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# Status of Microgrids in Canada

Alexandre Prieur  
2022 Symposium on Microgrids

CanmetENERGY

*Leadership in ecoInnovation*



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# Canadian Context

Canadians generally get their electricity from a clean grid.

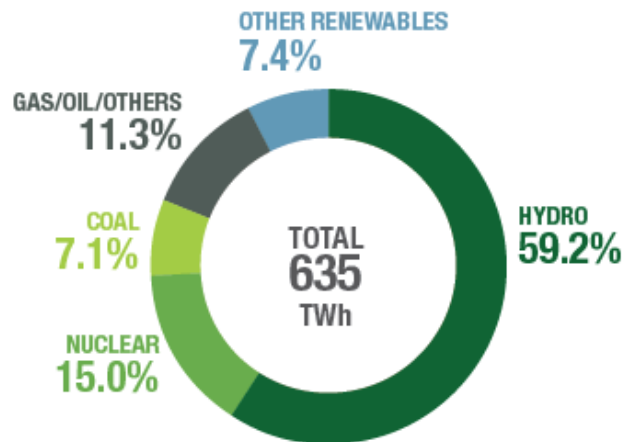
- Integrated entity: provincial, territorial and cross-border
- or through a remote microgrid.

Microgrid main drivers

1. Renewable generation integration to main grid (i.e. Net Zero community and DER integration)
2. 2050 Net Zero targets (i.e. electrification)
3. Reduce diesel dependence for isolated community

GENERATION IN CANADA – 635 TWh

GENERATION BY SOURCE, 2019



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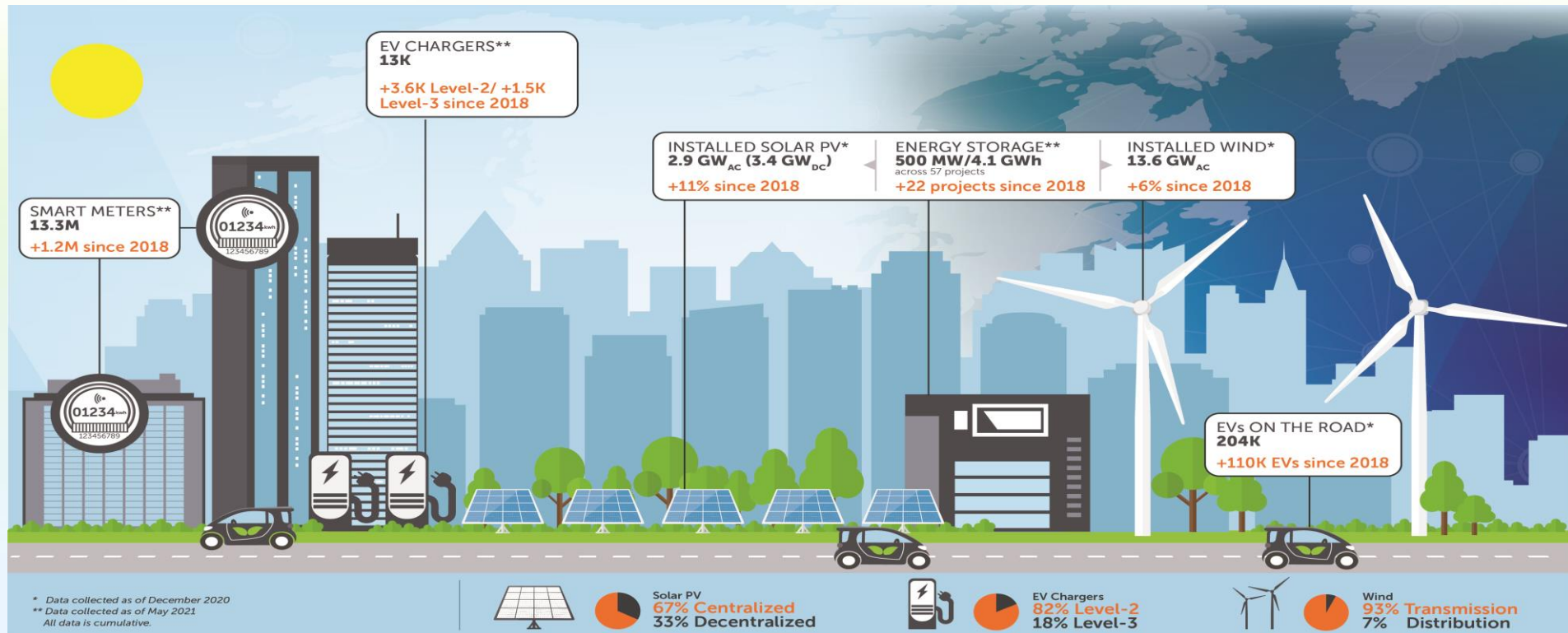


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# Smart Grid Deployment Metrics 2020-21



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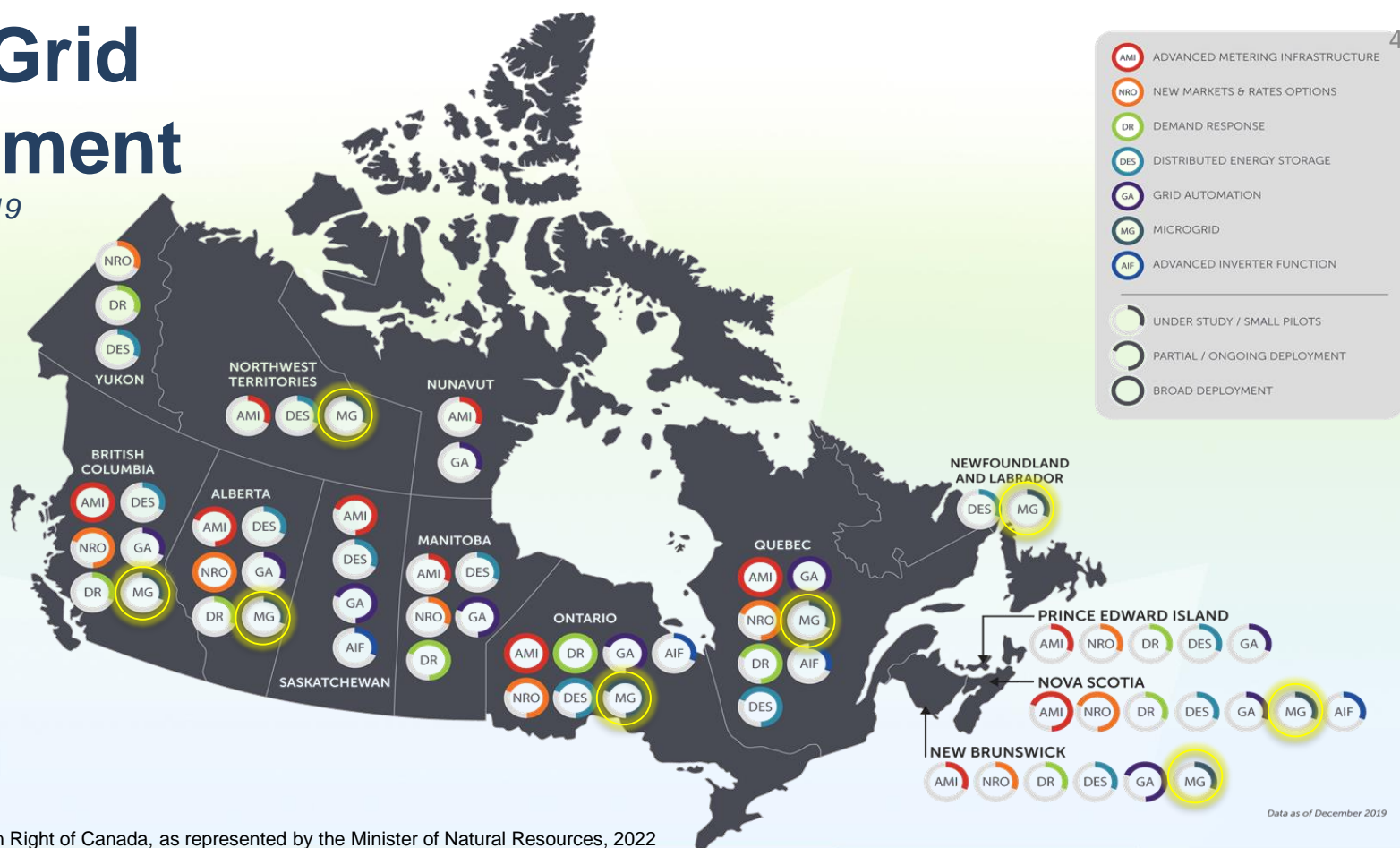
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# Smart Grid Deployment

as of December 2019



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Data as of December 2019



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# Public Sector Investments

5



**\$2,115M**  
TOTAL PROJECT VALUE



**\$726M**  
PUBLICLY INVESTED



**538**  
PROJECTS



+ \$753M in total project value, + \$260M in public investments over 316 projects

Data as of October 2021

1. Infographic does not include academic funded networks
2. The Ministry of Ontario Energy, Northern Development and Mines Smart Grid Fund microgrid projects are not included.

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# Federal Funding Programs

Department	Program	Period	Funds
<b>NRCan</b> (Natural Resources Canada)	Energy Innovation Program ←	ONGOING	\$52.9M / year
	Program of Energy Research and Development ←	ONGOING	\$35M / year
	Clean Growth Program	2017 - 2021	\$155M
	Green Infrastructure		
	• Smart Grids ←	2018 - 2022	\$100M
	• Electric Vehicle Infrastructure Demonstrations	2018 - 2022	\$30M
	• Electric Vehicle and Alternative Fuel Infrastructure Deployment Initiative	2018 - 2022	\$80M
	• Emerging Renewable Power Program	2018 - 2023	\$200M
	• Energy Efficient Buildings RD&D	2018 - 2026	\$182M
<b>NSERC</b> (Natural Sciences and Engineering Research Council Canada)	• Clean Energy for Rural and Remote Communities ←	2018 - 2024	\$220M
	• Smart Renewables and Electrification Pathways Program (SREPs) ←	2021 - 2025	\$964M
<b>SDTC</b> (Sustainable Development Technology Canada)	NSERC Energy Storage Technology Network	2015 - 2020	\$5.2M
	Sustainable Development Tech Fund	ONGOING	\$400M

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# Microgrid Deployment 2020-21

Total Project Value	Publicly Invested	Number of Projects	
\$245 Million	\$75 Million	26 Projects	

## Canada's investment in energy innovation

### Current Investments



Canada's investment in energy innovation is an important part of building our clean economy.

Learn more about our contributions to Research, Development and Demonstration projects in Canada.

Location:

Technology Area:

Innovation:

Funding Program:

<https://www.nrcan.gc.ca/science-and-data/funding-partnerships/funding-opportunities/current-investments/21146#invenstment>

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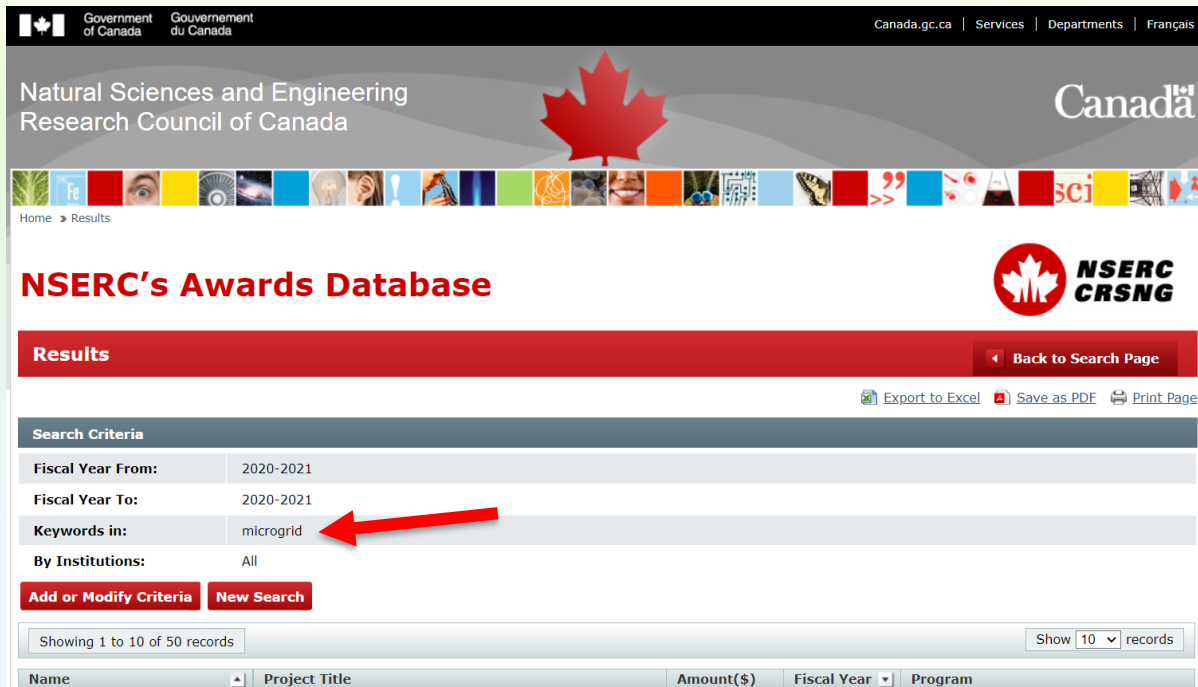


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# Academic – Microgrid related projects



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Natural Sciences and Engineering Research Council of Canada

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Home > Results

## NSERC's Awards Database

**Results** [Back to Search Page](#)

[Export to Excel](#) [Save as PDF](#) [Print Page](#)

**Search Criteria**

Fiscal Year From:	2020-2021
Fiscal Year To:	2020-2021
Keywords in:	microgrid
By Institutions:	All

[Add or Modify Criteria](#) [New Search](#)

Showing 1 to 10 of 50 records [Show 10 records](#)

Name	Project Title	Amount(\$)	Fiscal Year	Program
------	---------------	------------	-------------	---------

Last 2 years:  
102 projects awarded

50 in 2020-2021  
52 in 2019-2020

[https://www.nserc-crsng.gc.ca/ase-oro/Results-Resultats\\_eng.asp](https://www.nserc-crsng.gc.ca/ase-oro/Results-Resultats_eng.asp)

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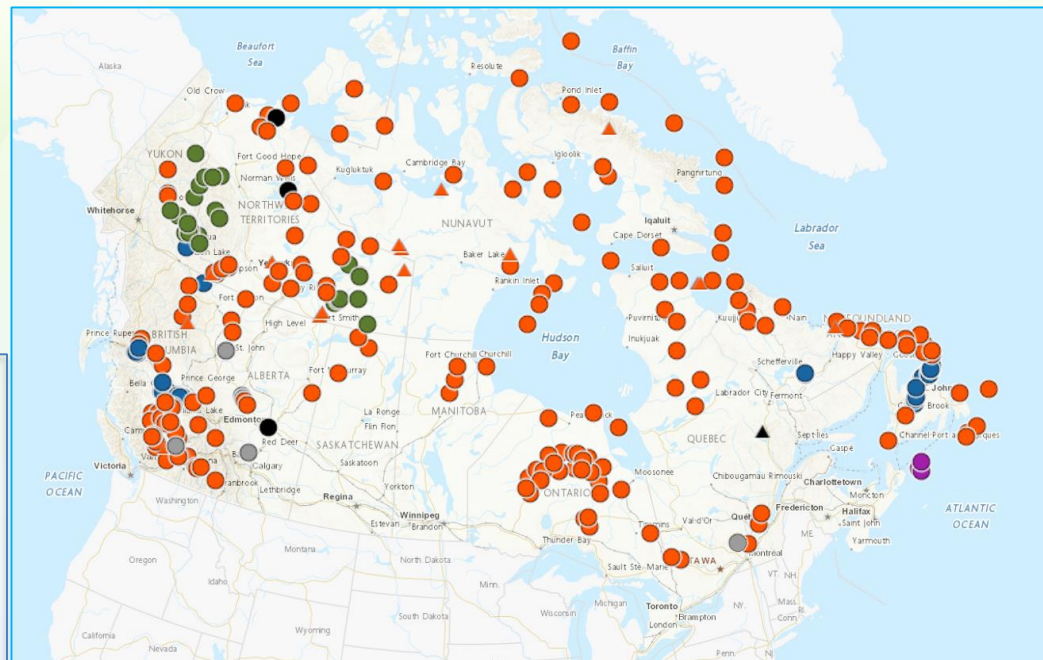


# Remote Communities

In Canada, many Northern and remote communities lack a connection to the North American electricity grid. Around 300 of them depend on diesel-based generation for power.

## Main power source

- Diesel
- Heavy fuel oil
- Hydro
- Natural gas
- Regional grid
- Unknown
- ▲ Diesel – commercial
- ▲ Natural gas – commercial



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# Remote communities Policy

The Pan-Canadian Framework on Clean Growth and Climate Change, Canadian governments are investing in programs to **reduce diesel-dependency**. Including addition of renewable energy projects and their integration into existing diesel-based microgrid systems.

In November 2021, the Government of Canada announced a new investment partnership with the [International Renewable Energy Agency \(IRENA\)](#) to support the transition of remote communities to renewable energy through projects to help remote communities transition away from diesel and toward clean forms of energy.

## Benefits

**Economic:** contribution to GDP, direct, indirect, and induced impacts of capital and operational spending

**Environment:** avoided diesel consumption and GHG emissions

**Society:** reduction in criteria air contaminant (CAC) pollutants harmful to human health, social impacts of energy poverty and local energy

# Clean Energy for Rural and Remote Communities (CERRC)

- \$220M over 8 years (2018-2026) for bioheat, renewable energy demonstration and deployment, and capacity-building projects
- All funding provisionally allocated
- 37 announced renewable and bioheat projects  
<https://www.nrcan.gc.ca/reducingdiesel/clean-energy-for-rural-and-remote-communities-funded-projects/22524>

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# Announced CERRC Renewable & Bioheat Projects

Proponent	Community	Region	Project Title
Askii Environmental Inc.	Big Trout Lake First Nation; Pikangikum First Nation; North Caribou Lake First Nation	Ontario	Wood Chip Heating for Remote Ontario First Nation Communities
Bingwi Neyaashi Anishinaabek	Sand Point First Nation	Ontario	The BNA Diesel Displacement and Biomass Processing Project
Carcross / Tagish First Nation	Carcross	Yukon	Carcross Biomass District Heating System
Chu Cho Environmental Ltd (1)	Tsay Keh Dene Nation	British Columbia	Tsay Keh Dene nation Sustainable Biomass Energy Project Preparedness Program - Feasibility Study
Chu Cho Environmental Ltd. (2)	Tsay Keh Dene Nation	British Columbia	Tsay Keh Dene nation Sustainable Biomass Energy Project Preparedness Program - Feasibility Study
Denesoline Corporation Ltd	Lutsel K'e Dene First Nation	Northwest Territories	A hybrid renewable energy platform and its associated Learning Energy Management System (LEMS) for the remote community of Lutsel K'e First Nation in NWT
Esk'etemc First Nation	Alkali Lake	British Columbia	Esk'etemc Biomass District Heating System Expansion
Gitxsan Energy Inc. (1)	Hazelton	British Columbia	Upper Skeena Recreation Centre (USRC) BioHeat Facility
Gitxsan Energy Inc. (2)	Hazelton	British Columbia	Conversion of Gitxsan Wet'suwet'en Education Society (GWES) College to Bioheat
Hamlet of Aklavik	Aklavik	Inuvialuit	Biomass heating for the Sittichinli Recreational Complex
Kapawe'no First Nation	Narrows Point, North Shore of Flave Lake	Alberta	The Narrows Point Energy Project (NPEP)
Kluane First Nation (1)	Burwash Landing	Yukon	KFN Forest Resources Management Plan
Kluane First Nation (2)	Destruction Bay (Kluane First Nation Traditional Territory)	Yukon	Kluane First Nation Wind-Diesel Project
Kwadacha First Nation	Kwadacha First Nation	British Columbia	Briquette Manufacturing for Community Bioheat
Kwikwasut'inuxw Haxwa'mis First Nation	Gliford Island	British Columbia	Hybrid, smart-grid solar PV and battery demonstration project

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# Announced CERRC Renewable & Bioheat Projects (cont'd)

Proponent	Community	Region	Project Title
Lake Babine Nation	Lake Babine (Wit'at FN)	British Columbia	Wit'at Biomass District Heating System
Lhoosk'uz Dene Nation	Kluskus Village, Quesnel Area, Cariboo	British Columbia	Kluskus Biomass Combined Heat and Power
Nihtat Corporation (1)	Inuvik	Inuvialuit	Biomass in the Beaufort Delta
Nihtat Corporation (2)	Inuvik; Iqaluit	Inuvialuit	NWT and NU Thermal Community Solar PV Deployment Project
Nishnawbe Aski Nation	Nishnawbe Aski Nation	Ontario	Growing Bioheat in Nishnawbe Aski Nation
NRStor Inc.	Arviat	Nunavut	Arviat Clean Energy Microgrid
Ontario Power Generation	Gull Bay	Ontario	Gull Bay First Nation Diesel Offset Micro Grid Project
Oujé-Bougoumou Cree First Nation	Ouje-Bougoumou	Quebec	Ouje-Bougoumou District Heating System Renovation
Qikiqtaaluk Business Development Corporation (1)	Iqaluit	Nunavut	Iqaluit Inuit Owned Land Smart Micro Grid
Qikiqtaaluk Business Development Corporation (2)	Sanikiluaq	Nunavut	Sanikiluaq High Displacement Renewable Energy
Rat River Development Corporation	Gwich'in (Fort McPherson)	Northwest Territories	Remote Bioeconomy: Willow to Energy
Sagatay Cogeneration Limited Partnership	White Sand First Nation	Ontario	Whitesand First Nation: Community Sustainability Initiative AKA the Bio-Economy Centre
Skidegate Band Council	Moresby Lake (Skidegate), Old Massett	British Columbia	Haida Gwaii Clean Energy Project
St. Mary's River Energy	Mary's Harbour	Newfoundland and Labrador	Mary's Harbour Renewables
Teslin Tlingit Council	Teslin	Yukon	Teslin Biomass Phase 2 Build out Planning
Three Nations Energy	Fort Chipewyan	Alberta	Fort Chipewyan Renewable Hybrid-Diesel Project, Phase II
Town of Inuvik	Inuvik	Inuvialuit	Inuvik Reservoir - Biomass Energy System Project
Tulita Land Corporation	Tulita	Northwest Territories	Tulita Bioenergy Project
Twin Sisters Native Plant Nursery	Moberly Lake	British Columbia	Twin Sisters Plants Nursery Biomass Conversion Project
Wahgoshig First Nation	Wahgoshig First Nation	Ontario	Wahgoshig First Nation Bioheat Demonstration Project
Wikwemikong Development Commission	Wikwemikong	Ontario	Wikwemikong Wood Pellet Heating and Infrastructure Project
Yukon Conservation Society	Whitehorse	Yukon	Yukon Electric Thermal Storage Demonstration Project

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# For more information...



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