



Resource Planning – August 2020

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OUTLINE OF PRESENTATION

- PART 1** Introduction – Who are the Nihtat Gwich'in?
- PART 2** Understanding the Beaufort Delta Context
- PART 3** Finding a Role in Renewables Development
- PART 4** Renewable Electricity Path Forward
- PART 5** Planning to Achieve Progress on Climate Goals

PART 1 – INTRODUCTION: Who are the Nihtat Gwich'in?

Nihtat Energy Ltd (NEL)

- Northern, Indigenous owned.
- Subsidiary of Nihtat Corporation
- Focused on developing and operating clean energy alternatives.
- Operating in Beaufort Delta region & other areas of northern Canada.

Nihtat Corporation

- Wholly owned by the Nihtat Gwich'in Council.
- Located in Inuvik, NWT.



PART 2 – UNDERSTANDING THE BEAUFORT DELTA CONTEXT

Population:

- Total population of region is 6,880
- 51% of population resides in Inuvik

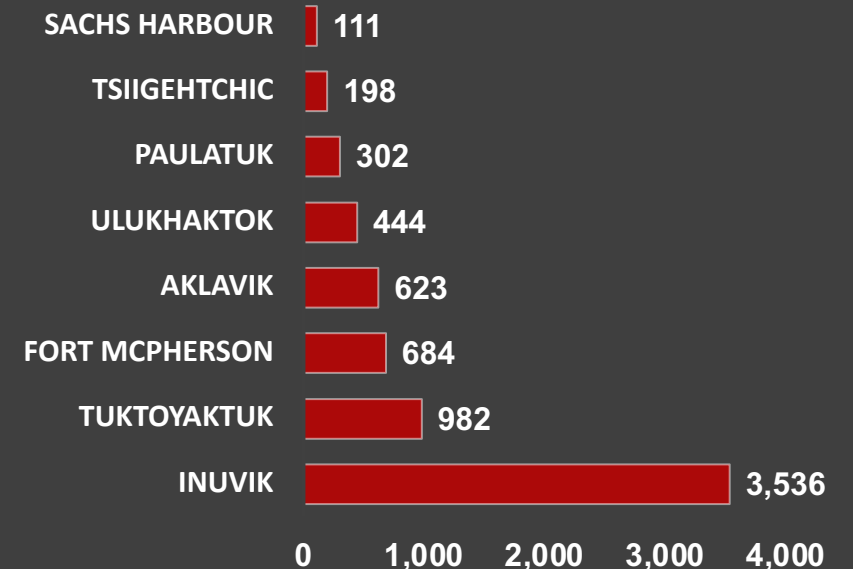
Access:

- Four are accessible by road most of the year via Dempster Highway (Figure 1)

Power Generation:

- Each community has its own isolated power generation
- No transmission connection between communities
- Fossil fuels used for electricity, heating and transportation

Beaufort Delta Region & Population



PART 3: FINDING A ROLE IN RENEWABLE ENERGY DEVELOPMENT

GNWT partnership model limitations & barriers

1. Offers debt financing & low risk return
2. Terms offered not attractive or acceptable
3. Model may be a barrier to Indigenous involvement in projects

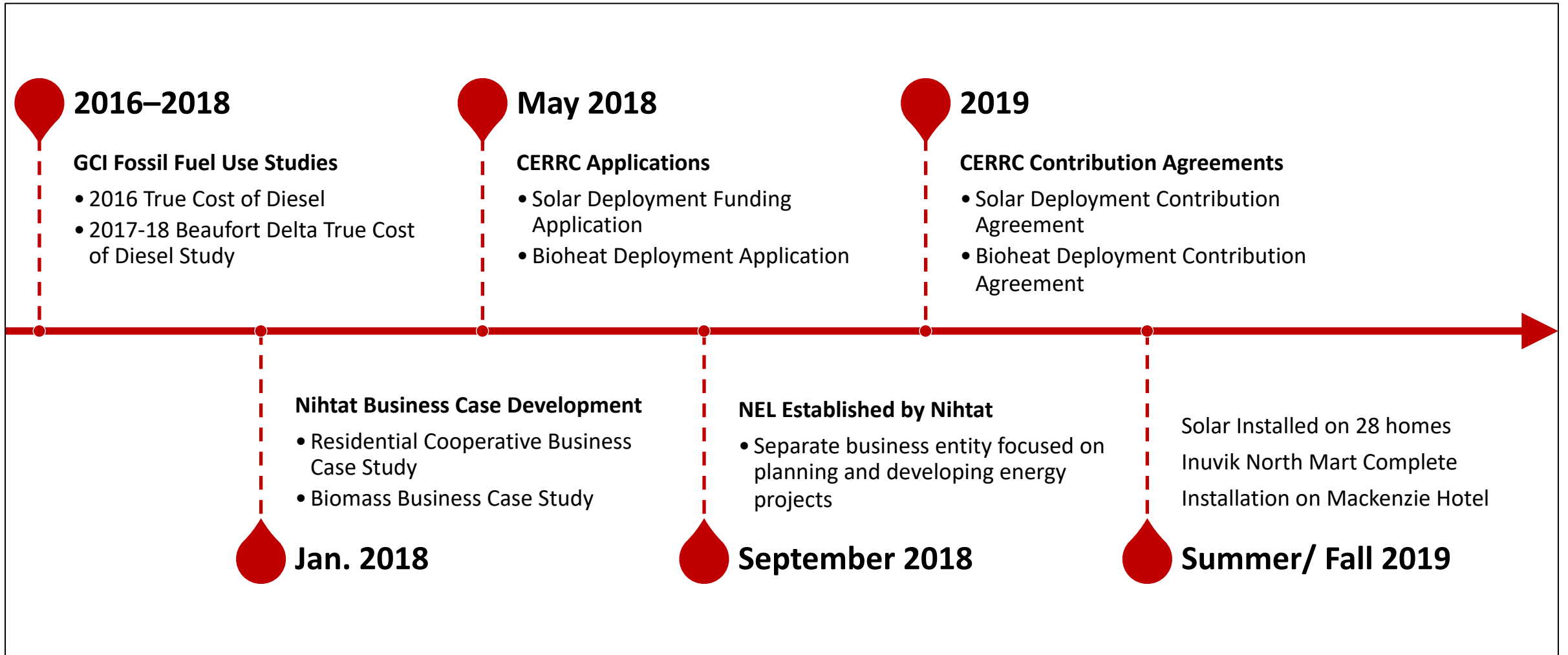
Objectives for Indigenous Involvement:

- Find better & more effective ways to ensure Indigenous involvement in long lived & capital intensive renewables
- Active & Meaningful Role in Project Planning
- Benefits & involvement that extend over project life



- Equity ownership
- Partnership
- Indigenous proponent

Gaining initial footing...



....Stepping into a New Role...

Nihtat Energy Ltd was formed to take on, and solve, the challenges defined by Nihtat Corporation's early experience in project planning; and find opportunities to develop renewable energy projects in Beaufort Delta and other areas of the north that could achieve the following **Core Planning Objectives**:

1. Facilitate Development of Renewables

- Facilitate development of renewables that can displace fossil fuels for electricity, heating or transportation uses in remote communities.

2. Enhance Indigenous Participation




- Enhance Indigenous participation in utility project planning and implementation; including ensuring that long term benefits from energy projects also flow to local Indigenous communities.

3. Ensure Meaningful Role in Climate Action

- Ensure local Indigenous communities have a meaningful role to play in taking action to mitigate climate change impacts.

....Initial Inuvik Solar PV Successes.....

Inuvik Project Completed in 2019/20

North Mart Inuvik	Mackenzie Hotel Inuvik	Solar Residential Program
		
<ul style="list-style-type: none"> • 165 kW AC Renewable Capacity Installed • 164.5 tonne/yr reduction in GHG emissions 	<ul style="list-style-type: none"> • 99 kW AC Renewable Capacity Installed • 76.5 tonnes/yr reduction in GHG emissions 	<ul style="list-style-type: none"> • 214 kW AC Renewable Capacity Installed • 154 tonnes/yr reduction in GHG emissions

Key 2019 Inuvik Solar Project Outcomes

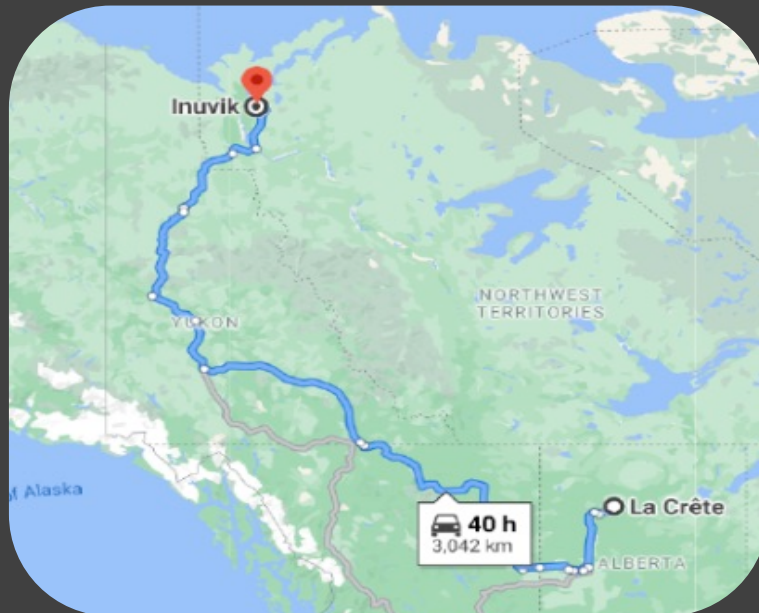
	Renewable Capacity Added	Expected Fossil Fuel Displaced (Yr1)	Expected GHG's Reduced (Yr1)
Environment / Climate Change	478.2 kW AC	571.8 MWh/yr	395.0 tonnes/yr
	Local Spending re: Construction	Jobs During Construction	Jobs During Operation
Local Economic Impacts	\$263,350	2-4	Up to 4
	Investment Benefits	Capacity Development	Other Benefits
Other Social & Economic Impacts	✓ NEL Lease Payments	✓ NEL experience	✓ Local participation in climate action
	✓ Homeowner bill savings	✓ Training	
	✓ Commercial bill savings		✓ Homeowner energy literacy

...Planning to Improve Biomass Supply Chain Costs ...

Since 2018, NEL has worked to **optimize biomass supply chain** to Beaufort delta.

Initial assessments have focused on:

1. Optimization of existing trucking
2. Developing a source biomass supply in Yukon to reduce the trucking distance



...Current Biomass Actions and Assessments...

Optimized Biomass Delivery

- 20' sea containers for transport, storage & biomass boiler site supply of wood pellets
- B-Train Chassis trailer to enhance supply chain reliability and costing

NEL received Northern REACHE funding for the following pre-feasibility assessments :

1. Feasibility of developing a pellet mill in Yukon
2. Feasibility of developing a community-wide district Energy system in Inuvik

...Planning Challenges & Lessons Learned...

Experience to date highlights material risks in these types of initiatives....

.... A large utility/ developer can absorb these risks – but a small business entity/ remote community cannot without additional support

NEL Key Lessons Learned from 2019 Planning

1

Expect delays when developing projects

While construction was completed for all planned solar PV projects in Inuvik; each project experienced delays that pushed completion later into the summer than originally expected (or into 2020) and meant that revenues or savings were deferred.

2

Getting project agreements in place can take time and be costly

Finalizing agreements with clients (be they homeowners, commercial entities, utilities or governments) was the single largest source of delay to moving ahead with these projects. In some cases this has been a key source of added costs; while in others delays in obtaining agreements have resulted in reduced funding and lost opportunities.

3

Anticipate that permitting will take longer than anticipated

Particularly for new projects or approaches that may be unfamiliar to the permitting agencies.

4

Making things work takes a committed team.

PART 4: RENEWABLE ELECTRICITY PATH FORWARD

*Path Forward....and
Next Planning
Focus....*

	Intermittent Renewable Capacity Allowed (kW)	Total Installed/ Planned Capacity (kW)	Capacity Available (kW)
Inuvik	670	670	0
Tuktoyaktuk	96	66	30
Fort McPherson	79	5	74
Aklavik	73	76	0
Ulukhaktok	47	0	47
Paulatuk	33	38	0
Sachs Harbour	22	19	3
Tsiigehtchic	18	0	18

- Allowed intermittent renewable capacity for isolated community grids is limited
- NEL's planning focus is finding ways to overcome this barrier to renewables development

....Finding solutions and overcoming existing barriers.....

Goal to find approaches that expand capacity limits on remote grids

Each concept takes a phased approach that would:

- ✓ Potentially expand total renewable electricity that can be developed
- ✓ Be applicable to other remote grids across NWT and Canada

Each concept would be developed in manner that provides for local involvement.

High Penetration Renewables Concepts

	Development Concept	Stage 1	Stage 2
1	<p>Phased Solar and Variable Speed Diesel Generation (VSG) in Aklavik</p> <p>Deployment of additional solar to fully test the installed VSG technology.</p>	<p>Initial PV Installation at Aklavik</p> <p>Addition of 150 kW AC of solar PV</p>	<p>Aklavik Solar Expansion</p> <p>Installation of PowerBridge equipment & additional solar PV capacity</p>
2	<p>Inuvik High Penetration Renewable Concept</p> <p>Identify measures to support development of high penetration renewable projects</p>	<p>1 MW AC Solar Farm in Inuvik</p> <p>Install a 1 MW AC grid connected solar farm in Inuvik.</p>	<p>3.5 MW Wind Project Near Inuvik</p> <p>Install a 3.5 MW wind project near Inuvik., with battery.</p>
3	<p>Microgrid concept at Inuvik Satellite Site Facility (ISSF)</p> <p>Solar PV array and microgrid expansion to reduce GHG emissions and energy costs at ISSF.</p>	<p>Initial Solar PV Array (60 kW AC)</p> <p>Install 60 kW AC solar array.</p>	<p>Microgrid Expansion</p> <p>563 kW DC additional solar capacity; iron-flow battery; and two 180 kW diesel generators, automated via a microgrid controller.</p>

PART 4: PLANNING TO ACHIEVE PROGRESS ON CLIMATE GOALS

A Way Forward – Near Term Project Concepts

Each concept provides for meaningful, near term Indigenous involvement in taking action to meet climate change impacts:

- ✓ Increasing electricity generated from renewables
- ✓ Displacing fossil fuel use and GHG emissions
- ✓ Connecting clean power with places that need it;
- ✓ Modernize electricity systems; and
- ✓ Finding solutions working with Indigenous Peoples and remote communities

	Potential Earliest In Service	PV Solar Installed (kW AC)	MWh/yr Fossil Fuel Displaced (Year 1)	GHGs Reduced (Tonnes/yr)
Concept 1 - Staged Solar VSG Project				
Phase 1 - Aklavik Solar PV Installation (150 kW)	2021	150	164	114
Phase 2 - Aklavik Solar Expansion (289 kW)	2021	289	315	220
Concept 2 - Inuvik High Penetration Renewables				
1 MW Solar Farm in Inuvik	2021	1000	1525	958
3.5 MW WTG and ESS near Inuvik	2022	3500	5703	3581
Concept 3 - ISSF Microgrid				
Phase 1 - Initial Solar PV Arrays (2x45 kW)	2021	90	156	89.8
Phase 2 - Microgrid Expansion (375 kW)	2023	375	544.4	313

DETAILED REVIEW

High Penetration Renewables Concepts

- 1 Phased Solar and variable speed diesel generation (VSG) in Aklavik.
- 2 Inuvik High Penetration Renewable concept (solar, wind and energy storage system [ESS]).
- 3 Microgrid concept at Inuvik satellite site facility (ISSF).

Thank you

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