate electricity.[26]

> *In 2008, Hydro-Québec's exports totalled $1.9 billion, accounting for 8 percent of Hydro-Québec's revenues and 32 percent of its net income of $977 million*
>
> ***Hydro-Québec Strategic plan 2009—2013***

Hydro-Québec is currently negotiating additional agreements to supply electricity via this new transmission line to Northeast Utilities and NSTAR as well as to other New England electricity distributors. Similar discussions are also under way with New York state authorities, including the New York Power Authority (NYPA) and the New York Independent System Operator (NYISO), with a view to increasing the supply of renewable, clean electricity to the New York market.[27]

And on January 20th, the Premiers of Québec and New Brunswick concluded an agreement originally unveiled last October, whereby Hydro-Québec will acquire most of New Brunswick Power's generation assets for $1.8 billion along with "firm transmission rights"[28] to New Brunswick Power's distribution network and grid, and to its transmission interconnections to the U.S. and Atlantic Canada, which will further enhance Hydro-Québec's ability to supply clean electricity to eastern markets in Canada and the US.[29]

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[25] NSTAR is the largest Massachusetts-based, investor-owned electric and gas utility, with revenues of approximately $3.3 billion and assets totalling approximately $8.3 billion. NSTAR transmits and delivers electricity and gas to 1.1 million electric customers in 81 communities and nearly 300,000 gas customers in 51 communities. http://www.nstar.com/about_nstar/

[26] http://www.hydroquebec.com/publications/en/strategic_plan/pdf/plan-strategique-2009-2013.pdf Hydro-Québec's Strategic Plan 2009-2023. p. 27.

[27] The State of New York is considering a number of means, including imports of hydropower from Québec, to reach its renewable energy goals and GHG emission reduction targets.

[28] http://www.hydroquebec.com/4d_includes/of_interest/PcAN2010-016.htm

[29] http://www.hydroquebec.com/4d_includes/of_interest/PcAN2009-161.htm

With a number of ongoing renewable hydroelectric development projects in Québec, Hydro-Québec expects to have nearly 24 terawatt/hours (24 billion kilowatt/hours) available by 2013 to support its increased electricity exports. By 2013, Hydro Québec's net exports are expected to account for 12% of the electricity Hydro-Québec supplies and 38% of its net income ($915 million).

And with greenhouse gas reduction legislation being passed with increasing frequency throughout North America requiring electrical utilities to progressively increase the proportion of electricity they supply from clean, renewable sources, Québec's abundance of renewable energy is not only in high demand it's also essential to the future economic growth of the regions Québec supplies with renewable energy.

A prime example is the province of Ontario where the province's coal-fired power plants are quickly being phased out in response to the global climate change crisis. In order to ensure that Ontario has an adequate electricity supply, the province of Ontario is greatly expanding its transmission interconnection capacities with neighbouring systems like Québec's.[30]

Québec's upgraded transmission interconnections with Ontario will also allow Québec to extend its supply of clean, renewable electricity to markets in the American Midwest and western New York State—a key strategic objective of Hydro- Québec.

Manitoba's Ambitious Renewable Electricity Export Plans

As with Hydro-Québec, Manitoba Hydro has plans to greatly increase its exports of clean, renewable electricity. As one of Canada's largest exporters of electricity, Manitoba Hydro already supplies renewable green energy to over 30 electric utilities through four wholesale markets in Canada and the mid-western United States. In 2007/08, Manitoba Hydro's electricity export revenues totalled $625 million with 82 per cent coming from the American market and 18 per cent from Canadian markets.[31]

As with Québec, the renewable, clean electricity that Manitoba supplies to neighbouring provinces and the American Midwest helps to keep Manitoba Hydro's rates among the lowest in North America while also helping to reduce greenhouse gas emissions throughout the region. Over the past 35 years, Manitoba Hydro's exports of clean

[30] Ontario will reportedly need 20,000 megawatts of generating capacity by 2030 to meet demand growth and Hydro-Québec plans to use its generating stations on the Ottawa River, which have a combined 1,295 megawatts of capacity, to export electricity to Ontario.

[31] http://www.hydro.mb.ca/corporate/electricity_exports.shtml

electricity have reduced greenhouse gas emissions by 172 million tonnes in the region through the reduced need for electricity generation from coal and gas-fired sources.[32]

> *The NDP government's motive in running Burrard Thermal "flat out" in the 1990s was "altruistic" because California's "lights were going out"... "They needed the power to keep the largest economy in North America rolling and we provided it to them"*
>
> ***NDP Energy Critic John Horgan speaking on CKNW's Christy Clark Show—August 31, 2009***

Manitoba Hydro's Corporate Strategic Plan 2009/10 outlines Manitoba Hydro's plans to maximize its electricity exports and net revenues by actively pursuing opportunities to the east, west and south of the province.[33] Manitoba Hydro's electricity exports typically account for more than 40 per cent of Manitoba Hydro's revenues and development of the province's clean, renewable energy resources is a therefore a major part of the Manitoba's long term vision to build the province's economy. By 2011/12, Manitoba Hydro plans to have 2,900 gigawatt/hours of electricity available per year for export, and by 2019/20 they plan to have 5,800 gigawatt/hours available for export. By 2023/24, Manitoba Hydro is targeting to have a full 10,700 gigawatt/hours available per year for export.[34]

To put this amount of electricity in context: BC Hydro's 11,000 megawatts of capacity typically generate between 43,000 to 54,000 gigawatt/hours of electricity each year.[35] The 10,700 gigawatt/hours of clean, renewable electricity that Manitoba Hydro is planning to have available solely for export purposes is therefore roughly equal to 20 to 25 percent of the total amount of electricity currently generated by BC Hydro each year

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[32] http://www.gov.mb.ca/chc/press/top/2008/01/2008-01-29-073000-3014.html

[33] http://www.hydro.mb.ca/corporate/csp/csp.pdf

[34] Note: Approximately six percent of North America's water flows through Manitoba. The rivers in Manitoba that supply power have more than twice the hydroelectric potential of Niagara Falls. To date, only 50% of this potential has been harnessed and about 4,915 megawatts of hydro electric potential at 11 major hydraulic sites are available. Source: http://www.gov.mb.ca/ctt/invest/busfacts/utilities/capacity.html

[35] http://www.bchydro.com/etc/medialib/internet/documents/about/company_information/quick_facts.Par.0001.File.quick_facts.pdf

and roughly a third of the 33,000 gigawatt-hours of electricity Manitoba Hydro typically generates each year.[36]

In other words, Manitoba Hydro's export target for 2023/24 of 10,700 gigawatt/hours of electricity (equal to 10,700,000 megawatt-hours) would be comparable to BC Hydro having an extra 14,000,000 to 18,000,000 megawatt-hours of electricity available solely for export and revenue generation purposes. This serves to underscore the seriousness with which provinces like Manitoba and Québec are approaching the opportunities made possible by their renewable green energy resources and the global climate change crisis that is upon us.

*Manitoba Hydro's electricity export agreement with the Wisconsin Public Service is "**worth over $2 billion**" to the people of Manitoba*

Manitoba Premier Gary Doer—from Manitoba Government News Release, April 17, 2008

As with Hydro-Québec, Manitoba Hydro's efforts to maximize its electricity exports and net revenues have already met with great success. For example, in January 2008, Manitoba's then Finance Minister, Greg Selinger (who was recently sworn in as Manitoba's new Premier), announced that Manitoba Hydro had signed an agreement with Minnesota Power to provide 250 megawatts of clean, renewable hydro power to Minnesota over 15 years starting in 2020. Selinger described the agreement with Minnesota Power as "a win-win situation for all parties involved" whereby Minnesota Power gains "clean, reliable, long-term and cost-competitive power" and Manitoba bolsters its export markets.[37]

Likewise, in April 2008, Manitoba Hydro reached a similar arrangement with the Wisconsin Public Service (WPS) to provide "up to 500 megawatts of clean, renewable hydro power over 15 years starting in 2018."[38] The agreement with Wisconsin was personally announced by Manitoba's Premier Gary Doer (who was recently appointed Canada's new ambassador to the United States). Premier Doer said the agreement would "significantly increase" Manitoba's electricity exports and "reduce the production of greenhouse gases by reducing the need for thermal generation in the United States." Premier Doer calculated the deal with Wisconsin Public Service to be "worth over $2 billion" to the people of Manitoba.

[36] http://www.hydro.mb.ca/corporate/ar/2008/ar_0809.pdf

[37] http://www.gov.mb.ca/chc/press/top/2008/01/2008-01-29-073000-3014.html

[38] http://news.gov.mb.ca/news/index.html?archive=&item=3525

As in British Columbia, Manitoba's government is working in close cooperation with First Nations to construct the necessary hydroelectric facilities needed to support the province's electricity export goals, a prime example being the Wuskwatim dam which is a partnership between Manitoba Hydro and Nisichawaysihk Cree Nation.[39]

Given the strong, and very clear, support that the Manitoba government has shown for the development and export of Manitoba's renewable clean energy, along with their clear understanding of Manitoba's role in helping to reduce greenhouse gas emissions region wide and equally clear embrace of independent suppliers of green energy, one can easily ask why their NDP counterparts in British Columbia are so vehemently opposed to the development of independent green energy projects and the export of British Columbia's green energy.[40]

"It's in our best interests to act quickly to get as much renewable energy into play as possible. As well as getting us off fossil fuels and combating global warming, renewable energy is also one way to dig ourselves out of the economic mess we're facing. It's good for business."

Dr. David Suzuki—"Run-of-river power projects may offer green energy solutions," March 31, 2009

[39] When completed, the Wuskwatim Generating Station will have a 200 megawatt capacity, and by building it in advance of electricity needs within the province it will provide electricity needed for export and export revenues.

[40] Interestingly, the NDP in British Columbia have traditionally supported independent green energy projects, and the role these projects play in achieving the province's energy goals, going all the way back to the early 1990s when the NDP were in government. In 1992, for example, the NDP Energy and Mines Minister Anne Edwards fully recognized that independent green energy producers are a source of expertise and innovation that can keep B.C.'s electricity sector efficient and competitive and the NDP encouraged a mix of private and public sector investment. (see: http://www.greenenergybc.ca/Assets/Anne_Edwards_October_1992_News_Release.pdf).

British Columbia's Untapped and Unrealized Green Energy Potential

In sharp contrast to the clear, bold path being pursued by Manitoba and Québec with respect to planet-saving renewable electricity exports, British Columbia has long been mired in a counterproductive, misinformed debate revolving around the question of public versus private generation of electricity. This misinformed debate has been lead, for the most part by ideologically-driven, self-serving public sector unions like the Canadian Office & Professional Employees Union (COPE 378) which represents BC Hydro workers.

Meanwhile, British Columbia's enormous, almost unparalleled potential for generating an abundance of renewable green electricity goes untapped, and the benefits completely unrealized, while the impacts of climate change become more apparent each day as last year's record breaking forest fire season in British Columbia demonstrated (to name just one of many examples).

Although we rarely stop to consider it on a daily basis, 92.8 percent of the electricity generated in British Columbia comes from clean, renewable hydroelectric sources.[41] But this is not the case in places like California where two-thirds of their electricity comes from carbon-emitting fossil fuels like coal (20.1 percent of electricity generation) and gas (37.7 percent of electricity generation) as can be seen in Table 5 below.[42]

Table 5: 2004 Total Electricity Production by Source (% of total)[43]

	Other Renewables	Hydro Electric	Nuclear	Waste and Biomass	Natural Gas	Diesel Oil	Coal	TOTAL
British Columbia	**0**	**92.8**	**0**	**1**	**6**	**0.2**	**0**	**100**
Alberta	2.3	4.4	0	0	12	2.6	78.7	100
California	**10.7**	**17**	**14.5**	**0**	**37.7**	**0**	**20.1**	**100**
Ontario	1.8	24.8	49.7	0	5.2	0.5	18	100
Oregon	2.3	64.4	0	0	26.3	0.1	6.9	100
Quebec	0.7	94.5	3.2	0	0.1	1.5	0	100
Washington	2.3	70	8.8	0	8.6	0.1	10.2	100

[41] BC Energy Plan – 2004 Total Electricity Production by Source (% of total) http://www.energyplan.gov.bc.ca/bcep/default.aspx?hash=7

[42] BC Energy Plan – 2004 Total Electricity Production by Source (% of total) http://www.energyplan.gov.bc.ca/bcep/default.aspx?hash=7

[43] http://www.energyplan.gov.bc.ca/bcep/default.aspx?hash=7

When you consider the fact that California's population of 37 million people is nearly ten times larger than British Columbia's population, and that it represents nearly half of the total population living in western North America (see Appendix 4), the magnitude of California's reliance on coal and gas to generate electricity comes into alarming focus, along with the massive amounts of carbon and greenhouse gas emissions these fuel sources are emitting.[44]

And disgracefully, it's not just California and the western states that require our help: Alberta generates 78.7 percent of its electricity by burning coal, some of which is imported into British Columbia to top up our alarming and paradoxical shortage of clean generating capacity.

Governor Arnold Schwarzenegger recently terminated protectionist machinations in the California State Legislature and placed the "highest priority" on accessing cost-effective renewable green energy for California including renewable green energy from places like British Columbia

A Triple Legacy for Future Generations—BCCGE

It is important to note at this point that a welcome ray of hope for British Columbia came late last summer in the Speech from the Throne as read by the Lieutenant-Governor, the Honourable Steven L. Point, OBC. The throne speech stated very clearly that British Columbia's green energy potential would be opened up "with new vigour" and that a new Green Energy Task Force would be appointed "to recommend a blueprint for maximizing British Columbia's clean power potential, including a principled, economically-viable and environmentally-sustainable export development policy."[45]

[44] More alarming still for environmentally conscious British Columbians is the fact that electricity generated by burning coal and gas in California, and in other western states and provinces (and even electricity generated in nuclear reactors), is flowing through the light bulbs and electrical outlets in British Columbia homes and places of work right now—and not just because British Columbia has become a net importer of electricity from these other jurisdictions in recent years. Once electricity is on the transmission grid there is really no way to tell whether it was generated from a clean, renewable source or from the dirtiest, most antiquated coal-fired generator or a nuclear reactor—electricity, like greenhouse gases, flows where it wants to once it is on the grid.

[45] http://www.leg.bc.ca/39th1st/4-8-39-1.htm

Last November, Premier Gordon Campbell formally announced the establishment of the Green Energy Advisory Task Force (comprised of four advisory task force groups) along with a new Cabinet Committee on Climate Action and Clean Energy. In making the announcement, Premier Campbell stated: "Clean energy will be a cornerstone of B.C.'s climate action plan that will create jobs, support families and generate new economic activity throughout British Columbia.... This task force and the new committee will ensure B.C. remains a leader in clean and renewable energy by developing our resources, maximizing our opportunities and establishing our potential as the supplier of choice for clean power."[46]

> *"British Columbia's abundance of renewable clean energy puts us in the driver's seat for a change and lets us turn the tables in our trading relationship with the Americans"*
>
> ***Bruce Sanderson, co-spokesperson, B.C. Citizens for Green Energy***

The province's commitment to green energy development was reaffirmed in the recent February 9, 2010 Speech from the Throne (See Appendix 6).[47] As stated in the Throne Speech, the province will be launching a comprehensive strategy to put British Columbia at the forefront of clean energy development and will introduce a new Clean Energy Act to encourage new investments in independent power production while also strengthening BC Hydro.

The Throne Speech made specific reference to British Columbia's enormous untapped green energy potential in bioenergy, run-of-river, wind, geothermal, tidal, wave and solar energy and stated that the province's green energy potential will be put to work for the British Columbia economy, to generate new wealth and new jobs in our communities and make it possible for our children to inherit opportunities and not our problems or our debt. BCCGE fully supports these initiatives and is hopeful that they will help to unlock our province's immense green energy potential.

In pursuit of these objectives, the Speech from the Throne called for the Canadian Environmental Assessment Act to be amended to create a unified federal-provincial review process, one that does away with redundancy and unnecessary costs. As stated in the throne speech, multiple governmental reviews replicate work, add cost, increase uncertainty, delay decisions, reduce investment and ultimately cost jobs. BCCGE fully agrees with this view of the redundant assessment processes and red tape that green

[46] http://www2.news.gov.bc.ca/news_releases_2009-2013/2009PREM0060-000565.pdf

[47] http://www.leg.bc.ca/39th2nd/4-8-39-2.htm

energy projects are subjected to and we are optimistic that will soon change for the better.

As was clearly and correctly stated in the Throne Speech, we cannot afford to hold investment and jobs hostage to overly complicated bureaucratic practices that have no place in the 21st Century, and BCCGE applauds the fact that the province will be redoubling its efforts to conclude equivalency agreements with Ottawa to ensure that environmental reviews are cost effective, timely and thorough.

BCCGE also welcomes the new unified process for environmental assessment and permitting in British Columbia that the Speech from the Throne stated will be implemented. The "One Project, One Process" approach will create a single framework that is timely, diligent and science-based. BCCGE was particularly pleased that Local governments will be asked to become partners in this streamlining endeavour and to take a look at all impediments to reasonable investment, including zoning, licensing and permitting requirements. At present, there are more than 50 approvals, permits and licenses from 14 government regulatory bodies, and numerous reviews and studies, that green energy projects in British Columbia typically require before they can get underway and there is considerable room for streamlining the process.

> *"In the low-carbon economy of the 21st century, renewable green energy will make British Columbia one of the least costly jurisdictions in North America, and that will not only allow us to produce goods more cheaply, it will also attract new businesses and industries to British Columbia seeking the competitive edge our province and its green energy can provide."*
>
> ***Bruce Sanderson, co-spokesperson, B.C. Citizens for Green Energy***

In support of the province's commitment to green energy development, new transmission infrastructure will link Northeastern British Columbia to an integrated grid to provide clean power to the energy industry and open up new capacity for clean power exports to Alberta, Saskatchewan and south of the border. The province will also be seeking major transmission upgrades with utilities in California and elsewhere.

Even more recently, at a Global Business Leaders Day forum during the 2010 Olympic Games celebrations, Premier Gordon Campbell took the opportunity to reiterate the province's support for green energy development stating that the Olympics were "a launching pad that will give [Canada] the opportunity to become the new energy

powerhouse of the North American continent" and raise the country's profile as one of the world's most secure sources of energy.[48]

As reported by Scott Simpson in the Vancouver Sun, the Premier said: "We have the richest bioenergy sources in the world in British Columbia. We have massive hydro power, which is clean energy, [with] which we can power all of the North American economy, from Québec to Manitoba to British Columbia." BCCGE is very hopeful, therefore, that the province is moving in the right direction with respect to unlocking British Columbia's green energy potential.

British Columbia's potential for generating clean, renewable electricity is nearly fourteen times greater than Manitoba Hydro's total export target of 10,700 gigawatt/hours per year for 2023/24

(Based on estimate by the Electricity and Alternative Energy Division (EAED) of the Ministry of Energy, Mines and Petroleum Resources)

And as Finance Minister Colin Hansen stated in the March 2, 2010 budget speech—echoing the Throne Speech promise that the provincial budget would set the foundation for the province we want in 2030 with a new agenda that, among other things, maximize British Columbia's potential as a clean energy powerhouse and a global leader in climate action—the province will redouble its efforts "to simplify approvals for new investments" and build on the province's other advantages in the months ahead.[49]

Accordingly, British Columbia could soon take its place alongside Québec and Manitoba as a major exporter of renewable green energy and finally start adding to the substantial contributions Québec and Manitoba are already making to continent-wide efforts to reduce greenhouse gas emissions and reduce dependence on fossil fuels like coal and gas to generate electricity.

The province is definitely moving in the right direction, but BCCGE encourages the province to go even further and faster in implementing an effective export policy and encouraging new investments in green energy production in British Columbia. BCCGE would even go so far as to suggest that budget and Throne Speech should have given clearer, more explicit, direction to every arm of the government—including BC Hydro—that the province is ready to act decisively and move forward to develop B.C.'s green energy potential.

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[48] "Trade minister touts Canadian advantage," by Scott Simpson. Vancouver Sun: February 23, 2010 (Page F2).

[49] http://www.bcbudget.gov.bc.ca/2010/speech/2010_Budget_Speech.pdf p. 10.

The Export Question

Although British Columbia's entry into the North America's 21st Century green energy marketplace has been laggard, the question of exporting clean, renewable electricity from British Columbia has not gone without a fair amount of well-considered discussion. In September 2007, for example, the 10th Report of the Premier's Technology Council stated that a specific economic development opportunity that British Columbia should set its sights on is to become "a net exporter of clean electrical energy" by 2020.[50]

The council's report cited "the significant economic opportunities for BC" associated with the growing demand for clean energy supplies and lower levels of greenhouse gas emissions.[51] As the council's report notes, the global pressure to access renewable energy sources to alleviate climate change, specifically the aggressive measures taken in California, are creating a huge market for renewable energy and associated technologies. The council's report went on to state that, "if we in BC act decisively, we are well positioned to capture a disproportionately large share of the market."[52]

The question of exporting renewable green energy from British Columbia has also been frequently discussed in the media, particularly during the past two years as the impacts of global climate change have become increasingly apparent in our daily lives.

For example, Vancouver Sun columnist Miro Cernetig observed in June 2009 that a "major question facing British Columbians" is whether we are "willing to build excess, green-power generation capacity and ship that electricity out of the province" in order to generate revenue like other provinces are doing, notably, Québec and Manitoba, and thereby help neighbouring provinces and states reduce their greenhouse gas emissions.[53]

Likewise, on CKNW's August 28, 2009 Bill Good Show, while host Bill Good was speaking to internationally renowned energy expert Dr. Mark Jaccard from Simon Fraser University's School of Resource and Environmental Management, Good stated that he does not have a problem with "producing power to sell to the Americans." By way of analogy, Bill Good pointed out that "we try to sell as much lumber as we possibly can to the Americans." Why not sell them electricity generated from British Columbia's completely renewable clean energy resources?[54]

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[50] PREMIER'S TECHNOLOGY COUNCIL – 10TH REPORT: SEPTEMBER, 2007. http://www.gov.bc.ca/premier/attachments/ptc_10th_report.pdf. Page 31.

[51] PREMIER'S TECHNOLOGY COUNCIL – 10TH REPORT: SEPTEMBER, 2007. http://www.gov.bc.ca/premier/attachments/ptc_10th_report.pdf. p. 30.

[52] PREMIER'S TECHNOLOGY COUNCIL – 10TH REPORT: SEPTEMBER, 2007. http://www.gov.bc.ca/premier/attachments/ptc_10th_report.pdf. p. 30.

[53] "New addition to skyline shows we're going with the wind," Miro Cernetig, Vancouver Sun: June 29, 2009. p. A1.

[54] Bill Good reiterated this very same point with Vaughn Palmer and Keith Baldrey on "Cutting Edge of the Leg" on December 11, 2009. Good stated: "One thing I don't understand is the opposition to selling power to the United

Vancouver Province columnist Michael Smyth has also tackled the question of exporting electricity from British Columbia. While guest hosting on CKNW's Christy Clark Show—also broadcast on August 28, 2009—Smyth indicated that he could not see anything wrong with exporting clean, renewable electricity to the United States while discussing the issue with his guest, Melissa Davis, from BC Citizens for Public Power (a group with strong links to the COPE 378 union that represents BC Hydro employees and to other public sector unions).[55]

Specifically, Smyth asked his guest Melissa Davis what would be so terrible if clean energy produced by independent companies in B.C. was sold for export: "What's wrong with that?" he asked Davis. "What's wrong with B.C. actually being a leader in clean, green energy, and selling power to somewhere like California, right? What is wrong with that?"[56]

Melissa Davis responded by saying that, if BC is going to be "a hero around global climate change" then the government should say so. Interestingly, Davis's response seems to suggest that she is somewhat open to British Columbia becoming "a hero around global climate change," and this raises the obvious question of how British Columbia can become that hero.[57]

States. We want to sell as much wood to the United States as we can; we want to sell as much of almost everything as we can. What is the objection to selling power to the United States?"

[55] The Board of Directors of BC Citizens for Public Power Includes: Gwenne Farrell, Vice-President of COPE 378 and Secretary-Treasurer of COPE-SEPB which is COPE Local 378's national union; Jerri New, past President of COPE Local 378, past National President of COPE, a former executive officer of the Canadian Labour Congress and former officer of the BC Federation of Labour; and Blair Redlin, a Research Representative for the Canadian Union of Public Employees (CUPE). http://www.citizensforpublicpower.ca/about_us/board_of_directors

[56] The subject of Burrard Thermal also came up during Smyth's interview with Melissa Davis and she stated that "no one with an environmental slant, including [her] group, would advocate for a 24/7, full capacity use" of Burrard Thermal.

Melissa Davis also stated that Burrard Thermal is considered to be very temporary "even from the government's own energy plan." Davis went on to state: "So we let [Burrard Thermal] operate for a few years, until the transmission lines are constructed between—the twinning, right—between the Lower Mainland and the Interior, and that should be done by 2016. [Burrard Thermal] shouldn't be generating any power after that."

Host Michael Smyth responded by stating: "Okay. Well I don't think that's really that far off from what the government is saying. I mean, I think the government is saying we want to shut this thing down eventually, but that it would be on line as a backup source here for the next few years, and it would be shut down a few years from now."

Smyth also countered Melissa Davis when she claimed that the B.C. Utilities Commission was not advocating "24/7" reliance on Burrard Thermal for electricity generation. Smyth said: "...what the BC Utilities Commission said was that for planning purposes—for planning purposes going forward—they should be able to rely on that smog belching dragon out there to crank up, up to 5,000 or 6,000 gigawatts a year as they plan for our energy supply in the future."

[57] We can only assume that Davis had not heard the Speech from the throne three days earlier on August 25th in which Lieutenant Governor Steven Point stated that British Columbia's green energy potential would be opened up "with new vigour" and that a new Green Energy Task Force would be appointed "to recommend a blueprint for maximizing British Columbia's clean power potential, including a principled, economically-viable and environmentally-sustainable export development policy."

Given the well-known perspective of Melissa Davis and her COPE 378-affiliated "public power" group, it would be safe to assume that the only "heroic" clean energy sources that would be acceptable to Davis and her organization would be those controlled by a large public sector union like COPE 378. This sentiment is readily apparent in Davis's response to Smyth regarding the clean, renewable energy sources that will eventually replace Burrard Thermal: "Great," she said. "Let's do it in a public—let's do it in a public way."

In response to Davis, Michael Smyth astutely commented: "So that's what it comes down to for you guys though, right; It's public versus private"—a question that is really only of interest and relevance to public sector unions like COPE 378 and COPE 378-affiliated organizations like Davis's.

Manitoba's electricity export agreement with Wisconsin reduces the production of greenhouse gases "by reducing the need for thermal generation in the United States."

Manitoba Premier Gary Doer—Manitoba Government News Release, April 17, 2008

Black Press legislative reporter and columnist Tom Fletcher has also written extensively and knowledgeably on the subject of green energy in British Columbia, and in a recent column he politely referred to the claims being made against green energy run-of-river projects by people and groups like Melissa Davis's and Rafe Mair's as "bunk."[58]

More recently, on the December 11, 2009 ***Cutting Edge of the Leg*** segment of the Bill Good Show on CKNW, host Bill Good again discussed the electricity export question with Vaughn Palmer and Keith Baldrey. Good stated: "One thing I don't really understand is the opposition to selling power to the United States. We want to sell as much wood to the United States as we can; we want to sell as much of almost everything as we can. What is the objection to selling power to the United States?"

Vaughn Palmer responded by saying: "I think it's a great idea to be doing it. A couple of Canadian provinces do it already—Québec, of course—it's a huge source of revenue for them." Palmer then spoke about Alaska's clean energy plans and the opportunity to "wheel" electricity through British Columbia to the lower forty-eight states and said: "Again, I think if we can get that kind of a deal going with the Americans, for British Columbia the long-term opportunity to sell into the United States market is strengthened."

[58] http://www.bclocalnews.com/opinion/68277737.html

Keith Baldrey agreed with Palmer and added: "... some of the opponents to this, including some New Democrats, forget it was actually the NDP government administration that got BC Hydro into the North American market in terms of selling power to the United States. So this predates the Liberals.... BC Hydro made a heck of a lot of money for the taxpayers of BC through Powerex, its export arm, generating power in BC and sending it south of the border, without having any negative impact on ratepayers here in this Province. It was all positive."

> *"... as Alberta has demonstrated, tapping into the revenue potential of a vast natural resource like British Columbia's clean, renewable energy can be a potent alternative to raising provincial revenue through a sales tax"*
>
> ***A Triple Legacy for Future Generations—BCCGE***

CKNW's Legislative Reporter Sean Leslie is also someone who has followed the green energy issue closely. While hosting CKNW's The World Today Weekend on the January 30, 2010, in response to NDP Energy Critic John Horgan who had said building infrastructure to export electricity is "profoundly wrong," Leslie stated: "But isn't that a resource we can sell, John? This is where I disagree with you—and we've had this argument before on this programme—but I mean I have no problem building to sell power to the United States. And you used the phrase 'despoiling rivers and valleys'. I mean these IPPs, they're not ruining massive river systems; it's not like damming the Peace River. These are mostly small projects that have small, minimal impacts on the environment."

In addition to the media, well-regarded academics like Andrew Weaver—lead author for the Nobel Prize-winning Intergovernmental Panel on Climate Change and professor and Canada Research Chair at the University of Victoria—have also commented on the question of exporting clean, renewable electricity generated in British Columbia.

In an opinion-editorial written by Professor Weaver in the April 28, 2009 Oak Bay News, Professor Weaver stated that "if we can generate excess green energy in B.C., a province blessed with so much potential for renewable energy production, we could export that energy to Alberta or the U.S. and displace energy production from highly-polluting coal-fired electricity plants." Professor Weaver went on to state that "there is no future for such [coal-fired electricity] plants and the sooner we eliminate them, the quicker we start to deal with global warming."[59]

[59] Oak Bay News, April 28, 2009. Andrew Weaver guest column

Interestingly, the question of exporting electricity to the United States also came up on CKNW's Christy Clark Show on August 31, 2009 during a discussion about Burrard Thermal between host Christy Clark and the NDP's Energy Critic, John Horgan. While discussing Burrard Thermal's role as a "backup" supply of electricity for the Lower Mainland, Clark pointed to the fact that the NDP, when they were in government during the 1990s, had cranked up Burrard Thermal to export electricity whenever money was needed. Christy Clark pointed out that then-Premier Glen Clark and his minister responsible at the time, Dan Miller, had cranked Burrard Thermal up for "many months of the year" and she asked Horgan how we could be certain that the NDP wouldn't do the same thing if they were ever to form government again.

Horgan responded that, when the NDP government was running Burrard Thermal "flat out," and selling the electricity to California, they were doing so as "an international service." Horgan then went on state that the NDP government's motive in running Burrard Thermal "flat out" was "altruistic" because California's "lights were going out" and "they needed the power to keep the largest economy in North America rolling and we provided it to them." However, Horgan also agreed with Christy Clark that "running Burrard Thermal all the time... is not the optimum energy solution to the Lower Mainland for a whole host of reasons, which [Clark had] articulated, and others have as well."[60]

"[The caller] talked about producing power to sell to the Americans. I don't have a problem with that; we try to sell as much lumber as we possibly can to the Americans"

CKNW Talk Show Host Bill Good: August 28, 2009 Bill Good Show

[60] To quote NDP Energy Critic John Horgan exactly, he stated: "But Christy, again, I don't want to debate with you the merits of running Burrard Thermal all the time. I agree with you. I agree that it is not the optimum energy solution to the Lower Mainland for a whole host of reasons, which you've articulated, and others have as well."

Prominent B.C. Environmentalists Support Renewable Energy

The urgent need to take action on climate change has also led prominent environmentalists like Dr. David Suzuki and Tzeporah Berman to speak out in support of developing British Columbia's renewable green energy resources as an alternative to burning fossil fuels like coal.

In a widely printed column on the subject of renewable green energy projects in British Columbia, Suzuki strongly agreed with the world's leading climate change scientists who have been very clear that we need to "reduce our reliance on non-renewable fossil fuels [and] look to renewable energy such as solar, wind, hydro and sustainable bioenergy."[61] As Dr. Suzuki stated in his column: "It's in our best interests to act quickly to get as much renewable energy into play as possible. As well as getting us off fossil fuels and combating global warming, renewable energy is also one way to dig ourselves out of the economic mess we're facing. It's good for business."[62]

> *"I personally don't care if renewables are built by Martians. We need to get it done right but we need to get it done"*
>
> ***Tzeporah Berman – "Backlash Against the Green Economy in BC," March 19, 2009***

Likewise, environmentalist Tzeporah Berman, one of the founders of the non-profit environmental group ForestEthics and a leading figure in the efforts to save Clayoquot Sound in the 1990s, wrote: "To vote against cap & trade or carbon taxes, or to campaign against renewable energy companies being allowed on the grid or against energy conservation, is to act against the reports of the Nobel Laureates on climate science and policy."[63]

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[61] "Run-of-river power projects may offer green energy solutions," By David Suzuki and Faisal Moola (March 31, 2009: http://www.straight.com/article-210518/david-suzuki-energy-urgency-pits-treehuggers-against-smokestack-pluggers

[62] Suzuki also spoke out against those—including self-serving public sector unions and the British Columbia NDP—who have been calling for a moratorium on green energy projects in British Columbia. Suzuki shares the view of Victoria's Dr. Andrew Weaver, a lead author for the Nobel Prize-winning Intergovernmental Panel on Climate Change, who (in a Vancouver Sun article) stated that "some environmental groups have chosen to abandon science and campaign against clean energy and climate policies."

[63] "Backlash Against the Green Economy in BC," by Tzeporah Berman (March 19, 2009: http://www.zerocarboncanada.ca/2009/03/19/backlash-against-the-green-economy-in-bc/

Berman says we need to follow the example and best practices of other jurisdictions that are successfully making the transition to a green economy by supporting independent renewable energy companies. She acknowledges that people want renewable energy done in environmentally sound ways, but as Berman stated: "I personally don't care if renewables are built by Martians. We need to get it done right but we need to get it done."[64]

> *It's not just California and the other western states that require our help: Alberta generates 78.7 percent of its electricity by burning coal, some of which we shamefully import into British Columbia to top up our province's bewildering shortage of clean generating capacity*
>
> ***A Triple Legacy for Future Generations—BCCGE***

In emphasizing the immediate action demanded by the global climate crisis, David Suzuki also cites environmentalist Bill McKibben, co-founder of 350.org. In McKibben's March 25, 2009 editorial entitled ***The fierce urgency of now*** McKibben states: "whatever natural endowments a region is blessed to have, these are the basis for your green economy: solar in the deserts, wind where it's windy, hydro where water's falling, geothermal if you've got it. Do it all, and do it quickly."[65] Green energy sources like wind, solar, run-of-river hydro, McKibben points out, "are precisely the kinds of renewable energy that every Earth Day speech since 1970 has trumpeted."

The dire consequences of climate change, and the urgent need to take action, were also the backdrop to last April's highly successful "Green Economy Dialogue" in Vancouver hosted by **PowerUP Canada.**[66] The one-day dialogue focused on the question of what it will really take to build a green economy in British Columbia and brought members of the public together with opinion leaders, decision makers, leading

[64] Berman also dismisses the notion that governments on their own have the capacity and financial wherewithal to shoulder the cost of the renewable energy development we need and at the scale needed. As Berman states: "… to think that the state alone can shoulder the finances or has the capacity to go it alone at the scale needed, is not supported by any empirical evidence on earth."

[65] "The fierce urgency of now," by Bill McKibben (March 25, 2009: http://www.thestar.com/article/607657

[66] http://www.greeneconomyconference.ca/index.html

academics, and journalists for “a rigorous, frank and engaging dialogue on building a low carbon green economy in British Columbia,” including discussion of the promise and challenges facing new green energy projects and the green jobs they create.

Keynote speakers and participants at PowerUP’s Green Economy Dialogue included:

- **Dr.Mark Jaccard,** internationally renowned academic and Professor in the School of Resource and Environmental Management at Simon Fraser University as well as a lead author on the Nobel prize winning Intergovernmental Panel on Climate Change’s Special Report on Renewables.
- **Guy Dauncey,** President, British Columbia Sustainable Energy Association.
- **Matt Horne,** BC Energy Solutions Program Director, Pembina Institute.
- **Karen Graham,** Senior Policy Analyst, Business Council of BC and project manager for the Business Council’s Corporate Responsibility Summit in October 2008 featuring former US President Bill Clinton.
- **Dave Crosby,** President, Construction, Maintenance & Allied Workers Union Local 2020.
- **Ian Gill,** President, Ecotrust Canada promoting the emergence of a conservation economy in the coastal temperate rainforests of North America.
- **Art Sterrit,** Executive Director, Coastal First Nation, member of the Gitga’at First Nation, and a leader in the implementation of the Coastal First Nations vision for a sustainable coastal economy.
- **George Hoberg,** Professor, Department of Forest Resources Management UBC where he teaches Sustainable Energy Policy and Governance.
- **Nicholas Heap,** Climate and Energy Policy Analyst, David Suzuki Foundation who works with government, scientists, energy experts and activists to advance sustainable energy solutions for government, utilities and the private sector.
- **Doug McArthur,** a Rhodes Scholar and Professor of Public Policy in the Graduate Public Policy Program at Simon Fraser University.
- **Merran Smith,** Director of Climate Program, ForestEthics and part of the vanguard of new environmentalism that actively promotes economic innovation and diversification as an integral component of environmental sustainability.
- **Bob Poore,** Senior Director of First Nations Partnerships Plutonic Power.
- **Matt Burns,** Vice President, NaiKun Wind Energy Group.
- **Bill Good,** host of the top-rated **Bill Good Show** on CKNW and co-anchor of CTV News at Six
- **Tzeporah Berman,** Executive Director and Co-founder of PowerUP Canada and ForestEthics as well as a seminal figure in the development and implementation of the campaign to protect Clayoquot Sound and the Great Bear Rainforest.
- **Keith Baldrey**, Global BC’s chief political reporter and a regular weekly commentator on CKNW’s Cutting Edge of the Ledge segment on the Bill Good Show.
- **Vaughn Palmer,** Vancouver Sun provincial affairs columnist and Cutting Edge of the Ledge commentator on CKNW’s Bill Good Show.
- **Chief Ken Brown,** elected Chief of the Klahoose First Nation and a passionate advocate of meaningful economic development and economic self-sufficiency for Klahoose peoples.

British Columbia's Renewable Green Energy Potential

Given British Columbia's enormous green energy potential, and the significant role it could play in the battle against climate change by helping our neighbouring provinces and states reduce their dependence on burning coal and gas to generate electricity, it is reasonable to ask two important questions: a) how much renewable green energy British Columbia could potentially produce and supply to neighbouring provinces and states, and b) how much revenue could this potentially provide for the people of British Columbia?

> *"What's wrong with B.C. actually being a leader in clean, green energy, and selling power to somewhere like California...? What is wrong with that?"*
>
> ***Guest Host Michael Smyth – CKNW's Christy Clark Show, August 28, 2009***

Green Energy Potential: Electricity and Alternative Energy Division

According to information on the website of the Electricity and Alternative Energy Division (EAED) of the Ministry of Energy, Mines and Petroleum Resources (see Appendix 2), British Columbia has the potential to generate 36,088 megawatts of renewable electricity—more than three times the current generating capacity of BC Hydro and the province's independent green energy producers combined (see Table 6 below).[67] This is a staggering amount of potential generating capacity as is the estimated 143,900,000 megawatt/hours of renewable green electricity this 36,088 megawatts of generating potential could produce—enough renewable green energy to power an amazing 12.8 million households or 360 large industrial users.[68]

[67] Electricity and Alternative Energy Division (EAED), Ministry of Energy, Mines and Petroleum Resources: http://www.empr.gov.bc.ca/EAED/EnergyEfficiency/Documents/BC%20Renewable%20Energy%20Potential.pdf. (Note: Independent green energy producers provide approximately 1,000 MW of generating capacity which represents 9% of BC Hydro's 11,000 MW total system capacity: http://www.ippbc.com/quick_facts_list/).

[68] The EAED estimate appears to assume an average net capacity factor of roughly 45 percent in order to yield 143,900 gigawatt hours of electricity per year. According to BC Hydro, the average household in BC Hydro's service area uses 11,258 kilowatt hours per year, and a large industrial customer such as a pulp mill might use as much as 400 gigawatt hours of electricity in a year. http://www.bchydro.com/etc/medialib/internet/documents/about/company_information/quick_facts.Par.0001.File.quick_facts.pdf

Table 6: British Columbia's Renewable Electricity Potential (Electricity and Alternative Energy Division (EAED), Ministry of Energy, Mines and Petroleum Resources).

Region	Small Hydro (run-of-river)	Large Hydro	Wind	Geothermal	Biomass[69]	Total
North Coast	583		4,368			**4,951**
Peace River	258	912	6,256			**7,426**
Central Interior	100		582		6,952	**7,634**
Vancouver Island	158		1,553			**1,711**
Lower Mainland	4,542			440		**4,982**
Kelly Lake	191		310			**501**
Nicola	264	1,000	3,940			**5,204**
Selkirk	301	1,000	290			**1,591**
East Kootenays	428					**428**
North West	800		40	800	20	**1,660**
(Megawatts)	7,625	2,912	17,339	1,240	6,972	**36,088**

And when you consider the fact that electricity consumption in the US is typically closer to 10 megawatt-hours per year per household than it is to the 11.3 megawatt-hours per year seen in British Columbia, 143,900,000 megawatt-hours of electricity would be enough to power a staggering 14.4 million households—considerably more than enough clean, renewable electricity needed to power every household in California, a state where nearly half of the people in western North America live and where two-thirds of the electricity is generated by burning fossil fuels like coal and gas.[70]

As a useful point of comparison to the 143,900,000 megawatt/hours of renewable British Columbia green electricity noted above, Manitoba Hydro is planning to have 10,700,000 megawatt/hours per year available solely for export by 2023/24. The 143,900,000 megawatt-hours of clean, renewable electricity that British Columbia could potentially generate according to the Electricity and Alternative Energy Division's estimate is therefore nearly fourteen times greater than Manitoba's entire, very considerable, electricity export target of 10,700,000 megawatt/hours per year for 2023/24.

[69] The Central Interior has 2,720 megawatts of biomass capacity from Pine Beetle wood and 4,232 megawatts of biomass capacity from Sustainable Forestry. We have combined these into a single biomass figure under the biomass heading for simplicity sake.

[70] U.S. Census Bureau State & County QuickFacts: http://quickfacts.census.gov/qfd/states/06000.html. California has an estimated 2008 population of 36,756,666 and, based on U.S. Census 2000 figures, there are 2.87 persons per household. This works out to an estimated 12.8 million households in California. Two-thirds of California's electricity comes from carbon-emitting fossil fuels like coal (20.1 percent of electricity generation) and gas (37.7 percent of electricity generation).

Western Renewable Energy Zones – Phase 1 Report

Another useful measure of British Columbia's potential for generating renewable green energy is the June 2009 ***Western Renewable Energy Zones – Phase 1 Report*** released by the Western Renewable Energy Zones Initiative (WREZ). The WREZ Phase 1 report attempts to quantify and estimate the renewable electricity generating capacity for wind, solar, geothermal, hydro, and biomass generating sources within each province and state connected to the western North American electricity grid.[71]

> *"…solar in the deserts, wind where it's windy, hydro where water's falling… [these] are precisely the kinds of renewable energy that every Earth Day speech since 1970 has trumpeted"*
>
> ***Environmentalist Bill McKibben, co-founder 350.org***

The WREZ project is a joint initiative of the Western Governors' Association and the U.S. Department of Energy and its goal is to facilitate the efficient regional development of high voltage transmission lines from areas with the potential for "abundant renewable resources and low or easily mitigated environmental impacts."[72] However, it should be pointed out that although the WREZ data is useful and provides a measure of renewable energy potential across western North America, the WREZ data somewhat underestimates British Columbia's renewable energy potential due to its emphasis on identifying areas in western North America that feature "the potential for large scale development of renewable resources" at a "utility scale," which is defined as being between 500 megawatts and 1,500 megawatts of total capacity.[73]

Nevertheless, and with all caveats noted, the WREZ Phase 1 Study estimates that British Columbia has the potential to generate a total of 21,315 megawatts of clean,

[71] As the WREZ Phase 1 report indicates, vast renewable energy resources are known to exist throughout western North America but many of these are located in remote areas without easy or cost effective access to existing transmission infrastructure. According the WREZ report, this remains one of the "greatest impediments to the rapid development of utility-scale, renewable-rich resource areas."

[72] The WREZ initiative is guided by a steering committee comprising the governors of the 11 Western states within the Western Interconnection, public utility commissioners from each of those states, and the premiers of British Columbia and Alberta.

[73] Western Renewable Energy Zones – Phase 1 Report, p. 2.

renewable electricity as can be seen in Table 7 below.[74] This is nearly double British Columbia's current total generating capacity of 11,345 megawatts (which includes hydroelectric and thermal generating sources—10,259 and 1,040.5 megawatts respectively—and 46 megawatts of diesel generation) and would be enough clean, renewable electricity to power nearly 7.5 million households.[75]

Table 7: Western Renewable Energy Zones – Phase 1 Report: Potential Renewable Energy Capacity (measured in megawatts - MW).

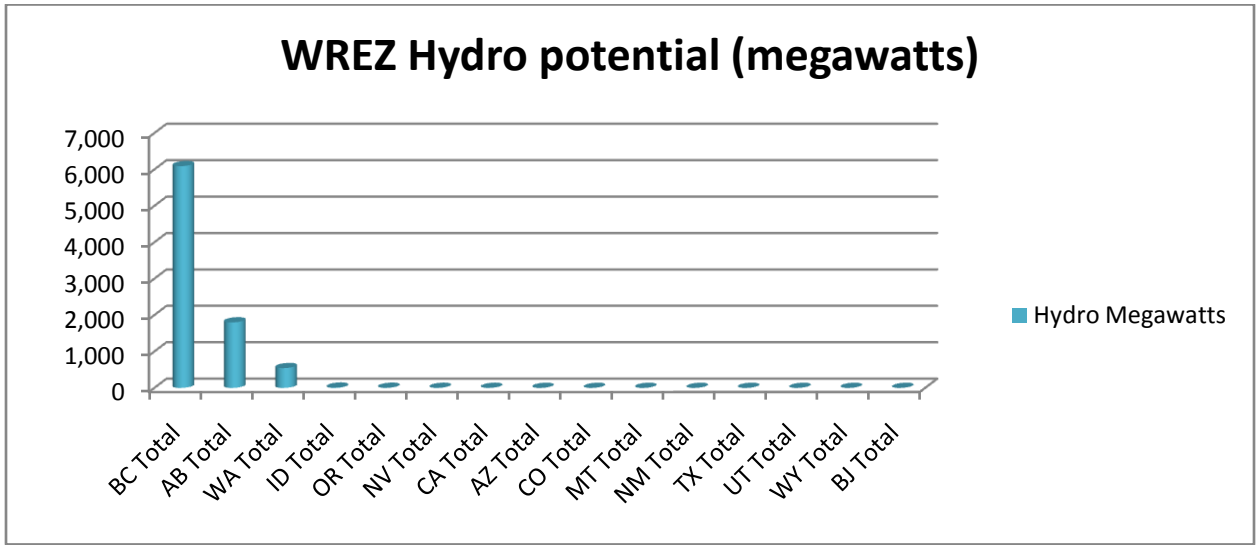
Hub state/ province	Solar MW	Wind MW by wind power class	Geothermal MW		Hydro MW	Biomass MW	Total MW
BC Total	**0**	**13,943**	**340**	**0**	**6,092**	**939**	**21,315**
AB Total	0	4,429	0	0	1,800	268	6,497
WA Total	0	3,260	0	300	544	101	3,905
ID Total	0	1,603	279	1,872	8	358	2,249
OR Total	0	2,897	832	1,893	3	646	4,378
NV Total	18,582	431	1,368	4,364	2	300	20,683
CA Total	16,069	6,042	1,434	11,340	2	147	23,693
AZ Total	19,780	3,717	0	1,043	0	327	23,824
CO Total	2,303	15,679	0	1,105	0	153	18,135
MT Total	0	10,059	0	771	0	147	10,206
NM Total	13,718	13,184	0	1,484	0	223	27,124
TX Total	4,277	507	0	0	0	3	4,787
UT Total	7,202	1,678	225	1,464	0	91	9,196
WY Total	0	14,854	0	174	0	16	14,869
BJ Total	4,991	2,937	0	0	0	0	7,928
	SOLAR TOTAL	WIND TOTAL	Discovered	Undiscovered			WREZ only
Grand Total	***86,921***	***95,219***	***4,478***	***25,810***	***8,452***	***3,720***	***198,789***

As one might expect, British Columbia leads the WREZ pack in hydroelectric generation potential with an identified 6,092 megawatts of generating capacity as can easily be seen in graph 1 below. Alberta follows British Columbia with 1,800 megawatts of potential hydro capacity and Washington State trails in third place with 544 megawatts of potential hydro capacity.

[74] Owing to the fact that the WREZ study focuses exclusively on large, utility scale sources of renewable electricity generation, the significant clean energy contribution that the province's smart meter and smart electricity grid initiatives will add to British Columbia's total capacity for generating renewable electricity is not accounted for in the WREZ estimates. Smart meters and a smart grid (which are targeted by the province for 2012) will make it possible for BC Hydro customers who produce more renewable electricity than they consume to sell their excess power back to BC Hydro and thereby make it available to others.

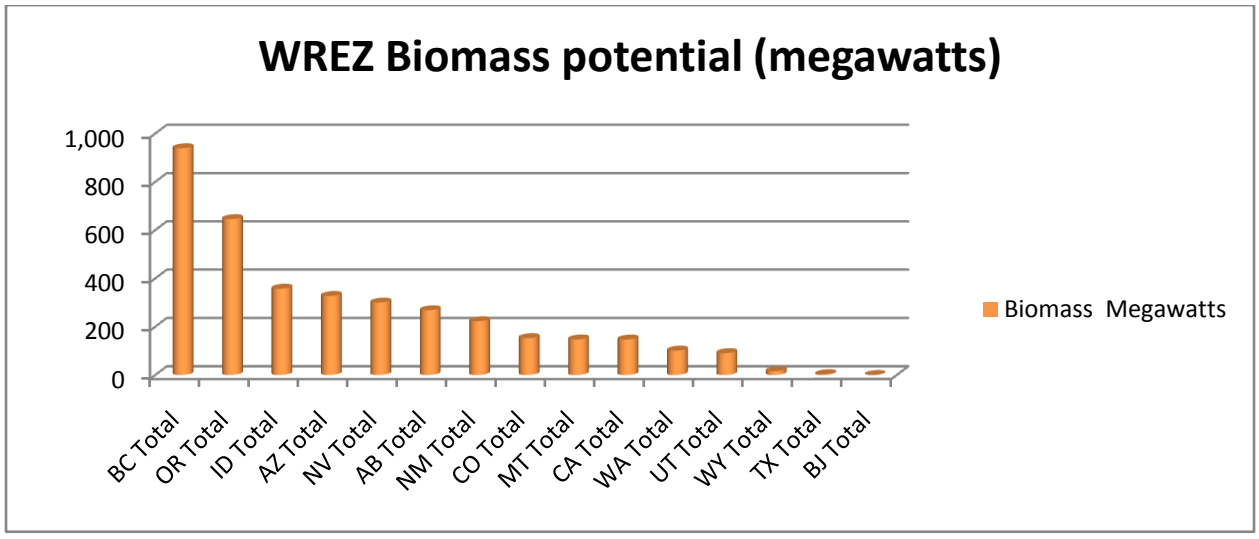
[75] 21,315 megawatts of generating capacity could generate a theoretical 186,719,400 megawatt hours of electricity per year. Divided by the same 45 percent net capacity factor implied in the EAED estimate this would yield 84,023,730 megawatt hours, which, divided by an average household consumption of 11.258 megawatt hours per household per year, equals enough power for 7,463,469 households.

Graph 1: Hydro Potential



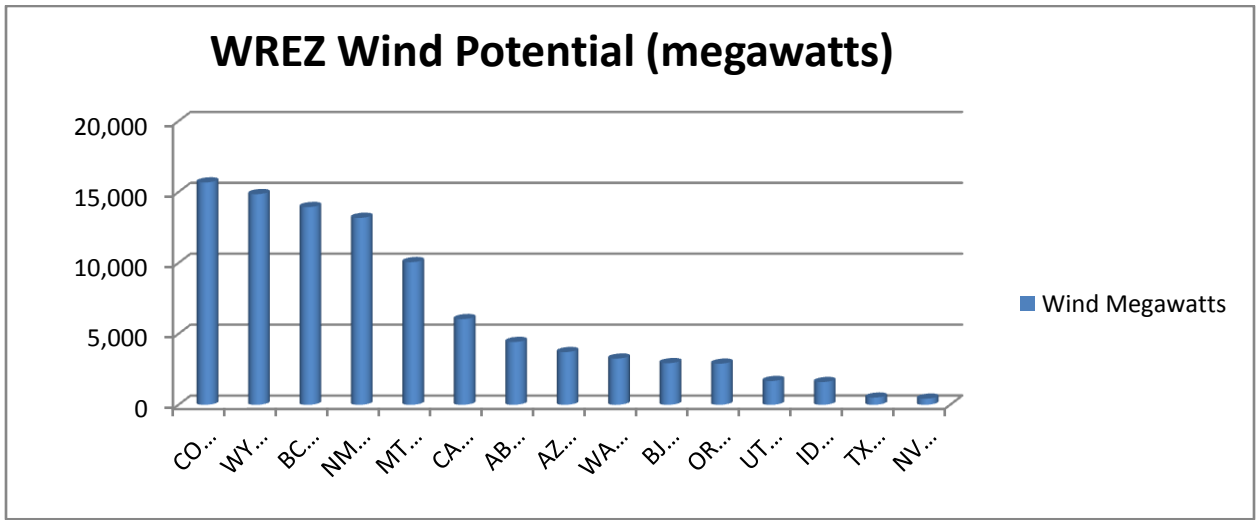
British Columbia also fares well in the WREZ estimates for biomass potential. As graph 2 illustrates, British Columbia is in the top spot with 939 megawatts of capacity followed by Oregon with 646 megawatts and Idaho and Arizona with 358 and 327 megawatts of capacity respectively.

Graph 2: Biomass Potential



In terms of potential wind power, the WREZ data places British Columbia in third place with 13,945 megawatts of potential generating capacity, close behind Colorado at 15,679 megawatts of potential capacity and Wyoming at 14,854 megawatts of capacity as can be seen in graph 3 below.

Graph 3: Wind Potential



Overall, it is readily apparent from the WREZ estimates that British Columbia has some of the highest potential in western North America for generating renewable green electricity and we have it in multiple generating categories: wind, hydro and biomass.

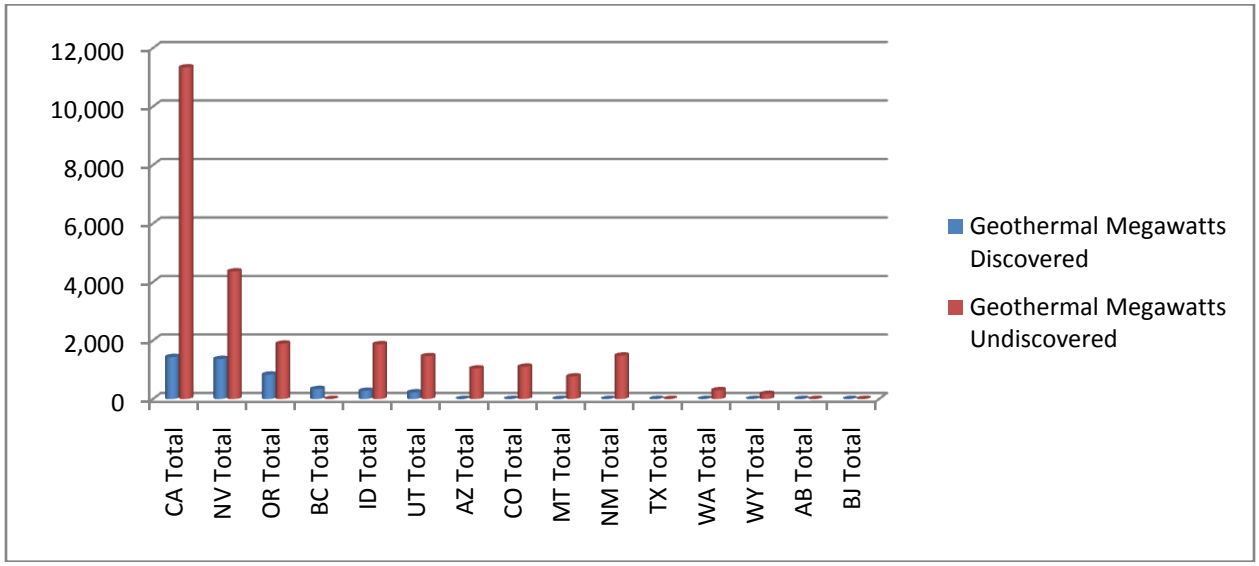
The $2.2 billion we currently spend servicing the province's debt would be enough to build six 300 bed hospitals similar to the new Abbotsford Regional Hospital and Cancer Centre

A Triple Legacy for Future Generations—BCCGE

However, the WREZ estimates only give British Columbia credit for 340 megawatts of potential geothermal power which barely registers compared to the WREZ estimates for California, Nevada and Oregon. In actual fact, British Columbia's geothermal potential is known to be fairly substantial and it potentially ranges as high as several thousand megawatts of generating capacity.

For example, the Canadian Geothermal Energy Association (CanGEA) estimates British Columbia's total geothermal energy potential at 3,000 to 6,000 megawatts which is ten to twenty times greater than the WREZ estimate.[76] Likewise, the estimates compiled by the Electricity and Alternative Energy Division (EAED) of the Ministry of Energy, Mines and Petroleum Resources pegs British Columbia's geothermal potential at 1,240 megawatts of capacity, which is also considerably higher than what is shown for British Columbia in the WREZ data.

Graph 4: WREZ Geothermal potential (megawatts)



The underestimation of British Columbia's renewable green energy in the WREZ Phase 1 report was commented on in considerable detail in a joint submission to the WREZ initiative by five British Columbia environmental organizations, including the David Suzuki Foundation, West Coast Environmental Law and ForestEthics (see Appendix 3).[77] As these groups pointed out in their submission, the methodology used to

[76] "Review of WREZ's analysis of renewable energy resources in British Columbia, and the results shown on the *Draft Preliminary Qualified Resource Areas Map*." Nicholas Heap, Climate and Energy Policy Analyst, David Suzuki Foundation; Dave Neads, Director, Bioenergy Program, B.C. Spaces for Nature; Merran Smith, Director, Climate Program, ForestEthics; Greg Gowe, Staff Counsel, West Coast Environmental Law; and Wendy L. Francis, Director of Conservation: Science and Action, Yellowstone to Yukon Conservation Initiative. p. 9. http://www.westgov.org/wga/initiatives/wrez/comments/BC%20ENGO%20submission%20re%20QRA%20map%20-%20technical%20appendix.pdf

[77] "Review of WREZ's analysis of renewable energy resources in British Columbia, and the results shown on the *Draft Preliminary Qualified Resource Areas Map*." Nicholas Heap, Climate and Energy Policy Analyst, David Suzuki Foundation; Dave Neads, Director, Bioenergy Program, B.C. Spaces for Nature; Merran Smith, Director, Climate Program, ForestEthics; Greg Gowe, Staff Counsel, West Coast Environmental Law; and Wendy L. Francis, Director of Conservation: Science and Action, Yellowstone to Yukon Conservation Initiative. (http://www.westgov.org/wga/initiatives/wrez/comments/BC%20ENGO%20submission%20re%20QRA%20map%20-%20technical%20appendix.pdf)

estimate British Columbia's renewable energy potential for the WREZ differed from that used to estimate the potential of other WREZ jurisdictions with the result being an underrepresentation of potential renewable energy resources in British Columbia relative to other western North American jurisdictions.

For example, the environmental groups' joint submission notes that wind resources in one-third of British Columbia (comparable in size to the whole state of Wyoming) were not accounted for in the WREZ estimates due to "exclusive reliance" on a 2008 BC Hydro study.[78] The WREZ estimates also neglect to include the Haida Energy Field located in Hecate Strait which is estimated to have a total renewable wind generation capacity of 15,000 megawatts.[79]

Likewise, "a large proportion" of British Columbia's viable hydroelectric resources do not appear to have been considered by the WREZ Analysis which the environmental groups believe will "far exceed the amount shown on the current Draft QRA Map."[80]

When the 15,000 megawatts of potential wind generating capacity from the Haida Energy Field and the estimated 3,000 to 6,000 megawatts of geothermal capacity cited by the Canadian Geothermal Energy Association are added to the WREZ estimate of 21,315 megawatts of clean, renewable electricity, British Columbia's potential capacity for generating clean, renewable electricity could be as high as 39,000 to 42,000 megawatts of potential capacity—nearly four times British Columbia's existing generating capacity—and not out of line with the 36,100 megawatts of renewable electricity potential estimated by the Electricity and Alternative Energy Division (EAED) of the Ministry of Energy, Mines and Petroleum Resources.

"[The caller] talked about producing power to sell to the Americans. I don't have a problem with that; we try to sell as much lumber as we possibly can to the Americans"

CKNW Talk Show Host Bill Good: August 28, 2009 Bill Good Show

[78] *Ibid.,* p. 5.

[79] *Ibid.,* p. 6.

[80] *Ibid.,* p. 9.

Pacific Gas and Electric Company's BC Renewable Study Phase 1

Another useful source for gauging British Columbia's potential for generating clean, renewable electricity is the Pacific Gas and Electric (PG&E) BC Renewable Study Phase 1 (June 20, 2008). Although PG&E's estimate of British Columbia's potential renewable electricity is focused on the amount of renewable electricity generating capacity that could potentially be in place by 2016, and based on development trends at the time their report was drafted, PG&E's estimates are worth considering—particularly in terms of establishing an achievable renewable electricity export target for British Columbia over the next several years.

PG&E conducted an in-depth analysis of British Columbia's potential wind, small hydro run-of-river, biomass and geothermal renewable generation and observed that British Columbia's considerable potential for renewable electricity generation is far in excess of what British Columbia needs to serve its own forecasted electricity load.[81]

Table 8 below illustrates the amount of renewable generating capacity that could potentially be available in British Columbia by 2016 according to PG&E's BC Renewable Study Phase 1. All combined, PG&E's study estimates that British Columbia could have between 8,300 and 17,250 megawatts of clean, renewable electricity generating capacity available by 2016 from run-of-river hydro, wind, biomass, and geothermal sources—potentially doubling and nearly tripling British Columbia's current generating capacity.[82]

Table 8: Pacific Gas and Electric Company – BC Renewable Study Phase 1: page 2 (June 20, 2008)

Generation Source	Potential Generating Capacity that Could Be Available by 2016		Potential Amount of Energy Generation that Could Be Available by 2016		Net Capacity Factor	Potential Capacity Beyond 2016
Units	**Megawatts**		**Gigawatt-hours per year**		**%**	**Megawatts**
Run-of-River Hydro	3,100	6,150	12,500	24,700	46%	4,480
Wind	4,400	10,300	11,500	26,900	30%	1,500
Biomass	700	700	5,200	5,200	85%	820
Geothermal	100	100	800	800	90%	600
Totals	**8,300**	**17,250**	**30,000**	**57,600**	--	**7,400**

[81] Note: "Given the vast amount of potential renewable resources in BC, the strong feasibility of building a transmission line, good indicators of commercial viability, and the results of economic analyses, PG&E has decided to proceed to Phase 2 of the Project, including pursuit of discussions with Powerex and transmission development activities." Pacific Gas and Electric (PG&E) BC Renewable Study Phase 1 (June 20, 2008). http://www.pge.com/includes/docs/pdfs/mybusiness/customerservice/nonpgeutility/electrictransmission/canada/BC%20Renewable%20Study.pdf

[82] PG&E reviewed each potential transaction structure in the context of obtaining benefits to the parties to the transaction as well as the ability to transact under that structure. Based on that review, PG&E believes that the fourth alternative of contracting directly with an entity such as BC Hydro and/or Powerex through a power purchase agreement to deliver an all-in product at the US/Canadian border is the most viable option to obtain renewable generation.

Again, it is important to note that PG&E's estimates are not an estimate of British Columbia's total potential for generating clean, renewable electricity but rather an estimate of the amount of generating capacity that could conceivably be available by 2016 in PG&E's scenario. But even by this relatively modest measure, British Columbia could potentially have nearly three times its current generating capacity available within seven years and have the capacity to generate substantial amounts of renewable green energy for export to neighbouring province's and states dependent on fossil-fuels.

British Columbia's Wind and Tidal Energy Resources

It should also be noted that in addition to the renewable wind, hydro, biomass and geothermal energy resources noted above, British Columbia also has significant potential to generate clean, renewable electricity from wave and tidal energy. British Columbia's wave energy potential is estimated to be in the range of 20,000 megawatts and potential tidal energy in the range of 4,000 megawatts. And "more than 30 potential ocean energy sites" have already been "identified and received preliminary permitting."[83]

Although wave and tidal power generation are currently more costly than the other forms of green energy that British Columbia is naturally blessed with, the cost of these energy sources will inevitably come down over time as wave and tidal energy technologies become increasingly viable on a commercial scale.

A prime example of the progress being made in bringing wave and tidal generated electricity online in British Columbia is the funding recently received by SyncWave Systems from the federal government's Clean Energy Fund for Renewable Energy and Clean Energy Systems Demonstration Projects. SyncWave's project—which will be located off Central Vancouver Island near Tofino—was selected for funding to demonstrate the performance, operations and life cycle of a pre-commercial 100-kW wave energy device in ocean conditions typical of British Columbia's open coast to further the technology and the understanding of ocean conditions and the regulatory environment.[84]

Although wave and tidal technology are in their infancy in British Columbia and not yet producing electricity on the scale that other technologies like wind, run-of-river, geothermal and biomass are poised to generate, when British Columbia's potential

[83] http://www.empr.gov.bc.ca/MACR/investors/Documents/Renew(small).pdf

[84] http://www.nrcan.gc.ca/media/newcom/2010/201001a-eng.php

wave and tidal resources are added to the province's other green energy resources, it can convincingly be shown that nearly 79,848 megawatts of clean, renewable energy potentially exist in British Columbia—nearly eight times the current 10,259 megawatts of clean, renewable generating capacity available from BC Hydro's heritage hydroelectric sources and more than seven times the current clean generating capacity of BC Hydro and its independent green energy suppliers combined (see Table 9 below).

Table 9: British Columbia's theoretical green energy potential in megawatts

Information Source	Hydro & ROR[85]	Wind	Geothermal	Biomass	Wave	Tidal	Total
EAED estimate[86]	10,537	17,339	1,240	6,972	—	—	36,088
WREZ estimate[87]	6,092	13,943	340	939	—	—	21,315
CanGEA estimate[88]	—	—	3,000 - 6,000	—	—	—	—
Haida Energy Field[89] *plus wave and tidal*	—	15,000	—	—	20,000	4,000	—
Theoretical Total	**10,537**	**32,339**[90]	**6,000**	**6,972**	**20,000**	**4,000**	**79,848**

Needless to say, developing 79,848 megawatts of clean, renewable generating capacity in British Columbia would be virtually impossible given the staggering amount of investment and labour that would be needed, not to mention the lengthy and painstakingly rigorous environmental reviews and studies required in the project approval and permitting process. As an example, BC Hydro's entire 10,259 megawatts of heritage hydroelectric generating capacity took several decades to accumulate, albeit with no new mega dams having been constructed since the 1980s. The 79,848

[85] This figure includes large hydro sources and small hydro sources like run-of-river (ROR). The Electricity and Alternative Energy Division (EAED) of the Ministry of Energy, Mines and Petroleum Resources, British Columbia estimates a potential 7,625 megawatts of small run-of-river hydro capacity and 2,912 megawatts of large hydro capacity.

[86] Electricity and Alternative Energy Division (EAED) – BC Ministry of Energy, Mines and Petroleum Resources

[87] Western Renewable Energy Zones – Phase 1 Report: Western Renewable Energy Zones Initiative (WREZ).

[88] Canadian Geothermal Energy Association (CanGEA)

[89] The Haida Energy Field is located in Hecate Strait and is estimated to have a renewable wind generation capacity of at least 15,000 megawatts.

[90] This figure represents the 17,339 megawatt province-wide estimate from the EAED combined with the 15,000 megawatts of potential in the Haida Energy Field. The EAED wind estimate for the north coast likely includes some of the potential in the Haida Energy Field already. However, estimates of the wind potential of the Haida Energy Field vary and are as high as 20,000 megawatts of capacity. We have opted to use the most common figure (15,000 megawatts) which allows room for error in the combined wind potential estimate.

megawatts of green energy capacity cited here merely serves as an indication of the immense green energy potential British Columbia actually has.

Moreover, there is never any guarantee that a specific green energy project will be approved or that a specific site will prove to be viable. In fact, most green energy projects never get past the preliminary study phase and are abandoned, often after millions of dollars have been spent on detailed environmental studies, project planning and site testing. Green energy projects in British Columbia typically require more than 50 approvals, permits and licenses from 14 government regulatory bodies before they can get underway.

To cite just one example, the Toba Montrose run-of-river project currently under construction in the headwaters of Toba Inlet (with an estimated capital cost of $660 million) carries with it over 1,600 separate commitments, restrictions, obligations and regulatory requirements.

For the few projects that do manage to jump through all of the regulatory hurdles and make their way through the bureaucratic red tape to reach the full-blown public hearing stage under the full gaze of the Province's Environmental Assessment Office (EAO), the risk, the time and the investment involved has been considerable and without any guarantee of success.

IPPBC: Economic Impact Analysis of Independent Power Projects

PricewaterhouseCoopers LLP recently carried out an Economic Impact Analysis of Independent Power Projects in British Columbia for the Independent Power Producers of BC (IPPBC), with a primary focus on the positive economic impact that billions of dollars in capital investment on green energy projects, and the jobs that would be created, would have on the British Columbia economy.

Although the focus and purpose of PricewaterhouseCoopers's economic analysis is very different from the focus and purpose of this BCCGE research report, electricity exports and ongoing revenue to the province from taxes, permits, licenses and other fees did figure among the many positive economic impacts that independent green energy projects could have in British Columbia.

In relation to the positive economic impact that renewable green energy exports could have for British Columbia, PricewaterhouseCoopers made note of the great opportunity

that renewable energy legislation in neighbouring jurisdictions like California and Washington State represents for renewable energy exports from British Columbia.[91]

PricewaterhouseCoopers also made note of the June 2009 Western Renewable Energy Zones – Phase 1 Report (WREZ) and the 65,500,000 megawatt-hours of renewable electricity the WREZ report estimates British Columbia could potentially generate from various wind, hydro, geothermal and biomass sources—renewable energy that could be exported from British Columbia limited only by the capacity to transmit the electricity.[92]

> Since 2001, Québec's electricity exports have prevented more than 30 million tonnes of GHGs from being emitted into the atmosphere—a significant contribution to the battle against global climate change and roughly equivalent to the amount of GHGs that would be created in a year by 7,870,000 cars
>
> ***Hydro-Québec Strategic plan 2009—2013***

However, while they acknowledge the WREZ estimate of 65,500,000 megawatt-hours of potential renewable energy that could be generated in British Columbia and the immense export potential that it represents, the sections of PricewaterhouseCoopers Economic Impact Analysis that reference renewable energy exports are based on a conservative forecast scenario by IPPBC in which British Columbia's independent green energy producers might only capture 10 percent of the total 120,000,000 megawatt-hours of renewable electricity currently legislated in renewable portfolio standards (RPS) across the Western North America; i.e., just 12,000,000 megawatt-hours of renewable electricity exports from British Columbia which is less than one-fifth of the WREZ estimate of British Columbia's green energy potential.[93]

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[91] **"**A study published by the Western Governors Association and the US Department of Energy attempted to identify and quantify the potential amount of renewable energy that could be supplied into the Western Interconnection. The paper estimates that British Columbia could eventually supply as much as 34,000 GWh from wind farms, 2,500 GWh from geothermal plants, 22,000 GWh from hydro plants and 7,000 GWh from biomass facilities. Should these estimates prove accurate, the export potential from British Columbia could be large but at the same time could be limited by transmission infrastructure." p. 33

[92] http://www.ippbc.com/media/FINAL%20IPP_Report(Feb%2010).pdf p. 34.

[93] http://www.ippbc.com/media/FINAL%20IPP_Report(Feb%2010).pdf p. 12.

IPPBC's cautious export forecast is completely understandable given the slow pace of approval and the red tape that green energy projects have hitherto experienced in British Columbia. However, the comprehensive strategy announced in the February 9, 2010 Speech from the Throne (see Appendix 6), which promises to put British Columbia at the forefront of clean energy development, and the new Clean Energy Act that will encourage investments in independent power production could change the situation considerably. As Premier Gordon Campbell stated at the Global Business Leaders Day forum during the 2010 Olympic Games celebrations, Canada's green energy producing provinces have the potential to power "all of the North American economy."[94]

Given the strong commitment to developing British Columbia's green energy potential evident in the Throne Speech along with the green energy vision expressed by Premier Campbell and the legislative drive in neighbouring jurisdictions like California to increase the proportion of their electricity coming from renewable sources, it is entirely likely that renewable green energy from British Columbia will ultimately be able to capture a much greater share of the renewable energy market than IPPBC has forecast in their understandably cautious scenario.[95]

And given the price of carbon that will inevitably be placed on electricity generated by burning fossil fuels like coal and gas—a carbon cost that renewable green energy from British Columbia will not have to bear—renewable energy from British Columbia may well prove to be the most cost-effective source of electricity for places like California.

It may even turn out that, with an available supply of cost-effective, carbon-free electricity from British Columbia, places like California would be inclined to exceed their renewable energy standards which would make it possible for cost-effective renewable energy from British Columbia to capture a share of the 67 percent of California's 2020 electricity needs that do not legally have to come from renewable energy sources.

And beyond 2020, in order to achieve the carbon reduction levels needed to arrest global climate change, it is likely that California and other jurisdictions reliant of coal-fired electricity will need to increase their renewable energy standards—which would open the door to an increased proportion of green energy exports from British Columbia.

[94] "Trade minister touts Canadian advantage," by Scott Simpson. Vancouver Sun: February 23, 2010 (Page F2).

[95] On September 15, 2009, California Governor Arnold Schwarzenegger signed Executive Order S-21-09 directing the state's Air Resources Board (ARB) to adopt regulations increasing California's Renewable Portfolio Standard (RPS) to 33 percent by 2020.

The Revenue Potential of British Columbia's Green Energy Resources

Calculating the revenue that could potentially be generated for the people of British Columbia by unlocking the province's vast green energy resources is certainly not a simple task owing to the many variables that come into play including the type of generating technology being used (e.g., wind, geothermal, run-of-river), the quality of the energy source employed, and the amount of green energy produced.

There are also several potential revenue streams that need to be considered including license fees, permits, levies, corporate income taxes (federal and provincial), the net revenue that BC Hydro (through Powerex) would generate as the likely marketer and shaper of British Columbia's green energy, and revenue from the carbon offsetting and "environmental attributes" of renewable green energy that have monetary value in emerging carbon trading mechanisms and cap and trade markets.

> *"One thing I don't really understand is the opposition to selling power to the United States. We want to sell as much wood to the United States as we can; we want to sell as much of almost everything as we can. What is the objection to selling power to the United States?"*
>
> ***CKNW Talk Show Host Bill Good: December 11, 2009 Bill Good Show***

It is important to note that developing British Columbia's green energy resources will certainly not happen overnight. It will take time. Green energy projects take many years to get off the ground with seemingly endless reviews and studies and considerable financial risk. A prime example is the NaiKun offshore wind project in Hecate Straight which recently received approval from the province's Environmental Assessment Office after more than six years of extensive, in-depth studies and reviews and at great cost. Nevertheless, British Columbia's immense green energy potential remains a fact and the green energy opportunities available are clearly worth pursing because of the many benefits they can bring to this province—economically, environmentally and socially.

In order to determine the potential revenue return that could be generated for the people of British Columbia by developing our green energy resources, some reasonable benchmarks for the development or these resources and their potential generating capacity must be established. The three key sets of data examined above—namely,

the estimate from the Electricity and Alternative Energy Division (EAED) of the Ministry of Energy, Mines and Petroleum Resources, the estimates in the Western Renewable Energy Zones – Phase 1 Report (WREZ), and the estimates in the Pacific Gas and Electric (PG&E) BC Renewable Study Phase 1—provide these reasonable benchmarks and are generally consistent with one another.

To determine the revenue that any given green energy project or source can produce, the key concept that needs to be considered is the constancy of the energy source and the amount of energy it can generate, i.e., the "capacity factor." The capacity factor is determined by comparing the theoretical maximum electricity output, i.e., how much electricity a project could generate if it could run 24 hours a day 365 days a year, to its actual output. A generator that runs at full capacity for 12 hours a day, for example, would have a net capacity factor of 50 per cent.

In theory, geothermal power can come close to a 100 per cent net capacity factor because the heat source is constant and—barring any mechanical breakdown or service downtime—it could run non-stop (recognizing, of course, that electricity demand is also a limiting factor).

The same theoretical net capacity factor of 100 per cent could also apply to biomass where the biggest limiting factor is typically how much biomass is available.

Large Hydro dams also tend to have a high capacity factor and are theoretically dependent only on the amount of water stored in their reservoirs and the demand for the electricity they produce. Large hydro dams typically fall into the 70 to 95 per cent capacity factor range—but as we've seen in British Columbia over the past decade, low water levels have had a impact on the amount of electricity that BC Hydro's large mega dams have been able to produce which has led to BC Hydro becoming a net importer of electricity in most years of late.[96]

Wind power typically has a net capacity factor in the range of 25 to 30 per cent while run-of-river is typically in the 30 to 45 per cent capacity range. However, the capacity factor for a run-of-river can easily jump up to the 60 per cent range if there is, for

[96] BC Hydro's 2008 Annual Report states that, "prior to fiscal 2008, BC Hydro was a net importer of electricity for seven consecutive years due to average or below average system water conditions every year." BC HYDRO 2008 ANNUAL REPORT (for the period April 1, 2007 through March 31, 2008) page 67. And although fiscal 2008 was "an exceptional inflow year, with inflows well above normal," BC Hydro projects fiscal 2009 will see a return to "average inflow conditions" and an expectation that "BC Hydro will once again be a net importer of electricity." http://www.bchydro.com/etc/medialib/internet/documents/info/pdf/info_annual_report_2008.Par.0001.File.info_annual_report_2008.pdf.

BC Hydro serves 95 per cent of B.C.'s population, as noted in BC Hydro's 2009/10–2011/12 Service Plan, and BC Hydro's status as a net importer of electricity can be taken as fairly representative of the current state of affairs in British Columbia (BC Hydro Service Plan 2009/10–2011/12, page 9). Eighty-eight per cent of BC Hydro's approximately 1.8 million customer accounts are residential, with the remainder being either commercial or industrial. Each of these three groups consumes roughly one third of the total electricity supplied by BC Hydro. (http://www.bchydro.com/etc/medialib/internet/documents/info/pdf/service_plan.Par.0001.File.service_plan_2009-10-2011-12.pdf).

example, a lake or some other form of natural water storage associated with the project. Or, as is the case in much of coastal British Columbia, if there are copious amounts of water available on an ongoing basis due to frequent rainfall.

By applying the appropriate capacity factors for each type of green energy generation represented in the renewable energy estimates from the EAED, the WREZ, and the PG&E data[97] it can be shown that British Columbia could reasonably have the potential to generate between 30,090,600 to 140,368,050 megawatt-hours of renewable green energy each year as shown in Table 10 below—enough green electricity to power 2.7 million to 12.4 million houses.

Table 10: Potential megawatt-hours of electricity per year

Energy Source (megawatts)	EAED estimate	WREZ estimate	PG&E estimate	Net Capacity Factor	Potential number of megawatt-hours generated
small hydro run-of-river	7,625	6,092	3,100 - 6,150	45%	12,220,200 – 30,057,750
large hydro	2,912	—	—	80%	20,407,296[98]
Wind	17,339	13,943	4,400 - 10,300	30%	11,563,200 – 45,566,892
Geothermal	1,240	340	100	90%	788,400 – 9,776,160
Biomass	6,972	939	700	90%	5,518,800 – 54,967,248
Total	36,088	21,315	8,300 - 17,250	—	**30,090,600 – 140,368,050**

As noted above, there are several green energy revenue streams that could potentially benefit the people of British Columbia and these can be grouped under three main headings: a) direct revenues through taxes and fees; b) BC Hydro/Powerex net revenue from green energy exports; and c) revenues from carbon offsets and other green attributes. Each will be examined in detail below.

[97] PG&E's estimates are an indication of British Columbia's potential green energy generating capability that could be available by 2016. Beyond 2016, PG&E estimates that British Columbia could have an additional 7,400 megawatts of renewable green energy capacity for a total estimate of 28,715 megawatts.

[98] This "large hydro" figure has not been included in any of the revenue calculations in this paper.

Direct Revenue from Taxes, Fees, Licenses and Other Government Levies

According to information on the Independent Power Producers Association of British Columbia (IPPBC) website, approximately 25% of the revenues from independent green energy producers are paid back as taxes, fees and levies to local, provincial, and federal authorities.[99]

Using the green energy cost figures found in the BC Energy Plan as a reasonable benchmark for determining the revenue that British Columbia's green energy could potentially generate, British Columbia's renewable green energy could conceivably generate $1.6 billion in new direct public revenue every year as can be seen in Table 11 below.

Table 11: Potential direct revenue return to the public per year through taxes and levies

Energy Source	Average potential megawatt-hours of electricity	Average price per megawatt-hour	25% direct revenue return to the public per year through taxes, levies and fees
hydro	21,138,975	$77.5	$ 410 million
Wind	28,565,046	$72.5	$ 520 million
Geothermal	5,282,280	$52	$ 69 million
Biomass	30,243,024	$83	$ 630 million
Total	**85,229,325**	**—**	**$ 1.6 billion**

Potential revenue return to the public per year through taxes and levies to governments	**$1.6 Billion** **in new public revenue per year**

However, a portion of the revenue shown in Table 11 above represents corporate income taxes payable to the federal government, and it is therefore important to separate out the direct revenue return that would accrue directly to the people of British Columbia.

[99] A typical 7 MW run-of-the-river project with a penstock that produces 35 GWh/yr will pay $67,000 in water rentals and $120,000 in property/school taxes (or $200,000 if located in a municipality rather than a Regional District), plus First Nations/Community Benefits payments, plus Provincial and Federal Income Taxes. http://www.ippbc.com/EN/quick_facts_list/

To begin with, approximately 10% to 20% of the revenue that returns to the public through taxes and levies to governments in Table 11 above goes directly to the province in the form of water taxes, property taxes, land leases and other fees and levies. The remaining 80% to 90% of the direct revenue shown in Table 11 above represents corporate income taxes (federal and provincial) with 37% accruing to the provincial government and 63% to the federal government as per the effective provincial corporate tax rate of 11% and the effective federal corporate tax rate of 19%. This means that British Columbia's green energy could potentially generate $790 million in direct new public revenue each year for the people of British Columbia as can be seen in Table 12 below.

Table 12: Potential revenue return to the people of British Columbia from taxes, fees and levies

Potential revenue return to the people of British Columbia	**$790 million**

Revenue Generated through BC Hydro and Powerex

The second source of revenue that would benefit the people of British Columbia is the net revenue that BC Hydro would generate through Powerex as the entity through which the province's renewable electricity would likely be marketed and delivered to various export markets. As the PG&E BC Renewable Study Phase 1 (June 20, 2008) indicates, "the most viable option" for facilitating the purchase and transport of renewable electricity from British Columbia to California is for PG&E to contract directly with BC Hydro and/or Powerex through a power purchase agreement to deliver an "all-in product" at the US/Canadian.[100]

[100] PG&E reviewed each potential transaction structure in the context of obtaining benefits to the parties to the transaction as well as the ability to transact under that structure. Based on that review, PG&E believes that the fourth alternative of contracting directly with an entity such as BC Hydro and/or Powerex through a power purchase agreement to deliver an all-in product at the US/Canadian border is the most viable option to obtain renewable generation.
http://www.pge.com/includes/docs/pdfs/mybusiness/customerservice/nonpgeutility/electrictransmission/canada/BC%20Renewable%20Study.pdf

Powerex's products and services include traditional energy products such as electricity and natural gas as well as Green-e® Energy-certified environmental offerings and a selection of ancillary services and financial alternatives. Powerex's website states that the BC Hydro subsidiary can provide energy for days, weeks, months or longer under standard agreements or on terms that are custom-designed to meet customers' changing daily and seasonal energy needs.

And as Scott Simpson reported in the Vancouver Sun on January 26, 2010, Powerex just struck a "precedent-setting" five-year deal with PG&E to deliver between 330 and 1,000 gigawatt-hours of renewable green electricity yearly (i.e., 330,000 to 1,000,000 megawatt-hours per year)—enough to power 30,000 to 90,000 households.[101]

> *"There is a need to replace existing fossil fuel electricity generation... as quickly as we can manage to sources that do not emit greenhouse gases if we are to avoid a truly dangerous level of climate change, and prevent catastrophic impacts..."*
>
> ***Nicholas Heap, Climate and Energy Policy Analyst, David Suzuki Foundation et al.***

It is worth noting that green energy opponents often make reference to $60 per megawatt hour as the "spot" price for electricity—implying that green energy from British Columbia will be sold at a perpetual loss on the export market.[102] However, the spot price in the Mid-Columbia (Mid-C) energy hub (where 30% to 40% of the energy traded is generated cheaply by fossil fuels like coal and gas), does not really compare to the long term and medium term renewable energy supply contracts that Powerex would be entering into with entities like PG&E. These longer term energy supply contracts would undoubtedly yield a much higher price than the Mid-C spot price.

The premium renewable green energy product that Powerex would be able to shape and deliver to the energy marketplace would also have several advantages over

[101] "Powerex strikes green-power deal with California utility PG&E," By Scott Simpson. Vancouver Sun: January 26, 2010. http://www.vancouversun.com/technology/Powerex+strikes+green+power+deal+with+California+utility/2485509/story.html

[102] The spot price for electricity can fluctuate quite substantially. For example, during the cold snap early last December (2009), the Mid-Columbia spot price for peak period power reached $120 Canadian per megawatt-hour.

cheaply produced carbon-emitting energy generated by burning coal and gas. For example, the wide range and dispersed nature of British Columbia's renewable green energy resources, coupled with BC Hydro's legacy hydroelectric dams, would provide a high degree of "firmness" to British Columbia's green energy supply and would assure a high degree of delivery reliability to export customers.

And given the ever-increasing proportion of electricity that utilities in places like California are required to supply from renewable energy sources, cost-effective green energy from British Columbia is very much an "in-demand" product. In fact, Powerex's website describes environmental products as "the newest frontier in energy marketing" and one that Powerex is in a "unique position" to serve with products and services to manage [their] customers' "evolving needs to buy or sell environmental risk, whether it be exposure to carbon, requirements to meet a renewable portfolio standard (RPS) or manage intermittent renewable resources."[103]

A rough guide for estimating the potential revenue that British Columbia's green energy could generate for Powerex and BC Hydro is the average 8.7 per cent net income that BC Hydro achieved during the past two fiscal years—recognizing that, in the cases of Québec and Manitoba, renewable electricity exports yield a very high rate of return compared to the lower margin seen in domestic electricity sales, with domestic prices kept low in part because of the high rate of return from electricity exports.[104] In 2008, for example, Hydro-Québec's exports totalled $1.9 billion, accounting for 8 percent of Hydro-Québec's revenues and 32 percent of its net income of $977 million, while Manitoba Hydro's electricity export revenues in 2007/08 totalled $625 million with exports typically accounting for more than 40 per cent of Manitoba Hydro's revenues.[105]

Nevertheless, Using BC Hydro's current overall net income rate of 8.7 per cent as a conservative benchmark, export sales of British Columbia's renewable clean electricity could potentially yield $560 million yearly through BC Hydro/Powerex as can be seen in Table 13 below.[106]

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[103] http://www2.powerex.com/ProductsAndServices.aspx

[104] A June 2009 article in BC Business indicates that Powerex had gross revenues of approximately $1.5 billion for the fiscal year ending on March 31, 2009 and $1.9 billion in fiscal 2008 ("Trading Up," by Valerie McTavish. BC Business: June 24, 2009 http://www.bcbusinessonline.ca/bcb/top100co2009/2009/06/24/trading). And page 126 of BC Hydro's Annual Report 2009 states that Powerex's net income over the last five years has ranged from $83 to $259 million. The net revenue rate of 8.7% used for calculations in this paper is consistent with these gross revenue and net revenue figures.

[105] Since 2001, Québec's electricity exports have also prevented more than 30 million tonnes of GHGs from being emitted into the atmosphere—a significant contribution to the battle against global climate change and roughly equivalent to the amount of GHGs that would be created in a year by 7,870,000 cars. Over the past 35 years, Manitoba Hydro's exports of clean electricity have also reduced greenhouse gas emissions by 172 million tonnes in the region through the reduced need for thermal electricity generation from coal and gas-fired sources.

[106] http://www.bchydro.com/etc/medialib/internet/documents/about/company_information/quick_facts.Par.0001.File.quick_facts.pdf

Table 13: Potential yearly net revenue from BC Hydro/Powerex as an exporting entity

Energy Source	Average potential megawatt-hours of electricity	Average cost per megawatt-hour	BC Hydro/Powerex potential net revenue per year
hydro	21,138,975	$77.5	$ 140 million
Wind	28,565,046	$72.5	$180 million
Geothermal	5,282,280	$52	$ 24 million
Biomass	30,243,024	$83	$ 220 million
Total	**85,229,325**	**—**	**$ 560 million**
	Potential yearly net revenue from BC Hydro/Powerex (based 8.7% net revenue)		**$560 million in potential net revenue**

Revenue Potential from Carbon Offsets and Other Green Attributes

The third source of revenue that green energy generated in British Columbia could potentially provide for the people of this province—and one that will be increasingly important and monetarily valuable in a low-carbon economy—is the carbon offsetting value inherent in renewable green energy resources. In the most recent BC Hydro Clean Power Call, BC Hydro stipulated that "ownership of all environmental attributes" such as carbon credits is to vest with BC Hydro as one of BC Hydro's terms for energy purchase agreements with independent green energy producers.[107]

The "environmental" or green attributes of renewable energy could easily end up being worth $30 to $40 per megawatt-hour in a cap-and-trade system or other monetary based carbon reduction scheme. And on this basis, British Columbia's renewable green energy could conceivably generate as much as $2.9 billion per year. In fact, the environmental attributes of British Columbia's green energy resources could potentially

[107] BC Hydro Clean Power Call – Electricity Purchase Agreement Term Sheet (June 11, 2008). http://www.bchydro.com/etc/medialib/internet/documents/info/pdf/clean_power_call_schedule_7_epa_term_sheet.Par.0001.File.clean_power_call_schedule_7_epa_term_sheet.pdf

become the most robust source of revenue return for the people of this province as carbon emissions and overall carbon footprints become increasingly undesirable.

Carbon offsetting energy credits, typically in the form of Renewable Energy Certificates, are already being bought and sold on a voluntary basis by many companies, organizations and individuals eager to support the development of renewable energy resources and offset the amount of non-renewable, fossil fuel generated electricity they consume. For example, a June 2009 article in Scientific American listed the top 25 US companies and organizations that purchase green energy (based on U.S. Environmental Protection Agency data) and noted that "more and more corporations, government agencies and entire cities are making large, long-term commitments to ensure that the power they do use comes from renewable sources."[108]

Topping Scientific American's list of companies and organizations that buy substantial green energy credits is Intel which bought 1.3 million megawatt-hours of green energy credits last year representing 46 percent of the total power used by the Santa Clara, California based company (enough green energy to power 122,091 US households).

New York based PepsiCo was second on Scientific American's list purchasing 1.15 million megawatt-hours of green energy representing 100 percent of the total power they used (enough to power 107,451 US households). The Pepsi Bottling Group (separate from PepsiCo) purchased an additional 470 thousand megawatt-hours of green energy credits.

> *"British Columbia is very definitely the richest and most blessed province in Canada—we just have not realized it yet"*
>
> ***Bruce Sanderson, co-spokesperson, B.C. Citizens for Green Energy***

Although the renewable energy credit market is still in its infancy here in British Columbia, there is a growing market among British Columbia companies, organizations and individuals who want to offset their carbon footprint. As reported in a recent article in Business in Vancouver, companies like Bullfrog Power Inc. buy green energy credits and sell them to businesses and organizations such as Urban Barn, Fraser Health, the David Suzuki Foundation, the Ethical Bean Coffee Company and TD Bank Financial Group.[109] Bullfrog's customers pay 2 cents per kilowatt-hour on top of their regular energy rates—a rate equivalent to $20 per megawatt-hour.

[108] "Top 25 Green Energy Leaders," by Katherine Harmon. Scientific American, June 2009.

[109] "Energy certificate market grows in B.C.," by Curt Cherewayko. Business in Vancouver: February 16, 2010.

To cite another example: the residential and small business customers of ConEdison in New York can opt to have 2.5 cents per kilowatt-hour added to their electricity bill to support renewable energy generated from wind power—a rate equivalent to $25 per megawatt-hour.[110]

However, many environmentalists and energy economists, such as Simon Fraser University's Dr. Mark Jaccard, consider the current price placed on carbon to be too low.[111] In an excellent report on carbon pricing prepared for the David Suzuki Foundation by Dr. Jaccard and his associates it was suggested that a market price for carbon of $75 to $100 or even more per tonne could be possible by 2020 to achieve the kind of carbon reductions needed to arrest global climate change.[112]

> *"British Columbia's abundance of renewable clean energy puts us in the driver's seat for a change and lets us turn the tables in our trading relationship with the Americans"*
>
> ***Bruce Sanderson, co-spokesperson, B.C. Citizens for Green Energy***

It should also be pointed out that the carbon price underlying British Columbia's carbon tax is currently just $15 per tonne. However, this will rise to $20 per tonne on July 1st of this year (July 1, 2010) and to $30 per tonne in 2012.[113]

When mandatory carbon cap and trade systems are inevitably implemented in North America (or even on a regional basis as an interim step) and carbon costs are added to coal-fired and gas-fired electricity generation, among other sources of carbon emissions, a carbon price of $30 to $40 per tonne is, in all probability, somewhat conservative but appropriate for the calculations in this research report.

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[110] http://conedisonsolutions.com/residential_green_power.html

[111] As an interesting aside to the price of carbon, Dr. Mark Jaccard points out that most Canadians pay about $90 a tonne to dump waste at their local municipal landfill.
http://www.davidsuzuki.org/files/reports/Pricing_Carbon_saving_green_eng.pdf

[112] http://www.davidsuzuki.org/files/reports/Pricing_Carbon_saving_green_eng.pdf

[113] http://www.rev.gov.bc.ca/documents_library/notices/BC_Carbon_Tax_Update.pdf

And as Finance Minister Colin Hansen stated in the March 2, 2010 budget speech, there is "huge growth potential in carbon trading." Since 2005, Hansen said, "carbon transactions worldwide have been valued at well over $100 billion" and that analysts predict the global carbon trading market "could be valued in the trillions when the U.S. government adopts cap-and-trade." Hansen stated that "B.C. will be ready" for this when it happens and noted that the province has "forged important international and regional partnerships—including ICAP, the International Carbon Action Partnership, whose goal is to reduce emissions worldwide by linking cap-and-trade systems."[114]

And to encourage companies engaged in international business activities to set up offices here in British Columbia, the province is amending the ***International Financial Activity Act*** to include carbon trading among the range of activities that qualify for tax reductions.[115]

As an aside to the question of carbon pricing and its inevitability across North America and globally, British Columbia's abundance of renewable green energy will give British Columbia's businesses and industries a strong competitive advantage because they will not have to bear carbon costs for the electricity they consume. In the low-carbon economy of the 21st century, renewable green energy will make British Columbia one of the least costly jurisdictions in North America and that will not only allow us to produce goods more cheaply, it will also attract new businesses and industries to British Columbia seeking the competitive edge our province and its green energy can provide.

A prime example is the multimillion dollar, state-of-the-art data center that RackForce Networks opened last July in Kelowna in partnership with IBM. RackForce's new data center was built to serve a worldwide customer base and the demanding needs of next-generation IT systems. And thanks to British Columbia's abundance of renewable green energy, this new data center is one of the greenest facilities of its type in the world with a carbon footprint less than 1/50th that of a conventional data center powered by electricity from coal-fired and gas-fired generating plants.[116]

The Throne Speech and the March 2, 2010 budget show that the province is moving in the right direction with respect to unlocking British Columbia's green energy potential. However, the province must go even further and faster in encouraging new investments in green energy production and implement an effective export policy so that British Columbia's potential to be the pre-eminent renewable green energy powerhouse in North America becomes a reality along with the benefits it will bring to the province.

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[114] http://www.bcbudget.gov.bc.ca/2010/speech/2010_Budget_Speech.pdf p. 12.

[115] http://www.bcbudget.gov.bc.ca/2010/speech/2010_Budget_Speech.pdf p. 11.

[116] http://www.rackforce.com/media_center.html

The Total Potential Revenue From Green Energy

When the various potential revenue streams from British Columbia's green energy are brought together, the people of British Columbia potentially stand to receive $4.3 billion in yearly revenue from our province's vast green energy resources as can be seen in Table 14 below.

Table 14: Total potential yearly revenue to the people of British Columbia from green energy

Revenue Source	Revenue Potential
Potential direct revenue return to the people of British Columbia through licenses, taxes and fees	$790 million
Potential net revenue through BC Hydro/Powerex	$ 560 million
Potential revenue from carbon credits, carbon offsets and other green attributes of British Columbia's renewable energy	$2.9 billion
Total potential yearly revenue to the people of British Columbia	**$4.3 Billion**

It is important to point out that the potential revenue figures shown above do not include any contribution from British Columbia's considerable wave and tidal energy resources which are just now beginning to come into their own. Wave and tidal power will inevitably expand the British Columbia's green energy generating capacity by a considerable amount and further diversify the green energy resource options our province can draw on.

Green energy revenues clearly have an enormous potential for the people of British Columbia and they could easily be used to substantially reduce the province's $27 billion taxpayer-supported debt and ultimately completely eliminate it. If revenue from the development of British Columbia's green energy resources was diligently applied to the province's debt, British Columbia's provincial debt could conceivably be paid off in 15 years or even less.

As Alberta Premier Ralph Klein said when he announced the elimination of Alberta's debt in 2004, leaving a debt-free province is "an amazing gift to the future" and one which would also save our province $2.2 billion in debt servicing costs each year and pave the way to eventually eliminating the need for a provincial sales tax.[117]

The millions of megawatt-hours of renewable green energy that British Columbia could potentially generate each year would also have a immense positive impact on greenhouse gas reduction efforts and the world that future generations will inherit through the avoidance of millions of tonnes of harmful greenhouse gas emissions in western North America from coal-fired generation—not to mention the billions of dollars and the human misery and dislocation that unchecked global climate change would cost us all.[118]

And in addition to the annual $4.3 billion direct pay back to the people of British Columbia and the environmental benefits that would result from the development British Columbia's green energy potential there would also be billions of dollars in other economic benefits such as the capital investments in green energy infrastructure and the creation of thousands of much-needed jobs.

Given the amazing triple legacy that British Columbia's vast green energy resources could provide to future generations, why would we not pursue the export opportunities available to us and why would the people of British Columbia not support doing so?

Putting British Columbia's Renewable Green Energy Potential to Work

It should be noted that British Columbia is certainly not the only jurisdiction in the western North America with the potential to generate clean, renewable electricity. As graph 5 below based on the WREZ data shows, Arizona, Nevada, California and New Mexico all have considerable potential to generate clean, renewable electricity from solar energy—Arizona has an estimated 19,780 megawatts of solar generating capacity, Nevada has 18,582 megawatts of solar capacity, California has 16,069 megawatts and New Mexico 13,718 megawatts.[119]

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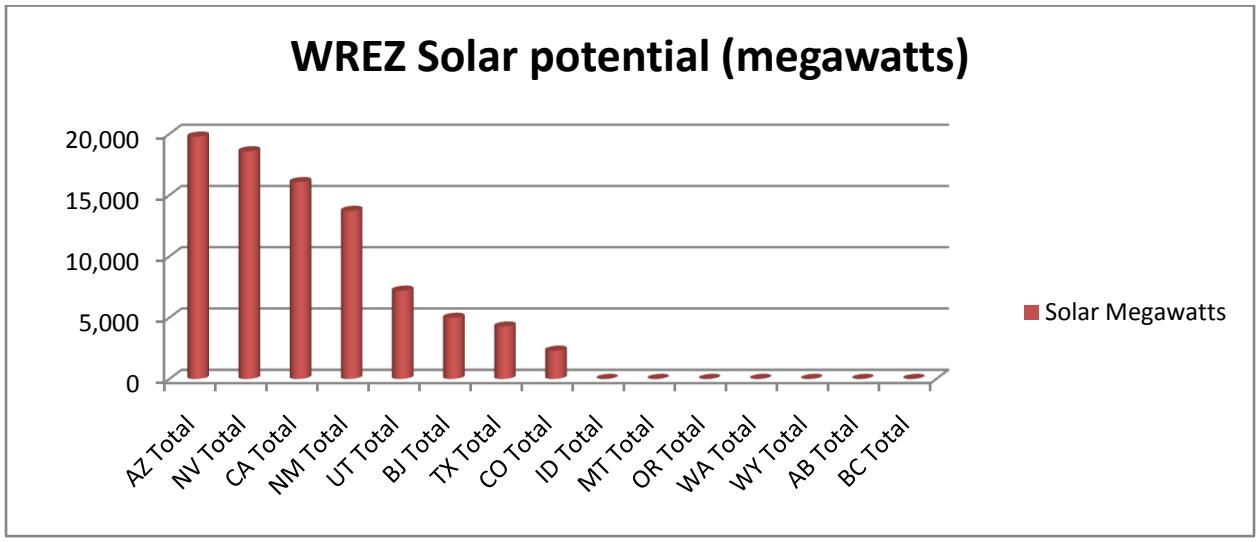
[117] "Klein declares Alberta's debt retired," CTV.ca (Jul. 13 2004) http://www.ctv.ca/servlet/ArticleNews/story/CTVNews/1089644515172_85053715/?hub=TopStories

[118] Renewable clean electricity avoids 0.9 metric tonnes per megawatt-hour in greenhouse gas emissions from coal-fired generation. For gas-fired generation, the conversion factor is 0.36 metric tonnes of avoided greenhouse gas emissions per year.

[119] The cost of solar power is currently very high compared with most of the other renewable energy resources that British Columbia is blessed with and solar is therefore not considered to be feasible from a utility perspective. However, emerging concentrating solar technologies could have potential in some of the sunnier parts of British

Graph 5: Solar



But even though sun-drenched southern states like Arizona and California have a vast potential for generating clean, renewable electricity from solar power, solar power is also considerably more expensive as an energy source than wind, small hydro run-of-river, biomass, or geothermal as Table 15 from the BC Energy Plan below indicates.

Table 15: Summary of Resource Options (BC Energy Plan)

Description	Wind	Run-of-river small hydro	Biomass	Geothermal	Large hydroelectric	Solar	Wave and tidal	Natural gas	Coal
Estimated Cost $/MW/hour	$71 – $74	$60 – $95	$75 –$91	$44 – $60	$43 – $62	**$700 – $1700**	$100 – $360	$48 – $100	$67 – $82

Wind, run-of-river, biomass, and geothermal all fall into a relative cost range of $43 to $95 per megawatt-hour which compares favourably to the $43 to $62 cost range for electricity generated by BC Hydro's existing mega dams and even with new

Columbia. A BC Hydro green energy study in 2002 also estimated British Columbia's photovoltaic solar potential at 280 MW on detached or semi-detached homes at 280 MW and 160 MW on commercial buildings which, given current costs, is considered to be less than cost effective. (BC HYDRO GREEN & ALTERNATIVE ENERGY DIVISION-- GREEN ENERGY STUDY FOR BRITISH COLUMBIA PHASE 2: MAINLAND Report No. E44 October 2002).
http://www.bchydro.com/etc/medialib/internet/documents/environment/pdf/green_energy_study.Par.0001.File.greenenergystudy-summary.pdf

hydroelectric mega dam projects like the proposed Site C dam where costs could range as high as $100 per megawatt-hour.[120]

Solar generated electricity, however, can cost a much as $700 and $1,700 per megawatt-hour which puts solar power at a significant disadvantage in terms of generating clean, renewable electricity at a competitive cost. That's not good news for jurisdictions like California and other southern states rich in solar energy potential even though the cost of solar is slowly coming down.

For British Columbia, though, in addition to being one of the few places on earth fortunate enough to have renewable green energy potential that far exceeds our own needs, the good news is that we are also richly endowed with virtually every form of cost-competitive renewable energy imaginable. This means that California and the other southern states mentioned above—all of which have high potential for generating electricity from higher cost solar power—will be hard pressed not to need the less expensive green energy British Columbia can provide even while they take steps to develop their own higher cost solar power potential.

> *Without clean, renewable electricity supplied from British Columbia to support the greenhouse gas and carbon reduction targets that must be achieved, states like California—which has nearly half of western North America's population—will fail in the battle against climate change*
>
> ***A Triple Legacy for Future Generations—BCCGE***

Interestingly, the contrast between British Columbia's wealth of cost-competitive sources of renewable electricity and California's more costly solar power resources was reflected in the protectionist subtext and political wrangling seen in the California State Legislature last year over the state's Renewable Portfolio Standard (RPS). Fortunately, Governor Arnold Schwarzenegger terminated this debate, and the protectionist machinations that were taking place, by signing an executive order on September 15, 2009 vetoing the bills passed in the California State legislature.[121]

Governor Schwarzenegger considered the state legislature's Renewable Portfolio Standard bills, which would have substantially increased costs on Californians and

[120] BC Energy Plan – 2004 Total Electricity Production by Source (% of total): Summary of Resource Options http://www.energyplan.gov.bc.ca/bcep/default.aspx?hash=7

[121] Governor Arnold Schwarzenegger press release: September 15, 2009 http://gov.ca.gov/press-release/13273

California's businesses, to be "unnecessarily complex."[122] He was also concerned that the renewable standard proposed by the state legislature could be held up in legal battles for restricting the sale of energy across state lines in violation of the American Constitution's commerce clause.

The executive order signed by Governor Schwarzenegger on September 15, 2009 sent a strong message that the "highest priority" will be placed on those renewable green energy resources that can provide California with the greatest environmental benefits and the least environmental costs that can be developed expediently in support of a "reliable, efficient, cost-effective electricity system," including renewable energy resources and facilities located throughout the Western Interconnection such as those located in British Columbia.[123]

There is therefore no question whatsoever, in light of Governor Schwarzenegger's decisive action, that California and other jurisdictions in the Western Interconnection are eager to access the abundance of clean, renewable electricity British Columbia potentially has to offer. In fact, without renewable green energy supplied from British Columbia to support the greenhouse gas and carbon reduction targets that must be achieved, states like California—where nearly half of western North America's population lives—will fail in the battle against climate change and we will all be the worse off for it.

> *"There is no future for [coal-fired] plants and the sooner we eliminate them, the quicker we start to deal with global warming"*
>
> ***Andrew Weaver (lead author for the Nobel Prize-winning Intergovernmental Panel on Climate Change and professor and Canada Research Chair at the University of Victoria) Opinion-editorial in the Oak Bay News—April 28, 2009***

British Columbia's abundance of renewable clean energy is something our American neighbours urgently need, and it's something British Columbia is almost uniquely able to provide. That puts us in the driver's seat for a change and lets us turn the tables in our trading relationship with the Americans. We've always needed them to buy our products more than they've needed us. But now, with climate change and carbon reduction and renewable energy standards upon us, combined with the more limited number of viably cost-effective renewable energy sources available inside the United States, the trade equation is poised to change drastically in British Columbia's favour as the need to develop and access renewable energy is becoming ever more crucial.

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[122] Governor Arnold Schwarzenegger press release: September 15, 2009 http://gov.ca.gov/press-release/13273

[123] *Ibid.,* Governor Arnold Schwarzenegger press release

Conclusion and Recommendations

BCCGE's purpose in preparing this research report has been to explore and quantify British Columbia's potential for generating renewable green energy and provide some measure of the revenue that could be potentially generated for the people of this province. By every measure British Columbia's green energy potential is immense and unlocking it would allow us to leave a triple legacy built from a secure supply of clean, renewable electricity, a substantial reduction in the devastating impacts of global climate change, and elimination of the provincial debt and eventually even the provincial sales tax (PST).

British Columbia's abundance of renewable clean energy is something our American neighbours urgently need to help them meet their carbon reduction and climate change goals, and that puts us in the driver's seat for a change and lets us turn the tables in our trading relationship.

> Since 2001, Québec's electricity exports have prevented more than 30 million tonnes of GHGs from being emitted into the atmosphere—a significant contribution to the battle against global climate change and roughly equivalent to the amount of GHGs that would be created in a year by 7,870,000 cars
>
> ***Hydro-Québec Strategic plan 2009—2013***

Exports are fundamental to the British Columbia economy. They are the fuel that makes our province run. We export our lumber products and we export our non-renewable minerals and metals. Why, then, should we not export our renewable green energy? Renewable energy is a resource just like any other we have and there is great need for it. There is absolutely no reason why we should not be exporting something so important that nature has so amply blessed us with.

As this paper has shown, the revenue potential from tapping into British Columbia's green energy potential is worth many billions of dollars to the people of British Columbia. In fact, the revenue potential from British Columbia's green energy resources is so great that it could easily be shared directly with the regions where green energy is being generated, with 25 per cent of the revenues going directly to the regions and 75 per cent to the province.

And if revenue from British Columbia's green energy was diligently applied to paying down British Columbia's $27 billion taxpayer-supported debt, our provincial debt could conceivably be paid off in 15 years or even less. If British Columbia had no debt, and no debt servicing costs, ongoing green energy revenue of $4.3 billion per year could even conceivably cancel out the need to raise the 4.5 billion to $5 billion dollars in revenue currently raised each year through the provincial sales tax and allow us to eliminate British Columbia's provincial sales tax.

Moreover, as should be readily apparent, climate change and greenhouse gas emissions do not recognize international or provincial boundaries and the overriding environmental benefits of tapping into British Columbia's enormous potential for generating renewable green energy for export to other jurisdictions is not only something we can do, it is something we must do.

British Columbia's ambitious 2020 greenhouse gas reduction target of 33 per cent shows that our province is serious about climate change and serious about reducing greenhouse gas emissions. But clearly we have even more to offer based on our province's immense green energy potential. BCCGE therefore makes the following five key recommendations relating to green energy policy followed by eight additional recommendations specific to green energy exports and allocation of the revenue:

1. BCCGE recommends that the province take steps to establish an effective export policy and thereby vigorously pursue the financial, economic, climate change and environmental opportunities inherent in becoming a major green energy exporter and a North American green energy powerhouse. As the 10th Report of Premier's Technology Council states, there are "significant economic opportunities for BC" associated with the growing demand for renewable green energy supplies and lower levels of greenhouse gas emissions[124] and "if we in BC act decisively, we are well positioned to capture a disproportionately large share of the market."[125]

2. BCCGE recommends that steps be taken to ensure that green energy projects proceed in a timely manner by streamlining the green energy approval and permitting process and eliminating the current duplication of federal and provincial environmental review processes.

3. BCCGE recommends that a set number of days be established in which government agencies, at all levels, are required to respond to applications for permits, approvals and licenses in order to provide the level of certainty needed to attract green energy investment to British Columbia.

[124] PREMIER'S TECHNOLOGY COUNCIL – 10TH REPORT: SEPTEMBER, 2007. http://www.gov.bc.ca/premier/attachments/ptc_10th_report.pdf. p. 30.

[125] PREMIER'S TECHNOLOGY COUNCIL – 10TH REPORT: SEPTEMBER, 2007. http://www.gov.bc.ca/premier/attachments/ptc_10th_report.pdf. p. 30.

4. BCCGE recommends that a set number of days likewise be established for BC Hydro within which the crown corporation must award power call contracts to independent green energy producers and thereby provide the level of certainty needed to successfully attract green energy investment to British Columbia. The much-delayed conclusion of BC Hydro's current Clean Power Call process is a prime example of what should not be allowed to happen in this province, notably, delays that have resulted in numerous staff lay-offs by independent green energy producers along with lost economic opportunities and benefits and lost ground in the development of our province's immense green energy potential.

5. BCCGE also recommends that the province move faster and go further in pursuing policies that support the development of a strong clean energy sector in British Columbia—policies that acknowledge the complementary strengths of the private and the public sectors, policies that encourage entrepreneurialism and transfer financial risk away from BC Hydro, its ratepayers and the taxpayers of British Columbia.

With respect to the development of British Columbia's immense green energy potential, and the significant revenue that could be generated for the people of our province, BCCGE makes the following eight recommendations specific to green energy export targets and the allocation of green energy revenue to reducing and potentially eliminating the provincial debt and eventually replacing the revenue currently generated by the Provincial Sales Tax (PST):

1. BCCGE recommends that the province take steps to establish a green energy export capacity target for 2016 in the range of the 8,300 to 17,250 megawatts of renewable energy indicated in the Pacific Gas and Electric (PG&E) BC Renewable Study Phase 1 (June 20, 2008), potentially doubling and nearly tripling British Columbia's current renewable electricity generating capacity.[126]

2. BCCGE recommends that the province consider a green energy export capacity target for 2026 in the range of 21,315 megawatts as indicated in the June 2009 ***Western Renewable Energy Zones – Phase 1 Report***

3. BCCGE recommends that the province consider an electricity export plan for 2036 approaching 36,088 megawatts of renewable green energy generating capacity consistent with the figures outlined by the Electricity and Alternative Energy Division (EAED) of the Ministry of Energy, Mines and Petroleum

[126] PG&E reviewed each potential transaction structure in the context of obtaining benefits to the parties to the transaction as well as the ability to transact under that structure. Based on that review, PG&E believes that the fourth alternative of contracting directly with an entity such as BC Hydro and/or Powerex through a power purchase agreement to deliver an all-in product at the US/Canadian border is the most viable option to obtain renewable generation.

Resources—three times the current generating capacity of BC Hydro and independent green energy producers combined.[127] The estimated 143,900 gigawatt-hours of renewable green electricity that could be produced by 36,088 megawatts of renewable generating capacity would be enough to power a staggering 14.4 million households which is more than enough clean, renewable electricity to power every household in California, a state where nearly half of the 80 million people in western North America live and where two-thirds of the electricity is generated by burning fossil fuels like coal and gas.[128]

4. BCCGE recommends that the province consider an electricity export plan for the years beyond 2036 that maximizes British Columbia's potential for generating renewable green energy limited only by over-riding environmental and technological considerations existing at that time. British Columbia's full potential capacity for generating new electricity from renewable green energy sources could conceivably be as much as eight times the existing clean generating capacity of BC Hydro when potential green energy resources like tidal, wave and other sources not accounted for in the estimates considered in this report are factored in.

5. BCCGE recommends that the province commit to diligently applying all new revenues from green energy exports to paying down British Columbia's taxpayer-supported debt. Applied consistently, British Columbia's provincial debt could conceivably be paid off in 15 years or even less as Alberta forcefully demonstrated can be done with their non-renewable oil and gas revenues.

6. BCCGE recommends that the province, upon achieving debt-free status, commit to replacing the revenue currently generated by the provincial sales tax (PST) with ongoing green energy revenues.

7. BCCGE recommends that the province also consider the possibility of splitting ongoing revenue generated by green energy exports (once the province's debt has been paid off) with the regions where green energy is being generated. The revenue potential from British Columbia's green energy abundance is potentially so great that 25 percent of the revenues could go directly to regional, municipal and First Nations levels of government.

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[127] Electricity and Alternative Energy Division (EAED), Ministry of Energy, Mines and Petroleum Resources: http://www.empr.gov.bc.ca/EAED/EnergyEfficiency/Documents/BC%20Renewable%20Energy%20Potential.pdf. (Note: Independent green energy producers provide approximately 1,000 MW of generating capacity which represents 9% of BC Hydro's 11,000 MW total system capacity: http://www.ippbc.com/quick_facts_list/).

[128] U.S. Census Bureau State & County QuickFacts: http://quickfacts.census.gov/qfd/states/06000.html. California has an estimated 2008 population of 36,756,666 and, based on U.S. Census 2000 figures, there are 2.87 persons per household. This works out to an estimated 12.8 million households in California. Two-thirds of California's electricity comes from carbon-emitting fossil fuels like coal (20.1 percent of electricity generation) and gas (37.7 percent of electricity generation).

8. BCCGE recommends that municipal and regional governments in British Columbia take greater steps to become fully informed about green energy development, its economic value, and its value in the battle against climate change, and that they take greater steps to work cooperatively with green energy producers to maximise the economic and environmental benefits for their residents, including jobs and a legacy of clean, renewable energy for future generations.

BCCGE is not saying that every single megawatt of potential renewable green energy in our province can or even should be tapped into for the battle against climate change or for revenue generation to pay down the provincial debt. Nor is BCCGE saying that this can be achieved overnight. However, the opportunities made possible by British Columbia's abundant renewable green energy resources are considerable, and the urgency of the global climate change situation means we have an obligation to start contributing more substantially from British Columbia's unrivalled green energy abundance as Québec and Manitoba are already doing.

The new Clean Energy Act and the comprehensive strategy to put British Columbia at the forefront of clean energy development announced in the recent February 9, 2010 Speech from the Throne (see Appendix 6) hold great promise and show that the province is moving in the right direction with respect to unlocking British Columbia's green energy potential. However, it is BCCGE's hope that the province will go even further and faster in encouraging the new investments in green energy production in British Columbia and realize our province's potential to be the pre-eminent green energy powerhouse in North America. British Columbia is very definitely the richest and most blessed province in Canada—we just have not realized it yet.

*Manitoba Hydro's electricity export agreement with the Wisconsin Public Service is "**worth over $2 billion**" to the people of Manitoba*

Manitoba Premier Gary Doer—Manitoba Government News Release, April 17, 2008

APPENDIX 1: British Columbia's *Greenhouse Gas Reduction Targets Act*

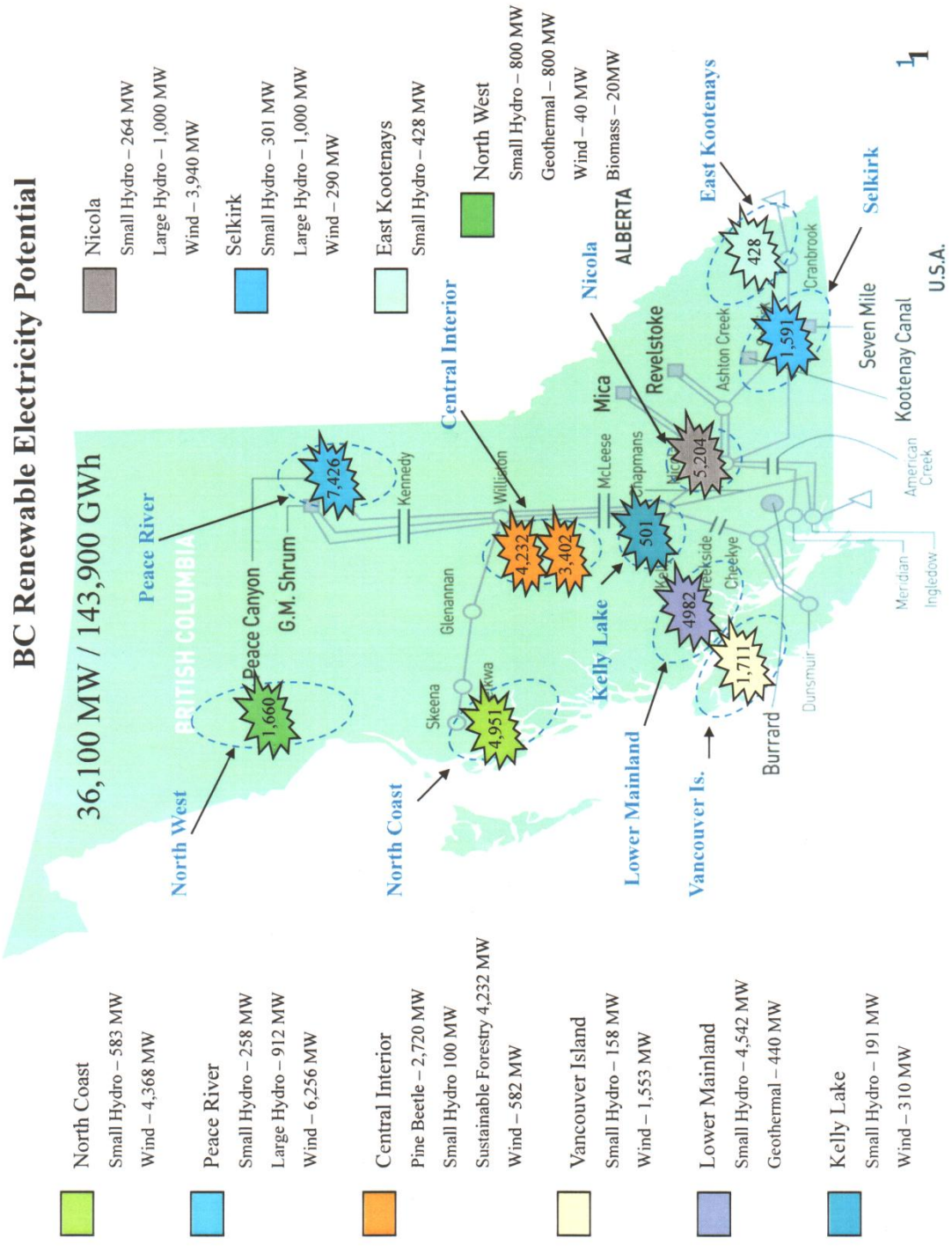
British Columbia's *Greenhouse Gas Reduction Targets Act* (GGRTA) spells out the province's aggressive greenhouse gas emissions reduction targets and puts into law the target of reducing greenhouse gas emissions (GHGs) by at least 33 per cent below 2007 levels by 2020. The Act was given Royal Assent on November 29, 2007 and brought into force on January 1, 2008.

The Greenhouse Gas Reduction Targets Act also calls for GHG emissions in the Province to be reduced by at least 80 per cent below 2007 levels by 2050.

The year 2007 was established under the provincial *Greenhouse Gas Reductions Target Act* as the base year for calculation of B.C.'s GHG emissions targets. (BRITISH COLUMBIA GREENHOUSE GAS INVENTORY REPORT 2007 - Ministry of Environment, July 2009. p. 7.) http://www.env.gov.bc.ca/epd/climate/ghg-inventory/pdf/pir-2007-full-report.pdf

Note: http://www.env.gov.bc.ca/epd/climate/ghg-inventory/index.htm 67.3 million tonnes of carbon dioxide equivalent (Mt CO_2e)

APPENDIX 2: Electricity and Alternative Energy Division (EAED) Estimates



APPENDIX 3: B.C. Environmental Organizations – Joint WREZ Submission

The following are some of the key points made in the joint submission to the WREZ initiative by five British Columbia environmental organizations, including the David Suzuki Foundation, West Coast Environmental Law and ForestEthics.[129]

- "Exclusive reliance on the 2008 B.C. Hydro study means that there has been no assessment of the wind resource in one-third of B.C. – an area comparable in size to the entire state of Wyoming"[130]

- "Failure to do so effectively writes off the wind energy potential for entire regions of the province, including areas like the Stikine which are expected to have enormous wind energy potential."[131]

- "the WREZ Analysis results on the QRA map also creates the impression that all viable wind energy areas in the province have already been identified.... The effect is to create a false impression of a relatively scarce wind energy resource in B.C."[132]

- "a large proportion of the viable wind resource within B.C. was never considered for inclusion within QRAs.... As a result, the B.C. wind resources displayed on the Draft QRA Map greatly under-represent the amount and distribution of wind resources in BC relative to other jurisdictions."[133]

- "A particularly striking example of this is the single tidy rectangle of offshore wind potential shown on the Draft QRA map, which corresponds to the investigative permit area for the Nai Kun Project. In fact, all wind models agree that the entire offshore region stretching from the base of the Alaskan Panhandle to northern Vancouver Island is a

[129] "Review of WREZ's analysis of renewable energy resources in British Columbia, and the results shown on the *Draft Preliminary Qualified Resource Areas Map*." Nicholas Heap, Climate and Energy Policy Analyst, David Suzuki Foundation; Dave Neads, Director, Bioenergy Program, B.C. Spaces for Nature; Merran Smith, Director, Climate Program, ForestEthics; Greg Gowe, Staff Counsel, West Coast Environmental Law; and Wendy L. Francis, Director of Conservation: Science and Action, Yellowstone to Yukon Conservation Initiative. (http://www.westgov.org/wga/initiatives/wrez/comments/BC%20ENGO%20submission%20re%20QRA%20map%20-%20technical%20appendix.pdf)

[130] "Review of WREZ's analysis of renewable energy resources in British Columbia, and the results shown on the *Draft Preliminary Qualified Resource Areas Map*." Nicholas Heap, Climate and Energy Policy Analyst, David Suzuki Foundation, *et al*. p. 5. (http://www.westgov.org/wga/initiatives/wrez/comments/BC%20ENGO%20submission%20re%20QRA%20map%20-%20technical%20appendix.pdf)

[131] *Ibid*., p. 5.

[132] *Ibid*., p. 6.

[133] *Ibid*., p. 6.

nearly-uniform extremely high quality wind energy resource area. – A total area many hundreds of times larger than the Nai Kun lease."[134]

- "the depiction of hydro resources on the Draft QRA Map is not consistent with the total small hydro resources identified by the 2007 KWL study. Instead of showing a large number of resources around the province, the Draft QRA Map shows only a very limited and highly-skewed selection of potential hydro sites."[135]

- "a large proportion of the viable hydroelectric resource within B.C. does not appear to have ever been considered by the WREZ Analysis."[136]

- "we are confident that the total amount of high-energy low-impact lands suitable for hydro energy development... will far exceed the amount shown on the current Draft QRA Map."[137]

- "We believe that the analysis of the geothermal energy resources in B.C. is not based on the best information available, and should be redone."[138]

- "In general, what is striking on the Draft QRA Map is how much of the known hot geothermal resource in B.C. is not included."[139]

- "we understand that the RETI study [California Renewable Energy Transmission Initiative] presented an extremely low estimate of B.C.'s geothermal energy potential."[140]

- "Despite the limited amount of publicly assessable data on B.C. geothermal resources, CanGEA [Canadian Geothermal Energy Association] estimates B.C.'s total potential for geothermal energy at 3,000 to 6,000 MW."[141]

[134] *Ibid.,* p.6.

[135] *Ibid.,* p. 7.

[136] *Ibid.,* p. 8.

[137] *Ibid.,* p. 9.

[138] *Ibid.,* p. 9.

[139] *Ibid*., p. 9.

[140] *Ibid*., p. 9.

[141] *Ibid*., p. 9.

APPENDIX 4: Population information for Western North America

U.S. Census Bureau - State & County Quickfacts - Population, 2008 estimate
USA - 2008 Population Estimate - 304,059,724 USA - Land area, 2000 (square miles) 3,537,438.44

State	Population, 2008 estimate	Land area, 2000 (square miles)
Arizona	6,500,180	113,634.57
California	36,756,666	155,959.34
Colorado	4,939,456	103,717.53
Idaho	1,523,816	82,747.21
Montana	967,440	145,552.43
Nevada	2,600,167	109,825.99
New Mexico	1,984,356	121,355.53
Oregon	3,790,060	95,996.79
Utah	2,736,424	82,143.65
Washington	6,549,224	66,544.06
Wyoming	532,668	97,100.40
El Paso County - Texas	742,062	1,013.11
Total:	**69,622,519**	**1,175,590.61**

2009 estimate Baja California – Mexico has a population of 3,165,776 and land area of 27,636 square miles.

State	Population, 2009 estimate	Land area, 2000 (square miles)
Baja California - Mexico[142]	3,165,776	27,636

Statistics Canada Quarterly demographic estimates (2009-03-26)
Canada total population, 2008 estimate: 33,441,277 Canada total land area: 9,984,670 **km²**

Province	Population, 2008 estimate	Land area, 2005 (square miles)
Alberta	3,610,782	255,540.94
British Columbia	4,405,534	364,764.22
Total:	**8,016,316**	**620,305.16**

[142] Baja California is the northernmost and westernmost state of Mexico. Its northern limit is the U.S. state of California. Over 75% of the population lives in the capital city, Mexicali, or in Tijuana. Both of these cities are adjacent to the U.S. border.

APPENDIX 5: The Western Interconnection

Although British Columbia has yet to capitalize on its enormous green energy export potential, British Columbia does have well-established electricity transmission interrelationships and interconnections with western North America as part of the Western Interconnection, a vast transmission grid extending from Canada to Mexico.

The Western Interconnection electricity grid includes the states of Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming; the part of Texas near El Paso; the Canadian provinces of Alberta and British Columbia; and a small portion of northern Mexico in Baja California.[143] The Western Interconnection encompasses a vast area of nearly 1.8 million square miles with a total population of nearly 81 million people and is overseen by the Western Electricity Coordinating Council (WECC). It is the largest and most diverse of the eight regional councils of the North American Electric Reliability Corporation (NERC).

Nearly half of the 81 million people served by western North America's electricity transmission grid (the Western Interconnection) live in California.

[143] Interestingly, Alaska is not part of the WECC's Western Interconneciton. However, while meeting with US President Barack Obama in Washington, D.C. on September 16th, Prime Minister Stephen Harper announced funding for the construction of a Northwest Transmission Line in northern British Columbia "which could eventually connect with Alaska." As noted in the Prime Minister's media release, the project "could advance a potential connection between southeast Alaska and the North American transmission grid via British Columbia."

APPENDIX 6: February 9, 2010 Throne Speech Excerpt re: Clean Energy

The following is the excerpted section from the February 9, 2010 Speech from the Throne that was specific to clean energy in British Columbia—A Future Powered by Clean Energy

http://www.leg.bc.ca/39th2nd/4-8-39-2.htm

A Future Powered by Clean Energy

Clean energy is this century's greenfield of opportunity.

British Columbia is blessed with enormous untapped energy potential.

We can harness that potential to generate new wealth and new jobs in our communities while we lower greenhouse gas emissions within and beyond our borders.

Clean energy is a cornerstone of our Climate Action Plan to reduce greenhouse gas emissions by one-third by 2020.

Building on the contributions of the Green Energy Advisory Task Force, your government will launch a comprehensive strategy to put B.C. at the forefront of clean energy development.

We have enormous potential in bioenergy, run-of-river, wind, geothermal, tidal, wave and solar energy. We will put it to work for our economy.

A new *Clean Energy Act* will encourage new investments in independent power production while also strengthening BC Hydro.

It will provide for fair, predictable, clean power calls.

It will feature simplified procurement protocols and new measures to encourage investment and the jobs that flow with it.

New investment partnerships in infrastructure that encourage and enable clean modes of transportation, such as electric vehicles, hydrogen-powered vehicles and vehicles powered by compressed natural gas and liquid natural gas, will be pursued.

We will support new jobs and private sector investment in wood pellet plants, cellulosic ethanol production, biomass gasification technologies and fuel cell technologies.

Bioenergy creates new uses for waste wood and beetle-killed forests and new jobs for forest workers.

A new receiving license will give bioenergy producers new certainty of fiber supply, while a new stand-as-a-whole pricing system will encourage utilization of logging residues and low-grade material that was previously burned or left on the forest floor.

Government will optimize existing generation facilities and report on the Site C review this spring.

It will develop and capture B.C.'s unique capability to firm and shape the intermittent power supply that characterizes new sources of clean energy to deliver reliable, competitively-priced, clean power — where and when it is needed most.

New conservation measures, smart meters and in-home displays will help maximize energy savings. New smart grid investments and net metering will provide more choices and opportunities for reduced energy costs and more productive use of electricity.

New transmission investments will open up the Highway 37 corridor to new mines and clean power.

New transmission infrastructure will link Northeastern B.C. to our integrated grid, provide clean power to the energy industry and open up new capacity for clean power exports to Alberta, Saskatchewan and south of the border.

We will seek major transmission upgrades with utilities in California and elsewhere.

If we act with clear vision and concerted effort now, in 2030, people will look back to this decade as we look to the 1960s today.

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