Towards a Positive Sum Regulation of Indigenous Utilities in B.C.

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By

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1. About the CERG

The Clean Energy Research Group (CERG) at SFU is a new group designed to promote transition to renewable energy, beginning with transitions for remote communities in BC who rely primarily on diesel generators. CERG first became aware of the inquiry in Nov. 2019, and a member attended the draft report workshop that month in Vancouver. CERG is a multidisciplinary group of engineers and social scientists well-versed in energy policy issues, and as a neutral party, we see this as a good opportunity to act as a neutral expert party to try to comment usefully on a policy topic of great importance to BC, and with wider implications for the precedents it sets.

2. Introduction

On March 11, 2019, the BCUC established the Indigenous Utilities Regulation Inquiry, setting April 30, 2020, as the date for a final report to be issued. As part of the process, BCUC invited public input, including open community meetings, written evidence, workshops, and written comments about how to regulate First Nations utilities which it now recognizes as legal actors in BC. At first glance, based on the depositions found at the BCUC website for this inquiry, the positions seem dichotomous. Incumbent stakeholders such as BC Hydro, the Commercial Energy Consumers Association, and Fortis appear to favor continuing to have BCUC as the regulator for the whole province. Meanwhile, most First Nations depositions, such as the Nisga'a, Beecher Bay, Osoyoos, Westbank, NVG, Adams Lake, and the Collective First Nations assert sovereignty to not only produce but regulate their own energy. Kitselas' deposition is along these lines, seeing BCUC as limited to dispute resolution. In this working paper, we lay out a proposal to reconcile these two polarized positions, one that would both ensure reliability, safety, and competitive pricing for consumers while still allowing for a recognition of the sovereign rights of First Nations and the desirability of not only their self-sufficiency but also of their ability to participate in the clean energy goals of BC.

In the following sections, we point to several issue areas that deserve more attention by BCUC and the provincial government as it prepares the final regulations. We believe that these issues should create pause in terms of the wider scope and implications of the issues involved here than so far touched upon in the inquiries. In the working paper, we sketch out the need to chart a course that attempts to balance the urgent needs for reconciliation and economic development of indigenous areas with that of to preserving and building upon a well-functioning electricity system. That system, in turn, needs to transition towards 100% clean energy over the coming decade, as laid out in the BC Clean Energy Act.

In the period from when this came to our attention, we have not had time to engage in extensive research, however, we believe that the principles below may be usefully considered in forming new regulations around indigenous utilities in BC. CERG is open to requests for follow up activities that may be helpful.

3. Executive Summary

CERG has examined current regulations, documents related to the Indigenous Utility Inquiry, and gathered additional relevant research in order to examine the principles laid out in the BCUC Draft (Nov. 1, 2019) and Interim Reports on the matter.

In general, we find much to appreciate in BCUC's efforts. The development of regulations around indigenous utilities is certainly timely; by all accounts indigenous clean energy projects are continuing at a rapid pace around the province, despite the challenges created through the cancellation of the standing offer programme. Ample notice and participation from knowledgeable and interested parties has been incorporated, and BCUC has been transparent in posting all relevant inputs during the process. The recommendations proposed in the draft report attempt to reach a fair balance between recognizing the need for First Nations to manage their own energy requirements and ensuring that all BC residents have access to reasonably priced, safe and reliable electricity. Nonetheless, we believe that there are still a number of issues that deserve more attention. The public long-term interest is not adequately reflected in the reports, which are dominated not surprisingly by depositions by parties with particular interests in the outcomes. In this report, we take the perspective of the public interest to try to offer an alternative view on regulatory outcomes, which in the end, will have profound effects on every ratepayer. We address each of these in detail in the following paper, and provide a brief description here:

Ambiguity

We find the proposals offered by BCUC to have sound principles, but still lack the clarity needed to regulate electricity in the province from multiple new utilities, which could take a number of forms according to the guidelines in the draft and interim reports.

Scope/Mission/Jurisdiction

We are concerned that there are issues that extend well beyond the scope of this inquiry, but that would have a serious impact on its regulatory capacity. Beginning with the ambiguous nature of land claims, we believe that there are a number of outstanding issues that suggest negotiations need to take place at the provincial/federal government level as they are beyond the scope of the BCUC's mandate. These include the need for the federal government to take leadership on interprovincial energy trading in order to promote a national clean energy plan. Indigenous utilities can play a major role in this transition.

Benefits to the Province of Indigenous Energy Development Underestimated

We argue that the extensive geographic nature of BC, including a number of isolated communities lends itself to developing a system of micro-grids as opposed to one large grid and remote generation, the status quo. The creation of decentralized but

connectable grids, if developed properly, would created some competition and redundancy that would reduce the potential for system failure based on its current course of over-reliance on a few large hydro sources, which may diminish from climate change. Furthermore, we argue that increasing the sources of clean energy in the province will help to alleviate the inherent problems of intermittency and costs of electricity storage. Finally, and perhaps most importantly, we present some preliminary calculations that put in severe doubt the energy demand projections forwarded by BC Hydro. We believe that even with Site C and beyond the possibilities of exporting clean energy to the US and the rest of Canada there will be increased demand through the electrification of LNG as adopted by the Province and the accelerating adoption of electric vehicles.

Benefits of Indigenous Generation to Indigenous Communities Underestimated

We strongly contend that the benefits of First Nations' electricity generation are undervalued in the approach taken here by BCUC and BC Hydro more generally. Part of CERG's mission is to gather evidence around this issue that we will present in more thorough analysis in a subsequent report, but for now we make the following claims. First, that the issue of indigenous energy has to be calculated holistically, including both tangible benefits of economic development, such as local jobs, training, knowledge, and potential revenue streams, and second more intangible (and harder to measure) benefits of reconciliation, greater autonomy and self-sufficiency, pride, and linkage with indigenous spiritual values around environmental preservation. These benefits, and the overall need for reconciliation should put the current relative neglect of this issue by BC Hydro into a different light, where the amount of costs of the diesel generators and at least partial conversion to renewable sources are not the only variables, and where the relatively small size of the potential projects does not diminish their importance to the local communities, as CERG will demonstrate in forthcoming case studies.[1] We also contend that the continued reliance on fossil fuels through remote diesel generation can not be economically or environmentally justified and should be addressed. Furthermore, we argue that the First Nations have a natural right through both the Canadian Charter and UNDRIP to produce clean energy and economic development opportunities.

A Positive, Win-Win Solution Set is Available

Based on the above analysis, we offer a different vision of a decentralized but connected grid in BC that embraces the inseparable goals of First Nations reconciliation and economic development through energy development and offering clean, safe and reliable energy at low rates to the province. In the following sections, we expand upon each of these points in greater depth

[1] It is notable that BC Hydro's webpage on its Remote Community Electrification Program states, "**Please Note: BC Hydro is not accepting applications to the Remote Community Electrification Program at this time.**" found at: https://www.bchydro.com/energy-in-bc/operations/remote_community_electrification.html, accessed Feb. 4, 2020.

4. Ambiguity

The CERG is concerned about the timeline given to complete the inquiry, the final report for which is due on Apr. 30, 2020. The BCUC has created an opening for input across the province over the past year, yet, we believe more research and discussion around concrete proposals is necessary. While the Interim report offers some proposed recommendations, much remains ambiguous about how the new regulations will operate in practice. On p.1 of the interim report, the BCUC lays out questions that "it must provide answers to," including defining indigenous utilities, and whether and how they should be regulated. These are important but not comprehensive questions around this issue, as we further discuss below. The proposed regulations discussed in the interim report on pp. 8-9 do not adequately address these questions or other pertinent issues. The proposals themselves are ambiguous. For example, stating that all ratepayers of indigenous utilities should receive the same protection is a good starting point as a principle, but it does not elaborate on any dispute mechanism, how a complaint would be heard, how to ensure rates are within reason, or how disagreements about the nature of, and potential solutions for, the complaint among the customer, indigenous utility, and BCUC would be resolved. The problems are compounded when we consider the possibility that First Nations may sell to each other, or back to the main grid, in the future.

The essence of the Spirit Bay Utilities case, that precipitated this enquiry, rests upon the claim that First Nations utilities should be granted the same exception from regulation as that granted to municipalities and regional authorities. In principle, this seems like a reasonable request. The Utilities Commission Act (UCA) definitions (1, c) exempt services provided by "a municipality or regional district within its own boundaries." Moreover part 21 of the UCA states that the regulations only apply to "a public utility that is subject to the legislative authority of the Province." It should be straightforward to argue for a change of legislation to include an indigenous public utility, as Tzeacheten First Nations argue, but we argue this would be an inadequate response, even if the legal decision was reversed.

The transcripts of BCUC's recent workshops on topic of regulation of Indigenous Utilities show the broad range of opinions on the definition of Indigenous utilities, and why it merits more nuanced discussion. While in one workshop the groups expressed definitions in terms of control and ownership (Transcript Volume 15, pp.56 and 63), another pointed out the challenges of doing so: namely, that making a firm decision on what constitutes an Indigenous utility might not be sensible because of its evolving nature, and that factors beyond ownership and control could play a role in the definition (Transcript Volume 16, pp. 48-49). Furthermore, it seems that many voices can be overlooked, as expressed by Chief Don Harris of Xa'xtsa First Nation (Transcript Volume 15, p.44).

Indeed, there are many complications that ensue including the fact there is no well-developed regulation around municipal utility activities. As noted in the Spirit Bay Utilities case, there was concerns that the company would be selling to customers who

did not have input into the governance area of the utility (vs. municipal utilities).[2] Moreover, of the 6 municipal utilities, only Nelson operates its own generation and transmission, however it is still subject to BCUC, and therefore not a comparable example to a separate indigenous utilities. As the BC Hydro submission for this Inquiry notes, there is concern about regulation (around the rates for) customers of Nelson's municipal power services who lie outside the municipality. Thus, even if the principle were accepted, it would provide little guidance, as reflected in the current BCUC inquiry into municipal regulation. As reflected in the Village of Valemount submission for that Inquiry (Exhibit C6-1) as well as the Nelson question, jurisdictional issues are far from settled even within the municipal exception. There are other emerging disputes about regulation over a number of district energy/heating/wastewater initiatives.[3] Such initiatives are surely a sign of a plethora of potential decentralized generation activities that will become more affordable and ubiquitous as renewable equipment rates decline over time. Indeed, solar PV modules have declined by 90% between 2009 and 2018, and onshore wind costs declined by 35% from 2010-17. Onshore wind is now competitive with fossil fuel generation in some instances, particularly coal, and as technologies continue to improve the gap between fossil fuels and renewables will continue to decline (IRENA 2019, 13-15). There is therefore a window of opportunity for Canadian businesses to enter into this burgeoning sector, while barriers to entry are low. Moreover, developing a variety of renewable sources is important not only for diversifying sources of energy, but also for energy efficiency through reduced transmission/distribution costs. Such systems should be designed in consideration of co-generation of energy and heat that would otherwise be wasted, including using waste heat directly for warming buildings and water. Homeowner, building, and municipalities will and should start to engage in self-generation, combined heat and power, district heating, and other forms of energy and emissions savings that have somewhat unpredictable effects on grid management and are largely unanticipated by current regulations, such as the Southeast False Creek neighbourhood energy project that uses waste water heat. More importantly, even if First Nations were granted such an exception, such a move would not touch on the wider issues of provincial energy supply and emissions, as we discuss below, which require some degree of coordination if not integration. As the FortisBC note to the municipal regulation inquiry (Exhibit C5-3) notes, it is important to balance these new municipal activities with ensuring that they fit into provincial energy plans and general ratepayer protections.

In fact, BC Hydro appears to be taking a discouraging stance towards generation beyond self-sufficiency in its approach to net metering. On its webpage regarding net metering, it states, "We've found that while most of the program's 1,330 customers are only generating enough power to offset their usage, some have oversized their generation. Some have consistent large annual surplus payouts, a situation that was never intended and which isn't in the best interests of our customers as a whole."[4] In its most recent

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[2] https://www.ordersdecisions.bcuc.com/bcuc/orders/en/item/212630/index.do, Accessed Jan. 21, 2019.
[3] https://www.vancourier.com/municipal-run-power-companies-and-bc-hydro-square-off-at-utilities-inquiry-1.23999851, Accessed Jan. 17, 2020.
[4] https://www.bchydro.com/work-with-us/selling-clean-energy/net-metering.html?WT.mc_id=rd_netmetering, Accessed Jan. 20, 2020.

application regarding net metering (BC Hydro Apr. 29, 2019), BC Hydro suggests that the main purpose of the net metering is a "load offset" program (3), revealing that it does not embrace the goals of distributed energy generation, which is the major thrust of emissions reduction programs in European countries such as Germany and Denmark, who actively use Feed-in-Tariff policies, the only region where major carbon emissions reductions have been achieved. These countries have developed robust clean energy companies such as Siemens and Vestas, who have developed from the favorable domestic conditions to become international giants. They provide a roadmap for how to close the rapidly diminishing cost gap between renewables and fossil fuels while meeting emissions targets. Instead, BC Hydro would like to offer a price that is reflective of regional wholesale prices and that is short-term in nature (5 years), thus working against its own statement that solar panels have a payoff time of "at least" 20 years.[5] On the face of it, this appears to be a sensible position, designed to protect the general ratepayer. However, as we show below, there is strong reason to think that Site C electricity will be insufficient in the near future, thus by foregoing the chance to create more distributed generation, BC Hydro reinforces its own position as the sole primary provider of electricity in the province. In short, there is a conflict of interest when the main generation company also sets the rules for new generation that could, in aggregated fashion, provide some competition in the future.

The high level of ambiguity both in terms of the questions posed and the proposals given in response to this inquiry in effect give wide scope to the BCUC to write regulations for indigenous utilities. Such regulations could take on a wide spectrum of practices, ones with varying degrees of acceptance by the different stakeholders. Normally in public policy, we would expect a second set of public input to take place once proposed regulations are made public, and that these would be subject to modification based on the degree of consensus of key stakeholders around possible policy implementation options.

5. Scope/Mission/Jurisdiction

According to UNDRIP Article 5, indigenous people have the right to maintain and strengthen their distinct political, legal, economic, social and cultural institutions. Hence, indigenous self governance and their "right to exercise autonomy and structure their own solutions"[6] are important factor for regulatory consideration at the national level. This brings us to further issues regarding the National Energy Board, the federal regulatory body for energy issue. Although the NEB reform identifies areas of reform that align with what CERG is proposing for Indigenous Utility Regulation in BC, it's important to recognize that this is new terrain. The National Energy Board Act (NEBA) and Canadian Energy Regulator Act (CERA) that underpin the federal energy regulatory framework speaks to the indigenous issue in relation to industrial organizations seeking to develop energy projects that cross indigenous territories. To date, it has not adequately considered regulation from the perspective of indigenous communities as autonomous players in the

[5] https://www.bchydro.com/news/conservation/2015/selling-electricity.html, Accessed Jan. 20, 2020.
[6] Joseph, B and Joseph C.f., (2017),Working effectively with indigenous people, Indigenous Relations Press (p65).

Canadian or the provincial context with the right to "exercise their autonomy and structure their solutions to flourish" (Joseph and Joseph 2017, 65). In fact, NEBA and CERA are primarily focused on pipelines in the interprovincial context and electricity in the international context.[7] Hence there are serious regulatory gaps in the current regulatory framework, at both the provincial and federal levels, when it comes to matters of interprovincial energy trade for indigenous utilities. In short, the question of indigenous utilities selling energy beyond reserve lands or exporting beyond provincial boundaries is one that needs to be incorporated at the federal regulatory as well as in B.C. There are complexities of scope even if we take this as a purely provincial issue.

We understand that the result of the inquiry is to provide recommendations for the Minister in charge, yet, since this is the principle pipeline for regulatory action, the scope and types of issues that it can discuss vs. those such regulations will confront should be consistent. CERG finds potential dissonance in these two aspects, that will entail problems unanticipated by the report. More specifically, we are not certain that the regulation can be effective given the ambiguity around land claims in BC. Indeed, Section 21.2 of the Utilities Commission Act states that regulation is inherently ambiguous in stating "the provision by a public utility of a class of service in respect of which the public utility is not subject to the legislative authority of the Province does not make this Part inapplicable to that public utility in respect of any other class of service." There are likely to be indigenous groups would not accept that BCUC has regulatory authority over lands that they claim. Furthermore, Points 3-6 and 10 of the Interim Report state that the proposed regulations would apply to both reserve lands and those subject to historical treaties. However, as there are multiple unresolved treaty claims, it is doubtful that the BCUC has the ability to regulate effectively outside areas that are already subject to treaties. Just as indigenous groups contest the extent and control of land areas, they would contest its ability to regulate utilities that they begin. Moreover, there could potentially be counter-claims over some lands among different indigenous groups. As such, in Exhibit C3-3 for this Inquiry, The First Nations Major Projects Coalition concludes by noting that the inquiry is "premature" until land jurisdiction claims are settled (11-12). As we discuss below, the only solution for mixed jurisdictions is to have a regulatory system with mixed representation of the different interests. Obviously, First Nations groups do not feel at this time that BCUC adequately represents their interests.

FortisBC's deposition for this Inquiry (Exhibit C4-2, 8) makes an argument for BCUC's jurisdiction in noteworthy ways. It states that, notwithstanding the limitations to provincial jurisdiction, provinces have the ability to apply laws on reserves under the *Constitution Act, 1867* and Section 88 of the *Indian Act*, as reflected in the decisions around the Spirit Bay Utilities proceeding that initiated this inquiry. Needless to say, many First Nations strongly dispute such claims, as reflected in numerous depositions to this Inquiry. Indeed, the Province's recent adoption of the UNDRIP principles seems to increase even further the ambiguity of jurisdiction, inasmuch as what those principles mean in practice are not yet defined.

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[7] https://www.cer-rec.gc.ca/bts/ctrg/gnnb/cncrdnctbl-eng.html?fbclid=IwAR1s2xr0y_EP9rd-y4edFPv400Y-3HqLehhRgbB0GOAsyRX26EPMEjsEIdk Accessed January 31, 2020

Bill 41-2019 of the B.C. legislature which requires the provincial government to abide by the principles of the United Nations Declaration on the Rights of Indigenous People (UNDRIP) is very brief and ambiguous about how they will work in practice.[8] However, it bears mentioning Article 26 of UNDRIP states:

1. Indigenous peoples have the right to the lands, territories and resources which they have traditionally owned, occupied or otherwise used or acquired.

2. Indigenous peoples have the right to own, use, develop and control the lands, territories and resources that they possess by reason of traditional ownership or other traditional occupation or use, as well as those which they have otherwise acquired.

3. States shall give legal recognition and protection to these lands, territories and resources. Such recognition shall be conducted with due respect to the customs, traditions and land tenure systems of the indigenous peoples concerned.

It is not our purpose here to try to resolve foundational land dispute issues, but merely to point out that the Inquiry can not offer clear recommendations on indigenous utility regulation while they continue.

The above suggests that a reasonable starting point for new regulation is recognizing the jurisdiction of First Nations utilities when selling in their own territories. Moreover, it makes good sense for the provinces to develop partnerships with First Nations on areas of common interest, as illustrated by the many delays regarding pipeline construction in B.C., where jurisdiction among federal, provincial and First Nations has been in dispute. Even the seemingly straightforward principle of "free, prior, and informed consent" (FPIC) has been subject to debate and varying interpretations (Patzer 2019).

The definition of indigenous utility itself requires considerably more effort, as discussed in the BCUC draft report (9-10). An indigenous utility would have to be defined differently than an independent power producer, although in its interconnection to the main grid, the effective role would be the same. In regard to the question of ownership, the principle should be that the indigenous utility has at least majority indigenous ownership or that the utility's decision-making power (control) lies with the members of a First Nation. We can also foresee a scenario where there could be a mixed ownership model between First Nations and non-First Nations owners; multiple indigenous groups co-owning a utility and this should be considered; disputes with non-indigenous shareholders or mixed indigenous group ownership need to be anticipated, along with those regarding overlapping territorial claims. A second question which arises

[8] https://www.leg.bc.ca/parliamentary-business/legislation-debates-proceedings/41st-parliament/4th-session/bills/first-reading/gov41-1, Accessed Jan. 21, 2020.

when such utilities begin to sell outside of their reserve lands. As discussed in the Spirit Bay Utilities case, this raises the necessity of adopting basic standards of protection for such ratepayers.

Equally problematic is the potential dissonance among different utilities operating in the province. For example, complete independence from provincial coordination could mean, in theory, that an indigenous utility would be able to use would be able to use higher carbon fuels and be out alignment with provincial efforts towards a low carbon future. There is an overriding public interest in coordinating all energy systems.

Beyond all this is the enormous missed opportunities for provincial trading of electricity. As of now, very small amounts of electricity are traded between the provinces. A CanadaWest Foundation (Martin 2018, 18-21) report describes Canadian electricity integration as "poor." It notes that organization by provincial monopolies (exc. Alberta) in electricity sectors itself is a major barrier to trading electricity, and is reinforced by mandates, such as that of BC, to focus on electricity self-sufficiency. Moreover, the Eastern and Western electricity systems do not operate synchronously (different frequencies and speeds) and therefore can not be connected by AC transmission lines, requiring additional infrastructure for conversion to DC. Furthermore, there is a lack of regulation around interprovincial electricity trading; an integrated system would require a new set of regulatory authorities and/or coordination around a system operator. This, in turn, contemplates a new and more active role by the federal government, most likely the NEB.

BC's abundance in renewable resources could help the country as a whole to wean itself off fossil fuels, starting with its neighbor, Alberta. Consider that 89% of Alberta's and 84% of Saskatchewan's electricity comes from fossil fuels and 58% of Ontario's from nuclear.[9] However, there is no leadership at the federal level to promote interconnections, in the form of infrastructure spending, or more generally in policy and regulation. A surplus of energy in BC represents missed opportunities for the country as a whole to shift to renewable energy, but in the absence of leadership at the federal level, starting with a lack of clarity over jurisdiction and authority between federal and provincial authorities, as reflected in the current disputes around pipelines, the enormous potential for integration to deal with renewable intermittency and peak hour/seasonal complementarities in demand side management and more generally to increase competition is being left on the table.

While the fundamental issue of jurisdiction can not be ignored, in the following sections, we argue that the desirability of encouraging indigenous economic development, in part through energy development, and the benefits to both those communities and the province, create a de facto situation of mutual interests, if the regulation is set up in such a way as to recognize these benefits. The recommendations in the interim report, however, do not anticipate such scenarios, leaning more on the side of allowing for indigenous utilities to sell electricity on reserve lands. This is implicit in the language in the Draft report (p. i) that the First Nation could "self regulate" in ways

[9] https://www.cer-rec.gc.ca/nrg/ntgrtd/mrkt/nrgsstmprfls/, Accessed Jan. 24, 2020.

similar to municipal and regional districts and "opt out" of BCUC regulation. Moreover, it is related to the BCUC decision to deny Beecher Bay autonomy from BCUC regulation (Draft Report, p.21), as it might lead to "a potential for abuse of monopoly power," which is what one could counterargue happens in the present system with BC Hydro being the monopoly. This would necessarily circumscribe the economic benefits to indigenous utilities by effectively limiting their ability to sell electricity to the rest of the province or to other provinces, and issue noted with concern by the FNLC (First Nations Leadership Council) in the Draft Report (p.42). The effect of the approach is therefore to reinforce the isolation of such groups, rather than posing them as potential contributors to clean energy solutions in the province. In fact, if the provincial government instead looks at the situation as win-win, then we contend that indigenous groups would be more willing to accept the idea of meeting a consistently principled approach to rate setting, quality and reliability standards, and interconnectivity.

6. Indigenous Energy Development will be Needed in B.C.

The current approach of BC Hydro in cancelling the standing offer programme makes sense at face value in terms of protecting ratepayers from higher cost energy and avoiding surplus energy supply. In this section, however, we demonstrate that BC Hydro's estimates of future demand and supply are unreasonable, and that, within a decade, the province will need considerably more electricity beyond what Site C can provide. Therefore, the electricity that First Nations can generate will be valuable for the province.

Supply and Demand Projection Synopsis

BC Hydro has published that they expect electrical demand to rise by 40% over the next 20 years.[10] The discussion below concludes this is the minimum expansion that is to be expected if aggressive climate mitigation through extensive electrification is to occur in B.C. The table below illustrates a simple bottom assessment that supports B.C. Hydro's assessment and indicates that expanded future electrical capacity is required to support demand growth. Supply side observations also support that the transition to renewable energy sources supports the inclusion of geographically dispersed small-scale generation assets as opposed to a few large-scale infrastructure developments. As consequence significant opportunity is present to include new public private partnerships (PPP) around clean energy and First Nation power projects.

[10] BC Hydro, 2017, Long-term energy outlook a story of energy, capacity needs, found at: https://www.bchydro.com/news/conservation/2017/long-term-energy-capacity-needs.html, accessed: 03-Feb-2020.

Table 1 Energy Demand Growth Summary

Energy Source	2020 BC Energy Use	2050 (upper bound) Joule -Joule transition	2050 (lower bound) Clean BC Technology & Policy Transition Scenario
Electricity	40-70 TWh	5x	1.5x – 2x (50%-100%)
Fossil Fuels	1165PJ	low	446PJ

Source: Wright and Arianpoo (authors)

Supporting Discussion The public discourse for the expansion of BC Hydro's electrical generating asset base over the last decade has been fraught with misinformation. Environmental groups have argued there is no need for expansion in efforts to prevent the Site C dam project. Government reports and commissions have been plagued with bounding constraints on the investigation and scope of the inquiry, as illustrated by the starkly differing estimates of Site C's importance and potential contributions of alternative sources between BC Hydro and BCUC. The lack of open source data on BC Hydro's modeling and data assumptions has led to an energy literacy deficit in which policy and decision makers are bereft with evidence-based knowledge. The following arguments provide a baseline that level sets the reader and provisions the basis for pragmatic reflection to try to fill in the gaps behind BC Hydro's projections.

British Columbia has a carbon free electrical hydro based power system (fossil fuel utilization does provide 10% or less of electrical generation) however, it only represents 17% of the province's total primary energy supply. Energy for transportation, space heating (residential, commercial and industrial) and heavy industry is predominantly powered by fossil fuels and represents 67% of all energy supply (another 16% comes from bio-fuel use.[11] Using the true technical definition of work (joules) 3/4 of all energy use is supported by fossil fuels in British Columbia. If this work is to be replaced on a joule by joule basis by electrification to transition to a carbon free economy as suggested by BC's Clean Energy Plan, a significant expansion of the hydro system would be required. Thus, an upper bound can be defined that results in an energy system that is 4x times bigger that the current system with 3/4th of that expansion yet to be built.

To put this in perspective- Site C is expected to generate 5000 GWh/annum, a mere 10% contribution of our projections of BC Hydro's future needs for 50,000 GWh of yearly production. In fact, the upper bound could be higher as a million more residents are expected to land in B.C in the next decade. The IEA has tracked energy growth as a function of population growth and GDP. It tracks directly with both indices in a linear fashion. Thus, population expansion from 4 to 5 million people would have a commensurate 20% expansion in power demand. So, the total upper bound might be a 5x expansion or 4/5 to be built of the total required.

The upper bound for demand growth is unlikely to reach a full 5x expansion based on population growth because it does not account for energy efficiency policies that can

[11] FortisBC, 2018, The facts about where B.C.'s energy comes from, found at: https://talkingenergy.ca/topic/facts-about-where-bcs-energy-comes, Accessed: 31-Jan-2020.

very effectively reduce this joule for joule replacement strategy. For example, policy driven demand side strategies offers significant reductions in capacity expansion. Namely, BC residents do not need to replace every internal combustion engine (ICE) car with a battery powered electric vehicle (BEV). Electrification and expansion of public transport yields significant scales of economy that reduce the kWh/km/passenger by sharing resources in multiple occupancy buses and trains. This has a welcomed co-benefit in reducing congestion in an already crowded road system and fundamentally shortening commute times. Furthermore, portions of the ICE inventory or standing stock could be carbon neutral by utilizing biofuels and other non-fossil sources of renewable hydrocarbons. Support for these solutions via the clean fuel standard allows the marketplace to bring to bear significant reductions in emissions via various routes and reduce the capacity demand increase to B.C Hydro if a carbon free economy is to be achieved. Furthermore, space heating which is predominantly natural gas does not need to be replaced with electrical resistance heating on a joule for joule basis.[12] Subsides for encouraging migration to heat pumps that can provide three to four units of heat for every unit of electrical energy consumed make a significant reduction in expected energy demand for the same joule for joule utility comparison. Furthermore, significant increases in house insulation and building standards that require thicker walls, higher performance insulation and heat recovery ventilation allows the total heat loss from buildings to be meaningfully reduced by over 50%. Thus, the overall demand for electricity for this portion of the expansion budget can be readily reduced.

In the absence of detailed critical analysis of the impact of the demand side options as a result of any given policy or energy economy modelling analysis, envision the following scenario to more accurately predict demand growth. It is fully commensurate with the recommendations of the Clean BC policy introduced by the BC NDP government. Imagine over a twenty-year period an optimistic scenario in which technology options are widely exploited and the solutions gain widescale social adoption. For example, transportation is predominantly electrified with 50% of all trips utilizing efficient public transit, capitalizing on scales of economy. Space heating has bifurcated into legacy gas systems utilizing renewable natural gas/hydrogen and electrical heat pumps on a fifty/fifty basis. Furthermore, total heating joules are reduced by an extensive retrofit insulation effort and new building codes demand insulated highly efficient new builds. Heavy industry has made a modest 20% reduction in total energy use and managed to transition to 50% total electrification. Demand has also increased on a per capita basis by an additional 1 TWh due to population growth. Finally, the LNG industries expansion is expected to create additional demand of 3000 GWh (ref).

The important point is not to offer a precise estimate, but to illuminate that electrification is the significant cornerstone in any policy aimed at transition to a carbon free economy and growth in electrical demand beyond what Site C can provide is an absolute certainty.

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[12] NEB, 2010, Households and the Environment: Energy Use: Analysis, found at: https://www150.statcan.gc.ca/n1/pub/11-526-s/2010001/part-partie1-eng.htm, Accessed: 06-Feb-2020.

Table 2 Electrification Requirements- Optimistic Scenario

Energy Utilization	Fuel Type	Sector Usage Petajoules	Total Electrical Equivalent	Scenario Compliant Energy Use	Conversion Notes
Industrial	Fossil	536 PJ	149 TWh	60 TWh	20% energy reduction 50% electrification
Commercial	Fossil	140 PJ	39 TWh	7 TWh	1:3 COP heat pumps -50% building insulation improvement
Residential	Fossil	151 PJ	42TWh	7 TWh	1:3 COP heat pumps -50% building insulation improvement
Transportation	Fossil	337 PJ	94 TWh	16 TWh	100% efficient electrical motor vs -30% efficient ICE -50% single car -50% transit 10:1 vs. Car
LNG Expansion				3 TWh	Contracted expansion
Population growth				1 TWh	
Totals			1165 PJ	94TWh 34 TWh	Excluding industrial

Source: https://www.cer-rec.gc.ca/nrg/ntgrtd/mrkt/nrgsstmprfls/bc-eng.html, Accessed Feb. 24, 2020.

The table is based on B.C. numeric data published by Canada's national energy regulator and parsed according to the imaginative scenario presented. BC Hydro currently produces between 40 and 70 TWh per annum.[13] If the industrial sector is excluded a notional 1.5x to 2x expansion of capacity for BC Hydro is required. If the industrial sector is included, then an expansion of 2x to 3x would be required. For reference Site C is expected to provide 5 TWh per annum, just 1/6 of future needs not including industrial electrification. This "back of the envelope" estimation is

[13] National Energy Board of Canada, 2019, NEB - Provincial and Territorial Energy Profiles - British Columbia, *Government of Canada*, Found at: https://www.cer-rec.gc.ca/nrg/ntgrtd/mrkt/nrgsstmprfls/bc-eng.html#s1, Accessed: 31-Jan-2020.

commensurate with BC Hydro's published expansion expectations.[14] If a significant portion of industrial electrification is adopted the demands for capacity expansion become commensurately larger.

The above scenario is a more reasonable upper bound on future demand compared to the initial naïve joule for joule comparison. However, consider a pessimistic future expansion scenario in which only 25% of cars become electrified, public transit options are poor. Space heating for commercial and residential has 30% heat pump and insulation retrofit uptake. Furthermore, the industrial sector has continued to relay on fossil fuels, in short, a minimum response change to the Clean-BC program. Table 3 illustrates that this minimal scenario results in a demand increase of 12 TWh – approximately equivalent to the development of two Site C (5.5TWh) facilities.

[14] BC Hydro, 2017, Long-term energy outlook a story of energy, capacity needs, Found at: https://www.bchydro.com/news/conservation/2017/long-term-energy-capacity-needs.html, Accessed Feb. 32020, and BC Hydro, 2013, Integrated Resource Plan Meeting B.C.'S Future Electricity Needs.

Table 3 Pessimistic Scenario Electrification Requirements

Energy Utilization	Fuel Type	Sector Usage Petajoules	Total Electrical Equivalent	Scenario Compliant Energy Use	Conversion Notes
Industrial	Fossil	536 PJ	149 TWh	No change	20% energy reduction 50% electrification
Commercial	Fossil	140 PJ	39 TWh	2 TWh	1:3 COP heat pumps 50% building insulation improvement 30% adoption rate
Residential	Fossil	151 PJ	42TWh	2 TWh	1:3 COP heat pumps 50% building insulation improvement 30% adoption rate
Transportation	Fossil	337PJ	94 TWh	4 TWh	25% cars electrified – all other transportation still fossil
LNG Expansion				3 TWh	Contracted expansion
Population growth				1 TWh	
Totals			1165 PJ	12 TWh	**2 Site C Equivalents**

Both the optimistic and the pessimistic adoption scenarios indicate that significant increased power demand is to be expected over the next two decades. Furthermore, both Tables 2 and 3 include just 3TWh for LNG production support. This is the contracted value for the exported power from the Kitimat facility which plans to export 10MT of LNG/annum. LNG requires between 200-400 kWh/MT depending upon the electrical technologies utilized to liquify the gas. If the Steelhead, LNG-Canada and Woodfibre proceed another 58MT/annum will come into production requiring an addition 18TWh of electricity. If all 13 of B.C.'s proposed projects were to come online for a total production of 186 MT/annum a massive 56TWh of electrical demand could be created.[15]

The above discussion illuminates that significant growth in BC Hydro's electrical system well beyond Site C is to required if a meaningful response to climate change is to be undertaken in British Columbia. The timeframe in which this transition is required, is

[15] https://www.nrcan.gc.ca/energy/energy-sources-distribution/natural-gas/canadian-lng-projects/5683, Accessed Feb. 10, 2020.

argued to be less than a decade according to the latest IPCC report (Masson-Delmonte, et al 2018). Historically large infrastructure projects proceed at a pedestrian rate, too slow to respond meaningfully to climate adaption polices. This is evidenced by BCUC's report projecting the delayed commissioning of Site C.[16] However, Public Private Partnerships (PPP) have a track record of proceeding rapidly in developing new generation assets. First Nations also have a track record in successfully delivering new PPP assets too (e.g. Kanaka Bar and Hupačasath First Nation projects) and consequently it is recommended that First Nations should be a partner at the provincial power capacity planning process in addition to leading first nation specific projects (Miller et al 2019).

Considerations around Stability When Connecting Multiple Grids

Transition to a renewables-based electricity system gives rise to additional concerns that are not apparent in fossil fuel-based systems. The current fossil fuel total primary energy supply is supported by a worldwide logistics industry that ensures 100% energy reliability. As economies shift to renewable sources, energy system reliability very quickly becomes an issue. What was not illuminated is the significant degree of capacity overbuild required to support a reliable system given intermittency of renewable sources. Indeed, the Energiewende policies utilized in Germany allowed rapid adoption of solar and wind technologies but when they reached 37% penetration, power management issues began to mount. Specifically, brownouts or soft power events increased from a rare yearly event to one or more per day. This variability arose as power sources would either suddenly be available or vanish while still supporting a load as a function of the weather. Furthermore, excess peak power events caused generator operators being paid to stop generating energy (Schmid et al 2016, Strunz 2014, and Fischer et al 2016). In solving the problem of power intermittency due to weather variation by excess geographic disbursement and overbuild. Unstable grid power fluctuations were introduced. This is a concern for the B.C. grid if significant numbers of modest power produces were to come online.

This issue deserves a lot more attention than CERG can expose here, however some observations are in order. Historically B.C Hydro has been blessed with large scale hydro generators supported by large dams. These assets function as energy storage (batteries) as well generators. Summer power is available due to reservoirs and/or snowpack (reserves) melt. However, as demand grows and B.C.'s climate shifts to a Mediterranean climate with warm wet winters and long dry summers, the reliance offered by high mountain snowpack is anticipated to wane with climate change (Ministry of Environment and Climate Change Strategy 2019). If wind and solar are utilized due to their cost competitiveness for additional power generation, it is possible that brown outs akin to what has been experienced in Germany may occur. Pumped storage and hydrogen storage facilities, albeit expensive, offer options to significantly reduce the capacity overbuild required to ensure reliability and stabilize the grid. The inclusion of storage allows the full capitalization of the renewable assets by storing all excess energy they can generate and simultaneously smoothing intermittent availability. Storage can be

[16] British Columbia Utilities Commission, "Inquiry Respecting Site C: Final Report to the Government of British Columbia," 2017.

viewed as a dispatchable load complementary to dispatchable generation assets. This would be a new network element; it allows adoption of significant numbers of intermittent generators to be aggregated into a virtual dispatchable generation asset. Grid stability can also be enhanced by setting demand side management prices at lower levels during off peak hours, such as for electric cars, in order to capitalize upon excess peak power generation from intermittent renewables.

In addition to these observations it is important to realize that the summertime depletion of existing high elevation dams and snow back can be retarded. For every intermittent period of power generation by a renewable asset permits long term energy storage in dams to be retained. These are important considerations supporting the inclusion of modest to small power generating assets that can be quickly developed by PPP's and first nations.

For those communities where grid connectivity is still prohibitively expensive despite escaping fossil fuel subsides the potential to take excess locally generated energy and to create hydrogen is technically feasible. This light but energy dense fuel is easily compressed and transported to a grid connected fuel cell hydrogen storage and generation facility – reversing the flow of fossil fuel "to" the community to a renewable fuel "from" scenario. As mentioned previously the development of pumped storage and hydrogen storage/fuel cell energy generation allows the inclusion of many small power producers into the grid in a manageable manner because their aggregate intermittent energy can be integrated into a consolidated large-scale power generator that can be utilized in a deterministic manner.

In addition to the above, it bears mentioning that there is vast geothermal potential in British Columbia that is presently underdeveloped. With greater freedom for development and encouragement from the province, the vast potential energy in First Nations' territories could be tapped for electricity use and or combined heat and power systems in a variety of locations, again reducing the costs of transmission and infrastructure maintenance. Geothermal energy, moreover, is not subject to the problems of intermittency of solar or wind sources.

7. Benefits of Indigenous Generation to Indigenous Communities Underestimated

Beyond the demand and supply factors noted in the previous section, the cancellation of the standing offer programme has had severe negative consequences on both indigenous communities and the province. While the province has formally recognized the value of indigenous energy in the Clean Energy Act (Part 1.2.l), in practice it has moved towards active discouragement of such efforts. From the perspective of the province, there is an inherent benefit in having competition in the marketplace. Introducing competition generally leads to better outcomes, and will incentivize investment in clean energy in diverse sources, beyond what BC Hydro can manage and administer on its own. Moreover, it could diversify the location of different generation facilities, which through their current "lumpiness" would lead to transmission

losses to remote areas, and increase resilience in the grid through offering a diversity of energy sources. Instead, we could see a system of micro-grids from indigenous and remote areas, that would interconnect to the main grid through the systems operator in strategic locations, and also have the possibility for interconnections and sales to other provinces. The micro-grids could allow for more economic and financial feasibility for indigenous utilities and help to reduce the reliance on diesel and its associated costs in remote areas. For example, there is great potential for northern indigenous groups in BC to sell energy to the Yukon and Alberta, to where transmission would be cheaper.

We also point out that the loss of energy through long transmission lines, and the remote status of different communities, many of which presently rely upon diesel generators, and the long-term reliability and storage capacity of the provincial system would be enhanced through having a diversity of energy sources. According to the Canadian Off Grid Utilities Association, there are 18 "non-integrated" communities in 10 locations in B.C., 50% of whom depend on diesel generators. These areas include 50 diesel generating units and 2 hydro units.[17] However, according to the latest NRCAN remote community energy database, there are 75 such communities in BC, with 55 (73%) running primarily on diesel, 14 on hydro (19%), and 6 (8%) on an unknown source of fuel.[18] The Remote Community Electrification Program, designed by the province to deal with this issue, now appears to be suspended or inactive.[19]

Moreover, while the CleanBC statement of principles (Province of B.C., 2018, 33) embraces the shift away from diesel, we can not find any plan that coordinates with BC Hydro to execute this vision. The most important initiative is the BC Indigenous Clean Energy Initiative, part of the "New Relationship Trust" that provides $100 million in an investment funds for a variety of initiatives, including clean energy projects.[20] While this approach is promising, it does not appear to be integrated into any long-term vision of energy for the province.

The long-term results of climate change are largely unpredictable at this point, so that the province's overwhelming reliance on hydro resources represents a risk on the one hand, and a set of missed opportunities on the other. The concerns about intermittency of wind and solar can be alleviated and demand management improved if there are a diversity of energy sources. Geothermal provides another major and largely untapped source of energy for the province, one not subject to intermittency. In fact, BC is

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[17] http://www.cogua.ca/history/bchydro_systems.htm, Accessed Jan. 20, 2020.
[18] Author from data found at https://atlas.gc.ca/rced-bdece/en/index.html, Accessed Jan. 20, 2020.
[19] It is notable that BC Hydro's webpage on its Remote Community Electrification Program, states that it is "not accepting applications to the Remote Community Electrification Program at this time," https://www.bchydro.com/energy-in-bc/operations/remote_community_electrification.html, accessed Jan. 20, 2020.
[20] https://www.newrelationshiptrust.ca/initiatives/bcicei/, Accessed Jan. 20, 2020. In examining the 2018/19 annual report for the New Relationship Trust and the website, we were unable to find any reporting on funding for clean energy projects or evaluations of them; it may simply be too early for this.

estimated to have between 3,000 and 6,00 MW of potential energy generation from geothermal sources.[21]

In forthcoming research, CERG will present a series of case studies of successful renewable energy that demonstrate the multiple benefits of transitioning from diesel generators in remote communities, and of economic and social development in indigenous communities who have already undertaken renewable energy projects, as well as developing a road map for achieving such a transition. Given the needs for reconciliation which can be significantly forwarded through local economic development, we believe that the province needs to prioritize indigenous energy projects as part of a new long-term supply plan. While we are sympathetic to the cautious approach of BC Hydro, our previous section shows plausible reason for developing new long-term supply, and for expanding the cost benefit calculation beyond just the cost or size of new electricity sources. CERG's more holistic approach to cost benefit analysis wrestles with benefits not directly related to energy prices such as employment and income generation as well as less easily quantified benefits, such as social pride, income mobility over time, and alignment with local environmental values.

8. The Outlines for a Mutually Beneficial Approach

While in the timeframe available we are unable to offer a detailed recommendation, on the basis of the above discussion and in examining models of other jurisdictions' regulations of utilities, we offer some principles around which CERG asserts a more constructive regulatory approach could be constructed. Our suggestions build off the principle that new technologies and the desirability for diverse sources of energy help to alleviate the natural monopoly and overreliance on a few large sources of hydro that forms the basis of the current B.C. electricity system.

In Canada, there is no policy precedent for indigenous sovereignty in energy (Henderson, 2019). While in the 1980s there was much to bemoan Canada's record on recognizing Indigenous sovereignty, advances have been made since then (Mason, 1983). In the case of Tsilhqot'in Nation v. British Columbia, the Supreme Court of Canada ruled *After Aboriginal title to land has been established by court declaration or agreement, the Crown must seek the consent of the title-holding Aboriginal group to developments on the land* (Supreme Court of Canada, 2019). This decision, along with Spirit Bay, provides an important opening for asking the question of how First Nations utilities should be treated.

We begin to answer this question with our findings on other jurisdictions' regulatory approaches to indigenous utilities. Like Canada, Australia recognizes indigenous land rights persist beyond colonization. Moreover, there are a number of microgrids throughout Australia that presage a far more decentralized grid there.[22] However, there is almost no literature in regards to aboriginal power issues in Australia.

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[21] https://www.cleanenergybc.org/about/clean-energy-sectors/geothermal and https://www.cangea.ca/britishcolumbiageothermal.html, Accessed Jan 24, 2020.

[22] M.A. Farrelly, and S. Tawfik, Engaging in disruption: A review of emerging microgrids in Victoria, Australia, *Renewable and Sustainable Energy Reviews*, 117 (2020): 1-11.

The case of New Zealand is better documented. Similar to BC, there is a fundamental clash of values between the Maori approach which sees natural entities as living beings, with similar rights to humans and the Western economic approach of treating the environment as externalities. The country is moving towards a co-management strategy, with efforts to build Maori capacity towards helping to manage natural resources, including several working agreements around fishing. The goal is to develop partnership institutions, similar to what we are proposing here, where neither party would have a veto. These would be centered around management plans for resources that are jointly agreed upon and for which responsibility is shared among the parties.[23] In fact, there is a vibrant geothermal sector in New Zealand including indigenous Maori participation. These are guided by the Resource Management Act (RMA) of 1991. The RMA gives regional authorities power to manage local resources. It also recognizes the relationship of the Maori with their ancestral lands, including the ability to develop renewable energy (sections 6/7).[24] Several indigenous utilities, primarily based on geothermal resources, have been set up as trusts where the local indigenous groups own a percentage of the generation as a joint venture with private sector parties, some with the Maori in the lead, often through trusts The Tuaropaki Trust runs 2 geothermal plants that supply power to 100,000 homes and is connected to the national grid, and help them to run a series of successful greenhouse operations.[25] Indigenous groups are also leaders in energy efficiency efforts. The outcomes, including skills training and collaborative learning as well as revenue generation (reinvested into economic development enterprises and educational scholarships) have contributed to Maori development. More importantly, authors report a psychic change in indigenous groups in New Zealand, stemming from a feeling of self-sufficiency and stewardship in consonance with environmental values (vs. dependence).[26] Overall Maori assets were worth an estimated C$860 m. in 2016. We believe that these alternative models deserve more research and scrutiny. They may not provide a blueprint but clearly they are struggling with similar issues. With more time and resources, CERG could do the research and synthesize the lessons of experience from other jurisdictions for BC.

As reflected in the Babaie report issued for this inquiry, there are a very wide range of arrangements for indigenous utilities across Canada, reflecting the diversity of local conditions and historical legacies (ii-v). The two most relevant are Alberta and Ontario. In Alberta, there are indigenous transmission systems that are regulated by the provincial government. However, indigenous distribution systems are organized under Rural Electrification Associations (REAs) and regulated by the Rural Development Branch of the Alberta Ministry of Agriculture and Forestry to ensure compliance with the Rural Utilities Act (R-21), which appears to be limited to ensuring good governance practices.

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[23] Greg Severinsen and Raewayn Peart, Reform of the Resource Management System: The Next Generation. Working Paper 3. Auckland: Environmental Defence Society, 2018, pp.7, 13, 34-7, and 154.

[24] http://www.legislation.govt.nz/act/public/1991/0069/latest/DLM230265.html, Accessed Feb. 5, 2020

[25] Bart van Campen, Comparison of Geothermal Regulation between Chile, Philippines and New Zealand, *Proceedings World Geothermal Congress 2015*, Melbourne, Apr. 19-25, 2015, 4-16; and Maria Bargh, Indigenous Peoples' Energy Projects, *Australasian Canadian Studies Journal*, 28,2(2010): 1-30.

[26] Julie MacArthur and Steve Matthewman, Populist resistance and alternative transitions: Indigenous ownership of energy infrastructure in Aotearoa New Zealand, *Energy Research & Social Science*, 43 (2018): 16-24.

Nonetheless, the Alberta Utilities Commission can receive complaints about REA distribution tariffs (12). In Ontario, there are a number of indigenous companies in different parts of electricity subsectors, including Independent Power Authorities, with complex regulatory arrangements. These activities are regulated through a licensing process administered by the Ontario Energy Board (OEB). Through this process, the OEB appears to indirectly regulate some key aspects of indigenous utilities, though the arrangements also seem to vary. For example, the Board has to approve service rate applications for the Five Nations Energy transmission company, while Cat Lake has exemptions from certain provisions (29 & 48). Meanwhile, OEB attempts to engage in rate protection in some communities, while the Electrical Safety Administration, the regulatory authority for that purpose, has no jurisdiction in First Nations' utilities. While these arrangements are interesting, in both provinces, there does not appear to be any integration between the indigenous system and the main grid, which we see as inherently problematic in that it misses the opportunities for mutual gain that we have documented above.

While in the 1980s there was much to bemoan Canada's record on recognizing Indigenous sovereignty, advances have been made since then (Mason, 1983). In the case of Tsilhqot'in Nation v. British Columbia, the Supreme Court of Canada ruled *After Aboriginal title to land has been established by court declaration or agreement, the Crown must seek the consent of the title-holding Aboriginal group to developments on the land* (Supreme Court of Canada, 2019). As a result of the United States' policy of recognizing the sovereignty of First Nations, tribal utilities are not subject to state regulators and this duty is carried out by the utility's Board of Directors (WAPA, 2010).

In Exhibit C3-3 for this Inquiry, The First Nations Major Projects Coalition lays out some interesting parameters regarding indigenous energy production in the U.S. It is important first to note that there generally is a competitive market for energy generation across the U.S., though it is regulated on the state level. In the U.S., tribes can produce electricity autonomously in their reserve lands, but are subject to state utilities when they sell outside of them (8). "Many" of the tribes follow federal safety guidelines, and tribal utility associations share legal services as well as help to build capacity (9-10). As a result of the United States' policy of recognizing the sovereignty of First Nations, tribal utilities are not subject to state regulators and this duty is carried out by the utility's Board of Directors (WAPA, 2010). Indigenous utilities are treated in similar ways to municipal utilities and rural cooperatives in this regard. By contrast with the situation in Canada, in the U.S., the The *Energy Policy Acts of 1992 and 2005*, combined with the *Indian Tribal Energy Development and Self-Determination Act of 2005* created the Office of Indian Energy Policy and Programs in the Department of Energy. This office was aimed at the removal of barriers to entry for indigenous tribal authorities into the energy market. There are some important examples of indigenous utilities that would be worth additional research. These include Yakama Power in Washington state, which meets state standards but operates independently; plans are to eventually reach 1.4 m. customers. In California, the Aha Macav Power service runs a natural gas system that interconnects with the California grid and was developed in partnership with the federal, state and local governments. In Arizona, the Ak Chiun Indian Community Electric

Utility Authority and the Navajo Tribal Utility Authority are both provide the full gamut of energy services, including solar. In Oregon, the Umpqua nation runs its own electricity, sewage, water, and irrigation systems, while the Confederated Tribes of the Warm Springs Reservation jointly own the 366.8 MW Pelton Round Butte Project with the Portland General Electric Company. Finally, in Alaska, the Chaninik Wind group, run by the United Tribal Governments of Kongiganak, Kwigilliingok, Tuntutuliak, and Kipnuk, run a microgrid utility (Massie 2018, and Kopin 2017). Most of these utilities are 100% indigenous-owned, but only the aforementioned Pelton Round Butte project and the Aha Macav Power system appear to sell outside of reservation lands. In sum, while the U.S. cases can not serve as models for the interconnection question, they could provide an interesting set of cases for how to set up an run indigenous utilities in Canada. CERG would be happy to undertake such studies and provide a summary report if we can find support.

The C3-3 deposition notes that energy generation has helped to create jobs and training programs, as well as preserving revenues for tribes in the U.S.. This seems like a sound starting principle to us, to recognize that the benefits of electricity generation go well beyond the energy sector. The principle is supported by FortisBC in their deposition (Exhibit C4-2, 10-11), where they distinguish between an indigenous utility that serves only customers who are part of its governance system (akin to the municipal exception) vs. sales to customers outside of it, which it argues is the essence of the BCUC decision on Spirit Bay.

The transcripts of BCUC's recent workshops on topic of regulation of Indigenous Utilities show the broad range of opinions on the definition of Indigenous utilities, and why it merits more nuanced discussion. While in one workshop the groups expressed definitions in terms of control and ownership (Transcript Volume 15, pp.56 and 63), another pointed out the challenges of doing so: namely, that making a firm decision on what constitutes an Indigenous utility might not be sensible because of its evolving nature, and that factors beyond ownership and control could play a role in the definition (Transcript Volume 16, pp. 48-49). Furthermore, it seems that many voices can be overlooked, as expressed by Chief Don Harris of Xa'xtsa First Nation (Transcript Volume 15, p.44).

From the above models, and given the jurisdictional issues brought out in the previous sections, we argue that BCUC should be reconstituted into a more diverse body, or work with a wider deliberative regulatory body that would include large indigenous power producers that could work towards a consensus on reasonable regulations and a dispute settlement mechanism for those who want to sell power to the main grid. This mixed regulatory commission represents an effective compromise between the current BCUC, which First Nations might find unrepresentative and unresponsive to their needs and the suggestion of an independent utilities commission as suggested by the FNLC (Draft report, p.59). The board should deal with setting reasonable provincial standards for utilities including indigenous or municipal utilities that sell outside of their reserve/designated territories. It would be worth considering having representative from neighbouring provinces and potentially states and the federal govt. on the board, so that

we can maximize the possibilities for First Nations groups to buy and sell electricity across provincial lines. There are clear interconnection possibilities in the Yukon and Alberta for example. The reason for rejecting the latter is alluded to above, that is the need to ensure reasonable prices, consistency, safety, and reliability to the main grid given the desire of many First Nations groups to be able to sell electricity to it. Moreover, not all indigenous groups will want or have the ability to create their own utilities. We could foresee the possibility that they could be subject to competing offers among different utilities, and therefore their ability to ensure the quality and reasonable price of their energy would be circumscribed. As Chief Michell of Kanaka Bar, Kistselas Geothermal and the Leq'á:mel First Nations mention in their input into this inquiry, it is important to ensure that there are universal safety and reliability standards for all provincial residents.[27] Our point is that this does not necessarily need to be administered by BCUC, but nor should it be left to the First Nation utility provider. There should be a universal minimum standard, and this can be achieved in a consensual way through a mixed regulatory/oversight board with representatives of the different utilities working with BCUC to achieve the shared goal. This group could also ensure compliance of First Nations utilities with reasonable regulatory standards, to protect clients in terms of prices, quality, and reliability of service. Finally, such a group could work actively to build up the capacity of indigenous utility operators to regulate their own systems. There should be revenue sources built into the electricity rates systems (e.g. a charge on exports/imports) to permanently fund capacity building and improvement in energy efficiency. In the end, the ability of First Nations to assert their rights depends more on their governance capacity than declarations around UNDRIP or FPIC (Tomlinson 2019).

We propose a more decentralized market system in which a system operator could dispatch indigenous electricity being offered at a competitive rate. This would eliminate the issue of the ban on retail access by electricity producers, as well as BC Hydro's inherent conflict of interest as a generator and manager of the transmission system (Draft Report, 62). The system would also include a mandatory fee, based on the percentage of each contract, for transmission maintenance and extension. New electricity should be 100% green. The system operator should be a neutral party paid for by public revenues who manages dispatch and ensures quality and reliability. There are numerous examples of such systems, such as the UK. We recognize the important responsibility to BC ratepayers, which is why clean energy to the grid would need to compete on price as well as meet basic quality and reliability standards.

At present, BC Hydro manages exports and imports of electricity, sometimes returning a profit to taxpayers. Under the system operator model, an export/import fee on contracts would be imposed, and contracts would be approved as long as the self-sufficiency and reasonable rates for local customers was first ensured.

[27] Michell and Kitselas comment is found in the BCUC draft report, p.48 and Leq'a:mel on p.68.

References

Bargh, Maria, 2010. Indigenous Peoples' Energy Projects, *Australasian Canadian Studies Journal*, 28,2: 1-30.

Fischer, W. J.-F. Hake, W. Kuckshinrichs, T. Schr, € Oder, and S. Venghaus, 2016. German energy policy and the way to sustainability: Five controversial issues in the debate on the ``Energiewende'', *Energy*, 115: 1580–1591.

FortisBC, "The facts about where B.C.'s energy comes from | Talking Energy," 2018. [Online]. Available: https://talkingenergy.ca/topic/facts-about-where-bcs-energy-comes. [Accessed: 31-Jan-2020].

Henderson, William B. 2019. Indigenous Self-Government in Canada. https://www.thecanadianencyclopedia.ca/en/article/aboriginal-self-government. Accessed Jan. 31, 2020.

IRENA (International Renewable Energy Agency, 2019). *Renewable Power Generation Costs in 2018.* Abu Dhabi: IRENA.

Jacobson, M. Z. Jacobson, 2017. 100% Clean and Renewable Wind, Water, and Sunlight All-Sector Energy Roadmaps for 139 Countries of the World, *Joule*, 1(1):108–121.

Joseph, B and Joseph C.f., 2017. *Working Effectively with Indigenous People*, Port Coquitlam: Indigenous Relations Press.

MacArthur, Julie and Steve Matthewman, 2018. Populist resistance and alternative transitions: Indigenous ownership of energy infrastructure in Aotearoa New Zealand, *Energy Research & Social Science*, 43: 16-24.

Martin, Nick, 2018, Power Without Borders, Moving Towards an Integrated Western Grid, Calgary: Canada West Foundation.

Mason, Michael D. 1983. Canadian and United States Approaches to Indian Sovereignty. *Osgoode Hall Law Journal* 21(3) : 422-474.

Masson-Delmotte, V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, and T. Waterfield (eds.), 2018. *IPCC, 2018: Summary for Policymakers. In: Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty*. In Press. Found at: https://www.ipcc.ch/site/assets/uploads/sites/2/2019/05/SR15_SPM_version_report_LR.pdf, Accessed: Feb. 3, 2020.

Miller, A., Patel, S., Gorzitza, C., Parkins, J.R. 2019. *Community Energy in Western Canada: Insights from case studies on small-scale renewable energy development.* Edmonton, AB: Future Energy Systems, University of Alberta. Found at: https://www.researchgate.net/profile/John_Parkins/publication/333933979_Community_Energy_in_Western_Canada_Insights_from_case_studies_on_small-scale_renewable_energy_development/links/5d0d1bb6458515c11ced4c9f/Community-Energy-in-Western-Canada-Insights-from-case-studies-on-small-scale-renewable-energy-development.pdf, Accessed Feb. 3, 2020.

NEB (National Energy Board of Canada), Households and the Environment: Energy Use: Analysis. Found at: https://www150.statcan.gc.ca/n1/pub/11-526-s/2010001/part-partie1-eng.htm, Accessed Feb. 6, 2020.

NEB, 2019. Provincial and Territorial Energy Profiles - British Columbia, *Government of Canada*, 2019. Found at: https://www.cer-rec.gc.ca/nrg/ntgrtd/mrkt/nrgsstmprfls/bc-eng.html#s1. Accessed: Jan 31, 2020.

Patzer, Jeremy 2019, Indigenous rights and the legal politics of Canadian coloniality: what is happening to free, prior and informed consent in Canada?, *The International Journal of Human Rights*, 23:1-2, 214-233.

Scmid, E., B. Knopf, and A. Pechan, 2016. Putting an energy system transformation into practice: The case of the German Energiewende, *Energy Res. Soc. Sci.*, 11: 263–275.

Severinsen, Greg and Raewyn Peart. 2018. Reform of the Resource Management System: The Next Generation. Working Paper 3. Auckland: Environmental Defense Society.

Strunz, S., 2014. The German energy transition as a regime shift, *Ecol. Econ.*, 100: 150–158.

Supreme Court of Canada. 2014. Tsilhqot'in Nation v. British Columbia. https://scc-csc.lexum.com/scc-csc/scc-csc/en/item/14246/index.do?r=AAAAAQA. Accessed Feb 2, 2020.

Tomlinson, Kathryn, 2019. Indigenous rights and extractive resource projects: negotiations over the policy and implementation of FPIC, *The International Journal of Human Rights*, 23(5): 880-897.

Van Campen, Bart. 2015. Comparison of Geothermal Regulation between Chile, Philippines and New Zealand, *Proceedings World Geothermal Congress 2015*, Melbourne, Apr. 19-25, 4-16.

Western Area Power Administration Renewable Resources Program. 2010. The Conversion of On-reservation Electric Utilities to Tribal Ownership and Operation. https://www.energy.gov/sites/prod/files/2016/04/f30/tribal_authority_case_studies_report.pdf. Accessed Feb 2, 2020.

Western Electricity Coordinating Council, 2014. *Capital Costs For Transmission And Substations: Updated Recommendations for WECC Transmission Expansion Planning.* Found at: https://www.wecc.org/Reliability/2014_TEPPC_Transmission_CapCost_Report_B+V.pdf, Accessed: Feb. 7, 2020.

BC Hydro

Application to Amend Rate Schedule (RS) 1289 for Net Metering Service, Apr. 29, 2019, found at: https://www.bchydro.com/work-with-us/selling-clean-energy/net-metering.html?WT.mc_id=rd_netmetering, Accessed Jan. 20, 2020.

2013. Integrated Resource Plan: Meeting BC's Future Electricity Needs: Public and Stakeholder Consultation Report for the September 3 to October 18, 2013 Consultation Period. Found at: http://www.llbc.leg.bc.ca/public/pubdocs/bcdocs2013_2/536895/irp-public-stakeholder-consultation-report-nov-2013.pdf, Accessed Feb. 3, 2020

Long-term energy outlook a story of energy, capacity needs. found at: https://www.bchydro.com/news/conservation/2017/long-term-energy-capacity-needs.html, Accessed Feb 3, 2020.

BCUC (British Columbia Utilities Commission), www.bcuc.com, accessed Jan. 3, 2019

Indigenous Utilities Regulation Inquiry

-Daria Babaie report, Exhibit A-13
-Community Input Workshop Vancouver November 27, 2019, Transcript Volume 15
-Community Input Workshop Nanaimo November 28, 2019, Transcript Volume 16
-First Nations Major Projects Coalition, Submission to the BCUC Indigenous Utilities Regulation Inquiry, Exhibit C3-3
-FortisBC Written Evidence, Exhibit C4-2
-Indigenous Utilities Regulation Inquiry Draft Report and Draft Report Summary, Nov. 1, 2019
-Indigenous Utilities Regulation Inquiry Interim Report, Dec. 31, 2019

Inquiry Respecting Site C: Final Report to the Government of British Columbia, 2017

Municipal Energy BCUC Municipal Energy Utilities Inquiry
-FortisBC Letter of Comment, Exhibit C5-3, Oct. 24, 2019
-Village of Valemount submission, Exhibit C6-1, Aug. 22, 2019

Province of British Columbia

-CleanBC, Our nature. Our power. Our future. Dec. 2018, found at: cleanBC.ca
-Utilities Commission Act, found at www.bclaws.ca, accessed Jan. 6, 2020.
-Clean Energy Act [SBC 2010] Chapter 22, found at www.bclaws.ca, accessed Jan. 6, 2020.
-Ministry of Environment and Climate Change Strategy (2019). Preliminary Strategic Climate Risk Assessment for British Columbia. Report prepared for the Government of British Columbia, Victoria, BC. Accessible at: https://www2.gov.bc.ca/gov/content/environment/climate-change/adaptation/riskassessment