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November 2022





Who are we?

- QEC is the sole supplier of electricity in Nunavut and serves approximately **15,000** electricity customers in **25** communities across over **two million** square kilometers.
- Provide safe, reliable and affordable electricity to all Nunavut communities.
- Promote local community development and employment opportunities.

To provide safe, reliable, sustainable and economical energy supply and service.



To provide safe, reliable and efficient electricity and plans long term affordable energy for Nunavummiut.

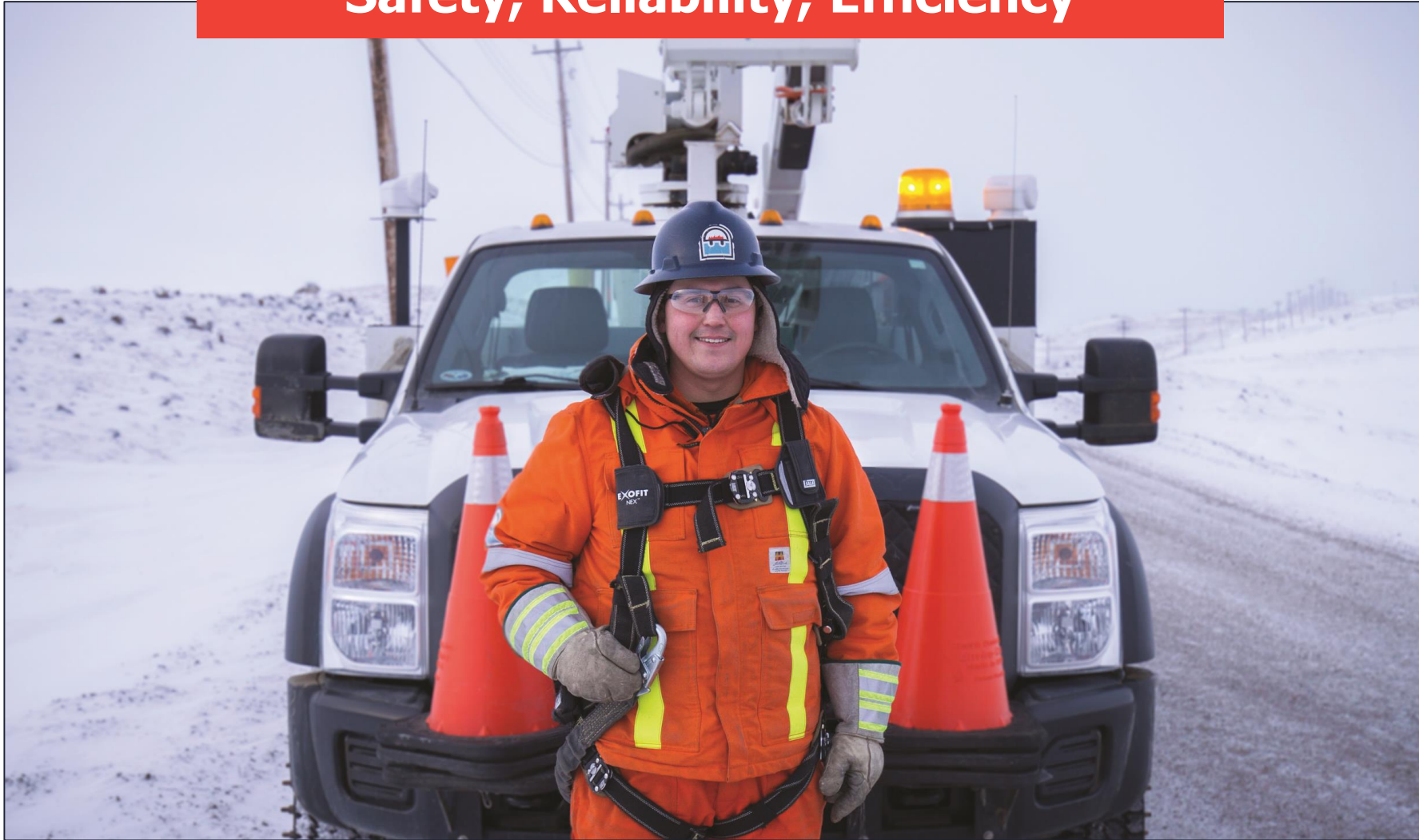


Safety, reliability, and efficiency.



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Safety, Reliability, Efficiency

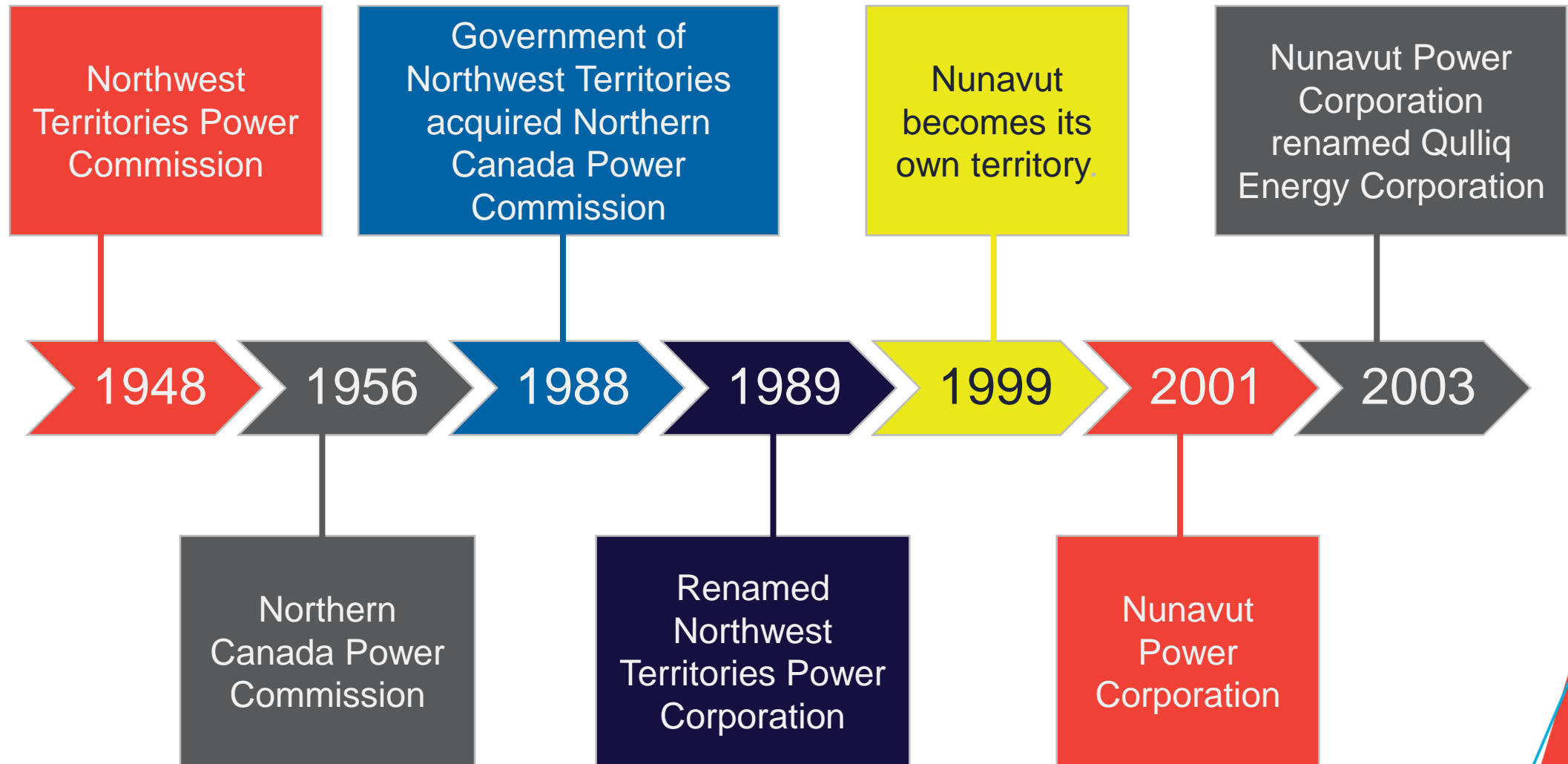


Background

- A Crown corporation 100% owned by the Government of Nunavut.
- No local energy resources or regional electricity transmission capability (diesel dependent).
- Approximately 220 employees.



History of QEC



Where are we located?





Powering Nunavut

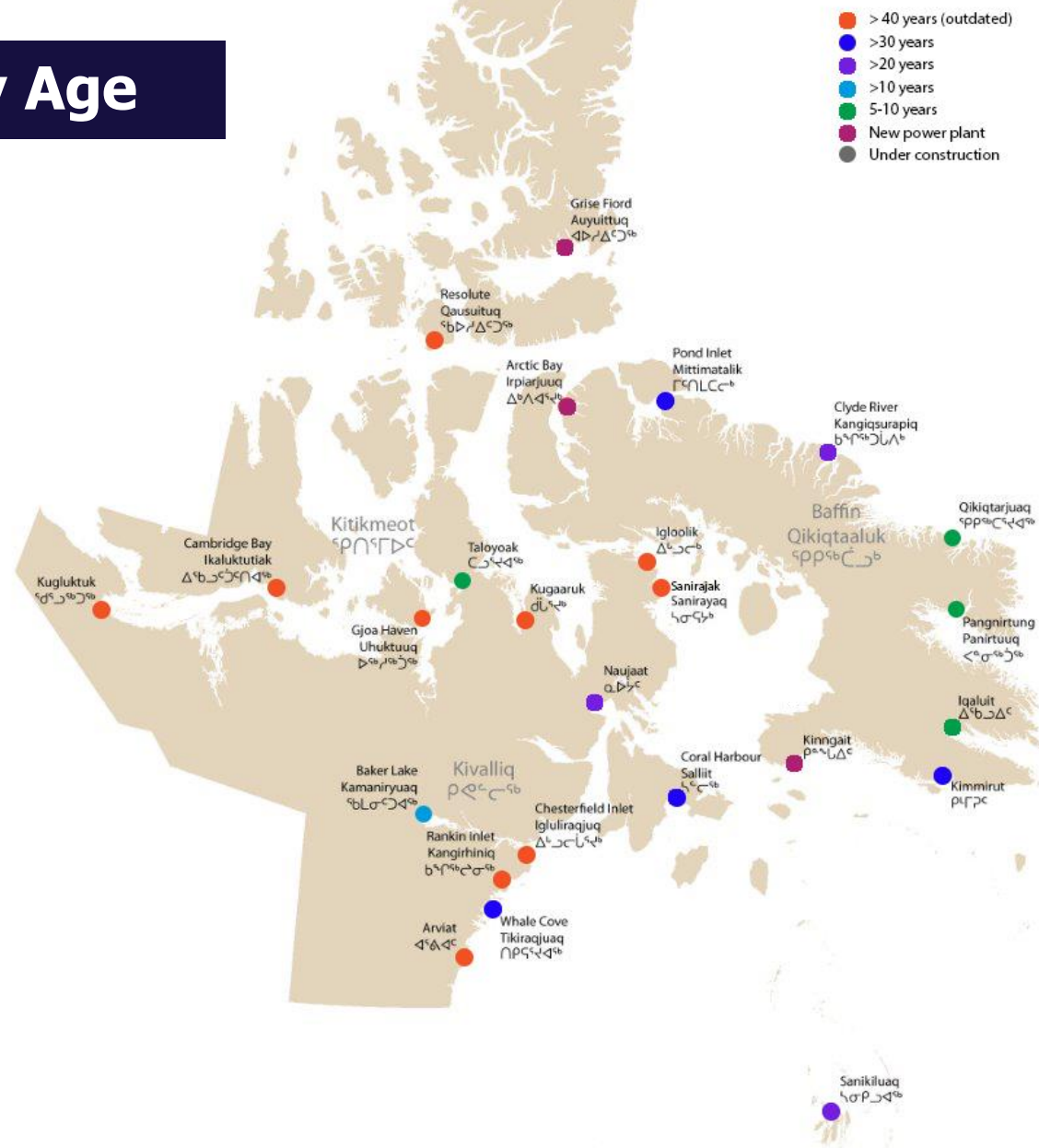
- **105 generators**
- **84,000 kW total installed capacity**
- **36 MW total peak demand**
- **2020-2021 total generation: 195,000,000 Kwh**
- **Reliability 99.98%**



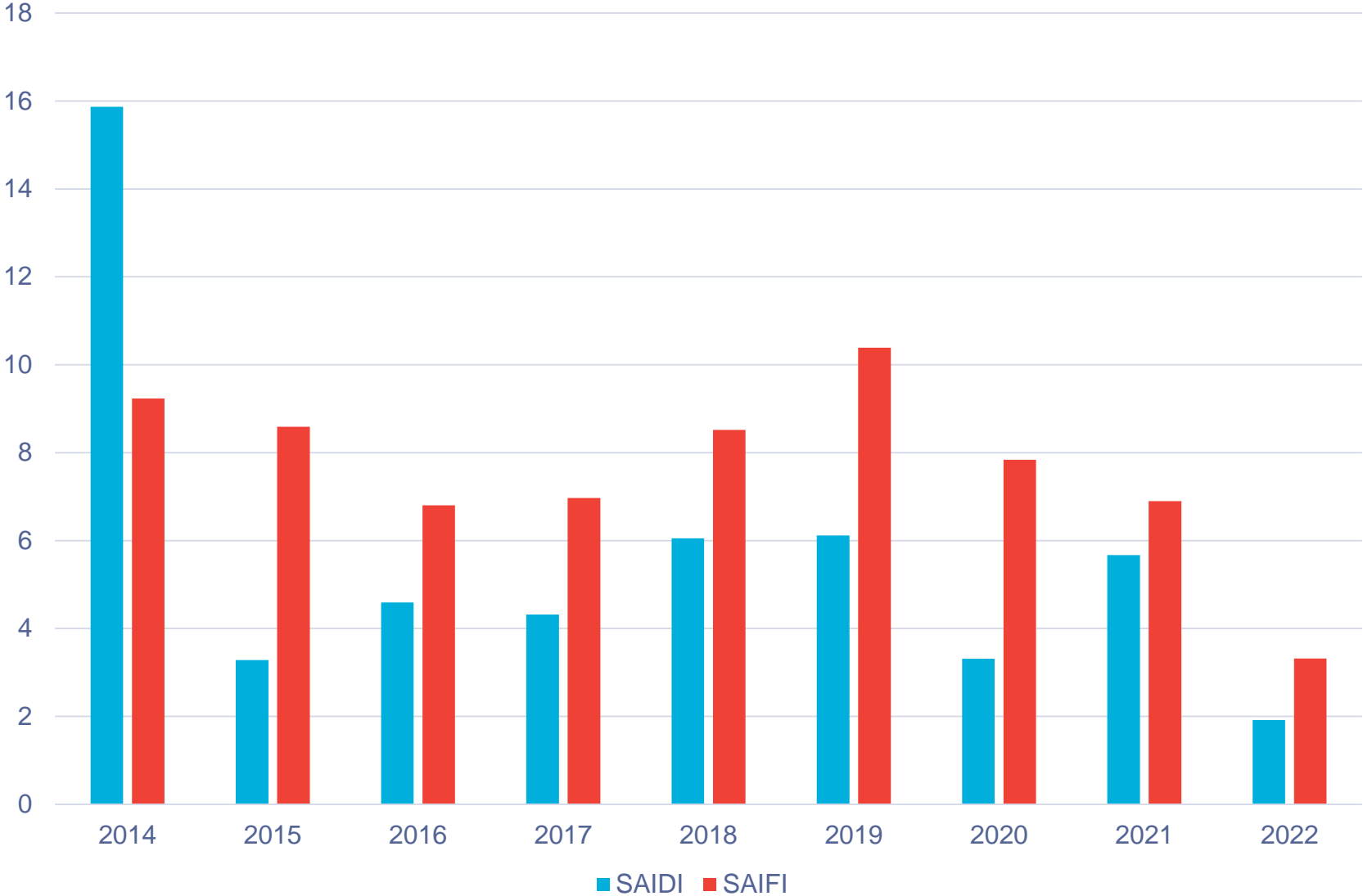
Powering Nunavut

- **Fuel Efficiency varies year by year with an average of 3.74 kwh/L**
- **Diesel, approx. 50 million litres per year**
- **350 km of distribution lines**

Power Plants by Age



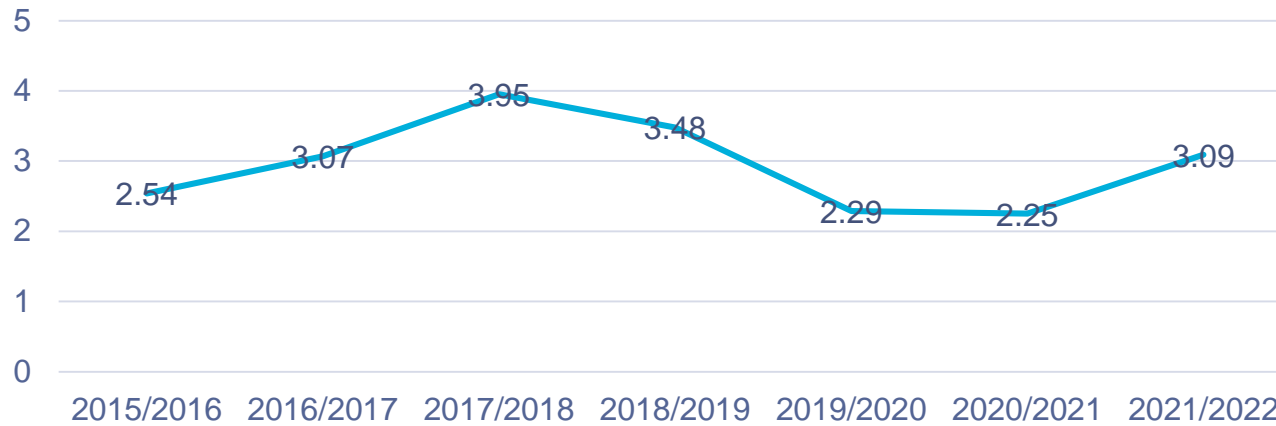
Reliability



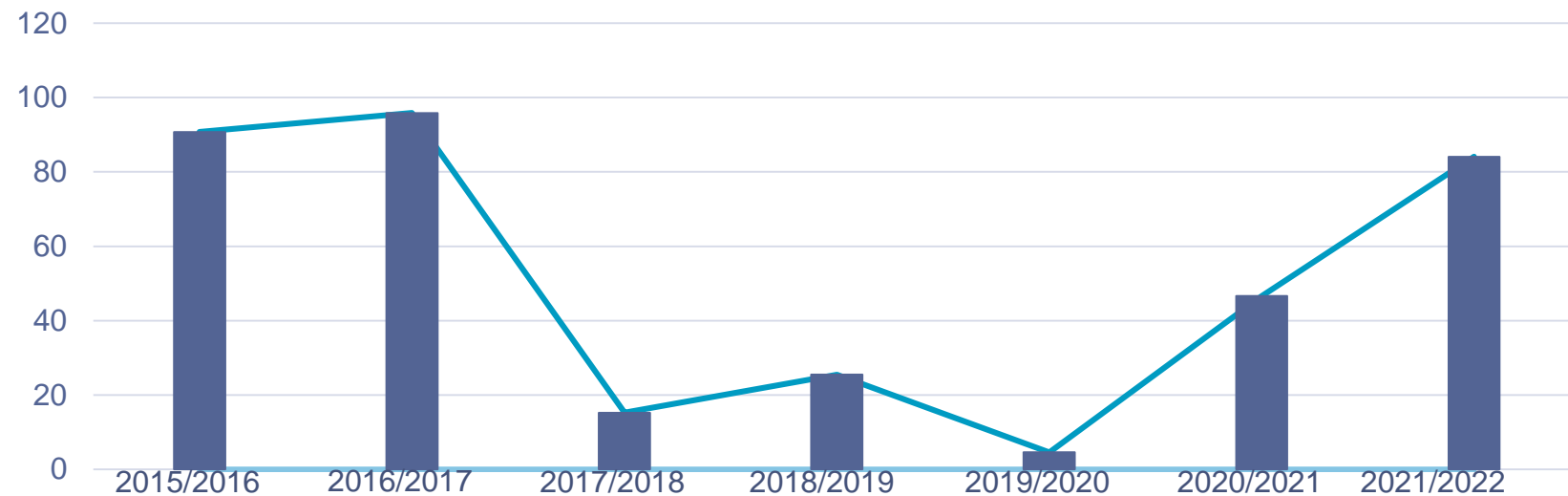
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SAFETY PERFORMANCE

Lost Time Injury Frequency Rate



Lost Time Injury Severity Rate



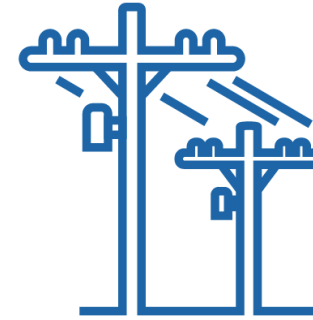
Operating in Remote Canada



Electricians, mechanics, meter techs, fleet personnel and power line technicians, based in the regional centers of Cambridge Bay, Iqaluit, and Rankin Inlet, support power plant staff in the communities.



QEC's Power Line Technicians (PLTs) spend most of the winter months flying into outlying communities to repair damage to power lines and poles and to correct issues with customer connections caused by adverse weather conditions and external factors.



During the spring and summer months, the PLTs focus on maintaining the distribution systems, performing preventative maintenance, and preparing the systems for new customer connections as demand for electricity continues to grow across the territory.

Emergency Preparedness

- QEC has an Emergency Plan for all communities and has identified specific contingencies.
- QEC has backup emergency generators installed in 12 of 25 communities to assist in the event of an emergency. For other communities, emergency generators can be airlifted in if necessary.
- Currently, QEC has a fire system impairment procedure developed, including fire detection and suppression equipment. The corporation completes annual inspections and maintenance on these systems.

Priorities Going Forward

Power Plant Rebuild

QEC will continue to supply safe and reliable power to Nunavut by rebuilding power plant infrastructure, replacing old equipment and using new technology to improve efficiency. QEC plans to build five new plants in the next five years.

Renewable & Alternative Solutions

QEC has started work on implementing complementary alternative and renewable energy initiatives

Funding

A steady flow of funding is critical to move these priorities forward while minimizing their impact on customers



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Long-term Investment Plan

- QEC has prepared a fifty-year Investment Plan (2020-2069)
- The Investment Plan identifies capital projects, organized into a number of categories, that will be required over the next fifty years.
- The plan will assist QEC with planning for future cash flow requirements and long-term financing arrangements (including debt timelines, amounts, cost of borrowing).
- The plan will also help to smooth out annual capital spending to avoid financing/funding issues for large investments within narrow time periods and to avoid the need for sudden, large rate increase.



CAPITAL PLANNING CATEGORIES

Category	Title	Description
A	Plant replacement and capacity increases	Includes investments in plant replacements and capacity increases
B	Genset replacement	Includes capital investments for generation units and related components (genset, prime mover, etc.)
C	Distribution upgrades	Includes capital investments for distribution systems and components (substations, distribution lines, poles and streetlights)
D	Fuel system upgrades	Includes capital investments for fuel supply systems fuel tanks, supply lines, etc.)
E	Structural upgrades	Includes capital investments for structural upgrade such as office buildings, transient units, etc.
F	Alternative energy	Includes capital investments for alternative energy projects (including residual heat assets)
G	Miscellaneous	Includes capital investments for assets not covered in the other categories (e.g. tools, Information Technology)
H	Line trucks	Includes capital investments for distribution line trucks.

INVESTMENT PLAN DEVELOPMENT

Utilities undertake capital projects primarily for one of three reasons:

1. **Sustainment spending:** To maintain existing assets and services
2. **Growth spending:** To address load and customer growth
3. **Strategic priorities:** To address strategic priorities and initiatives of the Corporation not captured in growth or sustainment spending



Opportunities in the Nunavut Energy Sector

1. Aging Infrastructure
2. Renewable Energy
3. Transmission
4. Hydroelectric (Iqaluit & Baker Lake)
5. Small Modular Reactors (SMRs)

1. AGING INFRASTRUCTURE

COMMUNITY	AGE	COMMUNITY	AGE
Cambridge Bay	1967	Pond Inlet	1992
Kugluktuk	1968	Clyde River	1999
Arviat	1971	Naujaat	2000
Resolute Bay	1971	Sanikiluaq	2001
Rankin Inlet	1973	Baker Lake	2003
Sanirajak	1974	Iqaluit	2014
Igloolik	1974	Qikiqtarjuaq	2016
Kugaaruk	1974	Taloyoak	2016
Chesterfield Inlet	1975	Pangnirtung	2017
Gjoa Haven	1977	Grise Fiord	2018
Coral Harbour	1988	Kinngait	2018
Whale Cove	1991	Arctic Bay	2021
Kimmirut	1992		

Plant design life
= 40 years



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2. RENEWABLE ENERGY PROGRAMS

- **NET METERING PROGRAM**
- **COMMERCIAL AND INSTITUTIONAL POWER PRODUCER PROGRAM**
- **INDEPENDENT POWER PRODUCER PROGRAM**

The corporation has been looking for alternative solutions to help bring renewable systems to the territory's energy supply mix without customers shouldering the cost of significant capital investments. Through the implementation of QEC's Net Metering Program and Commercial and Institutional Power Producer Program, the corporation has opened the door for residents, commercial customers, and local hamlets to participate in bringing renewable energy to Nunavut, while continuing to deliver a safe and reliable critical service.



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Net Metering Program

- ▶ Allows customers to generate their own electricity via renewable energy systems and send surplus power back to QEC's grids for an energy credit to offset their power bills.
 - ▶ Residential customers and one municipal customer per community
 - ▶ Energy credits reset to zero at the end of fiscal year
 - ▶ Renewable energy systems must be 10 kilowatts or less



Commercial and Institutional Power Producer Program

- ▶ Allows existing commercial and institutional customers to generate electricity using renewable energy systems and sell it to QEC.
 - ▶ Must sell all generated electricity directly to QEC
 - ▶ Limited to business premise installations





Independent Power Producer Program

- Open to large scale power producers interested in generating electricity using renewable energy systems
- Prioritizes Inuit participation
 - First come first served
- IPPs must sell all generated electricity directly to QEC
 - Presently compensated at avoided cost of diesel \$0.2476 /kWh
- Currently accepting applications (on an interim basis) for Connection Impact Assessments to assess whether potential projects meet the program's technical requirements
 - Early applications = solar and wind

2. QEC RENEWABLE ENERGY

- ▶ Small solar pilot project into a new power plant build in Kugluktuk
- ▶ District heating developments (most recently Taloyoak and Sanikiluaq)
- ▶ Geothermal investigation



3. Transmission

Kivalliq Hydro Fibre Link: connect a hydroelectric transmission line from Manitoba

- Alternative energy supply
- Latest cost projection: \$3 billion
- Waiting for final feasibility study reports and funding

Challenges:

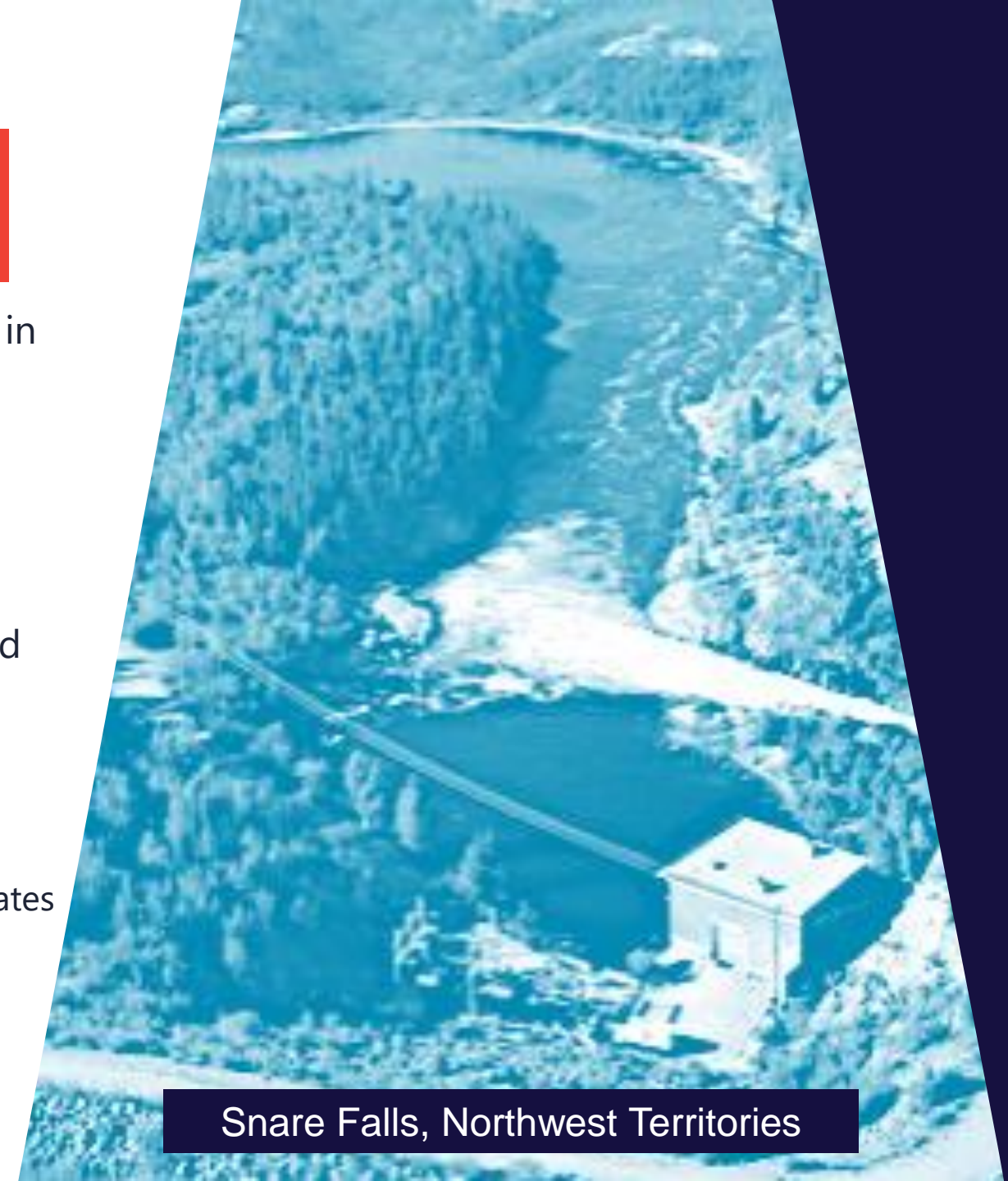
- Significant capital investment
- Customer impact
- Construction, operations and maintenance
- Extreme climate



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4. HYRDO ELECTRIC POTENTIAL

- Several small hydro projects potentially available in Nunavut
 - Up to 25 MW in the Iqaluit area
 - Up to 16 MW in Baker Lake area
- Potential to interconnect several communities and mines
- Challenges:
 - Seasonal water flows and overall hydrology estimates to determine energy and capacity by season
 - Other jurisdictions (Northwest Territories) have successfully developed hydroelectric facilities



Snare Falls, Northwest Territories

5. Small Modular Reactors

- Small Modular Reactors (SMR) offer potential for combined heat and power
- This would provide a significant benefit in the north as all homes and businesses presently use oil for space heating
- SMRs can offset the diesel used for electricity and space heating
- Technology still under development although some seem close to commercial testing
- SMRs with a modular design (shipping containers) offer a potential solution for the north where construction seasons are notoriously short
- Northern communities familiar with District Heating Systems (waste heat from power plants) but unfamiliar with nuclear technology used in these systems.

QUESTIONS



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Thank You.
www.qec.nu.ca

