Iqaluit Nukkiksautiit Project

Decision Support Package - Phase 1

November 2022 / PRIVILEGED & CONFIDENTIAL

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Nunavut Nukkiksautiit Corporation

Preamble

Nunavut Nukkiksautiit Corporation ("NNC") is a wholly-owned subsidiary of the **Qikiqtaaluk Corporation ("QC")**—the for-profit development arm of the **Qikiqtani Inuit Association ("QIA")**. QC, with QIA as its sole shareholder, is 100% Inuit-owned, invests in strategic business opportunities, and is a major contributor to all sectors of the Nunavut economy.

QIA is one of three Regional Inuit Associations affiliated with **Nunavut Tunngavik Inc. ("NTI")**, an organization tasked with upholding the Nunavut Agreement by working closely with partners and all levels of government to represent Inuit in the Inuit Nunangat, the Inuit homeland.

Through the Nunavut Agreement, 356,000 km² (17.7% of the territory's landmass) is dedicated as **Inuit-Owned Land ("IOL")**. NTI designates the responsibility of managing that IO Land to the Regional Inuit Associations. QIA represents 51% of Inuit living in the territory of Nunavut and manages nearly half of the IOL (which is situated in the Qikiqtani Region) making QIA one of the world's largest private landowners.

NNC is Nunavut's first 100% Inuit-owned renewable energy developer. Its mission is to lead Qikiqtani's clean energy transition on IOL in partnership with communities by establishing sustainable clean energy developments that foster economic, social, and environmental benefits. The company promotes a unique regional-community ownership structure. This approach enables communities to lead projects while easing project development burdens, bringing triple bottom line benefits to Nunavummiut without the strain on municipal resources. Improving access to affordable, clean energy while reducing Nunavut's reliance on diesel fuel is one of NNC's top priorities.

Renewable energy projects pursued by NNC are tailored to the individual needs and resources of each community. This is done by selecting the optimal mix of clean energy technologies such as solar, wind, hydro, tidal, and energy storage systems based on the determinants of each community. The primary goal is to develop solutions that are affordable, reliable and accessible that bring maximum benefits to communities.

Through all phases of a renewable energy project lifecycle, including planning, development, project financing, construction, and operations, NNC prioritizes the integration of **Inuit Qaujimajatuqangit ("IQ")**. In particular, the following Inuit Societal Values are actively embodied by NNC's business activities:

- Aajiiqatigiinniq: Decision making through discussion and consensus
- Piliriqatigiinniq/Ikajuqtigiinniq: Working together for a common cause
- Qanuqtuurniq: Being innovative and resourceful
- Avatittinnik Kamatsiarniq: Respect and care for the land, animals and the environment

By developing projects with the intent to own them in partnership with communities for the entire life of the infrastructure, NNC strives to ensure all renewable energy projects in Nunavut are technically and financially sound for the benefit of future generations.

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Nunavut Nukkiksautiit Corporation

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Nunavut Nukkiksautiit Corporation

November 14, 2022

Harry Flaherty
President, Qikiqtaaluk Corporation
5300 Qulliq Court, Suite 200
Iqaluit, Nunavut

RE: Iqaluit Nukkiksautiit Project, Decision Gate 1

Dear Mr. Flaherty,

As an Inuit-led project, the Iqaluit Nukkiksautiit Project aims to identify opportunities to improve energy security while reducing greenhouse gas ("GHG") emissions for Inuit in the City of Iqaluit by harnessing nearby renewable energy ("RE"). At present, like every community in Nunavut, Iqaluit is dependent on diesel power. Diesel carries risks and vulnerabilities that are ultimately borne by all Inuit who have no choice but to rely on them. The ever-climbing cost and volatile economics of fossil fuels, mechanical malfunctions and fire hazards of aging gensets, the unreliability of supply chains and fuel deliveries, and the substantial carbon footprint of burning diesel for power that directly exacerbates the climate crisis all combine to have serious negative impacts on the quality of life and autonomy of Inuit.

Through this project, the Nunavut Nukkiksautiit Corporation ("NNC") is working to offer Inuit a different choice. One that minimizes risks, vulnerabilities, and harms to the environmental and social networks that are central to Inuit culture. One that brings Inuit closer to energy sovereignty, environmental sustainability, and affordability. A choice that is selected through free, prior, and informed consent.

The Nunavut Agreement prescribes the rights afforded to Inuit and the responsibilities of Inuit organizations including a right to self-determination. Natural resource projects, including RE generation and supply, can be part of our future, provided proposals conform to an Inuit vision of the future. NNC believes such projects should only occur when Inuit believe it will strengthen Inuit communities and support a diversified Inuit economy, thereby enhancing Inuit cultural and social wellbeing. A proposed project located on Inuit-owned land ("IOL"), using Inuit resources, and affecting every aspect of Inuit harvesting and cultural rights, must respect Inuit rights, knowledge, and needs.

Consistent with the spirit and commitment of reconciliation, RE opportunities offer Iqaluit the ability to invest in and operate infrastructure that protects the land, creates local jobs, and generates financial returns that can be reinvested to promote growth and well-being. NNC seeks to support Inuit in the exploration and development of such opportunities while centering Inuit Qauijimajatuqangit ("IQ") every step of the way, including through all technical evaluations, modeling, and recommendations.

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Nunavut Nukkiksautiit Corporation

The Iqaluit Nukkiksautiit Project functions within a phase-gate system of project development. The five phases of the project include:

- Phase 1: Identify Opportunity
- Phase 2: Develop Alternatives
- Phase 3: FEED & Markey Evaluation
- Phase 4: Project Execution
- Phase 5: Asset Operation

Between each phase, there is a decision gate. This gate offers a pause for Inuit Rightsholders to decide whether or not the project should advance to the next phase.

At this time, NNC is pleased to announce the completion of Phase 1, and present you with the Decision Support Package ("DSP") for Decision Gate 1 of the Iqaluit Nukkiksautiit Project ("the Project"). This document provides project validation using existing data and analysis; a business case, market and economic evaluations; project strengths, and weaknesses; and, possible project configurations. The project team focused attention on creating an Inuit rightsholder approach to project development. The Qikiqtani Inuit Association ("QIA") are moving forward with developing a plan for the accompanying Tusaqtavut Study, which will be shared with Inuit rightsholder organizations for advancement.

The purpose of Phase 1 of the project was twofold: (1) to identify and understand the renewable energy ("RE") opportunity for the City of Iqaluit, and (2) to confirm agreement among project partners and Inuit rightsholders to proceed to deeper evaluation of the project. Above all the technical deliverables of Phase 1 of this project described above, the mission of this stage gate is to verify, include, and apply feedback from Inuit rightsholders prior to proceeding. NNC is dedicated to representing the best interests of Inuit through each phase, and will move forward to Phase 2 only if and when Inuit rightsholders, represented by QIA and the Qikiqtaaluk Corporation ('QC"), provide approval and consent.

As project sponsor, and on behalf of the project team, I want to thank you for supporting our efforts on the Iqaluit Nukkiksautiit Project to date. We hope that the enclosed DSP is prepared to your satisfaction, and look forward to receiving your feedback. If and when you decide that our recommendations are in alignment with the best interest of Inuit Rightsholders, we invite you sign this letter as an indication of support, approval, and consent for the project team to move forward to Phase 2.

Sincerely,

______________________________	______________________________
Heather Shilton	ACCEPTANCE OF RECCOMMENDATIONS
Director, Nunavut Nukkiksautiit Corporation	Harry Flaherty
	President & CEO, Qikiqtaaluk Corporation

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QIKIQTAALUK CORPORATION
& Group of Companies

November 14, 2022

Olayuk Akesuk
President, Qikiqtani Inuit Association
Igluvut Building, 2nd floor
922 Niaqungusiariaq Road
PO Box 1340
Iqaluit, Nunavut X0A 0H0

RE: Iqaluit Nukkiksautiit Project, Phase One Decision Gate

Dear Mr. Akesuk,

As an Inuit-led project, the Iqaluit Nukkiksautiit Project aims to identify opportunities to improve energy security while reducing greenhouse gas ("GHG") emissions for Iqalungmiut by harnessing nearby renewable energy ("RE"). At present, like every community in Nunavut, Iqaluit is entirely dependent on diesel fuel for electricity generation. Diesel carries risks and vulnerabilities that are ultimately borne by all Nunavummiut who have no choice but to rely on it. The ever-climbing cost and volatile economics of fossil fuels, mechanical malfunctions and fire hazards of aging gensets, the unreliability of supply chains and fuel deliveries, and the substantial carbon footprint of burning diesel for electricity that directly exacerbates the climate crisis all combine to have serious negative impacts on the quality of life and autonomy of Qikiqtani Inuit.

Through this project, Qikiqtaaluk Corporation's wholly-owned subsidiary, the Nunavut Nukkiksautiit Corporation ("NNC"), is working with Iqalungmiut to identify an alternative solution. One that minimizes risks, vulnerabilities, and harms to the environmental and social networks that are intrinsic to Inuit culture. One that brings Inuit closer to energy sovereignty and an affordable cost of living. A choice that is selected through free, prior, and informed consent.

The Nunavut Agreement prescribes the rights afforded to Inuit and the responsibilities of Inuit organizations including a right to self-determination. Natural resource projects, including RE generation and supply, can be part of our future, provided proposals conform to an Inuit vision of the future. NNC believes such projects should only occur when Inuit believe it will strengthen Inuit communities and support a diversified Inuit economy, thereby enhancing Inuit cultural and social wellbeing. A proposed project located on Inuit-owned land ("IOL"), using Inuit resources, and affecting every aspect of Inuit harvesting and cultural rights, must respect Inuit rights, knowledge, and needs.

Consistent with the spirit and commitment of reconciliation, RE opportunities offer Iqalungmiut the ability to invest in and operate infrastructure that protects the land, creates local jobs, and generates financial returns that can be reinvested to promote growth and well-being in the community. NNC seeks to work alongside Iqalungmiut in the exploration and development of such opportunities while centering Inuit Qauijimajatuqangit ("IQ") every step of the way, including through all technical evaluations, modeling, and recommendations.

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The Iqaluit Nukkiksautiit Project functions within a phase-gate system of project development. The five phases of the project include:

- Phase 1: Identify Opportunity
- Phase 2: Develop Alternatives
- Phase 3: FEED & Markey Evaluation
- Phase 4: Project Execution
- Phase 5: Asset Operation

Between each phase, there is a decision gate. This gate offers a pause for Inuit Rightsholders to decide whether or not the project should advance to the next phase.

Phase 1 Completion

At this time, NNC is pleased to announce the completion of Phase 1, and presents the Decision Support Package ("DSP") for the Phase 1 Decision Gate of the Iqaluit Nukkiksautiit Project ("the Project"). This document provides project validation using existing data and analysis; a business case, market and economic evaluations; project strengths, weaknesses, and risks; and, details on what Phase 2 will include. The project team focused attention on creating an Inuit rightsholder approach to project development. As you know, the Qikiqtani Inuit Association ("QIA") are moving forward with developing a plan for the accompanying Tusaqtavut Study, which will be shared with Inuit rightsholder organizations for advancement.

The purpose of Phase 1 of the project was twofold: (1) to identify and understand the opportunity for Iqalungmiut, and (2) to confirm agreement among project partners and Inuit rightsholders (Hunters and Trappers Associations, Iqaluit City Council, and QIA) to proceed to deeper evaluation of the project. Above all the technical deliverables of Phase 1 of this project described above, the mission of this stage gate is to verify, include, and apply feedback from Inuit Rightsholders prior to proceeding. NNC is dedicated to representing the best interests of Inuit through each phase, and will move forward to Phase 2 only if and when Inuit rightsholders provide approval and consent.

The key findings of Phase 1, as related to the purpose of the phase, were also twofold: (1) given initial assessment of existing data, there is an opportunity for RE adoption for the City of Iqaluit to be further explored, and (2) there is interest to further explore this potential from project partners, but most importantly, Inuit rightsholders.

Next Steps

Phase 2 prioritizes further development of the business case through data collection, preliminary engineering work, and refined economics models, all while continuing stakeholder and Inuit rightsholder engagement. Progression to Phase 2 for the Project would allow two key activities to take place, which include:

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1. The Tusaqtavut Study: an assessment that will integrate IQ and Inuit perspectives on potential impacts from the proposed Project in order to provide baseline understanding of Inuit culture, resources, and land use as they may be impacted throughout the life of the project.
2. Alternatives Generation and Concept Selection: the assessment of a wide range of project configurations for both technical and economic feasibility, such that a final recommendation can be made for a final concept, as influenced by the preferences of the community and Inuit rightsholders.

Given the positive findings of Phase 1, and that the financial risk associated with progressing to the next phase has been mitigated through the securement of project funding, it is recommended that the Project proceed to Phase 2.

Conclusion

As project sponsor, and on behalf of the project team, I want to thank you for supporting our efforts on the Iqaluit Nukkiksautiit Project to date. We hope that the enclosed DSP is prepared to your satisfaction, and look forward to receiving your feedback.

If and when you decide that our recommendations are in alignment with the best interest of the Qikiqtani Inuit Rightsholders you serve, we invite you to sign this letter as an indication of Qikiqtaaluk Corporation's ("QC")support, approval, and consent for the project team to move forward to Phase 2. At such time, and as NNC's parent company, we also respectfully request that you forward this DSP to Mr. Olayuk Akesuk, President of the Qikiqtani Inuit Association, seeking the same support, approval and consent on behalf of Inuit Rightsholders.

Sincerely,

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Harry Flaherty
President, Qikiqtaaluk Corporation

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ACCEPTANCE OF RECCOMMENDATIONS
Olayuk Akesuk
President, Qikiqtani Inuit Association

P.O. Box 1228 Iqaluit, NU X0A-0H0 Canada Phone: 867-979-8400 Fax: 867-979-8433 Web: www.qcorp.ca


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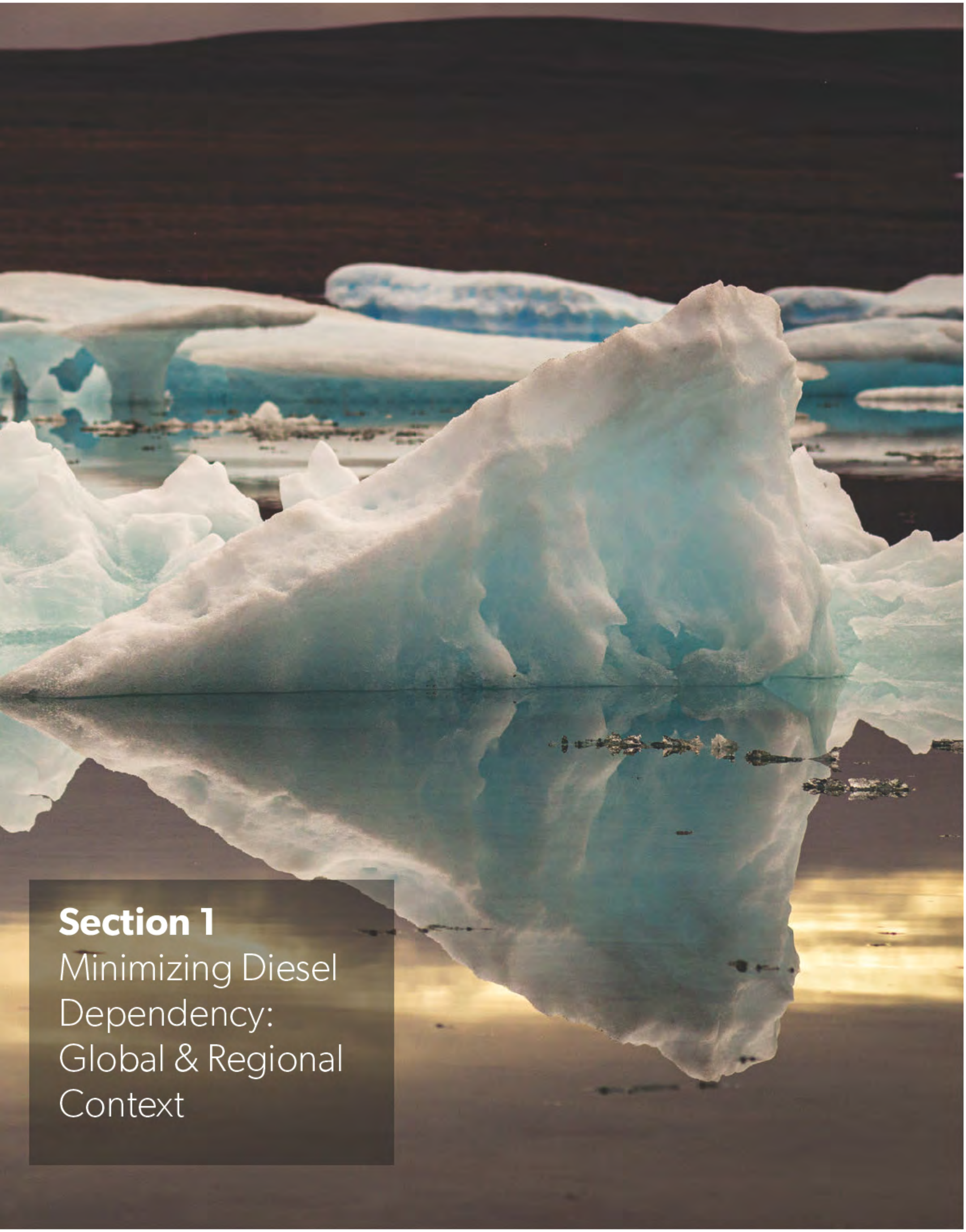


Section 1
Minimizing Diesel Dependency: Global & Regional Context

1.1 Diesel Dependency in the North

Across the Canadian Arctic, every off-grid community—most of which are also Indigenous—is reliant on fossil fuels to produce electricity and heat (Thomson 2019). Energy generation and distribution are constrained as they are not connected to the North American electricity and natural gas grids (Standing Senate Committee on Energy, the Environment and Natural Resources 2015). Diesel must be shipped in bulk from the south during the short summer season to keep the generators running all year round. As of 2020, collective diesel-equivalent ("diesel-eq") use in these communities was a staggering 682 million liters every year (Pembina Institute 2020). The fuel is stored in tank facilities in each municipality (Qulliq Energy Corporation n.d.) and must last through the winter.

Diesel is a well-known and reliable source of electricity and has been since the first generators were installed in the North through the 1950s and 60s (Standing Senate Committee on Energy, the Environment and Natural Resources 2015). It is important to note that Inuit, who were not involved in the decision making for implementation of diesel systems, bear all of the associated risks and vulnerabilities. Before being transferred to the Territories in the 1980s, they were owned and operated by the federal government through the Northern Canada Power Commission ("NCPC").

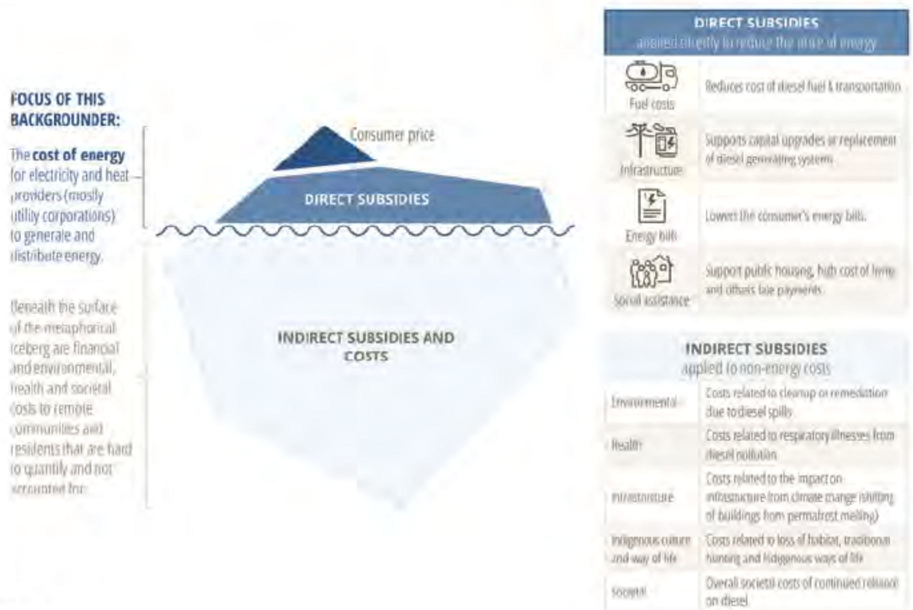
1.1.1 Risks of Diesel Dependency

Diesel generators also carry their own risks and vulnerabilities that ultimately are borne by all Inuit who rely on them.

High Cost of Remote Import

The cost of importing diesel by truck, barge, or plane over such long distances is high and ever-climbing. Generators consume large volumes of fuel, and the political and economic volatility of petroleum markets put affordability and stability of diesel-dependent energy systems out of reach (Standing Senate Committee on Energy, the Environment and Natural Resources 2015). As such, diesel is heavily subsidized in the North by territorial governments and the Government of Canada ("GC"); however, the subsidization programs are multi-layered and complex making it difficult to precisely quantify.

Subsidies in Nunavut can amount to almost 80%, bringing costs down for residential customers in the capital city, Iqaluit, to 28.4 cents / kWh for the first 1000 kWh in winter and 700 kWh in summer (Canada Energy Regulator 2018). Beyond this usage threshold, prices rocket to the unsubsidized rates which range from 58 cents / kWh (in Iqaluit) to $1.16 / kWh (in Kugaaruk) (Qulliq Energy Corporation 2019).



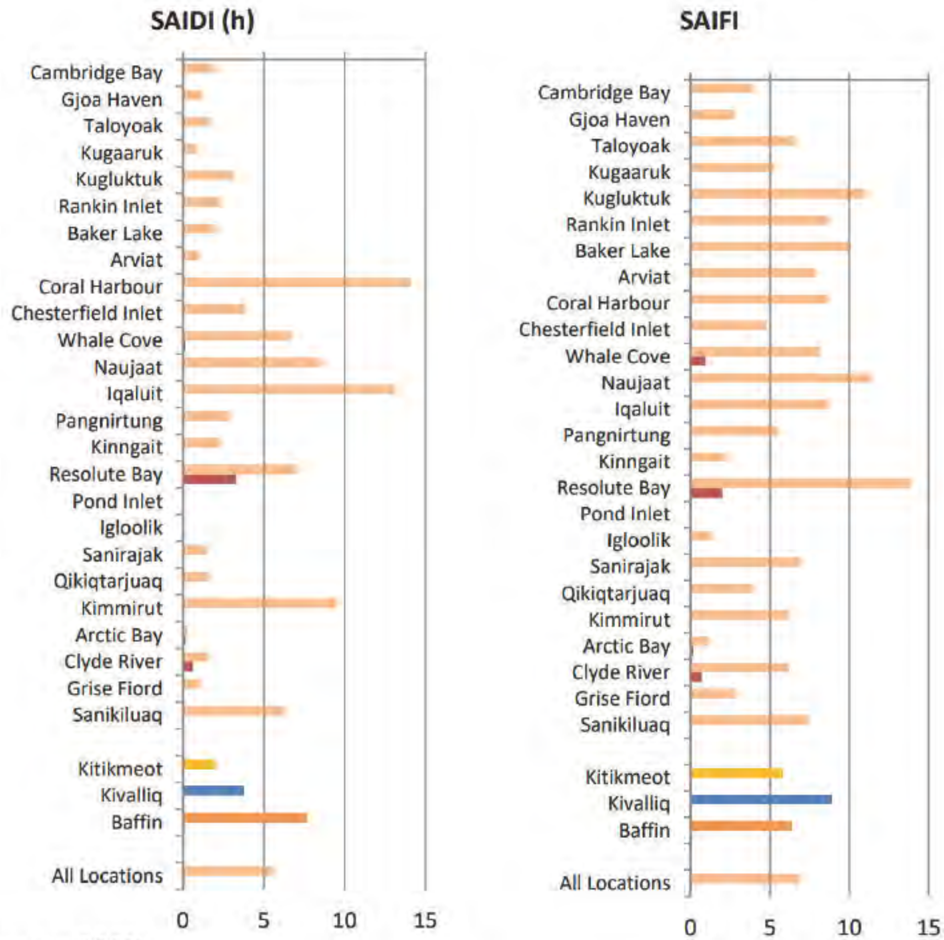
(Pembina Institute 2020)

Unsurprisingly, Nunavut has the lowest per capita electricity consumption in Canada (0.11 TWh; 60% less than the national average), and one of the highest electricity rates in the country because of low population density and the high cost of importing diesel (Canada Energy Regulator 2022). Qulliq Energy Corporation ("QEC") spends $54 million each year to burn 55 million litres of diesel, which supplies power to 38,000 Nunavummiut (Thomson 2019).

Adding to this, the GN spends an estimated $63.7 - $100 million each year to subsidize the use of diesel fuel in the territory, of which well over half is spend on electricity generation (Touchette, Gass and Echeverria 2017). Zooming out, when considering direct subsidies to remote communities across the Canadian artic, it is estimated that $300 million - $400 million is spent annually, to maintain diesel use (Pembina Institute 2021).

Mechanical Malfunction

Mechanical malfunction and the fire hazards of combustible fuel can result in power outages, which are extremely serious and potentially life-threatening events, especially during winter. QEC measures standard performance indicators for its diesel power plants, such as the System Average Interruption Frequency Index ("SAIFI") for customers and the System Average Interruption Duration Index ("SAIDI") for communities. The following charts display these indices for 2020-2021, with planned outages in red, and unplanned outages in orange. During this reporting period, Nunavut's SAIFI was 6.90 interruptions per customer on average, and SAIDI was 5.67 hours per customer on average (Qulliq Energy Corporation 2021).



(Qulliq Energy Corporation 2021)

However, these risks and vulnerabilities cannot be considered only within averages.

In April, 2015, a fire at the local diesel power plan in Pangnirtung, Nunavut caused community-wide power outages and the declaration of a state of emergency (CBC News 2015). At astronomical costs, mobile generators were airlifted in from The Northwest Territories Power Corporation, the Government of Nunavut's ("GN")'s Emergency Management division, and Northern Property REIT (Real Estate Investment Trust), while patients were evacuated to Iqaluit for continuing care. An emergency warming shelter was opened at Attagoyuk Ilisavik School where the Canadian Air Cadets supplied cots, mattresses and blankets, and long-distance communications and data systems began to degrade as backup batteries depleted.

Unreliable Delivery

Diesel deliveries are not always reliable due to supply chain issues, harsh weather, and the disruption of ice roads due to warming temperatures.

In 2018, the hamlet of Paulatuk, Northwest Territories almost ran out of diesel when extreme fall ice conditions shut down marine traffic (Malbeuf 2018). The territorial government stepped in to fly 600,000 litres of diesel to the community, costing $1.75 million over dozens of flights (Thomson 2019).

Since the 1970s, more than 9.1 million litres of diesel has been spilled in the Northwest Territories and Nunavut, more than half of which are from trucks and storage tanks (Government of Northwest Territories n.d.).

Burning diesel for power and heat creates local health, environmental, and financial issues. This system is a relic of times gone by, when there were no other options and the problems associated with diesel were not understood (Thomson 2019). This infrastructure and associated issues were forced upon Nunavummiut through a top-down colonial approach. Furthermore, expansion and development are limited in Nunavut communities, because the available electricity is restricted by the capacity of the generators. This creates major strains on housing markets, and growth of any kind.

Conversely, harnessing abundant local renewable energy resources like sun, wind, water, and biomass will create economic independence, local jobs, and energy security (Pembina Institute 2020). This transition has been difficult thus far for a number of reasons, arguably the most significant of which is a lack of financial capacity among Territorial Governments and their Utility Corporations to advance major energy projects due to their small rate and tax bases (Standing Senate Committee on Energy, the Environment and Natural Resources 2015). Ironically, the subsidization processes that sustain diesel energy systems block utility companies like QEC from experiencing any incentive to consider other solutions. If subsidies were not so robust, utilities would naturally prioritize exploring renewable energy ("RE") to reduce their financial liabilities and risks associated with diesel.

In Nunavut, QEC which is 100% owned by the GN, operates 25 stand-alone diesel power plants in 25 communities with a total installed capacity of approximately 76,000 kW (Qulliq Energy Corporation n.d.). Of these 25 diesel plants, 13 are already beyond their expected lifespans (Thomson 2019).

"To advance renewable energy projects in remote communities, we also need to level the playing field by revealing the real cost of diesel, and the true accounting for subsidies for diesel fuel and generator procurement, as well as the social costs of carbon. Only then can governments determine the more cost-effective, affordable power source." *- Dave Lovekin and Barend Dronkers; Pembina Institute and WWF-Canada*

Why is shifting away from diesel so difficult?

Shifting away from diesel dependence has been difficult thus far for a number of reasons, arguably the most significant of which is a lack of financial capacity among Territorial Governments and their Utility Corporations to advance major energy projects due to their small rate and tax bases (Standing Senate Committee on Energy, the Environment and Natural Resources 2015).

In Nunavut, Qulliq Energy Corporation ("QEC"), which is 100% owned by the Government of Nunanvut ("GN"), operates 25 stand-alone diesel power plants in 25 communities with a total installed capacity of approximately 76,000 kW (Qulliq Energy Corporation n.d.). They burn 55 million litres of diesel each year to supply power to 38,000 Nunavummiut (Thomson 2019). The regulatory structure is complicated, with a Utility Rates Review Council ("URRC") that regulates but doesn't have authority, and a utility that tends to be responsible for generating policy under which it operates.

While Nunavut has the lowest per capita electricity consumption in Canada (0.11 TWh) at 60% less than the national average, it also has one of the highest electricity rates in the country because of low population density and the high cost of importing diesel (Canada Energy Regulator 2022). Compared to the Canadian average electricity price of 12.9 cents per kilowatt hour (kWh), households in Nunavut (and Northwest Territories) pay more than 30 cents per kWh (Canada Energy Regulator 2017).

1.2 Climate Change and Social Responsibility

What can we expect?

Polar regions are experiencing impacts from climate change at a magnitude and rate that are among the highest in the world and will change profoundly by 2050 under all warming scenarios explored by the international science community (Intergovernmental Panel on Climate Change 2021). Near-term risks for biodiversity loss are high to very high in Arctic sea-ice, freshwater and terrestrial systems, and it is expected with high confidence that the disappearance of several Arctic fish, crab, bird and marine mammal species will occur, impacting food webs, subsistence and commercial harvests (Intergovernmental Panel on Climate Change 2022). Other expected changes include: glacier retreat, sea- and lake-ice thinning, permafrost thawing, coastal erosion from wave action, changes in ocean currents, and shifting ranges of plant and animal species (Nunavut Climate Change Secretariat n.d.). For example, glacial retreat in Grise Fiord has impacted biodiversity, traditional hunting practices and threatens the sustainability of future water supply.

As such, many facets of Arctic livelihoods, culture, identity, health, and security, particularly for Indigenous Peoples are increasingly threatened by climate change (Intergovernmental Panel on Climate Change 2021). Burning fossil fuels like diesel contributes directly to climate change; therefore, continued reliance on diesel exacerbates the worsening impacts of climate change, especially in the Arctic.

What can we do?

In its Sixth Assembly Mandate, Katujjiluta, the GN acknowledges the reality of climate change in the North and identifies infrastructure and diversification as solution drivers (Government of Nunavut 2022). Investments and growth should reflect the shared need of all Nunavummiut to build resilience and pivot away from practices that fuel the problem.

Mitigating the devastating impacts of climate change has also been identified as a major priority by the GC, which is reflected in both policy frameworks and funding opportunities.

The Pan-Canadian Framework on Clean Growth and Climate Change (Department of Environment and Natural Resources 2016) and the most recent and strengthened federal climate plan, A Healthy Environment and a Healthy Economy (Department of Environment and Climate Change 2020) lay out the problems and solutions pathways. The Canadian Net-Zero Emissions Accountability Act formalized Canada's net-zero emissions target of 2050 with a series of legally-binding 5-year emissions reductions milestones towards that goal (Environment and Natural Resources 2022). Canada's 2030 Emissions Reduction Plan ("2030 ERP") also provides a roadmap for the economy to achieve 40-45% emissions reductions below 2005 levels by 2030, in line with the International Panel on Climate Change's ("IPCC") recommendations (Environment and Natural Resources 2022).

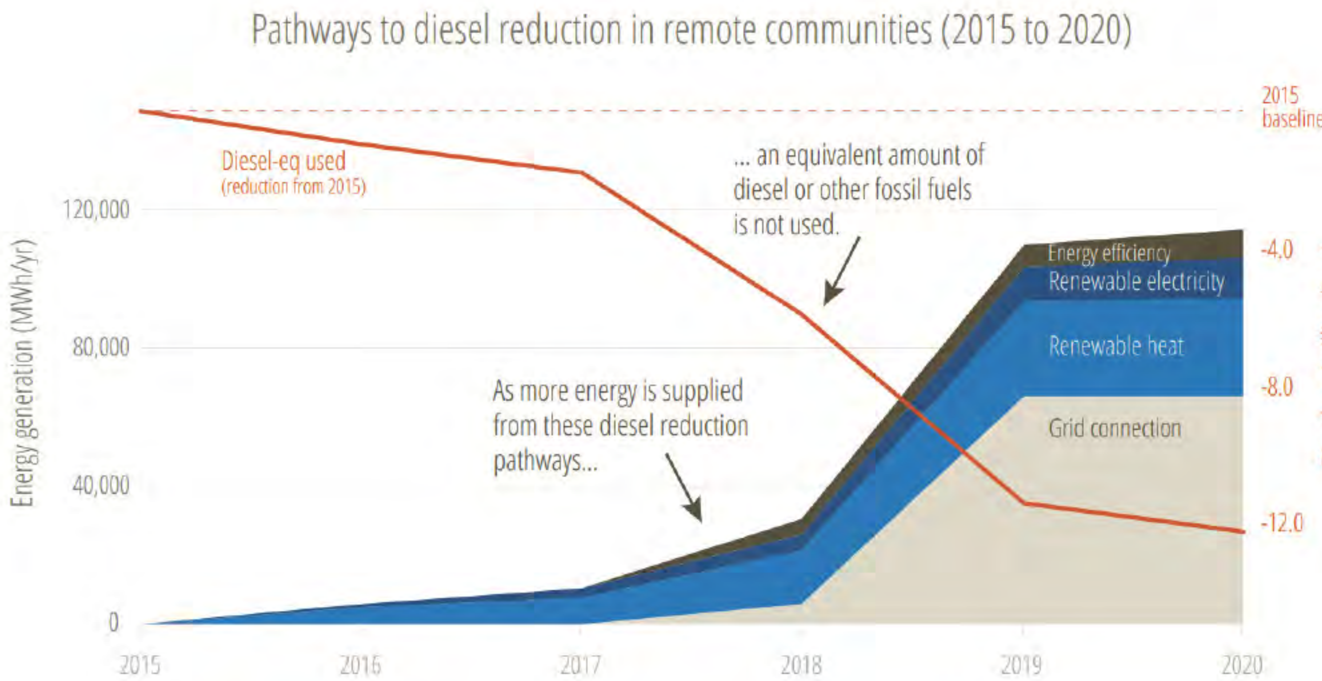
A key component in all of these strategies and commitments is supporting Northern communities to reduce their reliance on diesel and move toward renewable sources of energy. This is reflected in Environment and Climate Change Canada's launching of consultations in March, 2022, to develop Canada's Clean Electricity Standard ("CES") and drive progress towards a net-zero electricity grid by 2035 (Environment and Climate Change 2022). Additionally, the development of an Off-Diesel Hub in 2022, "to ensure that rural, remote, and Indigenous communities that currently rely on diesel have the opportunity to be powered by clean, reliable energy by 2030" is listed as a "current measure" that is "underway" within the GC's Implementation Plan for Canada's 2030 ERP (Environment and Natural Resources 2022). It is important to note that this language has softened over the past year, where the previous target was to have communities completely off of diesel by 2030.

Since 2019, the Off-Diesel Initiative for Remote Indigenous Communities Program committed $28 million to help 15 communities (chosen by an all-Indigenous jury) create a localized plan to reduce their dependence on diesel (Schober 2019). The Arctic Energy Fund, delivered through the Investing in Canada Infrastructure Plan, provides $400 million over 10 years to improve energy security in the Territories, which includes the transfer, in whole or in part, from fossil fuel-based systems to renewables (Infrastructure Canada 2018).

The GC's Clean Energy for Rural and Remote Communities ("CERRC") Program provides funding for renewable energy and capacity building projects and related energy efficiency measures in Indigenous, rural, and remote communities across Canada. Since 2017, CERRC has invested $217.8 million in 111 projects, and in collaboration with Crown-Indigenous Relations and Northern Affairs Canada's ("CIRNAC") Northern Responsible Energy Approach for Community Heat and Energy Program (Northern REACHE), and Indigenous Services Canada ("ISC"), another $300 million is now available to Indigenous, rural, and remote communities until 2027 for clean energy projects (Natural Resources Canada 2022).

These financial commitments to Canada's remote communities have resulted in a near doubling of clean energy projects, an 11-fold increase in solar capacity, and a reduction of over 12 million litres of diesel, in the 5-year space between 2015 and 2020 (Pembina Institute 2020). While this progress is encouraging, we still have a long way to go to achieve established emissions reductions and social responsibility goals by 2030 and 2050. Federal support is not lacking in transitioning the Northern energy landscape; the bottleneck for action that aligns with policies and priorities lies within the Territorial Government.

"Climate resilient development is enabled when governments, civil society and the private sector make inclusive development choices that prioritise risk reduction, equity and justice, and when decision-making processes, finance and actions are integrated across governance levels, sectors and timeframes (very high confidence)."- *Intergovernment Panel on Climate Change 2022*



(Pembina Institute 2020)

"The Government of Canada is investing in clean energy projects across the country so that rural and remote communities, including Indigenous communities, have access to the knowledge necessary to make informed choices to transition away from diesel fuel for heat and power. The government has committed to support these communities as they transition to clean, reliable energy by 2030 while prioritizing reconciliation, self-determination and community-led clean energy projects as part of the path to a low-carbon future." -*Natural Resources Canada 2021*

1.3 Emissions & Air Quality

Diesel generators across the Canadian Arctic are emitting greenhouse gases 24 hours a day, 365 days a year, many of which are in close proximity to homes, schools, and hospitals. Pollutants caused by diesel combustion include nitrogen oxides, volatile organic compounds, benzene, metals (such as mercury), sulphur dioxide, formaldehyde, and particulate matter, among others (Health Canada 2017). In Iqaluit alone, diesel is responsible for producing about 290 litres of formaldehyde each year (Thomson 2019).

Diesel exhaust contains up to 100 times more particles than gasoline-powered engines, which range in size from 0.01 to 1.0 micromitres (μm)—small enough to be deposited in lung tissue (Health Canada 2017). Ultrafine particles (those less than 0.1μm) make up 1-20% of the mass of diesel exhaust and can penetrate the lung and blood vessel walls to enter the bloodstream, affecting other parts of the body such as the cardiovascular system (Health Canada 2017).

Diesel exhaust has been explicitly labelled as a carcinogen by the World Health Organization (International Agency for Research on Cancer 2012). A causal linkage has been identified between diesel exhaust exposure and adverse respiratory health outcomes including lung cancer, and evidence suggests the same for bladder cancer (Health Canada 2016).

When fossil fuels are burned incompletely, black carbon—the third-largest contributor to global warming after carbon dioxide and methane—is produced. Black carbon particles are 3,200 times more potent as a greenhouse gas than carbon dioxide. These particles trap heat when suspended in the air, and make snow and ice absorb more heat, melting them quicker and increasing surface temperatures (Rabson 2017). A Health Canada study found that more than 700 people in Canada died prematurely in 2015 because of exposure to diesel exhaust from vehicles alone (not including diesel generators), including 400 attributed directly to black carbon (Rabson 2017).

In 2019, Nunavut's greenhouse gas emissions were 733,000 tonnes of carbon dioxide equivalent (CO2e), representing a 26% increase since 2005 (Canada Energy Regulator 2022). This carbon footprint, as considered from an annual per capita basis of 16.3 tonnes, is 16% below the Canadian average (19.4 tonnes per capita).

The most recent data on the greenhouse gas intensity of electricity generation in Nunavut indicate 850 grams of CO2e per kilowatt-hour (g of CO2e/kWh), which is quite substantive when compared to the national average of 120 g of CO2e/kWh (Canada Energy Regulator 2022).

1.4 Indigenous Truth & Reconciliation

International

With support from the vast majority of member states, the United Nations General Assembly adopted the Declaration on the Rights of Indigenous Peoples (the Declaration) in 2007 (United Nations 2007). It affirms the minimum standards for the survival, dignity, and well being of all Indigenous peoples (Department of Justice Canada 2021). It also shows that further steps are required to recognize, respect, and protect the human rights of Indigenous peoples and to meaningfully address past harms.

The Declaration is the culmination of almost 25 years of collaboratiown between Indigenous Peoples from around the world, including Canadian Indigenous leaders, and provides a roadmap to advance lasting reconciliation and healing with Indigenous Peoples (Department of Justice Canada 2022).

In Canada

Also in 2007, the Truth and Reconciliation Commission of Canada was established and spent the next six years travelling all over Canada to hear more than 6,500 witnesses and survivors share their accounts of profound harm done by the institutions of colonial government including Indian Residential Schools (Crown-Indigenous Relations and Northern Affairs Canada 2021). A 6-volume final report was released in 2015 which included 94 "Calls to Action" or recommendations to further reconciliation between Canadian settlers and Indigenous peoples.

Although Canada was one of four countries that initially voted against the Declaration, it was endorsed by the GC in 2016 and on June 21st, 2021, the United Nations Declaration on the Rights of Indigenous Peoples Act received Royal Assent and came into force.

Today there are over 160 discussion tables representing more than 500 Indigenous communities, and changes to a wide array of federal statutes are being enacted in an ongoing way to reflect the 94 Calls to Action (Department of Justice Canada 2022). The first annual progress report on the implementation of the United Nations Declaration on the Rights of Indigenous Peoples Act was tabled by the Minister of Justice in 2022 (the Act) (Department of Justice Canada 2022).

"The UN Declaration is a powerful tool for protecting and realizing the inherent rights and Treaty rights of First Nations peoples and can be a pathway to reconciliation. Its full implementation will see First Nations rights respected and implemented and is essential to addressing all forms of racism and discrimination in Canada. I urge all levels of government to work together with First Nations and other Indigenous peoples to ensure its full implementation to bring the UN Declaration to life in Canada."*— National Chief Perry Bellegarde, Assembly of First Nations (Department of Justice Canada 2021)*

"The implementation of the United Nations Declaration on the Rights of Indigenous Peoples has the potential to make meaningful and positive change to how Indigenous peoples, communities, and businesses participate in sustainable natural resources development. This includes having Indigenous peoples as full partners in the natural resource and net-zero carbon economy and ensuring that Indigenous peoples have a seat at the table for decisions that may affect their communities. Together, we can develop a stronger, more sustainable, and predictable path for Indigenous peoples, the Government of Canada, and industry."*- Department of Justice Canada 2021*

1.4.1 Truth and Reconciliation in Action

Inherent components of Canada's legislated commitments and of Inuit self-determination include finding ways to transition towards energy sovereignty and creating economic and social opportunities for clean energy systems in remote communities (Pembina Institute 2020). Similarly, the development of environmentally sustainable energy security in the North must connect with Canada's commitment to Truth and Reconciliation. The foundation for this connection is grounded in the distinguished works recognized and adopted by the federal government. In Nunavut, this is further supported by the Nunavut Lands Claim Agreement, where the Government of Nunavut has a responsibility to foster and support Inuit economic development opportunities.

The Declaration:

Social, Economic and Environmental Rights are addressed throughout the 46 articles comprising the document. Notable statements within these include:

- "Indigenous peoples have the right to maintain and develop their political, economic, and social systems or institutions, to be secure in the enjoyment of their own means of subsistence and development, and to engage freely in all their traditional and other economic activities."

- "Indigenous peoples have the right to determine and develop priorities and strategies for the development of use of their lands or territories and other resources."

- "Indigenous peoples have the right to the conservation and protection of the environment and the productive capacity of their lands or territories and resources. States shall establish and implement assistance programmes for Indigenous peoples for such conservation and protection, without discrimination."

The Act and 94 Calls to Action:

Ten principles emerged from this body of work to serve as a starting point to support new efforts and end the denial of Indigenous rights that led to disempowerment and assimilationist policies and practices (Department of Justice Canada 2021). Of these, two stand out as particularly relevant and essential to this aim:

- "Meaningful engagement with Indigenous peoples aims to secure their free, prior, and informed consent when Canada proposed to take actions which impact them and their rights on their lands, territories, and resources."

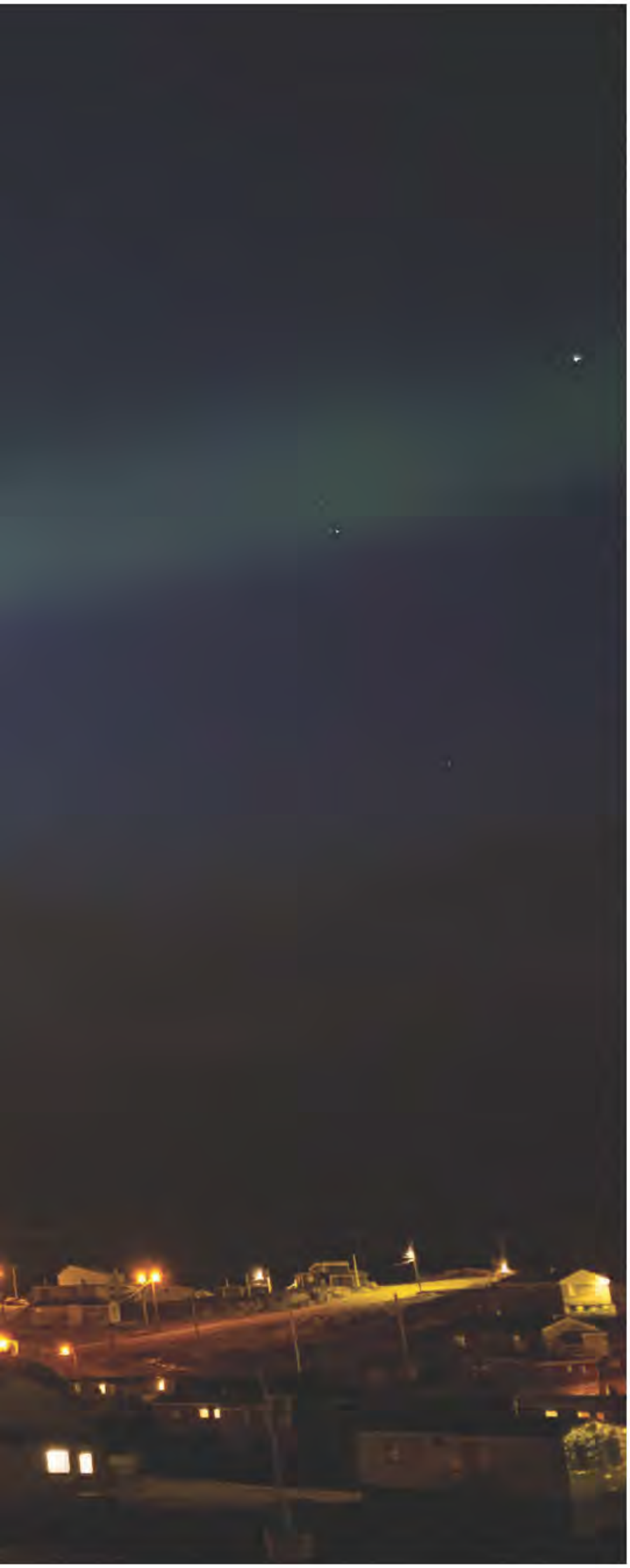
- "Reconciliation and self-government require a renewed fiscal relationship, developed in collaboration with Indigenous nations, that promotes a mutually supporting climate for economic partnership and resource development."

Renewable energy ("RE") systems are not dependent on the constant importation of expensive fuel from global markets, therefore offering local autonomy and financial stability in the generation and distribution of electricity and heat. RE minimizes greenhouse gas emissions, allowing meaningful ecological care. **RE, unlike diesel, is a choice that is freely made, not under the duress of survival and financial strain.** It follows that an Indigenous-led, renewables-first approach to developing energy security in rural, remote, Indigenous communities in the North is, when feasible, most appropriate in honouring Truth and Reconciliation. Supporting and prioritizing Inuit participation in climate change mitigation activities, such as transitioning to clean, renewable energy, is Reconciliation in action.

> "Indigenous self-determination in managing climate change impacts, adaptations, and solutions can accelerate effective robust climate-resilient development pathways in the Arctic (very high confidence). Arctic Indigenous self-determination in decision-making can establish robust climate resilience, especially in Indigenous communities, incorporating locally-derived definitions of social and economic success, culturally legitimate institutions of government, strategic visioning and thinking and public-spirited, nation-building leadership (very high confidence)."
>
> -*Intergovernmental Panel on Climate Change 2021*

As such, the Inuit—Canada Joint Table on Clean Growth and Climate Change is charged with advancing the National Inuit Climate Change Strategy ("NICCS") (Environment and Natural Resources Canada 2022). $1 million was provided in 2019 to support implementation of activities and initiatives in the following areas:

- Advancing the use of Inuit capacity and knowledge in climate decision-making;
- Improving Inuit health and environmental health outcomes through integrated wellness, education and climate policies and initiatives;
- Reducing the climate vulnerability of Inuit and market food systems;
- Closing the infrastructure gap with climate-resilient new builds, retrofits to existing builds, and Inuit adaptation to changing natural infrastructure; and
- Supporting regional and community-driven energy solutions, leading to Inuit energy independence.



1.5 An Inuit-led Approach

Inuit Societal Values ("ISV"), or Inuit Qaujimajatuqangit ("IQ"), are drawn from traditional, timeless, and observation-based knowledge that has been passed down orally through generations. While harvesting and the natural environment are a central focus of IQ, they also provide grounding in socio-economics and cultural practices of Inuit (Parks Canada 2019). IQ are at the centre of Inuit-led strategy building, decision making, and action.

> "IQ is more than a philosophy. It is an ethical framework and detailed plan for having a good life. It is a way of thinking, connecting all aspects of life in a coherent way. Western European culture and science, by contrast, tends to divide aspects of life into pieces that can be dissected, isolated and studied."
>
> -*Karetak, Tester and Tagalik 2017*

The Inuit Qaujimajatuqangit Division of the Department of Culture and Heritage works to ensure the integration of IQ and ISV initiatives across the GN (Government of Nunavut n.d.). As set out by the GN, there are a set of eight ISV. They include:

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ᐃᓅᖃᑎᒌᑦᓯᐊᕐᓂᖅ

ᐅᐱᒋᔭᖃᑦᓯᐊᕐᓂᖅ, ᐃᓚᒌᑦᓯᐊᕐᓂᖅ ᐊᓯᒥᓂᓪᓗ ᐃᑉᐱᒋᔭᖃᑦᓯᐊᕐᓂᖅ.

Inuuqatigiitsiarniq

Respecting others, relationships and caring for people.

ᑐᙵᓇᕐᓂᖅ

ᒪᑐᐃᖓᓂᖅ ᐱᑦᓯᐊᓂᒃᑯᑦ, ᐃᓚᕋᓇᙱᓐᓂᖅ ᐊᑕᖏᖅᑎᑦᓯᓂᕐᓗ.

Tunnganarniq

Fostering good spirits by being open, welcoming and inclusive.

ᐱᔾᔨᑦᓯᕐᓂᖅ

ᐃᓚᑦᑎᓐᓂᒃ, ᐃᓅᖃᑎᑦᑎᓐᓄᓪᓗ ᐊᒻᒪᓗ ᓄᓇᖅᑲᑎᑦᑎᓐᓂᒃ ᐱᔾᔨᑦᓯᕆᑎᖃᕐᓗᓂ.

Pijitsirniq

Serving and providing for family and/or community.

ᐋᔩᖃᑎᒌᓐᓂᖅ

ᐃᓱᒪᓕᐅᖃᑎᒌᓪᓗᓂ, ᐅᖃᖃᑎᒌᓐᓂᒃᑯᑦ ᐊᒻᒪᓗ ᐊᖏᖃᑎᒌᓐᓂᒃᑯᑦ.

Aajiiqatigiinniq

Decision making through discussion and consensus.

ᐱᓕᒻᒪᒃᓴᕐᓂᖅ / ᐱᔭᕆᐅᖅᓴᕐᓂᖅ

ᐊᔪᕈᓐᓃᖅᓴᕐᓂᖅ ᓱᓇᓕᕆᓗᓂ, ᐱᓇᓱᓐᓂᒃᑯᑦ, ᐆᑦᑐᕐᓂᒃᑯᑦ.

Pilimmaksarniq / Pijariuqsarniq

Development of skills through observation, mentoring, practice, and effort.

ᐱᓕᕆᖃᑎᒌᓐᓂᖅ / ᐃᑲᔪᖃᑎᒌᓐᓂᖅ

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Piliriqatigiinniq / Ikajuqtigiinniq

Working together for a common cause.

ᖃᓄᖅᑑᕐᓂᖅ

ᐃᓱᒪᑦᓴᖅᓯᐅᕐᓂᖅ ᐋᖅᑭᒋᐊᓕᒻᒥᒃ ᐋᖅᑭᑦᓯᓇᓱᑦᑐᓂ.

Qanuqtuurniq

Being innovative and resourceful.

ᐊᕙᑎᑦᑎᓐᓂᒃ ᑲᒪᑦᓯᐊᕐᓂᖅ

ᐃᑉᐱᒍᓱᑦᓯᐊᓂᖅ, ᑲᒪᑦᓯᐊᕐᓂᕐᒧ ᓄᓇᒥᒃ, ᓂᕐᔪᑎᓂᒃ ᐊᒻᒪᓗ ᐊᕙᑎᑦᑎᓐᓂᒃ.

Avatittinnik Kamatsiarniq

Respect and care for the land, animals and the environment.

Increasingly, and rightfully so, IQ and ISV are being elevated alongside, and integrated with, scientific knowledge. Together, they are complimentary sources of information that lead to a more complete understanding of the world, and how to approach opportunities and problem-solving. IQ are woven through all aspects of Northern society and governance, and are reflected at the federal, territorial, and community level. They are foundational in many areas of policy, from public education and law, to emergency response and development approvals. IQ are also a fundamental premise in many pieces of legislation, such as the Canadian National Marine Conservation Areas Act, the Nunavut Wildlife Act, and the Nunavut Land Claim Agreement (Parks Canada 2019).

A crucial understanding in how ISV can and should apply to any project proposal or investment is that this body of knowledge is an oral tradition, of which Elders are the primary source and authority. Incorporating IQ should be done within a local context, in collaboration with those considered most knowledgeable within either the local community, social group, or livelihood fraternity (Nunavut Impact Review Board n.d.).

At present, ISV and IQ knowledge-holders do not hold a seat at the table as true partners and co-developers in decision-making around energy policy in Nunavut. This is evidenced in the processes by which QEC has created programs in an attempt to integrate RE generation and sale opportunities within the territory.

- **Commercial & Institutional Power Producers ("CIPP") Program:** In 2020, The Honourable Jeannie Ehaloak, Minister responsible for QEC provided feedback to QEC based on advice from the Utility Rates Review Council (URRC). Highlighted as a lacking consideration in the development of this program were "…further consultations with stakeholders to better understand other potential avoided costs, socioeconomic benefits, new government grants, incentives, or cost savings related to the introduction of renewable energy generation and how these may impact the CIPP price" (Qulliq Energy Corporation 2021). Nevertheless, permission was granted to open the program without such engagement, and since its inception, there have been no successful applications leading to RE development.

- **Independent Power Producers ("IPP") Program:** As far back as 2007, in its energy strategy, IKUMMATIIT, the GN has been flagging an IPP Program as a priority for QEC to develop; thus, enabling the private sector to develop clean, alternative energy projects and sell its surplus power to QEC (Government of Nunavut 2007). Fifteen years later, at present, there is little to no tangible movement to open such a program for the benefit of Inuit, municipal governments, and Inuit Organizations. According to QEC's website, the program is still in development, and there is no mention of the meaningful inclusion or engagement of ISV and IQ knowledge-holders (Qulliq Energy Corporation n.d.). In September 2022, QEC announced interim approval of the IPP Policy, which has, to date, been issued for public comment and input. While this represents a positive step forward, there are still a number of significant gaps to close.

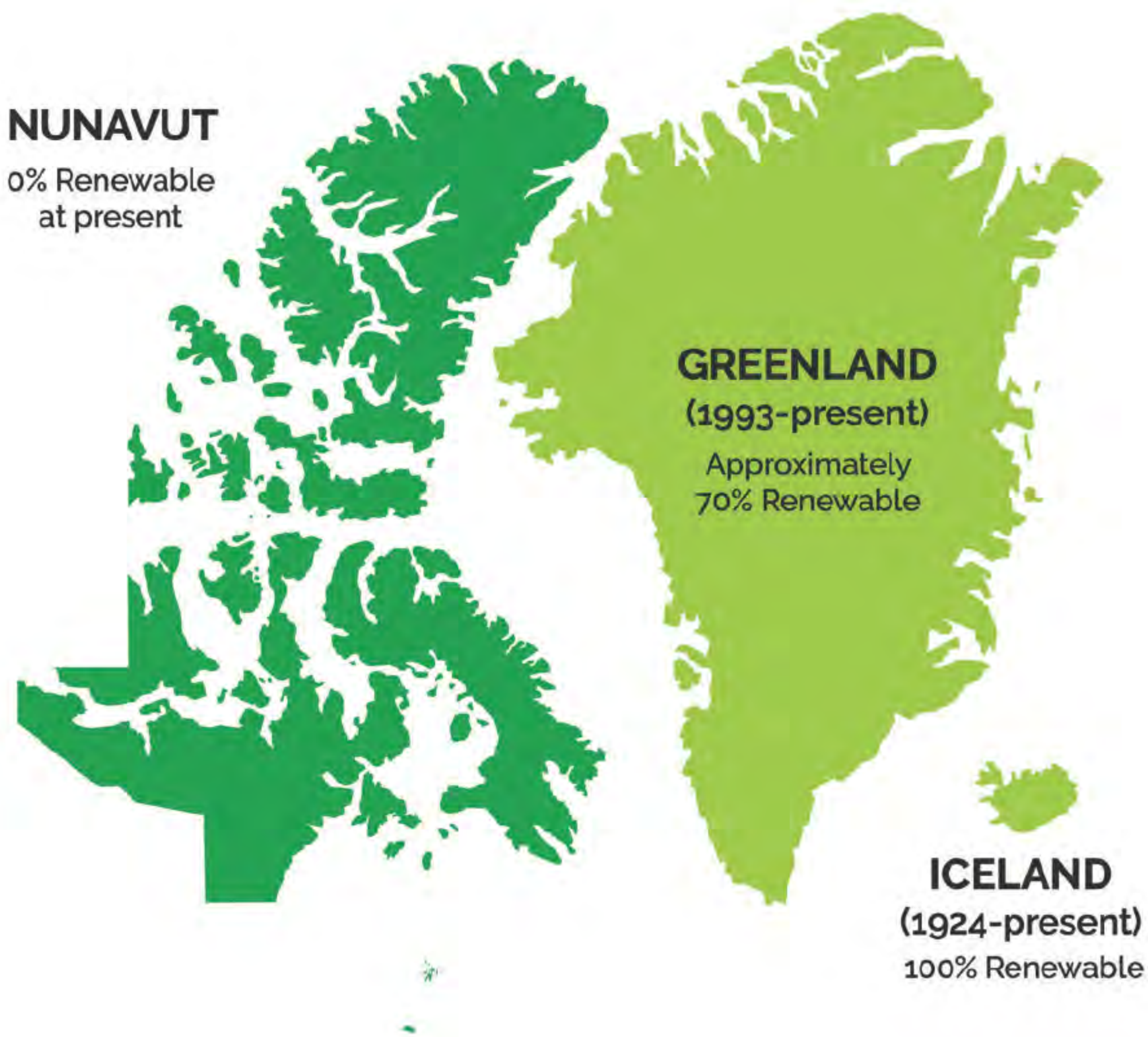
"I think one area that is lacking is policies from governments and utilities that support Indigenous inclusion in developing these projects. There's a lot more work needed to work with an advocate and push for better policies that Indigenous communities can participate in." *- Thomson 2019*

1.6 Analogous Regions: Successful Applications of Indigenous-led Renewable Energy

Greenland

Most of Greenland's 57,000 inhabitants are spread over a vast area in small communities along the fjords of the Western coast, accessible only by boat or airplane during the summer and by dog sled or skidoo in winter. Due to the self-contained nature of Greenland's communities, each town generates its own energy and distributes it via a micro-power grid and local district heating network. Historically, this energy was generated in Greenland by diesel-driven power plants, which require costly imports of fossil fuel, subsidized by the federal government, and are the biggest single contributor to the island's greenhouse gas emissions. The parallels with the Canadian Arctic are striking.

Since 1993, with the help of Landsvirkjun, the Icelandic utility, Greenland has been replacing its diesel power plants with renewable water power, to generate lower cost electricity and reduce the country's fuel imports and greenhouse gas emissions. The results of this process have been transformational to the Greenland economy. In addition to the economic benefits of displacing the diesel systems, the implementation of renewable energy and the associated energy security has had a transformational effect on Greenland's society.



By 2020, 71% of the energy Nukissiorfiit (Greenland's energy company) produced for the 17 towns and 53 settlements it serves was from renewable sources: solar, wind, and hydropower (Linnetved n.d.). Their goal is to achieve a 100% green transition by 2030. However, there are still 80 communities not served by Nukissiorfiit, that generate their power from diesel (Lovekin and Drinkers 2020). Transition is happening at all levels of governance, no matter the starting point, or scale. For example:

- In Illulissat, Greenland's third largest community (~4,500 residents), 95% of the town's energy comes from the local hydroelectric plant, which replaced a major heritage diesel power plant (Collingridge 2022). The plant's turbines are 200 meters below the surface, connected to a meltwater lake that feeds them by a tunnel blasted through permafrost (Knap 2012). It is monitored and controlled remotely, to come as close as possible to eliminating human maintenance and operation, which can be a limiting factor in the North, especially during winter (Knap 2012). Construction finished in 2014, and the estimated annual generation is 65 GWh (Landsvirkjun Power n.d.).
- In Qaanaaq, the northern-most town in Greenland, transitioning to RE is not just a fight against climate change; it's a fight for cultural survival (Kreier 2022). Residents struggle with energy poverty, which hampers their ability to afford basics such as feeding their sled dogs (Collingridge 2022). Local Inughuit, hunters, and researchers from Dartmouth College are collaborating to develop solar and wind hybrid systems that are both affordable and easily serviceable by residents (Collingridge 2022). The hope is that these technologies will benefit communities not only in Greenland, but all around the Arctic circle.

"The future does not lie in oil. The future belongs to renewable energy, and in that respect, we have much more to gain"- *Greenland Government, Inuit Ataqatigiit Party (Germanos 2021)*

The British Columbia Utilities Commission ("BCUC")

BCUC regulates all of British Columbia's ("BC") energy utilities, both fossil-fuel based and renewable. When customers have limited or no choice in utility providers, regulation is needed to make sure that safe, reliable services are delivered at a fair price, while also allowing utility companies to earn a fair return on investments (British Columbia Utilities Corporation 2020).

In 2019, the Lieutenant Governor of BC (representing the Queen at the provincial level) directed the BCUC to conduct an inquiry and provide recommendations to the Minister Responsible for the Hydro and Power Authority Act regarding the regulation of Indigenous energy utilities in BC (Globe Newswire 2020). Some of the questions to which answers were sought include (Lieutenant Govenor in Council, Janet Austin, OBC 2019):

- *What are the defining characteristics of Indigenous utilities, having regard to:*
  - The nature of ownership and operation of Indigenous Utilities
  - The types of services provided by Indigenous Utilities
  - The persons to whom services are provided by Indigenous utilities
  - The geographic areas served by Indigenous Utilities

- *Should Indigenous utilities be regulated under the Act or under another mechanism, or be unregulated?*

- *If it is appropriate to regulate Indigenous utilites under the Act, is there any matter under the Act in respect of which Indigenous utilities should be regulated differently from other public utilities, and, if so, how should that matter be regulated?*

To explore the answers, eleven Community Input Sessions and eight Draft Report Workshops were conducted throughout BC with 21 Registered Intervenors, 18 Interested Parties, 12 Letters of Comment, and feedback from representatives of more than 50 different First Nations groups (Globe Newswire 2020). A number of recommendations were finalized, which are now being reviewed by the BC government for integration into legislation (Nation Talk 2021). Of particular relevance, in terms of how this work might be replicated in the Territories, are the following:

- An Indigenous Utility should be defined as a public utility for which, as owner or operator, an Indigenous Nation has control. Not limited by geography or to the types of services to be provided, but includes the provision of public utility services to persons in its service area. Includes:
  - A remote, off-grid, Indigenous community developing a clean generation project to replace diesel generated electricity. The electricity generated could be distributed by the Indigenous utility or sold to an existing utility for distribution to the community.
  - An Indigenous group owning or operating a district energy system on its reserve lands for the purposes of residential or commercial development.
  - An Indigenous utility developing a clean generation project near existing transmission infrastructure, with the electricity produced being sold to an incumbent utility at a price that allows the Indigenous utility to recover its costs.

- An Indigenous Utility should be regulated by a competent arm's length regulator.

- A First Nation should determine the means of regulation of an Indigenous Utility providing services on that First Nation's reserve land, provided it demonstrates that it has an arm's length complain and dispute resolution pro cess to protect all rate payers.

    - A panel or body composed of Indigenous people and others with specialized knowledge, such as First Nations governance, assess a First Nation's complaint and dispute resolution process.

- The Government of BC must review and revise any policies that, in restricting an Indigenous utility's access to BC Hydro's transmission system, may result in an undue barrier to the First Nation's pursuit of economic self determination.

- The Government of BC must reconsider the Standing Offer Program (for independent power producers who develop small-scale RE projects, selling the electricity to BC Hydro) along with the cap for that program and any other provision that places undue economic barriers on potential participants. If the program is restructured and reintroduced, it should be based on market electricity prices so that Indigenous utilities are provided meaningful competitive economic opportunities while ensuring that all BC Hydro ratepayers are not harmed.

- The Government of BC consider mechanisms to encourage the development of further economic partnerships between incumbent utilities and First Nations.

- The Utilities Commission Act be amended to require the BCUC to consider the Declaration and the economic development needs of a First Nation applying for a Certificate of Public Convenience and Necessity to operate an Indigenous utility on Traditional Territory.

One year later, in 2021, the BCUC established its Indigenous Reconciliation Policy, in which they recognize and affirm the existing aboriginal and treaty rights of Indigenous Peoples including the rights to economic self-regulation and self-governance as enshrined in section 35 of the Constitution Act. They are dedicated to reconciliation with Indigenous Peoples are committed to principled, pragmatic, and organized approaches to implementing the Declaration into their work (British Columbia Utilities Corporation 2021).

This ground-breaking work of actioning Truth and Reconciliation in energy policy, regulation, and Indigenous-led power generation and distribution sets a strong example for the rest of Canada.

Now it is time for the GN and QEC to look to these precedents to create the same opportunities for Nunavummiut.

Section 2
Community Profile: Iqaluit

2.1 Community Overview

The city of Iqaluit is a community like no other in Nunavut. Formerly known as Frobisher Bay, Iqaluit is the largest municipality of Nunavut and the only city and capital of the Canadian Territory. In Inuktitut, Iqaluit means 'place of many fishes', historically referring to the area's rich fishing grounds. This exciting and dynamic city is the political, business, journalistic and transport hub of Nunavut and has an excellent airport. The modern city of Iqaluit is rich in traditional Inuit culture. Home to many Inuit artists, filmmakers, and musicians, it hosts arts and culture festivals in the spring and summer that bring together artists from the region. Iqaluit is home to the territory's main government offices. Nunavut's main hospital is in Iqaluit, as is Nunavut's Arctic College. Residential subdivisions are spread around Iqaluit.

7,429 Total Population

58.5% Inuit Population

42% Inuktitut Speaking

32.6 Median Age

19% Population with Highschool Diploma

(Stats Canada & QIA)

Employment
The major employers in Nunavut are Inuit organizations and territorial government, with oil, gas and mineral exploration, arts and crafts, hunting, fishing, tourism and transportation, providing opportunities for employment.

Housing
- Total Private Dwellings: 3297 (Stats Canada, 2021)
- Total Occupied Private Dwellings: 2710 (Stats Canada, 2021)
- Population density per square km: 144 (Stats Canada, 2021)
- Land area in square km: 51.58 (Stats Canada, 2021)

Transportation
With no roads connecting between or to southern Canada, Nunavut's communities are only accessible by air or sea. Some of the main means of transportation are:

- Iqaluit Taxi Service
- ATV/Snowmobile
- Canadian North
- Calm Air
- Canadian Air Charters

Electrical system capacity
Qulliq Energy Corporation (QEC) is a territorial corporation wholly owned by the Government of Nunavut (GN). QEC delivers electricity to approximately 15,000 customers across Nunavut. QEC generates and distributes power to Nunavummiut through the operation of 25 stand-alone diesel power plants in 25 communities, with a total installed capacity of approximately 76,000 kilowatts. The corporation's business activities are maintained at the head office located in Baker Lake and corporate offices in Iqaluit. Annual demand in the community is around 55GWh. There are approximately 800 customers in Iqaluit alone. Total load of around 60,000kWh is generated annually, while around 50,000kWh is sold.

2.2 Physical Setting

The city of Iqaluit is located on Baffin Island at the northern end of Frobisher Bay near the mouth of the Iqaluit Kuunga. Iqaluit is located near beautiful parklands that feature a range of landscapes, mountains, rivers, waterfalls, and ancient Thule sites to visit. Iqaluit is at the head of a large tidal basin, Frobisher Bay, or 'Tasiujarjuaq' in Inuktitut, and is situated on the shores of Koojesse Inlet. Dramatic tides create long stretches of rocky beaches and mud flats along the inlet. Historically, freeze-up of Frobisher Bay generally occurs in November and lasts until June. Climate change has had a dramatic effect on this rhythm in recent years, which is evident in freeze up occuring later in the year.

Location

Longitude 68° 31' W
Latitude 63° 45' N
Elevation 34m
Area: 52km2

Climate

In late June and early July, the city experiences nearly 24 hours of sunshine, with stunning twilight skies for two hours right before midnight. December's shortest days feature four hours of daylight and the sun is positioned just over the southern horizon. From October to April, Northern Lights are commonly sighted. Wintertime lows of -10 to -32 degrees Celsius are common. (Nunavut travel) In Iqaluit, the summers are cold and mostly cloudy, and the winters are frigid, snowy, windy, and overcast.

Based on the tourism score, the best time of year to visit Iqaluit for warm-weather activities is from mid July to early August. (weatherspark.com)

Weather Conditions

Average Temperature

From June 10 to September 16 is the warm season, that has 3.2 months of days with highs above 5 °C on average. In Iqaluit, July is the hottest month of the year, with an average high of 12 °C and low of 5 °C.

The average daily high temperature during the 3.3-month long cold season, which runs from December 15 to March 24, is below -16 °C. With an average low of -30 °C and a high of -23 °C, February is the coldest month of the year in Iqaluit.

Clouds

The average proportion of sky covered by clouds in Iqaluit varies significantly seasonally throughout the year. Iqaluit's clearer season starts about April 10 and lasts for 3.5 months, wrapping up around July 28. May is the clearest month of the year in Iqaluit, with the sky remaining clear, mostly clear, or partly cloudy 45% of the time on average. Around July 28 marks the start of the year's cloudiest period, which lasts for 8.4 months and ends around April 10. Iqaluit experiences its cloudiest month of the year in January, when the sky is typically overcast or largely cloudy 75% of the time.

Rainfall

The monthly rainfall in Iqaluit varies significantly by season. From May 22 to October 22 there are 5.0 months of rain, with a typical 31-day rainfall of at least 13 millimetres. With an average rainfall of 58 millimetres, August is the wettest month in Iqaluit. From October 22 to May 22 there are 7.0 months without a drop of rain. Iqaluit experiences zero millimetres of rain on average in February, the month with the least amount of precipitation.

Snowfall

The annual snow cover period lasts 9.0 months from September 16th to June 16th, with a sliding 31-day time window of at least 1inch of snowfall. The snowiest month in Iqaluit is April, with an average snowfall of 161 mm. The annual snow-free period is 3.0 months from June 16th to September 16th. The lightest snowfall occurs around July 28, with an average total snowfall of 0.0 inches.

Wind

The winds that occur at any given location are highly dependent on the local topography and other factors, with instantaneous windspeed and direction varying more than the hourly average. In Iqaluit, the wind speeds experience some seasonal variation throughout the year.
The windiest season of the year lasts for 8.8 months, from September 14th to June 8th, with average wind speeds exceeding 25.9 kilometer per hour. The windiest month in Iqaluit is October, with an average wind speed of 18.3 kilometers per hour. The milder period of the year lasts for 3.2 months from June 8th to September 14th. The coldest month in Iqaluit is July, with an average wind speed of 15.5 kilometers per hour.

Geology

Iqaluit is situated on gently rolling hills, with rocky outcrops and lush tundra valleys. The tides of Frobisher Bay at Iqaluit rise and fall eight to twelve metres (26-39 feet) twice a day — the second highest tides in Canada after the Bay of Fundy in Nova Scotia. (Travel Nunavut)

2.3 Rightsholder & Stakeholder Profiles

2.3.1 Inuit Organizations

As per the Constitution Act of 1982, The GC recognizes and affirms the existing aboriginal and treaty rights of the aboriginal peoples of Canada, which includes rights that may be acquired by way of land claims agreements (Department of Justice Canada 2022). In 1992, Inuit of the Nunavut Settlement Area, represented by the Tungavik Federation of Nunavut, now known as Nunavut Tunngavik Incorporated ("NTI"), voted to approve the Nunavut Land Claims Agreement ("NLCA") with Her Majesty the Queen in Right of Canada (Nunavut Tunngavik Inc.; Indian and Northern Affairs Canada 2010). The objectives of the NLCA are as follows:

- To provide for certainty and clarity of rights to ownership and use of lands and resources, and of rights for Inuit to participate in decision-making concerning the use, management and conservation of land, water and resources, including the offshore;
- To provide Inuit with wildlife harvesting rights and rights to participate in decisionmaking concerning wildlife harvesting;
- To provide Inuit with financial compensation and means of participating in economic opportunities;
- To encourage self-reliance and the cultural and social well-being of Inuit;

There is a wide range of Articles within the NLCA that define how these objectives are pursued and upheld for the Rightsholders and beneficiaries of the NLCA—Nunavummiut. Of particular significance, the NLCA defines and dedicates 356,000 km2 (17.7% of the territory's landmass) as Inuit-Owned Land ("IOL"); and, through the Nunavut Trust, committed ~$1.12 billion (over 17 years) in Settlement Payments (Nunavut Trust n.d.).

NTI is the overarching Inuit Organization that holds a mandate to speak for all Nunavummiut with respect to the rights and benefits of Inuit under the NLCA (Government of Nunavut; Nunavut Tunngavik Incorporated 2011). As such, NTI ensures that promises made under the NLCA are carried out, by coordinating and managing Inuit responsibilities and holding the federal and territorial governments accountable to fulfill their obligations (Nunavut Tunngavik Incorporated n.d.).

NTI designates the responsibility of managing IOL to three regional Designated Inuit Associations ("DIO") each of which have their own for-profit development corporations, or Inuit Birthright Corporations ("IBC"), that are tasked with developing sustainable wealth, Inuit participation in decision-making and economic opportunities, Inuit self-reliance, and cultural and social well-being. These IBCs own a multitude of subsidiary businesses with targeted mandates within fisheries, transportation, telecommunication, hospitality, energy, environment, construction, retail, and real estate (Qikiqtaaluk Corporation n.d.)

Region	Designated Inuit Organization	Inuit Birthright Corporation
Kitikmeot	Kitikmeot Inuit Association	Kitikmeot Corporation
Kivalliq	Kivalliq Inuit Association	Sakku Investments Corporation
Qikiqtani	Qikiqtani Inuit Association	Qikiqtaaluk Corporation

For the context of this project, Iqalungmiut are represented by the Qikiqtani Inuit Association ("QIA"). The QIA represents 51% of Inuit living in the territory of Nunavut and manages nearly half of the IOL making QIA one of the world's largest private landowners (Qikiqtani Inuit Association n.d.). NNC is a subsidiary of QC, a wholly-owned Inuit birthright development corporation created by QIA; NNC, therefore, represents QIA's renewable energy development interests as its core business drivers and values.

It is essential that that any and all RE and/or infrastructure developments respect and preserve the legislated rights of all Nunavummiut, as represented by their DIOs. Developments should proceed only with the consent of Rightsholders; i.e. if and when Nunavummiut's rights, as determined by the DIOs, NTI, and the NLCA, are not negatively impacted and permission to move forward is explicitly provided by the relevant DIO and NTI.

2.3.2 The Government of Nunavut

The GN and NTI uphold a mutually beneficial working relationship to improve the lives of Inuit and to help Nunavut realize its potential as a healthy, prosperous, and secure territory within Canada (Government of Nunavut; Nunavut Tunngavik Incorporated 2011). The Clyde River Protocol (1999), Iqqanaijaqatigiit (2004), Aajiiqatingiinniq (2011), and Katujjiqatigiinniq (2017) are all iterative protocols jointly signed by NTI and the GN to define their commitment to working together. In the most current version of the agreement, which was signed in January, 2020 (Nunavut Tunngavik Incorporated; Government of Nunavut 2020), both NTI and GN recognize:

- Inuit constitute 85% of the population of Nunavut and have constitutionally protected rights under the NLCA;
- NTI holds the mandate to advocate for and speak on behalf of Nunavut Inuit with respect to their aboriginal and treaty rights and benefits under the NLCA;
- The GN, in exercising its jurisdiction as a democratic and responsible public government must serve the needs and priorities of all citizens of Nunavut, in a fair and equitable manner.
  There are three joint priorities in the protocol: (1) Mobilize Inuit Identity and Culture, (2) Foster Quality of Life and Well-Being for Inuit, and (3) Develop, Monitor, and Renew Policies, Programs, Services and Legislation. The ways in which these three themes are to be actioned are defined in detail, but of relevance to this Project are the following:
- "Support the spirit of the United Nations Declaration on the Rights of Indigenous Peoples and its potential application in Nunavut."
- "Establish strategic partnerships for major infrastructure projects in Nunavut with all levels of government and private sector including foreign investors."
- "Advance Inuit goals and objectives through research and consultation."

For the context of this project, NNC and any affiliated contributing parties will be working side by side with Inuit Rightsholders in community, where ISV and true collaborative decision-making form the basis of all work that will be done. This puts power in the hands of Iqalungmiut to determine if and when the Project is serving their needs, priorities, and goals; and, upholding their rights.

The GN is a stakeholder, but not a Rightsholder. However, because the GN holds obligations to Nunavummiut through the Katujjiqatigiinniq Protocol with NTI, the approach this Project takes will empower Rightsholders to communicate with the GN and advocate for its participation in (and efforts to remove any barriers to) the advancement of any recommendations from this Project approved by Rightsholders.

2.3.3 Hunters and Trappers Associations

Similar to the three regional DIOs, there are three Regional Wildlife Organizations ("RWO"). These RWOs manage harvesting among Hunters and Trappers Associations ("HTA") within their respective regions (Nunavut Tunngavik Incorporated n.d.). The Nunavut Inuit Wildlife Secretariat ("NIWS") provides support to the RWOs and HTOs.

Article 5 of the NLCA recognizes, subject to availability as determined by the application of the principles of conservation, the legal rights of Inuit to harvest wildlife flow from their traditional and current use to meet their basic needs (Nunavut Tunngavik Inc.; Indian and Northern Affairs Canada 2010). In the case that total allowable harvest limits for wildlife stocks have not been set, an Inuk shall have the right to harvest that stock to the full level of their economic, social, and cultural needs.

It is essential that any and all RE and/or infrastructure developments respect and preserve the legislated hunting and trapping rights of all Nunavummiut, as represented by their HTAs. Developments should proceed only with the consent of Rightsholders; i.e. if and when Nunavummiut's rights to harvest, as determined by the HTAs and the NLCA, are not negatively impacted and permission to move forward is explicitly provided by the HTAs.

2.3.4 Municipal Governments

Nunavut municipalities, i.e. Hamlets and the City of Iqaluit, hold the responsibility to develop municipal plans which include regulations around land use and development that apply to IOL. Article 11 of the NLCA outlines how municipalities must go about land use planning with respect to the rights of Inuit Rightsholders. The Article applies to both land and marine areas with the Nunavut Settlement area, and "land" includes freshwater and resources including wildlife (Nunavut Tunngavik Inc.; Indian and Northern Affairs Canada 2010).

As Municipal Governments have the power to administer and amend land use regulations on behalf of Inuit Rightsholders, it is essential that any and all RE and/or infrastructure developments respect and preserve the legislated land use rights of all Nunavummiut, as represented by their Municipal Governments. Developments should proceed only with the consent of Rightsholders; i.e. if and when Nunavummiut's land use rights, as determined by municipal governments, NTI, and the NLCA, are not negatively impacted and permission to move forward is explicitly provided by the relevant municipal government—in this case, Iqaluit City Council.

A Note on the Inuit Tapiriit Kanatami Climate Philosophy & Policy

The Inuit Tapiriit Kanatami (ITK) is the National Representational Organization Protecting and Advancing the Rights and Interests of Inuit in Canada. It represents 65,000 Inuit in Canada, and produces advice, knowledge, strategies, action plans, policy tools and learning resources to protect and advance the rights and interests of Inuit in Canada (Inuit Tapiriit Kanatami 2022).

The ITK reports that Inuit have historically been excluded from government conversations and policy on climate action, and part of reconciliation is acknowledging Inuit as leaders in pushing forward climate action (Inuit Tapiriit Kanatami 2022). They look to the positive action achieved by off-grid Alaskan and Greenlandic communities, while acknowledging that energy policy in Canada is different and requires the GC to work closely with Inuit to achieve energy transitions that benefit communities.

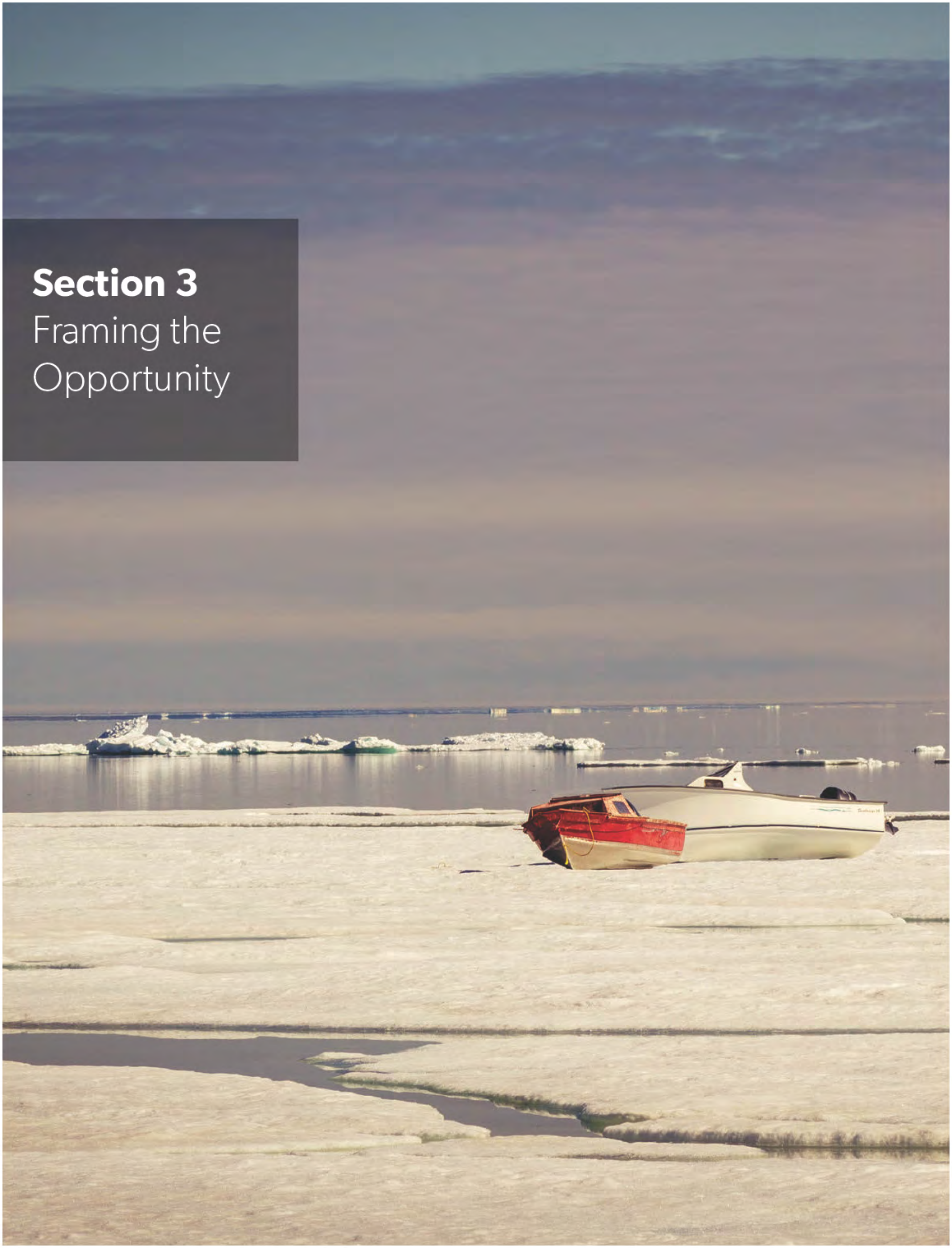
> "Inuit are rights holders and any climate action should apply a rights-based approach premised on partnerships with representatives of Inuit and governments."
>
> - *ITK Climate Policy*

The ITK have developed a National Inuit Climate Change Strategy with five priority areas, one of which is Energy. The Strategy "Supports regional and community-driven energy solutions leading to Inuit energy independence" (Inuit Tapiriit Kanatami 2019). The long-term outcome that ITK strives for in this area is for reliable, sustainable and affordable energy systems to be in place in all Inuit communities.

ITK states its intention, on behalf of Inuit Rightsholders, to work in partnership with governments to create policy environments where diesel fuel subsidies can be responsibly and strategically reinvested (Inuit Tapiriit Kanatami 2019) to include alternative energy mixes and cleaner technology. It commits to defining pathways to increase Inuit ownership and governance of energy systems.

This project looks to the goals objectives, actions, and guiding principles of the National Inuit Climate Change Strategy to ensure that all work being undertaken is in alignment with the rights of Inuit at the national level.

Section 3
Framing the Opportunity



3.1 Defining the Opportunity

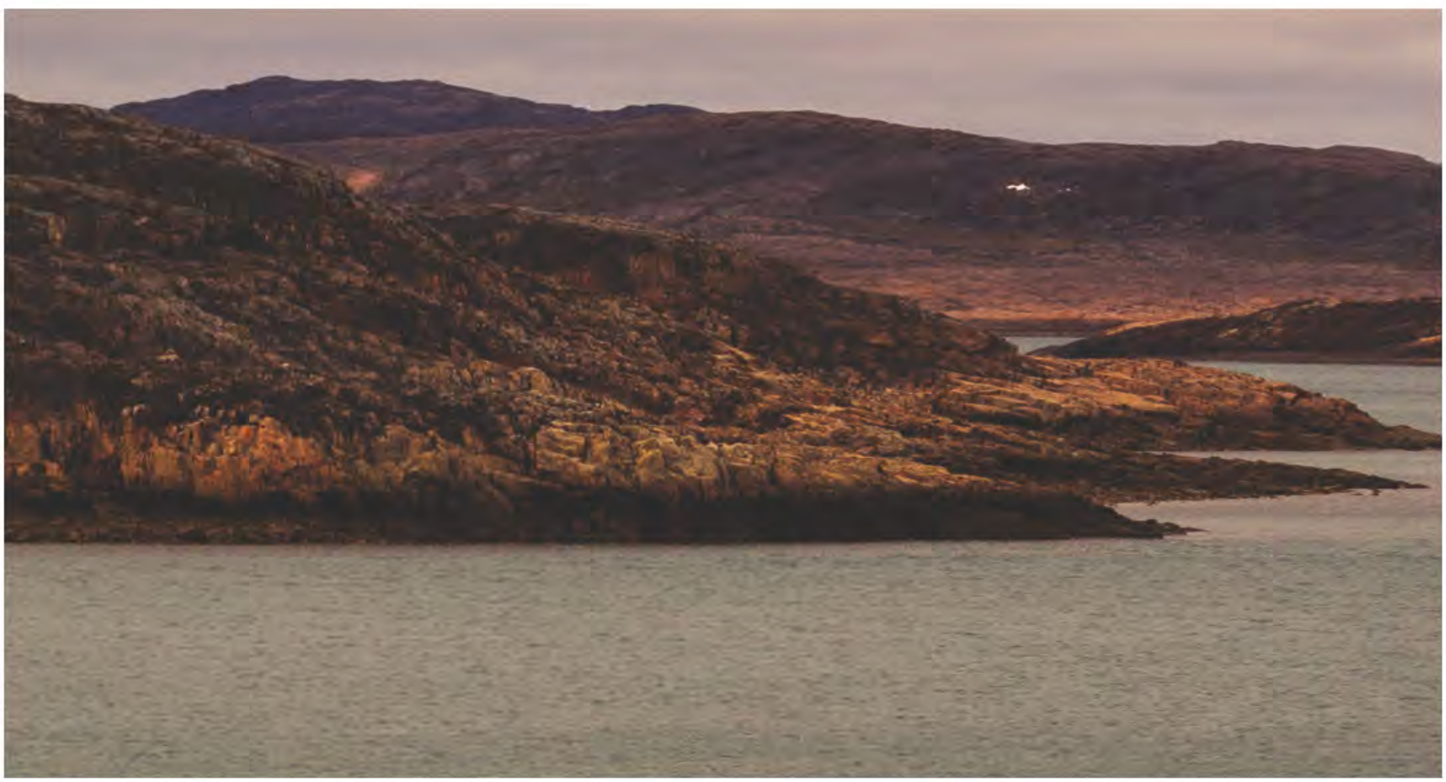
Nunavut is currently 100% reliant on diesel fuel for electricity and heat production as the communities are not connected to the North American electrical grid. As a result, individual communities have their own electricity generation and distribution system powered exclusively by diesel generators. To power these generators, fuel is delivered to the community via marine transshipment to be stored for future use, increasing the carbon footprint, risk of spills during transport and storage, and is neither economically nor environmentally sustainable in the long-term. With the City of Iqaluit having the largest population in the Territory and therefore the largest electrical load, transitioning Iqaluit's electricity supply away from diesel generation will have significant impact in reducing greenhouse gas ("GHG") emissions and reducing Nunavut's total reliance on diesel fuel.

With this, the Nunavut Nukkiksautiit Corporation ("NNC") is investigating opportunities related to renewable energy development on Inuit Owned Land ("IOL") in the Iqaluit area, hereafter referred to as the Iqaluit Nukkiksautiit Project. This would be a fully Inuit-led solution towards transitioning Iqalummuit off of diesel for electrical and thermal loads.

This project is founded upon an Inuit-led approach to project development. Consistent with the spirit and commitment of reconciliation, this project presents a unique Inuit-led and Inuit governed approach to developing Nunavut's natural resources.

A "Vision of Success" for the Iqaluit Nukkiksautiit Project includes:

- Inuit and community support for the Project;
- Development of a viable renewable energy solution on IOL;
- Majority Inuit ownership;
- Economic and environmental benefits to the region;
- Long-term energy security for the City of Iqaluit;
- Job creation and educational capacity building.

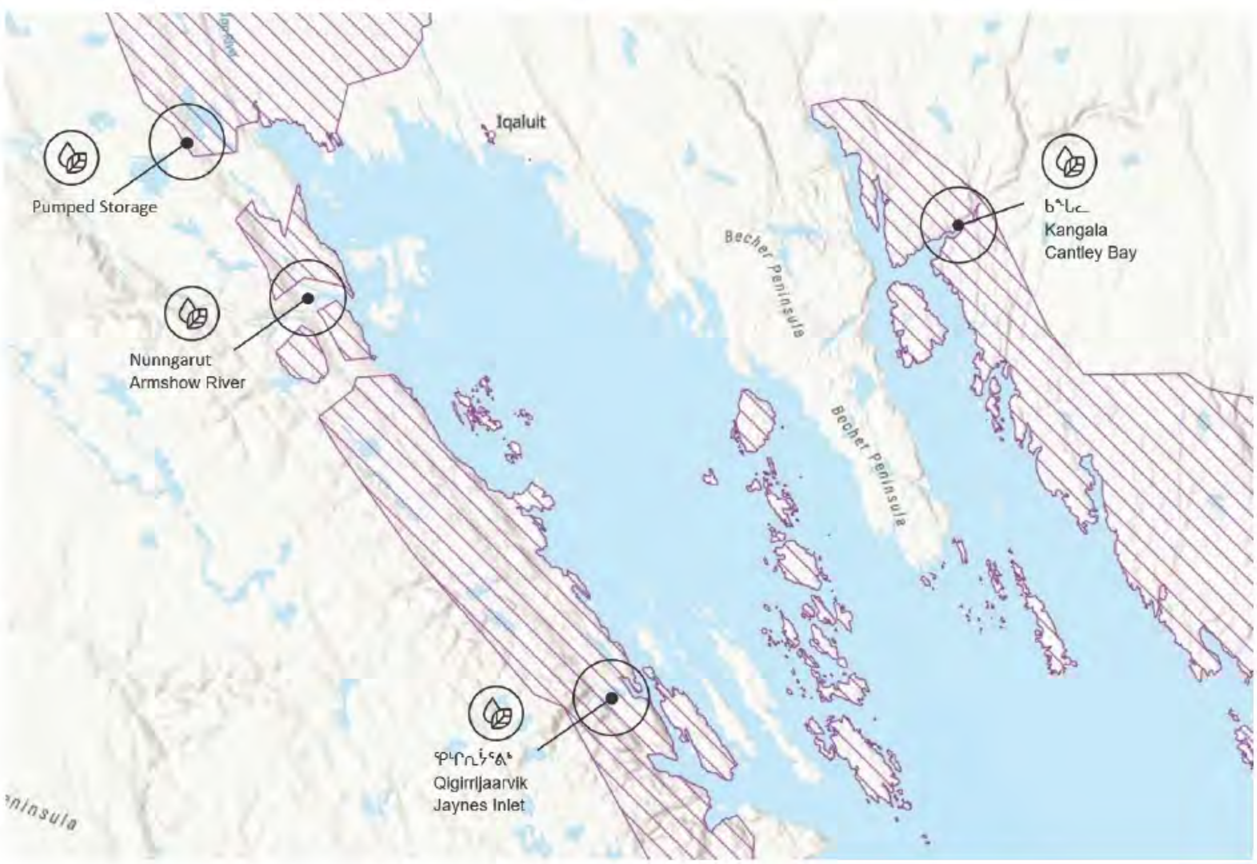


3.2 Understanding the Opportunity

From a purely 'energy demand' perspective, it is reasonable to assume that energy consumption will remain the same, or grow, in Iqaluit. Over the last 10 years, the population of the community has grown. Previous census data shows the population was 6,699 in 2011, 7,740 in 2011, and 7,429 in 2021, demonstrating a net increase of 10.8%. According to a report by the Government of Nunavut, the population of Iqaluit is anticipated to grow to 8,551 by the year 2036. A constant, or growing, population along with stable employment and accessible education are all positive indicators for renewable development. Electricity demand, already known to be an inelastic commodity, will only grow in demand with the growth in population, as well as with the global push to reduce emissions from all forms of fossil fuel consumption.

Nunavut's only utility, Qulliq Energy Corporation ("QEC") has continuously noted their concerns with certain sources of renewable energy due to its intermittency; hydroelectricity does not have that same issue and can in fact be more reliable, safe, and resilient than diesel generation. As such, a hydroelectric project in Iqaluit has the potential to bring environmental, social, and economic benefits to Nunavummiut, but could also provide improved reliability and safety to QEC, along with cost savings on the operational side of utility management.

Some feasibility work was undertaken by QEC 10-15 years ago; a review of this past work has been completed to better understand any gaps in information and develop recommendations for future data collection (see IQA-TDP-RP-001). Three sites had previously been identified for hydroelectric development: Jaynes Inlet, Armshow River, and Cantley Bay. These sites show promise from a development perspective, and will be evaluated over the course of the project.In addition to these sites, other technologies and strategies, such as wind integration and pumped hydro, will be explored in the early phases of development.



Additionally, while early engagement has taken place, more detailed consultations with wider reaching Rightsholders is planned for the next phase of feasibility. As the Designated Inuit Organization ("DIO") for the Qikiqtani Region, QIA will be tasked with leading and initiating public outreach by exploring a series of broad questions regarding current energy systems and seeking feedback on the social acceptability of renewable energy solutions, focusing on hydroelectric power generation. Presuming Inuit rightsholders support the examination of hydrolelectric potential, QIA would undertake a "Tusaqtavut Study" to gather Inuit Qaujimajatuqangit ("IQ") in the Iqaluit area, formally recording the Inuit knowledge and Inuit traditional knowledge through the documentation of land use and cultural activities. NNC also plans to undertake collaborative community engagement with QIA to formally introduce the project plan, project components and stages and to seek input and feedback from the general public, extending beyond the interests of Inuit rightsholders and the Tusaqtavut study.

It is important to note that the Tusaqtavut Study will gather community data on land use in the Iqaluit region, and will inform early technical development and direction. The early engagement and input of Inuit knowledge in the project development process is a key feature of the Iqaluit Nukkiksautiit Project.

3.3 Structuring the Opportunity

3.3.1 Value Drivers

The primary objective of the Iqaluit Nukkiksautiit Project is to find and develop an economically and environmentally sustainable solution for Iqalungmiut through an Inuit-led approach to project development. The community drivers, in this case, outweigh purely financial/economic drivers, so they are unique in comparison to a traditional 'for profit' developer model.

It is important to note that in Phase 2 of the project, the QIA will establish the IQ Assessment Criteria, which will be used to refine specific drivers as the project matures. Based on discussions thus far, the following business drivers will be used for evaluating the project at key decision points, in no particular order:

1. **Community Favourability** – The facilities associated with the Iqaluit Nukkiksautiit Project will serve a core function to the community for generations to come and will also be a part of the physical landscape. It is important that the community understand the value created and the trade-offs of the project through all phases of project development. For this reason, the project should conform to the 'phase-gate' approach to project development, with QIA & NNC filling the role of the 'gatekeepers' at each major progress milestone of the project.

2. **Economic Indicators** – Key infrastructure projects, such as electricity systems, are central to the quality of life for a society. It is, therefore, understood that high financial returns are not the drivers of such projects. That said, the project should make good financial sense, and have some positive return to investors. For these reasons, the Iqaluit Nukkiksautiit Project should target a positive net present value ("NPV") position and set a desired internal rate of return ("IRR") target in Phase 2. Note that the economic targets may help guide decisions on sizing of the system for present vs. future load growth.

3. **Ownership Structure** – The Iqaluit Nukkiksautiit Project will, inevitably, be a major capital project and will therefore carry some inherent financial risk. This risk, carefully managed under a well-planned and executed project, will produce financial returns. Carrying 100% of this risk may not be desirable, so a minimum target of 51% Inuit ownership should be achieved through the course of the project.

4. **System Reliability** – Reliability is critical in the off-grid since multiple generation sources are not typically an option. For the Iqaluit Nukkiksautiit Project, system reliability should achieve at a minimum the same reliability as a diesel system.

5. **Reducing the Environmental Footprint** – Diesel systems are significant sources of emissions, contributing to global warming and reducing air quality from a local perspective. Renewable systems, while boasting little-to-no emissions, also have an environmental footprint, especially in terms of physical landscape. Great care will be taken to minimize the impact to wildlife, hunting practices, and general quality of life for the community. Coordination with Inuit Rightsholders, alignment with IQ and respect for the land will be paramount.

3.3.2 Key Risks and Uncertainties

While the opportunity is clearly significant, it is important to note that major capital projects carry inherent risk, if the risks are not managed properly. NNC acknowledge this and through an early approach to risk management, have implemented a phase-gate project approach (further discussed in Section 5). In addition to the phase-gate system, the following are envisaged to be additional risk mitigation measures that will be built into the project:

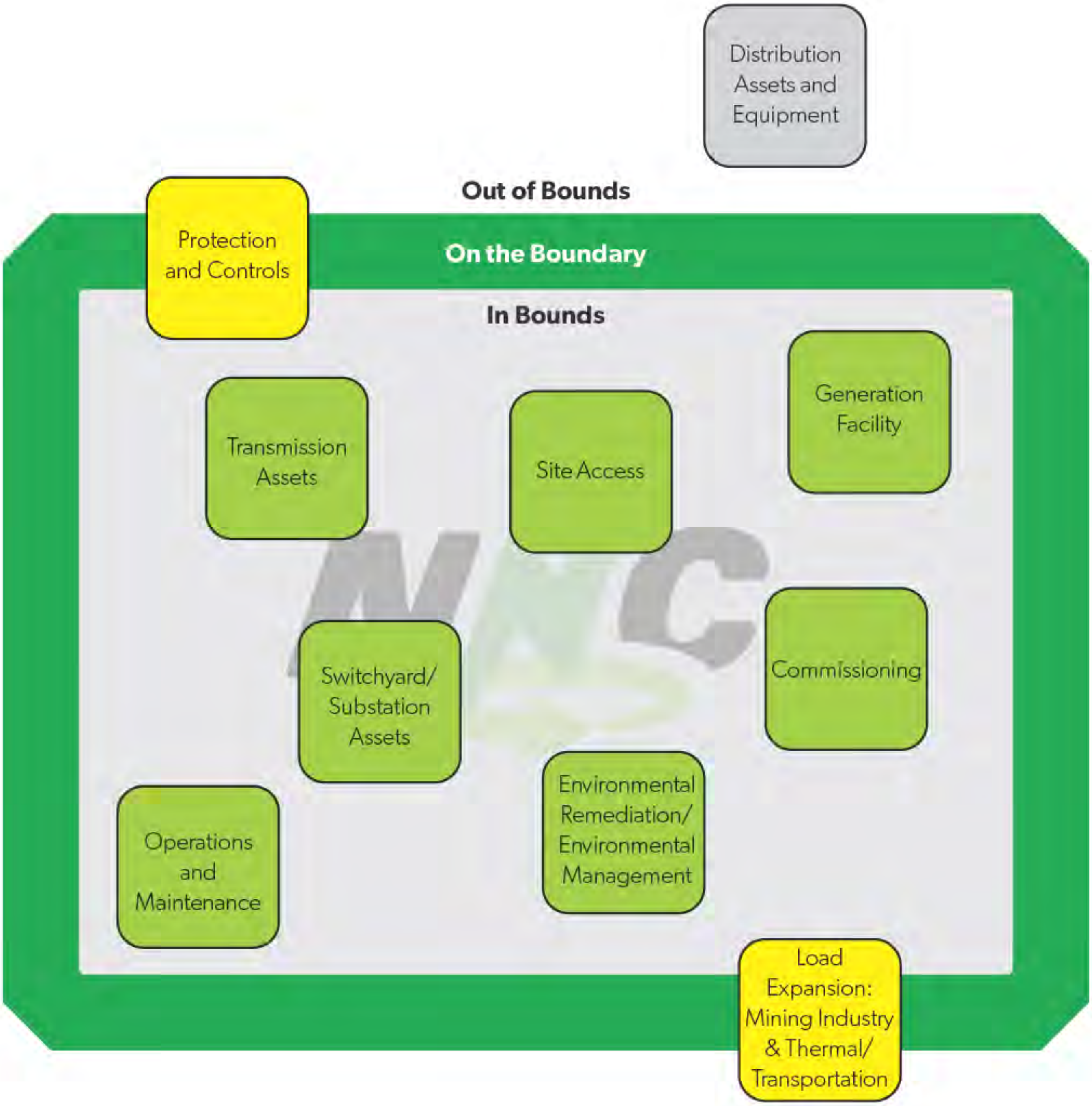
- 'Cold Eyes' Review of Decision Support Packages at each major decision gate;
- Involvement of international hydroelectric subject matter experts from Landsvirkjun, the national utility of Iceland, during the technical development of the project. Landsvirkjun offers the unique perspective of both a designer and utility.
- Obtain external funding for the early phases of development, eliminating the risk of sunk cost;
- Early and ongoing engagement with Inuit Rightsholders and community members to ensure local collaboration in all project phases;
- Early adoption of project management and controls mechanisms consistent with the Project Management Body of Knowledge standards.

Project risks will be captured and mitigated throughout development, but early phase (1 & 2) identified risks include:

Early Phase (1&2) Risks (including significant assumptions)		
Risk	Initial Risk Rating	Proposed Mitigation Measures
Community Opposition	Medium	Engagement has already commenced with the Iqaluit Community Lands and Resources Committee ("CLARC") and the establishment of a Stakeholder Engagement Plan will ensure stakeholders are engaged early and often
Data Collection Delays	Low	Data collection will commence early, and members of the Project Team have collected this type of data for renewable energy projects in the past and thus have an appropriate understanding of the lenght of time and associated cost of doing so
Travel Delays	Low	Planning will commence early enough that there should be no timing constraints if site visits are delayed due to weather constraints or potential new impacts of the spread of COVID-19 varients
Inflation	Low	The risk will be low during the FEED and planning phase; it will be a risk to be contemplated during the construction phase and will be managed through a contracting strategy
Productivity during Pandemic	Low	Project team will be small and will reside in a relatively small populated/low risk region. Productivity not expected to be significantly impacted during planning phase
Regulatory Approvals Process	Medium	Clarity on Regulatory Strategy will be confirmed through Phase 2 and Phase 3

3.3.3 Preliminary Project Boundaries/Project Frame

The following graph illustrates elements considered for the project, and whether those elements are 'in/out of scope' for the project. Items considered on the boundary are not yet decided on and will be revisited in future phases of the project to decide whether to move it 'in' or 'out'.



Project Boundaries	In Bounds	Out of Bounds	On the Boundary	Rationale: Why it should be in	Rationale: Why it should be out
Transmission Assets	x			There will be a requirement to interconnect to Iqaluit's existing grid	
Generation Facility	x			Water power and wind power facilities will be the core asset in this project	
Site Access	x			Dedicated access will be required for construction and O&M activities	
Distribution Assets and Equipment		x			It is assumed that power will be sold to ("QEC") for distribution
Switchyard/Substation Assets	x			Necessary for grid integration (upgrade to ("QEC") switchyard) and switchyard at generation facility	
Protection and Controls			x	There will be some P&C invloved with facility integration; boundary TBD	("NNC") may want to 'own' the integration in to the grid from a software perspective
Load Expansion: Mining Indistry			x	The economic benefit and system stability of a larger load	Shorter/unpredictable timelines for mining developments
Commissioning	x			Needs to be commissioned before integration to QEC's equipment	
Operations and Maintenance	x			Needs to be considered from perpective of economics and community benefits	
Environmental Remediation/ Environmental Management	x			May need to mitigate issues raised during environmental assessment process	
Load Expansion: Thermal and Transportation			x	Fossil fuel will be highly volatile over a 40 year period and is not a long term solution	It would be significant up front investment with no certainty of when heating/transportation fuels will phase out

3.3.4 Project Team

Project Management

Heather Shilton, Project Manager

Nunavut Nukkiksautiit Corporation

Heather has over five years experience in the renewable energy industry, primarily in Ontario, new York State, and Nunavut. She has a Bachelor's degree in Geography, Environmental Studies, and History from Mount Allison University and a Master's degree in Cultural Analysis and Social Theory from Wilfrid Laurier University. She currently serves as the Board Treasurer for the Arctic Renewables Society, is an appointed member to the Sustainable Development Advisory Council for Environment and Climate Change Canada, and oversees a number of renewable energy and energy efficiency initiatives in the Qikiqtani Region of Nunavut in her role as Director at Nunavut Nukkiksautiit Corporation. She is the Nunavut Regional Champion with Efficiency Canada and is a Certified Environmental Professional with a specialization in Energy with ECO Canada. Heather joined NNC in 2019 bringing with her experience developing various portfolios of 5-30 MW onshore wind and solar PV projects across North America, in addition to the early development community-scale renewable energy projects in remote communities. Prior to joining NNC, Heather worked on community-owned renewable energy projects in partnership with Indigenous communities and local community members. Heather will be Project Manager for the project.

Keith Drover, Assistant Project Manager

Growler Energy

Keith is a professional engineer with 15 years of experience executing complicated projects in harsh and challenging environments. With a background in both early project development and execution, Keith's skill set includes project organization and implementation of project management systems with a specialization in risk management. Keith's career has given him insight into all aspects of project development, including early phase wind and hydroelectric development and large-scale renewable energy project construction. Keith will be the Assistant Project Manager for the project and will report to the Project Manager.

Jillian Byrne, Project Controls Engineer

Growler Energy

Jill is an Engineer-In-Training with 2 years of experience developing and executing renewable energy projects. With a background in wind and solar project development, Jill's skill set includes opportunity identification, project development, and construction handover. Jill's career has given her insight into projects ranging from 2-150 MW in a variety of climates. Jill will be the Project Controls Engineer and will report to the project manager.

Jess Puddister, Regulatory and Stakeholder Managaer

Nunavut Nukkiksautiit Corporation

Jess Puddister holds a B.Sc. in Earth Science from Dalhousie University, and is NNC's Stakeholder and Regulatory Manager. She has a diverse background in the geotechnical and environmental sectors. Her experience includes groundwork investigations for new construction, environmental site assessments, marine and wetland field studies, dam safety reviews/inspections, bedrock geology reports, and solar array design/installation. Since 2018, Jess has honed her focus on ground-level climate crisis response. Through FCM's Municipalities for Climate Innovation Program, she collaboratively led intersectional municipal climate change vulnerability assessments with six communities and developed custom adaptation plans for their town councils.

Collaborators

Matthew Hamp, QIA Lead

Qikiqtani Inuit Association

Matthew is a professional engineering with 14+ years of experience managing major construction projects in Nunavut. Matthew lived in Mittimatalik for 7 years and worked for both private and public sectors delivering construction projects. Matthew will be a senior project advisor with a focus on community activities.

Richard Paton, IQ Lead

Qikiqtani Inuit Association

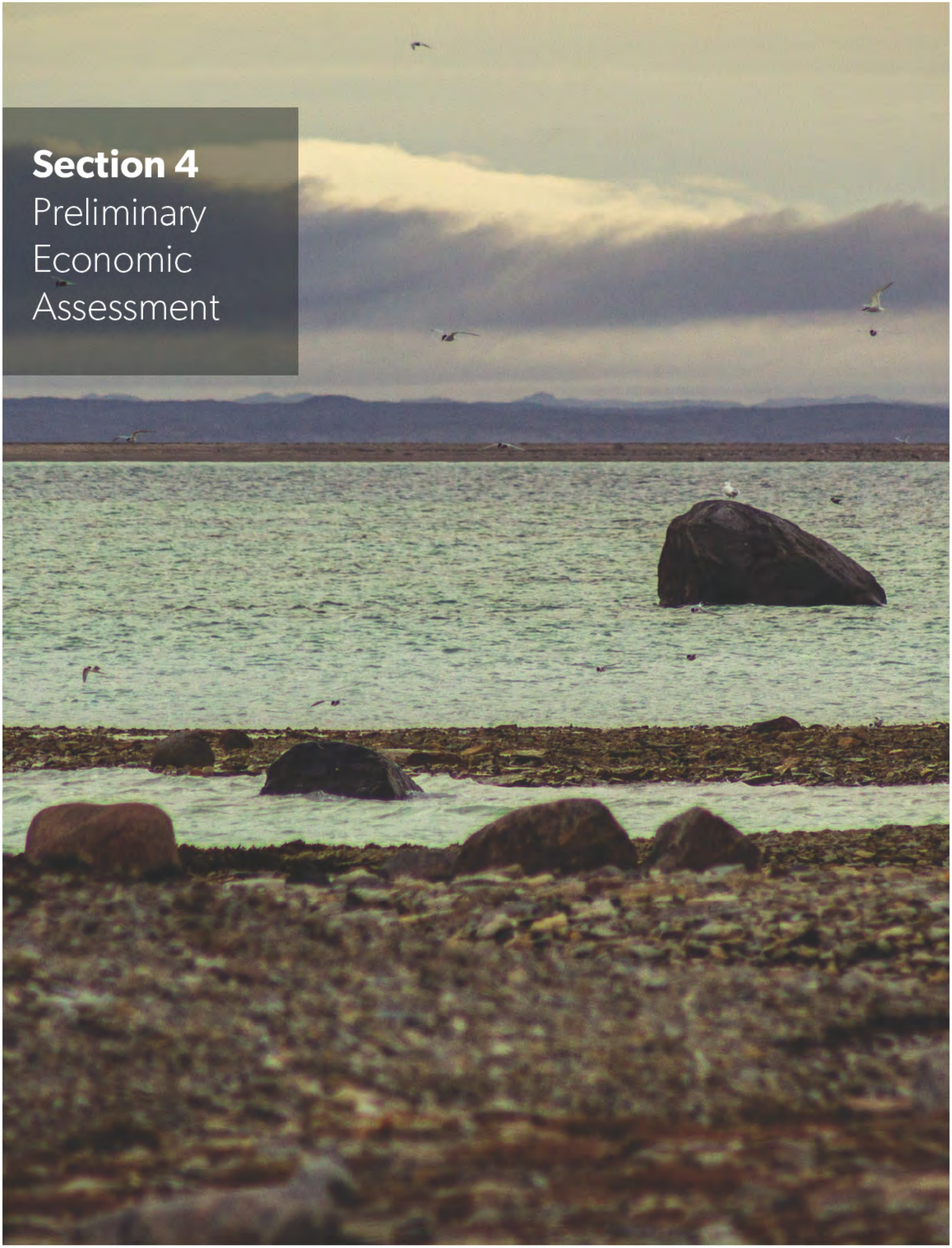
Richard Paton, is QIA's Director of Inuit Qaujimajatuqangit and Engagement. Mr. Paton is responsible for overseeing and directing QIA's activities and interests in the areas of Inuit-led research, collection and application of IQ and integration of Inuit culture and societal values within projects. Mr. Paton has held a variety of senior positions with the Government of Nunavut and Nunavut Tunngavik which provide him with deep insight into the considerations required to effectively engage communities and project partners.

Adam Leece, Technical Lead

Canada Project Limited

Adam Leece is a civil and environmental engineer with over 17 years of experience in project design, project management, and construction experience and a strategic understanding of regulatory requirements across a wide range of projects. Adam has led, reviewed, and supported a variety of regulatory applications across Canadian energy developments to ensure alignment and compliance with Municipal, Provincial, and Federal regulations.
Adam will set priorities and define the technical approaches and strategies for the project team. Adam will also act as the technical liaison for interactions with the Owner to ensure their requirements are understood, addressed and completed by the Project team.

Section 4
Preliminary Economic Assessment



4.1 Economic Assessment Introduction

The objective of a Phase 1 project economics assessment is to determine whether there is an opportunity worth exploring in greater detail in Phase 2 by generating and evaluating a range of viable development alternatives. At this stage in development, project details are not well-defined, so it is important to use broad metrics and logic in early phase assessment. The project team is also unable to establish a target energy sales price since there is no precedence in the region and little-to-no information has been published by QEC on target sales price for electricity on a utility-scale. For this reason, the project economics assessed if renewable energy systems are more cost-effective for Iqaluit by evaluating net present value ("NPV") and the levelized cost of energy ("LCOE") for both diesel and renewable systems. Phase 1 economic analysis addresses a simple question: from a financial perspective, does it make sense to build and implement a renewable system or stick with running diesel systems ("business as usual" case)?

The project team used a parametric study approach, drawing on capital cost norms from renewable energy projects in analogous regions. Considerable work has been completed on Iqaluit hydro development, producing a wealth of data useful for the creation of norms. A range of economic outcomes was assessed to create a 'bookend' economics model that would demonstrate the range of possible outcomes for the project in comparison to the existing "business as usual" approach. To create the economic 'bookends', the project used the following parametric scenarios for input:

- 20 MW hydro only facility at Armshow River;
- A 20 MW wind facility at Iqaluit + 10 MW hydro facility at Janes Inlet

Energy demand in Iqaluit has increased at a steady pace in the past decade, driven by a growing economy and an increased interest in electrification. This trend is expected to continue and will likely increase as the impetus to decarbonize grows increasingly important in priority. For the purpose of the current analysis, an annual increase in demand is estimated at 2.8% and will be used for the analysis herein.

In assessing the relative attractiveness of development, discounted NPV and LCOE was assessed. These calculations were completed assuming a service life of 20 years based on the economic life of a wind facility; this would be considered highly conservative for a small hydro facility which has, conservatively, an economic life of 40 years. Please note that small hydro facilities are notoriously durable and tend to outlive their economic life, however, for the purpose of investment decisions and analysis, a 20-year window is considered to account for the economic life of the wind facility in the hybridization scenario.

For the analysis, an inflation rate on costs of 2% per year, and a weighted average cost of capital or discount rate of 8% were assumed.

The discounted NPV was calculated as:

$$\text{NPV} = \text{Capital Costs} + \frac{\sum^{t}(\text{Diesel Generation Costs} + \text{System Fixed and Variable Operating Costs})^{t}}{(1+\text{Discount Rate})^{t}}$$

The levelized cost of energy was calculated as:

$$\text{LCOE} = \frac{\text{NPV (Renewable Energy System Generating Cost + Diesel Fuel Generating Costs)}}{\text{Electricity Generated (20 Years)}}$$

From an NPV perspective, the lower the NPV value, the more cost-efficient the system is considered. Similarly, from an LCOE perspective, the lower the LCOE value, the greater the combined capacity factor and cost-effectiveness of the system. The renewable energy system model NPV and LCOE must at the minimum, return results that are lower than the business-as-usual diesel-only generation NPV and LCOE determination.

4.2 Reference Case

4.2.1 Diesel System Assumptions

True costs of diesel generation in Iqaluit, which is heavily subsidized, is not explicitly published since costs are distributed across multiple government departments. Greater effort will be employed in later phases to investigate and model the true cost of delivery for utility-scale diesel systems in Nunavut. In the meantime, diesel generation norms from mining applications in Northern Canada were used for the parametric estimate.

For this assessment, a typical diesel generation cost rate was developed and presented in the table below. The basis of the diesel cost rate is as follows:

- Direct fuel costs based on existing and forecasted market pricing;
- A typical generator efficiency of 35% is assumed to represent long-term operating conditions. Efficiencies above 40% are uncommon in conventional diesel systems.
- Non-fuel operating costs include operator salaries, mechanical and electrical maintenance, servicing and overhauling that equipment; storage facilities for the fuel; buildings to contain the generators and associated components of the diesel units;
- In lieu of considering the capital cost of diesel generation in comparison to that of the renewable energy systems, a capital cost allowance is included to consider the full life cycle costs including unit replacement based on information from Pinto & Gates (2022) and the Gwich'in Council International (n.d.).
- With a rise in concerns over climate change and a widening deployment of carbon pricing, it is likely that the utility will not continue to be exempt from carbon tax. At a value of $50/tonne and $100/tonne CO_2e, this would equate to $36/MWh and $73/MWh respectively. This in turn would represent a 6% and 12% increase in the diesel cost basis. Carbon pricing was omitted from initial analysis to be conservative, however, will be included as a sensitivity in Phase 2 economic analysis.
- Distribution is a significant cost to the utility, likely representing close to $.30/kWh in addition to generating costs. A base assumption for the current analysis is that this cost will be consistent across all options (i.e. assumes that QEC will act as the distributor).

Parameter	Estimate Basis
Fuel Costs ($/L)	$1.45
Generator Efficiency	35%
Fuel Generation Costs ($/kWh)	$0.39
Non-fuel Operating Costs ($/kWh)	$0.19
Capital Cost Component ($/kWh)	$0.15
Carbon Tax ($/kWh)	Not Included
Total Generating Costs ($/kWh)	**$0.73**

Diesel System Generation Costs (Parametric)

4.2.2 Renewable System Assumptions

The capital and operating cost estimates are intended for relative comparison of power and energy system options and should not necessarily be considered to provide an absolute representation of costs. The capital and operating cost estimates presented herein are not detailed estimates and are meant to illustrate order-of-magnitude comparisons to enable the assessment of the opportunity. Please note that Knight Piesold (2011) estimates have not been verified by the Project team; this will be an important activity during Phase 2 and will be incorporated into Phase 2 analysis.

The parameters are based on readily accessible data and/or experience on similar projects in generally accessible locations with a premium applied to site work for the remote location. For the purpose of this analysis, Jayne's Inlet and Armshow River was selected as a sample locations for comparison to the 'diesel only' case. The capital cost basis for the various components of the renewable energy system are as follows:

Component Capital Cost	Unit Rate ($CAD/kW)	Basis
Wind Facility		
WTG Supply	$970	Industry Experience
Civil Works	$100	
Electrical Works	$40	
Foundations	$120	
WTG Installation	$110	
Permitting/Inspection	1.5% of Capital Cost	
Transport and Logistics	$50	Assumption
Hydro Facility		
Jaynes Inlet 10 MW Generation Facility	$144,000,000	Knight Piesold (2011)
Armshow River 20 MW Generation Facility	$391,800,000	
Balance of Plant – Wind & Hydro		
New Roads	$320,000/km	Experience
Existing Roads Upgrade	$160,000/km	Experience
Substation(s)	$250,000 + $18,000/MW	Experience
Transmission Line (DB)	$150,000/km	Experience
System Upgrades	$250,000 fixed price	Assumption
Construction Site Services	2.5% of site work	Experience
Remote Site Premium	10% of site work	Experience
EPCM Cost	8% of Capital Cost	Assumption
Interest During Construction (IDC)	Not included	
Contingency	15% of total	Assumption

Renewable System Capital Costs (Parametric)

Component Operating Cost	Unit Rate ($CAD/kW)	Basis
All Facilities		
Operators & Vehicles	$200,000 per year	Industry Experience
OEM Service Parts	$75,000 per year	
OEM Inspections	$50,000 per year	
Third-Party Service Contractor	$140,000 per year	
Capex Allocation (BOP)	%0.5 of CC	
Insurance	%0.2 of CC	
Telecoms	$1,000 per year	Assumption
Office Support Allocation	$3,000 per year	Assumption

Table 3 - Renewable System Operating Costs (Parametric)

4.2.3 Economic Outputs

Several scenarios and iterations of the power and energy model were run to evaluate the benefit of a renewable energy system, test the sensitivity to sizing and key inputs, and to provide an initial optimization of the system configuration. For each scenario, the energy characteristics, LCOE, NPV, and fuel offset were reported.

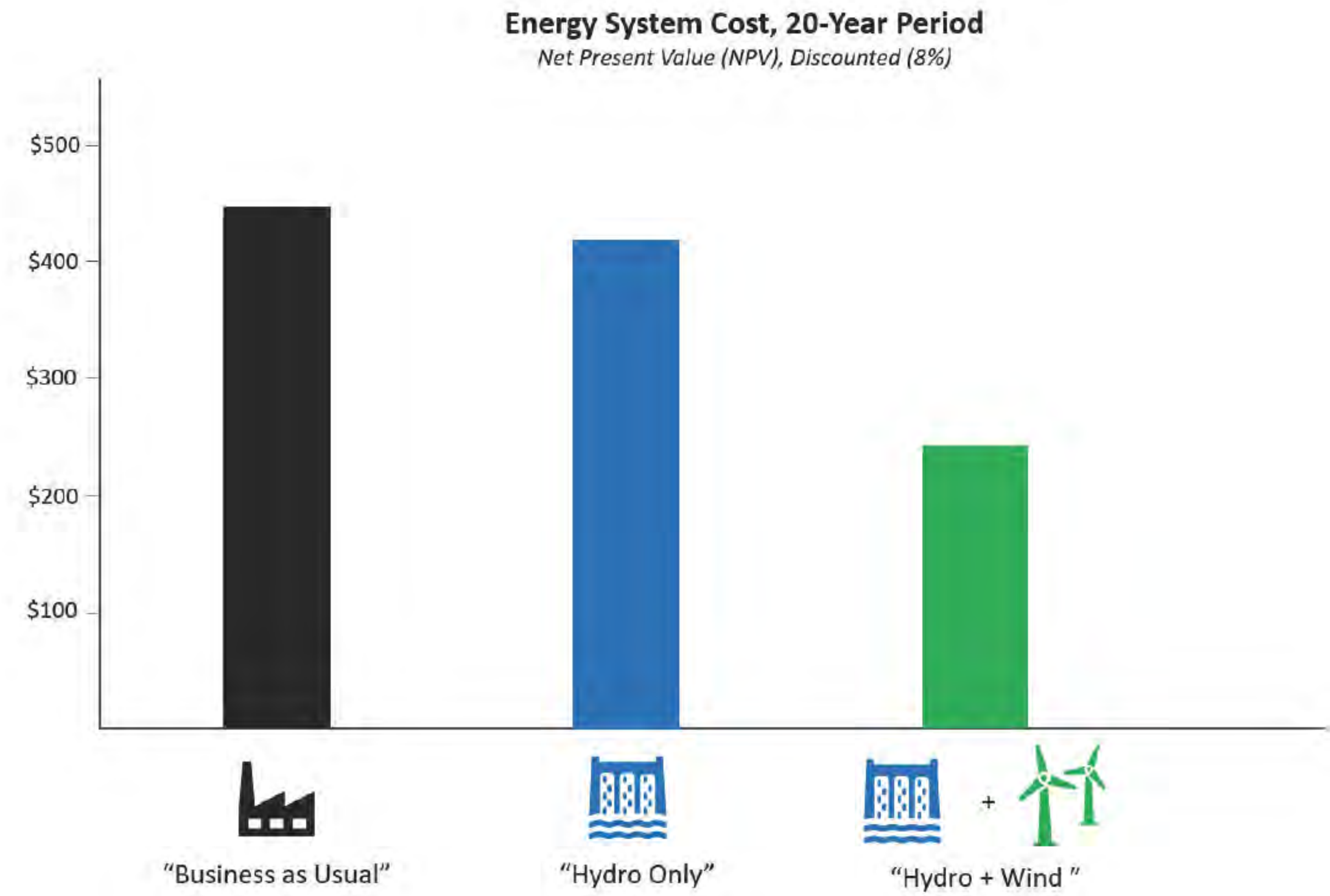
Based on preliminary data, inputs and assumptions, it is clear that there are multiple scenarios where renewable systems are competitive or out-pace the "business as usual" diesel system scenario. Please note that this analysis doesn't consider financial and commercial details, such as financing rates, profit hurdles, funding availability, IPP Policy pricing structures etc. It simply looks at the unsubsidized, true cost comparison of systems.

It is apparent that, as the load grows in Iqaluit, the business case for new build renewable systems improves. In the ten-year period that has elapsed from previous analysis by Knight Piesold, the load forecast has increased consistently, which has had a material positive effect on the economics. Furthermore, the hybridization of the hydro facility with wind has a significant impact on cost while still meeting mean annual energy demand targets. In practical terms, the wind allows for a 10MW hydro facility to increase its capacity to 20MW will producing the same (approximately) annual energy. This is a major cost advantage which has a material impact on the project economics.

	20 MW Hydro Scenario	**20 MW Wind + Hydro Scenario**
Load Characterization		
Average Demand (MW)	80,000 – 150,000 MWh	
Annual Mean Energy Generation (MWh)	149,300	117,769
Renewable System		
Wind Array (MW)	-	20
Hydro Facility (MW)	20	10
Capital Cost (millions)	$392	$184
Base Case		
Diesel Fuel Offset	100%	96%*
Business as Usual NPV (millions)	$430	$430
Renewable System NPV (millions)	$408	$214
Savings over 20yr Life (millions / %)	$22 / -5%	$216 / -50%

** This renewable penetration rate is based on a single hydro + wind scenario. This will be optimized in Phase 2 and will likely lead to a higher penetration rate for the hybrid scenario.*

Summary of Economic Outputs



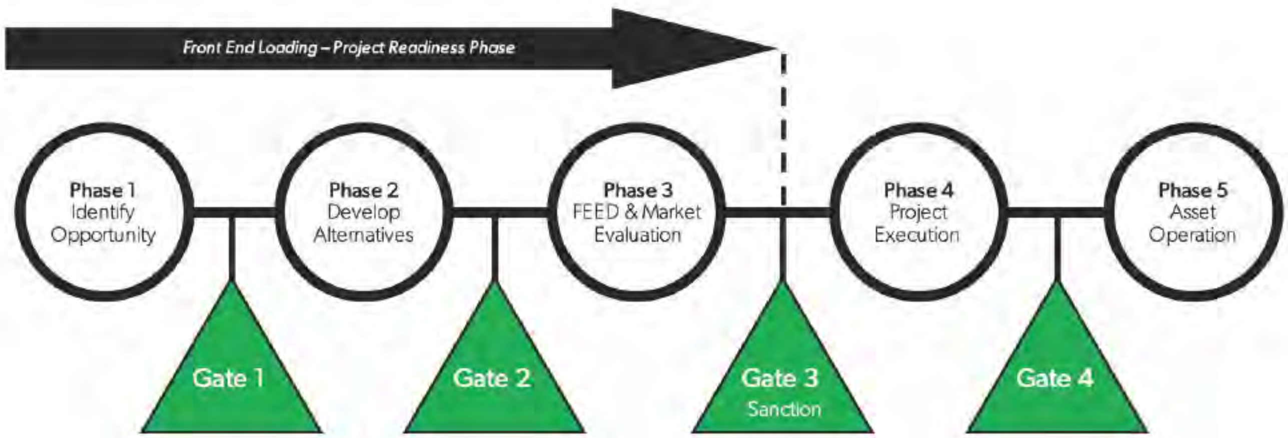
Based on parametric analysis of true costs to the community, it is recommended that further investigation into viable alternatives be conducted to further explore this business opportunity. There exists a clear business case for renewable energy development in Iqaluit, as illustrated by the NPV method of evaluation.

Phase 2 will present a much more in-depth analysis of alternatives and the relative project economics and sensisitivities. The Phase 1 bookend economics illustrates that, in a 'unfunded diesel' vs. 'unfunded renewable' scenario, there is clearly a renewable systems that, at a minimum, compete with the existing system. This, on economic merits alone, represents an incentive to investigate renewable alternatives in Phase 2.

Section 5 Plan for Phase 2

5.1 Phase - Gate Approach

The Iqaluit Nukkiksautiit Project is classified according to the phase-gate system, which helps mitigate risk and ensure the optimal solution is carried through. This approach to project development is broken down into phases, which are separated by gates. The phases constitute the development work including the execution and completion of key activities and deliverables. The gates are decision checkpoints, whereby the project does not proceed to the following phase until agreement and signed approval from all key project decision makers, based on the information provided in the phase-specific Decision Support Package (DSP), is obtained.



Phase 1: Identify the Opportunity (Current Phase)

Phase 1 includes a review of the project to understand if an opportunity exists, with specific focus placed on the development of an Inuit rightsholder approach to project development. This stage will also include a review of possible project configurations and high-level economics. Critical here is evaluating the market and recognizing project strengths and weaknesses. The purpose of this phase is to confirm agreement among project partners and Inuit rightsholders to proceed to a deeper level of evaluation.

Phase 2: Develop Alternatives

Phase 2 focuses on further developing the business case and project plan, led by the examination of Inuit rights and values, including the initiation and execution of the Tusaqtavut Study by the QIA. This phase is generally more labour-intensive than the first phase and includes a review of various project alternatives and some preliminary engineering work, including data collection and analysis. The purpose of this phase is to assess confidence in the project feasibility, including initial outcome so the Tusaqtavut Study and any data collection campaigns, market assessment, economics before proceeding. This phase includes on-going Inuit rightsholder engagement and community consultations/stakeholder engagement since this is critical to project success.

Phase 3: Front-End Engineering Design (FEED) and Market Evaluation

During this phase, the projects' design and development is conducted, which will incorporate the findings and outcomes from the Tusaqtavut Study and the on-going Inuit Rightsholder and stakeholder engagement.

Engineering and cost estimates are refined to continue to understand economic and technical feasibility. The key outcome from this phase is coming to a decision on whether, and how, the project should proceed to execution.

The Phase 3 decision-gate is arguably the most critical in all the phase-gate process, as it is the signing of Final Invest Decision (FID) where the project funders are financially committing to the project.

Phase 4: Project Execution

Phase 4 is when capital funds have been allocated, and projects are being executed, including final engineering and construction.

Phase 5: Asset Operation

Following the construction, start-up, and commissioning activities, capital projects are overturned to operations.

5.2 Phase 2 Key Activities & Deliverables

The **key activities** identified for Phase 2 are as follows but may be tailored as the phase progresses with additional activities being included as needed.

Project Controls

Early establishment of project-specific control systems, and their frequent upkeep, is important for project success. This might include an interface management protocol and register, a project risk register including mitigation strategies, as well as a project schedule and budget.

Rightsholder and Stakeholder Engagement

As mentioned, Inuit rightsholder and stakeholder engagement is of utmost importance for project acceptance, and project success. This will include formal and informal collaboration with key organizations and individuals, as well as the general public. With this knowledge, an initial rightsholder and stakeholder engagement plan can be produced to guide consultations throughout the life of the project based on identified communication preferences.

Tusaqtavut Study and IQ Criteria Development

Ahead of direct consultation work, the Tusaqtavut Study will focus on collecting Inuit knowledge on land use in the Iqaluit region; activities include preparing an interview guide, applicable legal consent-related documents, and community engagement materials, along with completing training of QIA staff. Consultation efforts will be focused on hosting focus groups for Iqaluit Inuit (e.g., hunters, elders, youth, women, etc.), two weeks of in-community data collection, and the completion of up to 80 individual in-person interviews. The Tusaqtavut Study will begin early in Phase 2 and inform/direct the technical analysis and Alternatives Generation.

Alternatives Generation

Alternatives generation is one of the most important aspects of Phase 2, where the technical and economic feasibility of a wide range of project configurations will be assessed. An example of a possible project configuration includes hybridizing hydroelectric with wind generation. This might be deemed a viable, and desirable option, as it may allow the footprint of hydro facilities to be minimized, while still maintaining a high reliability. This cannot be determined without analyzing multiple other configurations and comparing various technical and economic factors to determine the preferred alternative. This process ensures that the preferred alternative is the best possible recommendation for the project.

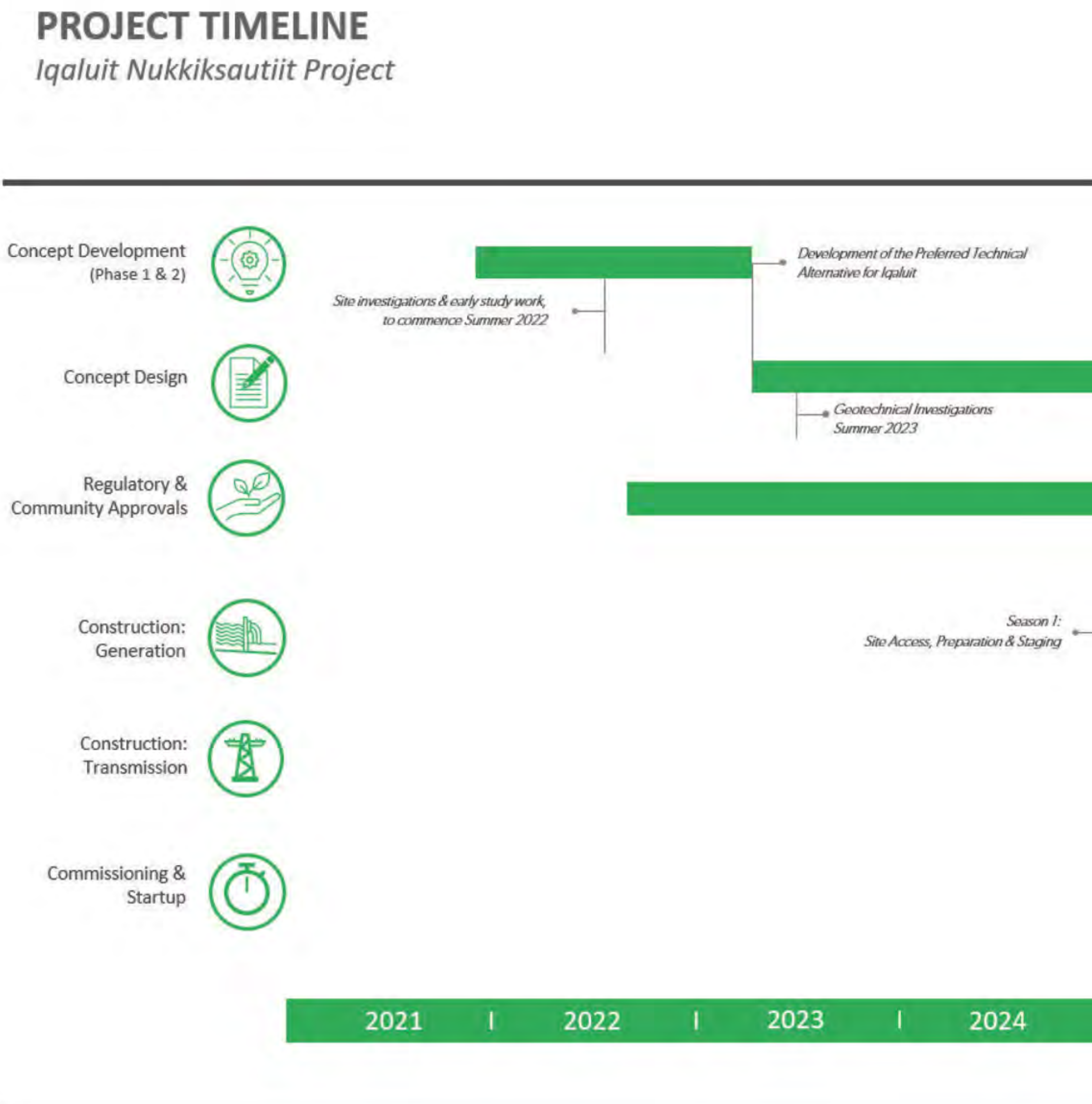
Aside from the Tusaqtavut Study data collection, two additional data campaigns may occur in Phase 2. This includes a Light Detection and Ranging ("LiDAR") assessment of potential sites to better understand the hydroelectric opportunity, and the installation of a Metrological Evaluation Tower (MET) to assess wind conditions on site.

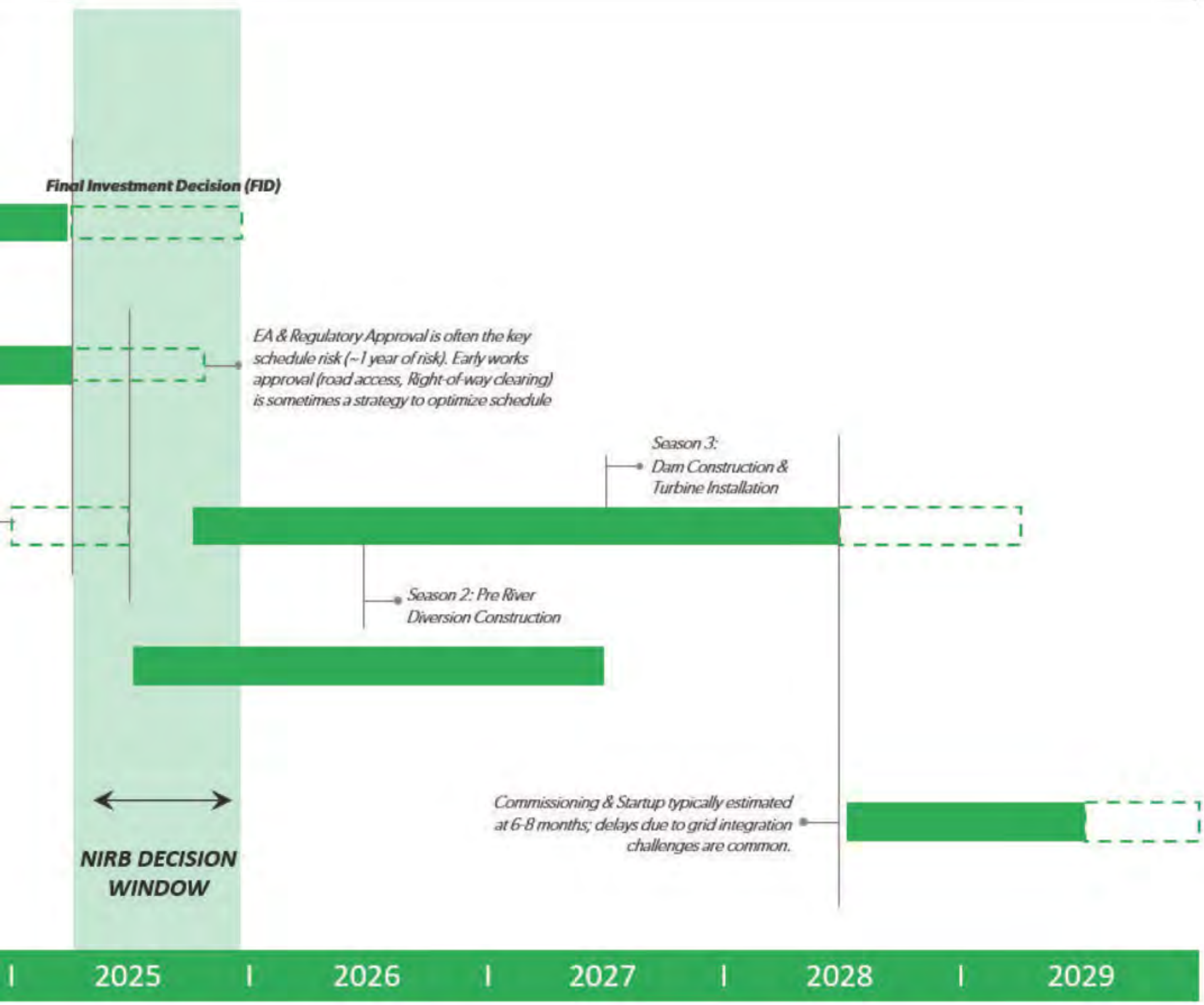
Key deliverables anticipated for Phase 2 include, but are not limited to:

- Project Controls Plan
- Project Management Plan
- Rightsholder & Stakeholder Engagement Plan
- Environment and Regulatory Review
- Tusaqtavut Study
- Alternatives Generation & Selection Report
- Power & Energy Model for Preferred Alternative
- Phase 2 Decision Support Package

5.3 Project Timeline

A high-level milestone focused schedule has been developed for the project. The total duration of Phase 2 is an estimated 9 months, beginning in July 2022.





Final Investment Decision (FID)
EA & Regulatory Approval is often the key schedule risk (~1 year of risk). Early works approval (road access, Right-of-way clearing) is sometimes a strategy to optimize schedule
Season 3: Dam Construction & Turbine Installation
Season 2: Pre River Diversion Construction
Commissioning & Startup typically estimated at 6-8 months; delays due to grid integration challenges are common.
NIRB DECISION WINDOW
2025
2026
2027
2028
2029

PROJECT ROADMAP

Iqaluit Nukkiksautiit Project

PROPOSED SCOPE

Phase 1 *Identify the Opportunity*	Decision Gate 1 (Jun 2022)	Phase 2 *Alternatives Generation & Selection of Preferred Alternative*	Decision Gate 2 (Mar 2023)	Phas *Developme Preferred Al*
Duration: *3 months*	[redacted]	**Duration:** *9 months*	[redacted]	**Duration:** *24-36 mths*

[redacted]

KEY MILESTONES

TECHNICAL VALIDATION

BUSINESS CASE SUBMISSION TO QIA

ENVIRONMENTAL & REGULATORY PLAN

PREFERRED ALTERNATIVE SELECTION

PRE-FRONT-END ENGINEERING DESIGN (PRE-FEED) | FRONT-END ENGINEERING DESIGN (FEED)

IQ STUDY

BUSINESS CASE & ECONOMICS REVIEW

MOU SIGNED BTWN QIA/QC

ALTERNATIVE SCREENING WORKSHOP

OWNERSHIP STRUCTURE/ALIGNMENT

HAZOP I

ACTIONS:

NNC to complete Project Validation using existing data and analysis. A business case and economics model will be created for the Iqaluit site. QIA to begin Inuit Qaujimajatuqangit study.

KEY INTERIM DECISIONS:

- Regional power outlook (inc. forecast)
- Commercial & Ownership Strategy
- Strategic Fit with Organizational Mandate
- Funding availability and Strategy

KEY DELIVERABLES:

- Project Framing Document
- Technical Validation Report
- 'Book-end' Economics Model
- Phase 1 Decision Support Package
- Phase 2 Execution Plan
- Phase 2 Funding Plan
- Stakeholder Engagement Strategy

ACTIONS:

NNC to look at viable alternative development schemes for Iqaluit; Alternatives will be evaluated and the Preferred Alternative/scheme will be proposed. Regulatory and Stakeholder Engagement Plan to be developed and implemented in this phase.

KEY INTERIM DECISIONS:

- Ownership structure
- Appropriate Project Boundaries & Frame
- Alternative Evaluation Criteria
- Preferred Alternative Selection

KEY DELIVERABLES:

- IQ Study
- Alternatives Generation & Selection Report
- Environmental & Regulatory Review Report
- Updated Project Framing Document
- Level 4 Cost Estimate
- Level 2 Schedule
- Economics Model (for Preferred Alternative)
- Phase 2 Decision Support Package
- Phase 3 Funding & Financing Plan
- Phase 3 Execution Plan

ACTIONS:

Several key activities to be co
highlighted by detailed desigr
Alternative for Iqaluit. Contra
developed and implemented
data collection and critical lon
(i.e. turbines) will occur in pha

KEY INTERIM DECISIONS:

- Commercial Agreements (
- Environmental & Regulato
- Contracting Strategy for C
- Procurement of Critical Lo

KEY DELIVERABLES:

- Technical Basis of Design
- Technical Drawings & Doc
- Work Breakdown Structur
- Power Purchase Agreeme
- EA Project Registration Do
- Level 3 Schedule/Level 2 C
- Project Risk Assessment (
- Probabilistic/Risk Loaded
- Phase 3 Decision Support
- Phase 4 Funding & Financi
- Phase 4 Execution Plan

Nunavut Nukkiksautiit Corporation

Mar 2025		Dec 2029	
e 3 *nt of the* *lternative*	Decision Gate 3 (FID)		
	Phase 4 *Construction*	Decision Gate 4	**Phase 5** *Operations*
[redacted]	**Duration:** *36-48 mths* [redacted]		**Duration:** *50+ years* [redacted]

[redacted]

COST & SCHEDULE REVIEW

PEER REVIEW

REVIEW

Construction

Operations

mpleted in this phase,
n of the Preferred
cting Strategy will also be
in this phase. Any early
g lead item procurement
ase 3.

Land, water use, PPA etc)
ry Strategy
onstruction Phase
ng Lead Items

uments
e/Commercial Plan
nt
cument
Cost Estimate
Cold Eyes Review)
Economics Model
Package (FID)
ing Plan

ACTIONS:

Construction Phase will focus on the construction of the preferred alternative, with a high focus on safety, environmental stewardship, quality and engineering surveillance. Operations readiness will become a greater focus area in this phase. Project will be handed over to the operating entity at the end of the phase.

KEY INTERIM DECISIONS:

- Operating Philosophy
- Handover and Turnover Strategy
- Site Surveillance and Management
- Financial closeout strategy

KEY DELIVERABLES:

- Phase 4 Construction Plan
- Site Safety Plan
- Project Controls Plan
- Risk Management Plan
- Quality Assurance & Surveillance Plan
- Environmental Monitoring Plan
- Lessons Learned - Construction
- Handover and Turnover Plan
- Ready For Operations Plan
- Commissioning & Start-up Plan

Operations Documents to be defined and implemented by the Operations Entity in Phase 2/3...

5.4 Phase 2 Budget

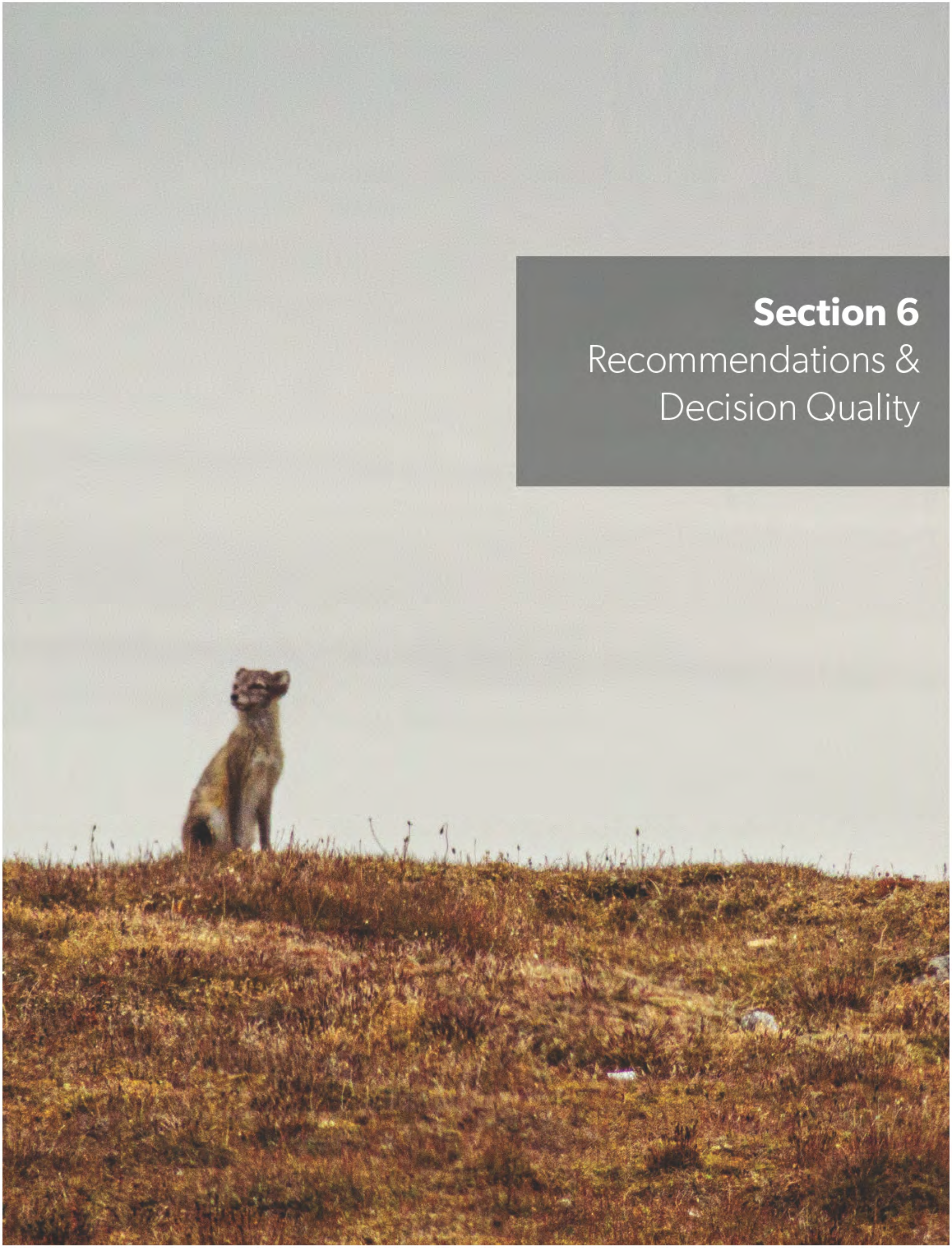
The total cost for execution of Phase 2, inclusive of project management, community engagement, and technical development is estimated to be [redacted] Canadian Dollars. The following is a breakdown of this estimate.

Task	Cost
Project Management	[redacted]
Tusaqtavut Study & IQ Criteria Development	[redacted]
Environment & Regulatory Plan Development	[redacted]
Data Collection & Load Profile Development	[redacted]
Alternatives Generation Assessment	[redacted]
Phase 2 DSP Preparation	[redacted]
Other (overhead, travel, etc.)	[redacted]
[redacted]	[redacted]

Phase 2 project estimates were prepared by NNC in collaboration with QIA for submission to CIRNAC's Northern REACHE funding program in Q1 2022.

Please note that the Project Team was successful in securing the Phase 2 budget ([redacted]) via the Northern REACHE funding Program. There is no additional funding required from NNC or QIA for this phase of activity.

Changes in the estimate that have the potential to significantly impact the total will be communicated to the partners for approval before proceeding.



Section 6
Recommendations & Decision Quality

6.1 Decision Quality

The following section highlights the confidence the Project Team has in the work done to date and the requests and recommendations made within this document. A Decision Quality ("DQ") is a framework used to aid in high-quality decision-making using a simple process; team members, anonymously, rank their confidence on a scale from one to ten across six elements. The average is calculated to understand the project team's views on each element, highlighting areas of strength, or opportunities for improvement.

Appropriate Frame

Has the correct problem been identified, and is the who, when, how, and why of the decision (regarding the solution) understood?

Creative, Doable Alternatives

Has a robust set of possible alternatives been identified that are each feasible and compelling?

Meaningful, Reliable Information

Has the correct information been identified to guide decision making?

Clear Values and Trade-Offs

Have decisions been made that reflect project value drivers, while ensuring the associated trade-offs are known and understood?

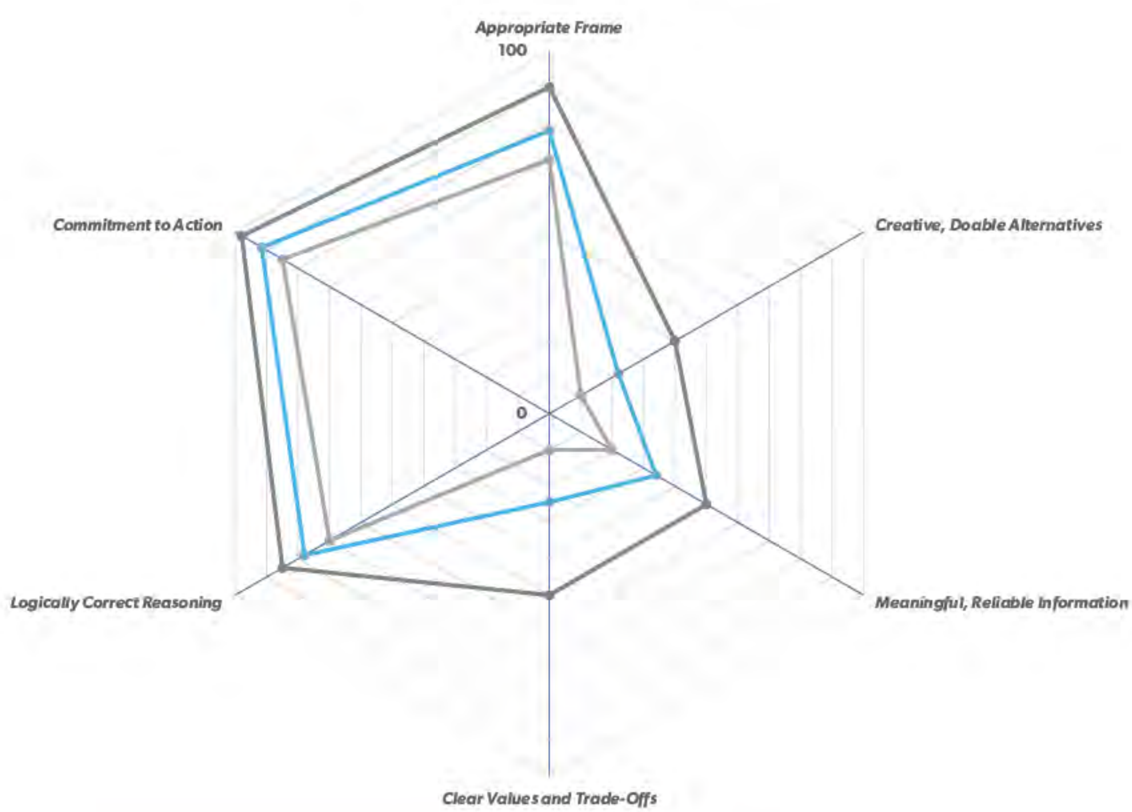
Logically Correct Reasoning

Have biases been mitigated? Are decisions supported with rational reasoning?

Commitment to Action

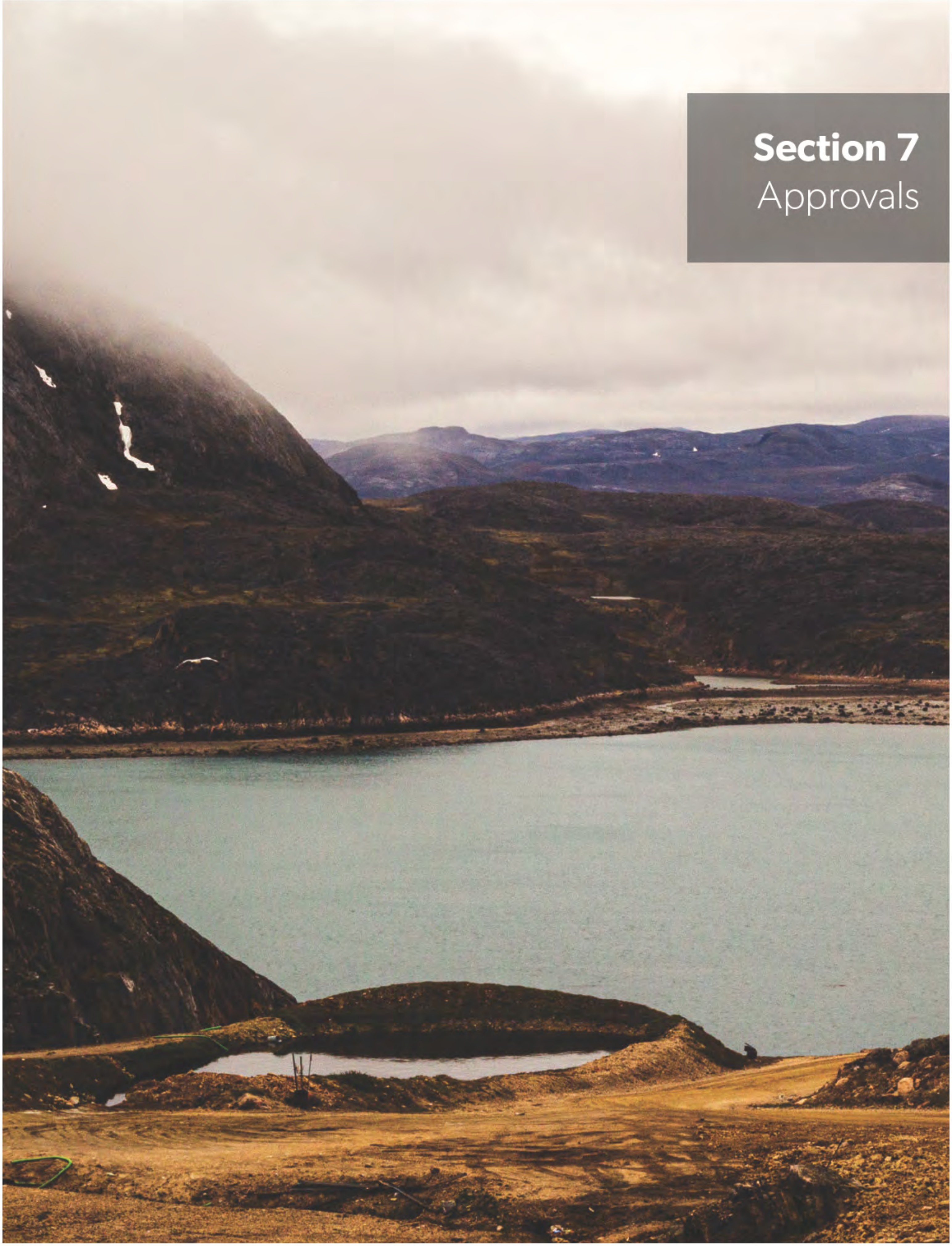
Have appropriate actions been taken to demonstrate an ability to accomplish the goals of the project (adequate staffing, etc.)?

Decision Quality (DQ) Spider



Element	Reasoning	Rating
Appropriate Frame	The Project Frame has been identified, with many items classified as in or out of scope, providing some certainty and confidence to the group. However, there remains significant items on the boundary, requiring further work to move them in or out of scope.	MED-HIGH
Creative, Doable Alternatives	This is anticipated to be a low score at this stage of the project, as the Alternatives Generation and Concept Selection will take place in Phase 2. Some initial thoughts have been pulled together for Phase 1, but detailed work will be the focus of the next phase.	LOW
Meaningful, Reliable Information	Thus far, data and information has been obtained from third parties. The confidence in this data and information can, and will, be improved in Phase 2 as the data collection campaigns begin (Tusaqtavut Study, RE data collection, etc.). Load forecasting is a noted area of weakness.	LOW-MED
Clear Value and Trade-Offs	Presently, only high-level values and trade-offs can be identified. As the data collection picks up in Phase 2, and in-depth conversations with Inuit Rightsholders are had, along with the development of various project configurations, a greater understanding of value and trade-offs is expected.	LOW
Logically Correct Reasoning	Focus has been put on ensuring project team preferences, biases, and any illogical justifications have not been factored into the project, but rather reasoning is based on available data, as well as preferences of Inuit Rightsholders.	MED-HIGH
Commitment to Action	The Project is appropriately staffed for the duration of Phases 1, 2, and 3.	HIGH

Section 7
Approvals



7.1 Authorization to Proceed Request

Approval for the Iqaluit Nukkiksautiit Project to progress to Phase 2 is requested, given:

1. Strong economic indicators (NPV) associated with renewable energy development;
2. Phase 2 project funding ([redacted] has been secured via the Northern REACHE program, eliminating the financial risk of progressing.
3. The Project Team has been established and is prepared for Phase 2. The team is ready to proceed with adequate, and capable, staffing.

Commitment is formally made by completion of the tables below. The signatures below represent acknowledgement of this document and authorization by the named Approvers, on behalf of the respective partners, to proceed with the Iqaluit Nukkiksautiit Project Phase 2 as described in this document.

Name / Position / Company	Signature	Date
Heather Shilton Director, Nunavut Nukkiksautiit Corporation		
Harry Flaherty CEO, Qikiqtaaluk Corporation		
Olayuk Akesuk President, Qikiqtani Inuit Association		

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