

From diesel dependency to energy empowerment

Six energy service models that could fast-track climate action in remote communities

Emily He and Madeleine Whitestone | February 2022



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by Emily He and Madeleine Whitestone | February 10, 2022

In remote communities across Canada, energy efficiency programs and renewable energy projects are increasing in number and uptake. While the advancement of clean energy in places that remain heavily reliant on diesel-generated power is encouraging, systemic barriers remain, preventing clean energy project proponents from moving ahead. Insufficient capacity, gaps in expertise, and the high cost of upfront capital investments combine to slow Indigenous-led energy projects from developing at the pace and scale needed to transition away from diesel.

Although it is indisputable that progress is being made, it is still not uncommon that project proponents may have limited business experience, project management skills, technical assessment skills, or the permitting requirements, time and resources, that are needed to develop clean energy projects. Moreover, because subsidized diesel is a cheap source of power, the business case for clean energy can be hard to make. Proponents face high interest rates, and lenders associate elevated risk with renewables due to perceived uncertainty in guaranteeing sufficient energy savings during the pay-back period to redirect the money saved in energy costs toward covering loan repayments.

Energy service models, or ESMs, offer options for clean energy proponents to develop, build, and operate projects by alleviating some of the challenges associated with lack of capacity and capital. While the ESMs operating in other jurisdictions can be applied in remote communities, new energy policies will need to be put in place to enable Indigenous entrepreneurs to access them.

Below is an overview of the types of energy service models that have been successfully implemented in jurisdictions outside of Canada's remote communities and how those models, if applied within the setting of remote communities, would support an accelerated adoption of clean energy projects. ESMs could be a means of empowering remote communities by facilitating their collective ownership and autonomy over community energy systems.

Alternative energy business models

Six energy service models are presented that are relevant to clean energy development in remote communities. The models fall within three categories described in the table below: energy service provider models; financing models; and collaborative ownership models.

Energy Service Model	Operated by	What it offers
Energy service provider models <ul style="list-style-type: none"> • Energy-as-a-service • Energy service companies 	Entrepreneurs and clean energy businesses	Provides advice, project management and project development; does not require upfront costs thus reducing capital costs.
Financing models <ul style="list-style-type: none"> • On-bill utility financing • Property tax financing 	Utilities / public housing corporation / local government	Costs to proponent are incorporated into either utility bills or higher property taxes instead of an upfront capital investment.
Collaborative ownership models <ul style="list-style-type: none"> • Community solar • Energy co-ops 	Entrepreneurs and clean energy business, utilities	Pooled resources and shared risks and benefits when developing renewable energy projects. Benefits are distributed among members of the collective or co-op.

Figure 1 shows the interplay between the energy service models. Energy service models can be applied to circumvent a conventional energy business model that prevents clean energy projects from moving forward at the pace and scale needed. One energy service model can unlock opportunities for other models.

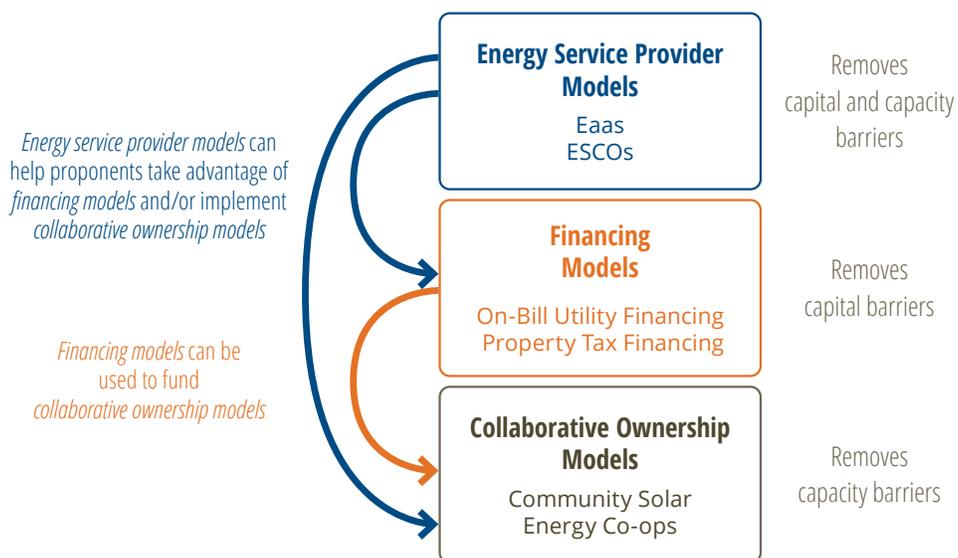


Figure 1. Connections between energy service models

Energy service providers

Energy service providers include both energy-as-a-service (EaaS) and energy service companies (ESCOs). Both provide advice, expertise, and management services for clients interested in developing local clean energy projects. Clients can be homeowners, small businesses, or communities. Energy service providers offer:

- Energy advice, including:
 - Recommendations for energy efficiency upgrades
 - Support in identifying and applying for provincial, territorial, and federal incentives and rebates to reduce capital costs
 - Marketing, technology, and regulatory advice
- Equipment ownership and financing
 - Pays for renewable energy, energy storage, and energy efficiency systems
 - Owns the equipment so the customer does not have liability concerns
- Management
 - Monitors equipment performance for the duration of its operating life and makes upgrades as needed
 - Provides regular maintenance of equipment

Energy service providers develop, build, and underwrite clean energy projects that customers would otherwise have to pay for upfront. Customers fund projects through fee-for-service, leases, loans, and other forms of payment where expenses are repaid according to multi-year agreements.

Additional benefits include risk-sharing between customers and service companies and guaranteed cost and emissions savings. Such services have become increasingly popular and the range of expertise offered continues to expand.¹

Financing options

Lack of access to capital and long payback periods dissuade building owners and those who rent from investing in clean energy projects. One option is that utilities provide the upfront capital, which is repaid over time as an expense included in electricity bills. Alternatively, programs administered through local governments or municipalities can use public funds to provide upfront capital which is repaid at a low default rate through an additional expense line on property taxes.

¹ Sasha Wedekind, “Energy as a service solutions grow despite the pandemic,” *Smart Energy International*, March 2, 2021. <https://www.smart-energy.com/industry-sectors/energy-grid-management/energy-as-a-service-solutions-grow-despite-the-pandemic/>

Utility financing / Pay-as-you-save (PAYS)

On-bill utility financing, also referred to as pay-as-you-save (PAYS), is a way to finance a project through loans offered by the customer's utility. Loans are repaid through an additional charge on the utility's monthly energy bill. Loan repayments are calculated to be roughly equivalent to the energy savings generated by the clean energy project. This means that monthly utility expenses don't increase even though the loan is being paid off.

Once the loan is paid off, savings from cheaper energy costs are realized entirely by the customer. Some programs allow for the payment responsibility to be transferred to new renters or building owners, while others link the loan to the individual and require the remaining balance to be paid off when the account closes.

Utilities are able to provide loans if they receive the capital needed from either private investors, ratepayers, or government. Figure 2 shows the flow of capital from source to utility to customer.

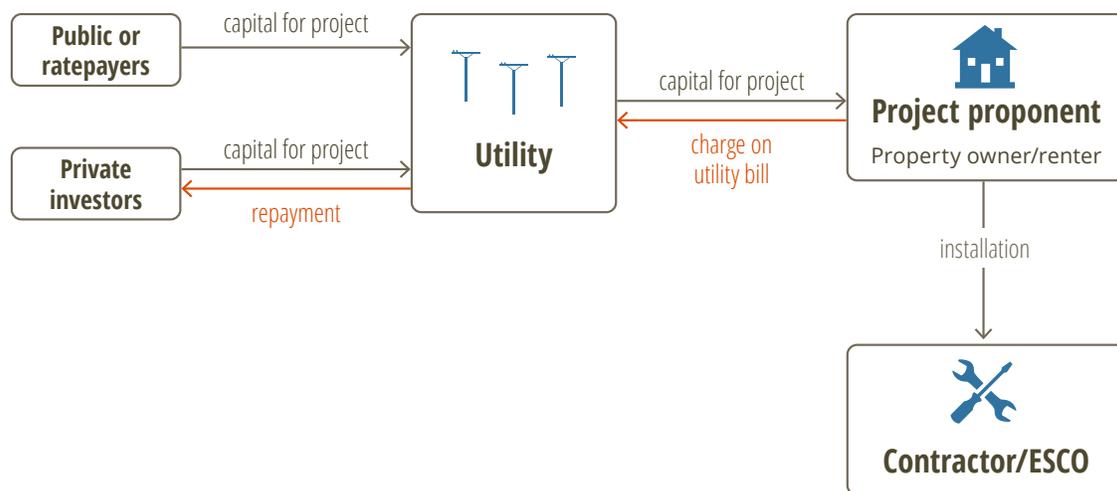


Figure 2. PAYS financing relationships

A number of jurisdictions in Canada have successfully implemented PAYS programs. In places where PAYS programs have been initiated, there has been a five-fold increase in energy efficiency retrofits.² Key to uptake is widespread applicant eligibility; financially attractive incentives such as longer payback periods and low interest rates; an efficient application process; and utility-facilitated installation. Manitoba Hydro's Power Smart Residential

² Clean Energy Works, "About PAYS for energy efficiency." <https://www.cleanenergyworks.org/about-pays-for-ee/>

Program, one of the most successful on-bill utility financing programs in North America, meets all of these criteria.³

Property tax financing / Property Assessed Clean Energy (PACE)

Property tax financing, also known as PACE financing, is typically administered by a municipality. In the case of remote Indigenous communities, it is often the local government, be that the First Nation council or another Indigenous government (depending on specific self-government agreements or reserve status), that is responsible for administering property taxes and hence would administer a PACE program.⁴

An application for a loan is submitted to the local government and repayment is made through an increase in the applicant’s property taxes. The loan is usually attached to the property itself rather than the property owner; consequently, the property tax line item would be inherited by a new building owner. Doing so allows PACE programs to take advantage of lower interest rates and payback periods longer than a building owner’s occupancy.⁵

The flow of capital in PACE is illustrated in Figure 3 below.

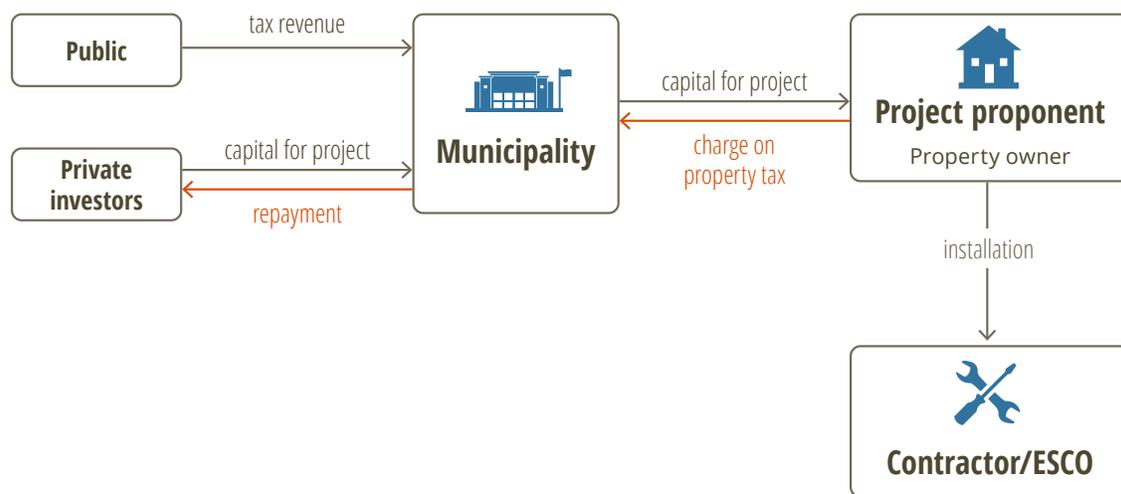


Figure 3. PACE financing relationships

³ Michelle Brownlee, *Financing Residential Energy Savings: Assessing Key Features of Residential Energy Retrofit Financing Programs* (Sustainable Prosperity, 2013). <https://institute.smartprosperity.ca/sites/default/files/publications/files/Financing%20Residential%20Energy%20Savings.pdf>

⁴ Government of Canada, “Fact Sheet – Taxation by Aboriginal Governments.” <https://www.rcaanc-cirnac.gc.ca/eng/1100100016434/1539971764619>

⁵ U.S. Department of Energy, “Property Assessed Clean Energy Programs.” <https://www.energy.gov/eere/slsc/property-assessed-clean-energy-programs>

It's worth noting that PACE financing is only available to property owners. By tying the loan to the property, energy efficient purchases that are not permanent upgrades, such as energy-efficient appliances, cannot be financed through PACE.

Successful PACE programs need to be both financially attractive and financially sustainable for the entity administering the program. Payback periods, loan rates, and customer incentives are all critical to success. Both Halifax's Solar City program and the City of Toronto PACE programs apply these criteria and have had significant uptake.⁶

Collaborative ownership

Through community solar and energy co-ops, individuals can work collectively to develop clean energy projects.

Collective ownership is a means of investing in community-based asset development, which generates local economic growth and brings distributed energy generation to the grid. Co-ops and community solar also build capacity as community members acquire the skills and knowledge required to support an energy transition in their community. These benefits can increase the visibility of clean energy projects and garner community support for more projects.

Community solar

Most community energy projects are solar PV systems, often referred to as community solar farms, and can be developed, owned, and operated by a community-based solar company or the local utility. Community solar projects in remote Indigenous communities provide an opportunity for Indigenous-owned businesses to develop and operate clean energy systems and to keep the revenue generated within the community. Community energy projects allow individual community members to buy or lease part of a shared renewable energy project in or near the community.

Financing for community solar varies. Upfront capital costs can be financed through PAYS or PACE programs, grants, loans, or investments made by community members. This service is especially beneficial for communities where renting is common, as community solar means that individuals can benefit from renewable energy without having to own property to attach solar panels.

Community solar projects are generally larger than projects run by an individual and thus benefit from economies of scale and access to a wider range of financing options. Stakeholder

⁶ *Financing Residential Energy Savings.*

relationships in a community solar project are shown in Figure 4; these relationships vary depending on project specifics.

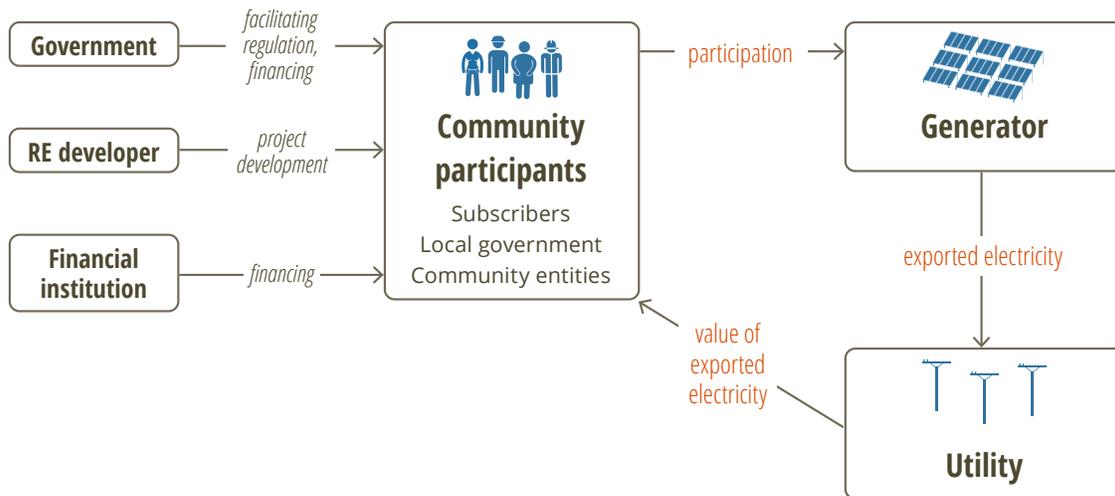


Figure 4. Business model blueprint for community solar projects

Adapted from: Pembina Institute⁷

There are many ways to increase community solar project accessibility. These include offering shares in the project for low-income community members, providing grants to offset membership fees, and incentives for solar installations on multi-family and multi-unit housing. These equitable access requirements can be implemented at the provincial/territorial level through policy mandates and financial incentives designed to target low-income households. Such requirements have been mandated in 15 states in the U.S. to increase uptake of community solar projects.⁸

Energy co-operatives

Co-operatives are governed and owned by and for their members. These members may be the customers, residents, or employees of the co-op. All members of a co-op have equal decision-making power and share profits equally. Co-ops are often overseen by a board of directors who are elected by the members. Members benefit from a positive return on investments based on the net profits generated by co-op projects.

If policy and regulations support it, renewable energy co-ops can serve as a community's utility, being responsible for the generation, distribution, and retail of energy. Co-ops can

⁷ Kabir Nadkarni and Sara Hastings-Simon, *Alberta Community Solar Guide* (Pembina Institute, 2017), 28. <https://www.pembina.org/pub/alberta-community-solar-guide>

⁸ National Renewable Energy Laboratory, *Equitable Access to Community Solar: Program Design and Subscription Considerations* (2021), 2. <https://www.nrel.gov/docs/fy21osti/79548.pdf>

adopt the community solar model to supply renewable energy to members — over 70% of community solar programs in the U.S. are co-op owned and operated.⁹

Renewable energy generation co-ops are the most common type of energy co-op.¹⁰ Renewable energy generation co-ops often enter into partnerships with the local utility to use the utility's distribution system to power member households. Members pay a service fee and the co-op uses the revenue to pay the utility.

The biggest challenges faced by co-ops include lack of community experience in the energy industry and limited access to capital. Government grants and loans offer support for project development and other business-related costs. One example is Ontario's Community Energy Partnerships Program, which helps renewable energy co-ops with startup costs that include regulatory approvals and feasibility studies.¹¹

Co-ops in the remote community context

The **Alaska Village Electric Cooperative** (AVEC) has been providing electricity to remote Alaskan communities for decades. It operates in 58 remote communities throughout the State. AVEC has more than 85 MW of installed renewable energy capacity and the largest service area of any retail electric co-operative in the world. Like remote communities throughout Canada, communities in Alaska experience high energy and infrastructure costs as well as difficulties in the transmission of energy. AVEC's solution was to connect community grids and pool resources and knowledge. A portion of AVEC's revenue stays within the communities.¹²

In Quebec, **La Fédération des Coopératives du Nouveau-Québec** (FCNQ) is owned by 14 member co-ops throughout Nunavik.¹³ FCNQ entered into a joint venture with Makivik Corporation, Nunavik's other main economic development organization, to form Tarquti Energy Corporation, a 100% Inuit-owned renewable energy company that expands FCNQ into the clean energy sector.¹⁴

⁹ Steven Johnson, "For Many Electric Co-ops, Community Solar is the Answer", (September 16, 2016). <https://www.electric.coop/many-electric-co-ops-community-solar-answer>

¹⁰ Judith Lipp, Mumtaz Derya Tarhan and Alice Dixon, *Accelerating Renewable Energy Co-operatives in Canada: A review of experiences and lessons* (TREC Renewable Energy Co-operative, 2016). http://www.trec.on.ca/wp-content/uploads/2016/08/2016_coop-arecc_report_final_screen.pdf

¹¹ *Accelerating Renewable Energy Co-operatives in Canada*.

¹² Aasa Marshall, "The Alaska Village Electric Co-op," *Cooperatives First*, September 27th 2017. <https://cooperativesfirst.com/blog/2017/09/27/alaska-village-electric-co-operative/>

¹³ La Fédération des coopératives du Nouveau-Québec, "Who we are." <http://www.fcinq.ca/en/qui-nous-sommes>

¹⁴ Makivik Corporation, "Tarquti Energy Corporation." <https://www.makivik.org/tarquti-energy-corporation/>

Policy recommendations for collaborative ownership models

Feed-in-tariff (FiT) programs and other policies that support connectivity between producer and consumer, such as calls for power or independent power producer policies, provide access to markets and grids. FiT programs offer transparent rates and terms for energy often with few or no restrictions on eligibility. Calls for power and power purchase agreements are typically negotiated on a project-by-project basis and therefore is not a transparent process.¹⁵

FiT programs are one of the most effective policy tools for supporting renewable energy co-ops.¹⁶ Ontario's introduction of a FiT program in 2010 was pivotal. The number of renewable energy co-ops jumped from two in 2010 to 111 in 2016.¹⁷ These policies can be designed to require that a designated portion of membership consist of members of the local community or that a percentage of membership be allocated to specific community groups. Ontario's FiT program offered an extra 1.5 ¢/kWh to energy co-ops with more than 50% First Nations and Métis participation. Nova Scotia's FiT program only accepted applications from projects that were at least 51% owned by community groups.¹⁸

Evaluating ESMs

Infrastructure, policies, and regulations make it difficult for remote communities to implement some of the energy services described above. For example, the prevalence of public housing in remote communities unjust restrictions of ownership and property rights on reserve land as defined in the Indian Act¹⁹ mean that people who rent their home cannot take advantage of property tax financing. In some instances, community members are not incentivized to enter into Energy Service Provider contracts as they do not benefit from equipment ownership and payback periods may exceed residency terms. On the other hand, community solar and renewable energy co-ops do not require members to own property nor be responsible for operating and maintaining energy systems.

Many energy service models entail a degree of support from utilities facilitated by government policies. For community solar projects and renewable energy co-ops, FiT or IPP policies need to

¹⁵ National Renewable Energy Laboratory, *A Policymaker's Guide to Feed-in Tariff Policy Design (2010)*, 2. <https://www.nrel.gov/docs/fy10osti/44849.pdf>

¹⁶ *Accelerating Renewable Energy Co-operative in Canada*.

¹⁷ Mumtaz Derya Tarhan, *Renewable Energy Co-operatives and the Struggle for "Critical" Energy Democracy: The Case of Ontario* (PhD dissertation, University of Toronto, 2020). https://tspace.library.utoronto.ca/bitstream/1807/103798/5/Tarhan_Mumtaz_Derya_202011_PhD_thesis.pdf

¹⁸ *Accelerating Renewable Energy Co-operative in Canada*.

¹⁹ Canada Mortgage and Housing Corporation, *Northern Housing Report (2021)*. <https://www.cmhc-schl.gc.ca/en/professionals/housing-markets-data-and-research/market-reports/housing-market/northern-housing-report>

be in place and offer attractive terms and conditions, which is often not the case in remote communities.

Utilities may perceive ESMs as competition for revenue. Both non-utility owned renewable energy and greater energy efficiencies result in revenue losses for a utility. At the same time, utilities are under pressure to keep energy rates low due to the high cost of living in remote communities.²⁰ Reforming utility business models will allow for the adoption of new revenue streams that encourage rather than impede the uptake of different energy service models will be critical moving forward.

Opportunities for Indigenous entrepreneurs

Several energy service models present opportunities for entrepreneurs to enter the market, including ESCOs, EaaS companies, community solar, and energy co-ops. In remote communities, where the majority of the population is usually Indigenous, new business models give rise to new and creative ways to develop clean energy projects and can create opportunities for Indigenous autonomy over, and participation in, the energy sector. Energy service models can be a catalyst for the development of Indigenous-owned and operated businesses.

Local, Indigenous, community-driven businesses possess place-based knowledge and likely have community support, both of which are crucial to successfully initiating clean energy projects. By partnering with non-local energy businesses, Indigenous entrepreneurs can eliminate any capacity shortfalls while still receiving the financial and ownership benefits of undertaking a clean energy project. Capacity-building programs can also support Indigenous community members' energy and business knowledge to help Indigenous entrepreneurs establish energy businesses and realize the full benefits.

Policy recommendations

Policy design and implementation

Many energy service models require tailored regulatory frameworks and policies to incentivize market entry. These include grants and entrepreneur loans for new business (leveraging the Government of Canada's Indigenous businesses initiative, tailored to clean energy businesses), and provincial/territorial government adoption of interconnection policies that create

²⁰ Matt Vis, "Hydro One proposes rate hike for remote northern communities", *Elliot Lake Today*, November 30, 2017. <https://www.elliottlaketoday.com/local-news/hydro-one-proposes-rate-hike-for-remote-northern-communities-779154>

opportunities for community solar and renewable energy co-ops to generate and sell energy to community members.²¹

Grants and low-interest loan programs are essential to overcoming a lack of startup capital and must be easily accessible for Indigenous applicants. They must also be designed to offset the barriers Indigenous proponents face when trying to access financing from traditional banks that require the use of land as collateral. Programs should be designed to prioritize and reward local and Indigenous business owners for creating avenues for local economic growth.

Energy rates offered to providers need to increase and be more attractive than the cost of subsidized diesel energy to create a strong business case and ultimately incentivize Indigenous businesses to enter the market.²² Rates should account for all social, environmental, and economic benefits and avoided costs gained from Indigenous-owned and operated renewable energy projects to ensure that externalities are included in the budgeting process and that proponents, particularly Indigenous developers, are given equitable access to the energy sector.²³

Regulatory change

Market entry should be facilitated through regulations that streamline the approval and connection of new independently owned renewable energy systems. For example, Alberta's Micro-generation Regulation, through which "Albertans obtain approval to generate their own energy and receive credit," was "developed to simplify approvals and interconnection and operating agreements with customers and wires owners."²⁴ Before this, independent generators were required to undertake a lengthy application process to connect to the grid and operate as energy suppliers.

Current regulations are not always conducive to the implementation of innovative energy service models. Regulatory amendments will be needed to support more community solar and energy co-ops. For example, the Vancouver Renewable Energy Co-op had to seek regulatory amendments to lower entry barriers for small-scale renewable energy developments.

²¹ Government of Canada, "Indigenous business initiative." <https://www.sac-isc.gc.ca/eng/1588079295625/1588079326171>

²² Marvin Quitaras, "Better government policies will unlock the cash remote Indigenous communities need for clean energy", *Pembina Institute*, May 4, 2021. <https://www.pembina.org/blog/better-government-policies-will-unlock-cash-remote-indigenous-communities-need-clean-energy>

²³ Pembina Institute, "Fair and Inclusive Rates." <https://www.pembina.org/FairRates>

²⁴ Alberta Utilities Commission, *Micro-generation notice submission guideline*. https://www.auc.ab.ca/regulatory_documents/Reference/MicrogenerationNoticeSubmissionGuideline.pdf

Another example was an amendment to the Quilliq Energy Corporation Act to allow entities other than QEC to sell power to the utility. However, QEC remains the sole entity for the retail supply of power — other producers are still required to sell their power only to QEC.²⁵ Regulations need to allow for equitable access to markets, potentially requiring additional amendments to legislation.

New and smart policies, in addition to regulatory reform that addresses the unique circumstances of the energy landscape in remote communities, are required in order to adopt new energy service models smoothly and successfully. These key changes will facilitate diversification in the energy sector and provide pathways for Indigenous participation in, and ownership of, energy services. Accelerating the clean energy transition in remote communities by addressing financial and capacity roadblocks entails the adoption of programs and services that are tailored to the unique needs and regulatory context in these places.

²⁵ Government of Nunavut, *Second session fifth legislative assembly of Nunavut, Government Bill, Bill 12, an act to amend the Quilliq Energy Corporation Act*. <https://www.assembly.nu.ca/sites/default/files/Bill-12-QEC-Act-English-French.pdf>