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Status of Remote/Off-Grid Communities in Canada

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1. Context of Study

This report aims to provide a snapshot of the most up-to-date information on electricity production and consumption in off-grid/remote communities in Canada. This information has been provided by federal, provincial and territorial regional officers working closely with remote communities in Canada and from Statistic Canada surveys.

Information on energy production and uses in remote communities was originally collected and summarized in a report by Sigma Engineering in 1985 for Natural Resources Canada (NRCan)¹. This report was then updated by CanmetENERGY-Varenes for the RETScreen program in 1999². RETScreen is a software program aimed to evaluate wind energy, small hydro, photovoltaic and biomass potential for electricity and heating production. It is used at the pre-feasibility level analysis stage of energy project developments in remote communities. The information collected for the program while not readily available to the general public has been used by different departments to assess electricity use in remote communities.

In 2009, a national off-grid subcommittee working group was created under the co-chairmanship of Aboriginal Affairs and Northern Development Canada (AANDC)'s Environment and Renewable Resources and NRCan's CanmetENERGY-Varenes to update this data and make it more readily available for analysis by AANDC and NRCan officers. The resulting Excel spreadsheet, shown in Annex A, has been reviewed and standardized so as to make it easily accessible through a new database and reporting format.

The current report provides a succinct analysis of the current data available. A cursory look at the spreadsheet in Annex A shows that there is still a lot of information missing from a majority of communities. Nonetheless, information that is available does provide a good overview of electricity production and consumption in off-grid remote communities of Canada. Furthermore, within this overview, regional analysis has been provided to inform the user of characteristics that are typical of each region, how electricity is used and what information is currently available.

From this work, a new database is being created that will permit regional officers and selected individuals to input additional information for each community. It is the intent that this information will then be available to the public on the internet so that energy information on all remote communities in Canada can be readily updated and accessible to all. A description of the database and how it is intended to be used is provided in Annex B.

The terms "off-grid community" and "remote community" are used interchangeably within the context of this report for communities that fulfill the following criteria³:

1. Any community not currently connected to the North-American electrical grid nor to the piped natural gas network; and
2. Is a permanent or long-term (5 years or more) settlement with at least 10 dwellings.

The North-American electrical grid is further defined in the Canadian context as any provincial grid under the jurisdiction of the North American Electric Reliability Corporation (NERC) and including the Newfoundland and Labrador main grid but excluding all territorial grids and provincial local grids.

¹ Energy Overview of Canada's Remote Communities, Sigma Engineering Ltd, 1985

² RETScreen Report on Canadian Remote Communities, CANMET-Varenes - Natural Resources Canada, 1999

³ Adapted from Sigma and RETScreen reports

2. Overview of Canada's Remote Communities

General Information

Using the above defined criteria, there are currently 292 Canadian remote communities with a total population of approximately 194,281 people (2006 Statistics Canada Census) in Canada. These communities include Aboriginal and non-Aboriginal settlements, villages or cities as well as long-term commercial outposts and camps for mining, fishing and forestry activities.

Of these, 170 sites are identified as Aboriginal communities (First Nations, Innu, Inuit or Métis) with approximately 126,861 people living in these sites. The remaining 122 communities are cities, villages or commercial outposts that are predominately non-Aboriginals or under non-Aboriginal governments, with approximately 67,420 people living in them.

Table 2.1: Number of Remote Communities in Canada and Population⁴

Province or Territory	Type	# Sites	Population
British Columbia (BC)		86	24 068
	<i>Aboriginal</i>	25	7 619
	<i>Non-Aboriginal</i>	61	16 449
Alberta (AB)		2	533
	<i>Aboriginal</i>	0	0
	<i>Non-Aboriginal</i>	2	533
Manitoba (MB)		7	3 063
	<i>Aboriginal</i>	4	2 160
	<i>Non-Aboriginal</i>	3	903
Saskatchewan (SK)		1	57
	<i>Aboriginal</i>	1	57
	<i>Non-Aboriginal</i>	0	0
Ontario (ON)		38	21 342
	<i>Aboriginal</i>	25	14 236
	<i>Non-Aboriginal</i>	13	7 106
Quebec (QC)		44	34 729
	<i>Aboriginal</i>	19	15 452
	<i>Non-Aboriginal</i>	25	19 277
Newfoundland and Labrador (NL)		28	8,910
	<i>Aboriginal</i>	16	5 634
	<i>Non-Aboriginal</i>	12	3 276
Yukon (YT)		22	30 176
	<i>Aboriginal</i>	21	29 840
	<i>Non-Aboriginal</i>	1	336
Northwest Territories (NT)		38	41 950
	<i>Aboriginal</i>	33	22 410
	<i>Non-Aboriginal</i>	5	19 540
Nunavut (NU)		26	29 453
	<i>Aboriginal</i>	26	29 453
	<i>Non-Aboriginal</i>	0	0
Grand Total		292	194 281

⁴ Population figures were obtained from Statistics Canada 2006 Census as reported by the off-grid subcommittee working group.: <http://www12.statcan.gc.ca/census-recensement/2006/rt-td/ap-pa-eng.cfm>

Province or Territory	Type	# Sites	Population
	<i>Aboriginal</i>	170	126 861
	<i>Non-Aboriginal</i>	122	67 420

Over the past twenty-five years⁵, the number of remote communities has decreased from 380 to 292, primarily as a result of grid extension and abandonment of communities due to relocation to larger villages or cities.

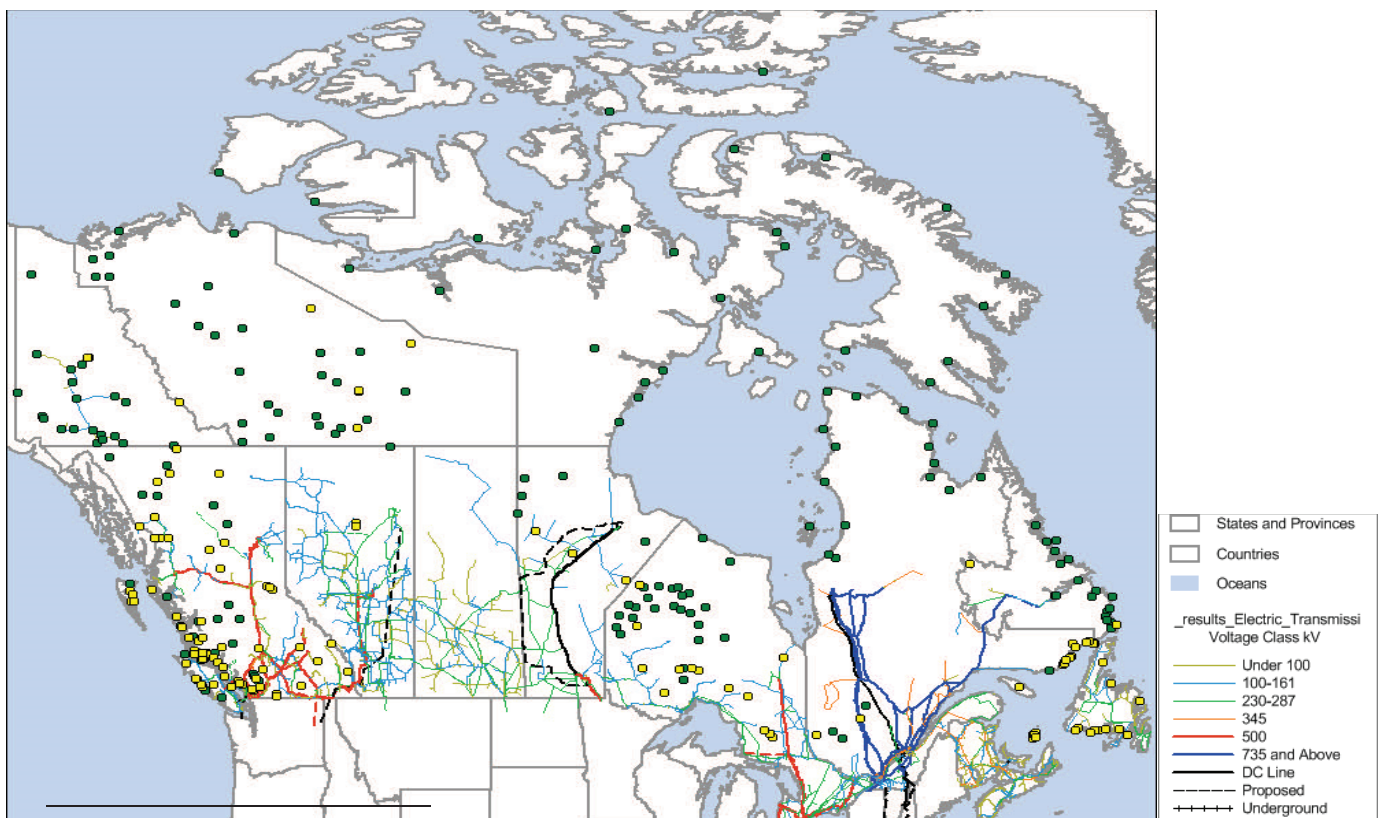
The overall population from 2006 census shows that there are just over 195,335 people living in these communities, which is practically the same as the 196,255 estimated in 1985. This shows that even when the number of communities has decreased, the populations have actually increased.

It is noteworthy that these estimates include those people living in three large communities of more than 10,000 people. The communities of Yellowknife (18,700), Whitehorse (22,900) and Magdalene Islands (13,180), represent about 28% of all people living in remote communities.

The remaining 141,500 inhabitants are scattered over the majority of Canada's land-mass, along the Atlantic, Arctic and Pacific coasts, throughout the interior boreal forest and tundra of the three territories and northern areas of most provinces and in the interior mountain regions of British Columbia. It is also to be noted that Prince Edward Island, New Brunswick and Nova Scotia do not have any off-grid communities.

The following map shows where these remote communities are located. Green dots show Aboriginal communities while yellow dots show non-Aboriginal sites. The map also provides the extent of the electrical grid above 65 kV (sub-transmission and transmission grids).

Figure 2.1: Remote communities and 65 kV grid lines and above
Green: Aboriginal communities / Yellow: Non-Aboriginal communities



⁵ The first major energy report on Remote Communities was made by Sigma Engineering Ltd for NRCAN in 1985, followed by an update by CANMET-Varenes' RETScreen group in 1999.

Electricity Infrastructure of Canadian Remote Communities

The electricity infrastructures of Canadian off-grid remote communities are diverse and vary depending on access to energy resources, remoteness of location and impact of climate. However, with the exception of a few local hydro grid-tied communities in Yukon, Northwest Territories and Quebec, the vast majority of remote communities across Canada rely on diesel generation for the production of electricity. Thus, most of these communities are characterised by a high degree of dependence on imported fuel and high energy costs.

The communities' power plants are operated by a number of bodies that range from provincial or territorial utilities, independent service providers, regional governmental organisations, and, in some cases, to Aboriginal bands themselves. In most cases these are subsidised by organisations such as electric utilities, regional governments or Aboriginal Affairs and Northern Development Canada (AANDC). Because of this, they are subsidised at very different rates and levels and it is often very difficult to perceive what is the real cost of electricity or energy service delivered to the community because of the many different parties involved.

A total of 251 communities have their own fossil fuel power plants totalling 453.3 MW. Of these, 176 are diesel fuelled, two are natural gas powered and 73 are from unknown sources but most likely diesel power plants or gasoline gensets in smaller settlements. A breakdown of these power plants is provided in the table below.

Table 2.2: Total Capacity of Fossil Fuel Power Plants in Remote Communities

Province or Territory	Main Power Source	Fossil Fuel Generation Type	FF Capacity kW	Number of Sites
AB	Fossil Fuel (FF)	Diesel	1450	1
AB Total			1450	1
BC	FF	Diesel	63894	26
		Diesel Restricted*	20	1
		Unknown	3838	35
	Hybrid (both FF and Renewable sources)	Diesel	305	1
	Hydro	Diesel	250	1
		Diesel backup	2650	1
Unknown	Unknown	0	15	
BC Total			70957	80
MB	FF	Diesel	1775	2
		Diesel Restricted	5400	4
		Unknown	0	1
MB Total			7175	7
NL	FF	Diesel	20993	24
		Unknown	525	2
	Hybrid	Diesel	2775	1
	Unknown	Unknown	0	1
NL Total			24293	28
NT	FF	Diesel	49559	22
		Natural gas	2120	1
		Natural Gas/Diesel	12380	1
	Hydro	Diesel	27660	1
		Diesel backup	6150	1
	Local Grid	Diesel backup	16812	5
	Unknown	Unknown	0	3
NT Total			114681	34

Province or Territory	Main Power Source	Fossil Fuel Generation Type	FF Capacity kW	Number of Sites
NU	FF	Diesel	50295	25
	Unknown	Unknown	0	1
NU Total			50295	26
ON	FF	Diesel	21040	21
		Diesel Restricted	2400	3
		Unknown	1305	7
	Hybrid	Diesel	825	1
	Unknown	Unknown	0	6
ON Total			25570	38
QC	FF	Diesel	106395	21
		Unknown	530	3
QC Total			106925	24
SK	FF	Diesel	350	1
SK Total			350	1
YT	FF	Diesel	8900	6
	Hydro	Diesel backup	27000	2
	Local Grid	Diesel backup	15700	5
YT Total			51600	13
Grand Total			453296	251

*Diesel generation is restricted to a few hours during the day

Note: FF = fossil fuels and RE = renewable energy

Eleven power plants are hydro based (see below) with a total generating capacity of 153.1 MW. Seven out of these eleven hydro sites also serve other communities than their own through local grids as shown in the next table.

Table 2.3: Capacity of Renewable Power Plants in Remote Communities

Province or Territory	Community/Site/Settlement Name	Main Power Source	Renewable Project: Type	Capacity kW	Hydro Comm.
BC	Atlin	Renewable Energy (RE)	Hydro	2100	1
	Iskut/Eddontenajon	RE	Hydro	2200	1
	Kitasoo	RE	Hydro	1700	1
BC Total				6000	3
NT	Fort Providence (Deh Gah Gotie Dene Council)	RE	Hydro	1480	1
	Fort Simpson (Lidii Kue First Nation)	FF	Hydro	25	1
	Fort Smith (Salt River First Nation #195)	RE	Hydro	18000	6
	Yellowknife	RE	Hydro	30300	4
NT Total				49780	11
ON	Deer Lake	Hybrid	Hydro	490	1
ON Total				490	1
QC	La Tabatiere	RE	Hydro	21000	13
QC Total				21000	13
YT	Mayo	RE	Hydro	5000	4
	Whitehorse	RE	Hydro	70810	11
YT Total				75810	15
Grand Total (11 hydro sites, 46 communities)			11	153105	46

Note: FF = fossil fuels and RE = renewable energy

A total of 63 sites are connected to 14 local grids (either hydro or diesel based) with some using diesel generators as backup power should the line fail or when hydro power cannot respond to the full demand. This may happen especially in winter when power failure can be critical.

Table 2.4: Capacity of Power Plants Connected to Local Grids

Province or Territory	Local Grid Power Plant Name	FF Capacity kW	RE Capacity kW	Total Communities
AB	Trout Lake	1450	n/a	1
		n/a	n/a	1
AB Total				2
BC	Bella Bella	8750	n/a	1
		n/a	n/a	1
	Bella Coola	7630	n/a	1
		n/a	n/a	1
	Masset	11524	n/a	1
		n/a	n/a	1
Sandspit	13600	n/a	1	
	n/a	n/a	3	
BC Total				10
NL	Mary's Harbour	1300	n/a	1
		n/a	n/a	1
NL Total				2
NT	Taltson	302	n/a	1
		950	n/a	1
		6150	18000	1
		7100	n/a	1
		n/a	n/a	2
	Yellowknife Snare System	1100	750	1
		7360	n/a	1
		27660	30300	1
n/a	69	1		
NT Total				10
QC	Cap aux Meules	67200	n/a	1
		n/a	n/a	6
	Kuujuarapik	3405	n/a	1
		n/a	n/a	1
Lac Robertson	n/a	21000	1	
	n/a		12	
QC Total				22
YT	Destruction Bay	700	n/a	1
		n/a	n/a	1
	Mayo	2000	5000	1
		6000	n/a	1
		n/a	n/a	2
	Whitehorse-Aishihik-Faro (WAF) grid	1000	n/a	1
		1500	n/a	1
		1800	n/a	1
		5400	n/a	1
25000	70810	1		
n/a	n/a	6		

Province or Territory	Local Grid Power Plant Name	FF Capacity kW	RE Capacity kW	Total Communities
YT Total				17
Grand Total	14	208 881	145 929	63

NA: Not Applicable. Sites connected to local grid with no back-up power.

Renewable (RE) plants are currently all hydro plants except for small wood pellet generation in Yellowknife.

Electricity Demand in Canadian Remote Communities

It is difficult to assess the current electricity production and uses for remote communities. These communities are scattered over vast regions comprising seven provinces and three territories and while regional bodies in charge of a group of communities might have good knowledge about a particular aspect of energy uses in these communities, this information is not readily shared and is often difficult to collate in a common format.

The database that is being developed currently has information on electricity demand from only 194 sites out of 292 and this data was reported for different years varying from 2004 to 2008. Some of the numbers reported are questionable as they are outside of the normal range of operation for their respective facilities or as aggregated regional numbers. This may either be because the aggregated total of capacity does not correspond to the aggregated total of demand or that these numbers were incorrectly reported.

As an example, a capacity factor⁶ or CF of 96% for diesel plants in Nunavut is not possible. Likewise, the installed capacity shown in the chart below ranges from 1.71 kilowatts per person (kW/p) to 7.44 kW/p and the demand ranges from 3.3 megawatts-hour per year (MWh/yr) to 14.4 MWh/yr for each person. It is clear that the low and high ends of these ranges are excessive and should be corrected when data is updated.

Table 2.5: Electricity Demand in Remote Communities

Province/Territory	Capacity FF	Capacity RE	Capacity Total	Yearly Demand	Capacity Factor	Year Reported	Sites Reported	Population	Capacity/Person	Demand / Person
	kW	kW	kW	MWh/yr	%	-	-	-	kW/p	MWh/y/p
AB	1,450	n/a	1,450	2,383	18.8%	n/a	1	195	7.44	12.2
BC	68,072	4,328	72,400	138,785	21.9%	2005	49	13,962	5.18	9.9
MB	7,175	n/a	7,175	12,807	20.4%	2006	6	2,937	2.44	4.4
NL	23,598	600	24,198	45,487	20.5%	2004	26	8,159	2.97	5.6
NT	72,919	50,633	123,552	357,603	33.0%	2008	29	36,757	3.36	9.7
NU	50,295	53	50,348	424,022	96.1%	2006	25	29,448	1.71	14.4
ON	25,210	520	25,730	84,356	37.4%	2007	28	14,618	1.76	5.8
QC	37,000	n/a	37,000	148,574	45.8%	2007	19	14,505	2.55	10.2
SK	350	n/a	350	190	6.2%	n/a	1	57	6.14	3.3
YT	41,900	75,810	117,710	263,208	25.5%	2005	10	25,771	4.57	10.2
Total	327,969	131,944	459,913	1,477,415	36.7%	n/a	194	146,409	3.14	10.1

⁶ The capacity factor is a measure of the output of a generator or power plant for a given period of time relative to the maximum amount of power that it can theoretically generate if it was operating at maximum output during that time. A diesel generator cannot operate at maximum output all the time and not all generators in a power plant are online all the time. Electricity generation depends on demand, which fluctuate during the day and from season to season. A power plant is usually designed to provide full power at peak demand while retaining a reserve margin of about 15-20%. This means that most of the time, a power plant will have a number of generators that are shut-off and will only be brought online when required. It also means that the CF of a power plant over the year is usually low.

Still, the aggregated numbers do give an indication about average capacity and demand for all of the remote communities of Canada and for individual provinces and territories.

As was stated above, the majority of off-grid communities rely on diesel generators for their electricity and on heating fuel for their heat. However, information on electricity generation and fuel consumption of diesel power plants is incomplete with only 100 sites reporting production out of a possible 257 sites that are diesel powered. The same can be said for electricity rates to consumers where only 114 sites with diesel generation have reported numbers.

The following table provides a breakdown of fuel purchased, diesel costs to utilities or service providers and electricity rates for sites where data was reported. Note that the table shows only a simplified electricity rate level based on average price paid. Besides an electricity rate, electrical utilities typically have monthly and demand charges that vary depending on the service providers.

Table 2.6: Fuel Purchased, Fuel Cost and Electricity Rate in Remote Communities

Province/ Territory	Yearly Demand	Fuel Purchased (FP)	Sites with FP Reported	Perform- ance	Diesel Cost to Utility	Last Year Reported	Electricity Rate to Consumer	Sites with ERC Reported
	MWh/yr	litre/yr		litre/MWh	\$/litre		\$/kWh	
AB	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
BC	10,351	3,117,100	15	301.0	\$ 0.37	2005	\$ 0.37	15
MB	n/a	n/a	n/a	n/a	n/a	n/a	\$ 0.36	4
NL	7,206	2,373,206	2	329.3	\$ 0.34	2004	\$ 0.14	5
NT	83,225	14,218,794	25	170.8	\$ 0.46	2008	\$ 0.26	34
NU	424,022	40,280,886	25	95.0	\$ 0.51	2006	\$ 0.60	25
ON	77,423	20,186,525	24	260.7	\$ 0.80	2007	\$ 0.17	8
QC	17,200	4,314,593	2	250.8	\$ 0.38	2007	\$ 0.40	19
SK	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
YT	15,296	5,391,000	4	352.4	\$ 0.36	2005	\$ 0.26	1
Total	635,556	90,232,104	97	142.0	\$ 0.46	n/a	\$ 0.32	111

The Performance column in the chart above provides an indication of how much fuel is used to produce electricity in a province or territory. While this would be a good indicator of the performance of power plants in a province or territory, this number must be used with caution because data provided for production and fuel purchase may not correspond to the same units or reported for the same years as there are large gaps in reporting. Still, the numbers provided do give an indication on the overall performance of diesel power plants in producing electricity.

Estimates for bulk delivered diesel fuel prices are highly dependent on the mode of transportation to the delivery site. In fact, fuel prices in communities that are accessible only by air can be up to twice the amount paid in communities accessible by barge or road. Thus, air access communities generally have higher fuel costs and often higher electricity rates.

For example, many of Ontario's remote communities are serviced by plane and hence they are shown to pay the highest for diesel fuel while Newfoundland communities where fuel is barged in pay the lowest. However, both have low electricity rates, showing that electricity rates are not just dependent on fuel costs.

While electricity costs is mostly dependent on fuel costs for grid-tied fossil fuel power plants, in small communities these costs are also greatly affected by the size of the generators, their running points, their performance and efficiency, their higher operation costs and the need for the utility to maintain power at all time. The cost of producing off-grid electricity from diesel generators can be up to 10 times higher than electricity generated on the main grid.

Electricity rates to end users on the other hand, are dependent on what customers can pay and the amount of subsidy that can be provided. In provincial jurisdiction, electricity rates are sometimes set by the on-grid residential average rates and applied to all residential clients. This is the case for Ontario and Newfoundland and Labrador sites and it is partially true for the Quebec sites. Remote communities under Hydro-Quebec's jurisdiction have the same average rate of 10 cents/kWh as on-grid residential clients but these numbers were not reported and have not been used in the average Quebec rate for off-grid communities. The 19 sites with electrical rate data are under the responsibility of the Makivik Corporation, which has its own rate structure that reflects better the real costs of electricity produced.

Residential retail rates are generally subsidized in remote communities at varying degrees in all jurisdictions by:

- absorbing the cost into the rate base;
- charging higher rates to commercial and governmental customers; and
- charging a higher rate for consumption in excess of a set limit per month.

In Nunavut, electricity rate is shown the highest, averaging around 60 cents/kWh while in Newfoundland and Labrador, remote communities pay the same rate as on-grid residents, or around 14 cents/kWh. Still one can see that on average, the electricity rate paid by consumers is about 32 cents/kWh, which is around three times what is paid by on-grid customers.

Why focus on Renewables in Remote Communities of Canada

The standard electricity production method in remote communities, using diesel-fuelled generators, has proven generally stable and reliable when properly maintained. However, the high cost of electricity in off-grid communities is a significant deterrent to economic development opportunities for any industry consuming even a moderate amount of electricity and adds to the cost of living for populations often living at a subsistence level. Further, this technology is also known to cause air pollution through greenhouse gas emissions and criteria air contaminants, as well as soil pollution through diesel fuel spills and leaks.

The following list is an assessment of the concerns raised by diesel generation that remote communities face in terms of environmental, social and economic sustainability. These were identified by AANDC in their ecoENERGY for Aboriginal and Northern Communities Program⁷ Overview in 2010:

Environmental Concerns

- Burning large amounts of diesel produces substantial greenhouse gas emissions. This contributes to climate change which negatively affects Northern communities.
- Fuel must be transported long distances by airplane, truck or barge, leading to a greater risk of fuel spills.
- The transportation of fuel by trucks on winter roads impacts the environment negatively through high greenhouse gas emissions from the vehicles.
- Fuel spills may take place while the fuel is being transported and stored, posing environmental risks. Fuel tank leaks contaminate soil and groundwater.

⁷ For additional information on the program please check : <http://www.ecoaction.gc.ca/ecoenergy-ecoenergie/aborignorth-autochnord-eng.cfm>

Social Concerns

- Generators can be noisy and disruptive, especially in quiet, remote communities.
- Emissions from diesel generators could contribute to health problems in community members.
- Black-outs can occur if diesel generators break down or are not properly maintained. This can be dangerous in cold, remote locations.

Economic Concerns

- Cold, northern locations have a high demand for diesel and heating fuel which contributes to high energy expenditures.
- Diesel fuel must be flown in, shipped in, or driven in on winter roads which leads to high transportation costs, which contributes to high energy expenditures.
- Diesel is a non-renewable resource; therefore the price of diesel fuel will likely continue to fluctuate in the future, based on overall supply and demand.
- The high cost of energy and energy supply issues in off-grid communities can deter new businesses, thus limiting future economic opportunities in off-grid communities.

In a recent report⁸ Lumos Energy identified the following range of positive attributes for the development of clean power in remote communities of Canada.

Table 2.7: Summary of Clean Power Valuation Features

Features	Valuation Attributes
Energy Security	Being more decentralized and closer to power users, clean energy enhances the stability of power systems and reduces demand on transmission capacity. Clean power also adds diversity to the power system.
Reduced Environmental Impacts	By reducing Criteria Air Contaminants (CAC) and Greenhouse Gas (GHG), waste products and air toxic emissions, clean energy offers a dramatically less impact environmental footprint than fossil fuel and nuclear energy.
Health Benefits	Clean energy reduces risk factors to human health which results in lower morbidity and mortality, and costs borne by the health care system.
New Clean Industry	Clean energy is a source of economic development for local economies offering job and wealth creation multipliers.
Price Hedging & Reducing Natural Gas Pressures	By diversifying power sources, clean energy reduces pressures on fossil fuel consumption, notably the marginal fuel source of natural gas. Thus, clean energy acts as a price hedge against higher natural gas prices.
Shorter Development Timelines	Clean energy projects, such as small hydro, medium-scale biomass and solar are subject to faster project timelines of development which represents a potential cost advantage and have an ability to respond to market needs faster.

Many of the remote communities of Canada have access to adequate renewable energy resources which, if properly managed, could help contribute to the communities' sustainable development. In fact, cost-effective deployment opportunities of renewable technologies exist in many remote communities for both power generation and space heating applications. The retention of such savings in the communities could lead to several benefits such as job creation, local skill development and increased community self reliance.

There are four main renewable energy alternatives to diesel generation in off-grid communities that could generate substantial economic development benefits for these communities. These are small hydro, biomass,

⁸ An Analysis of Aboriginal Clean Energy Projects & Ventures Across Canada: Identifying Potential Clean Energy 'Clusters' for Consideration by the Strategic Partnerships Initiative (SPI), Lumos Energy, March 2010

wind and solar energy (photovoltaic (PV) and heat). In some cases, connection to local grids can provide added benefits by clustering the demand of a number of communities around a common resource.

One of the tasks of AANDC's ecoENERGY for Aboriginal and Northern Communities Program has been to identify opportunities in using renewable energy in Aboriginal remote communities. By extension, the information gathered by the program can be applied to other remote communities with the added benefit that having more communities in an area or region adopting a given solution may actually make these more cost-effective through economies of scale or from clustering of actions.

3. Provincial/Territorial Information Details

The following sections provide a brief analysis of each province and territory's remote communities. The intent of this review is to provide general characteristics about remote communities in each region and show extent of information currently available for each.

The three provinces of Alberta, Saskatchewan and Manitoba have been grouped under the same region because there are only a few communities that are off-grid in each province. Provinces of Nova Scotia, New Brunswick and PEI are not shown because they have no communities that are off the grid.

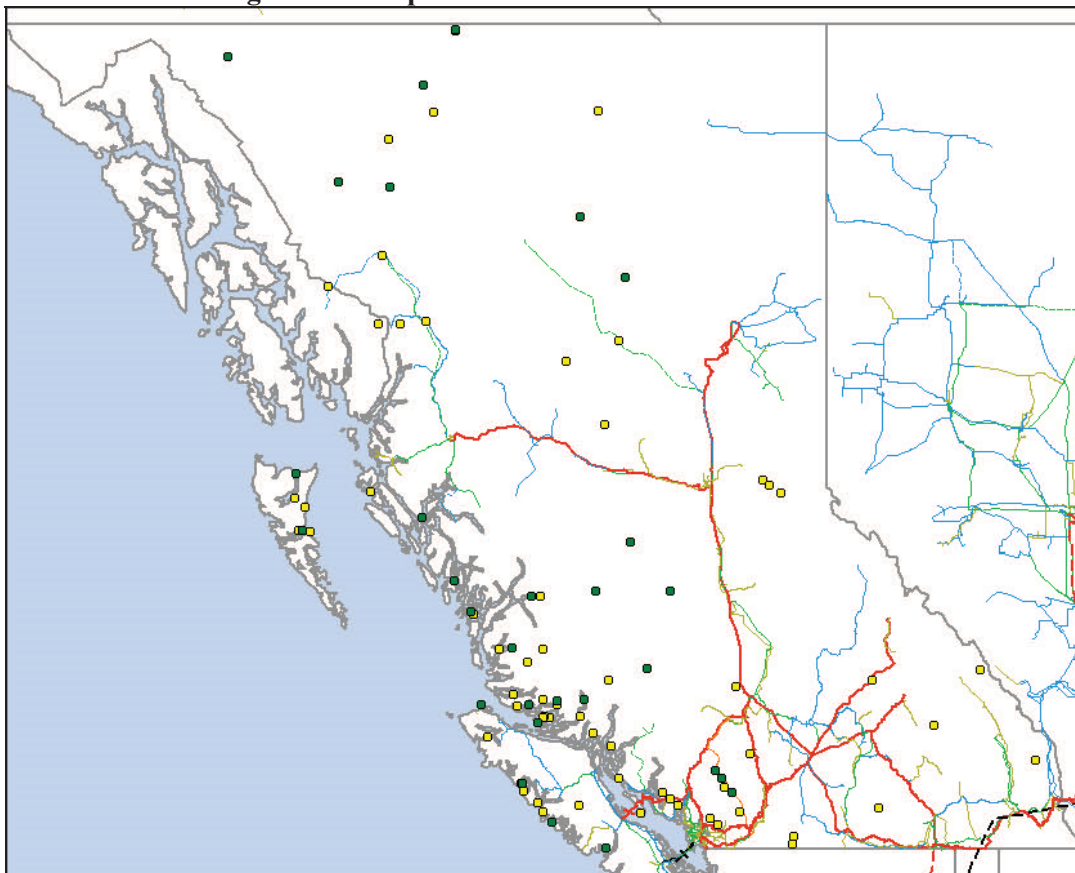
Note that in each table shown below, remote communities were attributed temporary site numbers for the purpose of this report. AANDC uses another set of numbers for Aboriginal-only communities. The numbering of communities will be reviewed within the new database. Note also that some of the temporary site numbers are missing. Sites that were abandoned or were connected within the last 10 years have been numbered but are not reported in the various tables.

Missing data are highlighted to show the extent of information that needs to be gathered. The development of the new database should greatly facilitate this process.

British Columbia

There are currently 86 remote communities in British Columbia (BC) with a total population of 24,068, of which 25 communities are Aboriginal with 7,619 people and 61 communities are non-Aboriginal with 16,449 inhabitants.

Figure 3.1: Map of British Columbia's Remote Communities



Green: Aboriginal communities / Yellow: Non-Aboriginal communities

Table 3.1: BC Remote Communities

Temp #	Community/Site/Settlement Name	First Nation/ Band Name	Type	Population Census 2006	Main Power Source	Local Grid Name	Fossil Fuel Generation Type	Electric Capacity (FF) (kW)	Renewable Type	Renewable Capacity (kW)	Annual Energy Demand (MWh)
-	Name	Name	-	(#)	-	Name	-	(kW)	-	(kW)	(MWh)
1	Acteon Sound	n/a	Non-Aboriginal	25	FF	n/a	n/a	125	n/a	n/a	657
2	Anahim Lake	Ulkatcho	Aboriginal	252	FF	n/a	Diesel	2650	n/a	n/a	4,990
3	Atlin	Taku River Tlingit First Nation	Aboriginal	322	RE	n/a	Diesel backup	2650	Hydro	2100	4,400
4	Baker Mine Camp	n/a	Non-Aboriginal	30	FF	n/a	Diesel	1500	n/a	n/a	7,008
6	Barr Creek	n/a	Non-Aboriginal	25	n/a	n/a	n/a	n/a	n/a	n/a	n/a
7	Bella Bella	Heiltsuk	Aboriginal	1104	FF	Bella Bella	Diesel	8750	n/a	n/a	10,147
8	Bella Coola	Nuxalk Nation	Aboriginal	2139	FF	Bella Coola	Diesel	7630	n/a	n/a	17,147
9	Big Bar/Jesmond Creek	n/a	Non-Aboriginal	133	FF	n/a	n/a	n/a	n/a	n/a	n/a
10	Bob Quinn Lake	n/a	Non-Aboriginal	17	FF	n/a	n/a	250	n/a	n/a	613
11	Boulder Bay	n/a	Non-Aboriginal	45	FF	n/a	n/a	75	n/a	n/a	324
12	Christian Valley	n/a	Non-Aboriginal	1850	FF	n/a	n/a	n/a	n/a	n/a	n/a
13	Cleagh Creek	n/a	Non-Aboriginal	23	FF	n/a	n/a	125	n/a	n/a	1,086
14	Da'nawda'xw First Nation (Sim Creek) (Dead Point 5)	Da'naxda'xw First Nation	Aboriginal	20	FF	n/a	Diesel	n/a	n/a	n/a	n/a
15	Dease Lake	n/a	Non-Aboriginal	394	FF	n/a	Diesel	3550	n/a	n/a	6,473
16	Dome Creek/Crescent Spur	n/a	Non-Aboriginal	475	FF	n/a	n/a	n/a	n/a	n/a	n/a
17	Drury Inlet	n/a	Non-Aboriginal	45	FF	n/a	n/a	125	n/a	n/a	1,086
18	Earl Creek	n/a	Non-Aboriginal	25	n/a	n/a	n/a	n/a	n/a	n/a	n/a
19	Eastgate	n/a	Non-Aboriginal	50	FF	n/a	n/a	50	n/a	n/a	263
20	Ehattesaht (Chenahkint)	Ehattesaht	Aboriginal	10	FF	n/a	Diesel	50	n/a	n/a	n/a
21	Erickson Gold Mine Village	n/a	Non-Aboriginal	130	FF	n/a	Diesel	2100	n/a	n/a	7,884
22	Field	n/a	Non-Aboriginal	352	FF	n/a	Diesel	600	n/a	n/a	1,883
23	Fort Ware	Kwadacha	Aboriginal	239	FF	n/a	Diesel	755	n/a	n/a	n/a
24	Germansen Landing	n/a	Non-Aboriginal	77	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25	Gilford Island	n/a	Non-Aboriginal	541	FF	n/a	n/a	45	n/a	n/a	114
26	Good Hope Lake (Dease River)	Good Hope Lake (Dease River)	Aboriginal	32	FF	n/a	Diesel	1230	n/a	n/a	613
27	Greenwood Camp	n/a	Non-Aboriginal	64	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28	Gwawaenuk Tribe/Kwa-wa-aineuk (Hopetown)	Gwawaenuk Tribe/Kwa-wa-aineuk	Aboriginal	10	FF	n/a	Diesel	40	n/a	n/a	n/a
29	Hagensborg	n/a	Non-Aboriginal	1000	Local Grid	Bella Coola	n/a	n/a	n/a	n/a	n/a
30	Hartley Bay (Kulkayu 4)	Hartley Bay	Aboriginal	157	FF	n/a	Diesel	1000	n/a	n/a	1,344

Remote Communities in Canada

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Temp #	Community/Site/Settlement Name	First Nation/ Band Name	Type	Population Census 2006	Main Power Source	Local Grid Name	Fossil Fuel Generation Type	Electric Capacity (FF)	Renewable Type	Renewable Capacity	Annual Energy Demand
-	Name	Name	-	(#)	-	Name	-	(kW)	-	(kW)	(MWh)
31	Hesquiant (Refuge Cove 6)	Hesquiaht	Aboriginal	113	FF	n/a	Diesel	150	n/a	n/a	438
32	Hornet	n/a	Non-Aboriginal	30	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33	Iskut/Eddontenajon	Iskut First Nation	Aboriginal	511	RE	n/a	n/a	n/a	Hydro	2200	2,468
34	Kingcome Inlet	n/a	Non-Aboriginal	148	FF	n/a	n/a	75	n/a	n/a	175
35	Kitasoo	Kitasoo	Aboriginal	282	RE	n/a	Diesel	250	Hydro	1700	n/a
36	Kitkatla	n/a	Non-Aboriginal	1391	FF	n/a	Diesel	850	n/a	n/a	1,007
37	Klemtu	n/a	Non-Aboriginal	447	FF	n/a	n/a	250	n/a	n/a	88
38	Kluskus (Sundayman's Meadow)	Kluskus	Aboriginal	32	FF	n/a	Diesel Restricted	20	n/a	n/a	260
39	Knight Inlet	n/a	Non-Aboriginal	45	FF	n/a	n/a	125	n/a	n/a	657
40	Kwicksutaineuk-ah-kwaw-ah-mish (Gwayasdums)	Kwicksutaineuk-ah-kwaw-ah-mish	Aboriginal	40	FF	n/a	Diesel	225	n/a	n/a	n/a
42	Lasqueti Island	n/a	Non-Aboriginal	457	FF	n/a	n/a	n/a	n/a	n/a	n/a
43	Liard First Nation (Lower Post 3)	Liard First Nation	Aboriginal	102	FF	n/a	Diesel	995	n/a	n/a	n/a
44	Longworth	n/a	Non-Aboriginal	53	n/a	n/a	n/a	n/a	n/a	n/a	n/a
45	Lower Post	n/a	Non-Aboriginal	180	FF	n/a	n/a	n/a	n/a	n/a	n/a
46	Machmell	n/a	Non-Aboriginal	45	FF	n/a	n/a	125	n/a	n/a	657
47	Manning Provincial Park	n/a	Non-Aboriginal	57	n/a	n/a	n/a	n/a	n/a	n/a	n/a
48	Masset (Old Masset)	Haida Nation/Haida Gwaii 4	Aboriginal	607	FF	Masset	Diesel	11524	n/a	n/a	24,275
49	McNab Camp	n/a	Non-Aboriginal	24	FF	n/a	n/a	50	n/a	n/a	350
50	Meziadin Lake - Highways	n/a	Non-Aboriginal	193	FF	n/a	n/a	500	n/a	n/a	631
51	Mooya Bay (Nootka)	n/a	Non-Aboriginal	45	FF	n/a	n/a	125	n/a	n/a	657
52	Moses Inlet	n/a	Non-Aboriginal	70	FF	n/a	n/a	100	n/a	n/a	613
53	Nancut	n/a	Non-Aboriginal	1275	FF	n/a	n/a	n/a	n/a	n/a	n/a
54	Narrows Inlet Logging Div	n/a	Non-Aboriginal	45	FF	n/a	n/a	125	n/a	n/a	657
56	Nemaiah Valley (Chilco Lake and Lohbiee)	Xeni Gwet'in First Nation	Aboriginal	148	Hybrid	n/a	Diesel	305	PV	28	1,279
57	Nuchatlaht	n/a	Non-Aboriginal	122	FF	n/a	n/a	8	n/a	n/a	70
58	Owikeno (Katit 1)	Oweekeno/Wuikinuxv Nation	Aboriginal	85	FF	n/a	Diesel	1050	n/a	n/a	1,168
59	Penny	n/a	Non-Aboriginal	74	n/a	n/a	n/a	n/a	n/a	n/a	n/a
60	Phillips Arm	n/a	Non-Aboriginal	45	FF	n/a	n/a	125	n/a	n/a	657
61	Pitt Lake	n/a	Non-Aboriginal	45	FF	n/a	n/a	125	n/a	n/a	657
62	Port Clements	n/a	Non-Aboriginal	483	Local Grid	Masset	n/a	n/a	n/a	n/a	657

Remote Communities in Canada

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Temp #	Community/Site/Settlement Name	First Nation/ Band Name	Type	Population Census 2006	Main Power Source	Local Grid Name	Fossil Fuel Generation Type	Electric Capacity (FF)	Renewable Type	Renewable Capacity	Annual Energy Demand
-	Name	Name	-	(#)	-	Name	-	(kW)	-	(kW)	(MWh)
64	Quatam River	n/a	Non-Aboriginal	45	FF	n/a	n/a	125	n/a	n/a	657
65	Queen Charlotte City	n/a	Non-Aboriginal	1079	Local Grid	Sandspit	n/a	n/a	n/a	n/a	n/a
66	Queen's Cove	n/a	Non-Aboriginal	10	n/a	n/a	n/a	n/a	n/a	n/a	n/a
68	Sandspit	n/a	Non-Aboriginal	3000	FF	Sandspit	Diesel	13600	n/a	n/a	22,948
69	Savary Island	n/a	Non-Aboriginal	31	n/a	n/a	n/a	n/a	n/a	n/a	n/a
70	Scott Cove	n/a	Non-Aboriginal	45	FF	n/a	n/a	125	n/a	n/a	1,086
71	Scotty Gold	n/a	Non-Aboriginal	80	n/a	n/a	n/a	n/a	n/a	n/a	n/a
72	Sechell Creek	n/a	Non-Aboriginal	45	FF	n/a	n/a	125	n/a	n/a	657
73	Seymour Arm	n/a	Non-Aboriginal	95	n/a	n/a	n/a	n/a	n/a	n/a	n/a
74	Seymour Inlet	n/a	Non-Aboriginal	45	FF	n/a	n/a	125	n/a	n/a	1,086
75	Shearwater	n/a	Non-Aboriginal	100	Local Grid	Bella Bella	n/a	n/a	n/a	n/a	n/a
76	Sheemahant	n/a	Non-Aboriginal	47	FF	n/a	n/a	575	n/a	n/a	569
77	Simoon Sound	n/a	Non-Aboriginal	32	n/a	n/a	n/a	n/a	n/a	n/a	n/a
79	Skidegate Landing	Haida Nation/Haida Gwaii 4	Aboriginal	781	Local Grid	Sandspit	n/a	NA	n/a	n/a	n/a
80	Stave Lake	n/a	Non-Aboriginal	55	FF	n/a	n/a	110	n/a	n/a	219
82	Takla	n/a	Non-Aboriginal	538	FF	n/a	n/a	n/a	n/a	n/a	n/a
84	Telegraph Creek	Tahltan	Aboriginal	216	FF	n/a	Diesel	2050	n/a	n/a	1,960
85	Tide Lake	n/a	Non-Aboriginal	125	FF	n/a	n/a	n/a	n/a	n/a	n/a
86	Timfor	n/a	Non-Aboriginal	45	FF	n/a	n/a	125	n/a	n/a	657
88	Tlatlasikwala (Hope Island 1)	Tlatlasikwala	Aboriginal	5	FF	n/a	Diesel	70	n/a	n/a	n/a
89	Tlell	n/a	Non-Aboriginal	282	Local Grid	Sandspit	n/a	n/a	n/a	n/a	n/a
90	Toad River Area	n/a	Non-Aboriginal	80	n/a	n/a	n/a	n/a	n/a	n/a	n/a
92	Trout Lake BC	n/a	Non-Aboriginal	65	n/a	n/a	n/a	n/a	n/a	n/a	n/a
93	Tsawataineuk (Quaee 7)	Tsawataineuk (or Dzawada'enuxw)	Aboriginal	60	FF	n/a	Diesel	900	n/a	n/a	1,208
94	Tsay Keh Dene (Finlay River)	Tsay Keh Dene	Aboriginal	325	FF	n/a	Diesel	500	n/a	n/a	n/a
95	Uchucklesaht (Elhlateese 2)	Uchucklesaht	Aboriginal	27	FF	n/a	Diesel	125	n/a	n/a	255
96	Western Mines (Myra Falls)	n/a	Non-Aboriginal	30	FF	n/a	Diesel	2000	n/a	n/a	4,030
Total	86	25		24,068		10		70,957		6,028	138,785
	Sites	Aboriginal Sites				Local Grid	Total FF+RE	76,985		CF	20.6%

FF: Fossil Fuel – RE: Renewable Energy – NA: Not Applicable

For the 86 communities with available power plant data, total electric capacity from all sources is approximately 77 MW.

The total fossil fuel generation capacity is 71.0 MW with the following breakdown:

Diesel Generation: 67.1 MW

Unknown (either diesel or gasoline powered gensets): 3.8 MW

The total renewable generation is mainly hydro-based with three sites totalling 6.0 MW and one PV site totalling 28 kW.

Included in the above production total are four local grids that connect 10 communities with the following breakdown:

Bella Bella: 8.75 MW Diesel power plant serving Bella Bella and Shearwater on the northern coast of BC.

Bella Coola: 7.6 MW Diesel power plant serving Bella Coola and Hagensborg, at the western extremity of the Queen Charlotte Sound.

Masset: 11.5 MW Diesel power plant serving Masset and Port Clements, in the northern part of the archipelago of Haida Gwaii.

Sandspit: 13.6 MW Diesel power plant serving Sandspit, Queen Charlotte City, Skidegate Landing and Tiell, in the archipelago of Haida Gwaii.

Out of these 86 communities, only 49 have production data. These 49 communities have a combined diesel and hydro capacity of 72.4 MW producing an estimated 138,785 MWh giving a capacity factor of 21.9%.

From the BC sites, 47 communities report bulk diesel fuel price with an average of 37 cents/litre. However, only 15 diesel communities show actual purchase of fuel with corresponding electricity production. These 15 sites have a total capacity of 7.8 MW from fossil fuel and 2.1 MW from renewable and a total production of 10 351 MWh of electricity for a capacity factor of about 11.9% and consume about 3,117,100 litres of diesel fuel per year. However, the small amount of data warrants cautious use of these numbers as the level of error can be significant.

From the data collected, communities in BC can also be segmented in two main groups based on their electricity suppliers. B.C. Hydro services 29% of the remote communities and about 40% of the population. The rest is serviced by Independent Power Producers or IPPs. Most Aboriginal communities (98% or 24 communities) are serviced by BC Hydro. 13 of these communities are funded directly by AANDC to pay for their electricity.

Prairies

Alberta, Saskatchewan and Manitoba have been grouped in a single region, named Prairies, because of the limited number of remote communities in these provinces.

In the past twenty-five years the number of remote communities has decreased from 34 to 10 sites. Grid extension has and will likely continue to be the main reason of this decrease. Manitoba Hydro, which currently services seven remote communities in Manitoba, has tied six communities to its electric grid within the last few years. Alberta has only two remote communities and Saskatchewan has one.

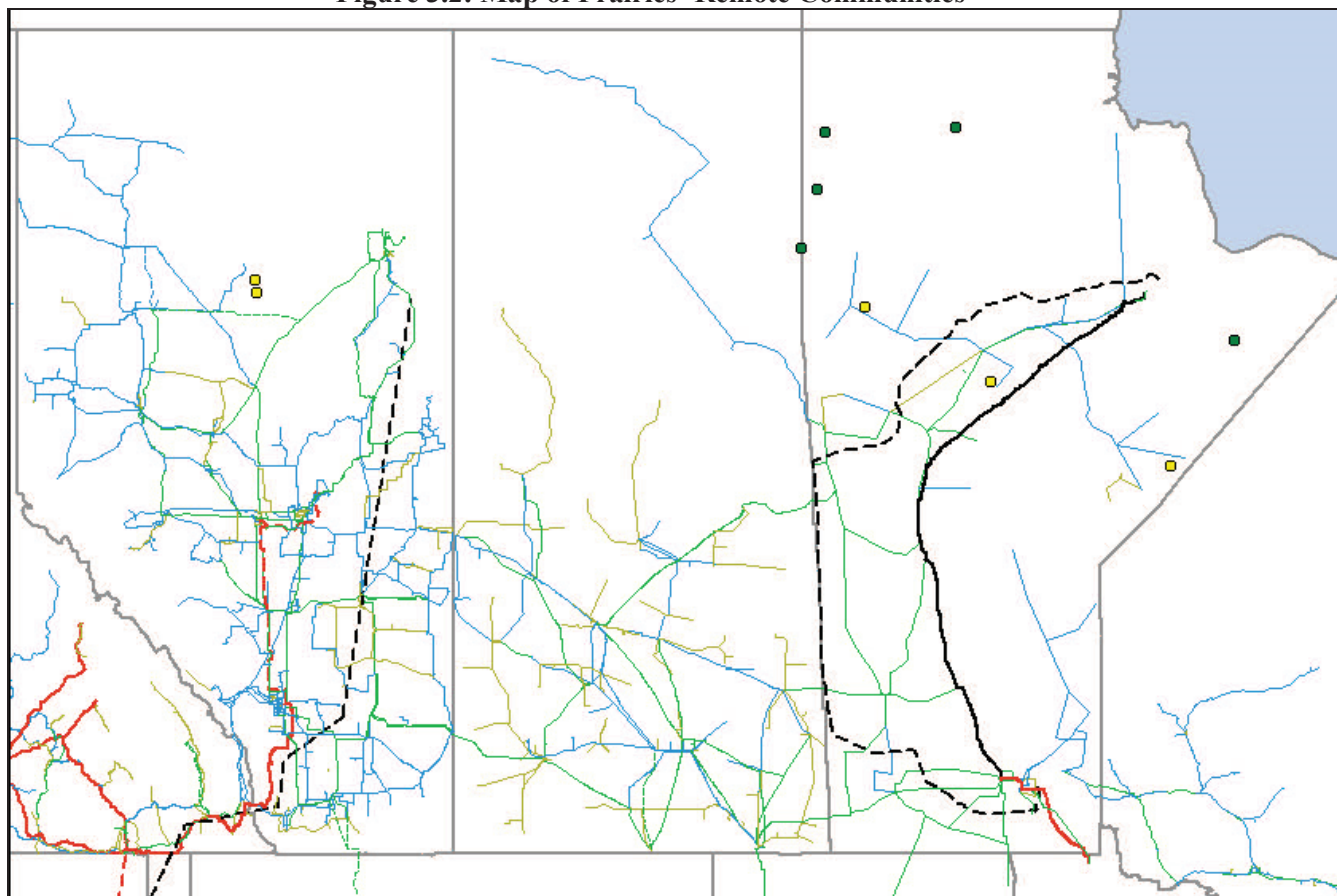
The total installed capacity in remote communities in the Prairies is estimated at 9 MW, supplying energy to 3,653 people.

Five communities are Aboriginal settlements in northern Manitoba and Saskatchewan, with a total of 5.75 MW of diesel capacity supplying electricity to 2,217 people.

The two communities in Alberta are non-Aboriginal settlements that are inter-tied together and are powered by a 1.45 MW diesel power plant supplying 533 persons.

The three other non-Aboriginal communities are scattered in mid-northern Manitoba and use about 1.8 MW of diesel capacity providing power to 903 persons. They are generally very close to a grid and could well be connected in the near to medium-term future.

Figure 3.2: Map of Prairies' Remote Communities



Green: Aboriginal communities / Yellow: Non-Aboriginal communities

Table 3.2: Remote Communities of Alberta, Saskatchewan and Manitoba

Pro v.	Temp #	Community/Site/Settlement Name	First Nation/Band Name	Type	Population Census 2006	Main Power Source	Local Grid Name	Fossil Fuel Generation Type	FF Capacity	Renewable Type	RE Capacity	Annual Energy Demand
-	-	Name	name	-	(#)	-	Name	-	(kW)	-	(kW)	(MWh)
AB	101	Peerless Lake	n/a	Non-Aboriginal	338	Local Grid	Trout Lake	n/a	n/a	n/a	n/a	n/a
AB	102	Trout Lake	n/a	Non-Aboriginal	195	FF	Trout Lake	Diesel	1450	n/a	n/a	2,383
SK	103	Peter Ballantyne Cree Nation (Kinoosao - Thomas Clark 204)	Peter Ballantyne Cree Nation	Aboriginal	57	FF	n/a	Diesel	350	n/a	n/a	190
MB	104	Barren Lands (Brochet 197)	Barren Lands	Aboriginal	306	FF	n/a	Diesel Restricted	1175	Waste Heat Recovery	n/a	2,368
MB	108	Granville Lake	n/a	Non-Aboriginal	126	FF	n/a	n/a	n/a	n/a	n/a	n/a

Remote Communities in Canada

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Pro v.	Temp #	Community/Site/Settlement Name	First Nation/Band Name	Type	Population Census 2006	Main Power Source	Local Grid Name	Fossil Fuel Generation Type	FF Capacity	Renewable Type	RE Capacity	Annual Energy Demand
MB	109	Northlands (Lac Brochet)	Northlands	Aboriginal	604	FF	n/a	Diesel Restricted	1450	Waste Heat Recovery	n/a	2,505
MB	112	Red Sucker Lake	n/a	Non-Aboriginal	585	FF	n/a	Diesel	1250	n/a	n/a	1,842
MB	113	Shamattawa (1)	Shamattawa First Nation	Aboriginal	920	FF	n/a	Diesel Restricted	1325	Waste Heat Recovery	n/a	3,169
MB	115	Sayisi Dene First Nation (Churchill Indian Reserve) Tadoule Lake	Sayisi Dene First Nation	Aboriginal	330	FF	n/a	Diesel Restricted	1450	Waste Heat Recovery	n/a	2,459
MB	116	Thicket Portage		Non-Aboriginal	192	FF	n/a	Diesel	525	n/a	n/a	464
Total	-	10	5	-	3,653	-	0	-	8,975	-	n/a	15,380
		Sites	Aboriginal Sites				Local Grid	Total FF+RE	8,975	kW	CF	19.6%

FF: Fossil Fuel – RE: Renewable Energy – NA: Not Applicable

Most of the southern regions of these three provinces are covered by an extensive grid network and Aboriginal communities in this area are grid connected.

Alberta Power, Sask Power and Manitoba Hydro are the main power suppliers to the remote communities in Alberta, Saskatchewan and Manitoba respectively. AANDC funds power for the five Aboriginal communities.

Average diesel fuel price for electricity generation is 35 cents/litre in Manitoba's remote communities and 52 cent/litre in Saskatchewan. Prices are not available for Alberta's remote communities.

Ontario

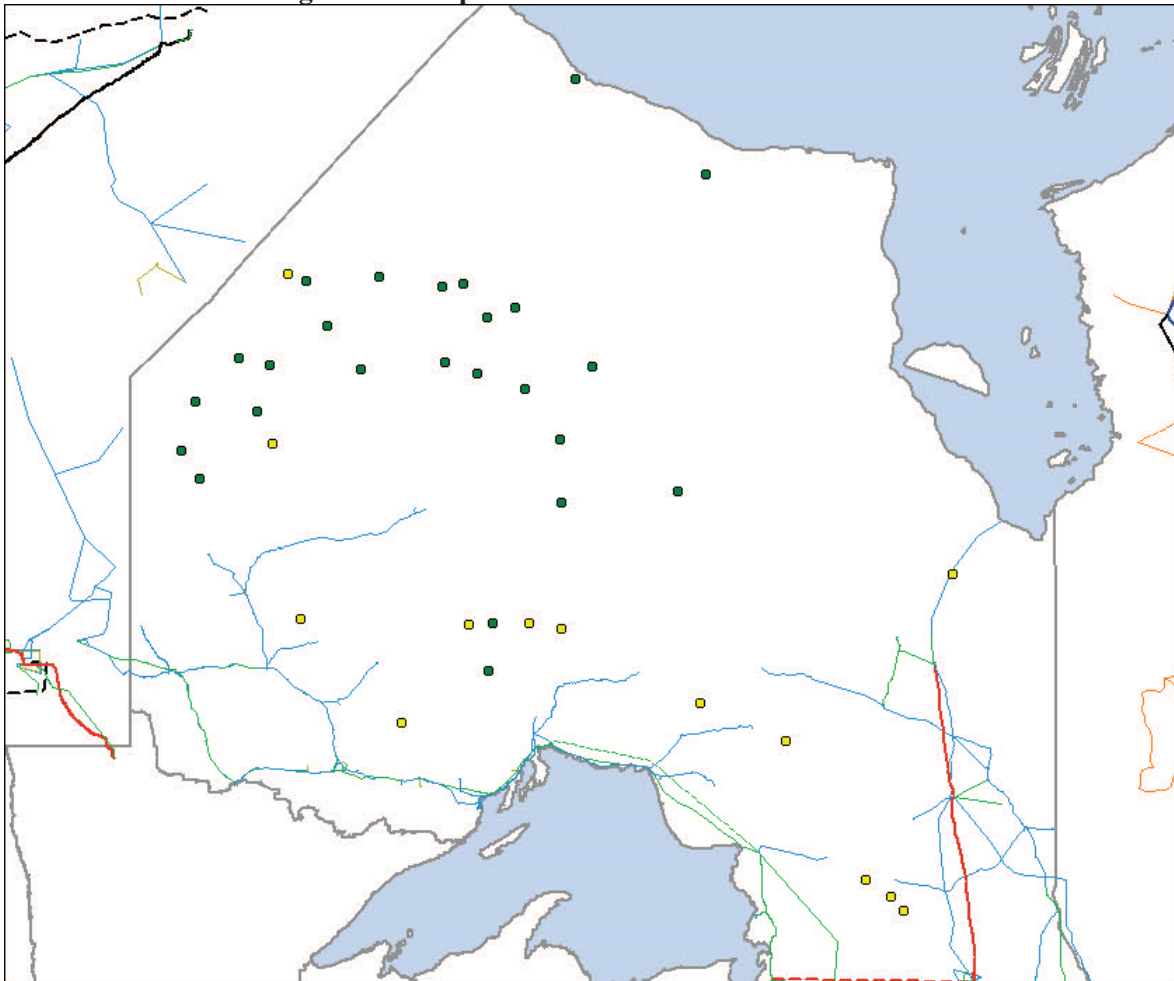
According to the Sigma study of 1985, there were at that time 43 remote communities in Ontario with a total population of around 15,000 persons. Today, there are 38 remote communities with a population of 21,342 (2006 Census). Of these communities, 25 are Aboriginal communities with a total of 14,236 peoples or two-third of the remote communities' population.

The installed fossil fuel plant capacity at these 38 remote sites totals 25.57 MW with only one hydro site at Deer Lake with a capacity of 490 kW, using a backup of 825 kW of diesel capacity and a 30 kW wind turbine at Kasabonika that complements a diesel plant of 825 kW.

From the 28 sites that report production data, their fossil fuel capacity is 25.21 MW and renewable capacity is 0.5 MW. These sites produce an estimated 84,356 MWh/yr (mainly 2007 numbers), giving a capacity factor of 37.4 % for a population of 14,618 persons.

Independent Power Producers service 12 of these 28 sites with a total population of 6,107. The fossil fuel capacity is estimated at 9.87 MW and produces 31,070 MWh giving a capacity factor of 36%.

Figure 3.3: Map of Ontario’s Remote Communities



Green: Aboriginal communities / Yellow: Non-Aboriginal communities

Only 10 of these sites report fuel price paid by the service providers. These 10 sites are all Aboriginal sites serviced by IPPs. The diesel plants have a total capacity of 8 MW. The sites reportedly purchased 5,128,865 litres per year for their electricity consumptions with an average fuel price of 80 cents/litre between 2004 and 2007.

Eight of these sites report an average retail electricity price of 17 cents/kWh and nine sites report a service rate (non-subsidised) of 94 cents/kWh. This would tend to indicate that a subsidy of about 77 cents/kWh is provided to retail consumers, however it is not possible to assess realistically because of the low numbers of data.

Table 3.3 Remote Communities of Ontario

Temp #	Community/Site/Settlement Name	First Nation/Band Name	Type	Population Census 2006	Main Power Source	Local Grid Name	Fossil Fuel Generation Type	FF Capacity	Renewable Type	RE Capacity	Annual Energy Demand
-	Name	Name	-	(#)	-	Name		(kW)	-	(kW)	(MWh)
119	Armstrong (Whitesand)	Whitesand	Aboriginal	247	FF	n/a	Diesel	1400	n/a	n/a	4,139
121	Auden	n/a	Non-Aboriginal	85	n/a	n/a	n/a	n/a	n/a	n/a	n/a
122	Bearskin Lake	Bearskin Lake	Aboriginal	459	FF	n/a	Diesel	825	n/a	n/a	2,894

Remote Communities in Canada

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Temp #	Community/Site/Settlement Name	First Nation/Band Name	Type	Population Census 2006	Main Power Source	Local Grid Name	Fossil Fuel Generation Type	FF Capacity	Renewable Type	RE Capacity	Annual Energy Demand
123	Big Trout Lake (Kitchenuhmaykoosib Aaki 84)	Kitchenuhmaykoosib Inninuwug	Aboriginal	916	FF	n/a	Diesel	2600	n/a	n/a	5,756
124	Biscotasing	n/a	Non-Aboriginal	135	FF	n/a	n/a	325	n/a	n/a	961
126	Collins	n/a	Non-Aboriginal	100	FF	n/a	n/a	n/a	n/a	n/a	n/a
127	Deer Lake	Deer Lake	Aboriginal	681	Hybrid	n/a	Diesel	825	Hydro	490	4,391
128	Ebanetoong (Fort Hope 64)	Eabametoong	Aboriginal	1144	FF	n/a	Diesel	1565	n/a	n/a	3,400
129	Ferland	n/a	Non-Aboriginal	81	n/a	n/a	n/a	n/a	n/a	n/a	n/a
130	Fort Severn (89)	Fort Severn	Aboriginal	567	FF	n/a	Diesel	550	Waste Heat Recovery	n/a	2,626
131	Graham	n/a	Non-Aboriginal	90	n/a	n/a	n/a	n/a	n/a	n/a	n/a
132	Gull Bay (Gull River 55)	Gull Bay	Aboriginal	206	FF	n/a	Diesel	550	n/a	n/a	981
133	Hillsport	n/a	Non-Aboriginal	68	FF	n/a	n/a	170	n/a	n/a	503
134	Kasabonika	Kasabonika Lake	Aboriginal	681	FF	n/a	Diesel	825	Wind	30	4,037
136	Kee Way Win (Keewaywin (Niska))	Kee-Way-Win	Aboriginal	318	FF	n/a	Diesel	590	n/a	n/a	2,364
137	Kingfisher Lake 1	Kingfisher	Aboriginal	415	FF	n/a	Diesel	825	n/a	n/a	2,053
138	Lac Seul	n/a	Non-Aboriginal	2160	FF	n/a	n/a	n/a	n/a	n/a	n/a
139	Lansdowne House (Neskantaga)	Neskantaga First Nation	Aboriginal	265	FF	n/a	Diesel	705	n/a	n/a	1,878
140	MacDowell	n/a	Non-Aboriginal	22	n/a	n/a	n/a	n/a	n/a	n/a	n/a
141	Moose River Crossing	n/a	Non-Aboriginal	90	n/a	n/a	n/a	n/a	n/a	n/a	n/a
142	Muskrat Dam	Muskrat Dam Lake	Aboriginal	252	FF	n/a	Diesel	825	n/a	n/a	2,116
143	North Car bou Lake (Weagamow Lake 87)	North Caribou Lake	Aboriginal	700	FF	n/a	Diesel	825	n/a	n/a	4,305
144	North Spirit Lake	North Spirit Lake	Aboriginal	259	FF	n/a	Diesel	100	n/a	n/a	2,085
145	Oba	n/a	Non-Aboriginal	75	FF	n/a	n/a	360	n/a	n/a	n/a
146	Ogoki/Marten Falls 65	Marten Falls	Aboriginal	221	FF	n/a	Diesel	610	n/a	n/a	2,190
147	Peawanuck (Winisk 90)	Weenusk (Peawanuck)	Aboriginal	221	FF	n/a	Diesel Restricted	1010	n/a	n/a	2,249
148	Pikangikum (14)	Pikangikum	Aboriginal	2100	FF	n/a	Diesel Restricted	1250	n/a	n/a	5,033
149	Ponask	n/a	Non-Aboriginal	10	n/a	n/a	n/a	n/a	n/a	n/a	n/a
150	Poplar Hill	Poplar Hill	Aboriginal	457	FF	n/a	Diesel	185	n/a	n/a	2,189

Temp #	Community/Site/Settlement Name	First Nation/Band Name	Type	Population Census 2006	Main Power Source	Local Grid Name	Fossil Fuel Generation Type	FF Capacity	Renewable Type	RE Capacity	Annual Energy Demand
151	Ramsey	n/a	Non-Aboriginal	4011	FF	n/a	n/a	n/a	n/a	n/a	n/a
152	Sachigo Lake 1	Sachigo Lake	Aboriginal	450	FF	n/a	Diesel	550	n/a	n/a	2,874
153	Sandy Lake	Sandy Lake	Aboriginal	1843	FF	n/a	Diesel	3250	n/a	n/a	11,025
154	Sultan	n/a	Non-Aboriginal	179	FF	n/a	n/a	450	n/a	n/a	1,330
155	Summer Beaver	N binamik	Aboriginal	362	FF	n/a	Diesel	1760	n/a	n/a	1,996
156	Wapekeka 1 (2) (Angling Lake)	Wapekeka	Aboriginal	350	FF	n/a	Diesel	550	n/a	n/a	2,346
157	Wawakapewin (Long Dog Lake)	Wawakapewin	Aboriginal	21	FF	n/a	Diesel Restricted	140	n/a	n/a	3,357
158	Webequie	Webequi	Aboriginal	614	FF	n/a	Diesel	825	n/a	n/a	3,067
159	Wunnummin Lake 1 & 2	Wunnummin	Aboriginal	487	FF	n/a	Diesel	1125	n/a	n/a	2,213
Total	38	25	-	21,342	-	0	-	25,570	-	520	84,356
	Sites	Aboriginal Sites				Local Grid	Total FF+RE	26,090		CF	36.9%

FF: Fossil Fuel – RE: Renewable Energy – NA: Not Applicable

Hydro One Remote Communities services thirteen of the 28 existing remote communities with a total population of 8,129 people. The fossil fuel power plants have an estimated capacity of 14.4 MW with two sites having an additional 0.5 MW in renewable capacity. These are estimated to produce 50,492 MWh/yr giving a capacity factor of 38.6%. No fuel or costing data has been reported for these sites.

No indication is provided on the service providers for the remaining three sites that have production data. These are small non-Aboriginal sites using gensets that are less than 500 kW for a total of 946 kW and producing about 3,000 MWh or 33.8% capacity factor for a total population of 382 persons.

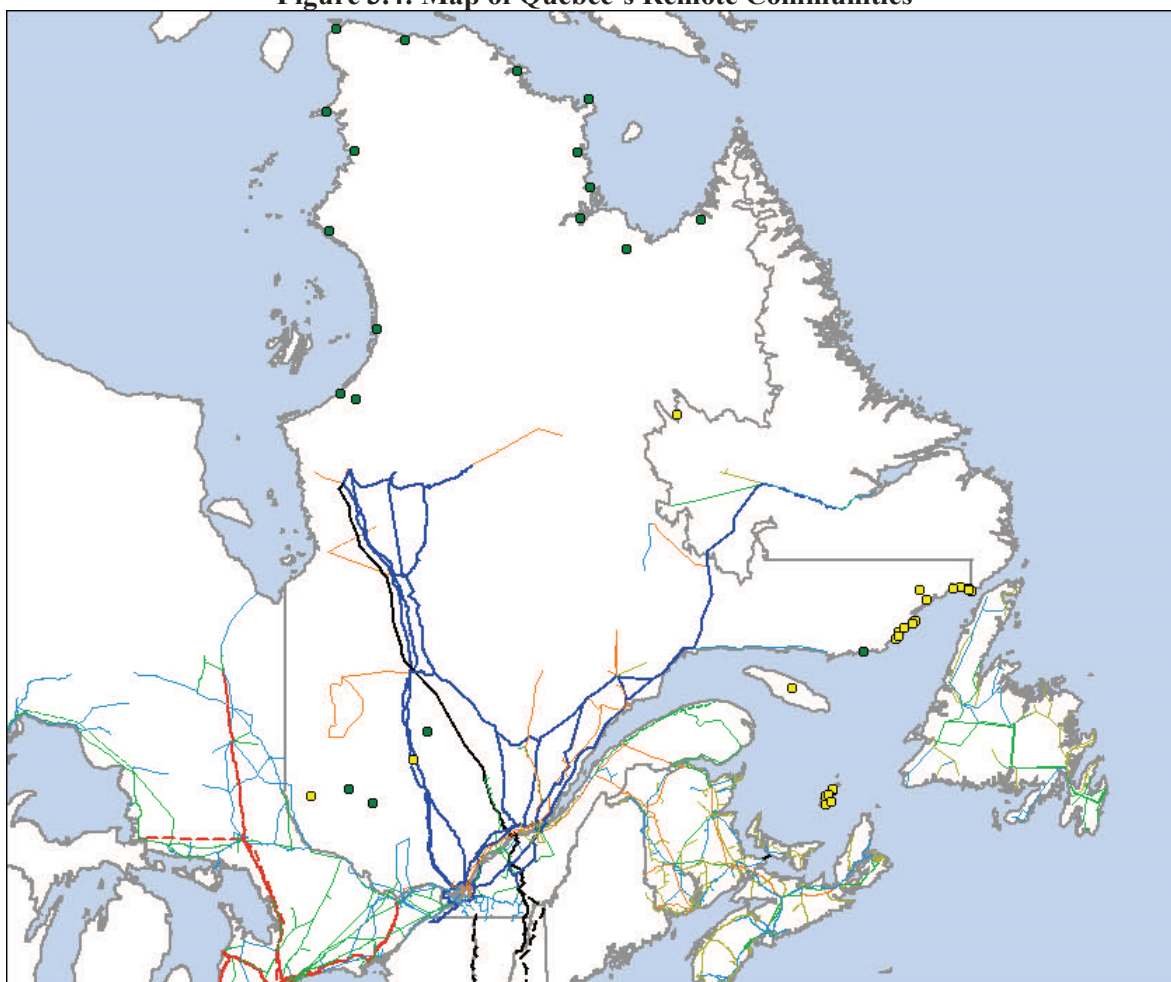
The ten other remote sites are non-Aboriginal communities, mostly settlements near the rail tracks in the center of Ontario and with a total population of 6,724 persons. No data on capacity, production or fuel uses are available.

Quebec

Over the last 25 years, the number of remote communities in Quebec and their population did not change very much going from 47 to 44 sites and from 35,000 to 34,729 persons.

It is only recently that the three communities of Fort Rupert, Weymontachie and Wemindji in the Haute-Mauricie region have been tied to the grid between 2006 and 2009.

The total installed capacity in all of Quebec's remote communities is estimated at 128 MW of which 107 MW is fossil fuel powered and 21 MW is hydro. Numbers for production are provided only for 18 sites totalling 37 MW. These are fossil fuel plants and have an estimated yearly production of 87,214 MWh/yr (2007) giving a capacity factor of 26.9 %.

Figure 3.4: Map of Quebec's Remote Communities

Green: Aboriginal communities / Yellow: Non-Aboriginal communities

There are three local grids in different regions of Quebec that contribute significantly to the total installed capacity. Two are very large and tie a number of villages together while the other one is a small two-village grid.

The Cap-aux-Meules diesel grid services 7 communities on Magdalene Islands, for a population of 13,180 persons and has an installed capacity of 67 MW, using heavy, #6 oil commonly referred to as Bunker C fuel. Production number for the power plant is not available. Diesel fuel price paid in 2007 was 16 cents/litre.

The Lac Robertson hydro grid services 13 communities, providing electricity to a population of 4,760 persons and has an installed capacity of 21 MW. Production number for the power plant is not available.

The Kuujuaapik diesel grid ties the Cree village of Whapmagooshui to the Inuit village of Kuujuaapik. Both have a total population of 1,380 persons. The power plant has an installed capacity of 3.4 MW, producing 9,800 MWh/yr (2007) for a capacity factor of 32.9%. A total of 2,400,000 litres of diesel fuel was purchased in 2007 for an average price of 51 cents/litre. The electricity rate paid by consumers was 41 cents/kWh in 2006.

Table 3.4: Remote Communities of Quebec

Temp #	Community/Site/Settlement Name	First Nation/ Band Name	Type	Population Censuses 2006	Main Power Source	Local Grid Name	Fossil Fuel Generation Type	FF Capacity	Renewable Type	RE Capacity	Annual Energy Demand
-	Name	Name	-	(#)	-	Name	-	(kW)	-	(kW)	(MWh)
160	Akulivik (Cape Smith)	Akulivik	Aboriginal	507	FF	n/a	Diesel	900	n/a	n/a	2,300
161	Anticosti	n/a	Non-Aboriginal	273	FF	n/a	Diesel	2790	n/a	n/a	4,015
162	Aupaluk	Aupaluk	Aboriginal	174	FF	n/a	Diesel	780	n/a	n/a	1,200
163	Aylmer Sound	n/a	Non-Aboriginal	80	Local Grid	Lac Robertson	n/a	n/a	n/a	n/a	n/a
164	Belleterre	n/a	Non-Aboriginal	427	FF	n/a	n/a	n/a	n/a	n/a	n/a
165	Blanc Sablon	n/a	Non-Aboriginal	350	Local Grid	Lac Robertson	n/a	n/a	n/a	n/a	n/a
166	Bradore Bay	n/a	Non-Aboriginal	175	Local Grid	Lac Robertson	n/a	n/a	n/a	n/a	n/a
167	Cap aux Meules	n/a	Non-Aboriginal	1648	FF	Cap aux Meules	Diesel	67200	n/a	n/a	n/a
168	Chevery	n/a	Non-Aboriginal	296	Local Grid	Lac Robertson	n/a	n/a	n/a	n/a	n/a
169	Clova	n/a	Non-Aboriginal	40	FF	n/a	n/a	n/a	n/a	n/a	745
170	Etang du Nord	n/a	Non-Aboriginal	3099	Local Grid	Cap aux Meules	n/a	n/a	n/a	n/a	n/a
171	Fatima	n/a	Non-Aboriginal	2809	Local Grid	Cap aux Meules	n/a	n/a	n/a	n/a	n/a
172	Grand Entree	n/a	Non-Aboriginal	733	Local Grid	Cap aux Meules	n/a	n/a	n/a	n/a	n/a
173	Grosse Ile	n/a	Non-Aboriginal	575	Local Grid	Cap aux Meules	n/a	n/a	n/a	n/a	n/a
174	Harrington Harbour	n/a	Non-Aboriginal	285	Local Grid	Lac Robertson	n/a	n/a	n/a	n/a	n/a
175	Havre Aubert	n/a	Non-Aboriginal	2238	Local Grid	Cap aux Meules	n/a	n/a	n/a	n/a	n/a
176	Havre aux Maisons	n/a	Non-Aboriginal	2078	Local Grid	Cap aux Meules	n/a	n/a	n/a	n/a	n/a
177	Ile D'Entrée	n/a	Non-Aboriginal	178	FF	n/a	Diesel	1200	n/a	n/a	n/a
178	Inukjuak (Port Harrison)	Inukjuak	Aboriginal	1,597	FF	n/a	Diesel	2755	n/a	n/a	7,400
179	Ivujivik (C Wolstenholme)	Ivujivik	Aboriginal	349	FF	n/a	Diesel	1015	n/a	n/a	1,400
180	Kangiqualujuaq (George R)	Kangiqualujuaq	Aboriginal	735	FF	n/a	Diesel	1920	n/a	n/a	3,800
181	Kangiqsujuaq (Maricourt)	Kangiqsujuaq	Aboriginal	605	FF	n/a	Diesel	1520	n/a	n/a	3,200
182	Kangirsuk (Payne Bay)	Kangirsuk	Aboriginal	466	FF	n/a	Diesel	1360	n/a	n/a	2,800

Remote Communities in Canada

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Temp #	Community/Site/Settlement Name	First Nation/ Band Name	Type	Population Censu s 2006	Main Power Source	Local Grid Name	Fossil Fuel Generation Type	FF Capacity	Renewable Type	RE Capacity	Annual Energy Demand
183	Kawawach kamach	n/a	Non-Aboriginal	419	FF	n/a	n/a	n/a	n/a	n/a	n/a
184	Kitcisakic (Grand Lac Victoria)	Communauté anicinape de Kitcisakic	Aboriginal	294	FF	n/a	Diesel	n/a	PV	3	n/a
185	Kuujuuak (Fort Chimo)	Kuujuuaq	Aboriginal	2132	FF	n/a	Diesel	4335	Solar Thermal System	n/a	15,100
186	Kuujuaraapik (P Baleine)	Kuujuaraapik	Aboriginal	568	FF	Kuujuarapik	Diesel	3405	n/a	n/a	9,800
187	La Romaine (2)	Montagnais de Unamen Shipu	Aboriginal	926	FF	n/a	Diesel	4935	n/a	n/a	12,100
188	La Tabatiere		Non-Aboriginal	500	RE	Lac Robertson	n/a	n/a	Hydro	21000	n/a
189	Lac Rapide	Algonquins of Barriere Lake	Aboriginal	854	FF	n/a	Diesel	1525	n/a	n/a	n/a
190	Lourdes de Blanc Sablon	n/a	Non-Aboriginal	700	Local Grid	Lac Robertson	n/a	n/a	n/a	n/a	61,360
191	Middle Bay	n/a	Non-Aboriginal	97	Local Grid	Lac Robertson	n/a	n/a	n/a	n/a	n/a
192	Mutton Bay	n/a	Non-Aboriginal	200	Local Grid	Lac Robertson	n/a	n/a	n/a	n/a	n/a
193	Obedjiwan (28)	Atikamekw d'Opitciwan	Aboriginal	1782	FF	n/a	Diesel	2900	n/a	n/a	5,054
194	Old Fort Bay	n/a	Non-Aboriginal	367	Local Grid	Lac Robertson	n/a	n/a	n/a	n/a	n/a
195	Puvirnituk	Puvirnituk	Aboriginal	1457	FF	n/a	Diesel	2870	n/a	n/a	7,400
196	Quaqtaq	Quaqtaq	Aboriginal	315	FF	n/a	Diesel	1085	n/a	n/a	1,900
197	Salluit	Salluit	Aboriginal	1241	FF	n/a	Diesel	2000	n/a	n/a	5,500
198	St Paul's River	n/a	Non-Aboriginal	456	Local Grid	Lac Robertson	n/a	n/a	n/a	n/a	n/a
199	St. Augustin	n/a	Non-Aboriginal	980	Local Grid	Lac Robertson	n/a	n/a	n/a	n/a	n/a
200	Tasiujak (Leaf Bay)	Tasiujaq	Aboriginal	248	FF	n/a	Diesel	850	n/a	n/a	1,600
201	Tete a la Baleine	n/a	Non-Aboriginal	274	Local Grid	Lac Robertson	n/a	n/a	n/a	n/a	n/a
202	Umiujaq	Umiujaq	Aboriginal	390	FF	n/a	Diesel	1050	n/a	n/a	1,900
206	Whapmagoostui	Première nation de Whapmagoostui	Aboriginal	812	Local Grid	Kuujuarapik	n/a	n/a	n/a	n/a	n/a
Total	44	19	-	34,729	-	22	-	106,925	-	21,003	148,574
	Sites	Aboriginal Sites				Local Grid	Total FF+RE	127,928	kW	CF	13.3%

FF: Fossil Fuel – RE: Renewable Energy – NA: Not Applicable

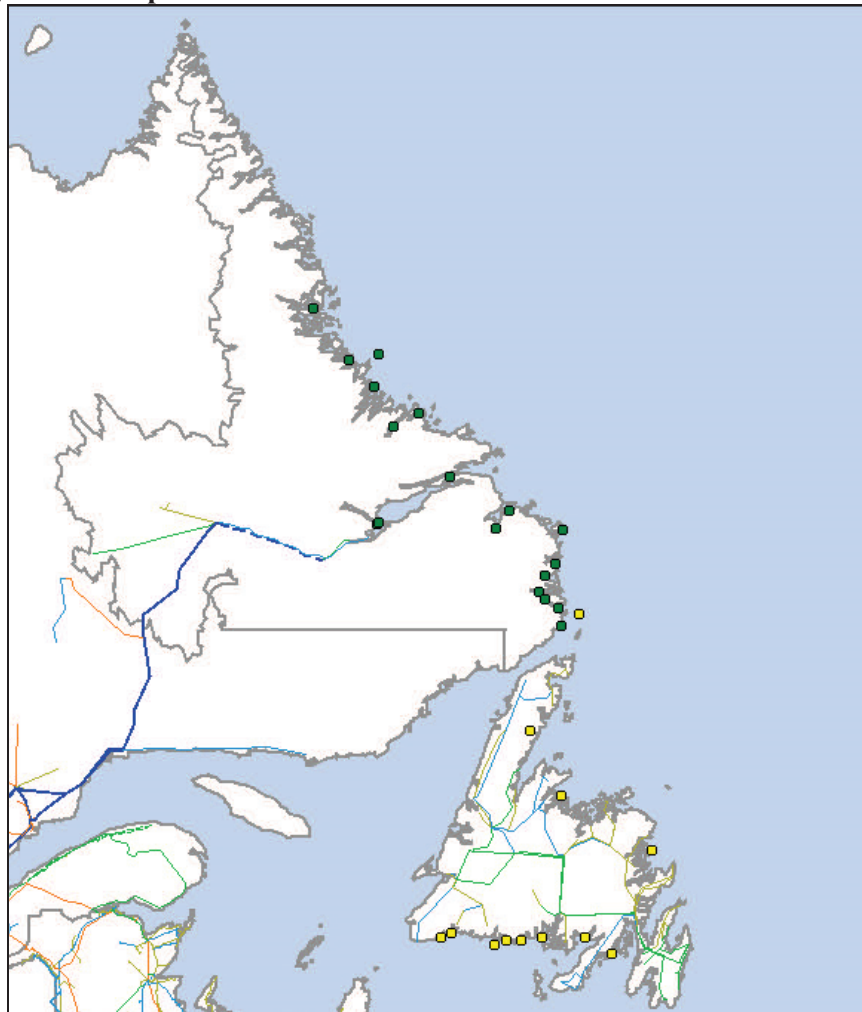
Hydro-Québec is the main electricity supplier in all of Quebec's remote communities but has transferred management of the 14 Nunavik sites to the Makivik Corporation. These 14 sites are Inuit villages in northern Quebec with a total population of 10,784 persons. These sites are all powered by diesel power plants. Their total capacity is 25.85 MW, producing an estimated 65,300 MWh/year (2007) giving an average capacity factor of 28.8%. The diesel fuel price averaged 53 cents/litre in 2007. The electricity rate paid by consumers in 2006 was 41 cents/kWh.

Newfoundland & Labrador

With the exception of Churchill Falls, Newfoundland Island and the Labrador Peninsula are not connected to the North American electric grid. However, since the grid on the island is large, and uses a large diesel fuel power plant providing electricity to most of Newfoundland island cities and villages; these are considered "non-remote" for this database. This situation could be further validated in the near future with the connection of the province to the North American grid through a submarine cable from Newfoundland to Nova Scotia.

Newfoundland & Labrador is one of the provinces where remote communities have undergone substantial changes in the past twenty-five years. The number of remote communities has decreased from 74 to 29 and the population in these communities has decreased from 30,000 to 9,964. Grid extension was the main reason for the decrease in the number of remote communities and migration also contributed to the population decrease in the remaining communities.

Figure 3.5: Map of Newfoundland and Labrador's Remote Communities



Green: Aboriginal communities / Yellow: Non-Aboriginal communities

The total installed capacity in these remote communities is estimated at 24.9 MW of which 600 kW is from wind generation and the remaining is fossil fuel powered, mainly from diesel generators.

From the 26 sites that report production data with an estimated capacity of 24.2 MW, the total yearly production is about 43,485 MWh/yr for a capacity factor of 20.5%.

As can be seen on the map, there are 11 remote communities on the island. These are all non-Aboriginal sites. There are 17 communities in Labrador. 16 are Aboriginal settlements, and 1 is a non-Aboriginal settlement.

The communities on the island are scattered along its coasts or are on small islands of the coast and are difficult to access by the grid. The sites are diesel powered and have a total capacity of 9 MW with one site supplemented by 600 kW of wind generation and servicing 3,152 people. Total production is about 14,873 MWh/yr, for a capacity factor of 17.6%. The average diesel price is about 36 cents/litres (no year given). Retail price of electricity is not provided but N&L Hydro reports a high-tier rate of 15 cents/kWh (2011).

Table 3.5: Remote Communities of Newfoundland and Labrador

Temp #	Community/Settlement Name	First Nation/Band Name	Type	Population Census 2006	Main Power Source	Local Grid Name	Fossil Fuel Generation Type	FF Capacity	Renewable Type	RE Capacity	Annual Energy Demand
-	Name	name	-	(#)		Name	-	(kW)	-	(kW)	(MWh)
207	Black Tickle	Black Tickle	Aboriginal	220	FF	n/a	Diesel	765	n/a	n/a	1,080
208	Cartwright (Métis)	Cartwright	Aboriginal	552	FF	n/a	Diesel	1485	n/a	n/a	3,933
209	Charlottetown	Charlottetown	Aboriginal	366	FF	n/a	Diesel	620	n/a	n/a	1,496
211	Francois	n/a	Non-Aboriginal	211	FF	n/a	Diesel	550	n/a	n/a	751
212	Grey River	n/a	Non-Aboriginal	233	FF	n/a	Diesel	522	n/a	n/a	715
213	Harbour Deep	n/a	Non-Aboriginal	203	FF	n/a	Diesel	658	n/a	n/a	873
214	Hopedale	Hopedale	Aboriginal	530	FF	n/a	Diesel	1840	n/a	n/a	2,673
215	La Poile	n/a	Non-Aboriginal	7	FF	n/a	Diesel	408	n/a	n/a	577
216	Little Bay Islands	n/a	Non-Aboriginal	261	FF	n/a	Diesel	1350	n/a	n/a	1,830
217	Lodge Bay	n/a	Non-Aboriginal	124	Local Grid	Mary's Harbour	n/a	n/a	n/a	n/a	465
218	Makkovik	Makkovik	Aboriginal	362	FF	n/a	Diesel	1300	n/a	n/a	2,422
219	Mary's Harbour	Mary's Harbour	Aboriginal	417	FF	Mary's Harbour	Diesel	1300	n/a	n/a	3,110
220	McCallum	n/a	Non-Aboriginal	206	FF	n/a	Diesel	522	n/a	n/a	545
221	Mud Lake	Mud Lake	Aboriginal	60	FF	n/a	Diesel	180	n/a	n/a	221
222	Mushuau Innu First Nation (Natuashish 2) (formally located at Davis Inlet)	Mushuau Innu First Nation	Aboriginal	706	FF	n/a	Diesel	695	n/a	n/a	n/a
223	Nain	Nain	Aboriginal	1034	FF	n/a	Diesel	2920	n/a	n/a	5,142
224	Norman Bay	Norman Bay	Aboriginal	45	n/a	n/a	n/a	n/a	n/a	n/a	n/a
225	Paradise River	Paradise River	Aboriginal	14	FF	n/a	n/a	145	n/a	n/a	186
226	Petites	n/a	Non-Aboriginal	102	FF	n/a	n/a	380	n/a	n/a	272

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Temp #	Community/Settlement Name	First Nation/Band Name	Type	Population Census 2006	Main Power Source	Local Grid Name	Fossil Fuel Generation Type	FF Capacity	Renewable Type	RE Capacity	Annual Energy Demand
227	Port Hope Simpson	Port Hope Simpson	Aboriginal	529	FF	n/a	Diesel	1390	n/a	n/a	2,187
228	Postville	Postville	Aboriginal	219	FF	n/a	Diesel	735	n/a	n/a	1,293
229	Ramea	n/a	Non-Aboriginal	1224	Hybrid	n/a	Diesel	2775	Wind	600	6,686
230	Rencontre East	n/a	Non-Aboriginal	212	FF	n/a	Diesel	686	n/a	n/a	934
231	Rigolet	Rigolet	Aboriginal	269	FF	n/a	Diesel	870	n/a	n/a	2,064
233	South East Bight	n/a	Non-Aboriginal	115	FF	n/a	Diesel	327	n/a	n/a	482
234	St Lewis	St. Lewis	Aboriginal	252	FF	n/a	Diesel	695	n/a	n/a	1,923
235	St. Brendan's	n/a	Non-Aboriginal	378	FF	n/a	Diesel	850	n/a	n/a	1,208
236	William's Harbour	Williams Harbour	Aboriginal	59	FF	n/a	Diesel	325	n/a	n/a	419
Total	28	16	-	8,910	-	2	-	24,293	-	600	43,433
	Sites	Aboriginal Sites				Local Grid	Total FF+RE	25,588		CF	20.3%

FF: Fossil Fuel – RE: Renewable Energy – NA: Not Applicable

The remote communities of Labrador are along the eastern coast and are mainly Inuit or Inuit-Métis villages except for two that are Innu First Nations sites and one that is a non-Aboriginal community. This last one, Lodge Bay, is a community of both non-Aboriginal and Inuit-Métis people and is connected to Mary's Harbour power plant.

The 17 remote communities of Labrador are diesel powered and have a total capacity of 16 MW, servicing 7,277 people. Of these sites, 16 report production numbers. These have a total capacity of 15.3 MW producing about 28,614 MWh/yr for a capacity factor of 21.4%. The average diesel price is about 32 cents/litres. Only five sites maintained by the Nunatsiavut regional government report retail electricity price of 14 cents/kWh (no year given).

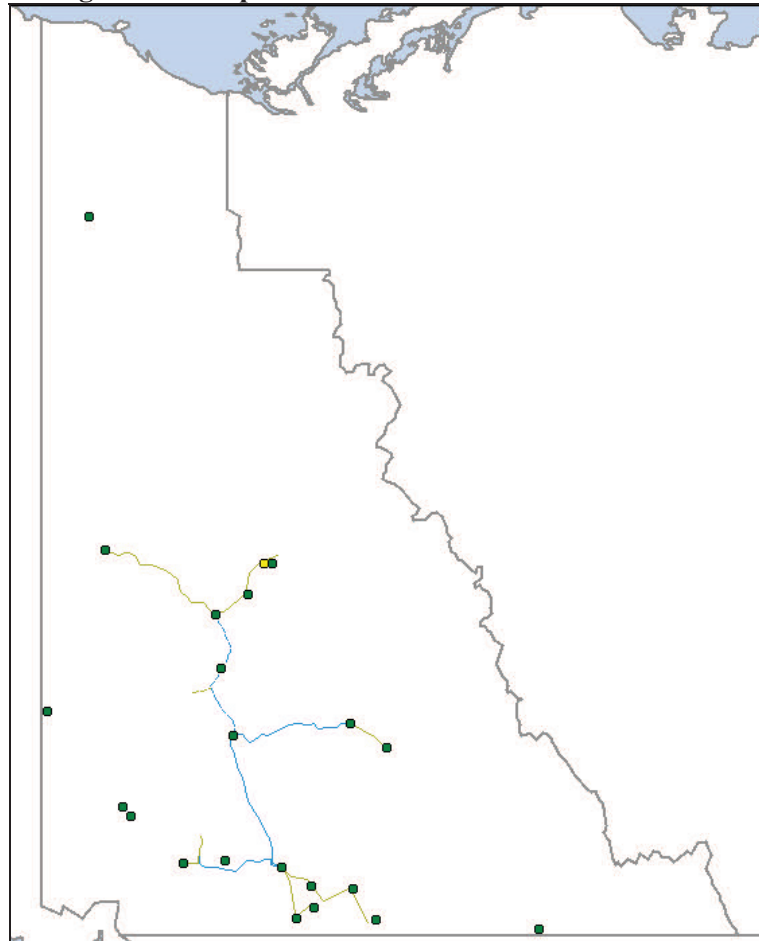
Newfoundland & Labrador Hydro services all the diesel plants on the island and in Labrador. The Nunatsiavut regional government operates five of the Labrador Inuit communities.

Yukon

There are 22 remote communities in the Yukon with a total population of 30,176 people up from 22,828 from the Sigma report of 1985 for the same number of sites. High birth rates and resettling have been two of the main reasons for the increase in population. All the communities except one are shown as Aboriginal, the exception being an old commercial mining town, Elsa, which is connected to a local grid.

Yukon Energy Corporation, a publicly owned electrical utility and Yukon Electrical Company Ltd., a private power company, are the electricity suppliers and operators of all power plants in the Yukon. While the territory has a few extensive grid lines, these grids are considered local because they are not part of the North American grid and all their communities are deemed as off-grid remote communities.

The total capacity of all power plants in the Yukon is 51.6 MW from diesel fuel generation and 75.8 MW from hydro for a total of 127.4 MW.

Figure 3.6: Map of Yukon's Remote Communities

Green: Aboriginal communities / Yellow: Non-Aboriginal communities

The largest grid system is called the Whitehorse-Aishihik-Faro Lake (WAF) and constitutes the bulk of this capacity. Hydro stations in the WAF system account for 70 MW, wind for 0.8 MW and diesel stations for 34.7 MW of capacity, for a total of 105.5 MW. This system provides power to 11 communities including Whitehorse, the capital of Yukon for a total population of 26,952 people (22,998 in Whitehorse alone). The WAF generates about 216,072 MWh/yr, for a capacity factor of 23.4%. Diesel fuel quantity is not reported although utility price is given at an average cost of 33 cents/litre.

Two other local grids (the Mayo and Destruction Bay grids) serve 4 and 2 communities respectively.

The Mayo grid is composed of a 5 MW hydro facility with a diesel backup plant of 2 MW near Mayo and another diesel plant of 6 MW in Dawson City that is used only as backup since it was connected to the Mayo grid in 2004. While the total capacity on this grid is large at 13 MW, power is mainly supplied by the hydro facility. It serves a total of 1,926 people. Total production is estimated at 28,121 MWh/yr, giving a capacity factor of 24.7% for the total capacity, or 64.2% using only the hydro facility.

The Destruction Bay grid is composed of one 700 kW diesel power plant powering electricity to a total of 128 persons. It produces an estimated 3,069 MWh/yr for a capacity factor of 50%. Utility fuel rate is 37 cents/litre in these northern locations.

Five other communities are not connected to any local grid. These are powered from individual diesel fuel power plants for a total of 8.2 MW, serving 2,270 people. They produce an estimated 15,946 MWh/yr for a

capacity factor of 22.2%. Average cost of diesel fuel at the utility level is around 47 cents/litre including Old Crow, the most northern site paying an estimated 80 cents/litre. Data for three of the site shows that a total capacity of 7 MW, producing 13,996 MWh/yr (22.8% CF) and consuming 4,881,000 litre/yr (2008 data).

The Yukon Electrical Company Ltd. is the power supplier and operator of all power plants in the Yukon.

Table 3.6: Remote Communities of Yukon

Temp #	Community/ Site/ Settlement Name	First Nation/ Band Name	Type	Population Censuses 2006	Main Power Source	Local Grid Name	Fossil Fuel Generation Type	FF Capacity	Renewable Type	RE Capacity	Annual Energy Demand
-	Name	Name	-	(#)	-	Name	-	(kW)	-	(kW)	(MWh)
302	Beaver Creek	White River First Nation	Aboriginal	112	FF	n/a	Diesel	900	n/a	n/a	2,069
303	Burwash Landing	Kluane First Nation	Aboriginal	73	Local Grid	Destruction Bay	n/a	n/a	Biomass district heating system	n/a	1,769
304	Carcross	Carcross/Tagish First Nation	Aboriginal	331	Local Grid	Whitehorse-Aishihik-Faro (WAF) grid	n/a	n/a	n/a	n/a	n/a
305	Carmacks	Little Salmon/Carmacks First Nation	Aboriginal	425	Local Grid	WAF grid	n/a	n/a	Biomass district heating system	n/a	n/a
306	Champagne	Champagne and Aishihik First Nations (?)	Aboriginal	24	Local Grid	WAF grid	n/a	n/a	Biomass district heating system	n/a	n/a
307	Dawson City	Tr'ondëk Hwëch'in (part of larger Han nation)	Aboriginal	1327	Local Grid	Mayo	Diesel Backup	6000	n/a	n/a	11,748
308	Destruction Bay	Kluane First Nation	Aboriginal	55	FF	Destruction Bay	Diesel	700	n/a	n/a	1,300
309	Elsa	n/a	Non-Aboriginal	336	Local Grid	Mayo	n/a	n/a	n/a	n/a	n/a
310	Faro	Kaska Dena people of Ross River, Ross River Dena Council	Aboriginal	341	Local Grid	WAF grid	Diesel Backup	5400	n/a	n/a	n/a
311	Haines Junction	Champagne and Aishihik First Nations	Aboriginal	589	Local Grid	WAF grid	Diesel Backup	1800	Biomass district heating system	n/a	n/a
312	Johnsons Crossing	Johnson's Crossing (tied to WAF grid)	Aboriginal	15	Local Grid	WAF grid	n/a	n/a	n/a	n/a	n/a
313	Keno	Keno (tied to Mayo grid)	Aboriginal	15	Local Grid	Mayo	n/a	n/a	n/a	n/a	n/a
314	Marsh Lake	Carcross/Tagish First Nation	Aboriginal	1653	Local Grid	WAF grid	n/a	n/a	n/a	n/a	n/a
315	Mayo	First Nation of Nacho Nyak Dun (affiliated with the Northern Tutchone Council)	Aboriginal	248	RE	Mayo	Diesel Backup	2000	Hydro	5000	16,373
316	Old Crow	Vuntut Gwitchin First Nation	Aboriginal	253	FF	n/a	Diesel	1100	n/a	n/a	1,300

Temp #	Community/ Site/ Settlement Name	First Nation/ Band Name	Type	Population Census 2006	Main Power Source	Local Grid Name	Fossil Fuel Generation Type	FF Capacity	Renewable Type	RE Capacity	Annual Energy Demand
-	Name	Name	-	(#)	-	Name	-	(kW)	-	(kW)	(MWh)
317	Pelly Crossing	Selkirk First Nation	Aboriginal	296	FF	n/a	Diesel	1000	n/a	n/a	1,600
318	Ross River	Kaska Dena people of Ross River, Ross River Dena Council	Aboriginal	313	Local Grid	WAF grid	Diesel Backup	1000	n/a	n/a	n/a
319	Stewart Crossing	Stewart Crossing (tied to Mayo grid)	Aboriginal	35	FF	n/a	Diesel	200	n/a	n/a	350
321	Tagish and Marsh Lake	Carcross/Tagish First Nation	Aboriginal	222	Local Grid	WAF grid	n/a	n/a	n/a	n/a	n/a
322	Teslin	Dakh-ka Tlingit First Nation	Aboriginal	141	Local Grid	WAF grid	Diesel Backup	1500	n/a	n/a	n/a
324	Watson Lake/Upper Liard	Liard First Nation	Aboriginal	474	FF	n/a	Diesel	5000	n/a	n/a	10,627
325	Whitehorse	Kwanlin Dun First Nation, Ta'an Kwach'an Council	Aboriginal	22898	RE	WAF grid	Diesel Backup	25000	Hydro	70810	216,072
Total	22	21	-	30,176		17	-	51,600	-	75,810	263,208
	Sites	Aboriginal Sites				Local Grid	Total FF+RE	127,410	kW	CF	23.6%

FF: Fossil Fuel – RE: Renewable Energy – NA: Not Applicable

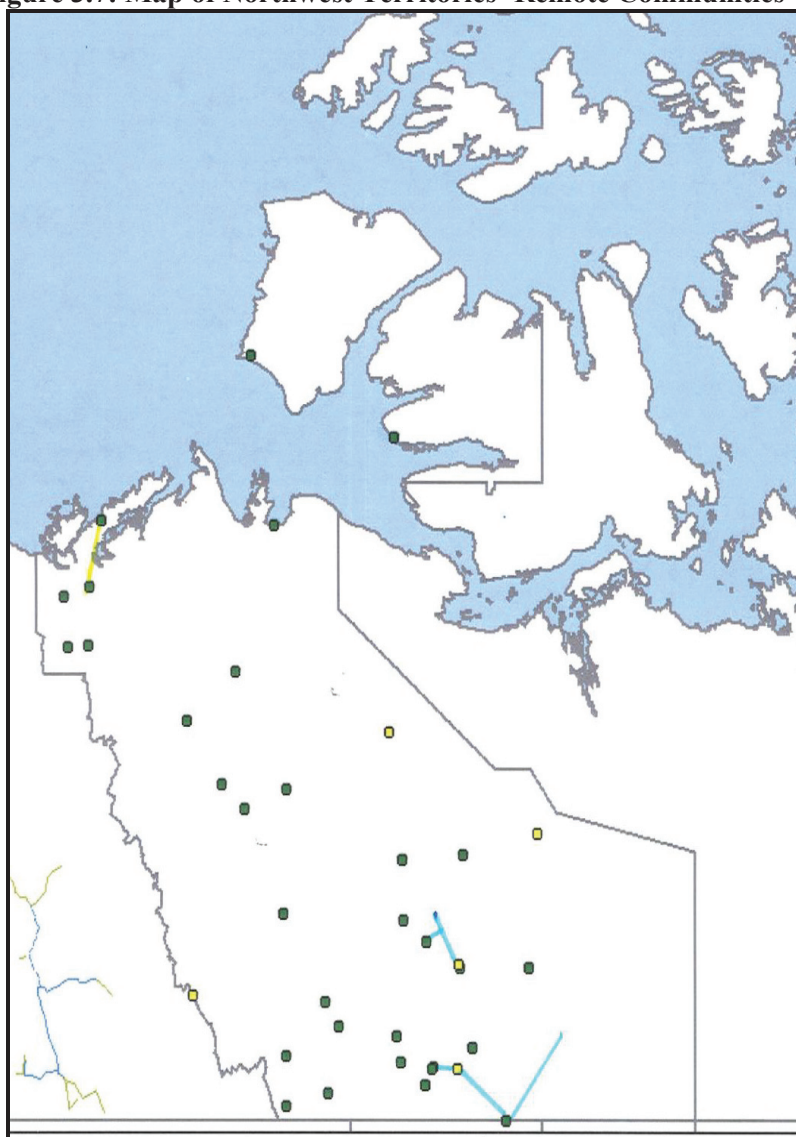
Northwest Territories

The Northwest Territories (NWT) were divided in 1999 to form another territory called Nunavut, on the eastern side of NWT. Both territories have a total of 64 remote communities, which is one more than what was reported in the Sigma report twenty-five years ago. Population has increased significantly, going from 46,041 in 1985, to 71,403 today for both regions. High birth rates has been one of the main reason for the increase in population as well as the creation of Nunavut, which has attracted many people to come back and live there.

More specifically, the NWT currently has 38 remote communities for a total population of 41,950 people. 33 sites are Aboriginal communities for a total of 22,410 people, 5 sites are non-Aboriginal, for a total of 19,540 people, including Yellowknife with a population of 18,700 people. The remote communities in the NWT are shown in Figure 7.

The total installed capacity in the NWT is estimated at 186.3 MW of which, 114.7 MW is fossil fuel powered and 71.6 MW is renewable power. Of this, most is hydro, with a total of 49.8 MW; the remaining is from waste heat (21 MW), wood pellet, PV and solar heaters (less than 1 MW). Total production is estimated to be around 357,603 MWh (2008), giving a capacity factor of 21.9%. In 2008, diesel fuel purchases totalled 14,218,794 litres for 25 sites producing 83,225 MWh/yr. Utility diesel price averaged 46 cents/litre (2008). Consumer rates averaged 26 cents/kWh.

The Northwest Territories Power Corporation (NTPC) is the main power supplier in the Northwest Territories. NTPC states that 75% of all NWT electricity is generated from hydroelectricity.

Figure 3.7: Map of Northwest Territories' Remote Communities

Green: Aboriginal communities / Yellow: Non-Aboriginal communities

There are two local grids in the NWT near Yellowknife, located in the mid-southern area of NWT, having a total installed capacity of 99.7 MW of which, 49.1 MW is from hydro and 50.6 MW is from diesel fuel power plants and servicing 27,795 people.

The Snare Transmission System comprises the City of Yellowknife and three adjoining Aboriginal villages totalling 18,700 people for the city and 2,141 people for the villages. It has a total installed capacity of 67.2 MW of which, 30.3 MW is from hydro, 0.8 MW is from wood pellet and 36.1 MW is from diesel powered plants. Annual production is estimated at 292,710 MWh/yr for a capacity factor of 49.7%. Diesel purchased in 2008 amounted to 394,464 litres with a utility cost of 26 cents litres.

The Taltson Hydro System is located to the northeast of Fort Smith and serves 5 additional communities with a total population of 6,954 people. The power system has a total installed capacity of 32.5 MW of which 18 MW is hydro and 14.5 MW are diesel backup stations. Production numbers provided were not consistent to be valid.

There are 28 remote communities that are not connected to a local grid of which 24 sites are Aboriginal communities, 2 are active mining sites and 2 are old mining towns. The total population for these sites is 14,155 people. Total installed capacity is 86.5 MW, with 64 MW from fossil fuel plants powered with diesel or natural gas, 21 MW is from waste heat and 1.5 MW is from hydro. Small PV and solar hot water systems have also been installed on public buildings.

Table 3.7: Remote Communities of Northwest Territories

Temp #	Community/Site / Settlement Name	First Nation/ Band Name	Type	Population Cens us 2006 (#)	Main Power Sourc e	Local Grid Name	Fossil Fuel Generation Type	FF Capac ity (kW)	Renewable Type	RE Capacity (kW)	Annual Energy Demand (MWh)
-	Name	Name	-	(#)	-	Name	-	(kW)	-	(kW)	(MWh)
237	Aklavik	Aklavik	Aboriginal	594	FF	n/a	Diesel	1800	n/a	n/a	2,817
238	Colville Lake (Behdzi Ahda" First Nation)	Behdzi Ahda" First Nation	Aboriginal	126	FF	n/a	Diesel	240	n/a	n/a	310
239	Deline (Fort Franklin)	Deline	Aboriginal	525	FF	n/a	Diesel	1250	n/a	n/a	2,610
240	Detah (Dene)	Yellowknives Dene First Nation	Aboriginal	247	Local Grid	Yellowknife Snare System	Diesel Backup	7360	n/a	n/a	n/a
241	Echo Bay (Port Radium)		Non-Aboriginal	10	n/a	n/a	n/a	n/a	n/a	n/a	n/a
242	Enterprise	Enterprise	Aboriginal	97	Local Grid	Taltson	n/a	n/a	n/a	n/a	n/a
243	Fort Good Hope (Community of K'asho Got'ine)	Charter Community of K'asho Got'ine	Aboriginal	557	FF	n/a	Diesel	1230	n/a	n/a	2,864
244	Fort Liard (Acho Dene Koe)	Acho Dene Koe	Aboriginal	583	FF	n/a	Diesel	1320	n/a	n/a	2,658
245	Fort McPherson (Tetlit Gwich'in)	Tetlit Gwich'in	Aboriginal	776	FF	n/a	Diesel	1825	Waste Heat Recovery	n/a	3,453
246	Fort Providence (Deh Gah Gotie Dene Council)	Deh Gah Gotie Dene Council	Aboriginal	727	RE	n/a	n/a	n/a	Hydro	1480	3,324
247	Fort Resolution (Deninu K'ue First Nation)	Deninu K'ue First Nation	Aboriginal	484	Local Grid	Taltson	Diesel Backup	950	n/a	n/a	6,000
x	Diavik Diamond Mine	n/a	Non-Aboriginal	810	FF	n/a	Diesel	27000	Waste Heat Recovery	21000	n/a
248	Fort Simpson (Liidlii Kue First Nation)	Liidlii Kue First Nation	Aboriginal	1216	FF	n/a	Diesel	3210	Hydro	25	8,274
249	Fort Smith (Salt River First Nation #195)	Salt River First Nation #195	Aboriginal	2364	RE	Taltson	Diesel Backup	6150	Hydro	18000	466
250	Hay River / West Point	Town of Hay River/West Point First Nation	Aboriginal	3648	Local Grid	Taltson	Diesel Backup	7100	Solar Thermal System	n/a	n/a
251	Hay River Reserve (K'atlodeeche First Nation)	K'atlodeeche First Nation	Aboriginal	309	Local Grid	Taltson	n/a	n/a	n/a	n/a	n/a
252	Holman	Ulukhaktok	Aboriginal	398	FF	n/a	Diesel	1140	n/a	n/a	1,977
253	Inuvik	Inuv k	Aboriginal	3484	FF	n/a	Natural Gas/Diesel	12380	PV	7.2	7,906
254	Jean Marie River	Jean Marie River First Nation	Aboriginal	81	FF	n/a	Diesel	230	PV	1.32	277

Remote Communities in Canada

FINAL

Temp #	Community/Site / Settlement Name	First Nation/ Band Name	Type	Population Census 2006	Main Power Source	Local Grid Name	Fossil Fuel Generation Type	FF Capacity	Renewable Type	RE Capacity	Annual Energy Demand
255	Kakisa (Ka'a'gee Tu First Nation)	Ka'a'gee Tu First Nation	Aboriginal	52	Local Grid	Taltson	Diesel Backup	302	n/a	n/a	n/a
256	Lutsel'Ke (Snowdrift)	Lutsel K'e Dene Band	Aboriginal	318	FF	n/a	Diesel	740	n/a	n/a	1,570
257	Nahanni Butte	Nahanni Butte Dene Band/ Deh Cho First Nation	Aboriginal	115	FF	n/a	Diesel	245	n/a	n/a	345
258	Norman Wells	Norman Wells	Aboriginal	761	FF	n/a	Natural gas	2120	n/a	n/a	6,300
259	Paulatuk	Paulatuk	Aboriginal	294	FF	n/a	Diesel	820	n/a	n/a	1,364
260	Pine Point (Former mining company)	n/a	Non-Aboriginal	10	n/a	n/a	n/a	n/a	n/a	n/a	n/a
261	Rae Lakes (Gameti)	Community Government of Gameti/Rae Lakes	Aboriginal	283	FF	n/a	Diesel	612	n/a	n/a	943
262	Rae Edzo (Dog Rib Rae)	Behchoko (Rae-Edzo)	Aboriginal	1894	Local Grid	Yellowknife Snare System	Diesel Backup	1100	Wood pellet	750	21,125
263	Sachs Harbour	Sachs Harbour	Aboriginal	122	FF	n/a	Diesel	795	n/a	n/a	857
264	Snare Lake (Dechi Lao't'i First Nations)	Dechi Lao't'i First Nations/Snare Lake (Wekweëti)	Aboriginal	137	FF	n/a	Diesel	380	n/a	n/a	460
265	Trout Lake	Sambaa K'e Dene Band	Aboriginal	86	FF	n/a	Diesel	327	n/a	n/a	368
266	Tsiigehtchic (Arctic Red River/Gwichya Gwich'in)	Tsiigehtchic	Aboriginal	175	FF	n/a	Diesel	500	n/a	n/a	854
267	Tuktoyaktuk	Tuktoyaktuk	Aboriginal	870	FF	n/a	Diesel	3085	n/a	n/a	4,357
268	Tulita Dene (Fort Norman)	Tulita	Aboriginal	505	FF	n/a	Diesel	1080	n/a	n/a	2,147
269	Tungsten	n/a	Non-Aboriginal	10	n/a	n/a	n/a	n/a	n/a	n/a	n/a
270	Wha Ti (Tlicho/Lac La Martre)	Whati (Wha Ti)	Aboriginal	460	FF	n/a	Diesel	1015	Solar Thermal System	n/a	1,718
271	Wrigley	Pehdzeh Ki First Nation	Aboriginal	122	FF	n/a	Diesel	715	n/a	n/a	675
272	Yellowknife	City of Yellowknife	Non-Aboriginal	18700	RE	Yellowknife Snare System	Diesel	27,660	Hydro	30300	270,227
273	Yellowknife N'dilo	Yellowknife (N'dilo)	Aboriginal	n/a	Local Grid	Yellowknife Snare System	n/a	n/a	Wood pellet	69	1,358
Total	38	33	-	41,950	-	10	-	114,681	-	71,633	357,603
Aboriginal Sites						Local Grid	Total FF+RE	186,314		CF	21.9%

FF: Fossil Fuel – RE: Renewable Energy – NA: Not Applicable

Only the 24 Aboriginal communities reported production numbers. These have a total capacity of 38.5 MW of which, 37 MW is fossil fuel and 1.5 MW is hydro. Total annual production for these communities is estimated at 58,427 MWh/yr for a capacity factor of 17.3%. Diesel purchased in 2008 amounted to

1,05411,603,542 litres with a utility cost averaging 47 cents litres (2008). Electricity rate to consumers averages 27 cents/kWh.

Nunavut

The Nunavut territory was officially created from the Northwest Territories in 1999. It comprises a major portion of northern Canada, and most of the Canadian Arctic Archipelago. The capital, Iqaluit, is on Baffin Island. The territory is also home of the most northern community of Canada called Alert.

Nunavut has 26 remote communities for a total population of 29,453 people. All are Inuit communities.

Figure 3.8: Map of Nunavut's Remote Communities



Green: Aboriginal communities / Yellow: Non-Aboriginal communities

There are no local grids in Nunavut as all the communities are of great distance from one another. All 26 sites are fossil fuel powered by diesel power plants for a total of 50.3 MW. Two sites have small PV and wind power systems totalling less than 100 kW. There are currently no hydro power stations in Nunavut, though one is being considered in Iqaluit.

Table 3.8: Remote Communities of Nunavut

Temp #	Community/Settlement Name	First Nation/Band Name	Type	Population Censuses 2006	Main Power Source	Local Grid Name	Fossil Fuel Generation Type	FF Capacity	Renewable Type	RE Capacity	Annual Energy Demand
-	Name	Name	-	(#)	-	Name	-	(kW)	-	(kW)	(MWh)
274	Arctic Bay (Ikpiarjuk)	Ikpiarjuk	Aboriginal	690	FF	n/a	Diesel	1130	n/a	n/a	7,652
275	Arviat (Eskimo Point)	Arviat	Aboriginal	2,060	FF	n/a	Diesel	2220	Waste Heat Recovery	n/a	18,810
276	Baker Lake	Qamanittuaq	Aboriginal	1,728	FF	n/a	Diesel	2165	n/a	n/a	17,724
277	Bathurst Inlet	Kingoak	Aboriginal	5	n/a	n/a	n/a	n/a	n/a	n/a	n/a
278	Broughton Island	Qikiqtarjuaq	Aboriginal	473	FF	n/a	Diesel	1110	n/a	n/a	23,196
279	Cambridge Bay	Ikaluktutiak (or Iqaluktuuttiaq)	Aboriginal	1,477	FF	n/a	Diesel	3125	District Heating System	n/a	23,359
280	Cape Dorset	Kinngait	Aboriginal	1,236	FF	n/a	Diesel	1805	n/a	n/a	14,786
281	Chesterfield Inlet	Igluligaarjuk	Aboriginal	332	FF	n/a	Diesel	810	n/a	n/a	5,631
282	Clyde River	Kangiqtugaapik	Aboriginal	820	FF	n/a	Diesel	1020	n/a	n/a	7,867
283	Coral Harbour	Sallit	Aboriginal	769	FF	n/a	Diesel	1290	n/a	n/a	8,493
284	Gjoa Haven	Uqsuqtuuq	Aboriginal	1,064	FF	n/a	Diesel	1535	n/a	n/a	10,576
285	Grise Fiord	Aujittut	Aboriginal	141	FF	n/a	Diesel	465	n/a	n/a	3,194
286	Hall Beach	Sanirajak	Aboriginal	654	FF	n/a	Diesel	1195	n/a	n/a	7,259
287	Igloodik	Iglulik	Aboriginal	1538	FF	n/a	Diesel	1705	District Heating System	n/a	14,545
288	Iqaluit (Frobisher Bay)	Iqaluit	Aboriginal	6184	FF	n/a	Diesel	11740	PV	3.2	128,732
289	Kimmitut (Lake Harbour)	Kimmitut	Aboriginal	411	FF	n/a	Diesel	840	n/a	n/a	5,005
290	Kugluktuk (Coppermine)	Qurluqtuq	Aboriginal	1302	FF	n/a	Diesel	1665	District Heating System	n/a	13,334
292	Pangnirtung	Pangniqtuuq	Aboriginal	1325	FF	n/a	Diesel	2225	District Heating System	n/a	16,093
293	Pelly Bay	Kugaaruk	Aboriginal	688	FF	n/a	Diesel	750	Waste Heat Recovery	n/a	6,000
294	Pond Inlet	Mittimataluk	Aboriginal	1315	FF	n/a	Diesel	2255	n/a	n/a	15,114
295	Rankin Inlet	Kangiqtiniq (or Kangirliniq)	Aboriginal	2,358	FF	n/a	Diesel	4280	Wind	50	39,164
296	Repulse Bay	Naujaat	Aboriginal	748	FF	n/a	Diesel	720	n/a	n/a	7,112
297	Resolute (Resolute Bay)	Qausuittuq	Aboriginal	229	FF	n/a	Diesel	3000	n/a	n/a	10,827
298	Sanikiluaq	Sanikiluaq	Aboriginal	744	FF	n/a	Diesel	990	District heating system	n/a	7,081
299	Taloyoak (Spence Bay)	Talurjuaq	Aboriginal	809	FF	n/a	Diesel	1505	District Heating System	n/a	7,671
301	Whale Cove	Tkirarjuaq	Aboriginal	353	FF	n/a	Diesel	750	n/a	n/a	4,797
Total	26	26	-	29,453	-	0	-	50,295	-	53	424,022
Sites		Aboriginal Sites				Local Grid		Total FF+RE	50,348	CF	96.1%

FF: Fossil Fuel – RE: Renewable Energy – NA: Not Applicable

Numbers for annual production for these communities are not reliable as they show a total annual production of 424,020 MWh/yr (2006) for about 30 MW of total capacity. This would give a capacity factor of 96.1%, which is unrealistic. Diesel purchased in 2006 amounted to 40,280,886 litres with a utility cost averaging 50 cents per litre (2006). However, because production numbers are questionable, diesel purchase numbers may also not be accurate. Electricity rate to consumers averages 60 cents/kWh.

Power plants are all operated by Nunavut Power. Electricity rates are regulated by the Quilliq Power Corporation, a subsidiary of the Nunavut government.

4. Conclusions

As can be seen from the information gathered by the off-grid working group of AANDC-NRCAN, it is difficult to have factual and up-to-date data for energy production and uses in remote communities of Canada. This overview report provides the best information available to AANDC and NRCAN at the time of writing. This does not mean to suggest that better information does not exist or that it is not collected. It is simply that it is not available in a centralised database and a uniform format. Furthermore, the number of remote communities and their population changes with time and without a proper methodology for reporting data in a common format and an organisation dedicated to managing this information, it will continue to be difficult to collect and rely on this information.

Despite this, information that is available today shows that remote communities in Canada are numerous and face serious energy issues related to their remoteness and reliance on technologies that were developed and installed many years ago. Very few remote communities use other technologies to produce electricity apart from true-and-tried diesel powered generators.

Remote communities of Canada are diverse in many aspects. They extend from over 20 degrees of latitude and 90 degrees of longitude and from arctic dry climate to sea-coast humid forestry climate and from mountainous to plain regions. Their population ranges from 10 to 15,000 with some communities that are completely independent while others are connected by local grids.

It is difficult to make comparison between communities considering the diversity of physical and climate conditions, as well as the diversity of energy supply methods in use and diversity of responsible agencies supervising these communities. However, the aggregation of this data, even if incomplete, provides significant insights in terms of community energy planning and points to areas that could be strategically targeted for future sustainable development programs.

One important element to understand is the impact that energy has on these communities and how expensive it is to provide reliable electricity to their population. Another element is to realise how little has been done to integrate local resources to the energy mix of these communities. Only Quebec, NWT and the Yukon use hydroelectricity on a large scale to provide electricity to a number of communities. BC has a few communities relying on hydroelectricity on an individual basis. Very little solar, wind and biomass projects have been installed successfully in Canada. There were many attempts from year to year but these have failed for a number of reasons. While it is not the scope of this report to discuss on these, failures, it is important to note that there have been successes and we can learn from past attempts. The fact is that remote communities must find ways to become more self-sufficient and environmentally sustainable.

The economies of remote communities have traditionally been based on local resources such as fishing, hunting and trapping but with modernisation, electricity, heat and mechanical transportation have been brought to these communities using technology and fuel imported from the south. It is clear that in the near-term, these communities will continue to rely on fossil fuels; however it is possible to reduce their dependence and increase their reliance on local energy resources. This would decrease pollution and could contribute to their economic development and security of energy supply.

The ecoENERGY for Aboriginal and Northern Communities Program is a good first step in this direction. The aim of the program is to work with all remote Aboriginal communities that rely on diesel power generation to improve energy efficiency and adopt alternative energy sources to reduce dependence on diesel fuel. This also has the added consequence of reducing greenhouse gas emissions in these regions and should stabilize, to some degree, the cost of energy in the communities.

This report and the database that it aims to build complement this effort by reporting factual information on all remote communities, whether they are Aboriginal or not, so that the most practical and cost-effective

solutions may be implemented for communities in a specific region. Clustering of greater numbers of communities may in turn attract outside investors with innovative solutions.

Annex A: Collected Data by Provinces and Territories

Excel tables showing remote communities data by provinces and territories have been compiled for use by government officials.

This data has been collected by the Off-Grid Sub-Committee Working Group up until September 2010 and has been reviewed and updated by NRCan between January and March 2011. The information is presented in a format that is common for each provinces and territories and is summarized in the Canada tab. This Canada table cannot be modified but it is possible to select a field in line 8 and show only these selected fields with subtotals of these fields shown in line 345.

As can be seen by the light red shading marker, there are still a number of important data that are missing. The aim of the database is to provide a tool to complete this information automatically by people who are in the field and have the information.

Please note that data shown in this report and in the accompanying Excel tables were originally obtained from a variety of sources that were verified for accuracy or consistency only up to a certain level. It is the best information available collectively but should be used with caution and verified individually for specific communities.

Note also that transcription errors might have occurred and are the sole responsibility of the author.

Annex B: Presentation of the Remote Communities Energy Database

The Remote Communities Energy Database is a tool that aims to collect and show pertinent factual information about the generation and use of electricity and other energy sources for all remote communities of Canada. It uses a web driven application so this information can be viewed by anyone with a web access and be updated by selected persons.

Most of the information collected in the database will be available to all. Only selected notes and information deemed sensitive by a community will be password protected and will be available only to authorized persons. Information that will be shown is public information that is normally available from Statistics Canada, from remote communities themselves, from publicly available reports or from public web sites. Its availability in one site where data can be collected and searched is what makes it a powerful tool.

The web application will be accessible from the Government of Canada's ecoAction web page. It will open on a map of Canada where users will be able to select a province or territory and then select the community to be shown. From this, the user will be able to download specific selected information in an Excel table. The information will be searchable and comparison between different communities will be possible.

The database will first be available only to selected persons so that it can be tested and its information updated by key stakeholders working with remote communities in Canada. It will initially be populated from data stored in the Excel file used within the current report. This information will automatically be updated by authorized officers from AANDC, NRCan and concerned provincial/territorial departments. Once the application will have been tested and updated to a public version, it will officially be released to the public.

Both NRCan and AANDC will be administrators of the database and will provide authorization for selected persons to do the changes to the application and provide updates on the data itself.

Figure A1 shows a mock-up of the home page of the database. From this page, users will be able to navigate down to a province/territory page or search for selected fields or for a specific remote community. A summary table of key information on remote communities will be shown on this first page.

A listing of each remote community with key selected information will be shown on the province and territory pages (mock-up not shown). From this page, it will be possible to select the community itself, which will open the remote community page.

The remote community page will show a small map of the selected site and provide general information on the community as well as specific electricity and energy related information. Figure A2 shows a mock-up of this remote community page. Note that because this is a web base application, information will not be presented as condensed in this figure but will be spread out on a number of sub-pages. This information will be searchable and will be downloadable to an Excel spreadsheet for further analysis.

Figure A1: Mock-up of Home Page of Remote Communities Energy Database

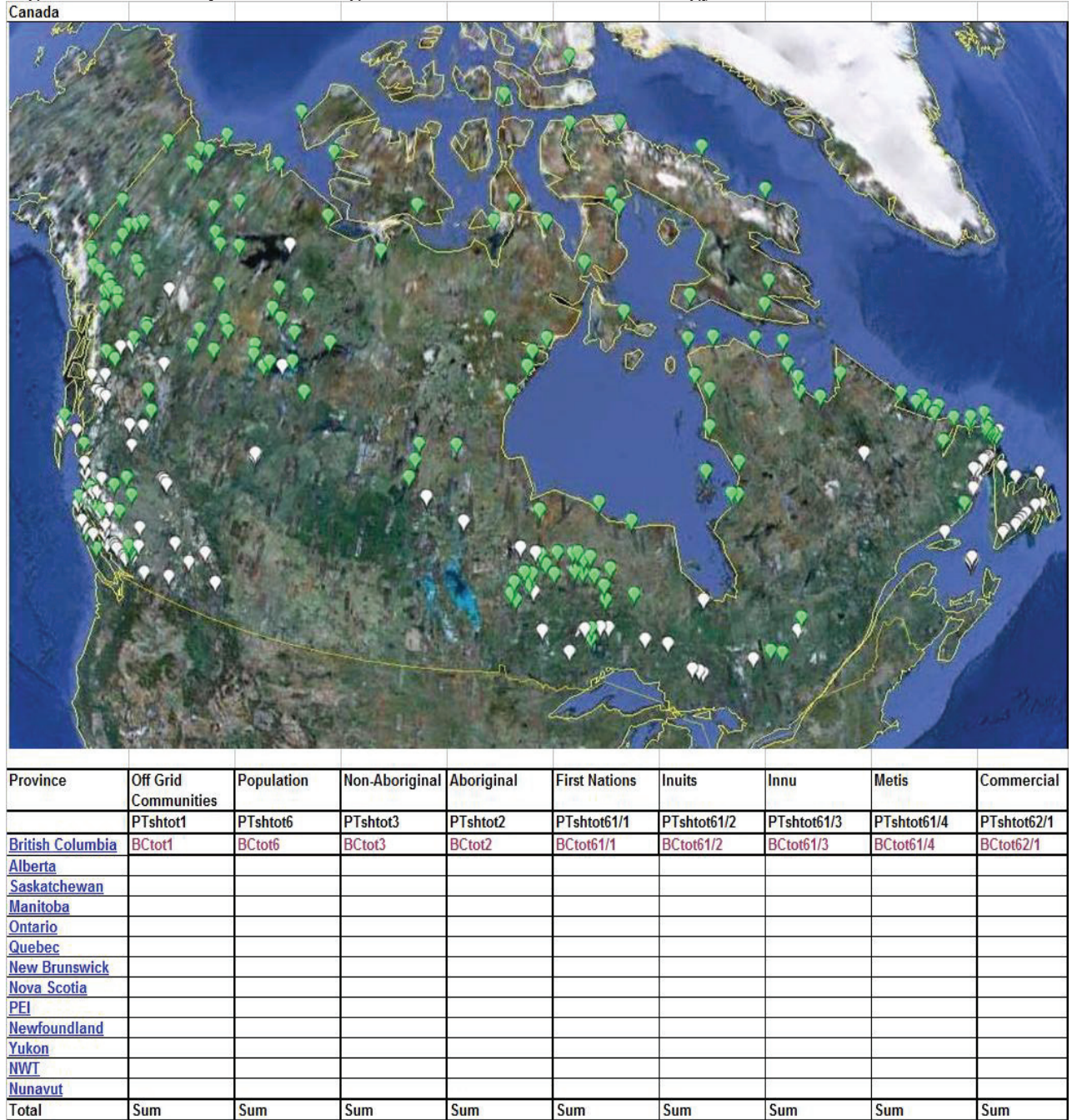


Figure A2: Mock-up of Remote Community Information Page

Remote Community Information Sheet

Name Community	<input type="text"/>			DB No.	<input type="text"/>	
Province/territory	<input type="text"/>	Status (Active/NonActive)		Map Locator		
Latitude	<input type="text"/>	Longitude	<input type="text"/>			
Region (description)	<input type="text"/>					
Type	<input type="text"/>	Abor/Non-Abor	First Nation/Inuit/Innu/Me is			
		<input type="text"/>				
	<input type="text"/>		<input type="text"/>			
INAC Community Number	<input type="text"/>	NRCan Community Number		<input type="text"/>		
Aboriginal Denomination	<input type="text"/>					
Population	<input type="text"/>	Date of last census:		<input type="text"/>		
Access (Road/Boat/Plane)	<input type="text"/>					
Electricity Service Provider	<input type="text"/>					
Main Power Source	<input type="text"/>					
Fossil Fuel Power Plant	<input type="text"/>					
Total Capacity	<input type="text"/>	kW	Year	<input type="text"/>		
Annual Generation (Aver.)	<input type="text"/>	MWh/yr	Year	<input type="text"/>		
Yearly Fuel Consumption	<input type="text"/>	L or m3 (Power Plant (Year		<input type="text"/>		
Fuel Price (at site)	<input type="text"/>	\$/L or m3	If available Purchase Price	<input type="text"/>	\$/L or m3	
			Transportation	<input type="text"/>	\$/L or m3	
Mean Transportation of fuel	<input type="text"/>	Distance from supply		<input type="text"/>	km	
Storage Capacity	<input type="text"/>	L or m3	Minimal Reserve (winter)	<input type="text"/>	L or m3	
Renewable Power Plant	<input type="text"/>			Show main only		
Total Capacity	<input type="text"/>					
Number Gensets	<input type="text"/>					
Other Renewable Energy Sources	<input type="text"/>					
Total Capacity	<input type="text"/>					
Annual RE Generation (Aver.)	<input type="text"/>	MWh/yr	Year	<input type="text"/>		
Local Grid	<input type="text"/>					
Lenght Grid (Plant to Subst.)	<input type="text"/>	km				
Nominal Size	<input type="text"/>	V	<input type="text"/>	MW	<input type="text"/>	
				Ph	Date Inst. <input type="text"/>	
Yearly Electricity Budget	<input type="text"/>	\$	Year	<input type="text"/>	dYbud1	
Funding Body	<input type="text"/>					
Demand Summary (details in supp. sheet)			Year Measured			
Average Annual Demand	<input type="text"/>	MWh/yr	<input type="text"/>			
Peak Load	<input type="text"/>	kW	<input type="text"/>			
Number households	<input type="text"/>	<input type="text"/>				
Commercial/Institutional	<input type="text"/>	<input type="text"/>				
Main Substation/Transformers	<input type="text"/>	MW	<input type="text"/>	KV/KV	<input type="text"/>	
				Ph	Date Inst. <input type="text"/>	
Energy Prices			Year Measured			
Electricity Price (Household)	<input type="text"/>	\$/L		<input type="text"/>		
Electricity Price (General Service)	<input type="text"/>	\$/kWh		<input type="text"/>		
Heating Oil Price	<input type="text"/>	\$/kWh		<input type="text"/>		
Community Energy Plan Conducted:	<input type="text"/>	Date	<input type="text"/>	Note:		
INAC Funding Notes	<input type="text"/>					
Notes	<input type="text"/>					
Show potential of Renewable	<input type="text"/>					
Information updated by:	<input type="text"/>	Date		<input type="text"/>		