Power purchase policies for remote Indigenous communities

Research on government power purchase policies to support clean power projects

WWF ARCTIC RENEWABLE ENERGY SUMMIT

Sept 15/16 2016

Dave Lovekin, Barend Dronkers

The Pembina Institute
“Research on government power purchase policies to support clean power projects”
Pembina Institute

Leading Canada’s transition to a clean energy future

- Research and analysis
- Consulting
- Stakeholder convening
- Credible and practical perspectives
Our work with Indigenous communities

- Pre-feasibility, feasibility and implementation of small-scale renewable energy systems
- Energy literacy capacity building training with KLFN
- Work with First Nations in Alberta, NWT on impacts from O/S and oil and gas development
- Convening / conferences to advance renewables in remote communities
Acknowledgements

This research project was funded by WWF as part of their *Sustainable Energy Solutions for the Canadian Arctic* project.
Outline

• Motivation / goals / scope
• Brief background – remote communities, power purchase policies
• Key observations
• Main drivers for policy implementation
• Challenges and barriers
• Opportunities and next steps
Implement solutions to mitigate further affects of climate change

• Advance clean power projects in remote Indigenous communities in Canada, considering the harm climate change and greenhouse gas emissions are causing in northern communities.
Research motivation / goals

• **Support the development** of clean power projects through **power purchase policies** in remote Indigenous communities

• Power purchase policies being **one policy instrument** to advance clean power projects
**Power purchase policies**

Policies exercised by governments or utilities that support the independent generation and selling of power by a third party (Independent Power Producer (IPP)) to a utility through a legally binding Power Purchase Agreement (PPA) contract.
Research scope

• remote communities across Canada with a focus on remote Indigenous communities

• Canada provinces / territories with some key review of international examples

• researched past and current provincial, territorial and federal government examples of power purchase policies

• focused on the price-based policy mechanisms but also investigated some key grant funding programs

• what government or utility policies have supported and enabled indigenous communities in clean power purchase

• why and how government policies came to be
Background

- ~ 300 remote communities across Canada
- ~ 170 are remote Indigenous communities

- Northwest Territories – 26
- Nunavut – 25
- Ontario – 25
- British Columbia – 25
- Yukon – 21
- Newfoundland and Labrador – 16

Diesel consumption

- Collectively remote communities consume more than 90 million litres of diesel per year for electricity generation.

1 barrel = 1 million litres of diesel per year.
Power purchase policies

• Focused mostly on priced-setting mechanisms but a few demand-setting mechanisms

• Also looked at a few relevant financial capital funding programs and support programs

Did not look at

• government fiscal policies (taxation)
• environmental policies (environmental impacts, performance regulations)
• technical and capacity-building assistance (training, awareness, skill development)
• or other policies capable of supporting clean energy systems in Indigenous communities
Policy types considered

- Net-metering

Price-setting mechanism

- Feed-in Tariff / Standing Offer
- Production incentives

Contract for Difference

Demand-setting mechanism

- Renewable Portfolio Standard
- Renewable Electricity Certificate markets
- Request for Proposal
### Key observations - # of PPA contracts

- Less than 5% of remote communities have clean energy projects with PPAs (~12 projects).
- This increases to only 7% when you consider projects in development (~18 projects).
- Majority of established projects are small to medium scale (up to 10kW solar, slightly larger micro-hydro systems).

<table>
<thead>
<tr>
<th>Jurisdiction</th>
<th># of remote Indigenous communities</th>
<th># with PPAs (including net metering connections)</th>
<th>Project types</th>
</tr>
</thead>
<tbody>
<tr>
<td>BC</td>
<td>25</td>
<td>4 current</td>
<td>Micro-hydro, Solar, Biomass</td>
</tr>
<tr>
<td>Alberta</td>
<td>7</td>
<td>0 current</td>
<td>N/A</td>
</tr>
<tr>
<td>Saskatchewan</td>
<td>1</td>
<td>0 current</td>
<td>N/A</td>
</tr>
<tr>
<td>Manitoba</td>
<td>4</td>
<td>0 current</td>
<td>N/A</td>
</tr>
<tr>
<td>Ontario</td>
<td>25</td>
<td>7+ current</td>
<td>Assumed solar</td>
</tr>
<tr>
<td>Quebec</td>
<td>19</td>
<td>0 current</td>
<td>N/A</td>
</tr>
<tr>
<td>Newfoundland and Labrador</td>
<td>16</td>
<td>0 current</td>
<td>N/A</td>
</tr>
<tr>
<td>Yukon</td>
<td>21</td>
<td>0 current</td>
<td>Wind</td>
</tr>
<tr>
<td>Northwest Territories</td>
<td>26</td>
<td>1 current</td>
<td>Solar</td>
</tr>
<tr>
<td>Nunavut</td>
<td>25</td>
<td>0 current</td>
<td>N/A</td>
</tr>
</tbody>
</table>
Key observations - # of PPA contracts

• Less than 5% of remote communities have clean energy projects with PPAs (~ 12 projects)
• This increases to only 7% when you consider projects in development (~ 18 projects)
• Majority of established projects are small to medium-scale (up to 10kW solar, slightly larger micro-hydro systems)

Trending ….

• Clean power projects in development are larger (50% penetration up to 100% full diesel offload during summer months)
• Newer projects are showcasing technologies that are both renewable energy but also coupled with storage technologies
Key observations – types of policies

- Net metering and SOP-like policies

- Either been formally introduced via legislation, or informally released through policy documents or by utilities

- No RFP, Contract for Difference, Production Incentive or RPS policies specific to remote Indigenous communities are offered in any Canadian jurisdiction
Key observations – types of policies

- RE Fund
- NM
- IPP
- CREP
- RCEP
- IPP
- NM
- IPP
- NM
- IPP
- NM
- IPP
- NM
- IPP
- NM
- IPP
- NM
- IPP
- NM
- IPP
- NM
- IPP
- NM
- IPP
- NM
- IPP
- NM
- IPP
- NM
- IPP
- NM
- IPP
- NM
Key observations – Three approaches

• Creating an enabling regulatory environment
  • Governments can create an enabling, but not compulsory, environment for clean power purchase
  • Through objectives and mandates for clean power projects, for utilities to purchase clean power, or for governments to account for full cost-benefits when making asset investment and/or upgrade decisions
  • Acts and regulations for clean power purchase, however, do not always specifically target remote communities, and in some cases even exclude them because of eligibility requirements
  • For remote communities, they may offer terms that are not favourable to developing clean power projects
Key observations – Three approaches

• Government-driven policy (and/or program implementation)
  • Power purchase policies can be introduced without using legislation
  • Strategy documents, IPP policy document, % RE uptake
  • net metering policies
  • catalyst funding programs – B.C. RCEP program, GNWT Community Renewable Energy Program, Alaska RE Fund

• Utility-driven policy (and/or program implementation)
  • Ontario’s HydroOne Remotes only utility to offer a formalized IPP program through the REINDEER program
  • Program based on Ontario’s SOP FIT program
Key observations – PPA contract rate

- Utilities base PPA rate on the *avoided cost of diesel*

**Avoided cost of diesel ($ / kWh)**

The cost to utilities to purchase, transport diesel to remote communities and produce electricity from this fuel

- Ontario REINDEER program offers some of highest rates – average being around $0.41 / kWh
- most PPA rates are generally around $0.30 / kWh
- two Canadian jurisdictions offer rates higher
  - B.C. PPA rate – includes a small capacity payment to account of reduced wear and tear on diesel systems
  - NTPC PPA – includes a 5% top-up to account for reduced O&M
- Some projects still needed capital $$ support
- Regardless, for the most part, PPA rates are based on avoided cost of diesel and are tough to make the economics work for projects
A different way of looking at this
Key observations – avoided cost of diesel and PPA price

Starting point – “Avoided cost of diesel”, fuel cost + shipping + GS characteristics

<table>
<thead>
<tr>
<th>Component</th>
<th>Diesel system</th>
<th>Renewable system</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon price</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental costs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Downstream fossil fuel subsidies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>O&amp;M costs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capacity payment / top-up</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

$ / kWh
Avoided cost of diesel and PPA price

Starting point – “Avoided cost of diesel”, fuel cost + shipping + GS characteristics

True cost of electricity from diesel power generation

Net benefits or life-cycle costs

$ / kWh

Lower cost of electricity

$ / kWh

Diesel system

Renewable system
Avoided cost of diesel and PPA price

Social costs

Health costs

True cost of electricity from diesel power generation

Many stakeholders sharing this cost

Starting point – “Avoided cost of diesel”, fuel cost + shipping + GS characteristics

$ / kWh

Net benefits or life-cycle costs

Policy instrument required

Necessary additional price for electricity to make RE project work

$ / kWh

Diesel system

Renewable system
Drivers for policy implementation
Driver: Energy strategies and mandates

• Strategies with a mandate set a direction
  • BC’s Energy Plan → Clean Energy Act
  • Alberta’s Climate Leadership Plan → Climate Leadership Implementation Act
  • NWT’s Energy Plan (& Solar Strategy) → ?? Act
  • Quebec’s 2030 Energy Policy → ?? Act

• Electric Utility & Public (Regulatory) Commission legislation
  • Clean power ↔ competition & local ownership
  • Enables purchase from Independent Power Producers
Driver: Power safety & reliability

• Black- & brown- outs ≠ options
  • Clean technology is very reliable (99.5% availability in 2016 @ Raglan wind energy project)
  • Clean & diesel power are part of a complete Hybrid (“bridging” energy solution)

• Clean = SAFE!
  • Solar has no moving parts
  • Wind turbines are commercialized technology (“Arctic package”)
  • Manufactures with proven track-records
Driver: Building relationships with Indigenous communities

• Legislation & utility policies
  • BC’s Clean Energy Act → “foster” development of First Nation communities with clean energy procurement
  • Ontario’s REINDEER Program → responding to First Nation energy needs with directed programing
  • Yukon IPP Policy → minimum 50% of projects must have shared Indigenous ownership

• Indigenous entrepreneurship & procurement
  • Manitoba Hydro & SaskPower actively work to procure Indigenous goods and services for projects
Driver: Reduce environmental impacts

- Clean power avoids...
  - Diesel spills and clean ups
  - Air quality and noise concerns
  - Greenhouse gas emissions

- Clean power **helps communities feel part of the solution** to mitigation & adaptation

- Impacts are on-site & transporting fuels
Driver: Clean technology advancement

• **High % Renewable Energy**
  
  • Clean power can supply up to 100% of instantaneous load without risking power reliability & community safety
  
  • Technologies are ready & developing quickly (e.g. computers everywhere in 90’s, but have constantly improved since)
Driver: Clean technology advancement

![Diagram showing the decrease in levelized cost of electricity for solar PV and natural gas from 1983 to 2015. The cost for solar PV shows a significant decline, while the cost for natural gas remains relatively stable.]
Driver: Local economic development & jobs

Source: Advantage Local: Why Energy Ownership Matters (ILSR, 2014)
Challenges and barriers

Cost and financing perspectives

PPA contract price \((\textit{avoided cost of diesel})\)

- Rate base \textit{cannot increase} (sustainable solution = lower \& less volatility)
- Downstream diesel subsidies \& carbon pollution

Utility mandate to maintain affordable rate-base

- Near- \& medium-term utility’s rate base to capture needed (hybrid) clean energy investments
- Diesel fuel subsidies \& externalized costs

External Funds

- Seed funding \& power purchase policies
- Access to capital

Policy \& legislative perspectives
Challenges and barriers

Cost and financing perspectives

Policy & legislative perspectives

Rate base should match technology capability & merit

Legislative and regulatory barriers

Improving technology in remote community learning-curves per projects — reduces cost

Legislative mandate (enforce policy decisions); freedom (remove obstacles)

Technology capability > policy perspective

Technology reliability & safety

Slow policy innovation
Policy options

• Exploring policy options for Territories & Provinces to involve Federal Government

• **Policy = funding for 3 key elements**
  1) Capacity building (training, education, skills development)
  2) Project development (resource monitoring, feasibility studies)
  3) Design & install (capital funding)

• **Grants** for (1) and (2)

• **Grants and other options** for (3) design & install
  • Contracts for clean power (Contracts for Differences)
  • Funds for attributes of Renewable Energy (RECs and Production incentives)
Opportunities and next steps

- Avoided cost of diesel is a starting point
- Clean power benefits > (unsubsidized = real) costs
- Government mandate is legislated with key project criteria:
  a) Habitat friendly, clean / renewable sources,
  b) Indigenous community and/or business involvement
  c) More...

- **Clear funding commitment** for communities & developers

- **Leadership** = need bold moves now; that pay off with benefits in decades to come
## Key observations – net metering

<table>
<thead>
<tr>
<th>Jurisdiction</th>
<th>Type</th>
<th>Enabling Act</th>
<th>Highlights</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alberta</td>
<td>Net metering</td>
<td>2008 Microgen Regulation</td>
<td>Although the deregulated market supports IPPs, there are no specific policies to support remote communities</td>
</tr>
<tr>
<td>Ontario</td>
<td>REINDEER program (net metering scheme)</td>
<td>2009 Green Energy Act</td>
<td>microFIT program that was not available to remote communities Small uptake (~ seven) in net metering projects in Ontario</td>
</tr>
<tr>
<td>Yukon</td>
<td></td>
<td>Yukon Public Utility Act</td>
<td>Restricted to very small project sizes – 5 kW or less Can go up to 25 kW with utility approval (for single transformers) Residents can apply for a 20% rebate (up to $5,000) to install a net metering system</td>
</tr>
<tr>
<td>NWT</td>
<td></td>
<td>2013 Energy Action Plan</td>
<td></td>
</tr>
<tr>
<td>Nunavut</td>
<td></td>
<td>2007 Ikummatiit Energy Strategy</td>
<td></td>
</tr>
</tbody>
</table>
### Key observations – SOP-like

<table>
<thead>
<tr>
<th>Jurisdiction</th>
<th>Type</th>
<th>Enabling Act</th>
<th>Highlights</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.C.</td>
<td></td>
<td>Clean Energy Act</td>
<td>Although micro-SOP does not exclude First nations, the program is incompatible with them because of clause to unconditionally buy power IPP projects with First Nations are approached on an ad-hoc basis</td>
</tr>
<tr>
<td>Manitoba</td>
<td>Non-utility generation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ontario</td>
<td>REINDEER program</td>
<td>2009 Green Energy Act</td>
<td>Designed to fill the gap of the FIT and microFIT program that was not available to remote communities Two stand-alone project with some larger projects currently in review</td>
</tr>
<tr>
<td>Yukon</td>
<td>SOP Call for Power</td>
<td>2009 Energy Strategy</td>
<td>Goal of establishing 10% of electricity demand provided by IPPs At least half of IPP projects incorporate some share of First Nation ownership</td>
</tr>
<tr>
<td>NWT</td>
<td>Informal IPP policy</td>
<td>2013 Energy Action Plan</td>
<td>Avoided cost of diesel plus 5%</td>
</tr>
</tbody>
</table>