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Nunavut Nukiksautiit Corporation

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Sanikiluaq Wind And Battery Energy Storage Project

Your Land, Your Resources, Your Power



ᑭᓇᑦᑲᓄᓐ — WHO WE ARE

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LEADING DEVELOPMENT

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**Qikiqtaaluk Business
Development Corporation**



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Nunavut Nukiksautiit Corporation

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PROJECT CONTRIBUTORS



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**Landsvirkjun
Power**



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**Growler
Energy**

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**CANADIAN
PROJECTS
LIMITED**



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Frobisher Energy Services

Completed Tasks



MET TOWER INSTALLATION

MET TOWER INSTALLATION



$\Delta_{\text{eff}} = \Delta - \frac{\gamma}{2}$

WIND ASSESSMENT

1507
 MARCH
 2017

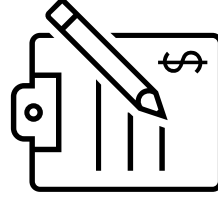
MARCH

2017

17c7
 MARCH
 2018

MARCH

2018



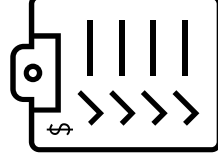
UΔ57C - 97Δ95UP, 4Δ90p

FUNDING APPLICATION

LA
MAY
2018

MAY

2018



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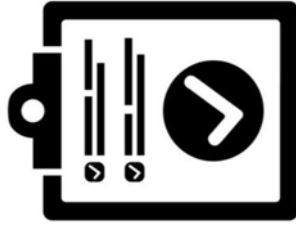
FUNDING APPROVED

SEPTEMBER 2019

SEPTEMBER

2019

Next Steps

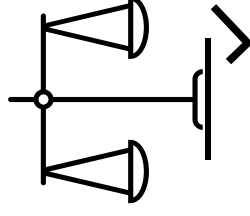


2021
 DECEMBER
 2021

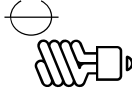
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 * PPA Dependent



2022



26 JUNE 2022



Competitive Levelized Cost of Energy

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Sanikiluaq Wind Project

Site Visit Report

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20-Oct-2021	0	Issued for Use	CWH	PWH	EJ
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1.0 Introduction

1.1 Background

The Sanikiluaq Wind + Battery Energy Storage System (BESS) Project is a planned renewable energy development to displace fossil fuel energy generation for the Hamlet of Sanikiluaq in the Qikiqtani region of Nunavut. On October 14, 2021, the project team visited Sanikiluaq to observe the project site, meet with the Hamlet council, and gather information from local community members as it may pertain to the future construction of the project.

The team members that visited the hamlet are:

1. Heather Shilton, Nunavut Nukkiqsautiit Corporation (NNC)
2. Einar Magnús Júlíusson, Landsvirkjun Power (LVP)
3. Peter Whelan, Growler Energy
4. Stephanie Adey, Growler Energy
5. Curtis Whelan, Growler Energy

The team departed Iqaluit onboard on Air Nunavut King Air charter (Figure 1) at approximately 5:30 AM EST and arrived in Sanikiluaq at approximately 8:00 AM EST. The team departed Sanikiluaq at approximately 2:45 PM EST. The team was split amongst the varying activities to facilitate the completion of all planned activities in parallel throughout the day.



Figure 1: King Air Charter Flight

The weather in Sanikiluaq during the site visit was sunny with temperatures between four and eight degrees, Celsius. The wind at the site was approximately 30 km/h gusting to 50 km/h.

1.2 Purpose

The purpose of this site visit report is to act as a record of and summarize the activities, findings, and insights gathered by the project team during the October 14, 2021, visit to Sanikiluaq.

1.3 Activities

The key activities completed during the visit to Sanikiluaq are:

1. Meeting with Hamlet Council
2. Hamlet Tour
3. Heavy Equipment/Machinery Viewing
4. Qulliq Energy Corporation Plant Tour & Operator Discussion
5. Visit to Proposed Project Site

Key information and photographic records of the above activities are discussed in the Section 2.0 through Section 6.0 .

2.0 Meeting with Hamlet Council

The Municipality of Sanikiluaq's council meeting took place at the temporary Hamlet office on Thursday, October 14, 2021, at 9:00AM Eastern Standard Time. The purpose of meeting with the council was to provide an update to the council members on the progress of the project. This included an overview of the completed, ongoing, and upcoming tasks ranging from the installation of the MET tower through to first power. The presentation slides used for the meeting can be found in Appendix A. Meeting attendees from both the council and the Project Team are summarized in Table 1.

Council	Project Team
Mayor Johnnie Cookie	Heather Shilton – NNC
Senior Administrative Officer (SAO) Ronald Ladd	Einar Júlíusson – LVP
Deputy Mayor – Emily Kattuq	Stephanie Adey – Growler Energy
Councillor Dinah Kittosuk	
Councillor Mick Appaqaq	
Councillor Lucy Appaqaq	
Councillor Moses Appaqaq	
HOLD	

Table 1: Sanikiluaq Council Meeting Attendees

The presentation went very well, and the key outcomes of the meeting are:

- In general, the council was very engaged in the presentation and are very thankful and supportive of the project. They recognize they are a smaller community within the

territory of Nunavut, but they want, and know they can be, among the first for community-level wind development.

- If gravel is to be produced and procured within the community during the execution phase of the project, the SAO will require a minimum of 6 months' notice. It is important for the Project Team to clarify what amount of gravel must be produced given the lead time to ensure appropriate planning and adequate notice is given to the community, if needed.
- The council demonstrated an interest in and were keen to learn more about the ownership and revenue sharing opportunities of the project. As a result, a Community Liaison is planned to be hired within Sanikiluaq to help facilitate our progress in understanding what these opportunities look like.

The council was asked for recommendations on any individuals who may be well suited as a Community Liaison for the project and other ongoing NNC initiatives. It was clarified that the individuals do not require education, but rather strong community knowledge and good connections. When the Project Team is ready, they can send the SAO a copy of the job description(s), and the SAO will distribute to community members.

- When the site location was discussed, the council clarified the location was on the far side of the MET tower (in comparison to the community) and agreed that this is the best location for the turbines as it is not within prime hunting grounds. An upgraded access road to that area would benefit berry pickers and hunters as they venture further onto the land.

3.0 Hamlet Tour

While some members of the team met with the Hamlet council, other members were taken on a vehicle tour of the hamlet, guided by the former Sanikiluaq Member of Legislative Assembly, Allan Rumbolt. Some key observations from the hamlet tour are:

- The hotel is being repaired following the recent storm damage. Information from the guide indicates that when reopened, the hotel will have more rooms than the original hotel and a dining area/restaurant.



Figure 2: Co-Op Hotel Sanikiluaq

- There are two temporary work camps in the community for the time being. They are being used for the ongoing construction activities relating to the health centre and the new housing association office.
- There is a new health centre in the community that is large in comparison to the population. It was based on the design for the new Kinngait Health Centre. The facility is well equipped to provide emergency medical care to the project with the option for medevac for more serious incidents.



Figure 3: Sanikiluaq Health Centre

- Roads in the hamlet are in relatively poor condition and would benefit considerably from additional gravel and grading. This is particularly evident in the road from the airport to the community.
- There is a sizable Co-op grocery store for food/amenities. The team did not enter the store this visit however a team member was in the store in October 2020 and confirmed it is fully-stocked.
- The hamlet avails of an open landfill for disposal of all community wastes, including, recyclables, organics, metals, and hazardous wastes. The project will need to consider disposal of wastes (including waste oil) in a more environmentally friendly manner. This could involve removal of the wastes on sealift and disposal in the south.



Figure 4: Hazardous Waste Stored at Landfill

- There is a new Arctic Eider Society building currently under construction. The Hunters and Trappers Organization (HTO) will share in this space. The team held discussions with some of the people working on the construction and discussed some of the equipment that was located at the project site (see Section 4.0). It is planned that this facility will be a net-zero facility and there exist opportunities for the Arctic Eider Society and HTO to collaborate with, and directly benefit from, construction of the wind project.



Figure 5: Arctic Eider Society Building Under Construction

- Information indicates that there is a new hamlet office planned for the community.

- There is a new housing association office being constructed near the QEC plant. The team had introductory discussions with some of the personnel working on the construction. The construction team for this office imported a considerable amount of cement due to the lack of a batch plant in the hamlet. This cement was located near the new building footprint.
- There is a magnetic observatory next to the QEC plant. Information indicates that there is very sensitive equipment contained in the buildings.



Figure 6: Magnetic Observatory Behind the QEC Plant

- Reports from the community and discussions with the guide indicate that vandalism is a major concern in the community. The project will need to be cautious leaving equipment unattended for extended periods of time.



Figure 7: Truck with Windows Vandalized

- The team viewed the sealift landing location. Consensus is that equipment shipped in containers as the only facility is a beach for landing the sealift barge. It is believed that the sealift landing location will be sufficient, however, there is no deep-water port capabilities in the hamlet. The sealift ship takes anchorage approximately one mile offshore according to the guide. This should be validated by the project team.



Figure 8: Sealift Landing Location

- There is a hamlet owned gravel pit/borrow source. It appears that considerable quantities of material are available, but discussions with community personnel indicate that there is

a long lead time for crushed material due to a backlog from ongoing construction projects in the hamlet. Information indicates that class A material costs \$60 per cubic yard.



Figure 9: Hamlet Pit

- There are plans to install a new water treatment facility. Surveying has taken place recently, but there are no indications on timelines or a specific location for the new facility. The current water station was viewed by the project team. Discussions with the guide indicate that there are considerable challenges pertaining to clean water in the community. Encouraging information from a Government of Nunavut employee indicates that there are reverse osmosis units installed in every house in the hamlet. It is therefore assumed that the potable water in the hamlet is sufficient for housing employees during construction. Any future water treatment facilities constructed in the community will benefit the wind/BESS project through load growth and potential for additional renewable energy generation.



Figure 10: Existing Water Treatment Facility

- Anecdotal information from the guide indicates that the proposed project location is the optimal location within the hamlet. All indications are that any other project locations would be susceptible to potential vandalism and friction within the community. The existing trail to the proposed wind site is often used for berry picking and access to hunting/fishing but is not the primary location for these activities. Upgrades to the road/trail would likely be a welcomed addition within the community.

4.0 Heavy Equipment/Machinery Viewing

As part of the hamlet tour, the project team was able to view all heavy equipment and machinery available in the community, both functional and non-functional. There are multiple companies in ownership of the equipment as well as the hamlet. Owners of some of the local equipment indicated a willingness to work with project team to acquire any additional required equipment. The owners expressed this as an opportunity to acquire new infrastructure to provide reliable service to the hamlet in the future. The equipment identified during the hamlet tour is:

- A 966 CAT Loader owned by Gary Rumbolt.



Figure 11: 966 CAT Loader

- 2001 International Dump Truck owned by Gary Rumbolt. Discussions with Allan Rumbolt indicate that the truck currently has transmission that are being investigated and repaired.



Figure 12: 2001 International Dump Truck

- 950 CAT Loader owned by Gary Rumbolt.
- JCB 530 Telehandler owned by Gary Rumbolt.



Figure 13: 950 CAT Loader and JCB 530 Telehandler

- Miscellaneous heavy equipment owned by Kawtaq Construction (majority shareholder is Gary Rumbolt). Stock was not taken of specific model numbers, however, all equipment at Kawtaq yard appears to be non-functional and in need of considerable repairs.



Figure 14: Kawtaq Equipment in Need of Repairs

- 320c CAT Excavator owned by another construction company operating in the hamlet (name unknown).

- Roller owned by another construction company operating in the hamlet (model number and company name unknown).



Figure 15: 320c CAT Excavator and Roller (model unknown)

- Crane (unknown model number) owned by another construction company operating in the hamlet. Information indicates that crane may be operational but is not road worthy and appears to be in poor condition. Certification status is unknown, but it is unlikely that the crane meets the required certifications for lifting devices. Team will not use uncertified equipment for construction.



Figure 16: Crane Owned by Other Construction Company

- Dump truck owned by hamlet and in process of being purchased by Gary Rumbolt. Information indicates that paperwork for dump truck is not in order. Dump truck was vandalized and does not have any windows currently (Figure 7).
- 330 CAT Excavator owned by Hamlet of Sanikiluaq.
- 950 CAT Loader owned by Hamlet of Sanikiluaq.
- Crusher owned by Hamlet of Sanikiluaq.



Figure 17: 330 Excavator, 950 Loader, and Crusher Owned by Hamlet of Sanikiluaq

- Drill owned by Canadrill.



Figure 18: Canadrill Drill

- 4026 Manulift Telehandler owner unknown, but Allan Rumbolt expressed interest in purchasing from the current owner instead of a resale to the Montreal-based dealer.



Figure 19: Manulift 4026 Telehandler

- CAT D6 Dozer owned by Hamlet of Sanikiluaq. Information indicates that the rental rate for the dozer is \$300/hr.



Figure 20: CAT D6 Dozer Owned by Hamlet of Sanikiluaq

5.0 QEC Plant Tour

During the visit, the project team had an opportunity to visit the QEC plant and were able to enter the QEC yard, view the diesel generators, view the switchgear room, and view the ongoing installation of the new district heating system.

The major takeaways from the discussion with the QEC plant operator and the QEC facility viewing are:

- There are some required changes to the current drawings because of impediments within the QEC yard. The project team feels it would be in the project's best interest for project-specific equipment to be installed beyond the boundaries of the current QEC yard.
- There is limited space for expansion within the current QEC facility. The project will need to collaborate closely with QEC for the installation of any equipment that needs to be installed in the facility.
- The Sanikiluaq district heating system was installed in the plant this past summer (2021).
- There will be transformer upgrades to the facility soon. There is a temporary 1,200 kW diesel generator in a trailer in the QEC yard to provide power to the hamlet during the upgrades.



Figure 21: Rear of QEC Plant



Figure 22: Miscellaneous Items in QEC Yard



Figure 23: New Storage Containers in QEC Yard



Figure 24: QEC Yard (North Side Looking West)



Figure 25: QEC Plant (View from Mezzanine)



Figure 26: QEC Plant Switchgear/Controls Room

6.0 Wind Site Visit

Following the QEC Plant tour, the team sourced ATVs and a guide, Johnassie Ippak, through Allan Rumbolt for traversing the existing trail to the wind site. All five team members participated in the site visit along with both Johnassie and Allan. The route taken by the team is shown in Figure 27.

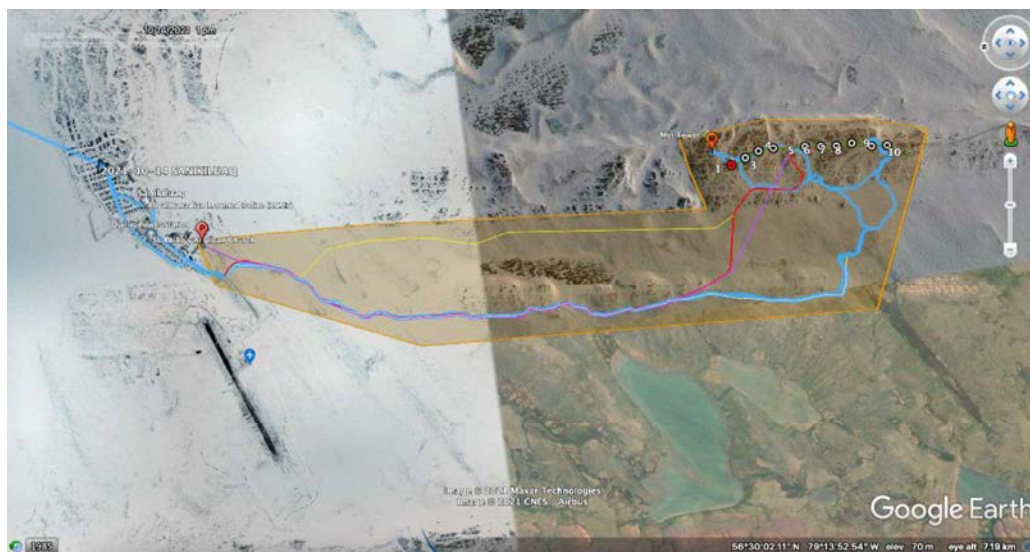


Figure 27: Sanikiluaq Site Visit Route

Some of the key observations from this visit are:

- The existing trail is rough, and it appears that there is limited use of the trail. Rocky sections were slow to traverse but should provide a solid foundation for road construction.
- Soft sections of the existing trail were difficult to cross, with no clear trail across some areas. Allan noted that areas around town that look OK to drive over, have seen large equipment sink and get stuck, requiring an excavator to retrieve. He mentioned that test drills went 12 m deep before reaching solid ground. It should be assumed that the soft sections along the trail may require more fill and an engineered solution like geotextiles between the fill and the existing ground.
- A fill-only road may be more advantageous than balancing cut fill along the route. This should be further assessed for productivity and investigating the price of the fill. Ability for a contractor to use their own equipment to remove material from the pit would be advantageous, rather than tying up the Hamlet's equipment. The pit appeared large enough for multiple operations to work simultaneously.
- The alternate, shorter route to the site was not traversed because of the difficulty in taking ATVs over the wet area near the Hamlet side of the trail. However, it was considered a viable option by Allan, noting that the prevailing wind should enable less snow buildup on the west side of the ridge, as compared to the east side. This route may be more economical depending on how much additional fill is required for soft sections of the existing trail.

- The Rolling rock outcrops along the top of the ridge provide very little flat working areas for wind turbine installation.



Figure 28: Met Tower at Proposed Project Location

- All turbine locations were visited, no insurmountable barriers identified for construction. Additional fill may be required depending on the turbine supplier's requirements for tower erection.



Figure 29: Wind Turbine 1 Proposed Location

7.0 Conclusions & Key Findings

Overall, the site visit was a success with considerable information obtained by the project team. The key findings from the project site visit are:

- There are no showstoppers – the team is confident that the project can be successful in the Hamlet.
- The Hamlet Council meeting was very positive, and the hamlet is supportive of the project and will see the project through to completion with the Project Team.
- Additional heavy equipment will be required for project execution. The equipment in the town is not sufficient to undertake the project without supplementary equipment. The age of the current equipment is of note to the project team and additional downtime/maintenance can be expected if this equipment is used. A valuable contact was established with the equipment owner who indicated a willingness to work with the project team to acquire the necessary equipment.
- The wind turbine foundation location conditions were close to expectations and no additional challenges were identified during the site visit.
- There are one to two wet areas that may present minor challenges requiring additional materials and/or equipment for the access road construction. No major challenges were identified during the site visit.
- Changes are required to the civil layout drawings concerning the QEC plant due to impediments within the QEC yard. The project team feels it would be best to place project-specific equipment beyond the bounds of the current QEC facility.
- Consideration will need to be given to accommodations during construction. It is unlikely that the hotel will meet the accommodation requirements for a construction team.
- Consideration is required for waste disposal (including waste oil). The team feels it is irresponsible to dispose of project wastes in an open landfill. This goes against the overall values of a community-led renewable energy initiative.



Appendix A – Bilingual Project Overview Presentation