Recent Developments in Renewable Energy in Remote Aboriginal Communities, British Columbia, Canada

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Hydroelectricity has a long tradition in British Columbia, provides approximately 95% of the province's electricity supply, and powers the electrical systems of several remote aboriginal communities. However, diesel generators remain in 23 remote aboriginal communities and a transition from fossil fuels to renewables is desired. This transition has been promoted through a series of Energy Plans from 2002 and the 2010 Clean Energy Act. One of the goals of the Act is to encourage economic development of First Nation and rural areas through the development of clean and renewable energy projects. The stage of development of these clean energy projects varies among communities and insights can be gained by reviewing progress to date. This paper reviews current community electricity systems, past renewable electricity projects, as well as available renewable resources, generation alternatives, and supportive targets and policies in British Columbia. The results show that two communities recently connected to the newly constructed Northwestern transmission line, and that 15 out of the 23 remote aboriginal communities participate, or plan to participate, in renewable electricity generation to reduce diesel dependence and greenhouse gas emissions, and to increase self-sufficiency.

Keywords: British Columbia, remote aboriginal communities, indigenous communities, diesel, renewable electricity, energy transition, climate action policies

Introduction

Renewable energy (hydroelectricity) has a long tradition in British Columbia and provides approximately 95% of the province's electricity supply. However, the electricity system in 23 remote aboriginal[1] communities was typically based on diesel generators. A transition from fossil fuels to renewables in these communities has been promoted through a series of Energy Plans from 2002 and the 2010 Clean Energy Act. One of the goals of the Act is to encourage economic development of First Nation and rural areas through the development of clean and renewable energy projects (BC Hydro, 2013f). The stage of development of these clean energy projects varies among communities and insights can be gained by reviewing progress to date. Some of the larger communities, serviced by BC Hydro, are powered by hydro-electricity projects owned by communities or Independent Power Producers (IPP). In some cases,

[1]The term aboriginal community is used in this paper. It is recognized that some communities prefer the term indigenous community while others prefer aboriginal community and that both are used in the literature.

communities have completely displaced diesel while achieving socio-economic benefits by having the community own run-of-river hydroelectric plants. The remaining diesel powered communities that independently operate their own systems are participating in hydroelectricity, solar or biomass proposals to reduce greenhouse gas emissions and increase local self-sufficiency. Before reviewing these renewable energy projects, the next sections of this paper will provide an overview of the population served in British Columbia's remote aboriginal communities, the capacity and type of current electricity generation systems, electricity price and rate structures, future demand expectations, renewable resource availability, as well as policies, plans and future projects to support renewable electricity generation in remote aboriginal communities.

Population

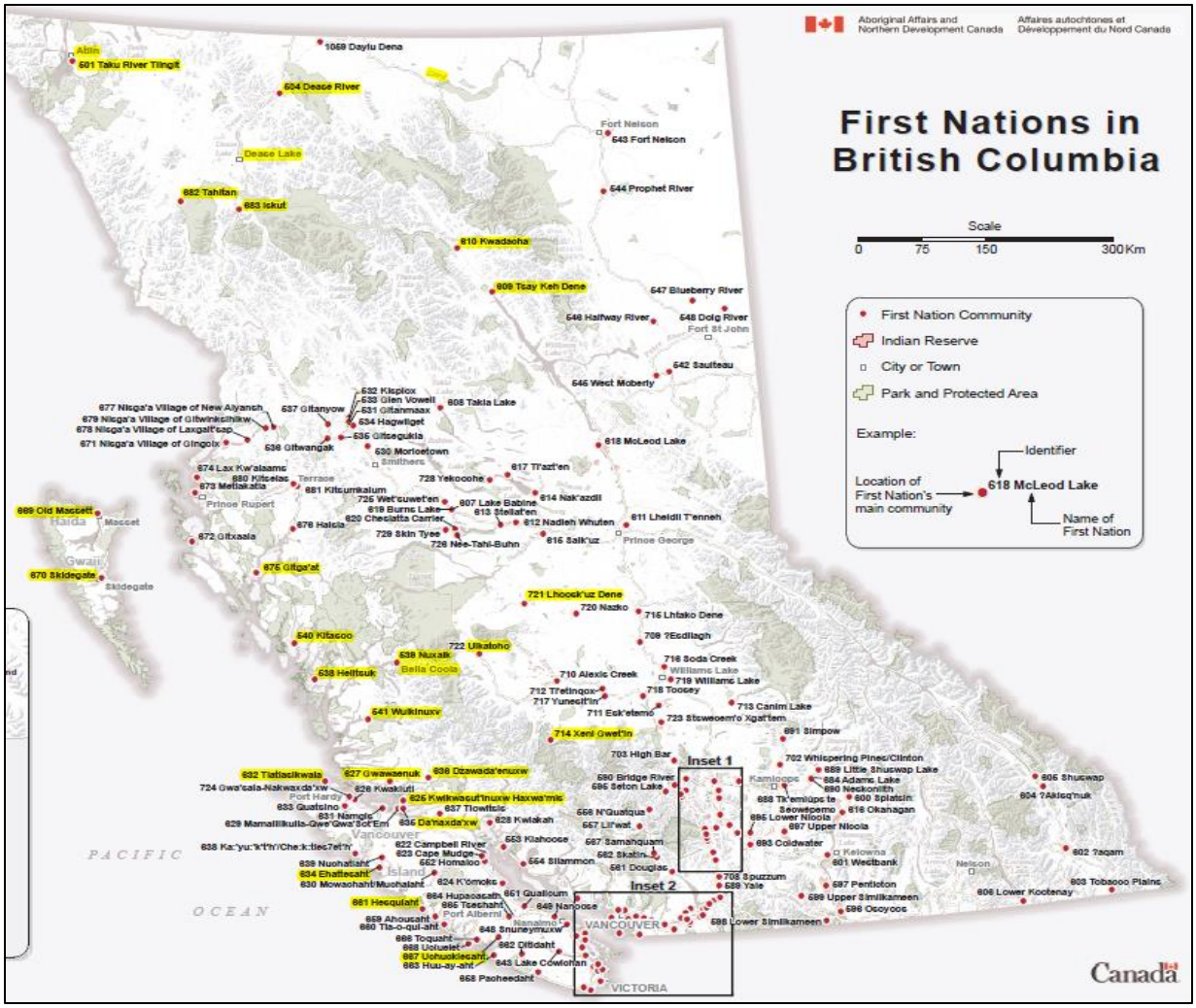
According to AANDC and NRCan (2011) in 2011 there were 86 remote communities in British Columbia (BC) with a total population of approximately 24,000 people, of which 25 were aboriginal communities with a population of approximately 8,000, and 61 were non-aboriginal communities with a population of 16,000 (AANDC and NRCan, 2011). Recent grid connections reduced the number of remote communities to 70 (Inglis, 2012). Of the 23 remote First Nation communities presented in Table 1 and Figure 1 only 12 communities have a population over 100, two communities have a population between 50 and 99 and seven communities have a population lower than 50.

Table 1: British Columbia's non-integrated area serviced and independent aboriginal communities

Nr	Community Name	First Nation name	Popula-tion 2011[2]	Diesel plant capacity kW	Annual energy demand (2011) MWh[3]	Service	
1	Anahim Lake	Ulkatcho FN	355	2,650	4,990	NIA served by BC Hydro- Zone II	Communities with a population larger than 100 people
2	Atlin	Taku River Tlingit FN	322	2,650[4]	4,400		
3	Bella Bella	Heiltsuk FN	1095	8,750	10,147		
4	Bella Coola	Nuxalk Nation FN	850	7,630	17,147		
5	Fort Ware	Kwadacha FN	250	755	n/a		
6	Hartley Bay	Gitga't FN	155[5]	1,000	1,344		
7	Refuge Cove	Hesquiaht FN	80	150	438		
8	Kitasoo	Kitasoo FN	315	250	n/a		
9	Lower Post (Liard River)	Liard FN	102	995	n/a		
10	Masset (Old Masset)	Haida Nation	607	11,524	24,275		
11	Nemiah Valley (Chilco Lake and Lohbiee)	Xeni Gwet'in FN	148	305	1,279		
12	Skidegate Landing	Haida Nation	781	No data	No data		
13	Finlay River	Tsay Keh Dene FN	105	500	No data		
14	Elhlateese	Uchucklesaht FN	19	125	255		
15	Sim Creek- Dead Point	Da'nawda'xw FN	20[6]	No data	No data	Independent	Communities with a population less than 100 people
16	Chenahkint	Ehattesaht	70	50	No data		
17	Good Hope Lake	Dease River	32	1,230	613		
18	Hopetown	Gwawaenuk Tribe-/Kwa-wa-aineuk	14	40	No data		
19	Sundayman's Meadow	Kluskus- Lhoosk'uz Dene FN	32[7]	20	260		
20	Gwayasdums	Kwicksutaineuk-ah-kwaw-ah-mish-Haxwa'mis FN	50	225	No data		
21	Katit	Oweekeno-Wuikinuxv FN	65	1,050	1,168		
22	Hope Island	Tlatlasikwala	29	70	No data		
23	Quaee	Tsawataineuk - Dzawada'enuxw FN	90	900	1,208		
	Total		**5,586**	**40,869**	**67,524**		

[2] http://pse5-esd5.aadnc-aandc.gc.ca/fnp/Main/Search/FNPopulation.aspx?BAND_NUMBER=540&lang=eng
[3] According to AANDC and NRCan (2011), unless otherwise noticed.
[4] The Atlin community is currently powered by hydroelectricity.
[5] Census population in 2006.
[6] Registered population in December 2015.
[7] AANDC and NRCan (2011) based on the 2006 census.

Figure 1: Map of remote aboriginal community locations, British Columbia



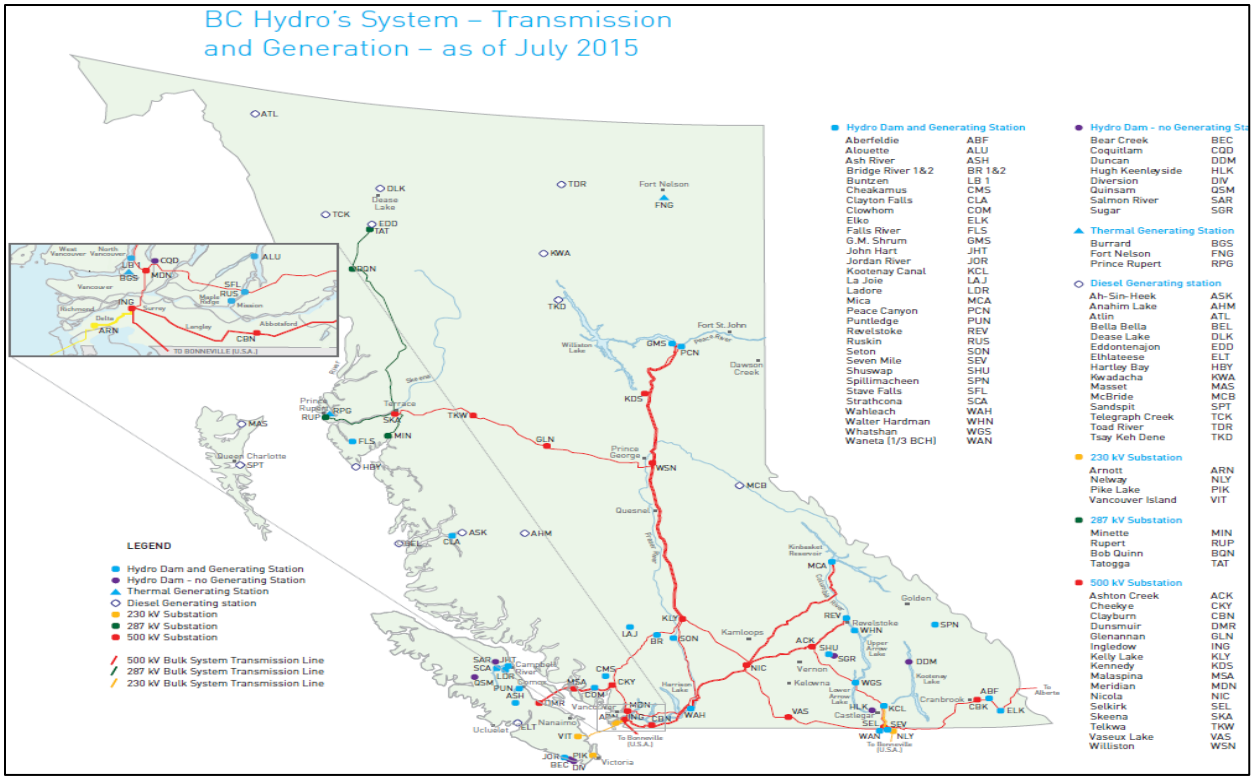
Source: AANDC and NRCan (2011); AANDC (2016)[8].

Electricity system

British Columbia's electrical system is part of the North American western interconnected electricity system, with BC Hydro providing power to 1.9 million customers, or approximately 95 percent of the population, through 31 hydroelectric plants and three thermal plants, with a total capacity of 12,000 MW (BC Hydro, 2013a; BC Hydro, 2014). Renewable electricity from BC Hydro's hydroelectric plants and from Independent Power Producers' (IPPs) owned hydroelectric generation projects meet approximately 95% of the electricity demand, with the remaining electricity generated using natural gas and other renewables (BC Hydro, 2014; OPC, 2010). British Columbia's transmission and generation system is presented in Figure 2.

Figure 2: BC Hydro's generation and transmission system, July 2015.

[8] See https://www.aadnc-aandc.gc.ca/eng/1100100021015/1100100021021

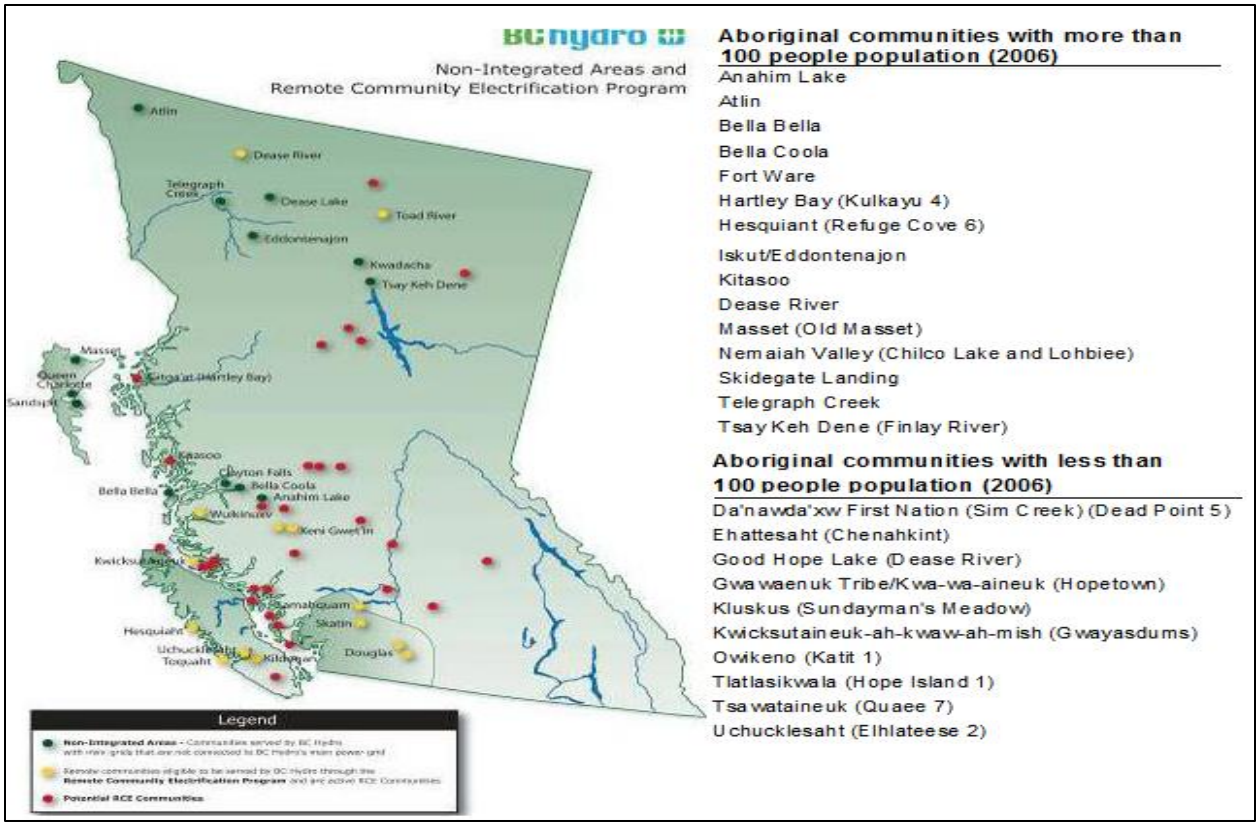


Source: https://www.bchydro.com/content/dam/BCHydro/customer-portal/documents/corporate/accountability-reports/financial-reports/annual-reports/bch-system-map-Jul-2015.pdf.

In 2012 British Columbia used 57,000 GWh of electricity, of which 10,900 GWh were produced by IPPs. Approximately 25% of the IPPs contribution was hydro generation, and this is forecast to increase over the next 20 years to approximately 25% of the total supply (BC Hydro, 2014; BC Hydro, 2012b; BCBC, 2013). Due to its hydroelectricity generation assets, the total emissions for electricity generation were 631,000 tonnes $CO_{2,eq}$ in 2012 and 730,000 tonnes $CO_{2,eq}$ in 2013, leading to average emission intensities of 18.5 tonnes $CO_{2,eq}$/ GWh (or 18 gr $CO_{2,eq}$/ kWh) (BC Hydro, 2014; BC Hydro, 2015c).

Most of British Columbia's communities are connected to the main grid within the integrated electrification area. The communities that are not connected to the main grid are either within BC Hydro's non-integrated area or outside it. Within the non-integrated area, BC Hydro either owns the electricity generation assets or buys electricity from IPPs and resells the electricity to the communities at similar rates to those in the integrated areas. Remote communities outside the non-integrated area may receive services from BC Hydro through the Remote Community Electrification (RCE) Program, or they may choose to operate their own electricity systems (BC Hydro, 2015a; ISIS, 2011). The remote aboriginal communities in the non-integrated area, the communities that are part of the RCE program, as well as the communities that could participate in the RCE program in the future are presented in Figure 3.

Figure 3: Remote aboriginal communities by type of BC Hydro program

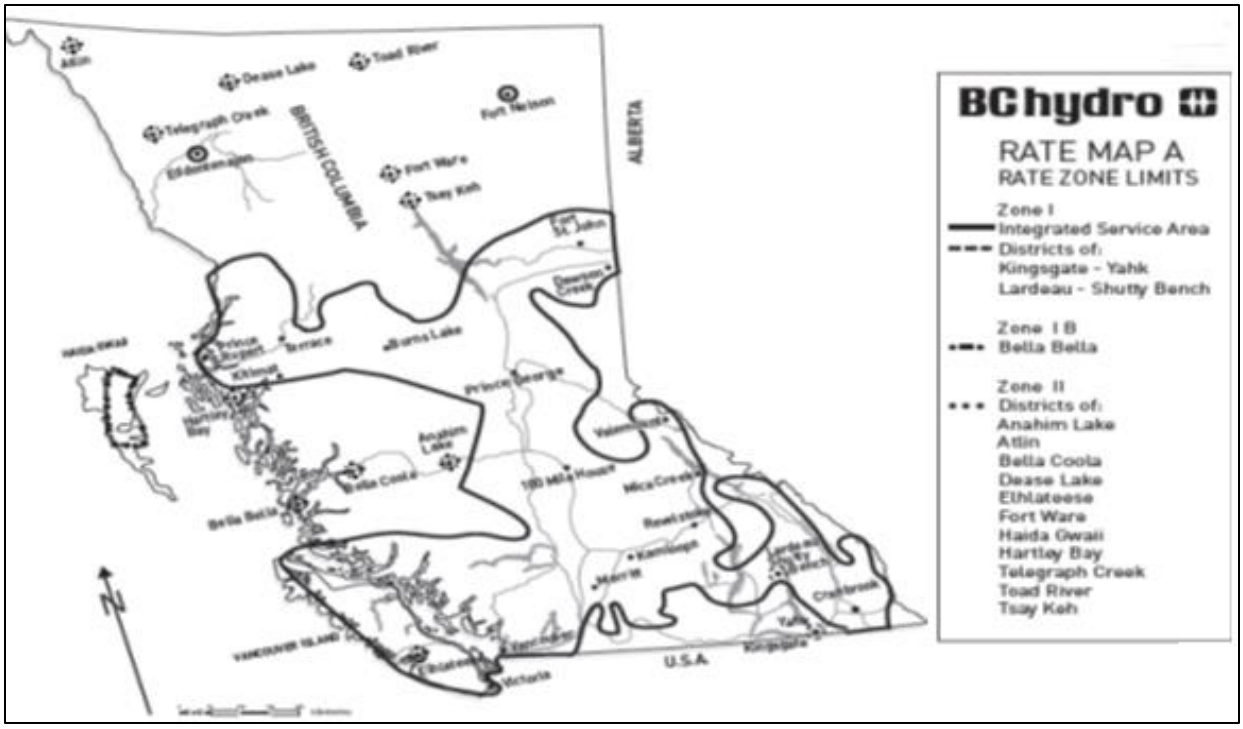


Source: Modified from BC Hydro (2010, p.4); AANDC and NRCan (2011).

Within the non-integrated area there are four local grids that are served by hydroelectricity and diesel generators, namely the Bella Bella and Bella Coola local grids in mainland BC, and the Masset and Sandspit local grids in Haida Gwaii. The Bella Coola grid provides electricity to approximately 2,000 people. It is powered by diesel generators established in 1955 in the Ah-Sin-Heek station and hydroelectricity through the Clayton Falls[9] run-of-river facility built in 1962 and updated to 2 MW in 1991 (BC Hydro, 2016a). The Bella Bella communities of Waglisla (home of the Heiltsuk First Nation) and Shearwater receive their electricity from the Central Coast Power Corporation (CCPC). The IPP provides electricity - to the Bella Bella non-integrated area that is generated mainly by the Ocean Falls hydroelectricity plant, while the diesel plants in Shearwater provide approximately 1% of the communities' annual electricity demand (BC Hydro , 2007). In Haida Gwaii, BC Hydro provides electricity through the northern grid that serves Old Masset, Masset and Port Clements using a diesel generating facility in Masset. The southern grid serves Skidegate, Queen Charlotte City, Tlell and Sandspit and receives power from the private 6 MW hydroelectric plant in Queen Charlotte with a backup BC Hydro diesel generation station available in Sandspit (BC Hydro, 2012a).

Figure 4: British Columbia's electricity rate system zones

[9] https://www.bchydro.com/community/recreation_areas/clayton_falls_recreation_site.html



Source: BC Hydro (2015b, p. 50).

Electricity rates

Electricity rates in British Columbia are set through a public hearing process and, despite recent increases (9% in 2014 and 6% in 2015), are some of the lowest electricity rates in Canada (OPC, 2010, p. 32), as a result of the large hydroelectric facilities on the Peace and Columbia rivers (OPC, 2010; BC Hydro, 2015d). As the original BC electrical system (consisting of diesel generators and hydroelectric plants) transformed to the integrated BC system with Zone I rates, the communities outside the system formed the non-integrated areas with the Zone II rate system, which include the districts of Anahim Lake, Atlin, Bella Coola, Dease Lake, Elhlateese, Fort Ware, Haida Gwaii, Hartley Bay, Telegraph Creek, Toad River and Tsay Keh (Figure 4), while a number of smaller aboriginal communities are served by IPPs or community energy systems (see Table 1).

In BC Hydro's non-integrated area serviced remote communities under Zone II rates, residential customers pay similar rates to residential customers under Zone I (9.55 c/kWh in comparison to 7.97 c/kWh) for the first 1,500 kWh/month, while for consumption beyond 1,500 kWh/month a higher rate is charged to discourage electric space heating from diesel-generated electricity (Table 2) (BC Hydro, 2015b). Small general service customers and general service customers in Zone II also pay similar rates to Zone I. According to BC Hydro (2015b) very few residential

customers under Zone II exceed the 1,500 kWh /month threshold, therefore electricity costs are comparable between Zone I and Zone II residential customers[10].

Table 2: Residential rates for Zone I and Zone II communities

2016 Rates	Residential Zone I RIB Rate (RS 1101)	Residential Zone II Rate (RS 1101)
Base Charge/day (cents)	17.64	18.82
Consumption threshold (kWh/month)	675	1500
Rate for consumption below threshold (c/kWh)	7.97	9.55
Rate for consumption above threshold (c/kWh)	11.97	16.41

Source: BC Hydro (2015b p. 22).

Since the total cost for the generation of electricity in the non-integrated area zones is higher than the revenue generated, the non-integrated area customers are subsidized by the ratepayers of Zone I. In 2014 under-recovered costs in Zone II equalled approximately $31.5 million and are forecasted to increase to approximately $34 million in 2015 and $35 million in 2016 (BC Hydro, 2015b).

Future power requirements and plans

BC hydro forecasts an electricity demand growth of 23,000 GWh, or more than 40% of the current (2012) 57,000 GWh, over the next 20 years, due to increasing population, residential demand, economic activity and mining and liquefied natural gas developments (BC Hydro, 2013a). BC Hydro's Integrated Resource Plan under the Clean Energy Act of 2010[11], addressed future demand through a combination of conservation measures, supply from major projects (such as the Site C on the Peace River), and supply from smaller renewable (biomass, run-of-river hydro and wind) projects. These projects are to be developed in cooperation with Independent Power Producers (IPP), who currently operate 81 clean and renewable power generation plants that are funded through Electricity Purchase Agreements providing about 20% of the BC Hydro's electricity (BC Hydro, 2013a; BC Hydro, 2013b).

Electricity demand in BC Hydro's non-integrated area's thirteen remote communities represented approximately 0.2% of BC Hydro's total, or 103 GWh in 2012. Demand grew at an average of 0.4% per year over the last four years and is forecast to increase by 2%, 1.2% and 0.7% annually over the next 5, 11 and 21 years due to anticipated growth in residential and commercial consumers (BC Hydro, 2012b). There are no available data on forecast future electricity demand for the ten smaller independent aboriginal communities. In 2014 the communities of Eddontenajon and Telegraph Creek were connected to the provincial grid by the newly constructed Northwestern Transmission line (BC Hydro, 2016b; RWB, 2011).

Availability of renewable energy sources in British Columbia

[10] https://www.bchydro.com/accounts-billing/rates-energy-use/electricity-rates/residential-rates.html https://www.bchydro.com/about/planning_regulatory/2015-rate-design/resources.html#2015rda
[11] http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/00_10022_01#section3

The identified potential of BC's renewable resources allows for successful demand coverage, as well as the achievement of provincial objectives of self-sufficiency, support for clean energy and economic development, and reduced greenhouse gas emissions (BC Hydro, 2014). The 2013 Resource Options Report assessed demand-side management options and resource options for generation and transmission for the next 20-30 years and identified solutions consistent with the 2010 Clean Energy Act (BC Hydro, 2013b). Options included biomass, wind, geothermal, run-of river, combined cycle gas turbine and cogeneration, as well as limited capacity from wave, tidal, and solar resources (BC Hydro, 2013c).

A complete list of available renewable energy options for the province is provided in BC Hydro (2013e) and OPC (2009). Supply options include 4,271 MW of onshore wind, 3,819 MW of offshore wind, 1,189 MW of run-of-river, and 1,100 MW from Site C, with costs ranging from 8 c/kWh to 1.17 $/kWh (BC Hydro, 2013c). Evaluation of the available renewable energy options included, besides impacts on provincial GDP, revenues, and employment from construction and operations (BC Hydro, 2013e), future potential electricity purchase agreements for IPPs, which are tied to specific impact benefit agreements signed with First Nation communities, therefore supporting aboriginal economic development (BC Hydro, 2013d). For example, bioenergy electricity purchase agreements have broad economic benefits for forestry and transportation besides construction and operation of facilities (BC Hydro, 2013d, p. 17).

Renewable energy policies and promotion

During the 2002-2012 period, British Columbia emphasized a shift towards clean energy through the introduction of the 2002 Energy Plan, the 2007 Energy Plan, and the 2010 Clean Energy Act. First, the 2002 Energy Plan introduced the private sector and IPPs for development of new electricity generation, with BC Hydro undertaking "improvements of existing plants" and the development of Site C (GBC, 2002, p. 9; BC Hydro, 2013f). Second, the 2007 Energy Plan proposed a policy framework promoting energy self-sufficiency, 90% renewable energy electricity generation and the creation of a market for renewable energy through a Standing Offer Program (OPC, 2010; BC Hydro, 2013f; GBC, 2007). Alternative energy policies were established through the Innovative Clean Energy Fund for the promotion of renewable energy technologies, the creation of a provincial bioenergy strategy, and the support of renewable fuels and hydrogen and fuel cell technologies[12]. Finally, the 2010 Clean Energy Act (CEA)[13] introduced British Columbia's 16 energy objectives, including the goals of generating 93% of electricity from "*clean or renewable resources and to build the infrastructure necessary to transmit that electricity*"[14], reducing GHG emissions in communities, introducing conservation measures, and encouraging economic development of First Nation and rural areas through the development of clean and renewable energy projects (BC Hydro, 2013f). Since the Energy Plan

[12] http://www2.gov.bc.ca/gov/content/industry/electricity-alternative-energy/innovative-clean-energy-solutions/innovative-clean-energy-ice-fund
[13] http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/00_10022_01#section3
[14] http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/00_10022_01#section3

2002 there have been eight power acquisition processes and a number of bilateral agreements for the creation of a renewable energy market, presented in Table 3, resulting in 87 electricity purchase agreements, of which 41 are in operation representing 5,300 GWh/year and 46 projects representing an additional 7,100 GWh/year are in the development stage (BC Hydro, 2013f) (BC Hydro, 2010).

The 2010 CEA also gave the ability to BC Hydro to implement feed-in-tariffs for specific renewable energy technologies[15] and provided for the creation of the First Nations Clean Energy Business Fund (FNCEBF). The FNCEBF promotes aboriginal community participation in the clean energy sector within their asserted traditional territories and treaty areas. The fund provides (a) revenue sharing agreements with First Nations where there are provincial water and/or land rentals from renewable energy projects undertaken in their territory, (b) capacity funding for the implementation of project feasibility studies and financial analysis of potential projects, community energy planning or engaging with project proponents, and (c) funding for financially viable renewable energy projects through an electricity purchase agreement.

Table 3: BC Hydro power acquisition processes since 2002

Acquisition process	Launch date
Green Power Generation Call	October 2002
F2006 Open Call for Power	December 2005
Standing Offer program (SOP)	April 2008
Bioenergy Phase 1 Call, Request For Proposals	February 2008
Clean Power Call	June 2008
Integrated Power Offer	Mid-2009
Community-Based Biomass Power Call Request for Expressions of Interest	April 2010
Bioenergy Phase 2 Call Request For Proposals	May 2010
Bilateral Agreements (e.g. Forest Kerr, Waneta Expansion)	Various

Source: BC Hydro (2013f, p. 4).

The development of clean and renewable energy projects by British Columbia's remote and grid connected aboriginal communities is supported by regional, provincial and federal programs, as well as programs for non-governmental organizations and programs specifically tailored to assist First Nation communities[16].

At the federal level, the Aboriginal and Northern Climate Change Program (ANCCP), the Aboriginal and Northern Community Action Program (ANCAP), the ecoENERGY for Aboriginal and Northern Communities Program (EANCP) and the Climate Change Adaptation Program (CCAP) covered both remote and on-grid aboriginal communities and provided funding for project's initial costs, community energy planning and capacity building (AANDC, 2014d). Aboriginal Affairs and Northern Development Canada (AANDC) and Aboriginal Business

[15] http://www.pembina.org/reports/pembina-assessment-of-the-clean-energy-act-final.pdf

[16] See "Support Program Guide for First Nation & Civic Community Energy Efficiency & Clean Energy Projects, updated May 2015" in http://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/electricity-alternative-energy/community_energy_funding_and_support_guide_-_update.pdf.

Canada (ABC) delivered the Aboriginal Business & Entrepreneurship Development (ABED) program that aimed to support both individuals and community related projects[17].

At the regional level, the Remote Community Implementation (RCI) program, which ran until March 2013, provided funding related to renewable energy[18] for both aboriginal and non-aboriginal remote communities. Finally, at the utility level, the Remote Community Electrification Program[19], established by BC Hydro in 2005, supported the electrification of the independent remote communities by BC Hydro. The program prioritized the inclusion of renewables in the communities' electricity mix and provided different financing options for community participation (BC Hydro, 2015a; BC Hydro, 2010)[20].

Renewable electricity generation in remote communities

The 23 remote aboriginal communities in British Columbia are powered by local diesel generators and hydroelectricity. There are approximately 41 MW of installed diesel capacity, which generated approximately 67,500 MWh in 2011, consumed 18,750,000 liters/year of diesel fuel, and contributed 54,000 tonnes $CO_{2,eq}$/year in $CO_{2,eq}$ emissions[21] (Table 1).

Hydroelectricity generation in remote aboriginal communities has a total capacity of 29.2 MW (Table 4) and nine of the 23 remote aboriginal communities are involved in renewable electricity generation. The electrical systems of Atlin, Bella Bella, Bella Coola, Kitasoo and Skidegate Landing are powered by a total of 26 MW of hydroelectric plants backed up by diesel generators. The remote communities of Atlin and Kitasoo completely displaced diesel through community owned small run-off-river plants and increased economic benefits through employment during construction and operations, subcontracting opportunities, and revenue generation to be used for further community business investment (Kirby, 2009). The Taku River Tlingit FN's Pine Creek (Atlin) project exports excess electricity (Morrin, 2016; Kirby, 2009), while the Kitasoo FN hydro plant powers the community owned seafood production facility that employs most of the community members (Sisco & Stewart, 2009). A solar-diesel minigrid was developed in Nemiah Valley in 2007 that displaces 26,000 liters of diesel annually (or 25% of the electricity generated) (Pelland, Turcotte, Colgate, & Swingler, 2012). The installation of a smart grid in Hartley Bay in 2008 led to the reconfiguration of the diesel engine dispatch strategies and displaces 77,000 litres of diesel fuel annually (NRCan, 2016). Finally, a hybrid hydro-hydrogen-storage system was installed in Bella Coola in 2010 to store excess energy generated, reduce diesel consumption by 200,000 litres, and cut down emissions by 600 tonnes $CO_{2,eq}$ annually (Fuel Cells Bulletin, 2010).

[17] https://www.aadnc-aandc.gc.ca/eng/1100100032796/1100100032800
[18] http://www.fraserbasin.bc.ca/ccaq_rci.html.
[19] https://www.bchydro.com/energy-in-bc/our_system/remote_community_electrification.html
[20] The threshold for a community's consideration under BC Hydro's Remote Community Electrification (RCE) program is a community with at least ten residences (Inglis, 2012).
[21] Assuming an average efficiency rate of 3.6 kWh/litre for the diesel engines and an average of 0.00080 tonnes $CO_{2,eq}$/kWh, for direct carbon emissions (emissions resulting from diesel and natural gas combustion only). See HORCI (2012).

Future projects include a 3.4 MW extension of the Atlin project (Morin, 2015), and hydroelectricity plants for five communities (Masset, Lower Post, Hesquiant, Oweekeno, and Elhlateese). A 28 kW solar plant is planned for Kitasoo, while a wood based biomass powered plant is considered for the community of Anahim Lake (see Table 4).

Remote communities may also connect to the provincial grid and end their remote classification as they gain access to much larger supply systems. The cooperation of aboriginal communities, hydroelectricity developers and BC Hydro led to the development of the Northwest Transmission line in 2014, which provided electricity for eleven potential mining projects from newly constructed hydroelectricity projects in the area, connected the remote communities of Eddontenajon and Telegraph Creek, and led to the generation of socioeconomic benefits for the Tahltan First Nation (RWB, 2011; BC Hydro, 2016b). According to the Tahltan Central Council, the impact benefit agreement signed with Alta Gas with respect to the Forrest Kerr Hydroelectric Project[22] includes contracting, training and employment opportunities during construction and operation of the project, and financial benefits of $1.8 billion over the projected life of the project (RWB, 2011, p. 3).

Table 4: Renewable electricity projects in remote communities, British Columbia

Community	Other	Hydro MW	Wind kW	Solar kW	Year	Source
Existing projects						

[22] The Forest Kerr Project received a 60-year electricity purchase agreement from BC Hydro, see http://www.farris.com/images/uploads/BAN__ALH_-_2010_-_Tahtlan_Nation_Sign_Precedent.pdf.

1	Anahim Lake					
2	Atlin		2.1		2009	Kirby (2009)
3	Bella Bella		15		1980	OPC (2009); BC Hydro(2007)
4	Bella Coola	Hydrogen	2		1992	Fuel Cells Bulletin (2010)
5	Fort Ware					See[23]
6	Hartley Bay	DRS			2008	NRCan (2016)
7	Refuge Cove					
8	Kitasoo		1.1		2006	GEA (2016)
9	Lower Post (Liard River)					
10	Masset (Old Masset)					
11	Nemiah Valley			28	2007	Pelland, et al.(2012)
12	Skidegate Landing		6		1992	Ah-You & Leng (1999)
13	Finlay River			Solar	2011	See[24]
14	Elhlateese					
15	Sim Creek- Dead Point					
16	Chenahkint					
17	Good Hope Lake		3		1997	Ah-You & Leng (1999)
18	Hopetown					
19	Sundayman's Meadow					
20	Gwayasdums					
21	Katit					
22	Hope Island					
23	Quaee					
	Total		**29.2**	**28**		
Proposed projects						
1	Atlin		3.4			Morin (2015)
2	Elhlateese		1			See[25]
3	Kitasoo			28	See	See[26]
4	Masset (Old Masset)					See[27]
5	Katit (Oweekeno)					See[28]
6	Annahim Lake					See[29]
7	Refuge Cove (Hesquiaht FN)					See[30]
8	Lower Post (Liard River)					See[31]
	Total		**4.4**	**28**		

Conclusion

Remote aboriginal communities in British Columbia are undergoing an energy transition from diesel generation to low-carbon renewable sources of electricity. The transition is being achieved

[23] https://www.ceaa-acee.gc.ca/050/documents_staticpost/63919/85328/Vol5_Appendix-Kwadacha.pdf
[24] Solar powered airfield.
[25] https://www.bchydro.com/content/dam/hydro/medialib/internet/documents/community/aboriginal/Elhlateese_bch_service.pdf.
[26] http://nationtalk.ca/story/bullfrog-power-and-b-c-s-kitasooxaixais-first-nation-partner-on-school-solar-project
[27] http://www.canadianenergylawblog.com/2013/03/12/bc-hydro-launches-the-haida-gwaii-request-for-expressions-of-interest-rfeoi/
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[30] http://www.firstpowercanada.ca/files/HesquiahtBrochure.pdf
[31] http://www.kaskadenacouncil.com/kaska-nations/dease-river-first-nation/44-kaska-dena/213-dease-river-development-corporation

through grid expansion and local hydroelectricity, solar and biomass projects. The remote communities of Eddontenajon and Telegraph Creek were recently connected to the provincial grid and benefit from large hydroelectricity generation within their territories. Nine remote communities are involved in large and small hydro projects within the non-integrated areas and generate and sell electricity to BC Hydro. One community plans to expand its hydroelectric plant and five remote communities are considering new community owned hydroelectricity generation. Two more communities are planning a solar photovoltaic project and a biomass based power plant, increasing the number of communities that will be using renewable resources for electricity generation to 15 out of the 23 remote aboriginal communities. The communities' transition from diesel generated electricity to renewable resources is promoted through provincial targets and programs, and financially supported by IPP policies and electricity purchase agreements, in cooperation with BC Hydro, so that both communities within the non-integrated areas and independent communities can own renewable electricity assets, reduce their dependence on diesel and increase community revenues.

Acknowledgements

The authors wish to acknowledge the financial and in-kind support of Natural Resources Canada's ecoENERGY Innovation Initiative, Hatch, Hydro One Remote Communities, Kasabonika Lake First Nation, Energy Council of Canada, and the Faculty of Environment. Valuable work on related topics by graduate students and other members of the Sustainable Energy Policy group in the Faculty of Environment at the University of Waterloo also helped to inform thinking in this area. The authors are grateful for this support; they, however, remain solely responsible for the contents of this article.

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