

Stantec, BC Hydro 2L22  
Emergency Rebuild Project  
from the south side,  
Surrey, British Columbia  
Photo courtesy of Stantec.

This report was researched and  
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# Power British Columbia

## Addressing the Old, Pursuing the New

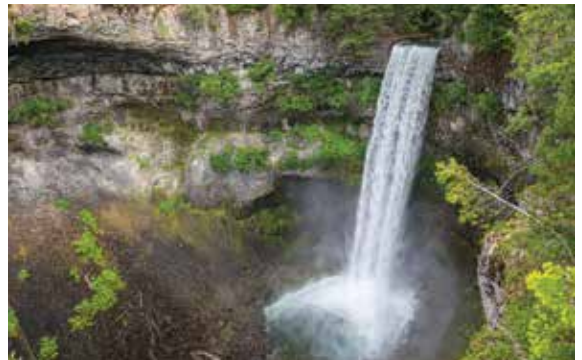
### Introduction

British Columbia (BC) has long enjoyed some of the lowest electricity costs in North America, but when in August 2013, a draft of the BC Rates Plan which proposed a 26% rate increase by 2016, was leaked, this was met with such a backlash of protest that the government was forced to reconsider the proposal.

Unlike Alberta, its deregulated neighbor, BC's power sector is a regulated environment dominated by BC Hydro, a crown-corporation accounting for 80% of the province's generation capacity. Additionally, BC Hydro controls most of the province's major transmission and distribution channels to the province's 4.6 million inhabitants. The exception to this is Fortis BC, a division of Newfoundland-based Fortis Inc, which controls electricity generation, transmission and distribution as well as gas distribution for 1.1 million customers in southwest BC.

Over the last two years, the Liberal government and BC Hydro have worked together in planning BC's energy future as the province's demand for electricity is expected to rise by 40% over the next 20 years. The culmination of this work was announced at the end of 2013: the government's 10 Year Plan and BC Hydro's complementary Integrated Resource Plan (IRP), which call for extensive new investments and upgrades to infrastructure, while simultaneously seeking to stem the inevitable tide of rate increases for customers.

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Stantec, BC Hydro 2L22 Emergency Rebuild Project from the north side, Surrey, British Columbia. Photo courtesy of Stantec.

Under its current plans, BC Hydro plans to spend C\$1.7 billion per year over the next 10 years on capital improvements while rates are expected to rise by 28% by 2019. "There is a direct, unassailable connection between investment in infrastructure and rates," said Bill Bennett, BC's Minister of Energy and Mines. "The cost of infrastructure is the main driving factor in determining rates. The Rates Plan was brought about to bring certainty to electricity rates for the residential, commercial and industrial consumers of BC."

Even with the rate increases, BC's electricity will remain amongst the cheapest in North America.

The plans fail, however, to clarify two very important issues: the upcoming final decision for whether BC Hydro's Site C, a long-proposed 1,100 MW project on the Peace River, is approved, as well as the development of substantial gas reserves through the construction of electricity-intensive LNG export facilities.

## The Last in a Legacy's Line: The Push for Site C

Site C is a project decades in the making. There are dozens of ways in which the project can be viewed, and a wide variety of stakeholders, each with differing concerns. If the project is approved, everyone in BC from First Nations to ratepayers to environmentalists to engineering, construction and procurement firms (EPCs) to independent power producers will feel an impact.

Site C was originally proposed as the third of four major dams on the Peace River in the mid-twentieth century. Two other dams, the 2,876 MW W.A.C. Bennett Dam and the 700 MW Peace Canyon Dam, were completed in 1968 and 1980 respectively.

In 1982 and 1989 the British Columbia Utilities Commission, BCUC indefinitely tabled proposals for developing Site C, but BC Hydro announced plans for Site C's resurrection in April 2010. The debate amongst stakeholders has not ceased since.

Following the approval of the IRP in November 2013, BC Hydro is currently working on securing the next round of permitting and social licenses for Site C. "The approved IRP contemplates that BC Hydro would proceed with various processes and stages to advance Site C to a stage that would enable the government to make an informed final decision on whether Site C should proceed sometime in 2014 or 2015," commented Charles W. Bois, a partner at Miller Thomson LLP.

If approved in the aforementioned timeframe, BC Hydro plans to bring the project online by 2024. "Site C is dispatchable and it produces 1100 MW of firm capacity, which makes it higher quality than run of river or wind, which are both intermittent resources," said Doug Little, vice president of energy planning and economic development at BC Hydro.

The government, meanwhile, is conscious that rosy growth projections made at the height of the commodities boom are untrustworthy. The resource-rich province recovered exceedingly well from the Global Financial Crisis, posting GDP growth figures of 5.1% and 4.4% in 2010 and 2011 respectively. However, lower commodity prices have partially been responsible for the province's slowed growth; the Royal Bank of Canada estimates 2.1% growth for 2014.

Although most indicators point towards Site C's approval in the coming months, there are still some hurdles to overcome. BC's independent power producers (IPPs) are closely monitoring the situation. "Conditions have changed; I would not classify myself as an advocate of the [Site C] project. It is my job to assess whether Site C is the best way to generate 1100 MW of electricity at the point in time when it would be built and operating. Over the last several months I have been busy trying to develop alternative packages of ideas, combinations of generation that I can take to the Cabinet and let them make the choice whether to pursue Site C or another option," commented Minister Bennett.

## Elucidating the Cocktail of Confusion

Site C's presence on the generation landscape is the largest major supply-side question mark for BC. On the demand-side, a number of soon to be determined factors caused BC Hydro to accelerate the IRP's revision timeline for 2015. "We acknowledge there is uncertainty in our load forecast, largely in the industrial sector due to the potential development of the LNG industry and the upstream natural gas sector. One of the action items we have in the IRP is to be ready with a Request for Proposals (RFP) from the IPP sector if needed. We are following the load growth very closely and if it looks like load is increasing faster than expected, we will be ready to launch a new procurement exercise. In addition, we will provide an update to the IRP in 2015," said Doug Little of BC Hydro.

While, Paul Kariya, executive director, Clean Energy BC, sees the IRP and 10 Year Plan as only encompassing the considerations of BC Hydro and its priority to get Site C built, he sees the two-year review window as a potentially positive development for BC's IPPs: "Typically an Integrated Resource Plan is given a five-year review window, but this two-year window indicates that the government is willing to review its policies once a final decision on Site C is made and if LNG companies reach final investment decision in 2014/15."

Much of the province's economic and demand-side future hinges on how BC takes advantage of Western Canada's upstream gas reserves and export opportunities. BC has been aggressive in promoting itself as an investment destination for major oil companies that are looking to take advantage of Asia's demand. According to government figures, these companies have invested nearly C\$7 billion in corporate acquisitions and upstream production. The caliber of real players with real dollars is certainly present, but much like Site C, ongoing reviews are still in process before final investment decisions are made in the coming months for the first wave of projects.

An estimate by Midgard Consulting puts the electricity demand needed for four

of the 13 proposed projects, Kitimat LNG (Apache and Chevron), LNG Canada (Shell with KOGAS, Mitsubishi, and PetroChina), Pacific Northwest LNG (PETRONAS, Progress Energy and JAPEX) and Prince Rupert LNG (BG Group), at 2900 MW.

Even with the 1100 MWs of Site C, which would not come online until 2024, BC would be nowhere near having enough generation capacity to accommodate LNG.

"The larger question becomes if there is large build out of oil and gas or mining in the north, will industry be able to obtain power from the existing grid, or are they going to be forced to self-generate?" according to Graham McTavish, vice president of power Canada at Stantec.

Even if BC Hydro had the capacity to meet these needs, there is an insurmountable connectivity issue associated



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with supplying LNG facilities with grid-based power according to McTavish: "Northwest BC [where the LNG sites are located] is dependent on a single radial 500 kV transmission line from Prince George to Terrace that is subject to numerous small outages during the year. As the LNG sector moves forward, we will probably see the industry rely on their own gas generation for their power needs; so there is significant opportunity for gas generation and renewables combined with local transmission and distribution upgrades in and around Kitimat, Terrace and Prince Rupert. A limited transmission infrastructure in the north is also affecting the construction of new industrial and IPP projects in much of BC. The large costs and timelines required to interconnect into the BC Hydro grid has significantly reduced the viability of some of these projects."

As the Liberal government faced the realities of its LNG promotion, BC has revised some of its ambitious efforts to reduce the province's greenhouse gas emissions. In 2012, the Clean Energy Act of 2010, which outlined an objective "to generate at least 93% of the electricity in British Columbia from clean or renewable resources," was amended to allow for gas generation at LNG facilities to be considered a "clean source" of energy. "Certainly the decision to label LNG as a clean fuel source and the upcoming decision on whether or not to allow as-yet-to-be-built LNG export plants to power inside the fence will have an effect on IPPs," commented Jason Jones, business development director - power transmission and distribution sector - environment practice, at Tetra Tech EBA.



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## Waxing or Waning?: The Role of IPPs

In the early 2000s, the Liberal government under Premier Gordon Campbell took the view of developing IPPs to meet generation demands. Although IPPs have had a presence in the province since the 1980s, this strategy enabled private sector players to make a significant impact in the market for the first time. Presently IPPs account for approximately 20% of BC's power production.

In 2008, 27 electricity purchase agreements (EPAs) were awarded to IPPs in a Power Call put out by BC Hydro. Of these 27, 14 projects have come online or are expected to come online in the near future. The rest have had their contracts terminated or deferred by mutual agreement between BC Hydro and the respective developer.

Glen Ichikawa, president of Kawa Engineering, a Vancouver-based engineering firm specializing in work with IPPs, explains the attrition rate from the 2008 Power Call. "The first is financing; some of these projects are millions (of dollars) over budget and no one is making much money on them. Some companies have gone belly up in the process. Lenders realize this and do not want the exposure, so it is harder to get money. The other side is the First Nation relationships; usually projects that fail have offended bands at an early stage and thus the project is always fighting uphill. Third, are construction costs. Contractors have lost money in the past, so they have raised prices to de-risk themselves when someone cannot pay."

The project-developer model of British Columbia's IPPs has had mixed success. Some projects begun by smaller local companies never made it off the ground, while other projects, such as GDF Suez's purchase of the Cape Scott wind farm from Sea Breeze Power, were attractive M&A options for global players. The province's IPP sector has consolidated to fewer, larger players; namely Innergex Renewable Energy, Alterra Power, AltaGas, Brookfield Renewable Power and Capital Power.

Compared to earlier power calls, John Carson, CEO of Alterra Power, sees the attrition rate as a structural reality: "The contract structure of any power call will affect the number that succeed, whether it is being more generous on dollars per MWh or the times of year when certain 'revenue buckets' can be filled. In the 2006 versus 2008 call for power, contracts were totally different.

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Lex Engineering design for a BC Hydro 69 kV, 25 MVA substation at Langley, British Columbia. Photo courtesy of Lex Engineering.

2006 was more developer-friendly showing a lower attrition rate, 2008 was tougher and had a higher attrition rate.”

While M&A activity in the IPP sector was robust from 2010 to 2013, most opportunities for a well-capitalized buyer to snatch a long term EPA at an attractive price have passed, even with Site C on the horizon. “Site C should have little impact on M&A activity in respect of current projects with EPAs, as the current IPPs are locked into EPAs ranging from 25 years to 40 years, guaranteeing their cash flow,” said G. Henry Ellis, a partner at Gowling Lafleur Henderson LLP’s Vancouver office.

As BC Hydro moves forward with Site C, it will likely dampen the prospects of IPPs in the province according to Ellis: “The bigger issue is that as Site C progresses, BC Hydro will reduce its emphasis of engagement with IPPs, as it is confident that Site C will supply most of the incremental power required for the next 20 years. The government’s focus on LNG, coupled with the results of existing power calls and BC Hydro’s current interest in can-

selling some EPAs where the opportunity presents itself, suggests that the government will place less emphasis in the future on contribution from IPPs and greater reliance on Site C for the extra required capacity.”

Vancouver-based Alterra Power, which plans on delivering its 62 MW Jimmie Creek run of river hydro project in 2016, is in many ways the quintessential example of an IPP navigating the cocktail of confusion in BC through geographic diversification and de-risking its assets. However, the company has a desire to continue its growth in BC if political decisions allow it. “If there is a call for more power input, Alterra is ready,” commented Carson.

Regardless of the course of action for Site C, opportunities for IPP developments, albeit small ones, remain under BC Hydro’s Standing Offer Program, SOP. The SOP is designed to allow small projects a streamlined, ad-hoc EPA process with BC Hydro, rather than having to bid through a power call. Recently, the size of projects allowed under the SOP was increased from 10 MW to 15 MW and the government is reviewing the program with the relevant stakeholders to create a more impactful program. “The IRP may have shut the front door to IPPs; the side door is still open via First Nations opportunities, as well as the SOP,” observed Michael Walsh, principal and international managing partner at Midgard Consulting.

While the SOP will be an option for IPPs, it will be a niche market and will take the right developer to execute the project according to Mark Bohn, managing partner at Travelers Capital Corporation. “There are some mid-market developers that have the experience

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and financial capacity to make these transactions happen. A 15 MW hydro project needs to be done smartly, but it can be a good deal. A developer has to have a good handle on the construction costs; perhaps they opt for a multiple contractor model versus a fixed-price EPC."

One of the most precarious issues in BC is land use due to the dozens of First Nations with land claims throughout the province. SOP projects require careful consideration of this land use and in many cases can deliver electricity to power-hungry remote First Nations communities. "While the SOP is a bit limited at the moment, First Nations and other communities are beginning to get more involved. Many of these communities run off of diesel and are looking for more energy efficient and environmentally friendly solutions," commented Bohn.

In the event that Site C is not approved or delayed, however, IPPs will have an unprecedented opportunity in the BC market to fill a potentially huge void.

## To Upgrade and to Conserve

As per the Clean Energy Act of 2010, under the IRP BC Hydro is looking to implement significant demand-side savings and conserve energy "including the objective of the authority (BC Hydro) is reducing its expected increase in demand for electricity by the year 2020 by at least 66%."

Reducing energy usage will take much more than a clever, omnipresent ad campaign. "BC Hydro is first targeting the low hanging fruit, changing light bulbs, etc in order to reduce usage. As they move forward, there will be a reliance on new tech-

nologies that in many cases have not even been developed yet to help them realize their future savings. There is obviously a bit of skepticism as to whether BC Hydro can really realize these savings," commented Sam Mottram, managing principal of power services at Knight Piésold.

Another key component to the IRP, which should serve as a major boon to the province's service providers, is the C\$1.7 billion BC Hydro plans to spend on upgrading its system. Aging infrastructure is a crucial issue across North America, and British Columbia is making key investments to nip the problem in the bud. However, with aging infrastructure comes an aging workforce across the continent as well. Amir Marciano, managing partner of Rakia Recruiting, sees foreign workers as a solution to British Columbia's medium term labor shortages. "In the electricity sector, government statistics predict that in five years there will be a void of 45,000 skilled personnel. In the interim, skilled workers can be imported from other provinces, however, this will not compensate for the historic lack of ability to attract personnel into the power sector. Currently, Rakia Recruiting is focusing on employing skilled foreign workers as another option to fill the void."

While an older generation is retiring, firms are grooming younger teams to take the reigns. Adrian Gygax, principal of Vancouver-based Gygax Engineering Associates (GEA), sees BC as maintaining its position as a hub of innovation as the next generation of engineers gain experience. "There are numerous young engineers and technologists in this province that have developed unique skills in the hydropower sector. There is a real potential to export these

skills, but we need a strong project base in this province on which to build. It is essential that we do not lose the knowledge base that now resides in our young engineers.”

Although not an insurmountable challenge, extreme weather conditions in the central and northern parts of BC, with snow lasting from November to March, adds another layer of complexity when it comes to infrastructure build. Guy Lemieux, president of Lex Engineering that specializes in the design and build of substations and transmission lines explains some of the special adjustments needed for their work in the province, “Lex transmission line and substations are designed to accommodate extreme temperatures of minus 50 °C and plus 40 °C. Transmission line conductors are sagged to not over tension at minus 50 °C and to provide the required vertical clearance at maximum sag during full load at maximum ambient temperature.”

Engineering firms also tend deal with the winter conditions by building as much of the substation and transmission line components at a manufacturing facility before transporting it to the remote locations where it is then assembled.

Infrastructure precedes development, which makes getting it out a challenge. “Arguably, the biggest problem with removing old infrastructure, especially in the metropolitan areas, is that site access conditions have significantly changed since infrastructure installation. Historically, transformers were moved by rail or barge; rail sidings have since closed, and barge sites have been replaced with condominiums,” commented David Stroud of Apex Industrial Movers.

As BC Hydro and the IPP sector are both active in developing projects, the province’s logistics sector has seen an increased workload as massive generation and transmission components are imported from around the world and often sent inland via rail, river and/or road. “Our growth has come from both BC Hydro and IPPs. BC Hydro has been enacting system upgrades, new sub-stations as well as replacing old infrastructure. When working with IPPs, there are additional site issues tending to be more in rugged remote terrain and difficult to access areas; BC



Mobile hoppers being lifted onto Amix’s ArcticTuk barge. Photo courtesy of Amix Heavy Lift.

Hydro’s locations are easier to access, being generally near major infrastructure, but BC Hydro’s equipment is usually much larger,” added John Brise of Apex Industrial Movers.

Given BC’s closer proximity to Asian manufacturing centers, it is surprising that much of Western Canada’s oversized industrial components arrive in a port such as Houston and are moved overland. Canadian companies such as Apex, Triton Transport, T-Lane Transportation and Amix Heavy Lift are working to make British Columbia

more accessible.

Amix Heavy Lift acquired a ringer-crane in 2005 and placed it on its ArcticTuk barge in order to move heavy equipment, including transmission cable spools, and generation turbines of up to 380 mt. “There are substantial savings in time and money; companies can import straight into a British Columbian port, utilize our services of heavy-lifting equipment, and then truck the cargo to site,” said Clarke Longmuir, president of Amix Heavy Lift. •

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