FINAL WRITTEN COMMENTS

NUU-CHAH-NULTH TRIBAL COUNCIL, COWICHAN TRIBES, GITANYOW FIRST NATION, HOMALCO FIRST NATION and B.C. FIRST NATIONS CLEAN ENERGY WORKING GROUP

BRITISH COLUMBIA UTILITIES COMMISSION INDIGENOUS UTILITIES REGULATION INQUIRY

March 6, 2020

A. Introduction

Given the extensive written and oral submissions the Nuu-chah-nulth Tribal Council, Cowichan Tribes, Gitanyow First Nation, Homalcow First Nation and B.C. First Nations Clean Energy Working Group ("*Collective First Nations*") have previously made in the British Columbia Utilities Commission's ("*BCUC*") Indigenous Utilities Regulation Inquiry ("*Inquiry*" or "*BCUC Inquiry*") these final written comments ("*Comments*") is almost exclusively a response to questions raised in Exhibit A-48, "*Guidance for Final Written Comments*".

At the outset, the Collective First Nations would like to thank the BCUC for conducting a meaningful and respectful Inquiry. It truly has been a two-way consultation process. Something that needs to occur far more often with First Nations and all levels of Canadian government and government related entities.

The Collective First Nations responses to the questions posed in Exhibit A-48 are set out below with the preamble and questions reproduced for ease of reference. There is also a section entitled "Conclusion".

B. Responses to Exhibit A-48

Preamble

"Several participants in the Inquiry have submitted that the BCUC should not regulate Indigenous utilities that operate within a First Nation's traditional territory (territory beyond reserve lands or Treaty lands). If providing written comments related to the regulation of Indigenous utilities on a First Nation's traditional territory, or lands subject to Indigenous self-government, participants are encouraged to address the following issues where they have a view:"

Question 1:

> ***" How and the extent to which the implementation of the Declaration on the Rights of Indigenous Peoples Act should impact the BCUC's recommendations?"***

Response 1:

In its Final Argument Dated October 4, 2019, the Collective First Nation's outlined in detail their position of the applicability of the United Nations Declaration on the Rights of Indigenous Peoples ("*UNDRIP*") and the Calls to Action of the Truth and Reconciliation Commission ("*TRC*") to the Inquiry. The relevant extracts from this final argument are attached as Exhibit A. These Comments build on this work.

Without hesitation, the BCUC must assume that that if its recommendations from this Inquiry ("*Recommendations*") are accepted by the B.C. Government that this government will implement the Declaration on the Rights of Indigenous Peoples Act ("*Declaration Act*") as necessary, in relation to these recommendations. The implementation, and in particular the timing of implementation of the Declaration Act in relation to the BCUC should have no bearing on the Recommendations. These recommendations must provide for First Nation self-regulated utilities within their traditional territories and any changes to laws and policies necessary to ensure that these utilities provide economic opportunities for First Nations.

It must be emphasized that when it makes the Recommendations, the BCUC is not making an enforceable order under the Utilities Commission Act ("*UCA*"). For example, there is no requirement for the BCUC to determine whether it has the jurisdiction under the UCA to implement or apply UNDRIP, as a result of the implementation of the Declaration Act or otherwise, as it relates to the Recommendations. If it was making an order under the UCA, it would have to make this determination. When conducting an Inquiry, the BCUC is constrained by the corresponding terms of reference and not its jurisdiction under the UCA[1].

Incidentally the BCUC must also conclude that because of the Declaration Act, UNDRIP is going to become an integral part of the economic and social landscape of B.C. Its Recommendations must foreshadow or portend the implementation of UNDRIP.

BC Hydro – Voluntary Declaration Act, UNDRIP and TRC Compliance

Without in any way derogating from the above, the Collective First Nations wish to note the directions the B.C. Government, by the Minister of Energy Mines and Petroleum Resources, by way of a mandate letter has already given to BC Hydro with respect to UNDRIP and TRC. And BC Hydro's adoption of these directions.

BCH is voluntarily complying with UNDRIP and TRC and as a result is spending money which is subject to BCUC regulation e.g. the Fiscal 2020 to Fiscal 2021 Revenue Requirements Application which is currently before the BCUC for approval. In relation to BC Hydro, the implementation of the Declaration Act including regulation by the BCUC is a moot point. It is already being done on a voluntary basis.

The directions are set out in most recent Mandate Letter[2] to the Executive Chair of BC Hydro ("Mandate Letter") as follows:

> "*Our Government has also made important commitments to reconciliation with Indigenous peoples, taking action against climate change, and working to ensure that our public service and public sector institutions are representative and inclusive of all our diverse society:*
>
> - *The Government is adopting and implementing the United Nations Declaration of the Rights of Indigenous Peoples (UNDRIP), and the Calls to Action of the Truth and Reconciliation Commission (TRC), demonstrating our support for true and lasting reconciliation with Indigenous Peoples. All public sector organizations are expected to incorporate the UNDRIP and TRC within their specific mandate and context. Additionally, in May 2018, the Government released 10 Draft Principles to Guide the Province's Relationship with Indigenous peoples, which serves as a guide for all public sector organizations as we continue to build relationships with Indigenous communities based on respect and recognition of inherent rights;"*

[1] UCA, section 5. See also Final Argument of the Collective First Nations, October 4, 2019, "Jurisdiction" pages 6-7

[2] https://www.bchydro.com/toolbar/about/accountability_reports/openness_accountability.html

BC Hydro's adoption of the directions contained in the Mandate Letter are set out in its 2020/21-2022/23 Service Plan[3]:

- *Implementation of the Declaration on the Rights of Indigenous Peoples Act and the Truth and Reconciliation Commission Calls to Action, demonstrating support for true and lasting reconciliation,*
- *Operating, maintaining and expanding BC Hydro's extensive electricity system impacts a significant number of Indigenous communities across the province. We continue to pursue meaningful, long-term relationships with Indigenous groups to better understand their interests so they can be incorporated in our planning and business operations. With the historic passing of the Declaration on the Rights of Indigenous Peoples Act in November 2019, BC Hydro is working to implement the United Nations Declaration on the Rights of Indigenous Peoples, the Calls to Action in the Truth and Reconciliation Report, and the Draft Principles that Guide the Province of British Columbia's Relationship with Indigenous Peoples into our business.*
- *Continue to advance reconciliation by incorporating the Declaration on the Rights of Indigenous Peoples Act, the Draft Principles that Guide the Province of British Columbia's Relationship with Indigenous Peoples and the Calls to Action of the Truth and Reconciliation Commission into our business.*

As a result of BC Hydro's voluntary compliance, there is no reason the BCUC Inquiry has to concern itself with the impact its recommendations may have on BC Hydro as they relate to the Declaration Act and for that matter UNDRIP and TRC.

The framing of the Recommendations should take into account the *10 Draft Principles to Guide the Province's Relationship with Indigenous peoples*[4] that are referenced in the Mandate Letter. They are an extremely strong indication of the B.C. Government's desire to create economic opportunities for First Nations which is what unregulated First Nations self-regulated utilities on reserve lands, treaty lands, and traditional territories/ Aboriginal title lands[5] are expected to achieve. And the B.C Government's receptiveness to the Recommendations that create these opportunities. For example, Principle 8 says:

> "8. *The Province of British Columbia recognizes that reconciliation and self- government require a renewed fiscal relationship, developed in collaboration with the federal government and Indigenous nations that promotes a mutually supportive climate for economic partnership and resource development (emphasis added).*

[3] February 2020, pages 5, 7 and 9. Similar provisions are contained in 2019/20-2021/22 Service Plan dated February 2019 which predate the ●

[4] https://www2.gov.bc.ca/gov/content/governments/indigenous-people/new-relationship/about-the-ten-principles

[5] See Principle 6 of the *10 Draft Principles to Guide the Province's Relationship with Indigenous peoples where the term "Aboriginal title lands" is used.*

The Province recognizes that the rights, interests, perspectives, and governance role of Indigenous peoples are central to securing a new fiscal relationship. It also recognizes the importance of strong Indigenous governments in achieving political, social, economic, and cultural development and improved quality of life. This principle recognizes that a renewed economic and fiscal relationship must ensure that Indigenous nations have the fiscal capacity, as well as access to land and resources, in order to govern effectively and to provide programs and services to those for whom they are responsible.

The renewed fiscal relationship will also enable Indigenous peoples to have fair and ongoing access to their lands, territories, and resources to support their traditional economies and to share in the wealth generated from those lands and resources as part of the broader provincial economy.

Question 2:

If an Indigenous utility's service area overlaps with that of an existing utility's "franchise area" (or service territory) should the Indigenous utility be able to serve customers residing within the existing utility's franchise area? If so, to what extent and why? To what extent, in any, should the BCUC's recommendation have regard to the resulting impact on the existing utility? Why or why not? Would any overlapped area be part of both utilities' service areas? Would one utility's claim have to prevail? How would competing claims be resolved by whom? Please discuss the implications if the Indigenous utilities are regulated under a different regime than the existing utilities, including how issues of conflict should be addressed.

Response 2:

Given the growing need for the renewable energy by the housing, transportation and industrial sectors in British Columbia to reduce greenhouse gas emissions, the demand for this energy, primarily electricity and possibly some renewable hydrogen produced from renewable electricity, will be large enough that concerns about adverse impacts on incumbent public utilities raised in the above questions will be addressed by the increased demand.

In this expanded market, a measure of competition would be beneficial to all users of electricity in B.C. It is likely that First Nations utilities would concentrate on serving new load as it is expected that the duplication of infrastructure to serve existing customers would not be cost competitive. To meet recently legislated GHG emission reduction levels the demand for renewable electricity is expected to increase significantly in the next two decades. Appendices B and C contain a high level analysis of the large amounts of new renewable electricity generation required to support the electrification required to meet B.C.'s legislated GHG reduction levels and the CleanBC plan. Currently, and to the Collective First Nation's knowledge, no such analysis has been conducted by the B.C. Government, BC Hydro or the Fortis Group of companies ("*Fortis*").

Appendix D contains an analysis of unserved electrical load in Northeast B.C.

While based on market data, the analyses are for illustrative purposes and are not intended to be definitive. The Collective First Nations do not have the resources to conduct the latter level of analyses.

As to the matter of "*service territories*" BC Hydro does not have a statutory or contractual service territory[7] and the issuance of a certificate of public convenience and necessity ("*CPCN*") under the UCA does not create one as confirmed by *Fortis*[8]:

> "*CPCNs do not confer exclusivity over a particular service territory in the formal legal sense.*"

If First Nations utilities are not regulated by the BCUC there would be no need for them to receive a CPCN under the UCA.

According to Fortis it does have statutory service territory for its electric utility[9] but none exists for its natural gas utility.[10]

Any competing claims would be left for resolution by the relevant First Nation and the B.C. Government. Because of the complexity of reconciliation by individual First Nations and the B.C. Government, resolution of any competing claims should be resolved as between them. The same principles should apply to resolution of any conflicts because of different regulatory regimes. A First Nation and the B.C. Government could decide to refer a matter that needs to be resolved to the BCUC but it would be up to them to make this decision.

Question 3:

> **Should Indigenous utilities operating on traditional territory serve only members of the First Nation, Indigenous people generally or should it have access to all potential customers within the territory? Please discuss the implications of any restrictions on who can be served.**

Response 3:

No. See the Collective First Nation's responses to Question 2 e.g. the market will be large enough for more than one renewable energy provider. First Nation's utilities should have access to all potential customers within their respective traditional territory. Or traditional territories should more than one First Nation collectively own or control a First Nation utility that provides service in the collective traditional territories of the owners/controllers.

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6 Currently BC Hydro's load forecast team does not keep an inventory of how it is tracking against the greenhouse gas reduction inventory. Fiscal 2020 to Fiscal 2021 Revenue Requirements proceeding, Transcript Volume 10, page 1693

7 Exhibit C2-6, page 3, "BC Hydro does not have an overarching agreement that defines a geographical area over which BC Hydro has exclusive rights to provide electricity services in British Columbia"

8 Exhibit C4-10,

9 Ibid pages 1-3

10 Ibid page 5

Question 4:

> **Consider these two situations. (1) An Indigenous utility (IU) operating in another utility's (Utility A) franchise area could purchase bulk electricity from Utility A and distribute the electricity to its (the IU's) customers in that territory – thereby not reducing Utility A's demand; or (2) the IU could generate its own electricity for sale to its customers – thereby reducing Utility A's demand.**

Response 4:

Please refer to the Collective First Nation response to Question 2. Because of the need to reduce greenhouse gas emissions, the expected increase in the size of the renewable energy market, primarily electricity, will result in room for more than one provider of electricity. Under these market conditions, an incumbent public utilities' market share will not shrink through competition. It will expand but not as much as with competition.

Question 5:

> **If an Indigenous utility operates in an existing utility's franchise area should there be any restrictions on the source of electricity (or other type of energy sold)? What factors, if any, should be considered?**

Response 5:

The Collective First Nations are interested in providing renewable energy so they have no comment on the provision of non-renewable energy. It is expected that the electricity that they would sell in their traditional territory will be renewable and sourced in this territory. It is conceivable the Collective First Nations could sell other renewable energy such as renewable hydrogen sourced in their territory. But this form or renewable energy is in its infancy and its potential is unknown.

To provide a competitive product, it may be necessary to shape renewable electricity from sources within their traditional territory so there should be no restrictions on the source of electricity. It may take some time to work out the details of a First Nation utility business model and they may differ across First Nation utilities.

Question 6:

> **Should the BCUC include the facilitation of economic opportunities for First Nations in its recommendations around a regulatory framework for Indigenous utilities? If so how?**

Response 6:

Yes. The BCUC can do so by recommending to the B.C. Government that First Nations utilities that are self-regulated can provide energy on reserve lands, treaty lands, traditional territory/Aboriginal title lands.

Insofar as they would not currently be allowed to do so, the BCUC could also recommend that First Nations utilities be allowed to wheel electricity on incumbent utilities electrical transmission and

distribution systems. Bearing in mind the First Nations utilities would not be retail customers. They would be utilities.

BC Hydro and Fortis have addressed electrical transmission and distribution access, and in the case of Fortis access to its gas distribution network, in their responses to BCUC Panel Information Requests[11]. According to Fortis[12]:

> "*Currently, the BCUC has provided for retail and wholesale access only to FBC's wholesale and largest industrial customers. In addition, FBC only has wheeling rates for customers connected at primary or transmission voltages…*
>
> *… FEI's service offering is unbundled already. Larger customers can source their own commodity and obtain Transportation only service from FEI.*"

BC Hydro has an Open Access Transmission Tariff ("OATT") but[13]:

> "*Direction 8 is seeking to prevent a BC Hydro retail load customer from using BC Hydro's transmission system, either directly or indirectly, to acquire energy from sources other than BC Hydro. BC Hydro does not have a distribution wheeling tariff other than RS 1268 to BC Hydro's Electric Tariff which allows for wheeling over the distribution system for the purpose of allowing a generator to access the transmission system for service under the OATT…*"

The Recommendations should state that Direction 8 should be clarified so there is no doubt First Nations utilities are not retail load customers. They should also state that Fortis and BC Hydro should have distribution tariffs that would allow First Nations utilities to have access to the respective electrical distribution systems.,

For the purposes of shaping renewable electrical generation, the BCUC should recommend that First Nations Utilities be given access to BC Hydro's reservoir storage at market based rates and conditions. In the past BC Hydro has entered into third party storage transactions[14]. Other than for domestic purposes, currently this storage is used to facilitate export sales.

C. Conclusion

The Recommendations must provide for First Nation self-regulated utilities within their traditional territories and any changes to laws and policies necessary to ensure that these utilities provide economic opportunities for First Nations.

All of which is respectfully submitted.

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11 Exhibit C2-6 and C4-10
12 Exhibit C4-10, page 7
13 Exhibit C2-6, page 2

14 BC Hydro 2004/05 and 2005/06 Revenue Requirement Application, Transcript Volume 19, pages 3315-3316

Appendix A

Extract #1 from Nuu-chah-nulth Tribal Council, Cowichan Tribes, Gitanyow First Nation, Homalcow First Nation and B.C. First Nations Clean Energy Working Group's Final Argument dated October 4, 2019

2. Introduction

…The following two passages from the "*Summary of the Final Report of the Truth and Reconciliation Commission of Canada*[15] ("*Truth and Reconciliation Commission*") help frame this Argument as they did the Collective First Nation's original Submission[16]:

> *"Canada denied the right to participate fully in Canadian political, economic and social life to those Aboriginal people who refused to abandon their Aboriginal identity."*
>
> *"In terms of the economy, that means participating in it on their own terms. They want to be part of the decision-making process. They want their communities to benefit if large-scale economic projects come into their territories. They want to establish and develop their own businesses in ways that are compatible with their identity, cultural values and world views as Indigenous peoples."*

In making its recommendations to the Provincial Government the BCUC must be prepared to go beyond its traditional role as a utility regulator and advance reconciliation with First Nations[17]… "

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[15] Pages 2 and 305

[16] Exhibit C13-2, page 1

[17] The term "Indigenous" includes First Nations, Metis and Inuit. The Collective First Nations do not represent Metis and Inuit but for convenience, the terms "Indigenous" and "First Nations" will be used interchangeably in this Argument

Extract #2 from Nuu-chah-nulth Tribal Council, Cowichan Tribes, Gitanyow First Nation, Homalcow First Nation and B.C. First Nations Clean Energy Working Group's Final Argument dated October 4, 2019

2. Economic Opportunity - UNDRIP – Self-Determination

2.1. Clean Energy Economic Opportunity

Since the early 2000's, First Nations have been involved in the clean energy industry in British Columbia. First Nation's participation has ranged from royalty sharing to equity ownership and had plans to develop more energy projects. When BC Hydro indefinitely suspended the Standing Offer Program and the micro standing offer program in February 2019, opportunities for First Nations to sell electricity to BC Hydro were eliminated.

First Nations have been trying to persuade the Provincial Government to provide opportunities in the clean energy industry as set out in the Clean Energy Act objectives[17]:

> *"(l) to foster the development of first nation and rural communities through the use and development of clean or renewable resources*"

First Nation Utilities are an opportunity to create revenue and jobs for their communities and allow these communities to continue to develop capacity in the development and management of clean energy projects.

2.2. UNDRIP

The Provincial Government has also committed to implement UNDRIP and the Calls to Action of the Truth and Reconciliation Commission. This government plans to table legislation this fall with respect to UNDRIP and pass it by the end of this session. As BC Hydro is a Provincial Crown Corporation it must live up to the commitments of its sole shareholder.

In adhering to UNDRIP the Province must allow First Nations to develop their own resources and be in charge of their own development. First Nations want to continue to develop clean energy from the resources in their territories and to be part of an industry that has high environmental standards. Having a First Nations Utility regulated by First Nations is consistent with the following provisions of this declaration[17]:

> *"Article 5*
>
> *Indigenous peoples have the right to maintain and strengthen their distinct political, legal, economic, social and cultural institutions, while retaining their right to participate fully, if they so choose, in the political, economic, social and cultural life of the State.*
>
> *Article 26:*
>
> *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."*

Controlling the lands and resources does not include regulation of Indigenous Utilities by the BCUC.

2.3. Reconciliation

Reconciliation has been embraced by the Provincial Government and Article 3 of UNDRIP states:

> "*Article 3*
>
> *"Indigenous peoples have the right to self-determination. By virtue of that right they freely determine their political status and freely pursue their economic, social and cultural development.*"

The right of self-determination includes the right of First Nations to freely pursue their own social, economic, and cultural development. Policies and programs of the Provincial Government must not prevent First Nations from developing their own projects or utilities.

Self-determination means that First Nations will regulate their own activities. Which they develop in their own way in their own time frame. There should not be oversight of their utilities by another body when First Nations can do so themselves. The time for paternalism is over.

First Nations are economic players in this province. They know business and how to conduct themselves in business. They understand the need to be competitive in pricing. But as responsible governments, they understand the need to have affordable electricity for their members. With high unemployment, and a portion of their members on social assistance, they will make electricity prices reasonable.

Several First Nations have large developments on their reserve, be it industrial parks, residential developments, or malls and developing a utility to serve these commercial and industrial businesses would be a good source of income for them and the need to have competitive prices.

Reconciliation means righting the wrongs of the past. One of those wrongs was to approve the continuation of Site C without even talking to First Nations who would be impacted by cessation of the SOP program. They must find opportunities, and First Nation Utilities that regulate themselves are a good idea.
Reconciliation means working with First Nations to develop resources in their territories by their own standards and laws. It means First Nations pursuing their economic development so they are no longer have the highest unemployment, are the lowest revenue generators and are dependent on the Federal Government.

When the Premier of the Province announced the continuation of Site C he made the following statement about reconciliation and UNDRIP[17]:

"Well our commitments to reconciliation and UNDRIP don't stop in the Peace. They are Province wide. We're working, Scott Fraser who again couldn't be with us today, has an explicit mandate to ensure that he works with his colleagues across Cabinet, across Government to make sure that we're implementing the UN Declaration on the Rights of Indigenous Peoples as well as the Reconciliation Calls to Action from the most recent Truth and Reconciliation Commission, at the federal level. So we're committed to doing that across Government. This element, these issues in the Peace are part and parcel of that."

Appendix B

New Electricity Demand in 2030
Required to Meet B.C.'s Legislated GHG Reduction Target

To meet recently legislated GHG emission reduction levels the demand for renewable electricity is expected to increase significantly in the next two decades.

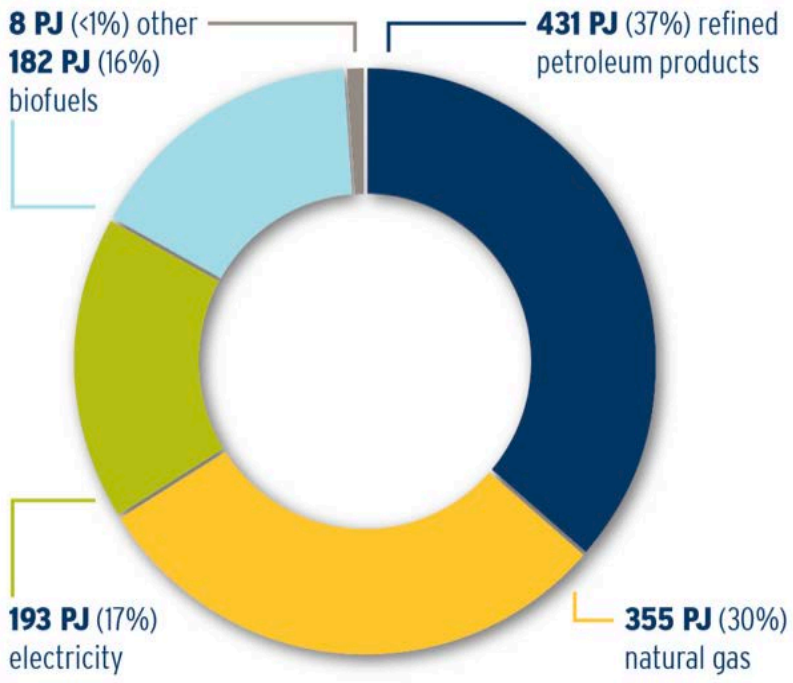
Appendices B and C contain forecasts of the large amounts of new renewable electricity generation required to support the electrification required to meet B.C.'s legislated GHG reduction levels and the CleanBC plan.

Appendix B is a provincial-level energy fuel switching analysis. Appendix C forecasts the new electricity demand for extensive electrification of four sub-sectors of the economy.

Appendix B shows that, by 2030, the amount of new renewable electricity required to meet B.C.'s 40% GHG reduction target, and thereby a 40% reduction in fossil-fuel consumption, could equal, 43,000 GWh which is 80% of the amount of renewable electricity being generated and used today.

The fuels used in B.C. are shown in the figure below published by FortisBC.

BC Energy Demand by Fuel (2019) [1]



Calculations show that replacing 40% of the amount fossil fuels that are currently being used would require 87,400 GWh (314 Peta Joules) of renewable electricity.

If conservation and energy efficiency reduced that by 50% then the amount of new renewable electricity supply required would be 43,700 GWh.

[1] Source: Fortis BC at https://talkingenergy.ca/topic/facts-about-where-bcs-energy-comes

The calculation conservatively assumes that, despite expected population and economic growth over the next 10 years, the total demand for energy will not increase over today's amount of 1,169 PJ.

Conclusion:

By switching 40% of fossil fuel consumption to clean electricity to meet the 40% emission reduction target, the demand for electricity will increase significantly.

Appendix C

Demand Forecast for the electrification of Four Sub-sectors

This Appendix forecasts the new electricity demand for extensive electrification of four Sub-sectors of the economy.

The Sub-sectors are;
1. Electric vehicles,
2. Building heating,
3. Upstream gas production, and
4. Gas transmission pipelines.

The electrification of these four Sub-sectors are illustrative examples of the amount of electricity that would be required to electrify all the many sectors of the economy in order to reach B.C.'s 40% GHG reduction goal by 2030.

The total new electricity demand for these four illustrative Sub-sectors is forecast to be 34,400 GWh.

Analysis, by Sub-sector

1. **Electric Vehicles:**

The University of Victoria Institute for Integrated Energy Systems paper[2] on the GHG and Load Implications of Transportation forecast that the amount of additional electricity required for electric vehicles by 2030 would be 6,554 GWh/year.

The breakdown by Vehicle Class is shown in the table below.

Electrified vehicle Class	Additional Electricity Required (GWh)
Passenger cars	1,185
Pass. light trucks	1,178
Freight light trucks	443
Medium-duty trucks	2,563
Heavy-duty trucks	1,130
School buses	4
Transit vehicles	44
Intercity buses	7
Total	**6,554**

2. **Building Heat Electrification**

Kerr Wood Leidal Ltd. estimated that additional energy required for building heat electrification in B.C. to be 13,921 GWh in 2030.

[2] Curran Crawford, Ph.D. & Julian-Alberto Fernandez-Orjuela, Ph.D, Institute for Integrated Energy Systems, University of Victoria, prepared for the Clean Energy Association of B.C. for its Electrification of BC Whitepaper, issued on October 15, 2018.

This estimation is described in a section of the Clean Energy Association of B.C.'s "*White Paper on Electrification of B.C.*" that was prepared by Ron Monk, P.Eng.[3] That section was based on a report by Kerr Wood Leidal entitled, "*Development of an Electrification Policy Framework for British Columbia*" for the Climate Action Secretariat, Province of British Columbia.

The demand implications of building heat electrification in 2030 factors in existing buildings and the additional new buildings that are likely to exist in 2030. The breakdown by Building Sector is shown below.

Building Sector	*GWh/year*
Residential (1)	2,084
Commercial (2)	11,837
Total	13,921

Note 1 assumes 25 percent of residential homes and multi-family dwellings using air- or ground-source heat pumps in 2030. Note 2 assumes 30 percent of private sector office buildings and retail, wholesale, and warehousing buildings; 15 percent of all other commercial and institutional building stock have been retrofitted with heat pumps by 2030.

3. Upstream Montney Electrification:

In 2030, if 61% of the volume of gas produced is electrified an additional 5,010 GWh/year of electricity will be required.

The data and the calculations are show in the following table which is followed by the sources of the data and assumptions.

Year	*Volume of Gas Produced*	*% Electrified (aka Served)*	*Volume of Gas Electrified*	*Energy Required*	*Additional Energy Required over 2018*
	Data Source A	Data Source B & Assumption C	Data Source A	Conversion Ratio Source D	
	Bcf/day	%	Bcf/day	GWh/yr	GWh/yr
2018	3.711	40%	1.494	1,941	
2030	8.771	61%	5.350	6,951	5,010

The 5,010 GWh/year energy requirement is based on the gas production volume reaching 8.771 Bcf/day in 2030 - as forecast by BC Hydro in the most recent regulatory proceeding.[4]

[3] Ron Monk M.Eng., P.Eng., Principal & Energy Sector Leader at Kerr Wood Leidal Associates Ltd. & Alex Charpentier P.Eng. prepared for the Clean Energy Association of BC's Electrification of B.C. White Paper issued on October 15, 2018.

[4] Data Source A – Gas Production Volumes: From BC Hydro Response to CEABC IR.4.58.1 on December 13, 2019, as part of BC Hydro F2020 – F2021 Revenue Requirement Application. Extracted from Tables 1, 2 and 3.

The calculations assume that is it is possible and practical to electrify 61% of the volume of gas production activities. BC Hydro serves 40% of the Montney volume today.[5] And it forecasts serving 61% of the Dawson Area in 2030.[6] This is very close to the 60% forecast by Steve Davis & Associates Consulting Ltd. in its report GHG Reduction from Electrifying Montney.[7]

The calculations also assume that 1,300 GWh/year of energy are required to electrify one Bcf/day of gas production activities. [8]

Appendix D contains related information on Montney electrification.

4. Gas Transmission Pipeline Electrification:

In 2030, if 90% of the volume of gas produced is moved by electrified compressors on the transmission pipelines an additional 6,871 GWh of electricity will be required.

The data and the calculations are show in the following table which is followed by the sources of the data and assumptions.

Year	*Volume of Gas Produced and Transmitted*	*% of Gas Transmitted by Electric Compressors*	*Volume of Gas Transmitted by Electric Compressors*	*Energy Required for Electric Compressors*	*Additional Energy Required over 2018*
	Data Source A	Assumption B	Data Source A	Conversion Ratio Source C	
	Bcf/day	%	Bcf/day	GWh/yr	GWh/yr
2018	3.711	0%	1.494	0	
2030	8.771	90%	7.894	6,871	6,871

The 6,871 GWh energy requirement is based on the gas production volume reaching 8.771 Bcf/day in 2030 - as forecast by BC Hydro in the most recent regulatory proceeding.[9]

The calculations also assume that is it is possible and practical to use electric compressors to transmit 90% of the volume of gas produced. That is approximately 10% less than the 96 - 99% penetration forecast in the report entitled "*2018 LNG/Upstream Gas Electrification and GHG Reduction*" by Richard Harper M.Eng., P.Eng.[10]

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[5] Data Source B – The 40% Electrification % for 2018 comes from BC Hydro Response to CEABC IR.4.58.1 on December 13, 2019, as part of BC Hydro F20-F21 RRA. Extracted from Tables 1, 2 and 3.

[6] Assumption Source C - The 61% Electrification % forecast for 2030 comes from BC Hydro Response to CEABC IR.4.58.1 on December 13, 2019, as part of BC Hydro F20-F21 RRA. Extracted from Table 1 for the Dawson Area.

[7] GHG Reduction from Electrifying Montney prepared by Steve Davis & Associates Consulting Ltd. for the Clean Energy Association of BC's Electrification of B.C. White Paper issued on October 15, 2018.

[8] Conversion Ratio Source D: 2018 LNG/Upstream Gas Electrification and GHG Reduction prepared by Richard Harper M. Eng., P.Eng. for the Clean Energy Association of BC's Electrification of B.C. White Paper issued on October 15, 2018

[9] Data Source A – Gas Production Volumes: From BC Hydro Response to CEABC IR.4.58.1 on December 13, 2019, as part of BC Hydro F2020 – F2021 Revenue Requirement Application. Extracted from Tables 1, 2 and 3.

[10] Assumption B: Adapted from Mr. Harper's report 2018 LNG/Upstream Gas Electrification and GHG Reduction was prepared for the Clean Energy Association of BC's Electrification of B.C. White Paper issued on October 15, 2018.

The calculations also assume that 870 GWh/year of energy is required by electric compressors to transmit one Bcf/day of gas.[11]

5. Total New Demand by 4 Illustrative Sub-sectors

The total of the above four illustrative Sub-sectors is 32,356 GWh as shown in the following table.

Sub-Sector	*GWh/year*
Electric Vehicles	6,554
Building Heating	13,921
Upstream Gas - Montney	5,010
Gas Transmisson Pipelines	6,871
Sub-total of 4 Sub-sectors	32,356

Extensive electrification of many other sectors of the economy, such as liquified natural gas terminals, mines, cement production, railways, vessels, ports, airports and agriculture, will be required to reach B.C. GHG reduction targets and will further increase the demand for renewable electricity.

Mr. Harper assumed a range of % Reduction from Conventional transmission practice between 96% and 99%. The assumption in this paper is for a penetration of 90% which is purely to err on the side of being conservative.

[11] Conversion Ratio Source C: The 870 is the average of 3 numbers in the Scenario tables in the 2018 LNG/Upstream Gas Electrification and GHG Reduction paper prepared by Richard Harper M. Eng., P.Eng. for the Clean Energy Association of BC's Electrification of B.C. White Paper issued on October 15, 2018.

Appendix D

Un-electrified New Gas Production in the Montney Gas Basin

Electricity data published by BC Hydro on December 13, 2019[12]

An example of an area where new load could be served by First Nation utilities is in north eastern B.C.

The volume of gas production in the Montney gas basin in northeastern B.C. has doubled in the last 10 years. The volume of Montney gas production is forecast to double again over the next dozen years.

In 2017 GHG emissions from gas production made up 17% of B.C.'s total emissions - making it the largest single sectoral emission source in the province. Extensive electrification is required to enable new gas production activities to be powered by grid-supplied renewable electricity rather than by gas-fired generators.

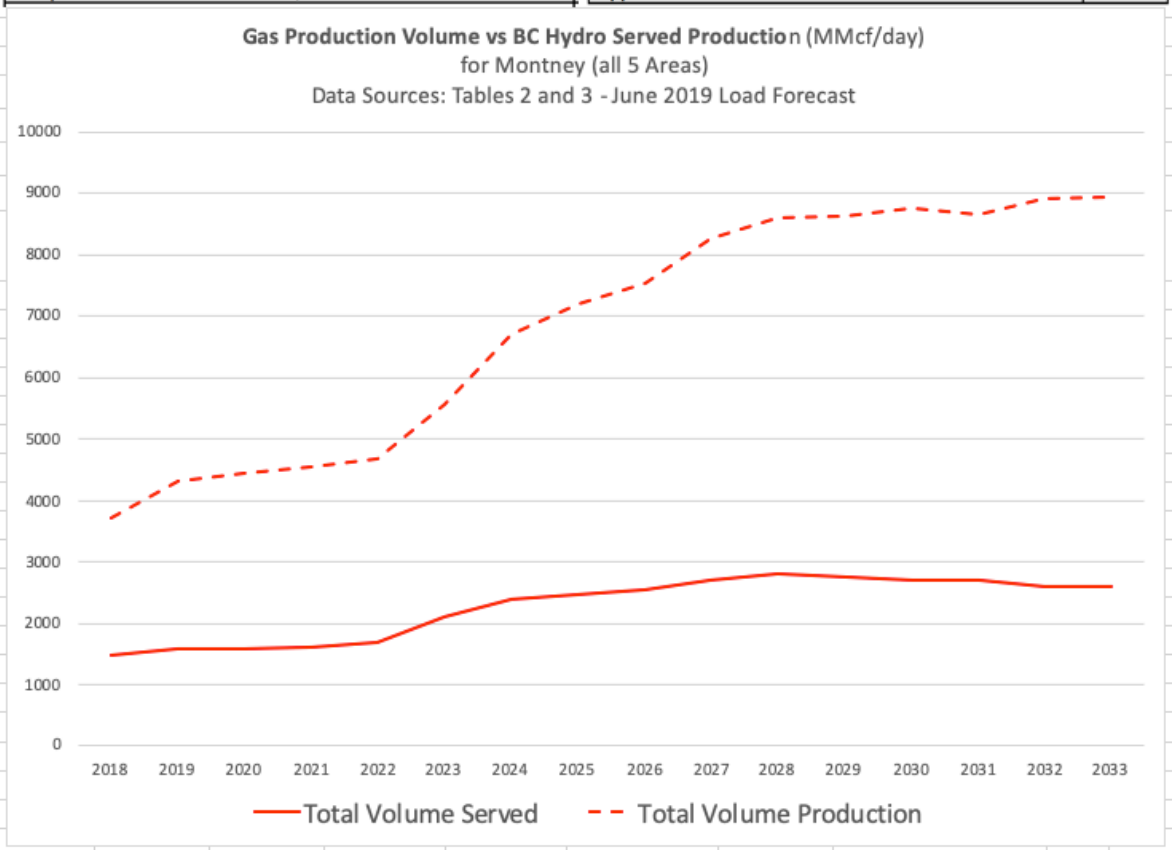
This Appendix quantifies the un-electrified new gas production in the Montney gas basin using recent BC Hydro data. The volume of gas production activities not being served by BC Hydro will almost triple by 2033. While BC Hydro will expand its electrical service in the Montney the percentage of Montney gas volume remaining un-served by BC Hydro will increase from 60% to 70% by 2033. Three of the five sub-basin areas in the Montney will have over than 90% of their gas volume not served by BC Hydro.

Analysis:

The figure below shows that the volume of gas production activities not being served by BC Hydro will almost triple by 2033.

[12] BC Hydro Response to CEABC IR.4.58.1 on December 13, 2019, as part of BC Hydro F2020 – F2021 Revenue Requirement Application. Data extracted from Tables 1, 2 and 3.

Clean Energy Association of B.C. Information Request No. **4.58.1** Dated: **October 30, 2019** British Columbia Hydro & Power Authority Response issued **December 13, 2019**	British Columbia Hydro & Power Authority **Fiscal 2020 to Fiscal 2021 Revenue Requirements Application**	**Exhibit: B-23-3**



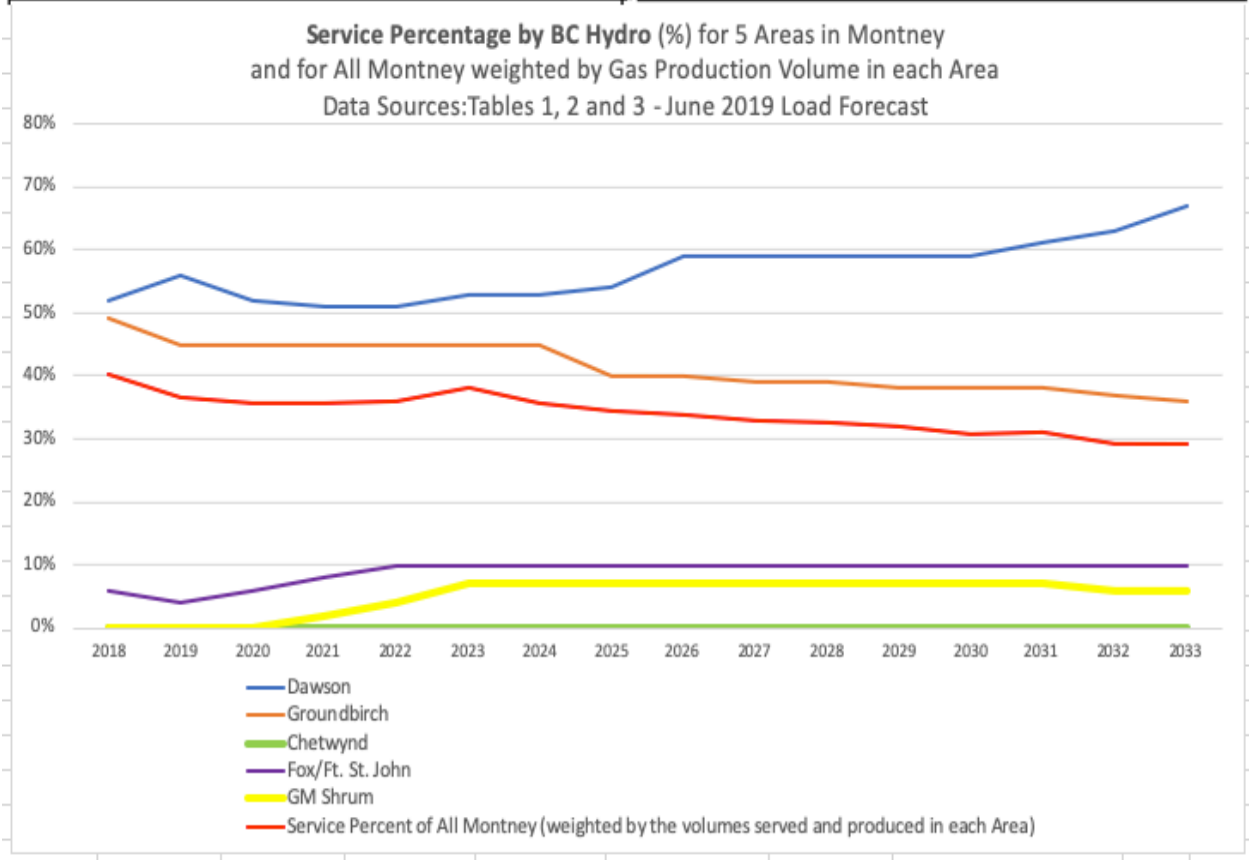
The numbers in the table below are based on the figure above. They shows that the volume of gas production activities not being served by BC Hydro will increase by 4,125 Bcfd, or 286% by 2033

Year	Total Volume Served Bcd/day	Total Volume Production Bcd/day	Total Volume Unserved Bcd/day
2018	1494	3,711	2,217
2033	2600	8,941	6,341
Increase in Unserved Volume (Bcd/day)			4,124
Increase in Unserved Volume (%)			286%

The figure below shows the percentage of All Montney gas volume being served by BC Hydro will drop from 40% to 30% over 15 years.

Three of the five sub-basin areas will have less than 10% of their gas volume served by BC Hydro.

Clean Energy Association of B.C. Information Request No. **4.58.1** Dated: **October 30, 2019** British Columbia Hydro & Power Authority Response issued **December 13, 2019**	British Columbia Hydro & Power Authority **Fiscal 2020 to Fiscal 2021 Revenue Requirements Application**	**Exhibit: B-23-3**



The corollary is that the percentage of All Montney gas volume remaining un-served by BC Hydro will increase from 60% to 70% by 2033.

Three of the five sub-basins areas will have over than 90% of their gas volume not served by BC Hydro.

Aside: The Federal government supports indigenous ownership of transmission lines to electrify the Montney. The recent "*Canada-BC MOU on Electrification of the Natural Gas Sector*[13]" included a pledge to "*Develop and consider new and/or alternative financing models that can advance priority transmission projects, which may include Indigenous or other private sector ownership and participation by the Canada Infrastructure Bank."* Indeed, the MOU's list of eligible projects specifically included the transmission line that would extend into one of the three sub-basin areas, described above, that BC Hydro is planning to leave over 90% unserved.[14]

[13] Memorandum of Understanding between the Government of Canada and the Government of British Columbia on the electrification of the natural gas sector

[14] The North Montney Power Supply project is listed in section 3.a.iii of the Canada-BC MOU on the Electrification of the Natural Gas. It would extend into the area known as the GM Shrum electricity transmission area. This is shown as the yellow line on the second figure in Appendix C.