HUDSON'S HOPE
PLAYGROUND OF THE PEACE

A Review of the Proposed Site C Clean Energy Project:

Exploring the Alternatives

July, 2014

URBAN systems

Executive Summary

The District of Hudson's Hope has clearly shared its concerns about the proposed Site C project's potential impacts to the community's natural environment, infrastructure and well-being. The Site C Joint Review Panel (JRP) was also clear in stating that the proposed project will have very significant, largely irreversible adverse impacts upon the Peace River Valley. In fact, Hudson's Hope will be one of the most impacted by the proposed Site C project. Additionally, the JRP report raises several uncertainties about the proposed Site C project. These uncertainties have brought into question the need for the proposed project and whether or not there are viable and cost-effective alternatives to a high-impact and capital intensive large-scale project. Some major uncertainties surrounding the project include:

- Whether the estimated future demand for electricity projected by BC Hydro is accurate;
- Whether the significant capital costs[1] of the project are justified given the availability of alternative and cost-effective energy options; and
- Whether the significant impacts to communities and the environment in the region are justified given the potential availability of affordable lower impact options.

Recognizing these major uncertainties, the District of Hudson's Hope retained Urban Systems Ltd. to review the findings of the JRP Report, and compile information from the proposed project's Environmental Impact Statement, BC Hydro's Integrated Resource Plan, and other relevant resources and data to examine the following key question:

Are the anticipated community and environmental impacts, and high-costs of the proposed Site C project justified and necessary for meeting British Columbia's future electricity needs?

To explore this question, this report reviews BC Hydro's anticipated long-term forecasted electricity needs as it relates to the proposed Site C project. Based on this review, it is evident that there is risk of overbuilding the province's generation capacity too far in advance of forecasted energy demands. This risk adds uncertainty to the need for the proposed Site C project. The premature development of Site C could place BC Hydro and rate payers in financial risk resulting from a lack of revenue generation required to support the upfront development costs of generating capacity without the actual demand to support it. Furthermore, this financial risk could be potentially exacerbated if there are cost overruns associated with the development of a $7.9 billion facility.

Nevertheless, it is evident that British Columbia will require more electricity in the future. Yet, the District, and evidently the JRP and other stakeholders remain unconvinced that the proposed Site C project is the *right* project to meet the province's future energy demands due to the risk of overbuilding capacity, the project's required financial costs and significant and likely irreversible community and environmental impacts.

[1] It is important to note that the JRP found that it could not confirm the accuracy of project cost estimates because it did not have the information, time or resources. Assuming the project cost estimates are accurate, the JRP found that the proposed Site C project would have a capacity to supply firm power over a long term at an ultimate cost (in dollars and greenhouse gas emissions) that would be the least expensive of the limited alternatives that the Government of British Columbia permitted the JRP to investigate.

Therefore, this report explores five Project Alternatives which investigate potential options for pursuing an incremental approach to adding new energy generation capacity to the provincial electricity system.

The five Project Alternatives and associated findings are summarized herein:

Project Alternative 1: Retrofits and Upgrades

Overall, retrofitting existing hydroelectric infrastructure could potentially displace the need for a large amount of power that would be generated by Site C. This option has been supported by the JRP, which suggested that retrofitting and upgrading the G.M. Shrum facility and adding a sixth turbine to Revelstoke Dam would potentially address power supply deficits projected by BC Hydro and would increase capacity by over 700 megawatts (MW). These retrofits alone would evidently delay the requirement for new capacity to 2028; deferring the immediate need for the development of the proposed Site C project. It is also important to note, that other heritage hydro infrastructure upgrades are available to BC Hydro that could provide up to an additional 1,465 MW of dependable capacity. It is evident that the unit capacity costs of most of the upgrades identified are more cost-competitive than the $7.18 million per MW projected cost for Site C. Given that these opportunities exist, it is likely that a significant portion of the province's future power needs could be met more cost effectively through retrofits and upgrades of heritage assets.

In addition to the potential upgrades to existing hydroelectric assets, the Burrard Thermal Generating Station, which has a similar capacity and could be operated to have a similar production profile as Site C, would provide further support for an incremental approach to developing energy infrastructure and would reduce the need for the Site C project. The anticipated cost of upgrading this facility to be in compliance with the *Clean Energy Act* and to allow for the facility to be used more regularly would be approximately $1 billion. However, this facility is set to prematurely close in 2016.

Project Alternative 2: Geothermal

Geothermal energy represents a potentially substantial energy resource in British Columbia. Currently, BC Hydro has identified 16 prospective geothermal sites in the province, with six of these sites having an estimated collective capacity of over 1,000 MW. This abundant energy resource remains untapped.

It is also evident that geothermal energy could be developed for similar costs as proposed for Site C. This has been supported by the JRP. BC Hydro also estimates in Chapter 3 of its current Integrated Resource Plan that 4 terawatt hours (TWh) of geothermal power and about 700 MW of capacity could be available within the range of $91 to $105 per MWh. This represents a cost similar to the $110 per MWh estimated for the proposed Site C project.

Project Alternative 3: Other Renewables and Enhanced Demand Side Management

In the process of reviewing the proposed Site C project, the JRP concluded that there are numerous renewable alternative energy resources available at costs comparable to Site C. However, since BC Hydro, as matter of public policy, is not mandated to develop such resources there has been a lack of analysis and consideration for their potential. Further, it appears that the analysis that was conducted failed to evaluate Site C and renewable energy options in an equitable manner due to the financial assumptions used to evaluate private sector investments into renewable energy projects relative to the

proposed Site C. The JRP also highlighted the limited consideration for Demand Side Management (DSM) initiatives as another analytical oversight by BC Hydro, citing a miscalculation of the potential opportunities for energy efficiency and conservation.

A review of BC Hydro's Integrated Resource Plan and an associated analysis of several renewable technologies and DSM measures revealed that they could be capable of providing sufficient amounts of energy at similar or lower costs than Site C. Consequently, it is evident that further investment is required to investigate the potential of these options and their respective roles in fulfilling future energy needs.

Project Alternative 4: Natural Gas / Cogeneration

Gas-fired generation or cogeneration plants fuelled by the abundant and domestic natural gas resources of Northeastern British Columbia could reduce or eliminate the need for the proposed Site C project.

The JRP report and interveners in the review process recognized BC Hydro's analysis did not justify the true potential of natural gas as an energy resource. This was largely due to the fact that BC Hydro's assessment considered that it would run the gas turbines at an 18 per cent capacity factor; although such facilities can operate with a capacity factor of 90 per cent or higher and therefore produce much more energy.

The JRP report also highlighted evidence submitted on the Shepherd Energy Facility in Calgary, a cogeneration facility, whose electrical energy output and capacity would be comparable to Site C. This facility is expected to have a unit energy cost of approximately $30 per MWh versus the expected energy cost of $110 per MWh for Site C.

Project Alternative 5: Emerging Technologies

Three trends are occurring simultaneously that could substantially reduce the need for the proposed Site C project and affect BC Hydro's forecasted revenues, thus limiting its ability to pay for such an asset over its 70 year amortization period. These three trends include: increases in BC Hydro electrical rates, the decreasing cost of solar photovoltaic (PV) modules, and the commercialization of micro grid enabling technologies.

To illustrate what these trends could mean in British Columbia one only needs to acknowledge the following:

1. BC Hydro rates in the next 5 years are approved to increase by 28%. For residential customers, by 2019 Tier 1 rates will increase to $88 per MWh and Tier 2 rates will increase to $132 per MWh. In parts of British Columbia, Tier 2 rates upwards of $132 per MWh already exist. Solar PV can already be developed for rates less than these.
2. Globally solar PV has emerged as a significant, reliable and affordable electricity source, and forecasts indicate the recent trends (i.e. increased efficiency and plummeting equipment costs) of this technology will continue over the planning horizon of BC Hydro's 2013 Integrated Resource Plan. Consider that the US Department of Energy has established a goal to achieve a solar PV unit energy cost of $60 per MWh by 2020, which would result in a significantly lower cost of power for consumers when compared to Site C at $110 per MWh.

3. There are also a host of new technologies that will enhance the capacity of micro grids that could operate more efficiently and cost-effectively, thereby reducing the need to maintain a large transmission infrastructure across the province. These technologies are also overcoming the challenges of energy storage.

While some may doubt the potential influence of these trends, one only needs to consider the current dynamics of the electricity market in many American states. For example, in California electricity rates are already higher than the cost of solar PV. As a result, large publically traded companies such as Solar City are aggressively providing full service solar installations and supplying electricity to customers at competitive rates when compared to traditional service providers.

In light of these trends, an investment in a large scale project like the proposed Site C project could result in a risk to ratepayers. Site C would provide approximately 7.5% of provincial electricity demand by 2028. At the same time, the US Department of Energy has a target of solar energy meeting 14% of national energy needs in the United States. This juxtaposition illustrates that the potential for solar and other emerging technologies to provide a more affordable and environmentally responsible electricity source to meet future electricity needs should not be dismissed.

Based on the research summarized and compiled information in this report, it is evident that the stated question presented by the District of Hudson's Hope is a difficult one to answer. There is uncertainty regarding the imminent need for the power that would be generated by the proposed Site C project, and there are likely alternatives which could be cost-competitive and viable to meet future electricity needs. More research is therefore needed on the relative costs and benefits of those alternatives, and how those alternatives could be further integrated into the existing power generation fleet within British Columbia to ensure electricity needs are met without the proposed Site C project.

The material cited within this document suggests that a commitment to the proposed Site C project is likely premature before the British Columbia Utilities Commission undertakes a review of the proposed project costs and long-term energy needs, including the comparative costs and benefits of potential alternatives. And as the JRP notes there is time to do this work.

The information and material in this report supports the request by the District of Hudson's Hope that the proposed project be referred to the British Columbia Utilities Commission for a thorough review. Such a review would be consistent with the requirements outlined within the 2014/2015 "Government's Letter of Expectations" between the Government of British Columbia and BC Hydro. Such a review also would provide an opportunity for this regulatory agency to consider potential alternatives, their benefits and costs relative to the proposed Site C project.

Table of Contents

1.0 Preamble

The British Columbia Hydro and Power Authority, better known as BC Hydro, is pursuing the development of the proposed Site C Clean Energy Project. The proposed hydroelectric dam project is intended to meet British Columbia's future electricity demand as projected in its 2013 Integrated Resource Plan (IRP). The proposed Site C project could provide 1,100 megawatts (MW) of new capacity and 5,100 gigawatt hours (GWh) of electricity annually. The project is estimated to cost $7.9 billion dollars.

In response to this project proposal, the District retained Urban Systems Ltd. to review the Site C Joint Review Panel Report, and compile information from the Site C Environmental Impact Statement, the Site C Business Case Summary and BC Hydro's Integrated Resource Plan to explore the need for the proposed project and potential alternatives.

In preparing this document, neither the District nor Urban Systems take issue with the Joint Review Panel's expertise which is considerable and should be recognized.

2.0 Introduction

The District of Hudson's Hope has clearly shared its concerns about the proposed Site C project's potential impacts to the community's natural environment, infrastructure and overall well-being.[2] The Site C Joint Review Panel (JRP) was also clear in stating that the proposed project will have very significant, largely irreversible adverse impacts upon the Peace River Valley. In fact, Hudson's Hope will be one of the most impacted by the proposed Site C project. Additionally, the JRP report raises several uncertainties about the proposed Site C project. These uncertainties have brought into question the need for Site C and whether or not there are viable and cost-effective alternatives to this high-impact and capital intensive large project.[3] Some major uncertainties surrounding the project include:

- Whether the estimated future demand for electricity projected by BC Hydro is accurate;
- Whether the significant capital costs[4] of the project are justified given the availability of alternative and cost-effective energy options; and
- Whether the significant impacts to communities and the environment in the region are justified given the potential availability of affordable lower impact options.

[2] See Appendix 1. Submission to Site C Environmental Assessment Joint Review Panel. District of Hudson's Hope. November 25, 2013.
[3] Report of the Joint Review Panel with Errata – Site C Clean Energy Project. Review Panel Established by the Federal Minister of Environment and the British Columbia Minster of Environment (2014). Available at: http://www.ceaa-acee.gc.ca/050/documents/p63919/99173E.pdf
[4] It is important to note that the JRP found that it could not confirm the accuracy of project cost estimates because it did not have the information, time or resources. Assuming the project cost estimates are accurate, the JRP found that the proposed Site C project would have a capacity to supply firm power over a long term at an ultimate cost (in dollars and greenhouse gas emissions) that would be the least expensive of the limited alternatives that the Government of British Columbia permitted the JRP to investigate.

Recognizing these major uncertainties, the District of Hudson's Hope retained Urban Systems to examine the following key question:

Are the anticipated community and environmental impacts, and high-costs of the proposed Site C project justified and necessary for meeting British Columbia's future electricity needs?

To explore this question, a review was completed of BC Hydro's anticipated long-term forecasted electricity needs as it relates to the proposed Site C project. Based on this review, it is evident that there is risk in overbuilding the province's generation capacity too far in advance of forecasted energy demands. This risk adds uncertainty to the need for the proposed Site C project. The premature development of Site C could place BC Hydro and rate payers in financial risk resulting from a lack of revenue generation required to support the upfront development costs of generating capacity without the actual demand to support it. Furthermore, this financial risk could be potentially exacerbated if there are cost overruns associated with the development of a $7.9 billion facility.

Nevertheless, it is evident that the Province of British Columbia will require more electricity in the future. Yet, the District, the JRP and other stakeholders remain unconvinced that the proposed project is the *right* project to meet the province's future energy demands due to the risk of overbuilding capacity, the project's proposed costs and significant and irreversible community and environmental impacts.

Therefore, this report explores 5 Alternative Scenarios[5], which investigate potential options for pursuing an incremental approach to adding new energy generation capacity to the provincial electricity system.

The five Project Alterative scenarios include:

- Project Alternative Scenario 1: Retrofits and Upgrades
- Project Alternative Scenario 2: Geothermal
- Project Alternative Scenario 3: Other Renewables and Enhanced Demand Side Management
- Project Alternative Scenario 4: Natural Gas / Cogeneration
- Project Alternative Scenario 5: Emerging Technologies

[5] It is important to note that there are a diversity of project alternatives and energy futures that British Columbia could pursue. However, for the purpose of this review the five Project Alternatives selected were based on those that were deemed most relevant and applicable to the current policy and energy landscape of British Columbia.

3.0 British Columbia's Need for More Electricity

The projected energy demand estimate utilized by BC Hydro is a "medium growth" forecast scenario. This forecast shows that demand in the province is expected to increase by approximately 40 per cent over the next 20 years. This demand growth is likely to be driven by a projected population increase of more than one million residents, and the continued expansion of the Provincial economy.[6]

The application of demand side management (DSM) practices is another important consideration in BC Hydro's future energy demand estimates. According to the *Clean Energy Act*, BC Hydro is mandated to reduce expected electricity demand by the year 2020 by at least 66 per cent.[7] The business case for the proposed Site C project incorporates DSM in all scenarios with a reduction in load growth by 78 per cent by 2021 through conservation and efficiency relative to status quo growth forecasts.[8,9]

The electricity demand estimates and projected DSM reductions provided by BC Hydro in justifying the need for the project were received as highly conservative and likely over-estimate provincial electricity demand. As a result, it is probable that the proposed Site C project may be built many years before the energy it produces is actually required. The JRP noted that the uncertainties associated with the energy demand forecasts mean that the proposed Site C project may not be needed until the 2030s, and in consideration of these estimates concluded that BC Hydro had not fully demonstrated the need for the project on the timetable currently proposed.[10]

The risk of overbuilding capacity too far in advance of forecasted energy demand adds uncertainty to the proposed Site C project. In general, the premature development of Site C could place BC Hydro and rate payers at unneeded financial risk due to a lack of revenue generation required to support the upfront development of an enormous amount of energy generating capacity without the demand (and revenues) to support it. Further, the potential for increased costs resulting from overruns and other risks associated with the development of the proposed project create even more uncertainty.[11]

---

[6] BC Hydro. (November 2013). Final Integrated Resource Plan. Available at: https://www.bchydro.com/energy-in-bc/meeting_demand_growth/irp/document_centre/reports/november-2013-irp.html
[7] Government of British Columbia. (2010). *Clean Energy Act*. Available At: http://www.leg.bc.ca/39th2nd/1st_read/gov17-1.htm
[8] Site C Clean Energy Project: Business Case Summary, (Updated May, 2014). Available at: https://www.sitecproject.com/sites/default/files/site-c-business-case-2014.pdf
[9] Report of the Joint Review Panel– Site C Clean Energy Project (2014). Page 283.
[10] Report of the Joint Review Panel– Site C Clean Energy Project (2014). Page 303.
[11] The actual development cost of most large hydroelectric facilities are much greater than their pre-development cost estimates. See for example: A. Ansar, et. al (2014). *Should we build more large dams? The actual costs of hydropower megaproject development*, in Energy Policy. Volume 69. Available at: http://www.sciencedirect.com/science/article/pii/S0301421513010926

4.0 If not Site C, What Alternatives are Available to British Columbia?

It is evident that the Province of British Columbia will require more electricity in the future. The District, and evidently the JRP and others stakeholders remain unconvinced that the proposed Site C project is the *right* project to meet the province's future energy demands due to the risk of overbuilding capacity, the project's required financial costs, significant and likely irreversible community and environmental impacts and the availability of viable alternatives.

In response, and as mentioned above, this report has explored Five Project Alternatives which investigate potential options for pursuing an incremental approach to adding new energy generation capacity to the provincial electricity system. The remaining sections of this report explores each of the Five Project Alternatives.[12]

5.0 Exploring the Alternatives

5.1 Project Alternative Scenario 1: Retrofits and Upgrades

Overview: In their evaluation of the proposed Site C project, the JRP has questioned whether retrofitting and upgrading existing BC Hydro energy infrastructure has the potential to fulfill BC's long-term energy needs and eliminate or defer the need for the proposed Site C project. Additionally in its 2013 Integrated Resource Plan, BC Hydro recommended that it continue to advance retrofitting and upgrading existing facilities through identification and early definition phase activities, but avoid committing significant capital before a need is confirmed.[13] In other words, if the motivation to develop Site C is focused on meeting future energy demand, then cost effective options for retrofitting and upgrading existing facilities should be assessed with a comparable level of detail prior to the development of new infrastructure.

Scenario Analysis: BC Hydro is already moving forward with upgrades to existing hydro facilities. Furthermore, BC Hydro is currently investing close to $800 million to install two additional turbines in the Mica Generating Station that will add 1,000 MW; the generating station was originally designed to hold 6 generating units with only 4 originally installed.[14] The upgrades currently being undertaken at the Mica dam facility demonstrate the need for BC Hydro to investigate further opportunities to upgrade existing hydro infrastructure.

---

[12] It is important to note that each project alternative explored within this report, on its own, may not in itself meet future electricity needs given the dynamics and challenges of meeting power reliability requirements and short-term and seasonal load demands. There is no "silver bullet". Rather, it is likely that a mix of project alternatives would be required to adequately balance reliability, price and environmental sustainability objectives and goals.

[13] BC Hydro. (November 2013). Final Integrated Resource Plan. Available at: https://www.bchydro.com/energy-in-bc/meeting_demand_growth/irp/document_centre/reports/november-2013-irp.html

[14] BC Hydro. (October 2013). Project Update - Mica Projects. Available at: https://www.bchydro.com/content/dam/BCHydro/customer-portal/documents/projects/mica-5-6/mica-projects-october-2013-project-update.pdf

Based on available literature other upgrades are evidently available to BC Hydro. These include the replacement of five turbines at the GM Shrum generating station at a cost of approximately $600 million and adding a sixth generating unit at a cost of approximately $420 million to the Revelstoke Generating Station.[15] These replacements and upgrades could provide 220 MW and 488 MW, respectively, of additional energy generation capacity. It is also possible to upgrade some existing hydro facilities, such as the Mica dam, to include pump storage schemes. Doing so could further enable the integration of intermittent renewable energy into the BC Hydro system and therefore use existing electricity generating infrastructure more efficiently.

As summarized in Table 1 below, BC Hydro has identified a number of facilities that could be retrofitted to increase capacity and efficiency of the province's electricity system. Such investments would allow for a phased approach to the development of the province's electricity infrastructure, relative to the proposed Site C project.

Table 1: Dependable Capacity at Heritage Hydro Facilities Available via Upgrades

Option	Dependable Capacity (MW)
5 new turbines at G.M. Shrum	220 MW
Revelstoke Unit 6	488 MW
Pumped storage at Mica	465 MW
Pumped storage at other locations	1,000 MW
Total	*2,173 MW*
Site C	1,100 MW

Source: BC Hydro, Integrated Resource Plan, November 2013, Table 2-3.

In addition to potential upgrades to hydroelectric generation systems, the Burrard Thermal Generating Station could provide similar capacity and output as Site C. The Burrard Thermal Generating Station having a capacity of 875 MW could produce 6.1 TWh/yr if operated as a base load facility, which is similar to the proposed to 5.1 TWh/yr and 1,100 MW for Site C. This could provide further support for the incremental approach of developing energy infrastructure. The cost of upgrading this facility to be in compliance with the *Clean Energy Act* and to allow for the facility to be used more than occasionally would cost approximately $1 billion.[16] Even if BC Hydro budgeted an additional $1.1 billion for carbon credits to offset projected greenhouse gas emissions for the next 20 years, this project option would still cost $5.8 billion less than Site C.[17] However, this facility is set to prematurely close in 2016.

[15] BC Hydro. (October 2013). Factsheet - Revelstoke Generating Station Unit 6 Project. Available at: https://www.bchydro.com/content/dam/BCHydro/customer-portal/documents/projects/revelstoke-unit-6/revelstoke-generating-station-unit-6-project-factsheet-oct-2013.pdf

[16] Report of the Joint Review Panel– Site C Clean Energy Project (2014). Page 303.

[17] Such a facility would likely produce 2.14 megatons of CO2e (based on the 5.1 TWh/y, and an assumed emissions intensity of 420 g of CO2e /KWh. At $25/tonne that equals approximately $54 million per year to offset 100 per cent of the facility's assumed emissions.

Overall, retrofitting existing infrastructure would potentially displace the need for power from the proposed Site C project. This has been supported by the JRP, which stated that adding the G.M. Shrum turbines and the sixth turbine at Revelstoke to the power supply deficits projected by BC Hydro would increase capacity to over 700 MW and move the requirement for new greenfield capacity such as that provided by Site C to 2028; potentially eliminating the immediate need for the development of Site C.[18]

Costs: Upgrading existing generation facilities combined with DSM could evidently be completed at lower costs than the development of the proposed Site C project. Such upgrades would likely reduce the risks associated with developing a large-scale project and allow the addition of new generation capacity to better follow forecasted demand. Such an incremental approach would also likely reduce financing costs (relative to the proposed Site C project) and allow for the greater adoption of alternative energy sources.

As shown in Table 2 below the unit capacity costs of most upgrades are competitive with the $7.18 million per MW projected cost for Site C. Given that these opportunities exist and have been considered by BC Hydro, it is apparent that a significant portion of British Columbia's future power needs could likely be met more cost effectively, in comparison to the projected costs of Site C.

Table 2: Dollars per Megawatt (MW) of Dependable Capacity[19][20][21]

Option	Dependable Capacity (MW)	Dollars/MW capacity
5 new turbines at G.M. Shrum	220 MW	$2.73 million per MW
Revelstoke Unit 6	488 MW	$0.86 million per MW
2 new turbines at Mica	1,000 MW	$0.80 million per MW
Site C	1,100 MW	$7.18 million per MW

Environmental Impacts: The environmental impacts of upgrading existing hydro facilities would be limited. Upgrades to facilities such as the Revelstoke Unit 6 or G.M. Shrum would not involve any significant change to the facility and construction activities would be within the existing facility's footprint. The primary environmental impacts would be related to the manufacturing and transportation of the equipment itself.

Upgrading and relying more on Burrard Thermal Generating Station would result in the utilization of natural gas, which would result in the release of greenhouse gas emissions and some air pollutants.

[18] Report of the Joint Review Panel– Site C Clean Energy Project (2014). Page 304.
[19] Report of the Joint Review Panel– Site C Clean Energy Project (2014). Page 297.
[20] BC Hydro. (October 2013). Factsheet - Revelstoke Generating Station Unit 6 Project. Available At: https://www.bchydro.com/content/dam/BCHydro/customer-portal/documents/projects/revelstoke-unit-6/revelstoke-generating-station-unit-6-project-factsheet-oct-2013.pdf
[21] BC Hydro. (October 2013). Project Update - Mica Projects. Available At: https://www.bchydro.com/content/dam/BCHydro/customer-portal/documents/projects/mica-5-6/mica-projects-october-2013-project-update.pdf

Relative to other large emitters in British Columbia and Canada, the Burrard facility would have nominal greenhouse gas footprint, which is estimated to be approximately 2.14 mega tonnes (MT) annually.[22]

Community Benefits: Retrofitting and upgrading existing energy infrastructure would also create many new employment opportunities. Unlike the proposed Site C project, these employment benefits would be well distributed throughout the province, versus being concentrated in the Peace Region. For example, if pursued the Revelstoke Unit 6 upgrade would create about 390 person years of temporary employment.[23] Similar employment benefits would arise from other facility upgrades. In the past projects such as the Revelstoke Unit 5 Project resulted in the hiring of over 380 person years of trades work. Of these, 33% (125 person-years) were local hires and about 6% (22.8 person years) were First Nation hires.[24] This scenario may also temper the existing labour shortage concerns in Northeast BC by distributing labour demand throughout the province.

Project Alternative Scenario Summary:

Table 3: Summary of Benefits and Limitations of Project Alternative Scenario 1: Retrofits and Upgrades

Benefits	Limitations
• Utilizes existing infrastructure more effectively and maximizes efficiency of existing assets. • Likely more cost effective relative to Site C. • Employment benefits distributed throughout the province. • Allows for an incremental/phased approach to developing energy infrastructure to match load demands. • Further enables the integration of renewable energy technologies. • Provides greater incentive and opportunity to focus on DSM opportunities. • Lower environmental impacts for hydro upgrades.	• The continued or enhanced utilization of Burrard Thermal Generating Station would have a higher carbon emission footprint relative to Site C. This would require investment into appropriate emission reduction technologies and/or carbon offsets. • Upgrading opportunities are bound to existing facilities and therefore limited. • The actual power output of such upgrades requires further analysis.

[22] Based on 5.1 TWh/y, and an assumed emissions intensity of 420 g of CO2e /KWh.
[23] BC Hydro. (October 2013). Factsheet - Revelstoke Generating Station Unit 6 Project. Available at: https://www.bchydro.com/content/dam/BCHydro/customer-portal/documents/projects/revelstoke-unit-6/revelstoke-generating-station-unit-6-project-factsheet-oct-2013.pdf
[24] Ibid.

5.2 Project Alternative Scenario 2: Geothermal

Overview: Geothermal energy represents a potentially substantial energy resource in British Columbia. Currently, BC Hydro has identified 16 prospective geothermal sites in the province, with six sites having an estimated cumulative geothermal potential of over 1,000 megawatts. In addition to the six most promising sites, the province's overall potential capacity is estimated to be 3000 MW.[25] This abundant energy resource remains untapped with no major geothermal plants producing electricity in British Columbia.

In their evaluation of the proposed Site C project, the JRP spoke to the lack of investment from BC Hydro in the research and development of geothermal sites. In fact, BC Hydro has characterized its present level of investment into understanding this energy resource as being under $100,000 per year.[26] The JRP saw this as a major oversight in BC Hydro's decision to pursue the Site C project, as geothermal could potentially provide a competitive, stable and cost effective energy source in the long-term. Further, it is also evident that geothermal resources could be developed incrementally at a similar or lower cost ($95 to $105 per MWh) relative to the proposed Site C project.[27] The JRP has stated that, a failure to pursue research into the province's geothermal resources over the past 30 years has left the province and its agencies without information about an important resource, essentially limiting their decision making abilities.[28]

In spite of BC Hydro's low investment in assessing geothermal resources, in its Integrated Resource Plan BC Hydro states that "*geothermal appears to be a low-cost resource option*," and that from a cost perspective "*BC's geothermal resource is estimated to total more than 700 MW* (at similar costs per MWh to Site C) *of renewable power*".[29] In other words, even with limited research, it has been estimated that geothermal energy could displace two-thirds of Site C's proposed capacity and potentially more cost-effectively.

Given the potential for geothermal energy resources to provide a viable alternative investment to Site C, the following section further outlines what is known about the scale and viability of the resource.

Scenario Analysis: It is evident that geothermal energy could be developed for similar a cost to the proposed Site C project. Consider that BC Hydro estimates in Chapter 3 of its current Integrated Resource Plan that 4 terawatt hours (TWh) of geothermal power and about 700 MW of capacity could be available within a range of $91 to $105 per MWh.[30] This represents a cost similar to the $110 per MWh recently estimated for the proposed Site C project.

The opportunities to develop geothermal resources, which would be individually smaller than Site C on a project basis, would allow new supply to progressively follow power demand forecasts. This could also obviate most of the early-year financial losses that are expected from the proposed Site C project should

[25] Clean Energy Association of British Columbia. (2011). Geothermal Fact Sheet. Available at: https://www.cleanenergybc.org/facts_&_resources/fact_sheets/
[26] Report of the Joint Review Panel– Site C Clean Energy Project (2014). Page 299.
[27] Report of the Joint Review Panel– Site C Clean Energy Project (2014). Page 303.
[28] Ibid.
[29] Report of the Joint Review Panel– Site C Clean Energy Project (2014). Page 299.
[30] Ibid.

it be built. Furthermore, with increased experience in the development of geothermal energy projects it may be possible to develop subsequent projects more cost-effectively.

It is evident that the best prospect for immediate geothermal development in British Columbia is the South Meager Geothermal Project located 55 kilometers north of Pemberton. At this location the average temperature of 260 degrees Celsius could support a facility with a generating capacity of up to 100 MW and meet future provincial energy demands for several years. Other geothermal prospects include Pebble Creek at North Meager (est. 300–700 MW); Canoe Hot Springs near Valemount (est. 50 MW); Mount Cayley near Squamish (est. 20–100 MW); Lakelse Hot Spring in northwest British Columbia (est. 10–50 MW); and Mount Edziza in northwest British Columbia (est. 200–800 MW).[31] Combined these geothermal energy sources could offset the power production proposed to come from Site C and potentially provide a sustainable, more cost-efficient incremental approach to energy development.

Costs: Like hydropower projects, the cost of geothermal energy projects are heavily weighted toward development costs, rather than operating costs. Based on available data, the development cost of a geothermal field and power plant is approximately $2500 per installed kilowatt (kW), with operating and maintenance costs ranging from $0.01 to $0.03 per kilowatt hour (kWh).[32] If similar expenditures for geothermal energy could be realized in British Columbia it would cost approximately $2.75 billion to develop the same capacity as Site C (1100 MW).

In most circumstances, geothermal projects provide a reliable and stable energy source. Most geothermal power plants can operate for more than 90 per cent of the time.[33] With such performance the Geothermal Energy Association (2007) estimates the levelized generation costs for a 50 MW geothermal to be between $88 and $92 per MWh. Based on these economics, over the lifetime of a plant, geothermal can be competitive with a variety of technologies, including hydropower and natural gas.

Environmental Impacts: The overall environmental impacts of geothermal energy development are limited. The following summarizes the most notable impacts:

- Emissions are low and only excess steam is emitted by geothermal flash plants. No air emissions or liquids are discharged by binary geothermal plants, which are projected to become the dominant geothermal technology in the near future.[34]
- Salts and dissolved minerals contained in geothermal fluids are usually re-injected with excess water back into the reservoir at a depth well below groundwater aquifers. This recycles the geothermal water and replenishes the reservoir as it recycles the treated wastewater.[35]
- Some geothermal plants do produce solid materials, or sludges, that require disposal in approved sites. In some instances these solids are now being mined for their as zinc, silica, and sulfur content.[36]

---

[31] Clean Energy Association of British Columbia. (2011). Geothermal Fact Sheet. Available at: https://www.cleanenergybc.org/facts_&_resources/fact_sheets/
[32] United States Department of Energy (2014). Geothermal FAQs. Available at: http://energy.gov/eere/geothermal/geothermal-faqs
[33] Ibid.
[34] Ibid.
[35] Ibid.
[36] Ibid.

- Pollutants such as nitrous oxide, hydrogen sulfide, sulfur dioxide, carbon dioxide and particulates may be present in the source "fuel" – but in extremely low amounts that can be controlled by an abatement system.[37]
- Land impacts also are minimal as geothermal power plants typically are constructed at or near the geothermal reservoir – there is no need to transport 'fuel' to the plant – and most facilities require a few acres for the plant buildings.[38]
- Geothermal wells and pipelines cover a considerable area but do not prohibit other uses such as farming, livestock or wildlife grazing and recreational activities.[39]
- Hydraulic fracturing technologies can stimulate geothermal production and potentially reduce construction costs. This would also leverage capacity and technologies from British Columbia's growing natural gas sector.[40]
- Waste heat from geothermal facilities could be used for other industrial purposes and/or district heating systems.

Community Benefits: Geothermal energy can evidently lead to numerous community and economic benefits. The following benefits have been identified as they relate to the construction and operation of a generating plant and associated transmission infrastructure:

- The construction of a 100 MW generating plant (for example), and associated infrastructure would employ some 250–350 personnel over a two-year construction period.[41]
- Once in operation such a facility would employ some 30–40 persons full-time.[42]
- The investment in establishing a similar geothermal capacity to the proposed Site C project would result in projects being dispersed throughout British Columbia – spreading the potential economic development benefits to a greater number of communities – in regions of the province not experiencing hyper-economic growth and the challenges that accompanies such growth.

[37] Clean Energy Association of British Columbia. (2011). Geothermal Fact Sheet. Available at: https://www.cleanenergybc.org/facts_&_resources/fact_sheets/
[38] Ibid.
[39] Ibid.
[40] See Bullis, Kevin (2013). Fracking for Geothermal Heat Instead of Gas. Available at: http://www.technologyreview.com/news/520361/fracking-for-geothermal-heat-instead-of-gas/
[41] Ibid.
[42] Ibid.

Project Alternative Scenario Summary:

Table 4: Summary of Benefits and Limitations of Project Alternative Scenario 2: Geothermal

Benefits	Limitations
• Allow BC Hydro to develop energy infrastructure in a phased approach. • Offer a lower risk of cost overrun exposure to ratepayers. • Employment opportunities would be spread throughout British Columbia. • Complimentary with the province's growing capacity to cost-effectively develop natural gas. • Reduced system-wide transmission upgrade requirements (cost savings). • Fewer environmental impacts relative to most conventional energy supplies, including large hydro development projects. • Fewer to no emissions of greenhouse gases. • Provides the possibility using by-product heat for other industrial purposes (i.e. co-generation). • Typically have a capacity factor, with plants having average availabilities of 90% or higher. • Minimal impacts on land and land use, so it can be developed to coexist with agricultural and other productive uses.	• Similar to Site C, the development costs associated with developing geothermal resources would be significant. • Environmental disturbance in the development of geothermal plant sites and would require mitigation.

5.3 Project Alternative Scenario 3: Other Renewables and Enhanced Demand Side Management

Overview: Investigations by BC Hydro into the viability and applicability of renewable energy technologies, such as wind, solar, and biomass, have evidently underestimated their potential to fulfill future electricity needs. In the process of reviewing the proposed Site C project, the JRP concluded that there are numerous renewable alternatives available at costs comparable to Site C. However, since BC Hydro, as matter of public policy, is not mandated to develop such resources, consideration for their potential has been limited.[43]

[43] Report of the Joint Review Panel– Site C Clean Energy Project (2014). Page 308.

Furthermore, the process in which BC Hydro has undertaken its assessment of renewable energy resources appears to be a flawed; notably in its exclusion of exploring off-shore wind resources and using 70 years as the selected amortization period for Site C while limiting Independent Power Producers (IPPs) to 30 years.[44] By excluding off-shore wind and limiting the amortization period for IPPs to 30 years - even though many clean energy projects could last longer (i.e. run of the river hydro) - BC Hydro has likely underestimated the potential of these resources and their cost-effectiveness relative to Site C. It is also evident that BC Hydro has not clearly defined the cost saving benefits of an incremental approach to energy infrastructure development.

In response to BC Hydro's approach to considering the potential of renewable energy options the Clean Energy Association of BC (Clean Energy BC) made a submission to the JRP reiterating the financial soundness of IPP power portfolios and questioning BC Hydro's projected weighted average cost of capital (WACC) of 5% for Site C and 7% for IPPs. It was suggested by Clean Energy BC that both be set at 6%. In this submission, Clean Energy BC made it very clear that BC Hydro's use of a WACC of 5% and a 70 year debt amortization period (which is double that provided for in the Federal Government guarantee of the Muskrat Falls project) is inappropriate given the uncertainty inherent in such a long time period.[45]

The JRP also identified that the exclusion of DSM capacity initiatives and the potential high effectiveness of DSM, from their analysis as another major analytical oversight by BC Hydro.[46] By ignoring the potential of renewable resources and developing excess capacity, the Site C project could discourage DSM and limit the potential of IPPs for decades to come.

Since the commentary provided by the JRP and participants involved in the review of the proposed project have clearly suggested that the power from the proposed Site C may not be required until the 2030s, there is opportunity to further characterize renewable energy resources and their potential role in meeting future needs.[47]

Scenario Analysis: BC Hydro's analysis of renewable resources and DSM options involved a review of several renewable energy technologies, as well as the development of five DSM scenarios to determine their ability to satisfy the future energy needs of British Columbia. This summary provides a review of both.

Renewable Energy Technologies: The applicability and viability of renewable energy resources in British Columbia is becoming increasingly relevant. In response to the development of the proposed Site C project there has been an enormous focus on the key options to provide the most stable, sustainable and secure energy future for the province. The review of the proposed Site C project conducted by the JRP revealed that renewable energy options are likely a viable solution to future energy needs, especially when combined with greater investment in DSM.[48]

---

[44] Such an amortization schedule skews the unitized energy cost ($/MWh) in favour of the proposed Site C project (JRP, 2014).
[45] Clean Energy Association of British Columbia aka Clean Energy BC. (February, 2014). Final Submission to the Site C Joint Review Panel. http://www.ceaa-acee.gc.ca/050/documents/p63919/98322E.pdf
[46] Report of the Joint Review Panel– Site C Clean Energy Project (2014). Page 295.
[47] Ibid.
[48] Ibid.

Although the Clean Generation portfolios considered by BC Hydro in their Integrated Resource Plan showed that a combination of wind, run-of-river and biomass resources could fulfill future needs, Site C was selected as the preferred development path. It was deemed preferable by BC Hydro as the proposed project could evidently provide power to ratepayers at lower costs, spawn more construction jobs and deliver dependable capacity to the electricity system.[49] However, as noted above, the methodology deployed by BC Hydro too has been heavily questioned by the JRP. In contemplating the potential of renewable energy resources the JRP highlighted that British Columbia is uniquely positioned to further increase the presence of renewables given that the province has:

- A storage-dominated hydraulic power system. This system is excellent for renewable energy integration as it can function as a significant "battery", so power can be dispatched in a manner that follows load demand on an hourly to annual basis; and,
- British Columbia's geography and vast distances may make power transmission expensive and inefficient, with the risk of failure. The cost of this infrastructure, inefficiency of the transmission (i.e. transmission losses), and associated risk of failure could be mitigated with the greater uptake of renewable and distributed power resources.[50]

It was also pointed out by the JRP that a broad portfolio of dispersed intermittent clean or renewable resources throughout British Columbia would be much more reliable than a few concentrated sites.[51]

Review of a recent analysis completed by BC Hydro revealed that renewables are capable of providing sufficient amounts of energy at similar or lower costs than Site C (see Table 5 below).

Table 5: Renewable Energy Opportunities in British Columbia

Option	Energy, GWh/yr	Capacity, MW	Unitized Energy Cost at Point of Interconnection $2013/MWh
Wood-based biomass	9,772	1,226	122-276
Biogas from biomass	134	16	59-154
Municipal solid waste	425	50	85-184
Wind, onshore	46,165	4,271	90-309
Run-of-river	24,543	1,149	97-493
Site C	5,100	1,100	110

Source: Adapted from Tables 2-2, Integrated Resource Plan, November 2013.

The conclusions of the JRP and associated interveners in the review process have demonstrated that BC Hydro has likely omitted the potential and cost-effectiveness of renewables as an alternative to the proposed Site C project. Further, the JRP and others have noted that renewable energy resources

[49] BC Hydro. (November 2013). Final Integrated Resource Plan. Available at: https://www.bchydro.com/energy-in-bc/meeting_demand_growth/irp/document_centre/reports/november-2013-irp.html
[50] Report of the Joint Review Panel– Site C Clean Energy Project (2014). Page 295.
[51] Ibid.

represent an opportunity to develop cost-effective, sustainable, stable and secure sources of energy that can be developed incrementally and well-distributed across the province.

DSM Scenarios: The business case for DSM programs are rooted in their potential to displace capital expenditures and the long term operations and maintenance costs of new facilities. Methods of DSM currently employed by BC Hydro include but are not necessarily limited to: codes and standards; rate structures aimed at promoting conservation and energy efficiency; education and outreach; and rebate programs.

The *Clean Energy Act* (CEA) provides BC Hydro with a mandate to achieve 66 per cent energy savings through DSM by 2021.[52] Five progressively more aggressive DSM Options were presented in Chapter 3 of the Integrated Resource Plan to meet future energy demands in British Columbia. These DSM options are summarized below:

- Option 1: This scenario would meet the minimum savings requirement under the *Clean Energy Act*.
- Option 2: This scenario would be higher than the minimum DSM target required by *the Clean Energy Act*, resulting in 7,800 GWh/year energy savings and 1,400 MW of capacity savings through DSM in 2021, or 78 per cent of load growth. This scenario is projected to require capacity and generation from Site C by 2028. It was also chosen by BC Hydro for the basis of the Site C economic analysis.
- Option 3: This scenario was identified as a partial alternative to the Site C project, deferring the need for Site C's energy output by up to two years. This scenario could result in 9,200 GWh/year of energy savings and 1,500 MW of dependable capacity savings by 2021.
- Options 4 and 5: These scenarios were screened out due the untested nature and uncertainty of customer acceptance of the proposed DSM initiatives. Option 5 however, has the potential to achieve a savings of 9,600 GWh and displace 1,600 MW of capacity and be a potential alternative to the Project; reversing load growth for a 20 year period.

The key conclusions from BC Hydro were that DSM Option 3 would defer the energy gap by up to two years; however it would not defer the capacity gap. Therefore, DSM Option 3 on its own is not an alternative to Site C. However, there is an evident aversion to pursue more aggressive scenarios which would require greater government regulation and rate structure adjustments to change market parameters and societal norms.[53] Yet DSM measures can be actively managed to increase or decrease incentives to achieve certain objectives and therefore offer greater flexibility and less risk than developing a large-scale project.

In reviewing BC Hydro's DSM analysis, the JRP concluded that the DSM yield ought to at least keep up with the growth in gross demand for electricity, and therefore the potential savings from 2026 to 2033 may be understated. This is supported by the point that as electricity rates increase, conservation programs will become more cost effective and significantly influence consumer and industrial customer behavior.

[52] Government of British Columbia. (2010). *Clean Energy Act.*
[53] Report of the Joint Review Panel– Site C Clean Energy Project (2014). Page 289.

For these reasons the JRP concluded that DSM options did not receive the same degree of analytic effort as did new supply.[54]

Costs: As shown in Table 5 (above) several renewable energy options exist and could potentially meet the energy demand for a similar or lower price relative to the proposed Site C project. The JRP testimonies suggest that the comparison of Site C with DSM and renewable energy options may be skewed due to the WACCs ascribed by BC Hydro to IPPs and itself, as well as the use of a 70 year amortization period proposed for Site C. These weighted factors have a major effect on the analysis of long-term project costs and the numbers provided by BC Hydro likely provide a distorted comparison. The DSM scenarios are also evidently undervalued as their potential to reduce the demand for electricity could have significant benefits, and reduce the amount of energy infrastructure required overall.

Consequently, further investment in investigating the role DSM and renewable energy could play in fulfilling the power need requirements is warranted. Combined with more aggressive DSM measures and with the right mix and phasing of renewable energy sources, it is evident that there are cost-effective and reliable options to meet future power needs and thus potentially displace the need for Site C.

Environmental Impacts: The environmental impacts of renewable or clean energy projects are not benign. A high-level review of the environmental impacts of renewable energy sources suggest that many projects can be developed with minimal adverse effects to agriculture, forestry, harvest of fish and wildlife resources, outdoor recreation and tourism, navigation, visual resources, and human health. This is supported by the JRP, which suggested that renewable energy resources would likely have a smaller impact on the environment, relative to the proposed Site C project.[55]

The DSM component in its essence is promoting conservation and the need for the development of energy infrastructure. The environmental benefits of DSM are well documented.

Community Benefits: There is an enormous potential for renewable energy projects to generate significant community benefit. Given the number of renewable energy projects likely required to offset the potential output of Site C, it is likely that there would be many opportunities for employment creation and skill development throughout the entire province. As shown in Table 6 below, the Clean Alternatives portfolio explored within the Integrated Resource Plan indicates that approximately 17 times more long-term jobs could be created relative to Site C. Most of these jobs would be distributed throughout the entire province versus being concentrated in the northeast region of the province which is already facing labour shortage challenges. Since these projects would likely be developed incrementally, the employment benefits to the province would likely be distributed over a longer period of time using local capacity, rather than being concentrated within estimated construction period of the proposed Site C project.

[54] Ibid.
[55] Ibid.

Table 6: Potential Employment Benefits[56]

Economic Development Attributes	Site C Portfolios	Clean Alternatives Portfolio
Construction Jobs (total jobs)	44,250	33,230
Construction GDP (millions)	$3,530	$2,610
Operations Jobs (jobs per year)	70	1,180

It is also important to acknowledge the potential diverse and significant benefits to First Nation communities associated with the development of British Columbia's renewable energy resources. As recently stated by Minister Bill Bennett "*British Columbia's clean-energy sector has a strong track record of working collaboratively with First Nations to promote economic development. Working with First Nations is a key part of doing business in British Columbia* …."[57] This contrasts to the challenges faced by BC Hydro to satisfy the concerns and perspectives of many, if not all, Treaty 8 First Nation communities which would be impacted by the proposed project.

Project Alternative Scenario Summary:

Table 7: Summary of Benefits and Limitations of Project Alternative Scenario 3: Other Renewables and Enhanced Demand Side Management

Benefits	Limitations
• Renewable energy projects would likely create more long-term jobs. • Renewables would allow for an incremental approach to energy resource development making it potentially more cost effective. • The economic and community benefits of project development would be better distributed throughout the province; often in areas seeking economic stimulus. • Renewable energy projects would likely impact smaller land areas and have a smaller environmental footprint on a project by project basis. • Encouraging DSM will reduce overall costs and environmental impacts of energy infrastructure development.	• Renewables would likely create less jobs during construction. • Renewables could create challenges associated with their dependability; resulting from their intermittency. • Greater consideration to understand potential cumulative environmental effects on certain environmental landscape should be given. Any environmental impacts associated with such projects would require mitigation.

[56] BC Hydro. (January 2013). Site C Clean Energy Project: Business Case Summary. Page 21. Available At: http://www.bchydro.com/content/dam/BCHydro/customer-portal/documents/projects/site-c/site-c-business-case-summary.pdf
[57] Clean Energy BC. (2014). Clean Energy Fuels First Nation Development. Available at: https://www.cleanenergybc.org/whats_new/News_releases/clean-energy-fuels-first-nations-development?News

5.4 Project Alternative Scenario 4: Natural Gas / Cogeneration

Overview: Gas-fired generation plants use natural gas to generate electricity. These plants are often established as cogeneration or Combined Heat and Power (CHP) facilities to simultaneously generate both electricity and heat from the same fuel.

Gas-fired generation or cogeneration plants could be fuelled by abundant natural gas resources in northeastern British Columbia. Such facilities could reduce or potentially eliminate the need for the proposed Site C project and provide a transition energy source toward the adoption of alternative technologies (such as geothermal, wind, and other renewables). Although there remains a degree of uncertainty as to how the natural gas industry will evolve in British Columbia, it is evident that there is more than a sufficient supply of natural gas from domestic basins including the Montney, Horn River and Liard. [58] These basins could supply the needed gas to fuel electricity production in British Columbia well into the future. In fact, many other North American jurisdictions are increasing the utilization of natural gas as a key fuel for producing electricity due to its abundance, and ability to provide a cost-effective source of electricity.[59]

Scenario Analysis: BC Hydro has undertaken an analysis that would see the utilization of natural gas as an alternative to the proposed Site C project; referred to as *Clean + Thermal Generation Portfolio*. In this analysis the energy that is proposed to come from Site C would be replaced by clean or renewable resources, while the system capacity that would be provided by Site C is displaced by thermal generation from simple-cycle gas turbines (SCGTs) and clean capacity resources.[60]

The JRP report and participants in the review process recognized BC Hydro's analysis overlooked the true potential of natural gas as an energy resource. This was largely due to the fact that BC Hydro's assessment considered that it would run the gas turbines at an 18 per cent capacity factor. However, such facilities can operate with a capacity factor of 90 per cent or higher and therefore produce much more energy.[61] It was also stated by participants that "*since BC Hydro's analysis did not recognize the backup capability that would also allow increased reliance on non-firm resources, BC Hydro would be buying high-cost energy in these blocks*" resulting in exaggerated costs of the *Clean + Thermal Generation Portfolio.*[62] It is evident that BC Hydro also overlooked the potential of using cogeneration

[58] See National Energy Board. (2013). An assessment of the unconventional petroleum resources in the Montney Formation, West-Central Alberta and East-Central British Columbia. Available at: http://www.neb-one.gc.ca/clf-nsi/rthnb/nws/nwsrls/2013/nwsrls30-eng.html, and, National Energy Board, BC Ministry of Energy and Mines. (2011). Ultimate Potential for Unconventional Natural Gas in Northeastern British Columbia's Horn River Basin. http://www.empr.gov.bc.ca/OG/Documents/HornRiverEMA_2.pdf and BC Oil and Gas Commission (2012). Hydrocarbon and By-Product Reserves Report. https://www.bcogc.ca/node/11111/download

[59] Potts, Dan. (2014). Site C Dam Unlikely to Ever Be Cost Competitive. Available at: http://blogs.theprovince.com/2014/07/06/dan-potts-site-c-dam-unlikely-ever-to-be-cost-competitive/

[60] BC Hydro. (November 2013). Final Integrated Resource Plan. Available at: https://www.bchydro.com/energy-in-bc/meeting_demand_growth/irp/document_centre/reports/november-2013-irp.html

[61] Report of the Joint Review Panel– Site C Clean Energy Project (2014). Page 293.

[62] Ibid.

facilities that could be more cost effective and environmentally friendly than traditional simple-cycle gas turbines.[63]

It is also important to acknowledge the current discourse surrounding meeting the energy demand for liquefied natural gas (LNG) projects. This discourse suggests that their energy demand will largely be supplied by natural gas. Given the projected export rates of LNG and the fact that this industry will seek the lowest cost generation option to minimize capital and operating costs, it is likely that natural gas generation is the lower cost option for providing power to the proposed LNG facilities.

Costs: The majority of the proposed Site C project's costs will be associated with its upfront capital costs, which are likely to be followed by low, predictable operating costs over its project life. As a result, the project would likely offer a cost predictable supply of electricity for many years to come. This attribute differs from other power generation facilities that rely on fossil fuels, such as natural gas-fired facilities. Natural gas-fired facilities tend to have lower up front capital costs, but tend have higher operating costs due to the cost of fuel required for their operation. Further, the operation and maintenance costs of natural gas facilities are subject to fluctuations in commodity prices which are contingent on continental and global markets conditions. It is important to note that it is possible to hedge natural gas prices to help smooth major price fluctuations in the cost of a facility's fuel.

With access to an ample and domestic source of natural gas and likely a lower cost of development and/or refurbishment cost, natural gas-fired generation opportunities may still provide a cost-effective alternative. For example, the JRP report highlighted evidence submitted on the Shepard Energy Facility in Calgary, a cogeneration facility, which will have an electrical energy output and capacity comparable to the proposed Site C project. This section of the JRP report highlighted differences between the anticipated unit energy costs of Site C ($110 per MWh) and the Shepard Energy Facility at $30 per MWh, including the cost of gas. This indicates that this type of facility could potentially offer significant economic benefits over Site C.[64] Furthermore, and as discussed earlier, the refurbishment and altered operations of the Burrard Generating Station could also provide cost competitive electricity and potentially circumvent the need for the proposed Site C project.

Environmental Impacts: The environmental impacts of a gas-fired generation or cogeneration energy facility would be far less from a land disturbance perspective. However, land, water and habitat disturbance from the development and transport of natural gas resources (i.e. the fuel) would further contribute to environmental impacts in the upstream supply region of northeast British Columbia.

Natural gas-fired generation would also result in air and greenhouse gas emissions – potentially generating substantially more emissions than the proposed Site C project, (and potentially much higher emissions depending on natural extraction and fuel processing methods used).

However, gas-fired power plants can be paired well with renewable energy resources, make beneficial use of the waste heat generation in a district heating system or industrial processes, and provide a transition fuel to a low-carbon future. As mentioned earlier in BC Hydro's *Clean + Thermal Generation*

[63] Ibid.
[64] Ibid.

Portfolio analysis, the development of gas-fired generation energy projects would likely coincide with further renewable energy resource development.[65]

***Community Benefits**:* The development or refurbishment of gas-fired generation or cogeneration energy projects could create significant community benefits. Such projects would provide many opportunities for long-term employment and skill development across the province. BC Hydro in its analysis of direct employment benefits showed Site C generating more short-term construction jobs, mostly in the Peace Region. However, as shown in Table 7, the *Clean + Thermal Portfolio* was shown to create approximately 14.5 times more long-term jobs, which would be better distributed throughout the province.

Table 8: Community Benefits Comparison[66]

Economic Development Attributes	Site C Portfolios	Clean + Thermal Portfolios
Construction Jobs (total jobs)	44,250	28,520
Construction GDP (millions)	$3,530	$2,230
Operations Jobs (jobs per year)	70	1,020

[65] BC Hydro. (November 2013). Final Integrated Resource Plan. Available at: https://www.bchydro.com/energy-in-bc/meeting_demand_growth/irp/document_centre/reports/november-2013-irp.html

[66] BC Hydro. (January 2013). Site C Clean Energy Project: Business Case Summary. Page 21. Available At: http://www.bchydro.com/content/dam/BCHydro/customer-portal/documents/projects/site-c/site-c-business-case-summary.pdf

Project Alternative Scenario Summary:

Table 9: Summary of Benefits and Limitations of Project Alternative Scenario 4: Natural Gas / Cogeneration

Benefits	Limitations
• Gas-fired generation or cogeneration plants could provide significant capital cost savings; which could be passed on to power users. • These facilities can reduce the need for transmission and distribution networks; thus improving the efficiency of the provincial electricity system. • These facilities can support the progressive integration of renewable technologies and thus act as a transition fuel. • Natural gas facilities would have fewer impacts on local terrestrial and aquatic ecosystems relative to the proposed Site C project. • Natural gas is available in abundance in northeastern BC and North American markets indicate commodity prices will remain suppressed for many years to come (i.e. the incentive for investing in LNG facilities), which could limit future fuel costs.	• Gas-fired generation or cogeneration plants produce more greenhouse gas emissions relative to hydroelectric facilities. This would require investment into appropriate emission reduction technologies and/or carbon offsets. • Natural gas prices are more volatile and vulnerable to price fluctuations; therefore dependence on natural gas would likely create more long-term uncertainty in regard to energy input and delivery costs. • Price fluctuation mitigation strategies may be required. • The extraction of natural gas has negative environmental impacts, thus requiring mitigation as per provincial and federal regulations.

5.5 Project Alternative Scenario 5: Emerging Technologies

Overview: BC Hydro's limited investment in the research and exploration of innovative energy technologies is a major challenge in fostering an environment that enhances their uptake. Yet, the objective for developing electricity resources, as stated in the *Clean Energy Act,* is "*to use and foster the development in British Columbia of innovative technologies that support energy conservation and efficiency of clean or renewable resources*".[67]

Even with such a policy statement, BC Hydro remains restricted in its ability to expand its mandate and satisfy this objective. As a result, there has been a lack of consideration for the potential role of emerging energy technologies within long term energy plans. The omission of these technologies has resulted in BC Hydro having a preference for proven large scale hydropower resources such as the proposed Site C

[67] Government of British Columbia. (2010). *Clean Energy Act.*

project. While these proven resources may meet future needs, neglecting emerging alternatives could have a disruptive[68] effect on potential future electricity demand and supply

It is probable that a disruptive effect could be realized in British Columbia, as electricity prices continue to rise and solar photovoltaic (PV) equipment costs continue to decline. If these trends continue it is likely that customers will opt to generate their own electricity from solar PV either displacing required grid capacity, or disconnecting from the grid altogether. This trend could significantly reduce the need to develop large scale capacity projects such as the proposed Site C project.

There are many examples of markets where the price of electricity has significantly affected the adoption of certain technologies over others, including British Columbia. For example, British Columbia is home to some of the lowest electricity prices in North America. As a result of low power prices the province saw a high adoption of baseboard heating and high adoption of heat pump technologies in the mid-2000s. However, with recent electricity rate increases and reductions in the price of natural gas the business case for such technologies has eroded.

The influence of the private sector could also drive significant disruption. Evidence of such a disruption is occurring throughout many North American jurisdictions where electricity rates are already higher than the cost of solar PV. Companies such as Solar City are aggressively providing full service solar installations. Solar City's recent purchase of a large module manufacturer demonstrates the private sector's motivation to be a catalyst to reduce the cost of solar installations and expand into markets offering lower utility electricity rates.

It is also important to acknowledge that the proposed Site C project could provide approximately 7.5 per cent of the province's electricity needs by 2028. Within the same time frame the US Department of Energy has established a target of solar energy meeting 14 per cent of national electrical energy needs.[69] This juxtaposition illustrates that the potential for solar to provide an affordable and environmentally responsible electricity source to meet provincial electricity needs in the future should not be dismissed. In light of these trends, an investment in a large-scale project like the proposed Site C project could result in a financial risk to ratepayers and the province.

Scenario Analysis: Three disruptive trends are occurring simultaneously that could substantially reduce the need for the proposed Site C project, affect BC Hydro's future revenues from the project, and potentially limit BC Hydro's ability to pay for such an asset over its 70 year amortization period. These three trends are summarized in the following paragraphs:

- BC Hydro rates in the next 5 years are approved to increase by 28%. For residential customers, by 2019 Tier 1 rates will increase to $88 per MWh and Tier 2 rates will increase to $132 per MWh. In parts of British Columbia, Tier 2 rates upwards of $132 per MWh already exist. Solar PV can already be developed for below those rates.

[68] Disruptive technology is a term coined by Harvard Business School professor Clayton M. Christensen to describe a new technology that unexpectedly displaces an established technology.
[69] Total project demand in 2028 without LNG and DSM is 75,500 GWh. 7,800 GWh are estimated to be displaced by DSM, Site C supply is 5,100 GWh. Assuming Site C is required in 2028, Site C would provide 7.5% of total demand in BC.

- At a global scale solar PV has emerged as a significant, reliable and affordable electricity source. Forecasts indicate the recent trends (i.e. increased efficiency and plummeting equipment costs – as illustrated in Table 8 below) of this technology will continue over the planning horizon of BC Hydro's 2013 Integrated Resource Plan. Consider that data from the US Department of Energy illustrates that the price of utility scale solar PV are approximately $112 / MWh, or $1.96 per Watt.[70] The International Energy Association (IEA) predicts that solar PV will achieve grid parity by 2020 in many regions the world.[71] However, the SunShot Initiative goes further with a mission to reduce utility scale solar PV prices to $60 / MWh or $1 per Watt by 2020.[72] These reductions in the cost of utility scale projects will result in further cost reductions in residential systems, conceivably making solar PV far more economical at both large and small scales than Site C whose unit energy cost is $110 / MWh.
- There are also a host of new technologies that will enhance the capacity of micro grids that could operate more efficiently and cost-effectively, thereby reducing the need to maintain a large transmission infrastructure across the province.[73]. These technologies are overcoming the challenges of energy storage and are currently tied to significant advancements in lithium ion battery technologies used for electric vehicles. Micro grid technologies could enable more local-based power production and help energy consumers overcome the reliability and availability limitations for intermittent energy sources such as solar PV. These extraordinary technological advances are predicted to enable customers to meet their energy needs independently and also provide centralized electricity grids an alternative for energy storage. This could allow for greater grid penetration of intermittent electricity sources.[74] Additionally a Navigant Research report projects that by 2018, total global capacity using micro grid technology would grow from 764 MW in 2012 to 4,000 MW by 2018.[75] Projecting continued significant growth on this front suggests that it is conceivable that by 2028 micro grid technologies could be sufficiently advanced as to displace a large capacity load.

The catalyst for the increased market penetration of solar energy will likely come from the private sector. Companies (such as Solar City) as well as from customers in all sectors – residential, commercial, and industrial – seeking lower costs and more certainty in the price of electricity. Greater involvement of the private sector in supplying electricity would result in lower demand for the energy produced by BC Hydro, ultimately reducing the overall need for BC Hydro to supply power through large scale centralized sources such as Site C.

Costs: As shown in Table 8 (below) solar PV is emerging as a significant, reliable and affordable electricity source within the timeframe of BC Hydro's 2013 Integrated Resource Plan. The goal set by the US Department of Energy to achieve a unit energy cost of $60 per MWh by 2020 would result in

---

[70] International Energy Agency. (2010). *Techonlogy Roadmap. A*vailable at: http://www.iea.org/publications/freepublications/publication/pv_roadmap.pdf
[71] Ibid.
[72] Renewable Energy World. (2014, 03 5). *US Solar Celebrates Records in 2013, Big Trends Coming in 2014.* Retrieved from Renewable Energy World: http://www.renewableenergyworld.com/rea/news/article/2014/03/us-solar-celebrates-records-in-2013-big-trends-coming-in-2014?page=2
[73] Navigant. (2012). *Micro Grid Enabling Technologies.* Retrieved from Nigant Research: http://www.navigantresearch.com/research/microgrid-enabling-technologies and Filice, L. (2014, 06 04). *Solar PV Micro Grid Market Moving into Commercialization.* Retrieved from Seeking Alpha: http://seekingalpha.com/article/2252413-solar-pv-micro-grid-market-moving-into-commercialization and
[74] Lovins, Amory (2011). Reinventing Fire: Bold Business Solutions for the New Energy Era. Chelsea Green Publishing.
[75] Navigant. (2012). *Micro Grid Enabling Technologies.* Retrieved from Nigant Research: http://www.navigantresearch.com/research/microgrid-enabling-technologies

significantly lower costs of power relative to the proposed Site C project at $110 per MWh. As a result, the potential disruptive effect of solar PV and other relevant trends (as described above) on future energy supply and demand dynamics in British Columbia should be considered in the case of the proposed Site C project. However, since BC Hydro, as matter of public policy, is not mandated to develop such resources, consideration for their potential has been limited.

Table 10: Total Installed PV System Prices and Costs of Electricity (Global Average)[76]

Year	System Price ($/w)	Levelized Cost of Energy Range* (cents/kWh)
2007	$ 7.20	22 to 42
2008	$ 7.00	23 to 41
2009	$ 5.12	17 to 31
2010	$ 4.55	15 to 28
2011	$ 3.47	12 to 23
2012	$ 2.58	9 to 18
2013	$ 2.33	8 to 17
2014	$ 2.10	7 to 15
2015	$ 1.89	6 to 14
2016	$ 1.75	6 to 14
2017	$ 1.61	6 to 13
2018	$ 1.49	5 to 12
2019	$ 1.38	5 to 12
2020	$ 1.27	4 to 11
2021	$ 1.17	4 to 11
2022	$ 1.07	4 to 10

*LCOE: Levelized Cost of Energy is a calculation of the cost of generating electricity at the point of connection to a load or electricity grid. It includes the initial capital, discount rate, as well as the costs of continuous operation, fuel, and maintenance. *Forecasted values are in italics.*

Environmental Impacts: The environmental impacts of solar PV are largely related to the transportation of equipment, land use, and the use of hazardous materials and global warming emissions created during the manufacturing of the panels. An Environment Canada study of the environmental impacts of solar PV indicated that solar PV's do not emit greenhouse gas emissions or air pollutants during operation, and that the largest manufacturing concern is associated with use of fluorinate gases (which is declining with more efficient manufacturing processes and the use of alternative substances). A small amount of

[76] Clean Edge (2013). Clean Energy Trends: 2013. Available at: https://cleanedge.com/reports/Clean-Energy-Trends-2013. Note: 2007 through 2012 are actual figures and 2013 through 2022 are estimates. Figures calculated using Clean Edge cost projects and the NREL Levelized Cost of Energy (LCOE) Calculator. Assumptions: Discount rate: 4%; Capacity Factor 16-26%; O&ML $6-$60/kW.

cadmium telluride is also used in PV cells. This form of cadmium is a natural byproduct of zinc mining and it could be an environmentally friendly means to sequester cadmium that can also be recycled from used modules.[77] Finally, large scale ground-mounted systems can consume a significant amount of land affecting wildlife habitat and terrestrial resources. However, such facilities can make use of existing disturbed areas such reclaimed mine sites (i.e. the SunMine Project located in Kimberly British Columbia) landfills, as well as rooftops.[78]

In comparison with the proposed Site C project, solar PV provides more flexibility in terms of where and how electricity is generated. This offers an alternative to avoid the concentrated land use, environmental and community impacts of the proposed Site C project.

Community Benefits: Solar PV has the potential to provide more widespread community benefits throughout British Columbia by distributing generation capacity and jobs in many locales. Additionally, the adoption of solar PV and micro grid technologies could enable communities to have greater control over their energy supply and costs. Such a model would enable communities to retain more energy dollars within their communities[79]. This will provide residents and businesses with the option of paying escalating electricity rates or having stable self-generation. Greater control over energy generation might also reduce total electricity demand as residents with solar PV systems will be more conscious of their consumption. Additionally, the potential employment benefits are substantial as the job market for solar PV is experiencing 10 times the US national average job growth rate.[80]

From an employment generation perspective, the Skypower solar project in Thunder Bay, Ontario recently provided the equivalent of 11.7 direct Jobs per MW installed plus many more indirect jobs.[81] Extrapolating from this example, it is estimated that the development of a solar capacity equivalent to the proposed Site C project could generate approximately 13,000 jobs. This would be fewer than the 44,250 jobs projected for the proposed Site C project. However, the jobs would likely be distributed throughout the entire province, often in communities where job opportunities are limited, versus a region currently facing labour shortage challenges.

---

[77] Environment Canada. (2010). *Assessment of the Environmental Perofrmance of Solar Photovolatic Technologies.* Available at: http://www.ec.gc.ca/scitech/B53B14DE-034C-457B-8B2B-39AFCFED04E6/ForContractor_721_Solar_Photovoltaic_Technology_e_09%20FINAL-update%202-s.pdf

[78] For more information on the SunMine project, please review: http://www.sunmine.ca/

[79] The Canadian Federation of Municipalities has suggested that most Canadian communities see at least 75 cents of every dollar spent on energy leave the local economy. Retaining these dollars within a community could support local economic benefits.

[80] United States Department of Energy. (2014, 02 12). *Progress Report: Advancing Solar Energy Across America.* Available At: http://energy.gov/articles/progress-report-advancing-solar-energy-across-america

[81] Based on recent 8.5 MW solar park in Thunder Bay 100 direct jobs http://skypower.com/skypower-news-dec13-2-2010.php

Project Alternative Scenario Summary:

Table 11: Summary of Benefits and Limitations of Project Alternative Scenario 5: Emerging Technologies

Benefits	Limitations
• By 2020, solar PV could provide more affordable electricity relative to the proposed Site C project and the BC Hydro electricity grid. • Solar PV can meet local energy needs and retain energy dollars within communities. • Solar PV has significantly lower environmental impact when compared to Site C. • As a product of local generation, solar PV can encourage more aggressive demand side management further reducing the need for additional large scale capacity infrastructure such as the proposed Site C project. • Solar PV is a more scalable investment than Site C since its modularity allows it to be developed incrementally thus reducing development risk. • Solar PV jobs would be well distributed. • There is a significant push by industry and other governments to rapidly improve the viability of micro grids and solar PV.	• There are future cost uncertainties with respect to solar PV and micro grid technologies. This could result in higher or lower costs. • Such a scenario would likely create fewer jobs. • The economic development benefits associated may be lesser than the proposed Site C project; however they would likely be better distributed.

6.0 Conclusion

Given the magnitude of the likely impact of the proposed Site C project upon the District of Hudson's Hope, the District decided to explore the following question:

Are the anticipated community and environmental impacts, and high-costs of the proposed Site C project justified and necessary for meeting British Columbia's future electricity needs?

Based on the research summarized and compiled information in this report, it is evident that the stated question is a difficult one to answer. There is uncertainty regarding the imminent need for the power that would be generated by the proposed Site C project, and there are likely alternatives which could be cost-competitive and viable to meet future electricity needs. More research is therefore needed on the relative costs and benefits of those alternatives, and how those alternatives could be further integrated into the existing power generation fleet within British Columbia to ensure electricity needs are met without the proposed Site C project.

The material cited within this document suggests that a commitment to this investment is likely premature before the British Columbia Utilities Commission undertakes a review of the proposed Site C project costs and long-term energy pricing, including the comparative costs and benefits of potential alternatives. And as the JRP notes there is time to do this work.

The information and material in this report supports the request by the District of Hudson's Hope that the proposed project be referred to the British Columbia Utilities Commission for a thorough review. Such a review would be consistent with the requirements outlined within the 2014/2015 "Government's Letter of Expectations" between the Government of British Columbia and BC Hydro. Such a review also would provide an opportunity for this regulatory agency to consider potential alternatives, their benefits and costs relative to the proposed Site C project.

7.0 Literature Cited

- Government of British Columbia (2014). Government's Letter of Expectations. See Corporation Accountabilities – Mandate. Available at: https://www.bchydro.com/content/dam/BCHydro/customer-portal/documents/corporate/accountability-reports/openness-accountability/bch-GLE-2014-15.pdf
- Government of British Columbia. (2010). *Clean Energy Act*. Available At: http://www.leg.bc.ca/39th2nd/1st_read/gov17-1.htm
- BC Hydro. (January 2013). Site C Clean Energy Project: Business Case Summary. Available At: http://www.bchydro.com/content/dam/BCHydro/customer-portal/documents/projects/site-c/site-c-business-case-summary.pdf
- BC Hydro. (October 2013). Factsheet - Revelstoke Generating Station Unit 6 Project. Available At: https://www.bchydro.com/content/dam/BCHydro/customer-portal/documents/projects/revelstoke-unit-6/revelstoke-generating-station-unit-6-project-factsheet-oct-2013.pdf
- BC Hydro. (October 2013). Project Update - Mica Projects. Available At: https://www.bchydro.com/content/dam/BCHydro/customer-portal/documents/projects/mica-5-6/mica-projects-october-2013-project-update.pdf
- BC Hydro. (November 2013). Final Integrated Resource Plan. Available At: https://www.bchydro.com/energy-in-bc/meeting_demand_growth/irp/document_centre/reports/november-2013-irp.html
- BC Oil and Gas Commission (2012). Hydrocarbon and By-Product Reserves Report. Available at: https://www.bcogc.ca/node/11111/download
- Bullis, Kevin (2013). Fracking for Geothermal Heat Instead of Gas. Available at: http://www.technologyreview.com/news/520361/fracking-for-geothermal-heat-instead-of-gas/
- Capital Power. (December 2012). Shepard Energy Centre Backgrounder. Available At: https://www.capitalpower.com/generationportfolio/constructiondevelopment/Documents/2012_Shepard_Media_Backgrounder.pdf
- Clean Energy Association of British Columbia. (2011). Geothermal Fact Sheet. Available At: https://www.cleanenergybc.org/facts_&_resources/fact_sheets/
- Community Energy Association of British Columbia. (February, 2014). Final Submission to the Site C Joint Review Panel. Available At: http://www.ceaa-acee.gc.ca/050/documents/p63919/98322E.pdf
- Environment Canada. (2010). *Assessment of the Environmental Perofrmance of Solar Photovolatic Technologies.* Available At:: http://www.ec.gc.ca/scitech/B53B14DE-034C-457B-8B2B-39AFCFED04E6/ForContractor_721_Solar_Photovoltaic_Technology_e_09%20FINAL-update%202-s.pdf

- Filice, L. (2014, 06 04). *Solar PV Micro Grid Market Moving into Commercialization.* Available At: http://seekingalpha.com/article/2252413-solar-pv-micro-grid-market-moving-into-commercialization
- International Energy Agency. (2010). *Techonlogy Roadmap .* Retrieved from International Energy Agency. Available At: http://www.iea.org/publications/freepublications/publication/pv_roadmap.pdf
- International Energy Agency. (2011). Co-generation and Renewables – Solutions for a Low-carbon Energy Future. Available At: http://www.iea.org/publications/freepublications/publication/CoGeneration_RenewablesSolutionsforaLowCarbonEnergyFuture.pdf
- Lovins, Amory (2011). Reinventing Fire: Bold Business Solutions for the New Energy Era. Chelsea Green Publishing.
- National Energy Board. (2013). An assessment of the unconventional petroleum resources in the Montney Formation, West-Central Alberta and East-Central British Columbia. Available at: http://www.neb-one.gc.ca/clf-nsi/rthnb/nws/nwsrls/2013/nwsrls30-eng.html
- National Energy Board, BC Ministry of Energy and Mines. (2011). Ultimate Potential for Unconventional Natural Gas in Northeastern British Columbia's Horn River Basin. http://www.empr.gov.bc.ca/OG/Documents/HornRiverEMA_2.pdf
- Navigant. (2012). *Micro Grid Enabling Technologies.* Available At: http://www.navigantresearch.com/research/microgrid-enabling-technologies
- Report of the Joint Review Panel with Errata – Site C Clean Energy Project. Review Panel Established by the Federal Minister of Environment and the British Columbia Minster of Environment (2014). Available at: http://www.ceaa-acee.gc.ca/050/documents/p63919/99173E.pdf
- Renewable Energy World. (2014, 03 5). *US Solar Celebrates Records in 2013, Big Trends Coming in 2014.* Available At: http://www.renewableenergyworld.com/rea/news/article/2014/03/us-solar-celebrates-records-in-2013-big-trends-coming-in-2014?page=2
- United States Department of Energy. (2014). Geothermal FAQs. Available At: http://energy.gov/eere/geothermal/geothermal-faqs
- United States Department of Energy. (2014, 02 12). *Progress Report: Advancing Solar Energy Across America.* Available At: http://energy.gov/articles/progress-report-advancing-solar-energy-across-america
- United States Department of Energy. (n.d.). *Sunshop Mission.* Available At: http://energy.gov/eere/sunshot/mission
- US Energy Information Administration. (April 2014). Annual Energy Outlook 2014 with projections to 2040. Available At: http://www.eia.gov/forecasts/aeo/pdf/0383(2014).pdf

Appendix 1

Submission to Site C Environmental Assessment Joint Review Panel: District of Hudson's Hope

SUBMISSION TO SITE C ENVIRONMENTAL ASSESSMENT JOINT REVIEW PANEL

District of Hudson's Hope

November 25, 2013

Contents

Attachments

REVISED DECEMBER 12, 2013

1.0 Introduction

This submission to the Joint Review Panel outlines our community's values, principles and history as it relates to the proposed Site C Clean Energy Project. It provides an inventory of our community's key impact concerns with respect to the proposed project and highlights the unique cumulative impacts faced by Hudson's Hope.

It is expected that the information presented herein will be carefully considered by the Joint Review Panel given our community will experience significant and direct impacts from the proposed Site C project.

1.1 Our Home

The District of Hudson's Hope is the third oldest non-First Nation community in British Columbia. Throughout its history, Hudson's Hope has faced significant change. From its roots in trading, prospecting and agriculture to its current role in energy and resource development and beyond, the community of Hudson's Hope has learned to adapt and change to suit these conditions. Its continued presence and vibrancy is a testament to our community's resiliency in the face of a changing world. Currently, Hudson's Hope faces change again. With the ongoing development of major industrial projects in the oil and gas, renewable energy, mining sectors, and the proposed Site C Dam, Hudson's Hope is being challenged to maintain the needed services and environment that make our community unique and a great place to live.

In May of 2012, Hudson's Hope articulated three core community values, which are important to consider in the context of the Site C project and how it would impact our community. These values are summarized below.

1. The Residents of Hudson's Hope value the small town feel of the community.

2. The community's natural setting is highly valued by our residents given the recreational opportunities, aesthetic values and historical significance

3. Hudson's Hope is proud of its community and wishes to promote and assert its interests within the Region.

These values are foundational to our community's position on the Site C project and represent the basis of our submission to the Joint Review Panel.

1.2 Our Expectations

In addition to articulating our core community values, Hudson's Hope has prepared four (4) overarching expectations to help facilitate this submission to the Joint Review Panel. These expectations are offered to the Government of Canada, Government of British Columbia and BC Hydro for consideration during this decision-making process. By upholding each of these four expectations, our community will be better enabled to continually adapt and respond to the challenges and impacts that are likely to arise from the Site C project should it proceed. Our expectations are summarized as follows:

1. The community will be better off after Site C than before. Experience with the W.A.C. Bennett Dam and Peace Canyon Dam hydroelectric developments in our community has indicated that the local benefits have been less than predicted and the negative impacts have been greater than predicted. **Attachment 1** summarizes some of our community's experiences with these developments. We cannot let history repeat itself.

2. As many project impacts are unavoidable, community residents, property owners and businesses will be provided fair compensation for all impacts in a timely and appropriate fashion.

3. The District of Hudson's Hope will be kept whole both in the short and long term. The financial implications of the construction and operation of Site C will be borne by BC Hydro and the Province and not by existing or future taxpayers. Funding to address impacts must be adequate and assured.

4. Agencies and organizations providing services to Hudson's Hope will be assisted in maintaining services at or above current levels during and after construction of Site C.

1.3 Our Position

As a community, Hudson's Hope has long considered the significance of the proposed Site C project. We have used recent planning activities to engage residents in discussions about the project, we have participated in a number of regional local government discussions on the topic of Site C and we have previously submitted our community's perspectives and concerns about the project to the Canadian Environmental Assessment Agency and BC Environmental Assessment Office.

If constructed, the development of the Site C dam and reservoir will have major impacts on the community of Hudson's Hope. The impacts on Hudson's Hope are proportionally greater than on any other community due to the proximity of the development to the community, the extent to which the reservoir would impact lands within the municipal boundary and the population of the community. Consider that approximately 20% of the new reservoir will be within municipal boundaries if constructed.

BC Hydro, in its Site C Environmental Impact Statement (EIS), has gone to considerable lengths to identify and quantify the impacts of the project. However the approach taken in the EIS is to describe impacts in relation to a larger region. This has the effect of downplaying the impact and, particularly, downplaying the impact on Hudson's Hope, specifically. Therefore where the EIS may describe an impact as not significant in the context of the larger region, the impact can in fact be very significant for Hudson's Hope. For these reasons Hudson's Hope finds it necessary to identify and describe impacts in the local context and to require BC Hydro and the Province to address these impacts with mitigation and compensation that offsets these local impacts.

Based on a review of the Site C EIS, Hudson's Hope believes that the project will have a diversity of *significant* and *unavoidable* impacts to our community. While some preliminary impact mitigation measures have been identified, the unavoidable direct and indirect impacts that are to arise from the Project will adversely impact the quality of life of the residents of our community. This can be concluded as Hudson's Hope has identified fourteen (14) major direct impacts to the community. These impacts are summarized in Figure 1 (see **Attachment 2**) and further characterized throughout this submission.

In addition to the 14 direct impacts summarized in Figure 1, Hudson's Hope has experienced a diversity of historical impacts from the two other large reservoir hydroelectric projects in our community and will experience a number of social, economic and environmental cumulative impacts from the development and operation of Site C and other industrial activities in our community.

Regardless of the pressures Hudson's Hope may face, sustainability is key to the community's long term viability and success. We ask that in its deliberations, the Panel apply the sustainability framework outlined in hearing document #1644 to its assessment of this project. Moving forward, our community understands the need to position and prepare itself for change in a way that meets the needs of the current community and the expectations of future generations. Since the majority of impacts that are to arise from Site C cannot be effectively mitigated - given the scope and scale of the project - Hudson's Hope must be fairly compensated by the proponent. This compensation must acknowledge the immediate, short, medium and long term impacts of the project should it be developed. This compensation will be re-invested into the community to protect and enhance the quality of life for our residents and forthcoming generations. An effective process must be established through which any commitments to mitigation and/or compensation would be monitored and enforced throughout the life of the project.

2.0 Our History with BC Hydro's Peace River Generating Facilities

As a community, Hudson's Hope has been grappling with the historical impacts of hydroelectric development since the early 1960s. This is because the District of Hudson's Hope is home to BC Hydro's Peace River generation facilities, including the W.A.C. Bennett Dam, GM Shrum Generating station, Peace Canyon Dam and Generating Station, and Dinosaur Reservoir. As well the Williston Reservoir has a significant presence within our municipal boundaries. These are the "back-bone" facilities of the provincial hydroelectric system, and collectively provide fully one third of British Columbia's electricity, as well as most of the hydroelectric storage which leverages the efficiency of the entire system. With the development of these generating assets, Hudson's Hope has long been the most heavily impacted jurisdiction within the Peace River region with respect to hydroelectric development. Hudson's Hope has never fully recovered from the disruption to the community that took place during the construction and now operation of these facilities. If constructed, the Site C project would represent the third mega hydroelectric facility to significantly impact Hudson's Hope within the past fifty years.

As a community we understand the experiences associated with the construction cycle of a large hydroelectric facility. For example, the construction of the W.A.C. Bennett Dam took approximately five years and employed more than 4,800 people at its peak. The initial influx of workers to the community, raised the population in 1966 to 5,500 leading to increased demand for services and increased competition for local finite resources. Similar experiences came with the Peace Canyon Dam.

The demands of construction created significant stresses to the provision of community services and the needs of the community were simply underfunded. Upon completion of the construction of the W.A.C. Bennett Dam and Peace Canyon Dam and associated facilities, the community struggled with the consequences of a boom and bust economic cycle and supporting the ongoing needs of a small permanent population, the core of our community. For example, there have been dramatic influences within our local population numbers, employment rates, land values, housing needs, community services, and infrastructure requirements. This has made it extremely challenging to plan for and deliver the services needed to sustain a high quality of life in our community.

From an environmental perspective, the existing facilities have sterilized hundreds of hectares of land and natural water ways within Hudson's Hope's through inundation and the destabilization of our community's shorelines. Additionally, evidence suggests that certain fish species in the Williston Reservoir are unsafe for human consumption given bioaccumulation of mercury. The source of mercury has been traced to the inundated trees standing prior to the 70,000-square-kilometre Williston watershed being flooded in 1966. While not documented to the same extent, both of these projects resulted in very similar impacts to those detailed in BC Hydro's recently submitted 16,000 page EIS for Site C.

Despite experiencing a long history of impacts from past hydroelectric development, Hudson's Hope has received little in the way of social, environmental, or economic benefits. The existing generating facilities represent the primary industrial base of Hudson's Hope, yet they are not taxable. If taxable by "normal standards", they would produce revenue for the District in the order of $28 million a year. However, BC Hydro generating facilities are exempt from taxation and instead provide Grant-in-Lieu allocated by an Order-in-Council. The current policy for Grant-in-Lieu allocation is unsatisfactory for Hudson's Hope. A separate document (see **Attachment 3**) has been submitted to the Joint Review Panel on the topic of Grant-in-Lieu.

Peace Canyon dam
Photo © Flickr Creative Commons

The restricted tax base and unsatisfactory Grant-in-Lieu policy have been major contributors to an infrastructure deficit in the community. Current community infrastructure challenges include water supply and treatment, water and sewer main replacement, asphalt rehabilitation, and other infrastructure deficiencies that are affecting quality of life in our community.

The history of the Site C project in our community is long-standing. Our community started to feel the impact of the project in 1974, with BC Hydro's first (informal) passive land acquisition in the area. As a result of its "Passive Property Acquisition Program" (formal), BC Hydro has acquired much of the fee simple land it needs to advance the Site C project.

According to the BC Assessment Roll, BC Hydro owned 99 properties within the District of Hudson's Hope at the beginning of 2013. Of those, 68 properties, comprised of 338.8 acres (137.1 hectares) was acquired for Site C through the passive property acquisition program. We understand that BC Hydro has added more property in the past year and is currently negotiating for additional properties within the District, some of them very large land tracts. Some in our community have suggested this has corporatized our land base and evidence suggests that these land purchases have deteriorated the value of property in the community and stagnated our community's growth for over 35 years.

3.0 Our Key Concerns Regarding Site C

The continued alteration of the Peace River Valley into a reservoir, the substantial activity during the construction phase, as well as the ongoing management of the Site C operations will have substantial impacts on the community of Hudson's Hope. In our community, the project is expected to affect all five aspects under consideration by the Joint Review Panel: Environmental, Economic, Health, Social and Heritage. More so, Hudson's Hope will bear significant impacts during construction, and will be the only community to endure negative long-term and permanent impacts in perpetuity due to inundation.

Below you will find a summary of the impacts on Hudson's Hope as a result of the Site C development, as well as a brief discussion on the cumulative impacts from the ongoing and future industrial activity in close proximity to our community.

This section of our submission has been organized by the key project components that are to drive the majority of impacts on Hudson's Hope, and the resultant impacts expected in our community.

3.1 Impacts from Inundation

Approximately 20% of the new reservoir would be within municipal boundaries. BC Hydro has provided estimates of the impacts to land within the District of Hudson's Hope, including: loss to flooding (603 hectares/1490 acres), loss to highway realignment (66 hectares/163 acres), and loss to the statutory right of way (1037 hectares/2562 acres). ***In total, our community will lose approximately 1700 hectares/4200 acres of land due to the reservoir requirements*.** This has widespread, multi-faceted implications which we have summarized below.

- **Loss of prime real estate:** Over 68 properties, totally over 338.8 acres (137.1 hectares**)** of land within the District has or will be lost to BC Hydro acquisition. Many of these properties were serviced lots and/or prime real estate with waterfront access or valley views. Since their purchase, many of the homes have been demolished and none of these properties will ever be put back into the market should the project proceed. Furthermore, impact lines will encroach on many properties located along the new reservoir, restricting the usable depth of these properties, potentially requiring relocation for some residents, and limiting opportunities for future development.[1] The loss of land availability and use has and will have a significant impact on real estate supply and values, population growth rates, the quality of life for our current residents, and the attractiveness of our community. Many of these properties were/are many acres in size and would have been suitable for subdivision development and other community purposes.

[1] EIS Section 11.2.3.12.1 states that no new residential structures would be permitted nor would existing residences be allowed to remain. Non-residential structures could only remain pending a geo-technical study. See also **Attachment 4** (Existing Statutory Right of Way agreement placed on land within the proposed Site C reservoir).

- **Municipal finances**: Similarly, the District of Hudson's Hope is foregoing significant potential property tax revenues due to the permanent loss of residential and commercial properties, as well as BC Hydro's property tax exemption. This is not being fairly compensated through the current Grant-in-Lieu program.

- **Agricultural and environmental value**: The Peace Valley is home to a diversity of agricultural activities; providing our community a local food supply, economic diversity and community security. Our local agricultural sector represents an important component of our local economy and heritage. The viability of our sector is at risk due to inundation and industrialization of the land base by other development, such as massive shale gas development, pipelines and mining.

Hudson's Hope also concedes that there will be significant loss of wildlife and habitat resulting from Site C. These losses are extensively detailed in the EIS. While the impacts and losses to the natural environment are well documented, it is important to acknowledge that our community's relationship with the land base and nature is critical to our community's well-being and identity. For many generations, Hudson's Hope has been home to several guide outfitter operations. We value the stability of this industry and their contribution to our economy. Similarly, trapping provides significant main and supplemental income for many of our long-time residents. These are longstanding activities which have survived for generations and, if stewarded, could sustain local residents far into the

future. Therefore, it is important for the Joint Review Panel to consider the relationship between community (Hudson's Hope and region) and the natural environment.

- **Historical and archaeological sites**: Rocky Mountain Portage House, on the south side of the Peace River across the river from Hudson's Hope, was established in 1804. While it is currently formally unrecognized as a heritage resource, this site does bear significant historical value in British Columbia and Canada as the first trading post established in what is now British Columbia. The Peace River was also a route travelled by many great northern explorers such as Alexander Mackenzie (1793), David Thompson (1804), Simon Fraser (1805) and James Murray Yale, later the Hudson's Bay Factor at Fort Langley, testify to the importance of this river and valley in the earliest days of European exploration. This rich history is being celebrated by our local historical society and museum. We wish to support their efforts to communicate stories of our past and attract visitors. The flooding will most certainly impact and potentially threaten these heritage treasures.

- **Community values:** The conversion from a picturesque river valley to a reservoir regime has and will continue to greatly affect the wellbeing and sustainability of our community. We pride ourselves on the natural beauty of our landscape – which attracts both community members and tourists – and our core values as a community reflect the sanctity of this resource.

- **Visual landscape change**: The reservoir will permanently alter the visual landscape of the river valley, with particularly poignant effects on Alwin Holland Park. This park is named after the first teacher to come to Hudson's Hope. Alwin Holland Park is the most popular and photographed park in the entire Peace Region, and it will be partially flooded. Significant landmarks, such as Teapot Island and the Shale Islands, will suddenly and permanently lose their appeal.

- **Recreation**: The creation of the reservoir would result in changing the recreation and lifestyle opportunities in our region. This may include, but is certainly not limited to, loss of recreational activities, such as fishing, boating, camping, hunting and wildlife viewing, and loss of facilities,

such as RV parks, boat launches and river access. For example, the Lynx Creek Campground and Boat Launch - a scenic and active campground and RV park - will be completely flooded. The removal of only a portion of timber prior to flooding will result in deadhead problems and more 'snags' for fishing. This will compromise the safety, enjoyment and marketability of the new reservoir.

- **Community infrastructure:** According to the Site C EIS, the inundation area will have a direct and significant impact on the District's civic infrastructure. More specifically, "With the filling of the Site C reservoir, the Hudson's Hope water intake, pumping station, and treatment plant would be inundated, and would need to be rebuilt in a new location. There could also be potential effects on the sewage settling ponds due to bank erosion, or due to a change in groundwater conditions at the time of reservoir filling. The Hudson's Hope shoreline protection would be designed to address the potential for erosion at this site."

  Additionally, the inundation area will:

  - Impact Riverside trails and views of Tea Pot Islands;
  - Flood the D. A. Thomas Boat Launch for a three to four year period;
  - Require the relocation of over eight kilometres of Highway 29 located within municipal boundaries and additional 22 kilometers outside municipal boundaries;
  - Flood the Lynx Creek subdivision now owned by BC Hydro;
  - Necessitate the construction of a large berm to protect Hudson's Hope townsite from future sloughing and erosion. The magnitude of the berm and the construction process should be appreciated. The berm will be 12 to 14 metres high, approximately 7 meters wide and will extend over 2.5 kilometres along the reservoir shoreline. Approximately nine hectares of land will need to be cleared and grubbed. Approximately 440,000 cubic metres of material will need to be excavated on site or hauled from the Portage Mountain pit for the construction.

See **Attachment 5** and **Attachment 6** for additional maps and illustrations of the impacts described above.

3.2 Impacts from Construction

The construction phase for Site C will become a story of dichotomous impacts. For example, it will undoubtedly create short-term positive employment and contracting opportunities for community and local and regional businesses. At the same time, we can expect an influx of transient workers with little-to-no vested interest in the community, who will stress our community's ability to deliver a high-level of service.

Our community's core concerns with respect to impacts from construction are summarized as follows:

- **Local workforce**: On average, BC Hydro estimates it will require 800 employees per year for Site C construction, with a peak of 1,700-2,100 in year five. Whereas the majority of the construction workforce will be required from the Fort St John-Taylor area to construct the dam and generating station, there are several opportunities to engage the local workforce in the Highway 29 realignment, general road works, clearing, construction material transport, transmission line construction, and berm construction. This demand may create a re-distribution of labour that could negatively impact local businesses. Citizens who do engage will likely benefit from the access to training and skills development.

- **Transient workers & accommodations**: With 90% of the construction workforce coming from outside of Hudson's Hope, there will undoubtedly be an impact on community development and sustainability. Hudson's Hope is interested in attracting and retaining workers and their families, with a desire to see new workers become permanent residents, rather than promoting more transient workers in camps (as is currently planned). However, to accommodate this growth more family housing is needed, civic infrastructure needs to be upgraded, and more supportive policies, programs and services will need to be put in place. The current plan to house employees in large temporary camps throughout construction do not align with these interests and will likely not contribute to our community's long-term wellbeing.

- **Local Business Opportunities:** There will inevitably be increased purchases and support for local businesses that can serve the construction workforce, which can be both a benefit and a burden. Additionally, with the correct communications and capacity building, local businesses may have the opportunity to bid on construction and ancillary contracts relating to the dam, reservoir clearing, transmission line and shoreline berm. However, these opportunities are not available to all businesses. Certain industries, such as recreation, tourism, guiding, trapping, forestry and agriculture, will experience adverse effects in the short and long-term due to construction and land losses. This does not align with the communities values in created a vibrant, diverse and sustainable economy.

- **Major haul routes**: Canyon Drive, Clark Avenue and Beattie Drive (Highway 29) will be used as major haul routes for riprap, road construction aggregate, and bridge materials during construction. These haul routes bisect the main townsite and are a safety concern for drivers and pedestrians. Additionally, heavy hauling will cause deterioration of the road beds and surfaces and the increased

traffic levels will cause noise, dust and other disturbances. Many of our local residents have expressed concerns about these impacts.

- **Health, social & protective services**: Construction activity will increase the demand for services provided by the municipality, businesses and our citizens, including medical, recreation, policing, and ambulance services. As such, BC Hydro's workforce would directly increase the demand for resources, while also potentially compromising services for our own citizens. For example, local emergency service providers may be called upon to complement the emergency services provided by BC Hydro in response to an extreme incident at the construction site. Such a scenario would reduce the essential service levels available to the community. Additionally, it is unclear how BC Hydro will contribute to the community's emergency services capacity and meet the demands of an increased population base within Hudson's Hope during the construction period of the proposed project.

- **Cultural and Heritage service:** Many local churches in Hudson's Hope are located along Highway 29. Given that the Highway will experience significant usage and impacts during construction, it is expected that the community's churches will also face disruptions and a number of impacts.

3.3 Impacts from Supporting Infrastructure

The District of Hudson's Hope will inherit new infrastructure developed in support of the construction and ongoing management of Site C. This new infrastructure includes, but is not limited to:

- Development of both temporary and permanent access roads and bridges;
- Expansion of transmission lines;
- Realignment and reconstruction of 8 km of Highway 29 within municipal boundaries, due to flooding
- Extraction from local quarry sites; and
- Creation of a 2.5 kilometers long, 7 meters wide and 12-14 meter high berm.

Of particular concern to the residents of Hudson's Hope is the rip-rap berm. To protect Hudson's Hope townsite from future sloughing and erosion, it is proposed that BC Hydro would build a substantial berm along the shoreline of the Peace River. To gain appreciation of the scale of the operation, approximately 9 hectares of land will need to be cleared and grubbed. Roughly 440,000 cubic metres of material will need to be excavated on site or hauled from the Portage Mountain pit for the construction. The sheer size of the berm would permanently alter what is left of the prized valley views, for residents and tourists.

The development of this infrastructure and the site restoration of temporary infrastructure (i.e., access roads, quarries, clearings, etc.) will have permanent impacts on our wilderness areas. For example, the present shoreline serves as a corridor for larger wildlife passing by the community, and as birthing, nurturing and wintering habitat for fox, rabbit, deer, and other wild creatures. The community will also experience impacts to the visual landscape, land availability and use, public health and safety, the established and focused expansion of the tourism industry and recreation activities, to name a few. Our residents will be the long-term recipients of these projects and have a significant interest in their design, construction, maintenance, and long-term impacts.

3.4 Impacts over the life of the Project

Based on our historical relationship with the W.A.C. Bennett and Peace Canyon dams, the impacts of these developments continue far beyond the construction phase. As previously mentioned, ***our community will be the only one left to experience the long-term and permanent effects of BC Hydro's Site C project.***

Potential impacts that the residents of Hudson's Hope will likely address in the lifespan of the project include:

- **Economic development:** The construction of Site C would bring short-term economic benefits, in the way of employment and contracting opportunities, as well as spin-off benefits to local businesses; however, the vitality of our community depends on the sustainability of our economy. We need to ensure that we will be better off than we were before, and that we do not instead find ourselves in a post-construction slump. Similarly, the long-term negative impacts of Site C on our communities' health, socio-economics, environment, and heritage will prevent other economic opportunities that could otherwise contribute to the growth, development, diversity, well-being and identity of our community. The loss of land precludes several opportunities in forestry, agriculture, tourism, and real estate. In addition, there are resounding impacts on the attractiveness of our community which would foreclose further opportunities to pursue economic diversity. We have attached a news article that discusses our historical economic impacts experiences with the W.A.C Bennett Dam in **Attachment 7**. Our community anticipates similar experiences with Site C, should it be developed.

- **Reservoir impacts:** Shoreline erosion due to previous hydroelectric projects in our region has been an ongoing concern, and we can only expect that this will be intensified with the development of a third dam. Fluctuating levels of water in the reservoir, as well as debris management and sloughing, will have impacts on the visual landscape, the recreational opportunities, and the habitats of both wildlife and fish.

- **Restoration and decommissioning**: While the lifespan of Site C is likely greater than 100 years, the decommissioning process will need to be taken into consideration if we are to ensure the sustainability of our community. Additionally, there are more immediate concerns with the restoration of support sites, such as quarries, construction sites, and access roads.

In addition to the concerns and impacts highlighted above, there are a range of physical impacts which will occur but which are not fully understood based on studies done in advance of the project. These impacts are likely to include: groundwater impacts, microclimate effects, wind velocity changes, precipitation, fog and visibility, air quality and dust, reservoir ice regime, visual effects, noise, impacts on traffic and transportation, wildlife dislocation and loss of heritage resources.

4.0 Cumulative Impacts in Our Community

As described above, the District of Hudson's Hope has experienced widespread historical changes and impacts due to the convergence of industrial interests on the same land base. Much of the natural landscape has already been changed by logging, mining, oil and gas development (conventional and non-conventional), pipelines, water withdrawals and stream crossings, large-scale hydro development (i.e., W.A.C. Bennett and Peace Canyon), transmission line construction, agricultural conversion and other industrial developments. The resulting environmental, social and economic cumulative impacts of the existing footprint from natural resource extraction and industrial development to our community remains poorly understood.

In addition to the proposed Site C project, Hudson's Hope is likely to see the development of several other large scale resource development and industrial projects in the near term. Based on a review of the BC Major Projects Inventory, it is evident that there are many major projects slated to be developed. For illustrative purposes, the projects that are likely to have the most significant influence on the well-being of our community are highlighted in Figure 4 (**Attachment 8**). It is important to note that Figure 4 excludes known projects that are smaller and therefore not included in the Major Projects Inventory and those projects that have yet to be announced and are contingent on favourable market conditions. Also Figure 4 does not highlight the sub-surface oil and gas tenures that have been distributed to the private sector, which are likely to be developed. It is understood that the sub-surface oil and gas rights have been leased under all of the municipality except for a number of our community's subdivisions including Lynx Creek, Thompson, Jamieson, and Beryl Prairie. The social, economic and environmental impacts of oil and gas development in our community is not well understood, especially in the context of the known impacts of the proposed Site C project.

Recognizing the above and based on the review of the current EIS, Hudson's Hope is of the opinion that the cumulative impact assessment methodology used by the proponent is insufficient to adequately understand and respond to the diverse cumulative impacts that are likely to occur in a region experiencing significant growth. More specifically, the District is of the opinion that the proponent has not sufficiently considered the:

- Historical impacts of natural resource and industrial development in the baseline;
- Impacts of the Site C project in relation to the impacts of existing major projects;
- Impacts of the Site C project in relation to known major projects to be developed;
- Impacts of the Site C project in relation to likely development scenarios (i.e. future developments that have yet to be officially inventoried, but have a high probability of being developed in the future);
- Mitigation and Compensation strategies to address local and regional cumulative environmental impacts such as losses of lands, aquatic and terrestrial habitat quality, quantity and connectivity, air quality, etc.;
- Mitigation and Compensation strategies to address local and regional cumulative economic impacts such as regionalized inflation, affordable housing, access to affordable services, labour, etc.; and

- Mitigation and Compensation strategies to address local and regional cumulative social impacts such as housing availability, labour force opportunities, community and family cohesion, loss of and potential creation of recreational opportunities, access to essential services (i.e. health care and education), substance abuse challenges, etc.

Given the importance of the issues identified above to our community's wellbeing, Hudson's Hope is of the opinion that the cumulative impacts associated with local and regional development activities (large and small) must be given greater consideration when evaluating Site C. To address the identified gaps, the District feels that the proponent and government agencies are responsible and accountable to further assess, mitigate and compensate for the cumulative impacts as it relates to the:

- Required upgrades in civic infrastructure to support a healthy community in Hudson's Hope;
- Additional demands and costs for social and community services (i.e. health care, policing, fire protection, and education) required to meet the projected population changes;
- Loss of recreational opportunities for the residents of Hudson's Hope;
- Potential changes to local and regional housing markets and issues of accessibility and affordability; and,
- Cumulative impacts to the community resulting from the Passive Land Acquisition Policy.

5.0 Conclusion

As described in this submission to the Joint Review Panel, Hudson's Hope has experienced an assortment of historical impacts from the existing hydroelectric projects in our community, and we foresee a diversity of social, economic and environmental direct and cumulative impacts that are unavoidable from the impending development of the Site C project, and other industrial activities in our community. For your convenience, we have also summarized our key concerns and the impacts to our community in a short video (see **Attachment 9**).

We welcome economic development in the District of Hudson's Hope although the development must align with our community values and identity: our values and identity being rooted in a naturalist and respectful relationship to the land we live in. This relationship has influenced the social dynamics of our community. We welcome new residents, more so on a permanent basis. We want growth to remain and flourish in District of Hudson's Hope after the construction of the facility, should it occur. We want to express and share our values and to use this development, should it proceed, as an opportunity to build and grow our community. However, it must respect ***our*** values, to maintain ***our*** identity and well-being. Sadly, cumulative effects have steadily eroded the land and with it our long-standing relationship to our natural environment continues to erode. In spite of this, we believe that together, we can assist BC Hydro in helping us, in stopping this erosion, to save and maintain what is left of our (*land)*, community values and identity.

Moving forward, our community understands the need to position and prepare itself for change in a way that meets the needs of the current community and the expectations of future generations.

Since the majority of impacts that are likely to arise from Site C cannot be effectively mitigated - given the scope and scale of the Project - Hudson's Hope must be fairly compensated by the proponent, should they receive authorization to proceed. This compensation must acknowledge the immediate, short, medium and long term impacts of the Project should it be developed. This compensation should come in the form of an:

- **Adjustment Fund:** that will provide compensation to the District, businesses and individuals who can quantify impacts not anticipated at the time of Site C planning;
- **Land Leasing Agreement:** that is specific to the District of Hudson's Hope and BC Hydro. This agreement would see BC Hydro lease impacted lands within the municipal boundary and provide a revenue source to the District to ensure the community can grow and prosper and provide a quality of life for residents that is better after the project than prior;
- **Adjustment Payment for Foregone Opportunities**: that compensates the District for the lost economic development opportunities that would have otherwise occurred in the community; and,
- **Grant-in-Lieu of taxes for the Site C reservoir:** that reflects the extent of the impact on the community and is calculated on the same scale as for other local governments in the Province.

For each proposal, it will be important to have a formalized impact mitigation and compensation oversight framework in place to ensure BC Hydro and all other parties are held accountable over the long-term. The compensation that is received must and will be re-invested into the community to protect and enhance the quality of life for our residents and forthcoming generations.

Attachments

1. Harnessing the Peace: Economic and Environmental Themes amid Public Responses to the Construction of the Bennett Dam, 1957-1968.
2. Summary of Major Impacts (Figure 1)
3. Grants in Lieu for Hydroelectric Facilities in Hudson's Hope
4. Statutory Right-of-Way Agreement
5. Flooding at Lynx Creek Campground (Figure 2)
6. Flooding at Alwyn Holland Park (Figure 3)
7. News Article: 30 Years After Being Relocated Hudson's Hope Family Gets Power
8. Natural Resource Activity Overview Map (Figure 4)
9. Impacts to Hudson's Hope – YouTube Video
10. Hudson's Hope Site C Legacy Flyer

empathy, intentional forgiveness, and Sacred Conversation in relieving unavoidable suffering. Systematic, quantitative, and qualitative studies investigating the role of Sacred Conversation will bring greater understanding to how the approach enhances an individual's ability to create transcendent meaning from suffering and bring relief to physical and psychological pain. Survey research delineating the nature of this approach, along with experimental research measuring outcomes of the approach with regard to curative effects in anxiety, depression, stress, anger, and immunodeficiency levels are warranted. Phenomenological studies revealing the meaning of the approach for individuals and families are also warranted. Such studies will provide an important bridge toward clinical discernment with regard to suffering, emotion, and transcendent meaning.

IDEAS FOR FURTHER STUDY

1. Think about the precise way in which you might wish to recap the argument in your paper, especially with regard to limiting expressions and markers of obviousness. Also think about employing other rhetorical features typically found in academic conclusions, such as exploring solutions to a problem, statements of relevance, and questions for further research.

2. Identify the rhetorical features in the conclusion to the article that follows.

CHAPTER REFERENCES

Bishop, W. (2003). Suddenly sexy: Creative non-fiction rear-ends composition. *College English, 65*(3), 257–275.

Castleden, H. (2002). The silent north: A case study on deafness in a Dene community. *Canadian Journal of Native Education, 26*(2), 152–168.

Davis, A. (1998). A study in modernism: The Group of Seven as an unexpectedly typical case. *Journal of Canadian Studies, 33*(1), 108–121.

Del Mar, D.P. (1998). Pimping and courtship: A 1940 court case from northern British Columbia. In R. Sandwell (Ed.), *Beyond city limits: Rural history in British Columbia* (pp. 212–224). Vancouver, BC: UBC Press.

Ferch, S.R., & Ramsey, M.I. (2003). Sacred conversation: A spiritual response to unavoidable suffering. *Canadian Journal of Counselling, 37*(1), 16–27.

Fetveit, A. (1999). Reality TV in the digital era: A paradox in visual culture? *Media, Culture & Society, 21*, 787–804.

Giltrow, J. (2002). *Academic writing: Writing and reading in the disciplines.* 3rd ed. Peterborough: Broadview Press.

Orsini, M. (2002). The politics of naming, blaming and claiming: HIV, Hepatitis C and the emergence of blood activism in Canada. *Canadian Journal of Political Science, 35*(3), 475–498.

Theberge, J.B. (1991). Ecological classification, status, and management of the Gray Wolf, *Canis lupus*, in Canada. *The Canadian Field-Naturalist, 105*(4), 1–5.

INTRODUCTION TO THE READINGS

The paper by Laurie Dressler presents another outstanding example of student research, involving work in the archives of a local museum.

LAURIE DRESSLER

Harnessing the Peace: Economic and Environmental Themes Amid Public Responses to the Construction of the Bennett Dam, 1957–1968

> If there is one thing that is of basic importance to the development of British Columbia, it is the development of the rich resources of the northern and central regions of the Province. The Peace River particularly is one of the areas in Canada most ripe for development . . .
>
> —W.A.C. Bennett[1]

1 The W.A.C. Bennett Dam (Bennett Dam) is located on the Peace River near Hudson's Hope, B.C. Construction of the dam commenced in April 1962 and was completed by December 1967; however, planning for the hydro-electric project began in the 1950s. In 1954, then Premier of B.C., W.A.C. Bennett, who held office from 1952 to 1972, first described his "Northern Vision."[2] At this time, Premier Bennett announced his plans for a $400 million hydro-electric project in the Rocky Mountain Trench, which would produce enough power to fulfill future demands in southern B.C. This project was to "bring untold wealth and prosperity to the region."[3] Behind the dam would lie an enormous reservoir, which would flood more than 177,300 hectares of wilderness land.[4]

2 This essay examines economic and environmental themes amid public responses to the building of the Bennett Dam, near Hudson's Hope, during the period 1957 to 1968. First, I will describe public responses from 1957 to 1963, when the project was announced and construction of the dam began. Second, I will address public responses from 1964 to 1968, when the construction phase neared completion and operation began. I will show that initial public responses to the building of the Bennett Dam emphasized a desire for industrial and financial growth; however, as the dam neared completion, public responses became focused on long-term economic and environmental issues.

Methods

3 The information gathered to describe public responses to the building of the Bennett Dam is taken from articles and editorial comments in the *Alaska Highway News*, Fort St. John, from 1957 to 1968. The North Peace Museum maintains a catalogued archive of the newspapers from March 16, 1944 to December 24, 1975. Articles pertaining to the dam are recorded in the catalogue; however, editorial comments and Letters to the Editor are not. Thus, in order to ensure the thoroughness of my own research, it was necessary to review each of the *Alaska Highway News* weekly publications, page by page, between 1957 and 1968. The back issues of the newspapers have been kept in very good condition in cardboard boxes, one year per box, and shelved according to the year of publication. Further responses by local residents are taken from Earl K. Pollon and Shirlee Smith Matheson's *This Was Our Valley*, a historical account of the people, environment, and economics of the area affected by the dam and its reservoir. I will also be drawing information from the *Fort Chipewyan Way of Life Study*, which addresses the impact on economic and environmental issues downstream of the dam on the Peace-Athabasca Delta, once the waterflow of the Peace River was reduced.

Public Responses to the Bennett Dam (1957–1963)

4 In 1957, Premier Bennett described to a Vancouver audience his plans for a hydro-electric dam on the Peace River, making B.C. the greatest manufacturing province because of its cheap and abundant power supply. The dam would create a reservoir that would provide opportunity for recreation, improve navigation on the Mackenzie water

routes, and would possibly change the northern B.C. climate.[5] When Premier Bennett spoke to a large audience in Fort St. John nearly a year later, he stated that the development of the dam would "bring untold wealth and prosperity to this region."[6] In a recent interview, Mary Humphries, long-time resident of the Hudson's Hope and Fort St. John areas, recalls an affirmative response to the Premier's message. According to Humphries, the people of the area looked to industry to provide security for their businesses and livelihoods, hoping that new industry in the area would diversify the economy and secure future development. However, Humphries also suggests that while people looked for immediate growth in their communities, they were not looking beyond the completion of the dam.[7]

5 Nevertheless, public responses in the *Alaska Highway News* did indicate some long-term environmental concerns. H.L. Briggs, manager of the B.C. Power Commission, issued public statements regarding the Premier's handling of the province's affairs. Mr. Briggs denounced the government's stewardship of the province and attacked Mr. Bennett's integrity.[8] Furthermore, Briggs commented on the signing of a pact between Premier Bennett and Wenner-Gren, a Swedish financier, to conduct surveys and begin planning for the hydro-electric project on the Peace River. Briggs accused the Premier of "robbing the generations unborn"[9] by signing the pact with the Wenner-Gren group. He suggested that the government had committed natural resources in the area to be flooded by the reservoir before the public had a chance to realize the value of such a commitment. Mr. Briggs wanted to reach out to the people who would be directly affected by the proposed dam, those who were not able to follow the developing controversy in the provincial capital, except through news media.[10] Similarly, mineral economist Desmond Kidd suggested that developing the energy, timber, and mineral resources of the north was not as important as developing power and selling it to southern B.C. Kidd was critical of the Wenner-Gren pact because he feared that the province might commit an error that would be regretted for many years to come. Kidd doubted that any industry would be brought to the north based on the available resources. Furthermore, he believed that the flooding of the reservoir would ultimately sacrifice these resources.[11]

6 While the Premier stressed industrial and financial opportunities, local residents questioned other aspects of the proposal. In her column, "The Other Side," Vera Loucks wrote about the Peace River development propaganda, which gave an impression of extensive industrialization in the area. Loucks claimed the real objective was to sell the power to southern B.C. and the United States. Indeed, Loucks indicated that the amount of power generated by the dam would exceed the demands in the north. Supporting Loucks' concerns, a September 1959 press release by Gordon Shrum, chairman of the B.C. Energy Board, suggested that B.C. should develop all of its power resources and quickly build an export market.[12]

7 However, in 1960, as final confirmation of the project approached, a widespread anticipation of immediate economic development in Hudson's Hope became apparent. According to a January 11, 1960 article in the *Alaska Highway News*, landowners were receiving regular purchase offers from those who wanted to establish businesses; the Hudson's Bay Company store was rumoured to be reopening; and sawmills were busy and expanding. A former business owner in Hudson's Hope, Art Anderson, reopened his hardware store, stating, "It's now at the dawn of a new era. No town in B.C. has a better future than Hudson's Hope . . ."[13]

8 Indeed, by 1960, all around the village of Hudson's Hope, residents were preparing for immediate industrial and financial growth. While there was some resistance to the tearing up of paths to widen street allowances and to the tearing down of fences, residents realized that this reconfiguring of their village was a prelude to the biggest development project in the province. Dan Murray of the *Alaska Highway News* reported that "big silver Canadian dollars took the place of those hostile beady eyes."[14] Murray noted that a new hotel was being built; plywood was being stockpiled, awaiting new builders; a new grocery store was opening; and an old cafe site had been purchased by Victoria businesspeople.[15] Other developments included the move of the Canadian Bank of Commerce, from a trailer to a permanent establishment. In addition, real estate prices had risen, and a gas station and taxi service were established. Travel options to and from Hudson's Hope were also improving with the start of Canadian Coachways daily bus run, an airstrip, and a new road south to the Hart Highway.[16]

9 However, despite the emphasis on financial and economi opportunities, public responses were becoming negative. The buildin of the Bennett Dam was attracting the attention of the public fa outside the area of Hudson's Hope and northern B.C. The influx o people coming to Hudson's Hope to work on the dam was putting strain on school facilities, forcing children to be bused to other school out of their district, and away from their homes. An angry paren wrote "that B.C. Hydro [should] be willing to build schools in lieu o [paying] taxes, if the government is unable to find money fo education."[17] As well, concerns were reported over water and sewe difficulties, due to the increase in the population. Without th construction of a sewer system, the village water wells could be ir danger of contamination from sewage.[18] With the building of the dar under way, Hudson's Hope was in the early stages of a boom, whic was affecting the lives of the residents of this once-quiet community According to Harry Hazlett, "Progress is good in many ways, anc we all like to see it, but it brings changes, takes away things that we dislike to lose, and brings some things with it that are not good."[19] Ir the following years, this resistance would mount.

Public Responses to the Bennett Dam (1964–1968)

10 By 1964, the general public response to the building of the Bennett Dam was clearly less enthusiastic. Mary Humphries wrote about the frustration of the local people who felt pushed aside to accommodate the dam, suggesting that the old ways were colliding with the new ways.[20] Further frustration appears in public responses from residents who were taxed for services and schools needed for the laborers working on the dam. For years, locals had survived by looking out for one another, by making a living to meet their needs, and by enjoying a quiet community; but the building of the dam disrupted their lifestyle. Dennis Geddes, the district administrator from 1963 to 1974, stated: "I never felt the powers-to-be intended that Hudson's Hope would benefit to any degree from the construction of the dam."[21] Residents of Hudson's Hope also expressed the need for a permanent hospital in their community. In February 1966, a chamber of commerce meeting was held in Hudson's Hope to address this concern. Reeve Mr. Gething, a district official, felt that because of the workforce at the dam site, the population warranted a hospital. The District of Hudson's Hope was attempting to acquire the Red Cross outpost

hospital property and building, and was looking into financing.[22] However, despite the chamber of commerce efforts, on June 29, 1967, the *Alaska Highway News* headline read, "No hospital for Hudson's Hope." The hospital, which had been promised by B.C. Hydro, would not materialize. The hydro commission was willing to finance the hospital, but was told that it would be for overnight and emergency cases only; normal confinement cases would not be allowed because funds could not be provided to ensure adequate facilities.General treatment cases would to go to Dawson Creek and Fort St. John.[23]

11 In 1963, Earl Pollon, a long-time resident of Hudson's Hope, described his personal frustration with the building of the dam, citing difficulties that the local people had getting employment at the dam site, the rush to build the dam, and the lack of respect for the acquisition of local property. Initially, Pollon supported the dam and the promise of prosperity, but he wrote a poem indicating his changing viewpoint:

> God How I hate It! Yes, I hate it!
> I wish this dam project in hell!
> With all the rumble and racket
> I'd sooner hear harness and bell!
> .....
> I'm afraid . . . I shake like a child.
> I long for a silence to last.
> My body's arrived at this epoch,
> My soul has remained in the past.[24]

Pollon eulogizes the quiet lifestyle he had enjoyed for many years, a lifestyle that would soon be gone.

12 In keeping with Pollon's sentiments, public responses to the new reservoir, later to be named Williston Lake, showed a heightened concern for the environment. By 1965, the dam was drawing thousands of tourists, and development of a recreation industry on the reservoir was being considered. Officials of the Bank of Montreal, who visited the site, suggested that once the reservoir had been filled, hunting, fishing, and other recreational activities would further support tourism.[25] However, according to Mary Humphries' editorial, the

world's biggest human-made lake wasn't going to do anyone a good. She foresaw it as a menace to wildlife, and shipping on it wou be nearly impossible. Humphries suggested that studies were need to establish the lake's effects on area wildlife and climate. Additional surveys to determine maximum water levels were necessary to ensu adequate clearing of the shoreline and to avoid floating debris a dead trees, which would lessen the lake's tourism potential.[26]

13 Environmental concerns are described in a June 19, 1968 artic in which a boom holding back debris behind the dam gave way, freei up hundreds of acres of debris to float down and jam up behind t dam. The boom was holding the debris until it could be burned. T amount of debris in the lake would take years to clean up, with tugbo working steadily between freeze-ups. Burning of the debris, or collected, was causing environmental concerns because of the amou of smoke created.[27]

14 Earl Pollon ultimately became a major spokesperson environmental issues. In *This Was Our Valley*, Pollon reflects on concerns about the sudden burst of activity in the area. Pollon specula about the future of the river and valley. Graves of trappers, mine Klondikers, prospectors, and Natives would be flooded by reservoir. For Pollon, the past would be lost, buried twice ove Moreover, he, too, was concerned about the effect the reservoir wo have on the environment and animals in the valley. He expres particular concern about the moose and their ability to find new habi Pollon also pointed out that Stone sheep would become more accessi to hunters as the water rose, even though it was illegal to hunt fr a boat.[29]

15 By 1968, the dam had been completed and the boom-town situat in Hudson's Hope was subsiding. An editorial in the *Alaska Highw News* suggested that if Hudson's Hope could come up with an indus commercial venture, or service, there was someone with a mill dollars to invest. The article further noted that the chamber commerce had received an inquiry and sent an invitation to investor to come and look around. The editorial concluded tha would be hopeless to wait for Mr. Bennett and B.C. Hydro to addr the future of Hudson's Hope: "They've got what they came for.

future is up to us."[30] The large school, which had been built to support the population explosion of the dam-building years, would now have to be maintained through local taxes, since the Peace River Power Project had been removed from the school tax rolls. "We've been cast into Bennett-dammed water to sink or swim... leaving us with nothing but a village and a large unorganized territory with a lot of overbuilt services.[31] Moreover, the medical doctors who were brought by Northern Powerplant Builders to work in Hudson's Hope announced that they would leave toward the end of 1968, closing the mobile clinic. Thus, Hudson's Hope would have no medical personnel in the community.[32] Public responses at this time showed that the people of Hudson's Hope realized that long-term economic growth would not materialize, and that their community would be left to its own devices, to develop and maintain industry.

16 As the construction era ended, intensified concerns for the environment are represented in public responses. Residents, some of whom were pioneers of the upper Peace River, faced displacement by the flooding of the reservoir. The Beattie family, in particular, who settled in the area in 1913, had to leave their ranch because the waters of the reservoir would completely cover it. Mrs. Beattie visited the ranch for the last time just before Hydro burned it to prevent debris from floating to the surface once flooding began. On August 29, 1963, the *Alaska Highway News* reported: "Mrs. Beattie loved and cared for the land with dedication and devotion, and the mist won't only be laying on the Peace River, some of it will be in her eyes."[33] Moreover, Ross Darnall, Sr., brought a court case against B.C. Hydro over compensation for his land, which was also to be flooded by the reservoir. Mr. Darnall presented his points to the judge, stating: "What is the value of a good fishing stream, the view of majestic mountains, the stillness of the afternoon, as well as the value of timber on a 250 acre ranch, all soon to be lost to a watery grave[?]"[34]

17 Environmentally-based public responses from residents 1200 kilometers downstream of the Bennett Dam began once the Peace River's flow had been reduced by the filling of the reservoir. The Peace-Athabasca Delta and the hamlet of Fort Chipewyan were for the first time seeing the impact of the dam. Athabascan Chipewyan, Mikisew Cree, and Chipewyan Métis who inhabited the Fort

Chipewyan region had not been previously informed about potential impact of the dam on their area. Charlie Voyageur, of Athabasca Fort Chipewyan First Nation, worked as a driller on dam site and could not recall thinking about or having it brough his attention that the dam might have an impact on the people of delta and Fort Chipewyan. Legislation to protect the environm and human communities was weak in the 1960s, and neither the Alb nor B.C. government took measures to fully assess downstream effe Low water levels on the delta, caused by the Peace River being h back to fill the reservoir, affected the existing vegetation supply mammals, thus reducing species populations. This, in turn, affec the lifestyle of the residents by reducing their hunting, trapping, a fishing opportunities. The people of Fort Chipewyan and the Pea Athabasca Delta not only worried that their livelihood would recover if the water level didn't increase, but also that their recreatio pleasure and spiritual inspiration would be lost as well. Moreov the residents worried about possible permanent diminishment of th land and waterways. In 1970, the residents of Fort Chipewyan file lawsuit against B.C. Hydro, citing the effects that the Bennett D had on the Peace-Athabasca Delta.[35] To date, the court case has been settled.

Conclusion

18 The building of the Bennett Dam on the Peace River inspire desire for immediate industrial and financial growth. Responses fr residents of Hudson's Hope and the upper Peace River initia showed optimism about new industry and wealth for the regi However, once the dam neared completion and the economy of t community began to slow down, responses showed concern for t long-term effects that the dam and its reservoir would have on hum lives, economic security, and the natural environment. The people the Peace-Athabasca Delta, who were unaware of the developme on the Peace River until the dam was complete, also voiced concer about the long-term economic and environmental effects on th region. In 1993, the Peace-Athabasca Delta Technical Studies we established to develop an ecosystem management plan. The goal the program was to understand and select strategies for restoring t role of water in the delta.[36]

19 In retrospect, regional responses to the construction of the Bennett Dam can be situated in the larger context of a global environmental movement that expresses moral concern about the relationship between humans and the environment. Indeed, as the finishing touches were being put on the Bennett Dam, Greenpeace, Earth First, and other organizations began to speak out against activities such as nuclear testing, whaling, and the construction of dams elsewhere in North America. Furthermore, a heightened regard for the environment has since become evident within the Peace region itself. In the 1970s, when B.C. Hydro proposed to build yet another dam on the Peace River (at Site C), opposition to the dam mounted quickly.

20 Leo Rutledge, a long-time Hudson's Hope resident who was involved in several wilderness organizations and was a member of the Peace Valley Environmental Association, spoke out against the Site C Dam. Rutledge argued that a hearing needed to be held to inform the people of the effect the dam would have on the area.[37] Meanwhile, the people of the area remembered the long-term economic and environmental impact of the Bennett Dam and were less ready to be swayed by optimistic economic forecasts. Public responses showed a concern for the environment, for the animal habitats that would be lost, and for the farmland that would be flooded by the new reservoir.[38] Despite these concerns for the environment, some Fort St. John business people spoke out in favor of the Site C project, envisioning the building of another dam in the area as a way to provide jobs and improve the economy.[39] However, in 1980, the B.C. *Utilities Act* was passed, compelling B.C. Hydro to produce demand and supply forecasts, and to conduct social and environmental impact assessments.[40] In 1983, the B.C. Utilities Commission rejected the Site C proposal because the demand for power did not warrant another dam, and impact studies were not completed.[41] Today, twenty years later, B.C. Hydro has expressed renewed interest in Site C. Thus, citizens may again debate the desirability of another mega-project on the Peace River.

NOTES

1. *Fort Chipewyan Way of Life Study* (Vancouver: Stuart Adams & Associates Planning Limited, 1998), p. 6.

2. Ibid.
3. "It'll Be the World's Largest," *Alaska Highway News*, 09 October 1958, p. 1.
4. "Welcome to the WAC Bennett Dam" Retrieved September 30, 1999 fr http://www.hhcn.prn.bc.ca/district/bc_hydro/bchydro.html
5. "400 M P.R. Power Project," *Alaska Highway News*, 09 October 1958, p. 1.
6. "It'll Be the World's Largest," *Alaska Highway News*, 09 October 1958, p. 1.
7. Interview with Mary Humphries, 21 February 2000.
8. David J. Mitchell, *W.A.C. Bennett and the Rise of British Columbia*, (Vancou Douglas and McIntyre, 1983), p. 25.
9. H.L. Briggs, "Canada's Biggest Give-Away Show in Your Own Backyar *Alaska Highway News*, 27 November 1958, p. 1.
10. "It'll Be the World's Largest," *Alaska Highway News*, 27 November 1958, p
11. Desmond Kidd, "Wenner-Gren Hydro Project Overrated," *Alaska High News*, 27 November 1958, p. 15.
12. Vera Loucks, "The Other Side," *Alaska Highway News*, 05 December 1959, p
13. "Hudson's Hope Begins to Stir as Zero Hour Nears," *Alaska Highway News* January 1960, pp. 1, 8.
14. Dan Murray, "Hudson's Hope . . . The Best Town by a Damsite!" *Alaska High News*, 07 September 1961, p. 10.
15. Ibid.
16. "Quiet Backwater Looks for Bigger Things," *Alaska Highway News*, 11 Janu 1962, pp. 1, 8.
17. "Our Readers Write," *Alaska Highway News*, 18 October 1962, p. 3.
18. "Quiet Backwater Looks for Bigger Things," *Alaska Highway News*, 11 Janu 1962, p. 8.
19. "Hudson's Hope, The Old and the New," *Alaska Highway News*, 10 Octo 1963, sec. 2, p. 3.
20. Mary Humphries, "White Water," *Alaska Highway News*, 14 November 19 sec. 3, p. 2.
21. "Hudson's Hope 1965," *Alaska Highway News*, 13 January 1966, sec. 2, p. 4.
22. "Plans Go Ahead for Hospital Here," *Alaska Highway News*, 17 February 19 sec. 2, p. 3.
23. "No Hospital for Hudson's Hope," *Alaska Highway News*, 29 June 1967, p.
24. Earl K. Pollon and Shirlee Smith Matheson, *This Was Our Valley* (Calga Detselig, 1989), p. 183.
25. The Bank of Montreal Visits the Peace River," *Alaska Highway News*, 19 M 1966, sec. 3, p. 4.
26. "We Need Help," *Alaska Highway News*, 05 June 1968, sec. 3, p. 2.
27. "Dam Boom Breaks, Debris Lets Loose," *Alaska Highway News*, 10 July 19 sec. 3, p. 6.
28. Earl K. Pollon and Shirlee Smith Matheson, *supra* 24, p. 131.
29. Ibid., p. 132.
30. "Editorial," *Alaska Highway News*, 24 January 1968, sec. 3, p. 6.
31. "Editorial," "Cast Aside?" *Alaska Highway News*, 08 May 1968, p. 1.

32. "Editorial," *Alaska Highway News*, 05 June 1968, sec. 3, p. 2.
33. "The River Gave," *Alaska Highway News*, 29 August 1963, pp. 4–6.
34. "Court Action Result of Hydro Land Grab," *Alaska Highway News*, 17 January 1968, p. 1.
35. *Fort Chipewyan Way of Life Study*, *supra* 1, p. 10.
36. *Peace-Athabasca Delta Technical Studies*, 1996, (WordPicture Communications), pp. 1, 2.
37. Earl K. Pollon and Shirlee Smith Matheson, *This Was Our Valley*, *supra* 24, p. 317.
38. Ibid., p. 310.
39. Ibid., p. 314.
40. Ibid., p. 310.
41. Ibid., p. 319.

9 Writing in the Sciences

> Every great advance in science has issued from a new audacity of imagination.
>
> —John Dewey

Scientific discourse has a reputation for being one of the more challenging forms of academic writing. It often involves highly technical language, numbers, graphs, equations, and tables that are unintelligible to the layperson. Some of us may feel as though scientists speak another language. Nevertheless, on the whole, we tend to tolerate and even respect such difficulty because we sense that something important is at stake. The goal of much science writing, after all, is to reveal patterns in nature, and that activity can have real and immediate significance in our lives. Further, scientific reports present data and interpretation in an effort to persuade others to accept or reject the hypotheses under consideration. Thus, while the humanities often struggle to justify their existence, science and technology are firmly entrenched as funding priorities among university and governmental administrators.

Whereas the goal of writing in the humanities may be to speculate philosophically on the human condition, the goal of much science writing is to reveal patterns in nature. Scientists want to let nature speak for itself.

Designs for Disciplines

An Introduction to Academic Writing

Edited by
Steven C. Roe and
Pamela H. den Ouden

Canadian Scholars' Press Inc. Toronto

Designs for Disciplines: An Introduction to Academic Writing
edited by Steven C. Roe and Pamela H. den Ouden

First published in 2003 by
Canadian Scholars' Press Inc.
180 Bloor Street West, Suite 801
Toronto, Ontario
M5S 2V6

www.cspi.org

CSPI gratefully acknowledges financial support for our publishing activities from the Government of Canada through the Book Publishing Industry Development Program (BPIDP) and the Government of Ontario through the Ontario Book Initiative.

National Library of Canada Cataloguing in Publication Data

Designs for disciplines : an introduction to academic writing / edited by Steven C. Roe and Pamela H. den Ouden.

Includes bibliographical references and index.
ISBN 978-1-55130-244-7

1. English language—Rhetoric. 2. English language—Grammar. 3. Academic writing. I. Roe, Steven C. (Steven Charles), 1960- II. Den Ouden, Pamela H.

PE1408.R647 2003 808'.042 C2003-903673-1

Cover design by Drew Hawkins
Cover art: David James, "Interlace Mandala" from his book *Celtic Designs: An Arts and Crafts Source Book*, first published by Blandford Press, 1997; 4th printing Orion Books, 2001.
Text design and layout by Brad Horning

09 10 11 12 7 6 5

Printed and bound in Canada by Marquis Book Printing Inc.

Canada

We dedicate this book to our families:
thank you for your constant support and encouragement.

S. R.—For Jane, Paul, and Julia

P.D.—For Fred, Diana, Jadon, and Jordan

Canadian Scholars' Press Inc.
425 Adelaide St. W., Suite 200, Toronto, ON, Canada M5V 3C1
Telephone: 416.929. 2774 Fax: 416.929.1926
email: emma.johnson@cspi.org

November 22, 2013 CSPI Ref. No. 08137

RE: Permission Request

Dear Gwen Johansson,

Thank you for your request for permission to reprint materials from publications for which Canadian Scholars' Press Inc. (CSPI) or Women's Press (WP) holds copyright. We are pleased to grant permission for the use of the materials shown below for the fee indicated and on the conditions set out in this letter. This permission covers only material for which CSPI/WP holds copyright; it does not cover any material with an independent copyright notice or a separate source notation.

Title: Designs for Disciplines, edited by S. Roe and P. H. den Ouden, CSPI, 2003 (ISBN 9781551302447)
Excerpt: Dressler, Laurie. Harnessing the Peace: Economic and Environmental Themes Amid Public Responses to the Construction of the Bennett Dam, 1957–1968, pp. 253–264.
For Use in: Submission to an environmental assessment hearing
Rights Requested: 1 photocopy
Requested Fee: N/A

Conditions:
1. The customary credit must be given to the author, the title, and to Canadian Scholars' Press Inc./Women's Press as publishers. The acknowledgement must also include the statement "Reprinted by permission of Canadian Scholars' Press Inc. and/or Women's Press" and the copyright notice exactly as it appears in our publication.

2. The acknowledgement must be placed either on the copyright page of your work or on the first page of each extract covered by this permission.

3. A cheque for the required fee must accompany the signed copy of the agreement. Please make cheque payable to Canadian Scholars' Press Inc. and mail it to the address above. This permission will not be valid until a signed copy of the agreement and payment are received by CSPI.

4. This permission is non-exclusive and unless otherwise stated is valid throughout the world in the English language only.

5. This permission covers one edition, press run and/or digital only. Unless specifically stated otherwise, this permission does not allow the use of this material in any other edition, or by any other means of reproduction, including (by way of example) digital reproduction, motion pictures, sound tapes, phonograph records, nor does it cover book clubs, translations, digest, abridgement, or selections that may be made from the publication. It does, however, include use in Braille, large-type, or other editions of your work by non-profit organizations solely for the use of the visually or physically handicapped, provided no fees are charged.

If these terms and conditions are acceptable, please sign one copy of this agreement and return it with the requested fee to us at the address above. Please make any fees payable in Canadian funds or equivalent USD to Canadian Scholars' Press.

I agree to the terms and conditions set forth above.

Requester's signature

Gwen Johansson

Requester's name and title (print)

Gwen Johansson, Mayor, District of Hudson's Hope

Date of this agreement

November 22, 2013

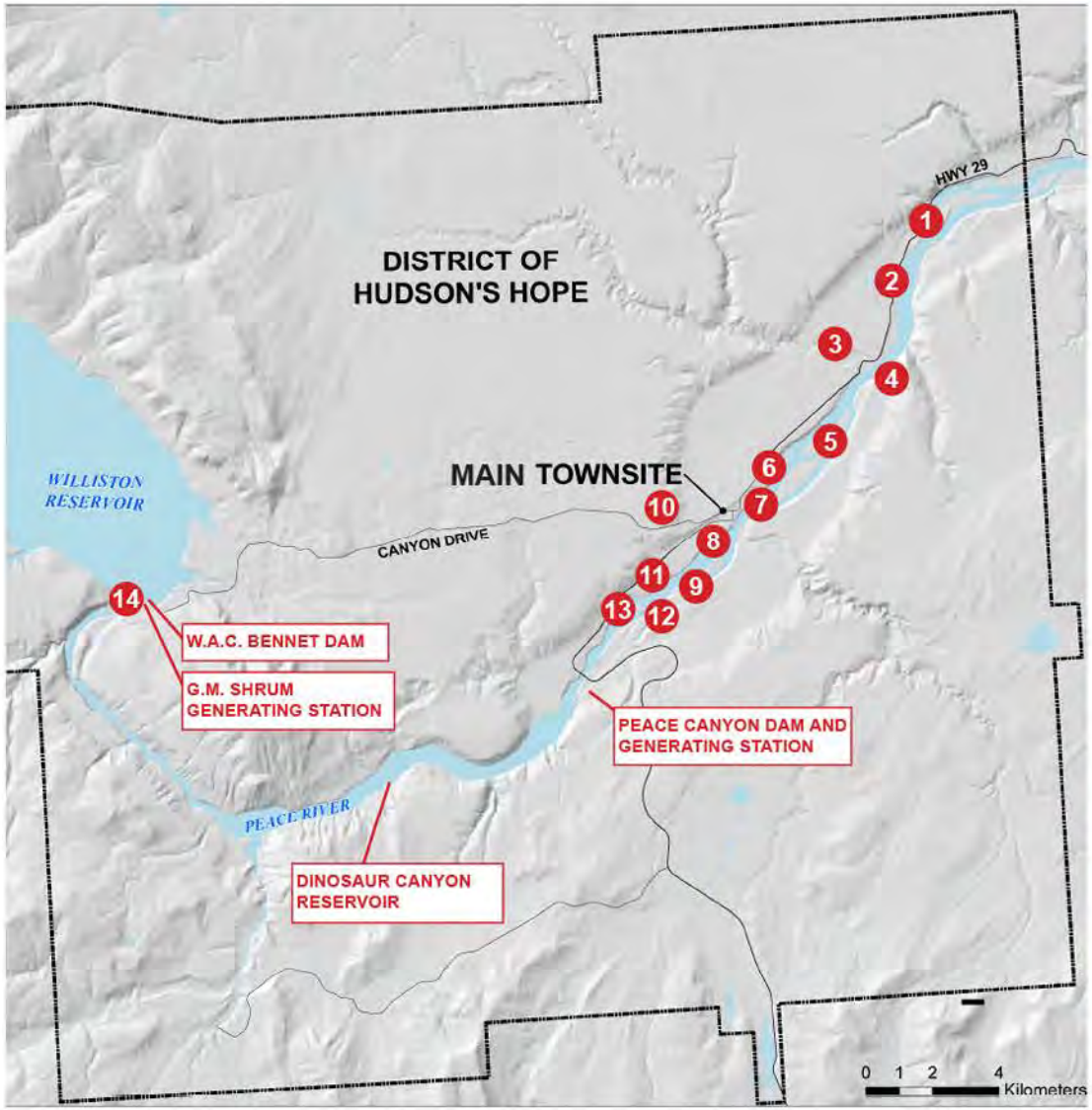
Permission is granted, provided the terms and conditions agreed to above are honoured.

Yours sincerely,

Emma Johnson
Permissions Coordinator
Canadian Scholars' Press, Inc. / Women's Press
425 Adelaide Street West, Suite 200
Toronto, ON M5V 3C1
416-929-2774 x 228
f: 416-929-1926
emma.johnson@cspi.org

HUDSON'S HOPE
PLAYGROUND OF THE PEACE

Summary of Major Impacts



1. Approximately 16 km, or close to 20%, of the **new reservoir** will be located within the District's boundaries.
2. The removal of only a portion of timber prior to flooding will result in deadhead problems and more 'snags' for fishing. This will compromise the safety, enjoyment and marketability of the new reservoir.
3. BC hydro has acquired (or is acquiring) 97 lots which will be lost to the new reservoir – including 29 serviced **residential lots** near Lynx Creek with valley views.
4. The **Lynx Creek Campground and Boat Launch** will be completely flooded.
5. Over 8 km of **Highway 29** located within District's boundaries will be flooded and will need to be re-aligned and re-constructed.
6. The proximity of the new reservoir to the District's existing **wastewater and treatment disposal facilities** may result in necessary upgrades to the plant's capacity in order to meet higher discharge requirements.
7. The **D.A. Thomas Boat Launch** will be inundated and inaccessible for a 3-4 year period during berm construction and the flooding of the new reservoir.
8. The community's **water supply** will be inundated and the District will have to design and develop a new water treatment plant, without the benefit of a pilot study resulting in a need to 'overbuild' the new plant making it more complex and costly to operate.
9. A **large berm**, approximately 12 m to 14 m high and over 2.5 km long, will be constructed to prevent bank recession and erosion throughout the extent of the townsite.
10. Canyon Drive, Clark Avenue and Beattie Drive (Highway 29) will be used as **major haul routes** for riprap, road construction aggregate, and bridge materials during construction. These haul routes bisect the main townsite and are a safety concern for drivers and pedestrians.
11. The new **bank stability** line will encroach on many properties located along the new reservoir. This will significantly reduce the usable depth of these properties. 27 prime valley view houses will be eliminated.
12. The new reservoir and the construction of the large berm will permanently alter the prized **valley views** of many residential properties through-out the community.
13. **Alwin Holland Park and Campground** will be partially flooded. It is one of the most popular and photographed parks in the entire Peace region.
14. The new reservoir will reduce the Peace Rivers ability to 'absorb' flood waters generated upstream. We believe this will reduce the **evacuation response time** for the community (to less than 45 minutes) in the event of a catastrophic failure at upstream dams. Reduced evacuation time will compromise the safety of the community.

FIGURE 1

Grants in Lieu for Hydroelectric Facilities in Hudson's Hope

Report prepared for District of Hudson's Hope

Introduction:

The District of Hudson's Hope is home to BC Hydro's Peace River generation facilities, including the WAC Bennett Dam, GM Shrum Generating station, Peace Canyon Dam and Generating Station, and Dinosaur Lake, entirely within our municipality, as well as a significant presence of Williston Reservoir. These are the "flag-ship" facilities of the provincial hydro-electric system, and collectively provide one third of the province's electricity, as well as most of the hydro-electric storage which leverages the efficiency of the entire system.

These generating facilities comprise the only industrial base in Hudson's Hope, yet are not taxable. If taxable, they would produce revenue for the District in the order of $28 million a year. BC Hydro generating facilities are exempt taxation and instead provide Grants-in-Lieu (GIL) allocated by Order-in-Council.

Grants-in-Lieu allocations to local governments are calculated in accordance with a policy administered by the Ministry of Finance. The Ministry maintains a policy that applies to all local governments in British Columbia, except District of Hudson's Hope, and a separate policy that applies only to Hudson's Hope. (Detailed in Appendix A.)

Currently under the "separate policy" noted above, the District of Hudson's Hope receives a substantially reduced Grant-in-Lieu compared to the amount that would be received if the provincial policy applied.

The restricted tax base has resulted in a significant infrastructure deficit in the community. Current challenges include water supply and treatment, wastewater treatment, sewer and water mains replacement, asphalt rehabilitation, and other infrastructure deficiencies affecting health and lifestyle. Current policy for Grant-in-Lieu allocation is unsatisfactory for Hudson's Hope.

Relevance to Site C:

BC Hydro is currently seeking approval for Site C, a third dam on the Peace River. Site C will have significant impacts on the municipality, as described in BC Hydro's application and detailed in other submissions by the District of Hudson's Hope,. In fact Site C will have greater impacts on Hudson's Hope than on any other local government.

The prospect of Site C brings the GIL issue to the forefront and raises additional concerns.

It might be reasonable to expect that since Site C will result in increased impacts on the District of Hudson's Hope, and that since the Grants-in-Lieu are intended to address relative impacts, that the Grant-in-Lieu to the District will be automatically increased should Site C become operational. However this is not the case under the current policy.

This fact has been clarified by letter from the Minister of Finance to the municipality, as follows:

"Unlike in the rest of the province, the grant payable to the District is not affected by changes in population or by changes (increases or decreases) in generating capacity." (Letter from Colin Hansen, Minister of Finance dated November 16, 2010, attached)

The District of Hudson's Hope maintains that the Grants-in-Lieu should reflect the principles of fairness, equity and relative impact, as stated in the provincial policy. Hudson's Hope would propose that as a condition for Site C to proceed, a new policy for Grants-in-Lieu must be developed for the District that adequately reflects the impacts on the municipality from the two existing hydro-electric facilities and the addition of Site C and related reservoir.

Limited Tax Base:

The District of Hudson's Hope has a very limited tax base. The total residential and commercial property assessment stands at $104,489,140 for 2013. Property tax revenue from these sources in the current year totalled $458,960.

The total light and major industrial assessments stand at $10,450,442 for 2013 and the resulting property tax revenue was $167,206.

It will be immediately evident to the reader that the tax revenue from these low assessments will not raise sufficient funds to address the infrastructure issues.

BC Hydro Tax Exempt Status:

The District of Hudson's Hope is home to BC Hydro's Peace River generation facilities, including the WAC Bennet Dam, GM Shrum Generating station, Peace Canyon Dam and Generating Station, and Dinosaur Lake, entirely within our municipality, as well as a significant presence of Williston Reservoir. These generating facilities comprise the only industrial base in Hudson's Hope, however BC Hydro generating facilities are exempt taxation and instead provide Grants-in-Lieu allocated by Order-in-Council.

While the District hosts what is arguably one of the most valuable industrial assets in the province and serves the needs of local employees, contractors and related service industry, it is evident that the assessments for these related properties do not generate sufficient tax revenue to pay for the services required, hence the District now faces an infrastructure deficit which has grown over time to total more than $25 million.

Taxation Option:

The BC Hydro generation in Hudson's Hope includes 2730 MW at GM Shrum and a further 700 MW at Peace Canyon, for a total of 3430 MW. We note there are several examples where dams and generating stations in BC are taxed at industrial rates. The following provides the Megawatt (MW) capacity for some of these facilities and the amounts of tax revenue received by the local jurisdiction in one recent year:

- The 125 MW Brilliant Dam, owned by Columbia Power Corporation, paid local government taxes of $421,000 in 2012, collected by the City of Castlegar.
- Four dams and generating stations owned by Fortis BC, totalling 235 MW, paid $781,507 local government taxes in 2012, collected by the City of Nelson.
- The Waneta dam and generating station, partly owned by Teck Corporation, and comprising 450 MW capacity, paid $1,288,813 local government taxes in 2012, collected by the Kootenay Boundary Regional District.
- Independent power producers' facilities in BC are subject to full industrial property assessments and tax levies.

If the BC Hydro generating facilities in Hudson's Hope were taxable on a comparable scale, they would produce revenue for the District in the order of $28 million a year.

Provincial Grant-in-Lieu Policy:

The current Grant-in-Lieu policy for BC Hydro generating facilities was introduced in 2007 and is based on the generating capacity at each facility and a three tier system of grants depending on the size of the facility. A formula set by the Ministry of Finance prescribes how the grant from each facility is distributed among the host community and other impacted jurisdictions, based on relative impact. (Details of this policy are described in Appendix A.)

Based on this policy, the District of Hudson's Hope would have received grants totalling $2,224,695 in 2013.

Separate Policy for Hudson's Hope:

Hudson's Hope does not fall under the provincial Grant-in-Lieu policy referenced above. Rather, a "separate policy" was established in 2007 and set an arbitrary amount for the grant to Hudson's Hope. In 2013 this grant amount was $1,225,042, a shortfall of $999,653 from the amount which would be prescribed by the provincial policy.

This "separate policy" treatment for Hudson's Hope results in irrational grant allocations when comparing impacted jurisdictions. This distortion is further exacerbated by a "waterbed provision" which increases the grants to other impacted jurisdictions in the approximate amount of the shortfall in the Hudson's Hope grant. (See Appendix A for details.)

As one example, this results in the District of Mackenzie receiving a grant nearly 20% larger than Hudson's' Hope, despite the fact that Mackenzie is not host to any facility and is impacted by only one reservoir, while Hudson's Hope is impacted by two reservoirs and hosts two dams and generating stations.

Summary of Policy Impacts:

- The current grant formula was introduced in 2007 and provides grant amounts for each generating station on a three tier system. The amounts have been subject to escalation since 2007. In 2013 the amounts were approximately $1636 per megawatt for the first 400 MW, then $1213 for the next 400 MW and $790 for each additional MW.

- On this basis, the 2013 grants for Peace Generating facilities would be:
    - Bennett/G M Shrum: 2730MW: $2,664,300
    - Peace Canyon: 700 MW: $1,018,300
    - Total: $3,682,600

- The provincial policy also prescribes the basis for distributing the grants-in-lieu to the impacted communities. This formula is set by the Ministry of Finance and is as follows:

    - 40% to the host community
    - 60% to the impacted jurisdictions (includes municipalities and regional districts)
    - For Bennett/GM Shrum, 40% is allocated to Hudson's Hope as host community and the remaining 60% is allocated among Mackenzie (28.76%), Peace River RD (21.95%), Hudson's Hope (5.28%) and Fraser-Fort George RD (4.01%).
    - For Peace Canyon, the entire grant is allocated to Hudson's Hope as both the host and impacted community.

- Based on the relative impact as set out in the provincial policy, in 2013 Hudson's Hope would have received a grant as follows:

    - 40% of Bennett/GM Shrum as host: $1,065,720
    - 5.28% of Bennett/GM Shrum as impacted community: 140,675
    - 100% of Peace Canyon as host and impacted community: 1,018,300
    - Total: $2,224,695

- However, Hudson's Hope does not fall under the provincial policy, rather, a "separate policy" was established in 2007 and set an arbitrary amount for the grant to Hudson's Hope. In 2013 this grant amount was $1,225,042, a shortfall of $999,653 from the amount which would be prescribed by provincial policy.

- In addition, a "waterbed" provision exists in the provincial policy, which allocates additional grant amounts to communities other than Hudson's Hope. By way of background, prior to 2007, Hudson's Hope's grant was capped at $616 per capita. In 2007, this cap was replaced by the arbitrary "separate policy" described above, and the "waterbed" provision provides that:

    "The balance of the total grant amount that would have been available to other jurisdictions impacted by the G.M. Shrum facility if the cap had been in place for Hudson's Hope (about $930K) was redistributed to those jurisdictions as though the cap was still in place. The jurisdictions are District of Mackenzie, Peace River Regional District and Fraser-Fort George Regional District." (Quote from Ministry of Finance per Grants-in-Lieu Policy.)

- Note that since the grant calculation under provincial policy has been escalated each year since 2007, but the notional Hudson's Hope "cap" remains fixed at the

pre-2007 amount of $616, the actual windfall to the other jurisdictions is increasing each year and amounts to about $1.6 million in 2013.

- The “separate policy” and the “waterbed provision” combine to distort the grant allocations such that they do not serve the principles of equity, fairness and relative impact. In addition the “waterbed provision” actually increases the financial burden on BC Hydro.

In 2013 the actual Grants-in-Lieu for Peace Generating facilities were allocated as follows:

-Hudson’s Hope:	$1,225,042.	
-Mackenzie:	1,458,011.	
-Peace River RD:	1,112,773.	
-Fraser-Fort George RD:*	670,395.	*Includes an amount for Mica/Kinbasket)
Total:	$4,466,221.	

Grant to which Hudson’s Hope would be entitled under provincial policy: $2,224,695.

Underpayment to Hudson’s Hope in 2013: $ 999,653.
Cumulative underpayment to Hudson’s Hope since 2007: $6,002,299.
(Appendix B provides details of Grant-in-Lieu amounts from 2007 to 2013.)

This allocation does not serve the principles on which Grants-in-lieu are based, i.e. fairness, equity and relative impact. Nor does this allocation serve the core intent of the provincial policy which allocates 40% to the host community and divides the other 60% based on relative impact.

In the past, the Province has pointed out that the Grant-in-Lieu *“is not intended to provide a windfall.”* Yet the “waterbed provision” clearly provides a windfall to jurisdictions other than Hudson’s Hope despite their bearing lesser impacts of the hydroelectric facilities.

The lump sum amount for Hudson’s Hope is arbitrary and illogical when compared to other grants. As one example, Mackenzie receives nearly 20% more than Hudson’s Hope. This clearly does not meet the intent of the distribution formula set by the Ministry which states that Hudson’s Hope would receive 45.28% of the Bennett/GMS grant while Mackenzie would receive 28.76%, and Hudson’s Hope would receive 100% of the Peace Canyon grant.

Hudson’s Hope has two generating stations within municipal boundaries and is impacted by two reservoirs. Mackenzie has no generating stations and is impacted by one reservoir. That impact is positive in that it provides a transportation option for logs.

Hudson's Hope is inundated should one of the dams experience a catastrophic failure and the municipality maintains warning sirens that would give the residents 30 minutes to evacuate.

Another example is Port Moody which received a Grant in Lieu of $1,235,121 for Burrard Thermal, a plant which rarely operates. The Ministry has not provided any explanation of the rationale for these imbalances.

Further inequity is created by the annual payments for as long as the dams operate to the Tsey Keh First Nation of approximately $2 million for impacts of Williston, and approximately $1.5 million to Kwadacha First Nation for impacts of Williston although that community is not located on the reservoir.

The Site C development is now in the advanced stages of planning. Should Site C proceed, Hudson's Hope will be the community that bears more of the additional impacts than any other community. Yet the "Separate Policy" for Hudson's Hope provides that *"the grant payable to the District is not affected by changes (increases or decreases) in generating capacity."*

Fairness, Equity and Relative Impact:

Ministry of Finance staff have indicated that the Grant-in-Lieu policy is based on key principles of equity across local and regional governments and reasonable financial obligations for the utility and that grants are awarded *"according to a formula that reflects the extent to which the jurisdiction is affected relative to other affected jurisdictions".*

The District of Hudson's Hope would argue that the current allocation of grants does not meet the principles of fairness, equity and relative impact.

- Full tax treatment for the Peace River generating facilities would result in a tax levy for the District of Hudson's Hope of approximately $28 million annually. Only BC Hydro, Columbia Power Corp and Rio Tinto Alcan are exempt taxation on generating facilities in BC. Other publicly owned and private corporations are assessed at industrial tax rates and pay tax levies accordingly.

- Allocation of grants based on relative impact, equity among local governments, and reasonable obligation for the utility, as detailed in the current provincial policy, would result in grants to the District in the order of $2.22 million. The provincial Grant-in-Lieu policy includes measures to ensure that the grants

allocated relate to the relative size and impacts of the facilities involved, and fairness in the proportional amounts.

- The actual allocation to the District under the "separate policy" totalled $1.23 million in 2013. The amount allocated to Hudson's Hope is set in a completely arbitrary manner and has no relationship to the size of facility or relative impact on the community.

Summary:

The District has an urgent need to address a significant backlog of infrastructure issues in the municipality. The backlog has developed over a number of years and could have been addressed in part by a Grant-in-Lieu policy that reflects relative impact from the hydroelectric facilities within municipal boundaries.

The current Grant-in-Lieu received by the District of Hudson's Hope represents a shortfall in the order of $27 million compared to assessment and tax levy at industrial tax rates. However the District acknowledges that full tax treatment is not required.

Provincial policy states that grants are calculated on the basis of the generating capacity of the facilities and are awarded *"according to a formula that reflects the extent to which the jurisdiction is affected relative to other affected jurisdictions".* Ministry staff has indicated that key principles guiding the allocation of Grants-in-Lieu include equity across local and regional governments and reasonable financial obligations for the utility.

The District of Hudson's Hope would argue that the current allocation of the Grants-in-Lieu does not serve the principles on which the grants are based, i.e. fairness, equity and relative impact. Nor does this allocation serve the core intent of the provincial policy which allocates 40% to the host community and divides the other 60% based on relative impact.

The Site C development is now in the advanced stages of planning. Should Site C proceed, Hudson's Hope will be the community that bears more of the additional impacts than any other community. Yet the "Separate Policy" for Hudson's Hope provides that *"the grant payable to the District is not affected by changes (increases or decreases) in generating capacity."*

Future impacts, should Site C proceed, will be significant and must be addressed by a renewed approach to Grants-in-Lieu for the BC Hydro facilities within the District's jurisdiction.

The District is appealing for a renewed grant-in-lieu treatment that reflects fairness, equity among local governments and recognizes relative impact of the hydroelectric facilities including Site C should it proceed.

Prepared by: David Read, Aspen Communications Ltd

November 20, 2013

Appendix A: Grants-in-Lieu Policy

Grants in Lieu Policy (as provided by Ministry of Finance - August 17, 2010)

- *In 2006 the Minister of Finance announced a new grant-in-lieu policy, effective for the 2007 taxation year.*

- *The method for calculating grants-in-lieu paid by BC Hydro in respect of its generation facilities was revised to provide greater transparency as to the method, and greater certainty for municipalities and regional districts as to the amount of the grant they would receive each year.*

- *For 2007, the base year for the new policy, grant amounts for all municipalities and regional districts were calculated as follows.*

    - *The generating capacity of the facility was apportioned as follows:*
        - *Tier 1: up to 400 MW*
        - *Tier 2: over 400 MW to 800 MW*
        - *Tier 3: over 800 MW*

    - *The generating capacity in each Tier was then multiplied by the rate below as applicable:*
        - *Tier 1: $1,160.00 per MW*
        - *Tier 2: $ 860.58 per MW*
        - *Tier 3: $ 561.16 per MW*

    - *The amount of the grant to be paid in respect of the generating facility was then apportioned to the municipality or regional district that is the host of the facility and the municipality(ies) or regional district(s) that is impacted by the facility. The host receives 40 percent of the total grant amount. All impacted municipalities and regional districts (this can include the host) share the remaining 60 percent of the grant amount. The percentages are historical.*

- *In each year after 2007, the amount of the grant to be paid to a municipality or regional district equals the total amount of the grant paid in the previous year, increased by the increase in total municipal property tax revenues.*

The 2010 Grants in Lieu are approximately $1420 for Tier One, $1053 for Tier Two and $686 for Tier Three. The Grants are currently indexed based on year-over-year changes in the total municipal property tax revenue in British Columbia. (E.g. the 2010 grants are increased 6.99% over 2009.)
The generation grants in respect to a particular generating facility are distributed with 40% to the host community (i.e. the local government jurisdiction in which the facility is located) and 60% to the "impacted" jurisdictions. The formula for distribution to the impacted jurisdictions is set by the Ministry of Finance. For Bennett Dam/GM Shrum, 40% is allocated to the District of Hudson's Hope as host community and the remaining 60% is allocated amongst District of Mackenzie (28.76%), Peace River Regional District (21.95%), District of Hudson's Hope (5.28%) and Fraser Fort George Regional District (4.01%). For the Peace Canyon facility, the District of Hudson's Hope receives the entire grant as both the host and impacted community.

- *The maximum annual grant that can be paid to any one municipality or regional district, with the exception of Hudson's Hope, is $616.19 per resident (based on the most recent Census Canada information available). If, in any given year, the total grant amount available to a municipality or regional district exceeds this cap, the amount in excess of the cap is redistributed on a pro rata basis to the other municipalities or regional districts also impacted by the facilities in respect of which the grant is paid. No municipality is currently near the cap (except Hudson's Hope which is outside the cap).*

Hudson's Hope Grant in Lieu Calculation

- *Subsequent to the announcement of the new grant-in-lieu policy, but prior to payment of the grants in 2007, an adjustment was made to the amount of the grant to be paid to Hudson's Hope. Hudson's Hope was no longer subject to the cap and the amount of the grant to be paid to the municipality was increased to $869,103.*

- *As a result of the adjustment made to the grant amount paid to Hudson's Hope in 2007 the cap no longer applies to grants paid to Hudson's Hope. Hudson's Hope is the only community to which the cap does not apply.*

- *The balance of the total grant amount that would have been available to other jurisdictions impacted by the G.M. Shrum facility if the cap had been in place for Hudson's Hope (about $930K) was redistributed to those jurisdictions as though the cap was still in place. The jurisdictions are District of Mackenzie, Peace River Regional District and Fraser-Fort George Regional District.* [Note: the amount redistributed has increased from $930K to about $1.6 million in 2013.]

- *In each year after 2007, the amount of the grant to be paid to Hudson's Hope will equal the total amount of the grant paid to the municipality in the previous year, increased by the increase in total municipal property tax revenue.*

Appendix B: Summary of Grants in Lieu 2007 to 2013:

The following table summarizes the grants in lieu as per the provincial formula and the actual grants received by the District of Hudson's Hope and the difference since 2007.

Year	**Grant per Formula**	**Actual Grant**	**Difference**
2007	$ 1,578,541	$ 869,103	$ 709,438
2008	1,677,041	923,347	753,694
2009	1,806,173	994,445	811,728
2010	1,932,424	1,063,957	868,467
2011	2,028,065	1,117,261	910,805
2012	2,112,197	1,163,683	948,514
2013	2,224,695	1,225,042	999,653
Total	**$13,359,137**	**$ 7,356,838**	**$6,002,299**

N 22337 F.R/W

THIS AGREEMENT is made as of the 29 day of March, 1978

JUL 11 10 03 AM '78

BETWEEN: PEACE VALLEY FARMS LTD.
(Incorporation Number 76745)
of 9947 - 100th Avenue
Fort St. John, in the Province
of British Columbia

(hereinafter called "the Owner")

OF THE FIRST PART

AND: BRITISH COLUMBIA HYDRO AND POWER AUTHORITY, of 970 Burrard Street, in the City of Vancouver, in the Province of British Columbia,

(hereinafter called "B. C. Hydro")

OF THE SECOND PART

WHEREAS

A. In order to impound the waters of the Peace River for electric power generation purposes, and for the purposes of controlling the flow of water along the Peace River, B. C. Hydro is constructing or has constructed, a dam or dams on the Peace River and may construct other such dams.

B. The Owner is the owner of the land described in Schedule I hereto (hereinafter called "the land").

C. As a result of the construction and operation of one or more such dams, the land or portions thereof will from time to time be flooded or injuriously affected.

D. For the consideration set out below the Owner has agreed with B. C. Hydro to execute these presents.

NOW THIS AGREEMENT WITNESSETH THAT:

1. The Owner, for and in consideration of the premises and of the sum of One Thousand Eight Hundred---------- ----------dollars ($ 1,800.00), (the receipt of which he hereby acknowledges) and of the covenants

MEMORANDUM OF REGISTRATION
Registered the 31 day of July, 1978.
on application received at the time written or stamped on the application.

and agreements on the part of B. C. Hydro hereinafter contained, hereby grants in perpetuity to B. C. Hydro the right, liberty and right of way for B. C. Hydro, its servants, agents and all others the licensees of B. C. Hydro, for purposes related to the construction, maintenance or operation of a dam, reservoir or any other plant, used or to be used for or in connection with the generation, manufacture, distribution or supply of power or for the purposes of controlling the flow of water:

(a) From time to time and for such period or periods and to such extent as B. C. Hydro may in its absolute discretion deem necessary or desirable, to saturate, permeate, overflow, flood and cover the land or any part or parts thereof with the flood, slack or backwater created by the erection or operation of any dam, dams, power generating plant or plants or other structure or structures;

(b) To cause debris to be deposited on the land in connection with overflowing, flooding or covering the land as aforesaid;

(c) To cause erosion, sloughing and slides on and of the land;

(d) To enter upon the land and remove, clear, destroy or dispose of any buildings, structures, timber or other natural growth, obstructions, accumulations, trash, filth or other things, and in particular, without limiting the generality of the foregoing, any buildings, structures, trailers, tents, or shelters for human habitation, which in the opinion of B. C. Hydro might in any way interfere with navigation or flood control or the operation of any such dam or generating plant, or the reservoir created by any such

dam, or tend to render inaccessible, unsafe or insanitary either the said reservoir or the margin of the said reservoir;

(e) To enter upon the land and erect structures and signs, excavate and do such other work as may be desirable in connection with the needs of navigation or flood control or the operation of any such dam, generating plant or reservoir;

(f) Generally to do all acts necessary or incidental to the business of B. C. Hydro in connection with the foregoing.

2. For the consideration aforesaid, with intent that the covenant hereinafter on his behalf contained shall as far as possible bind the land and every part thereof, and the owner or owners thereof for the time being, and all persons claiming through, under or in trust for him, her or them, and shall enure to the benefit of B. C. Hydro, its successors and assigns, the Owner, for himself, his executors, administrators, successors and assigns, hereby covenants with B. C. Hydro not, without the written consent of B. C. Hydro first had and obtained, to make, place, erect or maintain any building, structure, material or thing or to plant any growth or to use or allow to be used for the purpose of human habitation any building, structure, trailer, tent or shelter upon the land.

3. Notwithstanding anything hereinbefore contained, B. C. Hydro hereby covenants with the Owner that it will give its consent to any activity or purpose set out in paragraph 2 herein relating to any building, structure, material, thing, growth, trailer, tent or shelter wholly situate above a line, designated the "safe line" which is shown in yellow upon the sketch plan hereto annexed and marked Schedule II.

N 22337

4. For the consideration aforesaid, the Owner does further hereby for himself, his executors, administrators and assigns, release and discharge B. C. Hydro of and from all claim for loss, costs, damages, charges and expenses of any nature or kind to arise out of the impoundment, overflowing or flooding of water occasioned by the construction or operation of any dam, dams, generating plant or plants, or the exercise by B. C. Hydro of any of the rights, liberties and rights of way granted to it in this agreement, and does hereby accept the said consideration in full settlement and satisfaction of all present and future damages or causes of action which the Owner, his executors, administrators or assigns can now or may at any time hereafter incur, or have or make against B. C. Hydro by reason of the occurrence of any of the things aforesaid, and notwithstanding any such occurrence, he the Owner, for himself, his executors, administrators, successors or assigns, will not make any claim for compensation for personal injury (including death) or injury to any of his property, real or personal, on account of any such occurrence.

5. Notwithstanding anything hereinbefore contained, B. C. Hydro hereby covenants with the Owner not to cause the water impounded by the Peace River Dam to rise above an elevation of One Thousand Five Hundred and Twenty (1520) feet above mean sea level or One Hundred Feet (100) horizontally North and West of the One Thousand Five Hundred Fifteen (1515) feet contour, according to datum of the Geodetic Survey of Canada.

6. It is mutually agreed between the Owner and B.C. Hydro that:

(a) The title to all timber cut on the land and to all things destroyed or disposed of by B.C. Hydro in the exercise of its rights hereunder shall vest in B.C. Hydro;

N 22337

SCHEDULE I

ALL AND SINGULAR that certain parcel or tract of land and premises situate, lying and being in the Peace River Assessment District, in the Province of British Columbia, and more particularly known and described as:

South-west Quarter (SW¼) of Section Ten (10), Township Eighty-two (82), Range Twenty-five (25), West of the Sixth Meridian (W6M), containing by admeasurement One Hundred Sixty (160) acres more or less, EXCEPT Lot One (1) Section Ten (10), Township Eighty-two (82), Range Twenty-five (25), West of the Sixth Meridian (W6M), Peace River District, Plan 23479. Except Plan 21821

for Plan Exc Survey Dept.

HUDSON'S HOPE
PLAYGROUND OF THE PEACE

Flooding at Lynx Creek

29 residential lots near Lynx Creek with valley views will be completely flooded by the new reservoir. These lots are subdivided but are currently vacant because BC Hydro has already acquired the land and houses have been removed. The flooding of these lots will make it difficult to service land east of Lynx Creek in the future.

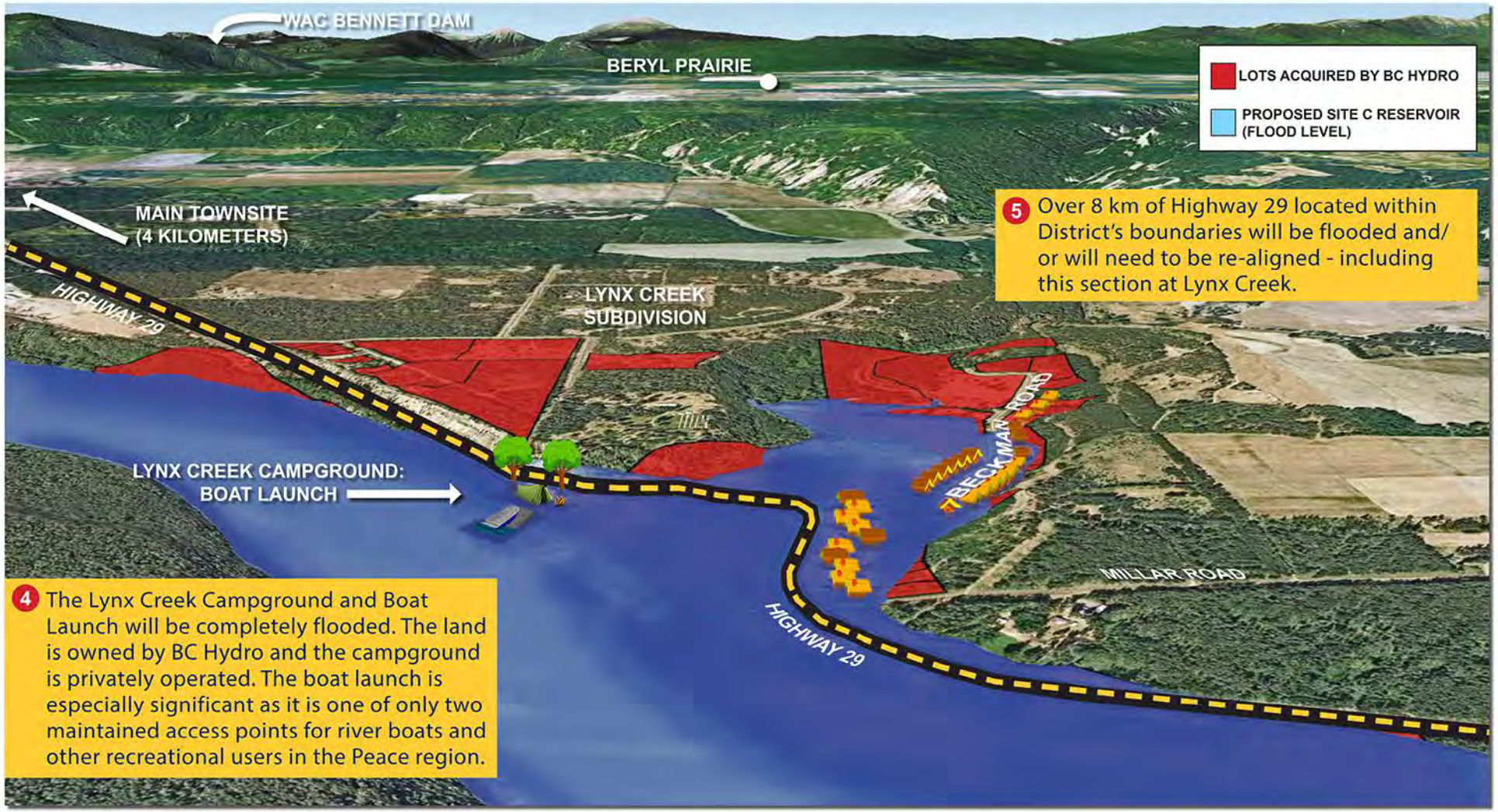
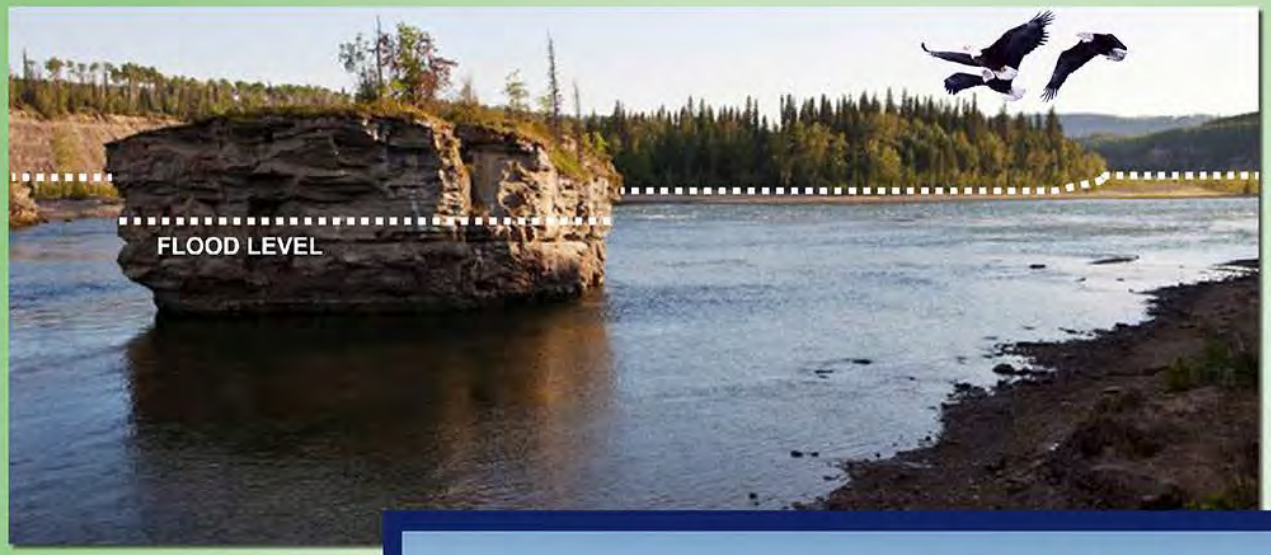


FIGURE 2

HUDSON'S HOPE
PLAYGROUND OF THE PEACE

Flooding at Alwyn Holand Park



Alwin Holland Park is one of the most popular and photographed parks in the entire Peace region. It draws visitors to the District.

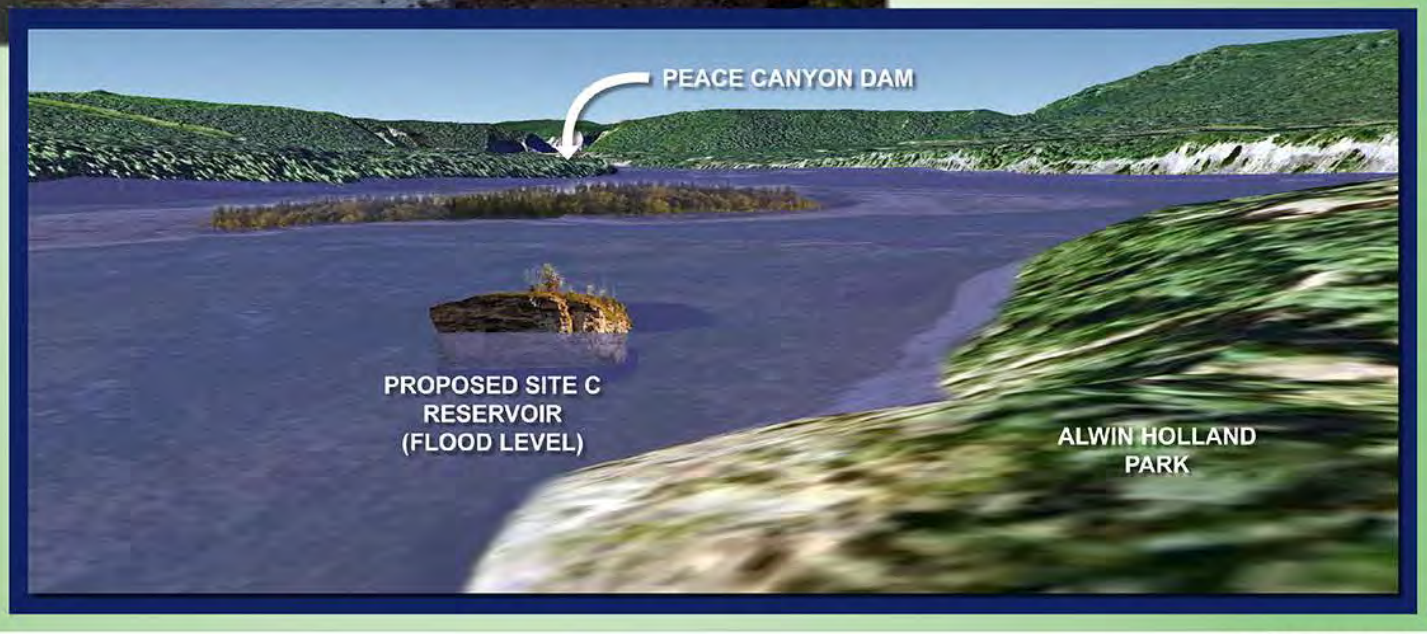


FIGURE 3

"The only newspaper in the world that gives a tinker's damn about the North Peace."

MONDAY, OCTOBER 23, 1995 — PUBLISHED MONDAY THROUGH FRIDAY IN FORT ST. JOHN, B.C. — 60¢ (INCLUDING GST)

Tania Wilson photo

FINALLY —

Robert and Ethel Beattie were finally rewarded Friday, when at 2 p.m., B.C. Hydro hooked up power to their home. Although WAC Bennett had promised it to them years ago, the couple have been living without power for nearly 30 years.

30 years after being relocated, Hudson's Hope family gets power

TANIA WILSON
For the Alaska Highway News

Hudson's Hope

Living within site of the WAC Bennett Dam, and a stone's throw away from Williston Lake, is a family who for the last 30 years has been forced to supply their own electricity. This period of "powerlessness" finally ended for the Beattie family of Hudson's Hope at 2pm on Friday, October 20th, when BC Hydro completed hookup and turned on the Beattie's power.

The Beattie family once maintained a profitable business of farming, freighting, guiding and trapping at the mouth of the Dunlevy River until 1962, when BC Hydro told them they had to move because of the construction of the WAC Bennett Dam.

BC Hydro had been granted a water licence to build a dam and store water in an elevation up to 2200 feet above sea level; this meant some residents of the valley would be displaced. An area above the flood level, on the mountainside along the north side of lake was allocated as a resettlement area. For the most part, the area has remained without permanent homes, as the high elevation and mountainside location was not comparable to valley land for farming, so it was difficult to make a living. Also, the amount of compensation paid was not sufficient to build new homes.

The Beattie family business was wiped out, Elizabeth Beattie (mother) who had run the family business in partnership with her sons could not move to the "resettlement area", located eight kilometres from the dam, and make a living.

Bob Beattie, eight miles downstream from the original homestead on his own farm, yielded to the sell pressure, at an unrealistically low price (approximately one-third of true value).

"Premier Bennett promised that they would receive power from the dam when and if they needed it. It was part of the land exchange deal."

— Mary-Lou Beattie relative of Elizabeth

On top of that, a promise was made to Elizabeth Beattie when she agreed to sell her land and move, which the family believed would be honored, but it took 30 years for the family to see any action.

"WAC Bennett invited Elizabeth Beattie to be present at the opening of the Dam in 1968," said Mary-Lou Beattie, wife of Elizabeth's son Jim. "Premier Bennett promised that they would receive power from the Dam when and if they needed it ... it was part of the land exchange deal." But when Jim Beattie requested hook up in 1982, the family was told if they wanted power, they had to pay for it.

During the past 13 years, Mary-Lou Beattie has written countless letters to BC Hydro, the provincial government and Tony Brummett, when he was the MLA for Peace River, asking "if this was a promise that was made, why couldn't it be kept?"

The Beatties were particularly frustrated when Hydro ran power lines out to the end of the paved road, 3 miles from the Beatties' farm, to provide power for a camp located there, but would not run the lines a little further up the road for the Beatties, said Ethel Beattie, wife of Bob Beattie. "And then they pulled down the lines, the poles and took it all away when the camp was finished," she added.

"Hydro's main reason for refusing to provide electricity was that the promise wasn't a valid one, and there was little they could do especially as all the people involved have died," Mary-Lou explained.

"It was only in the last year and-a-half that any progress has been made," said Mary-Lou. "When Gwen Johansson (Hudson's Hope municipal council) began fighting for us, she contacted Anne Edwards (Minister of Energy) and BC Hydro's board of directors voted in our favor."

In response to the statements that the promise wasn't valid and all the people involved had died, Mary-Lou produced a "pioneer lady in Hudson's Hope who attested to the fact that WAC Bennett did make that promise, she was there, and wrote a statement to that effect."

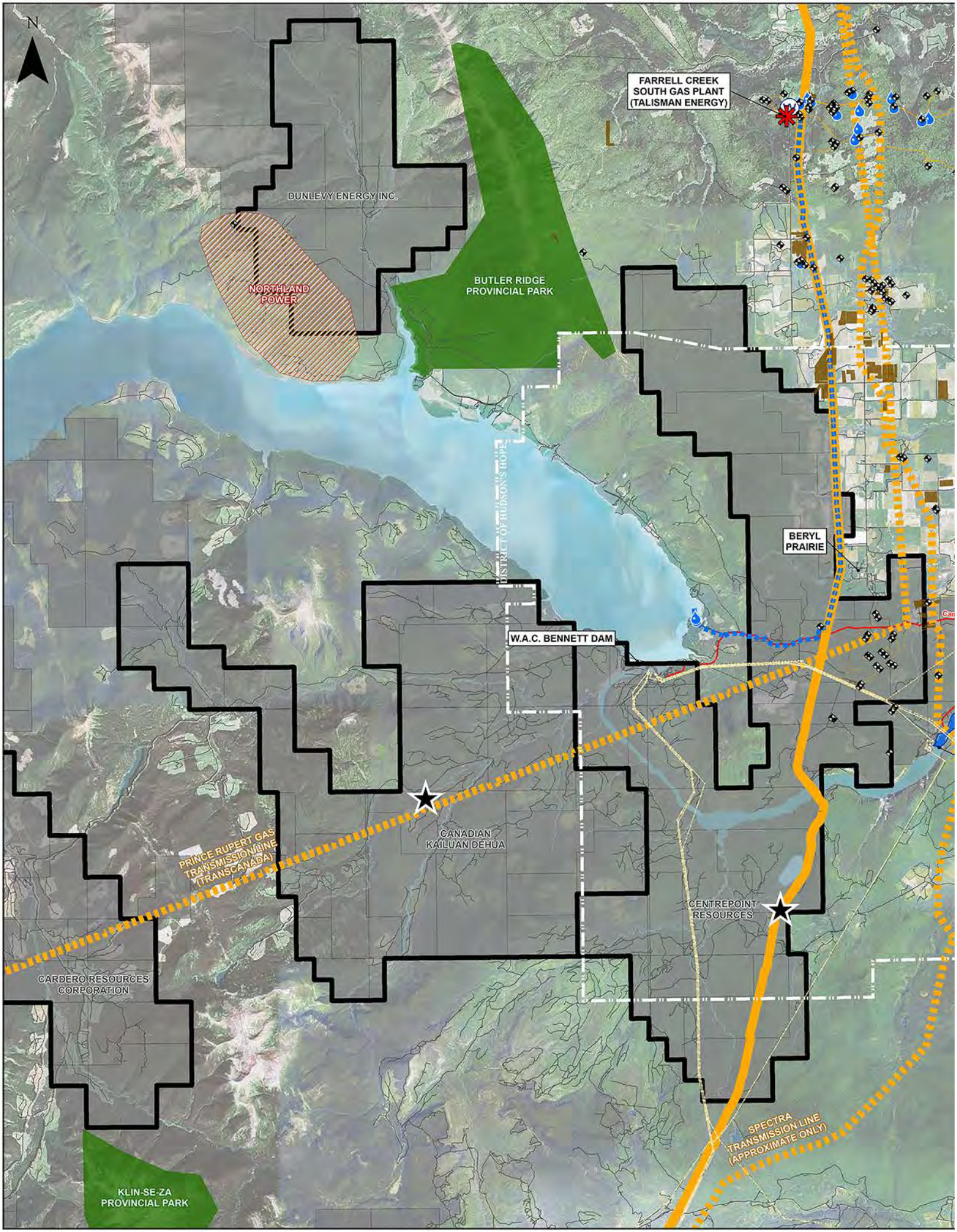
Approximately six months ago, BC Hydro made a last ditch effort to avoid providing access to electricity for the Beatties.

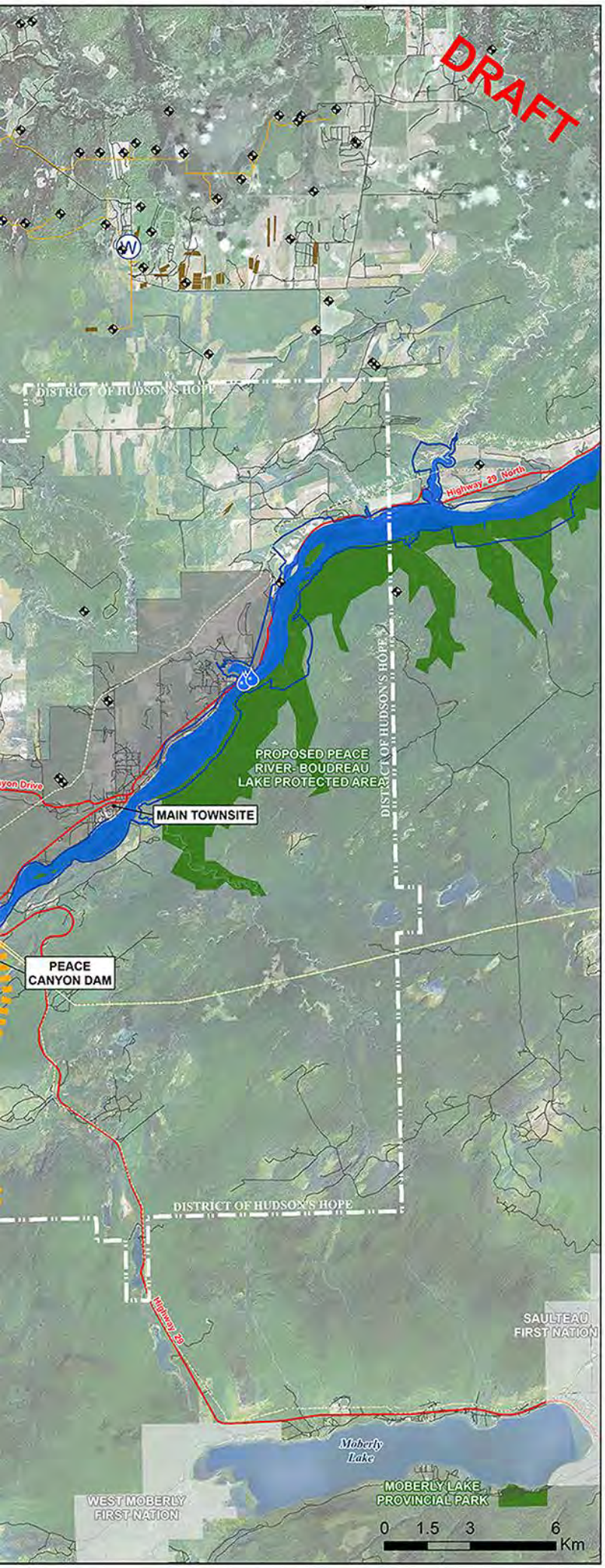
"Hydro offered to pay for diesel generators to provide electricity ... it was a rather ludicrous thing," Mary-Lou said. The family has been using generators for years to provide power.

Hudson's Hope Municipal Councillor, Gwen Johansson believes it is a shame it took so long to get power to the Beatties home.

"The dams provide about one-third of the province's power, and it is Williston Lake which gives Hydro it's flexibility, it's a big storage area which they can manipulate easily," said Johansson. Yet it took thirty years to get power to people living eight kilometres from the dam.

The cheers went up when an employee of B.C. Hydro turned on the power at the home of Robert and Ethel Beattie.


N
FARRELL CREEK SOUTH GAS PLANT (TALISMAN ENERGY)
DUNLEVY ENERGY INC.
NORTHLAND POWER
BUTLER RIDGE PROVINCIAL PARK
DISTRICT OF HUDSON'S HOPE
BERYL PRAIRIE
W.A.C. BENNETT DAM
CANADIAN KAILUAN DEHUA
PRINCE RUPERT GAS TRANSMISSION LINE (TRANSCANADA)
CENTREPOINT RESOURCES
CARDERO RESOURCES CORPORATION
SPECTRA TRANSMISSION LINE (APPROXIMATE ONLY)
KLIN-SE-ZA PROVINCIAL PARK



HUDSON'S HOPE
PLAYGROUND OF THE PEACE

Natural Resource Activity **Overview Map**

- Provincial Park/Protected Area
- First Nation Reserve

Oil & Gas
- Spectra Pipeline
- Major Gas Pipeline (Proposed)
- Minor Gas Pipeline
- Well Site/Facility
- Major Gas Plant
- Major Water Line
- Approved Water Withdrawl Location (Section 8)
- Temporary Work Camp (Known)
- OGC Waste Disposal Site

Coal
- Coal Mine Tenures
- Proposed Coal Project Area
- Initial Mine Site Location (Proposed)

Electricity
- Wind Farm Area (Proposed)
- Existing BC Hydro Transmission Line (Existing)
- Proposed Site C Reservoir
- Maximum Flood Impact Line (Erosion, Wave,Flood...etc.)

Roads
- Highway
- Local/Rural Resource Roads

NOTE:

Location of Oil & Gas, Electricity, and Coal data is approximate only. The location of many features were estimated based on hard-copy maps.

Source:
BC Hydro, Spectra and cadastral data provided by ICIS. March 2013.

Oil and Gas Commission, coal/mineral tenure and well data provided by the Land and Resource Data Warehouse. March 2013. OGC Facilities were adjusted by Urban Systems to align with other datasets.

Imagery provided by Google Earth Pro.

BC Hydro impact lines were digitized from PDFs found on BC Hydro's website.

FIGURE 4

9. Impacts to Hudson's Hope – YouTube Video

   http://youtu.be/br4GVMqAwMw

Two Funds

BC Hydro's Site C project has two funds to deal with communities: **Legacy Fund** and **Mitigation Fund.**

LEGACY FUND:

The Legacy is recognition for hosting the dam and reservoir during its 100+ year operating phase. It comes into effect *after* construction, once the dam and reservoir are on-line.

MITIGATION FUND:

Is to reduce impacts or to make up for what is lost.

Covers things like replacement of Hudson's Hope water intake or creating a downtown berm to protect shoreline. It is negotiated by each community separately.

Hudson's Hope is still negotiating mitigation as of August 2013.

This leaflet is about the Legacy Fund

The Peace River Regional District (PRRD) negotiated a Legacy for the Regional District. It is in the form of a "Term Sheet"

What *IS* a Term Sheet?

- It ***IS*** an "agreement to agree."
- It ***IS NOT*** an enforceable contract.
- It sets out general terms of what would be in a future contract.

What's *IN* that Legacy Term Sheet?

- $2.4 million dollars annually, for the entire region, starting when Site C comes on-line: earliest 2022.
- Indexing starts in the second year of operation.
- The first payment will be in 2013 dollars, whether it begins in 2022 or sometime far into the future.
- Payments are for 70 years – not the life of the operation.
- The distribution formula is based on 60% population and 40% service impacts.
- If the dam came on-line today, present population would give Fort St John 34.59%, Dawson Creek 13.02% and Hudson's Hope 10.99%. Remaining 41.4% would be split among Pouce Coupe, Tumbler Ridge, Chetwynd, Taylor and the Regional District.
- By signing, the parties agree that regional shared benefit issues of the region are resolved.

The PRRD communities outvoted Hudson's Hope to adopt the existing formula.

HUDSON'S HOPE DID NOT SIGN THIS TERM SHEET

Hudson's Hope Council rejects the Peace River Regional District's Term Sheet because it is unfair to Hudson's Hope. It benefits those who are not affected by the operation phase and punishes those who bear the cost.

HUDSON'S HOPE
playground of the peace

Why We Reject the Term Sheet

The Legacy Fund is to recognise the contribution made by the hosts of the project during its 100+ years of operation. The areas doing the hosting and paying the price in perpetuity for this operation phase are Hudson's Hope and the rural valley areas. The PRRD formula does not recognize this permanent contribution made by Hudson's Hope for provincial benefit. It gives the bulk of the benefit to those with no or minimal contribution during the project life.

Some of what Hudson's Hope would give up:

- Land (see amount below)
- Prime waterfront properties
- Unique Valley settings
- Significant Section of Alwin Holland Park (The Glen)
- Wildlife habitat & migration corridors
- Established infrastructure costs (water & wastewater treatment costs are expected to be higher, due to project)

BC Hydro supplied the following figures regarding impact to land within the District of Hudson's Hope:

Lost to flooding	603 hectares / 1490 acres
Highway realignment	66 hectares/163 acres
Statutory Right of Way	1037 hectares/2562 acres

No permanent structures are allowed on a Right of Way.

Some 30 residences have already been removed from land and many more will be lost should the project proceed.
The Hydro-owned properties where development may have occurred stand empty.

Every year the dam operates represents a lost opportunity for Hudson's Hope to use that land for homes, businesses, and other endeavours.

PRRD Distribution Formula

The distribution formula would be recalculated every year and 60% is based on population. If it came into effect today, Hudson's Hope would get 10.99%....

BUT...

...by the time Site C is operating and distribution of this fund begins, our percentages would have dropped because the population of other communities (e.g. cities) would have increased proportionately more than Hudson's Hope.
If we project payments over the 70 years, Hudson's Hope's share steadily diminishes.

No other City or Municipality will sacrifice so much, permanently, for having Site C produce electricity for the province

The PRRD formula offers Hudson's Hope only a tiny, diminishing fraction of an already small amount of money over a 70 year time period.

We need a formula based on impact, not population.

What Council is Doing

- We are investigating and exploring all options.
- We are doing our best to inform Hudson's Hope people of the issue by distributing this leaflet, directing people to information on the Hudson's Hope website, discussing it with groups and asking people's opinion.
- We have invited BC Hydro President and CEO, Charles Reid, to a community supper in Hudson's Hope to meet the people and talk about our issues.
- We are explaining our situation to media, government, BC Hydro, citizen groups and anyone interested.

How important is this to you?

Should we assign resources to seek a better settlement or accept what has been offered and move on?

Go to www.hudsonshope.ca and follow the Site C Legacy links to see more detailed information such as the complete Term Sheet, the PRRD/Hydro press release, letter templates, addresses to send letters to, the District of Hudson's Hope's booklet entitled ***Proposed Site C: Impacts on Our Community***, and much more.

HUDSON'S HOPE
Site C Legacy

Q. What legacy benefit would Hudson's Hope get if Site C were built?

A. Very little if the Regional District formula remains unchanged.