



NIRB Application for Screening #125783

Renewable Energy Microgrid Integration for Remote, Off-grid Cabins in Nunavut

Application Type:	New
Project Type:	Scientific Research
Application Date:	3/21/2023 9:24:26 AM
Period of operation:	from 0001-01-01 to 0001-01-01
Proposed Authorization:	from 0001-01-01 to 0001-01-01
Project Proponent:	Heather Shilton Nunavut Nukkiksautiit Corporation P.O. Box 1228 Iqaluit NU X0A0H0 Canada Phone Number:: 8672224658, Fax Number::

DETAILS

Non-technical project proposal description

English: Lead Researcher: Heather Shilton Affiliation: Nunavut Nukkiqsautiit Corporation Nunavut Nukkiqsautiit Corporation is undertaking a research project with the following proposed key areas of work: Micro hydro-kinetic feasibility: This activity aims to investigate the feasibility of hydrokinetic energy to support the energy demands of off-grid structures or small communities in Inuit Nunangat. The team will conduct a desktop study to assess the micro-hydrokinetic resources available in the region. Following this, they will carry out a data-collection campaign, which will involve two visits to Resolute Bay and Iqaluit. During the first visit, 2-3 researchers will conduct an initial reconnaissance to find suitable sites for data collection and meet interested community members. The second visit will be the field survey, and 2-3 researchers will collect bathymetry, water levels, and flow velocities at three river discharges at Sylvia Grinnell River, Apex River, and Resolute River. The final sites for data collection will be selected. All visits will be made through commercially available scheduled flights, and researchers will stay at local hotels. No private flights or camps will be set up as part of this activity. Advanced solar feasibility: This activity involves a desktop analysis of the solar resource available in the region. In addition, 1-2 researchers will travel to Iqaluit and install solar panels on a pre-existing cabin located at Pan-arctic data communications site in Iqaluit. The solar panels will be installed for a period of one year to carry out performance evaluations. All the equipment will be shipped to Iqaluit via sealift and will be shipped back to Montreal at the end of the evaluation period. The researchers will travel via scheduled flights and stay in local hotels. No private flights or camps will be set up as part of this activity. Energy Storage Optimization and Performance Evaluation: This activity involves installing a 1 kW saltwater battery at the Pan-arctic data communication center. All the equipment will be shipped to Iqaluit via sealift, installed, and operated for a year for performance evaluation. After the end of one year, all the electrical equipment, as well as the hazardous materials that form the electrolyte of the battery, will be shipped back to Ontario. A forklift will be required to install the equipment on the site. One researcher will travel to Iqaluit on a scheduled flight and stay at a local hotel to oversee the installation of the energy storage equipment. Throughout the project lifecycle, researchers who visit the territory will always travel through scheduled flights and stay in local hotels. No private flights will be used, and no camps will be set up. The field survey and data collection will be done using non-invasive techniques, and the equipment installed during the project activities will be temporary and will be disassembled and shipped back to Ontario at the end of the project lifecycle. Scientific outputs and publications arising out of this work will be adapted and translated to be accessible to a wide audience across Inuit Nunangat. Community engagement throughout the whole project will be conducted to the extent that communities and individuals wish to engage. Project progress and outcomes will be shared at key events with Inuit representation, such as trade shows, conferences, and regional meetings.

French: Chercheuse principale : Heather Shilton Affiliation : Corporation Nunavut Nukkiqsautiit La Corporation Nunavut Nukkiqsautiit entreprend un projet de recherche avec les domaines de travail proposés suivants : Faisabilité hydrocinétique : Cette activité vise à étudier la faisabilité de l'énergie hydrocinétique pour soutenir les demandes énergétiques des structures hors réseau ou des petites communautés dans l'Inuit Nunangat. L'équipe effectuera une étude de bureau pour évaluer les ressources micro-hydrocinétiques disponibles dans la région. Ensuite, elle mènera une campagne de collecte de données, qui comprendra deux visites à Resolute Bay et à Iqaluit. Lors de la première visite, 2 à 3 chercheurs effectueront une reconnaissance initiale pour trouver des sites appropriés pour la collecte de données et rencontrer des membres de la communauté intéressés. La deuxième visite sera l'enquête sur le terrain, et 2 à 3 chercheurs recueilleront la bathymétrie, les niveaux d'eau et les vitesses d'écoulement à trois débits de rivière de la rivière Sylvia Grinnell, de la rivière Apex et de la rivière Resolute. Les sites finaux de collecte de données seront sélectionnés. Toutes les visites seront effectuées par des vols réguliers commercialement disponibles, et les chercheurs séjourneront dans des hôtels locaux. Aucun vol privé ni camp ne sera mis en place dans le cadre de cette activité. Faisabilité solaire avancée : Cette activité implique une analyse de bureau de la ressource solaire disponible dans la région. De plus, 1 à 2 chercheurs se rendront à Iqaluit et installeront des panneaux solaires sur une cabine préexistante située au site de communication de données pan-arctique à Iqaluit. Les panneaux solaires seront installés pendant une période d'un an pour effectuer des évaluations de performance. Tout l'équipement sera expédié à Iqaluit via le transport maritime et sera expédié à Montréal à la fin de la période d'évaluation. Les chercheurs voyageront par des vols réguliers et séjourneront dans des hôtels locaux. Aucun vol privé ni camp ne sera mis en place dans le cadre de cette activité. Optimisation du stockage d'énergie et évaluation des performances : Cette activité implique l'installation d'une batterie d'eau salée de 1 kW au centre de communication de données panarctique. Tout l'équipement sera expédié à Iqaluit par voie maritime, installé et exploité pendant un an pour évaluation des performances. Après la fin d'un an, tous les équipements électriques, ainsi que les matériaux dangereux qui forment l'électrolyte de la batterie, seront expédiés de retour en Ontario. Un chariot élévateur sera nécessaire pour installer l'équipement sur le site. Un chercheur voyageera à Iqaluit sur un vol régulier et séjournera dans un hôtel local pour superviser l'installation de l'équipement de stockage d'énergie. Tout au long du cycle de vie du projet, les chercheurs qui visitent le territoire voyageront toujours par des vols

Inuktitut:

Inuinnaqtun:

Given Innuinaqtun is mostly spoken in the Kitikmeot Region and this project focuses on locations in the Qikiqtani Region, the project does not appear to be applicable to Innuinaqtun speakers.

Personnel

Personnel on site: 4

Days on site: 5

Total Person days: 20

Operations Phase: from 2022-05-09 to 2025-03-25

Activities

Location	Activity Type	Land Status	Site history	Site archaeological or paleontological value	Proximity to the nearest communities and any protected areas
Panarctic Communications Datacenter - Privately Owned Building	Equipment installation	Private	No known site history	There is no known archeological/paleontological value	Panarctic Communications Datacenter is located 3.5 KMs from Iqaluit and 1.7 KMs from Apex.
Sylvia Grinnell River	Marine Based Activities	Crown	No known site history - specific locations are not yet identified but known historical sites will be avoided for data collection activities.	There is no known archeological/paleontological value - specific sites are not yet identified but known areas of value will be avoided.	Specific locations are not yet identified but all protected areas will be avoided and all data will be collected using non-invasive equipment & techniques.
Niaqunguk (Apex) River	Marine Based Activities	Crown	No known site history - specific locations are not yet identified but known historical sites will be avoided for data collection activities.	There is no known archeological/paleontological value - specific sites are not yet identified but known areas of value will be avoided.	Specific locations are not yet identified but all protected areas will be avoided and all data will be collected using non-invasive equipment & techniques.
Resolute River	Marine Based Activities	Crown	No known site history - specific locations are not yet identified but known historical sites will be avoided for data collection activities.	There is no known archeological/paleontological value - specific sites are not yet identified but known areas of value will be avoided.	Specific locations are not yet identified but all protected areas will be avoided and all data will be collected using non-invasive equipment & techniques.

Community Involvement & Regional Benefits

Community	Name	Organization	Date Contacted
Iqaluit	Jordan Okalik-Musgrove	Nunavut Nukkiqsautiit Corporation	2022-05-09
Rankin Inlet	Jackson Lindell	Hamlet	2023-02-09

Authorizations

Indicate the areas in which the project is located:

North Baffin
South Baffin

Authorizations

Regulatory Authority	Authorization Description	Current Status	Date Issued / Applied	Expiry Date
Government of Nunavut, Nunavut Research Institute	Scientific Research License is required to carry out the project research activities, including equipment installation for data collection, field surveys and community engagements.	Applied, Decision Pending	2023-02-10	

Project transportation types

Transportation Type	Proposed Use	Length of Use
Water	A small boat to be used to carry out field surveys for river flow data.	
Land	Vehicles will be rented locally from rental companies or community members to be used to get to project locations. Forklift rented from local contractors to be used for equipment installation.	

Project accomodation types

Community
Other,

Material Use

Equipment to be used (including drills, pumps, aircraft, vehicles, etc)

Equipment Type	Quantity	Size - Dimensions	Proposed Use
Survey Boat (Locally Rented)	1	N/A	To carry out data collection in rivers
Acoustic Doppler Current Profiler (ADCP)	1	0.3 m x 0.2 m x 0.2 m	To measure water velocity and depth of rivers
Real time kinematic global positioning system (RTK-GPS)	1	1 m x 0.5 m x 0.5 m	To access location services
Vehicle (To be rented locally)	1	N/A	To get to project locations
Solar PV Panels	20	1.6 m x 1 m x 0.1 m	For Solar PV Installations
1 kW Battery Stack and Auxiliary Equipment	1	1.5m x 1m x 1m	To study battery storage performance
Water Tanks	4	1.6m x 1m x 0.8m	To store salt water electrolyte used in the battery
Forklift (to be rented locally)	1	N/A	To install battery and electrolyte tanks

Detail Fuel and Hazardous Material Use

Detail fuel material use:	Fuel Type	Number of containers	Container Capacity	Total Amount	Units	Proposed Use
Gasoline	fuel	1	100	100	Liters	For use in the survey boat and rental vehicle
H2SO4	hazardous	1	3	3	Liters	For use in the battery electrolyte
NaOH	hazardous	1	4	4	Kg	For use in battery electrolyte
Na2SO4	hazardous	1	150	150	Kg	For use in battery electrolyte
Non-volatile, biodegradable alcohol based solvent	hazardous	1	300	300	Liters	For use in battery electrolyte

Water Consumption

Daily amount (m3)	Proposed water retrieval methods	Proposed water retrieval location
0		

Waste

Waste Management

Project Activity	Type of Waste	Projected Amount Generated	Method of Disposal	Additional treatment procedures
Equipment installation	Hazardous waste	303 Litres of Liquid and 154 Kg solid	All the hazardous materials including H ₂ SO ₄ , NaOH, Na ₂ SO ₄ and Non-volatile, biodegradable alcohol-based solvent form the electrolyte that is to be used in the battery storage system. At the end of the battery operation cycle i.e., 1 year, the battery electrolyte solutions will be shipped back in the battery tanks and will be re-used, or disposed of locally in Ontario.	As all hazardous material is to be shipped back to be re-used or disposed of locally in Ontario, there are no additional treatment procedures required.
Equipment installation	Non-Combustible wastes	Details given below	<ul style="list-style-type: none"> •Packing material •Wire scraps < 10 m. •Sheet metal ducting scraps < 1m. •Building envelope hole saw scrap, approximately 6" diameter (gypsum board, insulation, plywood, metal roofing). Non-combustible waste will be disposed of using the communities current waste disposal methods.	No additional treatment procedures are anticipated at this time.
Equipment installation	Other, End of lifecycle Project Materials	N/A	All the equipment that is being brought into the community including the survey equipment, solar PV panels and battery equipment, and any other auxiliary equipment listed in the material use section, will be shipped back at the end of the project lifecycle to be reused for future research projects.	No additional treatment procedures are anticipated at this time.

Environmental Impacts:

There are no envisioned environmental impacts from this project. The equipment installed for the research project is non-intrusive, temporary equipment and will be shipped back after the end of the project. Leftover battery electrolyte solutions will be shipped back in the battery tanks and will be re-used, or disposed of locally in Ontario.

Additional Information

SECTION A1: Project Info

SECTION A2: Allweather Road

SECTION A3: Winter Road

SECTION B1: Project Info

SECTION B2: Exploration Activity

SECTION B3: Geosciences

SECTION B4: Drilling

SECTION B5: Stripping

SECTION B6: Underground Activity

SECTION B7: Waste Rock

SECTION B8: Stockpiles

SECTION B9: Mine Development

SECTION B10: Geology

SECTION B11: Mine

SECTION B12: Mill

SECTION C1: Pits

SECTION D1: Facility

SECTION D2: Facility Construction

SECTION D3: Facility Operation

SECTION D4: Vessel Use

SECTION E1: Offshore Survey

SECTION E2: Nearshore Survey

SECTION E3: Vessel Use

SECTION F1: Site Cleanup

SECTION G1: Well Authorization

SECTION G2: Onland Exploration

SECTION G3: Offshore Exploration

SECTION G4: Rig

SECTION H1: Vessel Use

A small boat will be used to collect data in the rivers during the site surveys to collect data using vessel mounted equipment. There are no impacts or waste associated with these activities.

SECTION H2: Disposal At Sea

There will be no disposal at sea as part of the project.

SECTION I1: Municipal Development

Description of Existing Environment: Physical Environment

Description of Existing Environment: Biological Environment

Description of Existing Environment: Socio-economic Environment

Miscellaneous Project Information

Identification of Impacts and Proposed Mitigation Measures

There are no envisioned environmental impacts from this project. The equipment installed for the research project is non-intrusive, temporary equipment and will be shipped back after the end of the project.

Cumulative Effects

There are no envisioned environmental impacts from this project. The equipment installed for the research project is non-intrusive, temporary equipment and will be shipped back after the end of the project.

Impacts

Identification of Environmental Impacts

		PHYSICAL	Designated environmental areas	Ground stability	Permafrost	Hydrology / Limnology	Water quality	Climate conditions	Eskers and other unique or fragile landscapes	Surface and bedrock geology	Sediment and soil quality	Tidal processes and bathymetry	Air quality	Noise levels	BIOLOGICAL	Vegetation	Wildlife, including habitat and migration patterns	Birds, including habitat and migration patterns	Aquatic species, incl. habitat and migration/spawning	Wildlife protected areas	SOCIO-ECONOMIC	Archaeological and cultural historic sites	Employment	Community wellness	Community infrastructure	Human health
Construction																										
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Operation																										
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Decommissioning																										
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(P = Positive, N = Negative and non-mitigatable, M = Negative and mitigatable, U = Unknown)

Project Location



List of Project Geometries

- | | | |
|---|-------|--|
| 1 | point | Panarctic Communications Datacenter - Privately Owned Building |
| 2 | point | Sylvia Grinnell River |
| 3 | point | Niaqunguk (Apex) River |
| 4 | point | Resolute River |