

August 3, 2021

Hon. Jeannie Hakongak Ehaloak

Minister Responsible for the Qulliq Energy Corporation

Legislative Assembly of Nunavut

P.O. Box 2410

Iqaluit, NU X0A 0H0

Dear Minister Hakongak Ehaloak,

RE: The Major Capital Project Permit Applications Respecting Construction of New Power Plants at Cambridge Bay, Gjoa Haven and Igloolik, and a Genset Replacement at Iqaluit Power Plant, Utility Rates Review Council of Nunavut’s Report 2021-02.

By letter dated March 3, 2021, the Qulliq Energy Corporation (QEC) applied to the Minister responsible for QEC for approval of major capital project permits for new power plants in the communities of Cambridge Bay, Gjoa Haven and Igloolik, and a genset replacement in the Iqaluit power plant. By letter dated March 12, 2021, the Minister responsible for QEC requested advice from the Utility Rates Review Council of Nunavut (URRC) with respect to QEC’s Applications.

In response to the Applications and the Minister’s request, please find attached the URRC’s Report 2021-02, respecting QEC’s major project permit applications.

Yours truly,

Anthony Rose

Chair

Utility Rates Review Council of Nunavut

CC: Premier Joe Savikataaq, Minister responsible for the URRC

William MacKay, Deputy Minister, Executive and Intergovernmental Affairs

Rick Hunt, President, Qulliq Energy Corporation

Rod Stockley, Acting Executive Director, URRC

P.O. BOX 1000, STN 200, IQALUIT, NU, X0A 0H0, [URRC@GOV.NU.CA](mailto:URRC@gov.nu.ca) [www.URRC.gov.nu.ca](http://www.URRC.gov.nu.ca/)



**Report to the Minister Responsible for the Qulliq Energy Corporation on:**

**The Major Capital Project Permit Applications Respecting**

**Construction of New Power Plants at Cambridge Bay, Gjoa Haven and Igloolik, and a Genset Replacement at Iqaluit Power Plant**

**Report 2021-02**

**August 3, 2021**

**UTILITY RATES REVIEW COUNCIL OF NUNAVUT**

**MEMBERS**

Anthony Rose Chair

Graham Lock Vice-Chair

Robbin Sinclaire\* Member

Nadia Ciccone Member

\*Abstained

**SUPPORT**

Rod Stockley Acting Executive Director

Wade Vienneau Consultant

**LIST OF ABBREVIATIONS**

|  |  |
| --- | --- |
| AEF | Arctic Energy Fund |
| BOD | Board of Directors |
| CHARS | Canadian High Arctic Research Station |
| CIPP | Commercial and Institutional Power Producers |
| FMB | Financial Management Board |
| GLO | Government Liaison Officer |
| genset | Generator Set |
| GN | Government of Nunavut |
| GRA | General Rate Application |
| IC | Installed Capacity |
| IFC | Installed Firm Capacity |
| IPP | Independent Power Producers |
| IR | Information Request |
| kW | Kilowatt |
| MPPA | Major Project Permit Application |
| PPD | Petroleum Products Division |
| QEC | Qulliq Energy Corporation |
| QEC Act | *Qulliq Energy Corporation Act* |
| RFC | Required Firm Capacity |
| SAO | Senior Administration Officer |
| SAIDI | System Average Interruption Duration Index**[[1]](#footnote-1)** |
| SAIFI | System Average Interruption Frequency Index**[[2]](#footnote-2)** |
| URRC | Utility Rates Review Council of Nunavut |
| URRC Act | *Utility Rates Review Council Act* |

**TABLE OF CONTENTS**

[1.0 BACKGROUND 1](#_Toc78397126)

[2.0 PARTICULARS OF THE APPLICATIONS 3](#_Toc78397127)

[2.1 CAMBRIDGE BAY 3](#_Toc78397128)

[2.2 GJOA HAVEN 5](#_Toc78397129)

[2.3 IGLOOLIK 7](#_Toc78397130)

[2.4 IQALUIT 10](#_Toc78397131)

[3.0 PROCESS 13](#_Toc78397132)

[3.1 MAJOR OR MINOR APPLICATIONS 13](#_Toc78397133)

[3.2 PUBLIC CONSULTATION PROCESS 13](#_Toc78397134)

[4.0 EXAMINATION OF THE APPLICATIONS 15](#_Toc78397135)

[4.1 COMMON MATTERS 15](#_Toc78397136)

[4.1.1 COMMON MATTERS – ARCTIC ENERGY FUND PROGRAM 15](#_Toc78397137)

[4.1.2 COMMON MATTERS – GOVERNANCE AND STAFFING 16](#_Toc78397138)

[4.1.3 COMMON MATTERS – PROJECT MANAGEMENT AND COST CONTROLS 17](#_Toc78397139)

[4.1.4 COMMON MATTERS – PROJECT TIMING AND PLANNING HORIZON 18](#_Toc78397140)

[4.1.5 COMMON MATTERS – DISMANTLING AND ENVIRONMENTAL REMEDIATION 19](#_Toc78397141)

[4.1.6 COMMON MATTERS – FINANCIAL AND RATE EFFECTS 20](#_Toc78397142)

[4.1.7 COMMON MATTERS – FUEL STORAGE – ROLES AND RESPONSIBILITIES 20](#_Toc78397143)

[4.1.8 COMMON MATTERS – RENEWABLE POWER 21](#_Toc78397144)

[4.1.9 COMMON MATTERS – AIR AND NOISE EMISSIONS 22](#_Toc78397145)

[4.1.10 COMMON MATTERS – APPLICATION COMPLETENESS REGARDING THE ASSESSMENT OF NEED AND FACILITY OPTIONS 23](#_Toc78397146)

[4.2 CAMBRIDGE BAY 25](#_Toc78397147)

[4.2.1 CAMBRIDGE BAY – NEED FOR THE PROJECT 25](#_Toc78397148)

[4.2.2 CAMBRIDGE BAY – ALTERNATIVE OPTIONS TO MEET THE NEED 27](#_Toc78397149)

[4.3 GJOA HAVEN 31](#_Toc78397150)

[4.3.1 GJOA HAVEN – NEED FOR THE PROJECT 31](#_Toc78397151)

[4.3.2 GJOA HAVEN – ALTERNATIVE OPTIONS TO MEET THE NEED 34](#_Toc78397152)

[4.4 IGLOOLIK 38](#_Toc78397153)

[4.4.1 IGLOOLIK – NEED FOR THE PROJECT 38](#_Toc78397154)

[4.4.2 IGLOOLIK – ALTERNATIVE OPTIONS TO MEET THE NEED 40](#_Toc78397155)

[4.5 IQALUIT 45](#_Toc78397156)

[4.5.1 IQALUIT – NEED FOR THE PROJECT 45](#_Toc78397157)

[4.5.2 IQALUIT – ALTERNATIVE OPTIONS TO MEET THE NEED 47](#_Toc78397158)

[5.0 URRC RECOMMENDATIONS 51](#_Toc78397159)

1. BACKGROUND
2. Qulliq Energy Corporation (QEC), as a designated utility, is required pursuant to Section 18.1 of the *Qulliq Energy Corporation Act* (QEC Act), to seek approval from the responsible Minister prior to undertaking a major capital project. In this regard, Section 18.1 of the QEC Act provides as follows:

Definition

* + 1. In this section, "major capital project" means a capital project that has a total cost that exceeds $5,000,000.

Major capital project

* + 1. The Corporation shall not undertake, nor permit any of its subsidiaries to undertake, a major capital project unless it applies in advance to the Minister for an order giving permission for the project.

Minister may seek advice

* + 1. Before responding to an application for permission made under subsection (2), the Minister may seek the advice of the Utility Rates Review Council (URRC) established under the *Utility Rates Review Council Act* (URRC Act).

Corporation to provide information

* + 1. The Corporation shall provide the Minister and the (URRC) with any information necessary for the Minister to decide whether permission should be granted.

What Minister may do

* + 1. The Minister may
       1. grant permission for undertaking the major capital project, with or without conditions; or
       2. refuse permission.

Order

* + 1. Permission granted by the Minister under paragraph (5)(a) shall be in the form of an order.

1. Section 7(e) of the URRC Act states, among others, the purposes of the URRC are to advise the Minister responsible for QEC concerning applications for permission for major capital projects under Section 18.1 of the QEC Act.
2. On March 3, 2021, QEC applied to the responsible Minister for approval of major capital project permits for new power plants in the communities of Cambridge Bay, Gjoa Haven and Igloolik, and the replacement of a generator set (genset) in the Iqaluit power plant (the Applications). On March 12, 2021, the Minister requested advice from the URRC with respect to the Applications. The URRC’s consideration of these matters is set out in this report.
3. PARTICULARS OF THE APPLICATIONS
   1. CAMBRIDGE BAY
4. QEC proposed the construction of a new power plant in the community of Cambridge Bay to replace the existing power plant. The project would commence after completion of the major project permit process and approval, which was anticipated to be at the end of the second quarter of fiscal year 2021/22. QEC stated that it required approval from its Board of Directors (BOD) and the Financial Management Board (FMB) prior to commencing the tendering portion of the schedule, anticipated to be in the third quarter of 2021/22. QEC expected to complete the project in the fourth quarter of 2025/26. Cambridge Bay is a remote community, located on Victoria Island, and access is limited to travel by air and sea. QEC provides electric service to residents of the hamlet of Cambridge Bay, and several larger electricity loads including the hamlet office and community centre, three schools, a health centre, as well as the Northern Store and Co‑op store, and the Canadian High Arctic Research Station (CHARS).
5. QEC submitted that the project has been identified to receive funding from the Arctic Energy Fund (AEF) program for a contribution of 75 percent of eligible expenses. The total preliminary cost estimate for the project is $50.237 million, including $1.679 million of ineligible expenses. Based on QEC’s forecast, the AEF contribution would be $36.419 million, with the remaining $13.818 million to be provided by QEC.
6. QEC stated that the existing power plant was constructed in 1958, with installed capacity (IC) of 4,950 kilowatts (kW) and installed firm capacity (IFC) of 3,850 kW. QEC indicated that the power plant had exceeded its 40-year design life, had technical and engineering deficiencies and was in poor condition. QEC stated:
   * + 1. Aging infrastructure – the facility is 63 years old. The building and ancillary equipment are old and have begun to deteriorate.
       2. Genset replacement – the oldest genset is only 14 years old, and none of the five gensets are approaching their retirement usage limit. Three of the gensets had between 38,000 and 45,000 engine hours as of January 2021, and the other two gensets had less than 15,000 engine hours.
       3. Safety issues – the facility is very old and is at a higher risk of equipment failure. Existing switchgear is not arc flash resistant nor can it be modified due to age. This increases the fire and safety risk of the facility.
       4. Environmental requirements – the existing plant has a diesel storage tank that is single-walled, which is not compliant with present codes. The tank is housed in a berm which requires decanting each year, and is prone to degradation from meltwater.
7. QEC described Cambridge Bay as a growing community with increasing demand for electricity. The 2020/21 peak load was 2,231 kW and was forecast to be 2,256 kW in 2021/22. QEC stated that the existing plant meets its required firm capacity (RFC) criterion – which is equal to peak demand plus 10 percent. QEC submitted that the current RFC surplus of about 35 percent would decline to about 25 percent by 2030/31.
8. QEC concluded that the although the plant’s IC could continue to meet the forecast increase in demand for electricity in the community, the deficiencies with the existing power plant placed the community at great risk of QEC not being able to supply safe, reliable power.
9. QEC presented two project options for the purposes of the Application, however, the option to upgrade and replace major components and systems within the existing facility was not considered to be a viable option. QEC stated that the upgrade and replacement was not technically feasible for the following reasons:
   * + 1. The existing plant has deteriorated and is beyond upgrading.
       2. The existing plant has no room for expansion.
       3. The existing site cannot accommodate the installation of temporary generation.
       4. The existing site does not have sufficient land space to accommodate a plant expansion.
10. QEC stated that the other option would involve the construction of a new power plant at a location outside the community, near the existing Petroleum Products Division (PPD) facility. It would consist of a five‑engine generation facility designed for a 40‑year life, with IC of 5,500 kW, and IFC of 4,150 kW that would improve reliability, efficiency, operation and safety. The new facility would also include fuel storage consisting of a 90,000-litre double-wall horizontal tank and two two‑million-litre vertical tanks with pumping facilities, a 400‑metre fuel pipeline to connect to the PPD facility, a concrete pad for transformer storage, pole racks, berms for used oil, and have space for additional buildings and storage. QEC also noted that it needed to add approximately two kilometres of distribution lines.
11. QEC submitted that the new plant would be more fuel efficient, generate less noise and air pollution and would be capable of integrating renewable energy sources.
12. QEC stated that the new power plant would meet Cambridge Bay’s peak load projections for 40 years.
    1. GJOA HAVEN
13. QEC proposed the construction of a new power plant in the community of Gjoa Haven to replace the existing power plant. The project would commence after completion of the major project permit process and approval, which was anticipated to be at the end of the second quarter of fiscal year 2021/22. QEC stated it required approval from its BOD and the FMB prior to commencing the tendering portion of the schedule, anticipated to be in the third quarter of 2021/22. QEC expected to complete the project in the fourth quarter of 2025/26. Gjoa Haven is a remote community, located on King William Island, and access is limited to travel by air and sea. QEC provides electric service to residents of the hamlet of Gjoa Haven, and a number of larger electricity loads including the hamlet office and community centre, three schools, a health centre, as well as the Northern Store and Co-op store.
14. QEC submitted that the project has been identified to receive funding from the AEF program for a contribution of 75 percent of eligible expenses. The total preliminary cost estimate for the project is $36.274 million, including $1.363 million of ineligible expenses. Based on QEC’s forecast, the AEF contribution would be $26.183 million, with the remaining $10.091 million to be provided by QEC.
15. QEC stated that the existing power plant was constructed in 1977, with IC of 2,320 kW and IFC of 1,600 kW. QEC indicated that the power plant had exceeded its 40‑year design life, had technical and engineering deficiencies and was in poor condition. QEC stated:
    * + 1. Aging infrastructure – the facility is 44 years old. The building and ancillary equipment are old and have begun to deteriorate.
        2. Genset replacement – genset G1 has exceeded its retirement usage limit. The other three gensets are relatively new with low engine hours.
        3. Safety issues – the facility is very old and is at a higher risk of equipment failure. Existing switchgear is not arc flash resistant nor can it be modified due to age. This increases the fire and safety risk of the facility.
        4. Environmental requirements – the existing plant has a diesel storage tank that is single-walled, which is not compliant with present codes. The tank is housed in a berm which requires decanting each year, and is prone to degradation from meltwater.
16. QEC described Gjoa Haven as a growing community with increasing demand for electricity. The 2020/21 peak load was 1,070 kW and was forecast to be 1,098 kW in 2021/22. QEC stated that the existing plant meets its RFC criterion – which is equal to peak demand plus 10 percent. QEC submitted that the current RFC surplus of about 25 percent was forecast to decline to about 18 percent by 2030/31.
17. QEC concluded that the although the plant’s IC could continue to meet the forecast increase in demand for electricity in the community, the deficiencies with the existing power plant placed the community at great risk of QEC not being able to supply safe, reliable power.
18. QEC presented two project options for the purposes of the Application, however, the option to upgrade and replace major components and systems within the existing facility was not considered to be a viable option. QEC stated that the upgrade and replacement was not technically feasible for the following reasons:
    * + 1. The existing plant has deteriorated and is beyond upgrading.
        2. The existing plant has no room for expansion.
        3. The existing site cannot accommodate the installation of temporary generation.
        4. The existing site does not have sufficient land space to accommodate a plant expansion.
19. QEC stated that the other option would involve the construction of a new power plant at a location outside the community, near the existing PPD facility. It would consist of a four‑engine generation facility designed for a 40-year life, with IC of 3,100 kW, and IFC of 2,000 kW that would improve reliability, efficiency, operation and safety. The new facility would also include fuel storage consisting of two 90,000-litre double‑wall horizontal tanks with pumping facilities, a 200‑metre fuel pipeline to connect to the PPD facility, a concrete pad for transformer storage, pole racks, berms for used oil, and have space for other buildings and storage. QEC also noted that upgrades were required to the existing distribution system.
20. QEC submitted that the new plant would be more fuel efficient, generate less noise and air pollution and would be capable of integrating renewable energy sources.
21. QEC stated that the new power plant would meet Gjoa Haven’s peak load projections for 40 years.
    1. IGLOOLIK
22. QEC proposed the construction of a new power plant in the community of Igloolik to replace the existing power plant. The project would commence after completion of the major project permit process and approval, which was anticipated to be at the end of the second quarter of fiscal year 2021/22. QEC also stated that it required approval from its BOD and the FMB prior to commencing the tendering portion of the schedule, anticipated to be in the third quarter of 2021/22. QEC expected to complete the project in the fourth quarter of 2025/26. Igloolik is located on a remote island and access is limited to travel by air and sea. QEC provides electric service to residents of the hamlet of Igloolik, and a number of larger electricity loads including the hamlet office and community centre, school, health centre, Northern Store and Arctic Co-op store.
23. QEC submitted that the project has been identified to receive funding from the AEF program for a contribution of 75 percent of eligible expenses. The total preliminary cost estimate for the project is $35.745 million, including $1.385 million of ineligible expenses. Based on QEC’s forecast, the AEF contribution would be $25.770 million, with the remaining $9.975 million to be provided by QEC.
24. QEC stated that the existing power plant was constructed in 1974, with IC of 2,370 kW and IFC of 1,520 kW. QEC indicated that the power plant had exceeded its 40-year design life, had technical and engineering deficiencies and was in poor condition. QEC stated:
    * + 1. Aging infrastructure – the facility is 47 years old. The building and ancillary equipment are old and have begun to deteriorate.
        2. Genset replacement – genset G3 has exceeded its engine hour retirement limit, and genset G2 is approaching its retirement usage limit. The other two gensets are newer with fewer engine hours.
        3. Safety issues – the facility is very old and is at a higher risk of equipment failure. Existing switchgear is not arc flash resistant nor can it be modified due to age. This increases the fire and safety risk of the facility.
        4. Environmental requirements – the existing plant has a diesel storage tank that is single-walled, which is not compliant with present codes. The tank is housed in a berm which requires decanting each year, and is prone to degradation from meltwater.
        5. Power plant capacity – the existing plant will not meet the community’s RFC requirement beyond the year 2023.
25. QEC described Igloolik as a growing community with increasing demand for electricity. The 2020/21 peak load was 1,329 kW and was forecast to be more than 1,331 kW in 2021/22. QEC stated that the existing plant will not continue to meet its RFC criterion – which is equal to peak demand plus 10 percent. QEC submitted that the current RFC surplus of about four percent was forecast to decline to a shortfall by 2023/24. The RFC shortfall would increase to about eight percent by 2030/31.
26. QEC concluded that the forecast increase in demand for electricity in the community and the deficiencies with the existing power plant places the community at great risk of QEC not being able to supply safe, reliable power.
27. QEC presented two project options for the purposes of the Application, however, the option to upgrade and replace major components and systems within the existing facility was not considered to be a viable option. QEC stated that the upgrade and replacement was not technically feasible for the following reasons:
    * + 1. The existing plant has deteriorated and is beyond upgrading.
        2. The footprint of the existing plant is too small to accommodate the new gensets.
        3. The existing site does not have sufficient land space to accommodate a plant expansion.
28. QEC stated that the other option would involve the construction of a new power plant at a location outside the community, near the existing PPD facility. It would consist of a four‑engine generation facility designed for a 40-year life, with IC of 3,450 kW, and IFC of 2,350 kW that would improve reliability, efficiency, operation and safety. The new facility would also include fuel storage consisting of two 90,000-litre double‑wall horizontal tanks with pumping facilities, a 400‑metre fuel pipeline to connect to the PPD facility, a concrete pad for transformer storage, pole racks, berms for used oil, and have space for other buildings and storage. QEC also noted that upgrades were required to the existing distribution system.
29. QEC submitted that the new plant would be more fuel efficient, generate less noise and air pollution and would be capable of integrating renewable energy sources.
30. QEC stated that the new power plant would meet Igloolik’s peak load projections for 40 years.
    1. IQALUIT
31. QEC proposed the replacement of genset G4 in the Iqaluit power plant. The project would commence after completion of the major project permit process and approval, which was anticipated to be at the end of the second quarter of fiscal year 2021/22. QEC stated it required approval from its BOD and the FMB prior to commencing the tendering portion of the schedule, anticipated to be in the third quarter of 2021/22. QEC expected to complete the project in the fourth quarter of 2023/24. Iqaluit is the largest community/city in QEC’s service territory, located on Baffin Island in Frobisher Bay. QEC provides electric service to residents of the city of Iqaluit, and a number of larger electricity loads including the Government of Nunavut (GN) and Government of Canada offices, community centres, schools, general hospital and clinics, recreational centres, and other commercial customers including the Northern Store and Arctic Ventures Marketplace.
32. QEC submitted that the project has been identified to receive funding from the AEF program for a contribution of 75 percent of eligible expenses. The total preliminary cost estimate for the project is $8.415 million, including $0.379 million of ineligible expenses. Based on QEC’s forecast, the AEF contribution would be $6.027 million, with the remaining $2.388 million to be provided by QEC.
33. QEC stated that the existing power plant was constructed in the 1960s, with IC of 22,600 kW and IFC of 17,600 kW. QEC indicated that the power plant was expanded and upgraded in 2013. The power plant has six generating units. The existing genset G4 was installed in 1992 and has exceeded its expected life cycle hours. QEC also noted that gensets G1 and G2 have also exceeded their expected life cycle hours. QEC submitted that although gensets G1 and G2 have exceeded their expected life cycle hours, genset G4 was the least stable. QEC added that genset G4 could no longer be overhauled, and that the availability of parts was an issue.
34. QEC described Iqaluit as a growing community with increasing demand for electricity. The 2020/21 peak load was 10,087 kW and was forecast to be 9,960 kW in 2021/22. QEC stated that the existing plant meets its RFC criterion – which is equal to peak demand plus 10 percent. QEC submitted that the current RFC surplus of about 60 percent was forecast to decline to about 40 percent by 2030/31. However, QEC noted that the combination of gensets G4, G1 and G2 represents a total capacity of 10,600 kW and each of the gensets has exceeded its expected engine hours.
35. QEC submitted that the loss of any two of the above-mentioned gensets would create a significant shortfall in the available capacity and would not meet the RFC by the year 2030.
36. QEC concluded that the forecast increase in demand for electricity in the community and the deficiencies with the existing power plant (gensets G4, G1 and G2) places the community at great risk of QEC not being able to supply safe, reliable power.
37. QEC presented two project options for the purposes of the Application. QEC submitted that it could either replace genset G4 with a unit of the same size (i.e., 3,300 kW), or a unit with a different size (e.g., 2,000 kW or 4,000 kW).
38. QEC stated that a same-sized unit would not require upgrades of the genset foundation, support structures or fuel system. Further, QEC noted that a same-sized unit would maintain the plant’s IC and IFC.
39. QEC submitted that a different sized unit was not recommended. QEC noted that the cost savings associated with a smaller unit were minimal, and that the IFC would be reduced. QEC also noted that a bigger unit was not justifiable because the current IFC would already meet longer term load and RFC projections.
40. QEC stated the most cost-effective option would be to replace genset G4 with a same‑sized unit. Further, there would be no effect on the IC or IFC.
41. The upgraded Iqaluit power plant would continue to consist of a six-engine generation facility designed for a 40-year life, with IC of 22,600 kW, and IFC of 17,600 kW that would improve reliability, efficiency, operation and safety.
42. QEC also submitted that the new genset G4 would be more fuel-efficient and generate less noise and air pollution.
43. QEC stated that the replacement of genset G4 would increase the overall power plant reliability in Iqaluit and will meet peak load and RFC projections until 2056.
44. PROCESS
    1. MAJOR OR MINOR APPLICATIONS
45. Under the URRC Act, it is directed that at the sole discretion of the URRC, the URRC shall determine whether an application is either minor or major for the purposes of determining the time required for processing of the application; a minor application provides for a time limit of 90 days for the URRC to report to the responsible Minister while a major application provides a time limit of 150 days. The URRC considered the significant level of investment proposed in the subject Applications, that much of the funding is expected to come from the AEF thus reducing the investment required by QEC, the need for information requests (IRs) and responses, and the need for submissions from the public. As a result, the URRC determined to treat the Applications as major applications.
46. The URRC determined that the Applications would be considered concurrently and that the 150-day deadline for submitting its report to the Minister would be August 9, 2021.
    1. PUBLIC CONSULTATION PROCESS
47. During April 2021, the URRC caused notice of the Applications to be provided in each of the affected communities. A separate notice for each Application was prepared and made available to the residents and customers in the communities of Cambridge Bay, Gjoa Haven, Igloolik and Iqaluit. The notices were posted on the URRC website, social media, and also provided to the government liaison officers (GLOs) in each community, by letter to each Member of the Legislative Assembly of Nunavut, mayor and senior administration officers (SAOs) as well as assistant SAOs across Nunavut. In addition, QEC also made public service announcements for each of the Applications noting both the opportunity and deadline for making a submission regarding the Applications to the URRC.
48. The URRC also provided an opportunity for the public to make written comments respecting the major project permit applications (MPPAs) by the deadline of May 14, 2021. One written public submission was received. The matters raised in the submission were addressed by QEC in its responses to the URRC’s IRs and were considered by the URRC in this report.
49. The URRC asked for more information from QEC regarding the Applications. This was conducted through two rounds of IRs. The URRC asked a number of questions that were common to all four applications, as well as questions specific to each application/community. Further, the URRC explored a number of topic areas associated with the potential complexities of conducting four major capital projects concurrently. QEC responded to the two rounds of IRs from the URRC on April 30, 2021, and on May 28, 2021.
50. EXAMINATION OF THE APPLICATIONS
    1. COMMON MATTERS
51. The URRC noted that a number of matters were common to all four applications. Further, the URRC noted that there was potential risk to QEC associated with the magnitude of conducting four major projects concurrently. Some of these risks have been noted in previous MPPAs. For example, the URRC explored QEC’s loss of the AEF program funding, project management and cost controls in the Arctic Bay MPPA, seeking an understanding of what QEC has changed to mitigate similar issues. The URRC made recommendations in URRC Report 2020-01 regarding its observations and concerns.
52. The URRC will address several of the common matters in this portion of the report rather than repeat them in its examination of each application.
    * 1. COMMON MATTERS – ARCTIC ENERGY FUND PROGRAM
53. QEC submitted that each of the four applications/projects should qualify for funding under the AEF program. Obviously, the AEF program funding of 75 percent of the eligible cost of these projects would be a significant benefit to QEC and its customers. The URRC explored this area and the associated risks to QEC further. In addition to information in the Applications, the URRC followed up with IRs to assess QEC’s controls and to better understand the timing of the AEF application and approval, payment mechanism (and the associated working capital requirement).
54. The URRC wanted to assess the controls that have been added to avoid a similar situation to the Arctic Bay denial for AEF funding. QEC appears to have revised its governance process and controls to ensure that future AEF funding is not jeopardized. The URRC considers these changes to be a positive development. QEC appears to have formalized the controls, requirements and timing of approvals and any subsequent contracts that are to be signed or expenditures made (as per the response to URRC‑QEC-1).
55. QEC stated that the AEF payment mechanism is well known and that the delay between expenditures and reimbursement is minimal. The URRC notes that combined AEF funding for the four applications is almost $95 million, spread over a few years. However, QEC did not appear to be unduly concerned about any cash flow or working capital implications. Based on QEC’s statements, the URRC considers that any future requirements for changes to QEC’s debt or credit facilities could be addressed in a subsequent application such as a General Rate Application (GRA), if necessary.
56. QEC submitted that it was working to utilize the entire $175 million in AEF funding prior to the March 31, 2028 end date for the program. The URRC understands QEC’s decision to address this as a key priority. Further, the URRC considers that it would be helpful to have reporting regarding the AEF funds used, proposed/applied for, as well as plans for potential projects that would make use of the remaining funds. This information should be part of QEC’s corporate strategic planning process and made available to the Minister Responsible and in the next GRA. In particular, URRC wishes to understand how any cost overruns may be addressed with the funding available through AEF and whether such costs would be shared on the same basis (75:25) between the federal government and QEC or whether these would need to be borne strictly by QEC and ultimately by ratepayers.
    * 1. COMMON MATTERS – GOVERNANCE AND STAFFING
57. QEC stated its view that its governance process and staffing is adequate to handle the four applications concurrently. The URRC notes that the IR responses provided some clarification regarding senior management positions, as well as the internal/external staffing resources that will be used by QEC. QEC indicated that there is sufficient staffing/resources in place to handle the projects concurrently and provided details about the in-house and external resources it planned to use for the various project stages.
58. The URRC notes the changes that QEC has made and the details QEC has provided about its governance and staffing/resources. While the URRC is hopeful that QEC’s efforts are adequate, the URRC considers that it may be of assistance to the Minister Responsible to have more information regarding the previous cost overruns and delays experienced by QEC for recent MPPA projects. The URRC is not aware of any post‑completion reviews or assessments regarding those projects. Without a good understanding of the reasons for past delays, cost overruns, and corrective measures to address these same issues in the future, the URRC remains concerned about QEC’s capacity to simultaneously manage four large, complex projects.
59. With respect to establishing QEC’s ability to undertake these major projects, the URRC considers that it may be appropriate for QEC to have its ability to simultaneously manage four large projects assessed by an independent third party with a focus on identifying and mitigating areas of weakness and/or risks. The URRC considers that independent oversight and timely reporting would increase the likelihood of completing the four projects on time and on budget.
    * 1. COMMON MATTERS – PROJECT MANAGEMENT AND COST CONTROLS
60. Further to the previous section regarding QEC’s governance and staffing, the URRC explored the potential risks related to project management and cost controls. The URRC notes that QEC seems to be confident in its ability to manage the projects concurrently and control costs. This is evident in QEC’s responses to the URRC’s IRs. QEC considers its combined/concurrent approach to be preferable than doing projects in a staggered approach. Further, QEC considers that a single contract is preferable to separate contracts for each power plant.
61. Notwithstanding QEC’s confidence, the URRC notes that there is the potential for both benefits and risks of dealing with a single consultant and construction contractor. Some of these may be addressed by the URRC’s recommendation for an independent assessment of QEC’s ability to plan and execute the project(s) as applied for.
62. The URRC also considers that regular reporting of progress and costs, compared to set project milestones, is critical to the success of these projects.
63. The URRC considers that the benefits associated with using a single planning, methodology and timeline may be achievable. The URRC also notes QEC’s view that the risk of a concurrent approach is less than with a staggered approach.
64. The URRC accepts QEC’s concurrent approach to the four projects, however, the URRC considers that there should be a timely mechanism to report on possible time delays or cost overruns. The URRC recommends that QEC report to the Minister as soon as it is aware of any forecast cost overrun of greater than 25 percent of the applied-for cost for any of the four projects.
    * 1. COMMON MATTERS – PROJECT TIMING AND PLANNING HORIZON
65. The URRC notes that the timing of the three new power plant applications may have limited the options available to QEC. The URRC agrees that there is some urgency to address potential reliability issues at all three sites, but considers that this may have been the case for some time now. In this regard, the URRC considers that waiting to address the problems may have limited the available options (particularly the ability to redeploy units from one site to another). From QEC’s responses to IRs, it is unclear what QEC’s plans are for the newer and lower operating hour units that will be removed from operation at the three sites.
66. The URRC understands that it may not be possible for QEC to definitively state what is feasible for each unit until its condition is fully known. QEC stated that some units may be kept as emergency spares, but did not make commitments beyond that. The URRC considers that QEC should include information about generating units removed from power plants. It is recommended that this information be included as related material as part of QEC’s planning process at the time of the next GRA to confirm that redeployment is being carefully considered.
67. The URRC is concerned that there is limited transparency in the planning horizon regarding QEC’s capital assets. The URRC notes that the age and state of deterioration at the three sites must have been known and present for some time. Similarly, the engine operating hours should be relatively predictable and easily forecast with some degree of certainty well in advance of the units exceeding their retirement limits. The URRC considers that while it is not possible to forecast when a genset will fail, QEC should have a good understanding of how the “normal” engine operating hours will accumulate at its power plants.
68. The URRC expects that given the age of many of the other power plants in QEC’s service territory, there are other urgent needs. In this regard, the URRC considers that waiting to apply for MPPA approval may limit QEC’s options to make improvements in an orderly and cost-effective basis. It also limits QEC’s opportunities to consider redeployment of newer and lower operating hour units from other sites. It may also limit QEC’s ability to undertake major projects in a more staggered approach.
69. The URRC recommends that QEC should advise the Minister of its plans and timing to improve or replace the power plants at the remaining communities that have power plants more than 40 years old in order that redeployment opportunities can be properly assessed. This information should also be provided in the next GRA as supplemental information stemming from those plans and assessments.
    * 1. COMMON MATTERS – DISMANTLING AND ENVIRONMENTAL REMEDIATION
70. The URRC notes that the Applications contained only limited information about QEC’s plans to address the dismantling of old power plant sites or the environmental remediation of those sites. This matter was pursued in the URRC’s IRs. QEC’s response to URRC IR2-QEC-4a suggests that “the common practice is not to remediate the sites as they are already deemed industrial. Typically, only dismantling of the assets occurs.”
71. The URRC notes that QEC described the buildings and foundations at the three old power plant sites as being in poor condition. In this regard, the URRC questions the safety and potential liability if these sites are repurposed.
72. QEC’s response to URRC IR2-QEC-4c suggests that QEC will remove the fuel systems within two years of shutting down the old plants. The old plants would then be decommissioned including removal of gensets, mechanical and electrical equipment, as well as all other equipment from the building. QEC stated in the response to URRC IR2-QEC-4a that it intended to keep the sites for storage purposes, which presumably defers any need to remediate the sites to a date well into the future. The URRC notes that dismantling work would likely not commence until sometime after 2026/27. Further, QEC may keep the old plants largely in place well after 2028 if their primary focus is only on dismantling and removing the fuel systems.
73. The URRC considers that at a minimum these dismantling costs should be estimated, along with any remediation costs QEC expects to incur to determine whether or not the costs are material. The URRC recommends including details about QEC’s plans and a forecast of the costs in its next GRA and also recommends that QEC examine its liability for these repurposed buildings that have unacceptable structural issues. The above information should be provided as information supplemental to QEC’s next GRA.
    * 1. COMMON MATTERS – FINANCIAL AND RATE EFFECTS
74. The URRC notes that QEC provided estimates of the capital requirements for each project along with the forecast rate effects. QEC stated that the capital expenditures (net of AEF funding) could be met with its currently available working capital, cash flow and credit lines/long-term debt arrangements.
75. The URRC agrees with QEC’s assessment that the rate effects do not appear to be out of line. QEC must provide safe and reliable service at just and reasonable rates. In the subject MPPAs, the forecast rate increases appear to be reasonable, subject to other recommendations in this report. The URRC will assess each application in more detail. Regardless, the reasonableness of the capital expenditure estimates/actuals and associated rate effects will be addressed in more detail in QEC’s next applicable GRA.
    * 1. COMMON MATTERS – FUEL STORAGE – ROLES AND RESPONSIBILITIES
76. The QEC provided a justification for the bulk fuel storage needed at the Cambridge Bay site. QEC’s reasons focused on the lack of storage available from the PPD. The URRC notes that the fuel storage at the other two sites was significantly different, and appreciates QEC’s responses to the IRs about this matter.
77. The URRC notes that the roles, responsibilities and costs associated with bulk and nominated fuel storage needed for QEC power plants is significant. The URRC notes from the IR responses that there appears to be overlapping roles and responsibilities for the planning and construction of fuel storage between QEC and the PPD.
78. The URRC would like to better understand the cost implications to QEC customers associated with fuel storage. The URRC notes that there are both capital and operating costs and considers this matter to be important. It would assist the URRC if more information was provided in the next GRA regarding the decision to have fuel storage provided by QEC versus the PPD, or some combination of the two.
    * 1. COMMON MATTERS – RENEWABLE POWER
79. QEC submitted that the three new power plants would be capable of integrating renewable energy sources, such as wind turbines or solar panels, should opportunities arise in the future. The URRC also notes that in response to IRs QEC referred to its plans to enable the integration of renewable power via other programs such as net‑metering, Commercial and Institutional Power Producers (CIPP) and Independent Power Producers (IPP).
80. The URRC notes that the development and investment in renewable power by QEC has not been the preferred approach. QEC stated that its preferred approach is to enable others to develop and invest in renewable generation and to connect them to QEC’s systems. The URRC notes that this appears to align with GN policy and the approach taken in many other jurisdictions.
81. The URRC notes that the one public submission that was made dealt with renewable power. It was suggested that QEC should be developing renewable generation instead of diesel generation.
82. The URRC notes QEC’s statements in these applications and in previous applications that diesel generation is currently the only reliable source of electricity available which is particularly critical in view of the harsh conditions in the territory and the remoteness of each community necessitating standalone power plants. The URRC also notes that QEC has taken some steps to enable the development of renewable power by others.
83. The URRC considers that the current projects using diesel-fuelled generation are long-lived (typically 40 years, plus or minus) which may either lock in QEC to diesel, or result in stranded assets if QEC goes another direction in the future. The URRC notes that the development of renewables will be the subject of future applications, such as CIPP and IPP. The URRC considers those future applications to be a better venue for consideration of this matter, since the only viable reliable generation systems at this time rely on diesel‑fuelled generation.
    * 1. COMMON MATTERS – AIR AND NOISE EMISSIONS
84. The URRC asked QEC for further information about its planned installation of equipment to address air and noise emissions from its new power plants, and the replacement genset in Iqaluit. The questions were similar to those made in the Arctic Bay MPPA. QEC provided cost estimates for the industrial scrubbers (air emissions) in the Arctic Bay IR responses, but did not provide a cost estimate for the hospital grade silencers.
85. The URRC asked additional questions to obtain a better understanding of the costs and benefits associated with the proposed equipment. The URRC also sought to better understand the statement in the Iqaluit application that the exhaust scrubber would reduce carbon dioxide produced by the replaced genset.
86. The URRC appreciates QEC’s responses to the IRs regarding the air and noise reduction equipment. The incremental cost of the industrial exhaust scrubbers compared to some lesser version appears to be justified. The URRC also understands that the reductions in carbon dioxide are due to increased fuel efficiency and not to some form of carbon capture. The air quality benefits associated with these expenditures seem to be justified.
87. The URRC also has a better understanding of the incremental cost of the hospital grade silencers. The URRC now understands that the incremental cost of the noise equipment compared to a traditional silencer appears to be justified in order to meet a reasonable noise level. The URRC considers that the costs and benefits associated with these types of investments/expenditures should be quantified whenever possible. The incremental investment of $20,000 per genset appears to be reasonable to achieve a 40-decibel noise level although QEC did not clarify what distance that noise level applied to. The information suggested that QEC consider the noise level at 800 metres from the power plant, and if that is what QEC estimated, the noise level should be acceptable to residents.
    * 1. COMMON MATTERS – APPLICATION COMPLETENESS REGARDING THE ASSESSMENT OF NEED AND FACILITY OPTIONS
88. The URRC notes that the Applications contained very limited information regarding the specific need in each community and the viable options for addressing need. In recent MPPA applications, QEC’s approach (for the most part) has been to state what the problem with the current facilities is (e.g., deterioration of the buildings/infrastructure, generating units etc.), but then not specifically provide an analysis to support the capacity or operational requirements (i.e., in terms of RFC, IFC or any other operational criteria QEC considers relevant). The URRC notes that information regarding population growth, and the associated peak load was provided in the applications and IR responses, however, QEC did not provide much detail about the actual need it was targeting.
89. The URRC also notes that QEC’s “standard” approach to meeting the vaguely defined need has usually been to present a “do-nothing” option, perhaps another option that is not viable, and the preferred option. The URRC is usually provided with only one viable option, and little else to review or consider. The only exception to the above approach was the Iqaluit application which did have a second viable option to replace genset G4 with a differently sized unit.
90. The URRC considers that the combination of a vaguely defined need and minimal viable options or alternatives to meet that need leave the URRC with few options. The URRC’s approach has been to ask for more information about the application and/or to ask about other options or alternatives that QEC may have considered. The responses have not contributed fully to URRC’s understanding of the decision process that QEC has followed in preparing their applications. The URRC does not consider QEC’s standard approach as set out above to be best practice in terms of application content.
91. The URRC notes from QEC’s IR responses that additional information and transparency at the application stage could drastically improve the URRC’s understanding of QEC’s rationale and proposed project(s). A well-defined need in terms of size, load variability and duration, time frame and other operational requirements would greatly assist the URRC, particularly when considering the various options to address the need.
92. The URRC considers that there must be several viable options for meeting the need at each community. The URRC notes from the three new power plant applications that there are four- and five- engine solutions, as well as numerous ratings for the proposed gensets in each power plant (e.g., 550, 850, 900, 950, 1,100, 1,350 kW and much larger units). QEC has typically applied for a single IC and IFC noting that its dispatch programming is set at 80 percent of capacity of each engine to ensure reliability and good fuel economy.
93. The URRC notes that power plant design and configuration may have elements of both “art and science,” however, the current applications have provided little information that would enhance the URRC’s understanding of QEC’s rationale for its proposed options.
94. The URRC also notes that the proposed options in each of the three new power plants is for all of the capacity needed to meet the communities’ needs in the longer term although the plant gensets seem to reach the end of their useful lives prior to the timing used by QEC in its applications. The URRC appreciates that this may be a good approach, but notes that it may limit QEC’s ability to optimize the amount of capital it spends in other communities. The URRC recommends that future MPPA applications provide an assessment of other feasible approaches. For example, future power plant applications could be based on long term forecast needs, but provide flexible approaches for meeting those needs as they change.
    1. CAMBRIDGE BAY
       1. CAMBRIDGE BAY – NEED FOR THE PROJECT
95. The URRC notes the stated need to address the condition of the 63-year-old Cambridge Bay power plant and the associated reliability, environmental and safety concerns. The URRC explored the need to address the deficiencies of the existing power plant in more detail through IRs. The responses by QEC clarified several aspects of the Application related to need that were of interest to the URRC.
96. QEC stated in the Application that the existing power plant had capacity to meet Cambridge Bay’s peak load projections for the foreseeable future. QEC provided population and peak load projections in the Application. The URRC accepts that the existing power plant would meet QEC’s RFC criterion until about 2048/49 if the plant’s deficiencies could be addressed.
97. QEC identified a number of deficiencies with the existing power plant in the Application and IR responses. The URRC notes that:
    * + 1. Condition of plant – the existing plant was constructed in 1958 and the 63-year-old facility suffers from various deficiencies. QEC submitted that the existing switchgear is not arc flash resistant which increases the fire and safety risk of the facility. QEC provided more details in the response to URRC IR1-QEC-6 along with photographs of the degraded portions of the facility. QEC stated that the “existing structures violate current national building codes and QEC Operations and Safety standards.”
        2. Buildings – the building structure is in poor condition and with no room for expansion. The foundation is heaving and shifting, creating a strain on piping and other equipment/systems. It would be useful to know if there was a flaw in the design or installation of the foundation, or if the expected useful life of this facility is in the range of 40 to 50 years due to the soil, topography and weather conditions at the site.
        3. Generating units – QEC provided the age and operating hours of the existing units. They are all relatively new with low operating hours.
        4. Fuel storage – the fuel storage tank is single-walled and the berm housing the tank is degraded. QEC implied that the fuel storage equipment does not meet current environmental codes and standards.
        5. Load growth and reliability – demand at Cambridge Bay is increasing. QEC forecast RFC based on forecast population growth. The current IFC would continue to meet the forecast RFC until about 2048/49. The System Average Interruption Duration Index (SAIDI)/System Average Interruption Frequency Index (SAIFI) information provided in response to URRC IR1-QEC-3i does not paint the picture of poor reliability. Instead, QEC stated in that IR response that “plant replacement decision for these communities is based on condition, not on reliability statistics.”
        6. QEC quantification and details regarding need – QEC did not quantify or provide details regarding need other than to state that a more safe and reliable power plant was required.
98. The URRC notes that there is a risk of failure due to the condition of the building and foundation, however, those problems have been addressed to date using supports/jacks and other types of stabilizers. The repair/maintain solution appears to be a low-cost solution, since the generating units are all relatively “healthy.” It is not clear how long the “aging infrastructure” problem has existed or why QEC would have invested in new units in the past four/five years at a degraded site.
99. Notwithstanding previous decisions to maintain and upgrade the power plant, the URRC accepts that the condition of the existing power plant, with the exception of the gensets themselves, is approaching the end of its useful life. QEC has provided enough information to demonstrate that the condition of the power plant could reduce its ability to continue to operate reliably in the near future and could at a minimum present a safety risk to employees.
100. In view of the foregoing, the URRC agrees with QEC that doing nothing is not an option. The power plant facility, including the foundation, buildings, fuel storage tanks, major electrical equipment and infrastructure do not appear to be capable of continuing to provide safe and reliable service to Cambridge Bay.
101. The URRC notes that QEC did not quantify or provide details regarding the need other than to state that there is a need to improve the reliability of the Cambridge Bay power plant. The need was not specified in terms of the amount of IC and IFC, or if all of the existing 4,950 kW IC and 3,850 kW IFC is required in the short to medium term. The URRC concludes that the capacity available would be sufficient to meet the peak load requirement for the longer term if it weren’t for the safety and reliability concerns of the building.
     * 1. CAMBRIDGE BAY – ALTERNATIVE OPTIONS TO MEET THE NEED
102. QEC presented two project options for the purposes of the Application, however, the option to upgrade and replace major components and systems within the existing facility was not considered to be a viable option. QEC stated that the upgrade and replacement option was not technically feasible for the reasons previously stated, being mainly due to age and deterioration of equipment/structure and the small footprint of the plant site. The URRC agrees that the upgrade and replacement option at the existing plant site is not a reasonable and prudent approach.
103. The URRC notes that QEC only provided one other viable option in the Application. The URRC explored this option further via IRs, and was not provided with any other viable options to consider.
104. The URRC has the following observations about the option applied for by QEC:
     * + 1. Size and configuration (proposed IFC) – the IFC increased from 3,850 kW to 4,150 kW, which extends the RFC/IFC test from 2048/49 to 2052/53. The current RFC is only 2,400 to 2,500 kW, so is all 4,150 kW of IFC required in the short to medium term?
         2. Timing – the timing to do something appears to be relatively urgent due to the condition of the building/infrastructure and foundation.
         3. Siting/location – the proposed location appears to be an upgrade to the existing location. It is away from the residences and is much closer to the PPD facility. Further, with the proposed new fuel storage and pipeline there is no need to truck fuel to the power plant.
         4. Other electrical facilities – the new facilities should improve reliability and safety. They should also make it easier to incorporate renewable generation at some time in the future.
         5. Fuel storage – the new storage facilities will provide adequate bulk storage as well as a pipeline to access the nominated fuel needed. This should reduce the cost to QEC and reduce the risk associated with handling and trucking fuel. The new storage facilities should also be compliant with environmental requirements.
105. The URRC notes that the proposed alternative meets the general need stated by QEC. As previously noted, the URRC does not have enough information to comment on whether or not it is the only viable solution. Further, there was no information or response by QEC that would shed light on how the Cambridge Bay project ranks in priority compared to the other three projects, or others that were not referred to but were considered by QEC.
106. The URRC notes that this project proposes to replace generating units that appear to have many remaining operating hours, and that the proposed solution provides much more IFC than the current RFC, and will for quite some time. It is not clear how much of the capital expenditures “saved or deferred” at Cambridge Bay could be directed to another site with urgent needs. QEC stated that it “recognizes the need for a long‑term approach to prioritize and maximize the benefit of capital expenditures while providing safe and reliable electricity service.”
107. The URRC also notes that the possibility of phasing in some of the new capacity was not addressed in the Application or IR responses. QEC stated that its concerns related to the timing and end date for funding from the AEF program. The URRC accepts that QEC’s current planning appears to focus on maximizing the use of the AEF program in the near term, but considers that future planning could assess replacements and expansions that match local demand in stages, rather than an immediate installation that provides for long-term forecast demand. The URRC has concerns about the reliability of a genset installed in year one of a project to meet the needs of a community in years 30 to 40. It would be useful to know how both age (as it relates to degradation, obsolescence and access to replacement parts) and operating hours affect the reliability of a genset. It would also be useful to know if staging capacity expansions would enable QEC to address issues in more communities in a timely and cost-effective manner.
108. The URRC notes that QEC’s preferred option would involve the construction of a new power plant at a location outside the community. As previously stated, it would consist of a five-engine generation facility designed for a 40-year life, with IC of 5,500 kW, and IFC of 4,150 kW that would improve reliability, efficiency, operation and safety. The new facility would also include fuel storage consisting of a 90,000‑litre double-wall horizontal tank and two two-million-litre vertical tanks, an approximately 400-metre fuel pipeline to connect to the PPD facility with pumping facilities, a concrete pad for transformer storage, pole racks, berms for used oil, and other buildings and storage. QEC would also require approximately two kilometres of distribution lines.
109. The URRC notes that the IFC of 4,150 kW exceeds the forecast peak load until almost the year 2058 (based on the response to URRC IR2-QEC-6), and the IFC exceeds the RFC until about 2053. Given that Cambridge Bay is a growing community and the plant is being built for long-term use, the URRC accepts that the proposed power plant capacity is reasonable on a long-term basis.
110. The URRC accepts that a five-engine design provides additional flexibility for operation and maintenance. However, the costs/benefits of other design options or staged configurations of larger and smaller gensets were not provided for the URRC’s consideration and may have enabled QEC to address needs in other communities.
111. The URRC notes that QEC provided information about the effects of the proposed power plant on its forecast capital expenditures, working capital requirements, and rates. The URRC agrees that the forecast increase in rates appears to be reasonable but will consider this matter further in the context of a GRA. Similarly, the forecast capital expenditures and working capital requirements appear to be reasonable – before and after funding is received from the AEF program. However, due to the size of the project, the URRC would be concerned if the federal funding was not in place as described in the Application and IR responses. The URRC is also interested in the competitiveness of the tender process and the likelihood that QEC will receive reasonable bids.
112. The URRC notes that QEC plans to complete the new power plant in 2025/26. The URRC agrees that this target date is desirable based on the need, as discussed earlier in this report.
113. The URRC notes that QEC intends to remove the fuel systems equipment within two years of ceasing operations. The URRC is interested in updates about the progress and forecast cost of this and other remedial work and requests it be included in the next GRA.
114. The URRC agrees that QEC’s preferred option is a reasonable option based on the information and assumptions provided in the Application. It will improve safety and reliability, comply with environmental regulations, improve air quality and reduce the noise level.
115. In view of all of the above, the URRC recommends that QEC be approved to proceed with the project as requested. The URRC recommends that QEC include consideration of the following, among others:
     * Sound financial and project management controls should be in place to optimize/minimize the cost of the new power plant and ensure that the project’s timelines are met.
     * Provide information about the deterioration of the foundation at the existing Cambridge Bay site and details about the design life of the foundation proposed at the new site. The URRC considers it would be useful to know more about the expected life of the foundation because it appears to limit the life of the power plant regardless of the condition of the gensets, buildings and ancillary equipment. To this end, the URRC recommends that QEC retain an engineering company with experience in the local soil, topography and weather conditions and utilize design criteria that will assure that foundation deterioration will not repeat itself at the new site.
     * Provide information to the URRC about the detailed plans, cost and status of the cleanup at the existing power plant and any redeployment/reutilization of the gensets in the next GRA.
     * If QEC is unable to access funding from the AEF program as stated in the Application and IR responses, that the Minister instruct the corporation to prepare and submit a new MPPA for approval as the loss of the funding would be considered a significant change.
     * That QEC review the options available once the bids have been received with a view to reconsidering the project, if the bid costs vary materially from the initial estimate of $50.237 million and advise the Minister of its conclusions. The URRC considers a variance greater than 25 per cent from the initial estimate to be material.
     1. GJOA HAVEN
        1. GJOA HAVEN – NEED FOR THE PROJECT
116. The URRC notes the stated need to address the condition of the 44-year-old Gjoa Haven power plant and the associated reliability, environmental and safety concerns. The URRC explored the need to address the deficiencies of the existing power plant in more detail through IRs. The responses by QEC clarified several aspects of the Application related to need that were of interest to the URRC.
117. QEC stated in the Application that the existing power plant had capacity to meet Gjoa Haven’s peak load projections for the foreseeable future. QEC provided population and peak load projections in the Application. The URRC accepts that the existing power plant would meet QEC’s RFC criterion until about 2046/47.
118. QEC identified a number of deficiencies with the existing power plant in the Application and IR responses. The URRC notes that:
     * + 1. Condition of plant – the existing plant was constructed in 1977 (or perhaps 1974 as per the response to URRC IR1-QEC-13b) and the 44-year-old facility suffers from various deficiencies. QEC submitted that the existing switchgear is not arc flash resistant which increases the fire and safety risk of the facility. QEC provided more details in the response to URRC IR1-QEC-13 along with photographs of the degraded portions of the facility. QEC stated that the foundation and building are in poor condition.
         2. Buildings – the building structure is in poor condition and with no room for expansion. The foundation is heaving and shifting, creating a strain on piping and other equipment/systems. The URRC notes that the deterioration of the foundation at the Gjoa Haven plant appears to be similar to what has occurred in the other older plants. It would be useful to know if there was a flaw in the design or installation of the foundation, or if the expected useful life of the facility is in the range of 40 to 50 years due to the soil, topography and weather conditions at the site.
         3. Generating units – QEC provided the age and operating hours of the existing units. Genset G1 (the largest unit) was identified as exceeding its retirement usage limit. The other three units are similarly sized and have far fewer engine operating hours. The oldest of the three (genset G3) was installed in 2009, and has less than 45,000 engine hours.
         4. Fuel storage – the fuel storage tank is single-walled and the berm housing the tank is degraded. QEC stated that the fuel storage equipment does not meet current environmental codes and standards.
         5. Load growth and reliability – demand at Gjoa Haven is increasing. QEC forecast RFC based on forecast population growth. The current IFC would continue to meet the forecast RFC until about 2046/47. The SAIDI/SAIFI information provided in response to URRC IR1-QEC-3i does not paint the picture of poor reliability. Instead QEC stated in that IR response that “plant replacement decision for these communities is based on condition, not on reliability statistics.”
         6. QEC quantification and details regarding need – QEC did not quantify or provide details regarding need other than to state that a more safe and reliable power plant was required.
119. The URRC notes the condition of the power plant facilities and genset G1. It appears that there is a need to address the reliability risks at Gjoa Haven and to address the condition of the current facilities. As with the other projects, the need from a generator capacity perspective was not quantified, nor were other operational considerations specified.
120. The URRC notes that there is a risk of failure due to the condition of genset G1, and the building and foundation, however, some of those problems have been addressed to date using supports/jacks and other types of stabilizers. The repair/maintain solution appears to have been a low-cost solution, when the generating units were all relatively “healthy.” It is not clear how long the “aging infrastructure” problem has existed.
121. Notwithstanding previous decisions to maintain the power plant, the URRC accepts that the condition of the existing power plant, including genset G1, is approaching the end of its useful life. QEC has provided enough information to demonstrate that the condition of the power plant could reduce its ability to meet the needs of the community in the near future.
122. In view of the foregoing, the URRC agrees with QEC that doing nothing is not an option. The power plant facility, including genset G1, the foundation, buildings, fuel storage tanks, major electrical equipment and infrastructure do not appear to be capable of continuing to provide safe and reliable service to Gjoa Haven.
123. The URRC notes that QEC did not quantify or provide details regarding need other than to state that there is a need to improve the reliability of the Gjoa Haven power plant. The need was not specified in terms of the amount of IC and IFC, or if all of the existing 2,320 kW IC and 1,600 kW IFC is required in the short to medium term.
     * 1. GJOA HAVEN – ALTERNATIVE OPTIONS TO MEET THE NEED
124. QEC presented two project options for the purposes of the Application, however, the option to upgrade and replace major components and systems within the existing facility was not considered to be a viable option. QEC stated that the upgrade and replacement option was not technically feasible for the reasons previously stated, being mainly due to age and deterioration of equipment and the small footprint of the plant site. The URRC agrees that the upgrade and replacement option at the existing plant site is not a reasonable and prudent approach.
125. The URRC notes that QEC only provided one viable option in the Application. The URRC explored this option further via IRs, and was not provided with any other viable options to consider.
126. The URRC has the following observations about the option applied for by QEC:
     * + 1. Size and configuration (proposed IFC) – the IFC increased from 1,600 kW to 2,000 kW, which extends the RFC/IFC test from 2046/47 to 2065/66. The current RFC is only about 1,200 kW, so is all 2,000 kW of IFC required in the short to medium term?
         2. Timing – the timing to do something appears to be relatively urgent due to the condition of the building/infrastructure and foundation.
         3. Siting/location – the proposed location appears to be an upgrade to the existing location. It is away from the residences and is much closer to the PPD facility. Further, with the proposed new fuel storage and pipeline there is no need to truck fuel to the power plant.
         4. Other electrical facilities – the new facilities should improve reliability and safety. They should also make it easier to incorporate renewable generation at some time in the future.
         5. Fuel storage – the new storage facilities will provide adequate storage as well as a pipeline to access the fuel needed. This should reduce the cost to QEC and reduce the risk associated with handling and trucking fuel. The new storage facilities should also be compliant with environmental requirements.
127. The URRC notes that the proposed project meets the general need stated by QEC. As previously noted, the URRC does not have enough information to comment on whether or not it is the only viable solution. Further, there was no information or response by QEC that would shed light on how the Gjoa Haven project ranks in priority compared to the other three projects, or others that were not referred to but were considered by QEC.
128. The URRC notes that this project proposes to replace two generating units that appear to have many remaining operating hours, and that the proposed solution provides much more IFC than the current RFC, and will for quite some time. It is not clear how much of the capital expenditures “saved or deferred” at Gjoa Haven could be directed to another site with urgent needs. QEC stated it “recognizes the need for a long-term approach to prioritize and maximize the benefit of capital expenditures while providing safe and reliable electricity service.”
129. The URRC also notes that the possibility of phasing in some of the new capacity was not addressed in the Application or IR responses. QEC stated its concerns related to the timing and end date for funding from the AEF program. The URRC accepts that QEC’s current planning appears to focus on maximizing the use of the AEF program in the near term, but considers that future planning could assess replacements and expansions that match local demand in stages, rather than an immediate installation that provides for long-term forecast demand. The URRC has concerns about the reliability of a genset installed in year one of a project to meet the needs of a community in years 30 to 40. It would be useful to know how both age (as it relates to degradation, obsolescence and access to replacement parts) and operating hours affect the reliability of a genset. It would also be useful to know if staging capacity expansions would enable QEC to address issues in more communities in a timely and cost-effective manner.
130. The URRC notes that QEC’s preferred option would involve the construction of a new power plant at a location outside the community. As previously stated, it would consist of a four-engine generation facility designed for a 40-year life, with IC of 3,100 kW, and IFC of 2,000 kW that would improve reliability, efficiency, operation and safety. The new facility would also include fuel storage consisting of two 90,000‑litre double-wall horizontal tanks, an approximately 200-metre fuel pipeline to connect to the PPD facility with pumping facilities, a concrete pad for transformer storage, pole racks, berms for used oil, and other buildings and storage. QEC would also require upgrades to its distribution lines.
131. The URRC notes that the IFC of 2,000 kW exceeds the forecast peak load beyond the year 2066 (based on the response to URRC IR2-QEC-6), and the IFC exceeds the RFC until sometime between the years 2065 and 2066. Given that Gjoa Haven is a growing community and the plant is being built for long-term use, the URRC accepts that the proposed power plant capacity is reasonable on a long-term basis.
132. The URRC accepts that a four-engine design provides additional flexibility for operation and maintenance. However, the costs/benefits of other design options or configurations of larger and smaller gensets were not provided for the URRC’s consideration.
133. The URRC notes that QEC provided information about the effects of the proposed power plant on its forecast capital expenditures, working capital requirements, and rates. The URRC agrees that the forecast increase in rates appears to be reasonable, but will consider this matter further in the next GRA. Similarly, the forecast capital expenditures and working capital requirements appear to be reasonable – before and after funding is received from the AEF program. However, due to the size of the project, the URRC would be concerned if the federal funding was not in place as described in the Application and IR responses. The URRC is also interested in the competitiveness of the tender process and the likelihood that QEC will receive reasonable bids.
134. The URRC notes that QEC plans to complete the new power plant in 2025/26. The URRC agrees that this target date is desirable based on the need, as discussed earlier in this report.
135. The URRC notes that QEC intends to remove the fuel systems equipment within two years of ceasing operations. The URRC is interested in updates about the progress and forecast cost of this work and expects that this information will be provided in the next applicable GRA.
136. The URRC agrees that QEC’s preferred option is a reasonable option based on the information and assumptions provided in the Application. It will improve safety and reliability, comply with environmental regulations, improve air quality and reduce the noise level.
137. In view of all of the above, the URRC recommends that QEC be approved to proceed with the project as requested. The URRC recommends that QEC include consideration of the following, among others:
     * Sound financial and project management controls should be in place to optimize/minimize the cost of the new power plant and ensure that the project’s timelines are met.
     * Provide information about the deterioration of the foundation at the existing Gjoa Haven site and details about the design life of the foundation proposed at the new site. The URRC considers it would be useful to know more about the expected life of the foundation because it appears to limit the life of the power plant regardless of the condition of the gensets, buildings and ancillary equipment. To this end, the URRC recommends that QEC retain an engineering company with experience in the local soil, topography and weather conditions and utilize design criteria that will assure that foundation deterioration will not repeat itself at the new site.
     * Provide information to the URRC about the detailed plans, cost and status of the cleanup at the existing power plant and any redeployment/reutilization of the gensets in the next GRA.
     * If QEC is unable to access funding from the AEF program as stated in the Application and IR responses, that the Minister instruct the corporation to prepare and submit a new MPPA for approval as the loss of the funding would be considered a significant change.
     * That QEC review the options available once the bids have been received with a view to reconsidering the project, if the bid costs vary materially from the initial estimate of $36.274 million and advise the Minister of its conclusions. The URRC considers a variance greater than 25 per cent from the initial estimate to be material.
     1. IGLOOLIK
        1. IGLOOLIK – NEED FOR THE PROJECT
138. The URRC notes the stated need to address the condition of the 47-year-old Igloolik power plant and the associated reliability, environmental and safety concerns. The URRC explored the need to address the deficiencies of the existing power plant in more detail through IRs. The responses by QEC clarified several aspects of the Application related to need that were of interest to the URRC.
139. QEC stated in the Application that the existing power plant did not have capacity to meet Igloolik’s peak load projections in the next few years. QEC provided population and peak load projections in the Application. The URRC accepts that the existing power plant would not meet QEC’s RFC criterion by 2022/23.
140. QEC identified a number of deficiencies with the existing power plant in the Application and IR responses. The URRC notes that:
     * + 1. Condition of plant – the existing plant was constructed in 1974 and the 47-year-old facility suffers from various deficiencies. QEC submitted that the existing switchgear is not arc flash resistant which increases the fire and safety risk of the facility. QEC provided more details in the response to URRC IR1-QEC-9 regarding the degraded portions of the facility. QEC stated that the building infrastructure and ancillary equipment are in poor condition.
         2. Buildings – the building structure is in poor condition and with no room for expansion. The foundation is heaving and shifting, creating a strain on piping and other equipment/systems. It would be useful to know if there was a flaw in the design or installation of the foundation, or if the expected useful life of the facility is in the range of 40 to 50 years due to the soil, topography and weather conditions at the site.
         3. Generating units – QEC provided the age and operating hours of the existing gensets. Genset G3 (the largest unit) was identified as exceeding its retirement usage limit, while genset G2 was approaching its retirement usage limit. The other two gensets were newer with fewer engine hours.
         4. Fuel storage – the fuel storage tank is single-walled and the berm housing the tank is degraded. QEC stated that the fuel storage equipment does not meet current environmental codes and standards.
         5. Load growth and reliability – demand at Igloolik is increasing. QEC forecast RFC based on forecast population growth. The current IFC would only continue to meet the forecast RFC until about 2022/23. The SAIDI/SAIFI information provided in response to URRC IR1-QEC-3i does not paint the picture of poor reliability. Instead QEC stated in that IR response that “plant replacement decision for these communities is based on condition, not on reliability statistics.”
         6. QEC quantification and details regarding need – QEC did not quantify or provide details regarding need other than to state that a more safe and reliable power plant was required.
141. The URRC notes the condition of the power plant facilities and gensets G2 and G3. It appears that there is an urgent need to address the reliability risks at Igloolik and to address both the capacity and the condition of the current facilities. As with the other projects, the need was not quantified.
142. The URRC notes that there is a risk of failure and insufficient capacity due to the condition of genset G3 (and potentially genset G2), and the condition of the building and ancillary equipment. It is not clear how long the “aging infrastructure” problem has existed.
143. Notwithstanding previous decisions to maintain the power plant, the URRC accepts that the condition of the existing power plant, including genset G3, is approaching the end of its useful life. QEC has provided enough information to demonstrate that the condition of the power plant could reduce its ability to meet the needs of the community in the very near future.
144. In view of the foregoing, the URRC agrees with QEC that doing nothing is not an option. The power plant facility, including genset G3, the foundation, buildings, fuel storage tanks, major electrical equipment and infrastructure do not appear to be capable of continuing to provide safe and reliable service to Igloolik.
145. The URRC notes that QEC did not quantify or provide details regarding need other than to state that there is a need to improve the capacity and reliability of the Igloolik power plant. The need was not specified in terms of the amount of IC and IFC, or how much more than the existing 2,370 kW IC and 1,520 kW IFC is required in the short to medium term.
     * 1. IGLOOLIK – ALTERNATIVE OPTIONS TO MEET THE NEED
146. QEC presented two project options for the purposes of the Application, however, the option to upgrade and replace major components and systems within the existing facility was not considered to be a viable option. QEC stated that the upgrade and replacement option was not technically feasible for the reasons previously stated, being mainly due to age and deterioration of equipment and the small footprint of the plant site. The URRC agrees that the upgrade and replacement option at the existing plant site is not a reasonable and prudent approach.
147. The URRC notes that QEC only provided one viable option in the Application. The URRC explored this option further via IRs, and was not provided with any other viable options to consider.
148. The URRC has the following observations about the option applied for by QEC:
     * + 1. Size and configuration (proposed IFC) – the IFC increased from 1,520 kW to 2,350 kW, which extends the RFC/IFC test from 2022/23 to 2060/61. The current RFC is about 1,500 kW, so the proposed 2,350 kW of IFC more than meets RFC in the short to medium term.
         2. Timing – the timing to do something appears to be relatively urgent due to the condition of the gensets, building/infrastructure and foundation.
         3. Siting/location – the proposed location appears to be an upgrade to the existing location. It is away from the residences and is much closer to the PPD facility. Further, with the proposed new fuel storage and pipeline there is no need to truck fuel to the power plant.
         4. Other electrical facilities – the new facilities should improve reliability and safety. They should also make it easier to incorporate renewable generation at some time in the future.
         5. Fuel storage – the new storage facilities will provide adequate storage as well as a pipeline to access the fuel needed. This should reduce the cost to QEC and reduce the risk associated with handling and trucking fuel. The new storage facilities should also be compliant with environmental requirements.
149. The URRC notes that the proposed alternative meets the general need stated by QEC. As previously noted, the URRC does not have enough information to comment on whether or not it is the only viable solution. Further, there was no information or response by QEC that would shed light on how the Igloolik project ranks in priority compared to the other three projects, or others that were not referred to but were considered by QEC. However, notwithstanding QEC’s reluctance to rank the projects it appears that Igloolik appears to be the most urgent of the three new power plants.
150. The URRC notes that this project proposes to replace two generating units that may have many remaining operating hours, and that the proposed solution provides more IFC than the current RFC, and will for quite some time. It is not clear how much of the capital expenditures “saved or deferred” at Igloolik could be directed to another site with urgent needs. QEC stated that it “recognizes the need for a long-term approach to prioritize and maximize the benefit of capital expenditures while providing safe and reliable electricity service.”
151. The URRC also notes that the possibility of phasing in some of the new capacity was not addressed in the Application or IR responses. QEC stated its concerns related to the timing and end date for funding from the AEF program. The URRC accepts that QEC’s current planning appears to focus on maximizing the use of the AEF program in the near term, but considers that future planning could assess replacements and expansions that match local demand in stages, rather than an immediate installation that provides for long-term forecast demand. The URRC has concerns about the reliability of a genset installed in year one of a project to meet the needs of a community in years 30 to 40. It would be useful to know how both age (as it relates to degradation, obsolescence and access to replacement parts) and operating hours affect the reliability of a genset. It would also be useful to know if staging capacity expansions would enable QEC to address issues in more communities in a timely and cost-effective manner.
152. The URRC notes that QEC’s preferred option would involve the construction of a new power plant at a location outside the community. As previously stated, it would consist of a four-engine generation facility designed for a 40-year life, with IC of 3,450 kW, and IFC of 2,350 kW that would improve reliability, efficiency, operation and safety. The new facility would also include fuel storage consisting of two 90,000‑litre double-wall horizontal tanks, an approximately 400-metre fuel pipeline to connect to the PPD facility with pumping facilities, a concrete pad for transformer storage, pole racks, berms for used oil, and other buildings and storage. QEC would also require upgrades to its distribution lines.
153. The URRC notes that the IFC of 2,350 kW exceeds the forecast peak load beyond the year 2066 (based on the response to URRC IR2-QEC-6), and the IFC exceeds the RFC until sometime between the years 2060 and 2061. Given that Igloolik is a growing community and the plant is being built for long-term use, the URRC accepts that the proposed power plant capacity is reasonable on a long-term basis.
154. The URRC accepts that a four-engine design provides additional flexibility for operation and maintenance. However, the costs/benefits of other design options or configurations of larger and smaller gensets were not provided for the URRC’s consideration.
155. The URRC notes that QEC provided information about the effects of the proposed power plant on its forecast capital expenditures, working capital requirements, and rates. The URRC agrees that the forecast increase in rates appears to be reasonable, but will consider this matter further in the next GRA. Similarly, the forecast capital expenditures and working capital requirements appear to be reasonable – before and after funding is received from the AEF program. However, due to the size of the project, the URRC would be concerned if the federal funding was not in place as described in the Application and IR responses. The URRC is also interested in the competitiveness of the tender process and the likelihood that QEC will receive reasonable bids.
156. The URRC notes that QEC plans to complete the new power plant in 2025/26. The URRC agrees that this target date is desirable based on the need, as discussed earlier in this report.
157. The URRC notes that QEC intends to dismantle the fuel storage equipment within two years of ceasing operations. The URRC is interested in updates about the progress and forecast cost of this work.
158. The URRC agrees that QEC’s preferred option is a reasonable option based on the information and assumptions provided in the Application. It will improve safety and reliability, comply with environmental regulations, improve air quality and reduce the noise level.
159. In view of all of the above, the URRC recommends that QEC be approved to proceed with the project as requested. The URRC recommends that QEC include consideration of the following, among others:
     * Sound financial and project management controls should be in place to optimize/minimize the cost of the new power plant and ensure that the project’s timelines are met.
     * Provide information about the deterioration of the foundation at the existing Igloolik site and details about the design life of the foundation proposed at the new site. The URRC considers it would be useful to know more about the expected life of the foundation because it appears to limit the life of the power plant regardless of the condition of the gensets, buildings and ancillary equipment. To this end, the URRC recommends that QEC retain an engineering company with experience in the local soil, topography and weather conditions and utilize design criteria that will assure that foundation deterioration will not repeat itself at the new site.
     * Provide information to the URRC about the detailed plans, cost and status of the cleanup at the existing power plant and any redeployment/reutilization of the gensets in the next GRA.
     * If QEC is unable to access funding from the AEF program as stated in the Application and IR responses, that the Minister instruct the corporation to prepare and submit a new MPPA for approval as the loss of the funding would be considered a significant change.
     * That QEC review the options available once the bids have been received with a view to reconsidering the project, if the bid costs vary materially from the initial estimate of $35.745 million and advise the Minister of its conclusions. The URRC considers a variance greater than 25 per cent from the initial estimate to be material.
     1. IQALUIT
        1. IQALUIT – NEED FOR THE PROJECT
160. The URRC notes the stated need to address the condition of genset G4 that was installed in 1992. QEC submitted that genset G4 has exceeded its retirement usage limit and was identified as being due for replacement by the year 2016. QEC also stated that its final major overhaul was completed on genset G4. QEC stated that no further overhauls could be made to genset G4. The URRC explored the need to address the deficiencies of the existing power plant in more detail through IRs. The responses by QEC clarified several aspects of the Application related to need that were of interest to the URRC.
161. QEC stated in the Application that the existing power plant would have capacity to meet Iqaluit’s peak load projections well into the future. QEC provided population and peak load projections in the Application. The URRC accepts that the existing power plant’s firm capacity would continue to meet QEC’s RFC criterion until about 2056.
162. QEC identified a number of deficiencies with the existing power plant in the Application and IR responses. The URRC notes that:
     * + 1. Generating units – QEC provided the age and operating hours of the existing units. Genset G4 (3,300 kW) was identified as exceeding its retirement usage limit and having a high risk of failure. QEC also noted that gensets G1 and G2 also exceeded their expected life cycle hours. QEC noted that the three gensets had a total capacity of 10,600 kW). QEC submitted that the loss of any two of the three mentioned gensets would create a significant shortfall in the plant’s ability to meet RFC. The other units were newer with fewer engine hours, although genset G3 also had accumulated significant engine hours.
         2. Load growth and reliability – demand at Iqaluit is increasing. QEC forecast RFC based on forecast population growth. The current IFC would continue to meet the forecast RFC until about 2056. The SAIDI/SAIFI information provided in response to URRC IR1-QEC-3i does not paint the picture of poor reliability. Instead QEC stated in that IR response that “plant replacement decision for these communities is based on condition, not on reliability statistics.”
         3. QEC quantification and details regarding need – QEC did not quantify or provide details regarding need other than to state that genset G4 should be replaced with a new genset of similar capacity in order to ensure safe and reliable service was provided to Iqaluit.
163. The URRC notes the condition of genset G4, as well as gensets G1 and G2. It appears that there is a need to address the reliability risks at Iqaluit. As with the other projects, the need was not quantified, however, QEC applied for the status quo.
164. The URRC notes that there is a risk of failure and insufficient capacity due to the condition and engine hours of gensets G1, G2 and G4. The increased risk is not based on an IFC/RFC shortfall, but is based on two of the older units being out of service at the same time. Based on QEC’s Application, it appears gensets G4 and G2 have remained in operation well beyond the expected life cycle hours.
165. The URRC accepts that the condition and engine hours of the three older gensets have placed them at or near the end of their useful lives. QEC has provided enough information to demonstrate that this could reduce its ability to meet the needs of the community in the very near future.
166. In view of the foregoing, the URRC agrees with QEC that doing nothing is not an option. The power plant facility, in its current state, may not be capable of continuing to provide safe and reliable service to Iqaluit if more than one of the older gensets fails.
167. The URRC notes that QEC did not quantify or provide details regarding need other than to state that there is a need to replace genset G4. The need was not specified in terms of the amount of IC and IFC, or how much of the existing 22,700 kW IC and 17,600 kW IFC is required in the short to medium term.
     * 1. IQALUIT – ALTERNATIVE OPTIONS TO MEET THE NEED
168. QEC presented two project options for the purposes of the Application. The first option was to replace the old genset G4 with a similarly sized unit. The second option was to replace genset G4 with a differently sized unit (smaller or larger). Without a targeted or specified need it was decided by QEC that the most cost-effective solution was to go with the same-sized unit. A slightly smaller one would not realize significant cost savings and would reduce the plant’s IFC. Alternatively, the selection of a slightly larger unit would not increase plant’s IFC because there are already larger capacity units in Iqaluit.
169. The URRC notes that QEC preferred the option to replace genset G4 with a similarly sized unit. The URRC explored this option further via IRs.
170. The URRC has the following observations about the option applied for by QEC:
     * + 1. Size and configuration (proposed IFC) – the IFC would be maintained at 17,600 kW, which would satisfy the RFC/IFC test until about 2056. The current RFC is only about 11,000 kW, so the proposed 17,600 kW of IFC more than meets RFC in the short to medium term.
         2. Timing – the timing to do something appears to be relatively urgent due to the condition of the gensets.
         3. Siting/location – the replacement of genset G4 with a similarly sized unit could be completed without the need for critical upgrades of the genset foundation, support structures or fuel system. QEC noted that ancillary equipment would need to be replaced.
171. The URRC notes that the proposed alternative meets the general need stated by QEC. However, the URRC notes that the Application raises other potential issues with respect to the Iqaluit power plant. Notably, the need to replace genset G4 is linked to the condition of two other gensets at the end of their useful lives. The URRC questions whether or not QEC assessed options to replace the capacity represented by the three old gensets. Perhaps the three old gensets could have been replaced by two new gensets? However, no information was provided regarding this potential alternative. The URRC would be concerned if the risk raised by QEC regarding the condition of the three old gensets (and the remaining two gensets; G1 and G2) is addressed in a piecemeal fashion in future applications.
172. The URRC notes that no information or responses by QEC shed any light on how the Iqaluit project ranks in priority compared to the other three projects, or others that were not referred to but were considered by QEC. However, notwithstanding QEC’s reluctance to rank the projects, it appears that the Iqaluit project appears to be fairly urgent.
173. The URRC notes that the proposed solution provides more IFC than the current RFC, and will for quite some time. It is not clear how much of the capital expenditures “saved or deferred” at Iqaluit could be directed to another site with urgent needs. QEC stated it “recognizes the need for a long‑term approach to prioritize and maximize the benefit of capital expenditures while providing safe and reliable electricity service.”
174. The URRC also notes QECs concerns related to timing and end date for funding from the AEF program. The URRC accepts that these concerns could negate the potential benefits of completing the project in phases, unless there are already enough other projects that could also utilize AEF funding prior to the end date.
175. The URRC notes that QEC’s preferred option would involve the replacement of a genset at the existing power plant. The URRC agrees that this is a cost-effective approach.
176. The URRC notes that the IFC of 17,600 kW exceeds the forecast peak load beyond the year 2062 (based on the response to URRC IR2-QEC-6), and the IFC exceeds the RFC until sometime between the years 2055 and 2056. Given that Iqaluit is a growing community, and the plant is being built for long-term use, the URRC accepts that the proposed power plant capacity is reasonable on a long-term basis.
177. The URRC notes that the existing power plant has six generating units of various sizes. The URRC considers that the replacement of genset G4 (and the other two units) could provide QEC with an opportunity to consider other design options or configurations. However, the costs/benefits of other design options or configurations was not discussed or provided in this application.
178. The URRC notes that QEC provided information about the effects of the proposed replacement on its forecast capital expenditures, working capital requirements, and rates. The URRC agrees that the forecast increase in rates appears to be reasonable but will consider this matter further in the next applicable GRA. Similarly, the forecast capital expenditures and working capital requirements appear to be reasonable – before and after funding is received from the AEF program. However, due to the size of the project, the URRC would be concerned if the federal funding was not in place as described in the Application and IR responses. The URRC is also interested in the competitiveness of the tender process and the likelihood that QEC will receive reasonable bids.
179. The URRC notes that QEC plans to complete the new power plant in 2023/24. The URRC agrees that this target date is desirable based on the need, as discussed earlier in this report.
180. The URRC agrees that QEC’s preferred option is a reasonable option based on the information and assumptions provided in the Application. It will improve safety and reliability, comply with environmental regulations, improve air quality and reduce the noise level.
181. In view of all of the above, the URRC recommends QEC be approved to proceed with the project as requested. The URRC recommends that QEC include consideration of the following, among others:
     * Sound financial and project management controls should be in place to optimize/minimize the cost of the new power plant and ensure that the project’s timelines are met.
     * If QEC is unable to access funding from the AEF program as stated in the Application and IR responses, that the Minister instruct the corporation to prepare and submit a new MPPA for approval as the loss of the funding would be considered a significant change.
     * That QEC review the options available once the bids have been received with a view to reconsidering the project, if the bid costs vary materially from the initial estimate of $8.415 million and advise the Minister of its conclusions. The URRC considers a variance greater than 25 per cent from the initial estimate to be material.
182. URRC RECOMMENDATIONS
183. Having considered the foregoing matters, the URRC recommends as follows:

Project-specific recommendations

* + That the major capital project permit approvals for construction of new power plants in Cambridge Bay, Gjoa Haven and Igloolik, and a genset replacement in the Iqaluit power plant as described in the Applications and IR responses, be approved.
  + That if the projected costs after tendering exceed the proposed costs for Cambridge Bay of $50.237 million by more than 25 percent, that QEC be instructed to prepare and submit a new MPPA to the Minister responsible for QEC.
  + That if the projected costs after tendering exceed the proposed costs for Gjoa Haven of $36.274 million by more than 25 percent, that QEC be instructed to prepare and submit a new MPPA to the Minister responsible for QEC.
  + That if the projected costs after tendering exceed the proposed costs for Igloolik of $35.745 million by more than 25 percent, that QEC be instructed to prepare and submit a new MPPA to the Minister responsible for QEC.
  + That if the projected costs after tendering exceed the proposed costs for Iqaluit of $8.415 million by more than 25 percent, that QEC be instructed to prepare and submit a new MPPA to the Minister responsible for QEC.
  + That QEC retain an engineering company with experience in the local soil, topography and weather conditions and utilize design criteria that will assure that reported foundation deterioration found in existing plants will not repeat itself at the new sites (i.e., Cambridge Bay, Gjoa Haven and Igloolik).
  + That the prudence of the actual cost of each of the projects be examined at the time each is proposed to be included in rate base.
  + That, at the time of the next applicable GRA, QEC provide details about the removal of assets, related to the four MPPAs, that are no longer used and required to be used (e.g. gensets, buildings and ancillary equipment). This should include the retirement of the assets and associated dismantling and clean-up costs.

General recommendations

* + That QEC provide information to the URRC about the detailed plans, cost and status of the cleanup at the existing power plants, an assessment of residual liability for the sites that have unacceptable structural issues after removal from service, and any plans for redeployment/reutilization of the gensets in the next GRA.
  + That future MPPA applications provide an assessment of other feasible approaches/options rather than replace or not (with the latter always being unacceptable nor feasible given current/future demand). For example, future power plant applications could be based on long term forecast needs, but provide flexible approaches for meeting the needs as they change.
  + That if QEC is unable to access funding from the AEF program as stated in any of the Applications and IR responses, that the Minister instruct the corporation to prepare and submit a new MPPA for approval as the loss of the funding would be considered a significant change.
  + That QEC advise the Minister regarding the financial responsibility for cost variances within the AEF program (i.e., if there is a cost overrun for a project, is the overrun eligible for AEF funding or is it to be borne by QEC and hence intended to be recovered from customer rates?).
  + That information regarding the AEF funds used, proposed/applied for, as well as plans for potential projects that would make use of the remaining funds should be part of QEC’s corporate strategic planning process and made available to the Minister Responsible and in the next GRA.
  + That QEC have its ability to simultaneously plan and execute four large projects assessed by an independent third party with a focus on identifying and mitigating areas of weakness and/or risk.
  + That QEC advise the Minister of its plans and timing to improve or replace the power plants at the remaining communities that have power plants more than 40 years old in order that redeployment opportunities can be properly assessed. This information should also be provided in the next GRA as supplemental information stemming from those plans and assessments.

1. Nothing in this report shall prejudice the URRC in its consideration of any other matters respecting QEC.

**ON BEHALF OF THE**

**UTILITY RATES REVIEW COUNCIL OF NUNAVUT**



**DATED: August 3, 2021**

**Anthony Rose, Chair**

**Utility Rates Review Council of Nunavut**

1. SAIDI - SAIDI is the average outage duration for each customer served (usually measured in minutes or hours over the course of a year). [↑](#footnote-ref-1)
2. SAIFI - SAIFI is the average number of interruptions that a customer would experience (usually measured in units of interruptions per customer over the course of a year). [↑](#footnote-ref-2)