Arctic Energy Summit 2017

Renewable Energy projects in the Canadian Arctic; Competitiveness and Financing

World Wildlife Fund Canada
September 18, 2017
Helsinki, Finland

WWF-Canada

Our Mission

To stop the degradation of our planet's natural environment, and build a future in which humans live in harmony with nature

OCEANS

ARCTIC

FRESHWATER

PEOPLE

Demonstrate that healthy ecosystems go hand-in-hand with strong local economies and community well-being

Foster a deeper connection to nature for Canadians

Why Renewable Energy in the Arctic?

- ✓There are many issues facing communities in the Canadian Arctic today – having cheaper, cleaner, local energy sources helps ease many of these problems.

- ✓Green energy **reduces pollution** in the community, improves health, and reduces our impact on the planet.

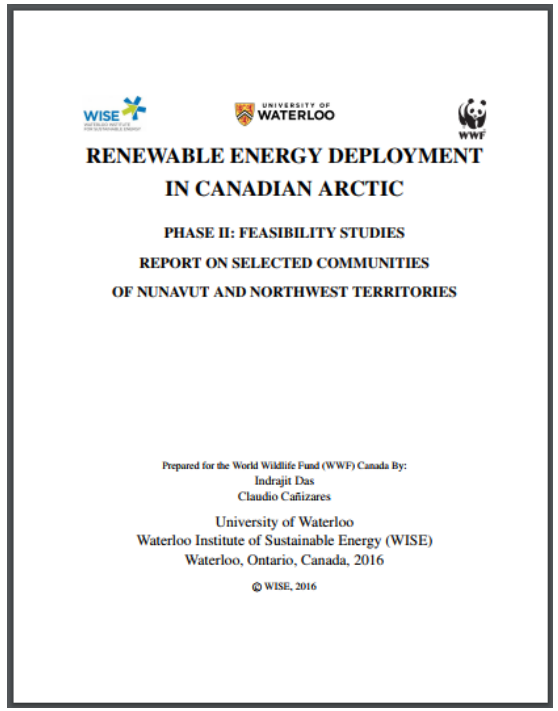
- ✓Switching to clean, green energy fights global warming and **protects habitats**.

- ✓**Economically**, it makes sense!

Competitiveness of Renewable Energy in Nunavut

Pre-feasibility and feasibility studies – University of Waterloo's Institute for Sustainable Energies:

Community	Optimum hybrid system	Optimum RE (%)	Savings over 20 years	Reduction in Emissions
Arviat	D-S-W-B	67%	$9 m	55%
Baker Lake	D-W-B	82%	$13 m	74%
Iqaluit	D-S-W-B	29%	$30 m	29%
Rankin Inlet	D-W-B	53%	$27	47%
Sanikiluaq	D-S-W-B	82%	$10	70%

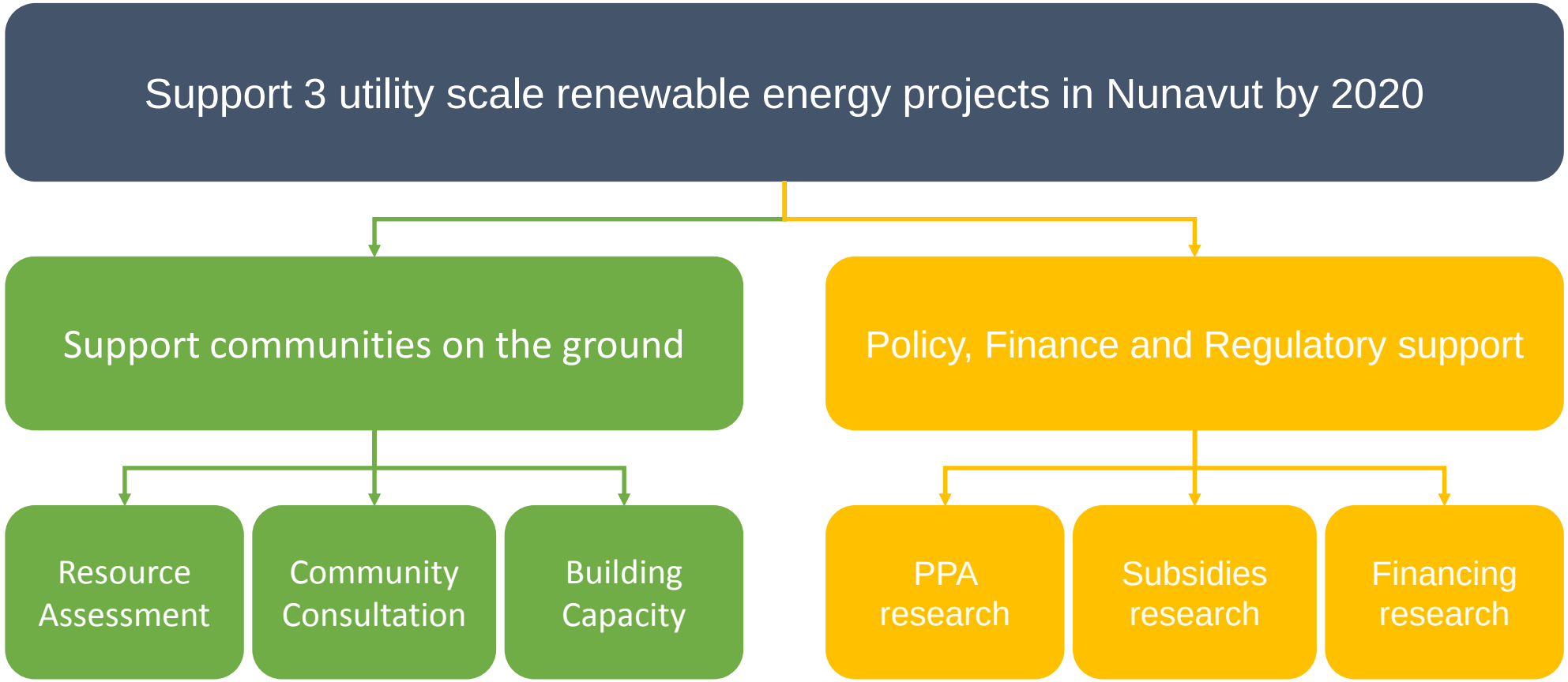


RENEWABLE ENERGY DEPLOYMENT IN CANADIAN ARCTIC

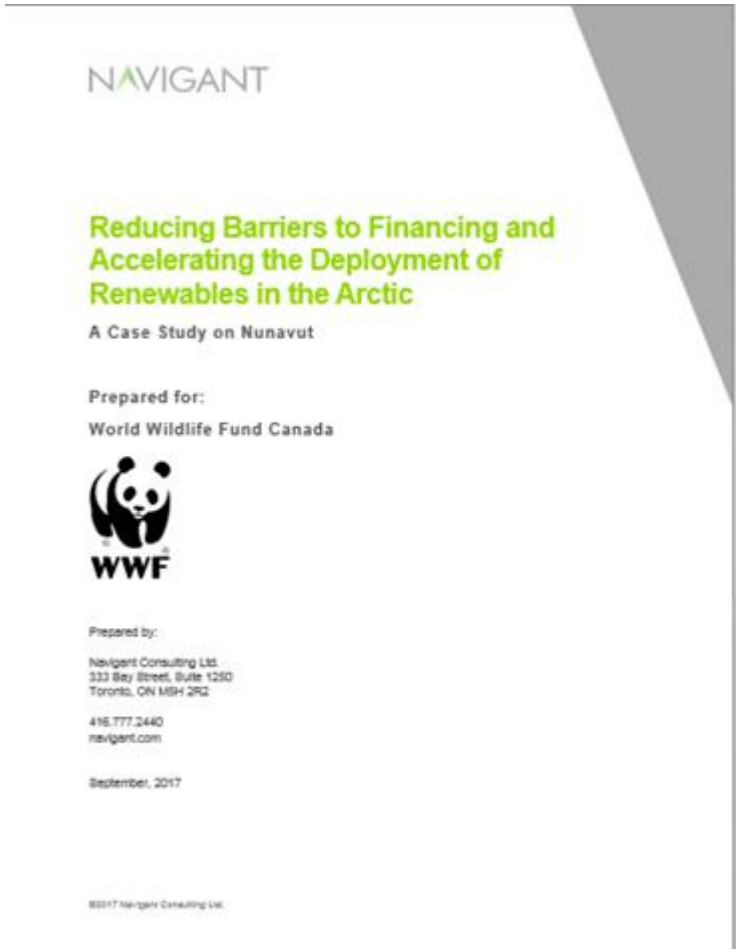
PHASE II: FEASIBILITY STUDIES
REPORT ON SELECTED COMMUNITIES
OF NUNAVUT AND NORTHWEST TERRITORIES

Prepared for the World Wildlife Fund (WWF) Canada By:
Indrajit Das
Claudio Cañizares
University of Waterloo
Waterloo Institute of Sustainable Energy (WISE)
Waterloo, Ontario, Canada, 2016

WWF-Canada goal: Facilitate three utility scale projects by 2020



Viable and cost effective framework to support the deployment of renewable energy projects


NAVIGANT

Reducing Barriers to Financing and Accelerating the Deployment of Renewables in the Arctic

A Case Study on Nunavut

Prepared for:

World Wildlife Fund Canada

WWF

Prepared by:

Navigant Consulting Ltd.
333 Bay Street, Suite 1250
Toronto, ON M5H 2R2

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September, 2017

WWF-Canada retained Navigant Consulting Ltd. to identify:

- ***Barriers to financing renewable energy projects***
- ***A Viable and cost effective framework***

Sources of Project Financing

Debt Capital

Sources:

- Commercial lenders (banks, investment funds, etc.)
- Government Infrastructure bank
- Export credit agencies
- Equipment suppliers

Considerations:

- Revenue Visibility / certainty
- Credit-worth counterparty to major commercial agreements
- Manageable risk levels
- Sufficient debt service coverage ratio

Equity Capital

Sources:

- Shareholder contributions
- Grants
- Tax equity investors

Considerations:

- Revenue Visibility / certainty
- Access to capital
- Positive net present value of equity cash flows

Three significant barriers to renewable energy financing in northern remote communities

Scale

- Small scale of individual projects limiting access to debt capital market

Equity

- Limited equity capital for customers, communities and incumbent utilities

Subsidies

- Highly subsidized electricity rates for most customers negatively impacting the economics of self-generation

Proposed framework and two fundamental objectives

Renewable energy should not increase costs to the utility, territorial government or customers

- Cap on what the utility should pay for the output from renewable energy at the ***avoided cost of the diesel fuel***

Renewable Energy development should be financed using private debt and equity, where possible leverage public capital as appropriate

- ***Long-term power purchase agreement***
- ***Entity that provides access to federal fund***

Three Core Elements

1 QEC/GN/CUSTOMER NO WORSE OFF

NO CHANGE TO CURRENT GN SUBSIDY STRUCTURE

- ✓ **Subsidies to electricity customers do not change**
- ✓ **Rates do not change in the short term**

Considerations

- Over time, rates could lower as RE costs reduce below cost of diesel. QEC could apply for lower rates

2 LONG TERM PPA

A 15-25 YEAR PPA BASED ON THE AVOIDED COST OF DIESEL

- ✓ **Avoided cost of energy**
- ✓ **Avoided energy + capacity**

Considerations

- Could require indigenous involvement
- Competitive procurement
- Capped at two rates (avoided energy or energy + capacity)
- Legislation that prevents IPPs from operating in the territory must be addressed

3 GREEN BANK

ESTABLISHMENT OF A FEDERAL GREEN BANK

- ✓ **Funded from Federal dollars**
- ✓ **Provide grants and loans**

Considerations

- Could require indigenous involvement
- Could be housed within an existing entity
- Could be set up for all three territories

Three broad mechanisms to support financing of power generation projects

Standard Tariff	Capital Grants	Loan Guarantees / Direct Loans
Securing Revenue: A standard offtake offer that is equal to (at minimum) the avoided cost of diesel	**Lowering up front Investment Costs:** Government grants to help fund renewable energy projects	**Lowering Borrowing Cost:** ***Loan Guarantees:*** Government underwriting of risk on renewable energy project loans ***Direct Loans:*** Direct Government loans to initiate renewable energy projects

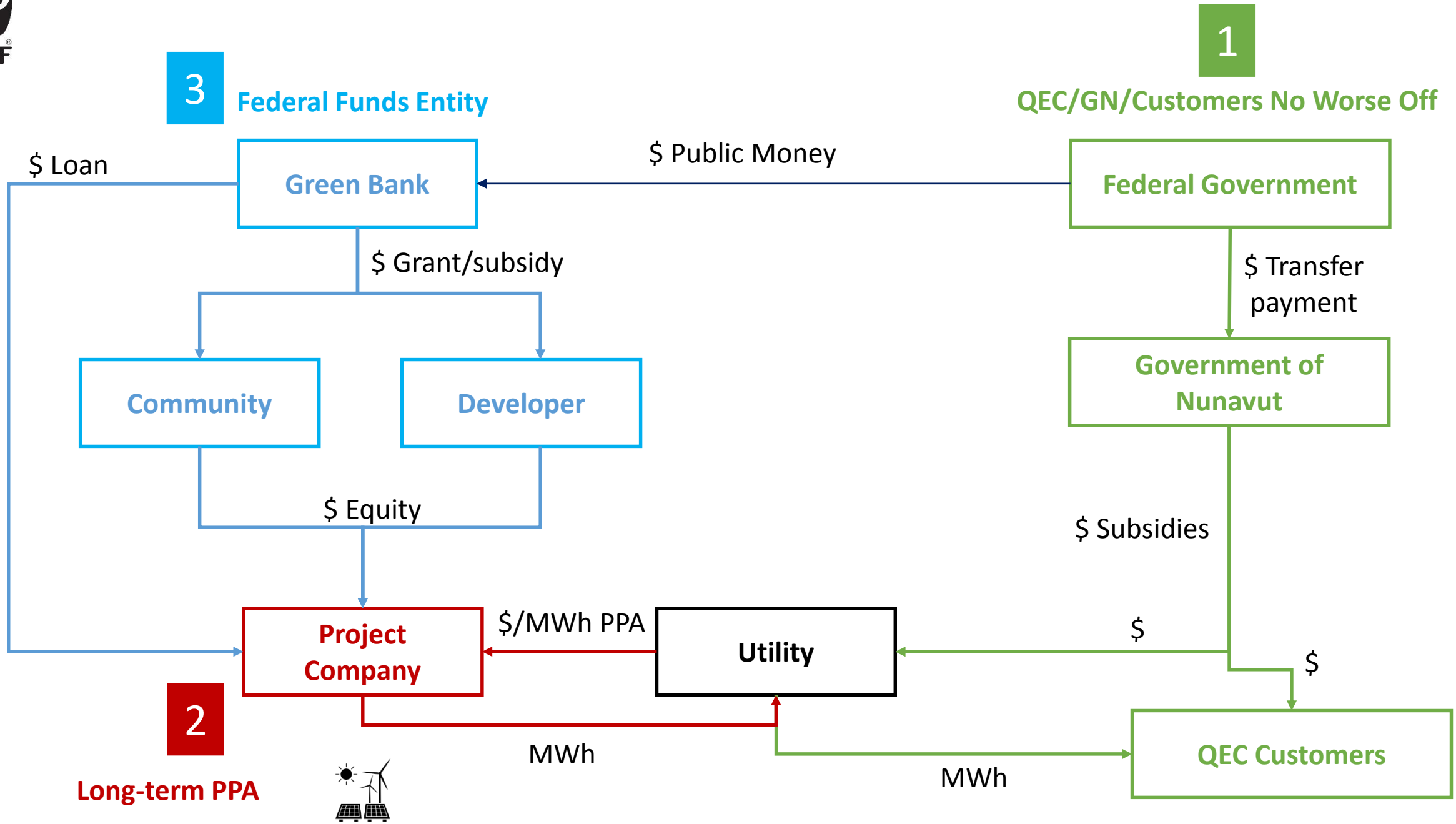
Barriers and Challenges

Standard Tariff	Capital Grants	Loan Guarantees / Direct Loans
Lack of clarity around the future costs of renewables makes it difficult to structure a tariff	The market in Nunavut is small	Entities face difficulty securing loans
Secure revenue stream	Depending on structure, possible lack of community investment	Possibility of a lower borrowing cost
There can be an added benefit if there is also private sector competition	Capital constraint eased	Community involvement provides opportunity for “skin in the game”
The market in Nunavut is small	Risk of nothing set aside for ongoing O&M	Territorial Government burden

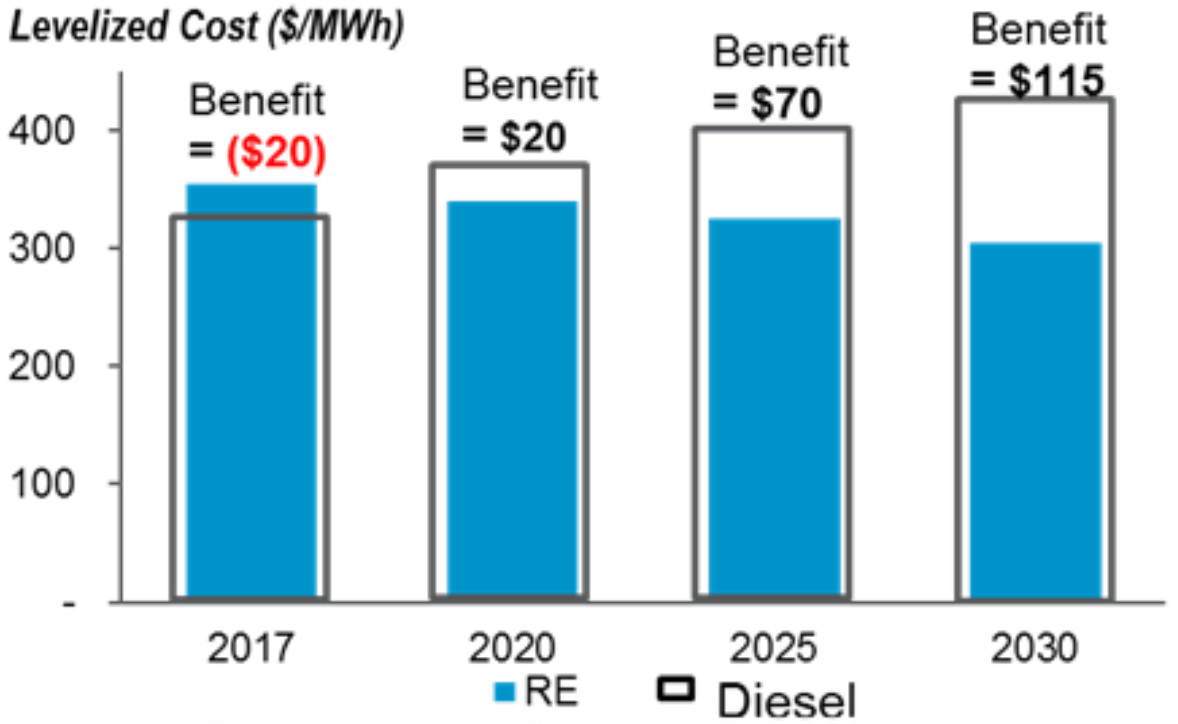
Results

Navigant analysis suggests:

- Favourable economics today with help federal funds
- Cost effective in 2020 and beyond in many communities

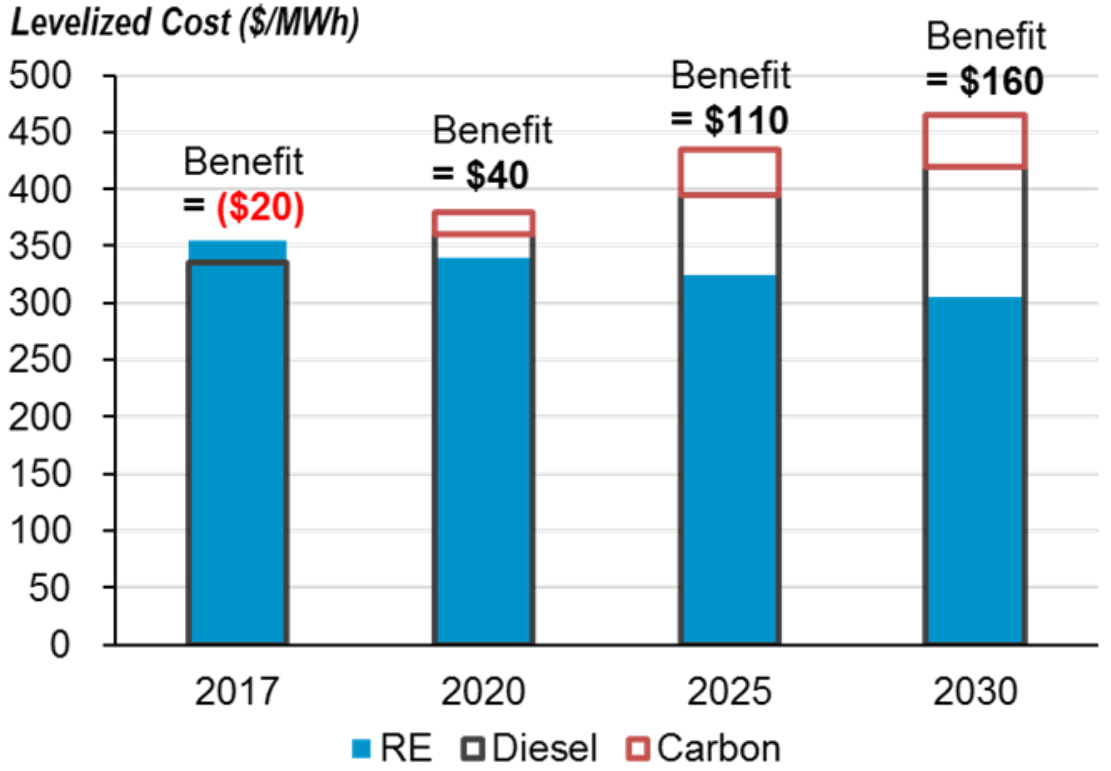

3
Federal Funds Entity
1
QEC/GN/Customers No Worse Off
$ Loan
Green Bank
$ Public Money
Federal Government
$ Grant/subsidy
$ Transfer payment
Community
Developer
Government of Nunavut
$ Equity
$ Subsidies
Project Company
$/MWh PPA
Utility
$
$
2
Long-term PPA
MWh
MWh
QEC Customers

Case Study: Rankin Inlet



Year	Diesel	RE	Benefit
2017	335	355	(20)
2020	360	340	20
2025	395	325	70
2030	420	305	115

Case Study: Rankin Inlet – with Price on Carbon



Year	Diesel	Carbon	RE	Benefit
2017	335	0	355	(20)
2020	360	20	340	40
2025	395	40	325	110
2030	420	45	305	160

Thank you

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