

Production Incentives

How the federal government can fill the cost–revenue gap for clean energy in remote communities

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- Boreal Grid
- Kisik Clean Energy
- Kluane First Nation
- Government of Northwest Territories
- Government of Nunavut
- Northern Energy Capital
- Nunavut Nukkiksautiit Corporation
- Solvest Inc.
- Tlingit Homeland Energy Limited Partnership (THELP)

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Executive summary

Financial barriers continue to limit the viability of renewable energy projects developed by independent power producers (IPPs) in remote diesel communities. Power purchase agreement (PPA) rates are often based on the value of diesel displacement, rather than project-specific development, operating and decommissioning costs. When combined with high upfront capital requirements, PPA prices set outside a competitive bid process increase project risk, leaving IPPs with little margin to absorb cost overruns or underperformance. This dynamic can discourage community ownership, constrain project scale and require communities to accept lower economic returns in order to participate in the clean energy transition. As a result, renewable energy projects in remote diesel communities remain highly reliant on government capital grants and contributions to manage risk and achieve financial viability.

A production incentive, structured as a per kilowatt-hour (kWh) price adder to IPP power purchase agreements, represents a potential policy option to address these barriers and improve the efficiency of federal support for renewable energy deployment on remote diesel grids. By linking support to actual energy production, such an incentive could improve project bankability and reduce financial risk, while preserving affordability for utilities and consumers. However, production incentives are not without limitations and must be carefully designed to avoid disadvantaging smaller or high-cost projects.

This paper explores the potential role of a federal production incentive in advancing renewable energy in remote diesel communities. It draws on qualitative input from conversations with Indigenous clean energy leaders and developers active in remote communities, as well as desktop research on the use of production-based price adders in Canada and comparable mechanisms used internationally.

Based on this assessment, the paper identifies a set of recommendations that set out how the federal government could explore introducing a production incentive for remote diesel communities:

1. Introduce a federal, production-based PPA top-up for renewable electricity on remote diesel grids to close the revenue gap created by avoided-diesel pricing. The top-up should raise project revenues to a bankable level, improving project viability and financing outcomes.
2. Co-design the production incentive with Indigenous partners through a time-limited, Indigenous-led process. Establishing a dedicated co-design mechanism, such as a taskforce, would ensure governance, pricing and access rules reflect Indigenous

priorities, regional equity and operational realities of remote power systems, supporting program legitimacy and durability.

3. Redirect a portion of ongoing federal diesel subsidy spending into a dedicated, long-term renewable energy fund that finances a transparent, production-based incentive, shifting public support from diesel consumption to verified diesel displacement and improving value for money while advancing community economic development and energy security.
4. Maintain and replenish dedicated federal funding programs to support Indigenous-led energy systems in remote communities, recognizing that grants and contributions are still required to address upfront costs and capacity needs not covered by production incentives.

1. Introduction

More than 210 communities in Canada are not connected to the North American electricity grid and rely primarily on diesel generation for electricity.¹ Federal, regional and Indigenous governments have prioritized reducing diesel use while increasing Indigenous participation in the electricity sector.² Many Indigenous communities are pursuing these goals by developing and owning renewable generation as independent power producers (IPPs) and selling electricity to local utilities under long-term power purchase agreements (PPAs).

Considerable progress has been made over the past decade in advancing Indigenous-owned renewable energy projects in remote diesel communities.³ Despite this, IPPs continue to face strong headwinds. Accessing sufficient funding, securing financing, and establishing adequate long-term revenue certainty remain persistent challenges, often requiring the financial support of federal, provincial, and territorial governments. This paper explores the use of production incentives as a tool for addressing these shortcomings and supporting a stronger financial and policy landscape for Indigenous and community-owned clean energy.

Production incentive

A production incentive is a form of government support paid to independent power producers for each unit of electricity generated, in addition to revenues received under power purchase agreements. Producers receive payment based on actual electricity production (in dollars per-kilowatt-hour (\$/kWh)). This provides a predictable, long-term revenue stream over the life of a project.

To date, federal funding has played a critical role in the development of renewable energy projects in remote, diesel-reliant communities, largely through grants and contribution agreements that provide upfront capital and capacity funding during project development. These programs have spurred meaningful progress and remain essential for advancing Indigenous-led renewable energy in remote communities and for meeting Canada's commitments to reconciliation and diesel reduction. However, financial challenges for these

¹ Arthur Bledsoe, *Diesel Reduction Progress II: Review of remote clean energy deployment and diesel consumption from 2016-2025* (Pembina Institute, 2026). https://www.pembina.org/sites/default/files/2026-04/Diesel_Reduction_Progress_II.pdf

² Arthur Bledsoe, Emily He and Rosa Brown, *Restoring the Flow: Policies to support Indigenous-led clean energy in remote communities* (Pembina Institute, 2025). <https://www.pembina.org/pub/restoring-flow>

³ *Diesel Reduction Progress II*

projects persist, including long-term revenue certainty, risk allocation and access to private financing, particularly for Indigenous-led projects in small communities.⁴

Against this backdrop, some Indigenous clean-energy advocates have raised interest in exploring whether a production incentive could complement existing federal funding programs by addressing these unresolved challenges. Proponents of the policy measure argue that a stable, long-term revenue stream linked to energy production could strengthen project bankability, spur private investment, and advance federal priorities to improve the efficiency of public spending.

This paper examines the possible benefits and limitations of a federally funded production incentive in accelerating Indigenous-led IPP projects in remote diesel communities. Our findings offer a preliminary exploration into the development and delivery of a federal production incentive, and under what conditions it may or may not be effective. This analysis is intended to inform early-stage policy conversations and support further work by federal decision-makers and Indigenous clean energy leaders working to reduce diesel reliance in remote communities.

This work was informed by conversations with governments, Indigenous clean energy leaders in remote diesel communities, and the developers working with them. These discussions provided insight into project-level financial realities that are not always captured in publicly available data, including concerns about long-term revenue sufficiency and community financial benefits. A desktop review was also conducted to examine the use of production incentives domestically and internationally, to assess whether and how this policy tool could be applied to remote diesel communities in Canada.

⁴ Personal communications with research participants, July-December 2025.

2. The economics of independent power production in remote communities

2.1 Financial challenges of remote energy

Renewable energy projects in remote diesel communities are more expensive and more complex than similar projects on large, interconnected grids.⁵ Isolated diesel systems require customized design, advanced controls and often battery energy storage to maintain reliability. Construction is more expensive and carries more risk due to short building seasons, fragile transportation links and the limited availability of specialized equipment, skilled workers and professional services.⁶ With small local loads, projects are limited in size, which raises per-kilowatt costs and means that fixed development costs and soft costs such as engineering, permitting, legal work and community engagement make up a larger share of total project budgets.

2.2 The cost–revenue gap

Against this backdrop, the rate IPPs receive for the electricity they generate is usually tied to the utility’s avoided cost of diesel generation, rather than competitively procured contracts that fully account for project costs.⁷ This means that PPA rates are determined by what the utility would have spent on diesel fuel and its transportation to the community. They may also include a portion of avoided operations and maintenance if diesel runtime is reduced.⁸ While this approach is designed to protect ratepayers by ensuring IPP projects do not increase overall utility costs, it also comes with unintended consequences. PPA rates may be too low to cover the actual costs to develop and operate renewable projects, or fail to provide the revenue needed to ensure communities earn a reasonable financial return for the energy they produce. This cost-

⁵ Naka Power Utilities (NWT), “NWT Energy Landscape.” <https://www.nakapower.com/en-ca/customer-billing-rates/rates-regulations/nwt-energy-landscape.html>

⁶ Dunsky Energy + Climate Advisors, *Utility Impacts of Clean Energy Projects in Remote Communities, Final Report*, prepared for Natural Resources Canada and Crown-Indigenous Relations and Northern Affairs Canada (2023), Findings. <https://natural-resources.canada.ca/climate-change/findings-clean-energy-transition-utilities-serving-remote-communities>

⁷ Emily He, *Power Purchase Agreements Part II: An overview of contract terms and conditions for Indigenous clean energy project proponent in remote communities* (Pembina Institute, 2024), 10. <https://www.pembina.org/pub/power-purchase-agreements>

⁸ Government of Yukon, *Public Utilities Act, O.I.C. 2019/25*. https://yukonutilitiesboard.yk.ca/pdf/OICs/OIC_2019-25.pdf

revenue gap is a challenge that was consistently highlighted by Indigenous IPPs we interviewed for this research. As a result, many projects with avoided diesel PPA rates struggle to cover capital and long-term operating costs without substantial upfront public funding, while also bearing uncertain financial risks related to operations and decommissioning costs, and may or may not generate a financial return for community benefit.

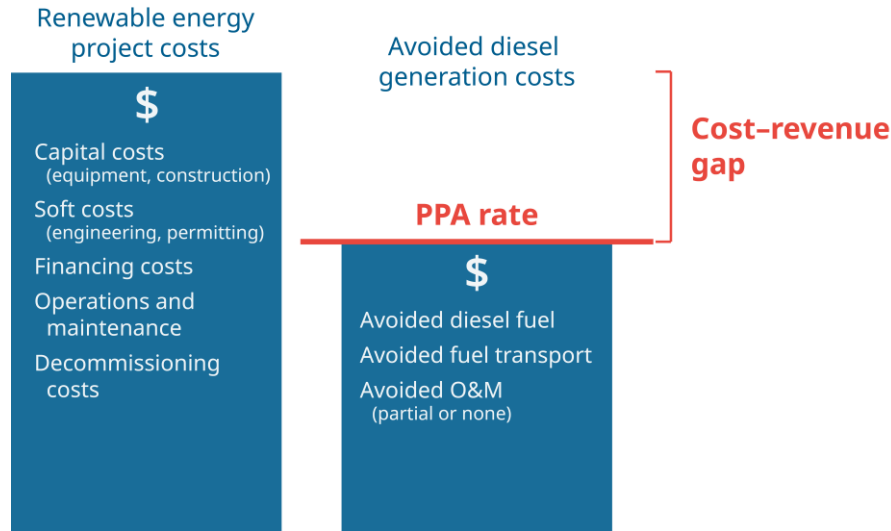


Figure 1. The cost-revenue gap

This disconnect between costs and revenue also shapes how financial risk is allocated. PPA rates cannot adjust to reflect higher capital costs, financing terms or operational uncertainty, so these risks are effectively transferred to project proponents. For Indigenous-led IPP projects, this means that communities are expected to absorb any construction cost overruns, higher than expected operations and maintenance (O&M) costs, and performance risk, despite having limited ability to influence these factors.

This pricing approach reflects a fundamental challenge inherent to remote diesel systems. Although the cost of renewable energy technologies has declined significantly and is often lower than diesel generation on a unit-cost basis, integrating renewables into small, islanded grids does not necessarily reduce overall system costs.^{9,10} Unlike large, interconnected grids, remote diesel systems have limited ability to manage renewable intermittency without compromising

⁹ IRENA, *Renewable Power Generation costs in 2024*, (International Renewable Energy Agency, 2025).

https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2025/Jul/IRENA_TEC_RPGC_in_2024_2025.pdf

¹⁰ InterGroup Consultants, *Net Metering and Community Self-Generation Policy Review, Final Report* (2021). Available

https://www.inf.gov.nt.ca/sites/inf/files/resources/gnwt_net_metering_and_community_generation_review.pdf

reliability, and diesel generator must remain in place to meet demand.¹¹ As a result, renewables often function as a supplementary or redundant energy source rather than a direct substitute, adding to total system infrastructure costs rather than displacing them. Without a corresponding reduction in diesel infrastructure or total system costs, utilities have limited ability to absorb the additional cost of renewable energy projects without increasing rates for all customers.

These challenges are further compounded by the structure of energy systems in the North (where most remote diesel communities are located). Electricity costs in the North are already significantly higher than on southern grids, and regulatory frameworks generally require that IPP projects must not increase costs for utilities or ratepayers.¹² While these constraints protect affordability for communities, they also eliminate any flexibility to adjust PPA rates to recover higher capital, operating and financing costs. Projects must therefore bear elevated cost and risk pressures without any corresponding increase in revenue, undermining their ability to secure financing.

By contrast, renewable energy projects on integrated grids are typically developed through competitive procurement processes that allow proponents to bid PPA prices that reflect the actual cost of construction, financing and long-term operations. Projects that proceed do so under PPAs that support financing and long-term viability. Remote communities do not have access to this pricing flexibility or market-based cost recovery.

¹¹ Emile Forcier, *Microgrid Stability with Intermittent Renewables, Renewable Energy Penetration Analysis*, (CIMA+, 2021). Available at https://www.inf.gov.nt.ca/sites/inf/files/resources/s13291a_renewable_energy_penetration_analysis_-_gnwt.pdf

¹² Dave Lovekin and Dylan Heerema, *The True Cost of Energy in Remote Communities* (Pembina Institute, 2019) <https://www.pembina.org/reports/diesel-cost-backgrounder-2019.pdf>

Table 1. Key differences between remote diesel and grid-connected Indigenous IPPs

Indigenous IPPs sell electricity into:	Project objectives	Ownership model	Project capacity	Price for power
Remote diesel grids	Energy sovereignty Local environmental and health impacts Economic reconciliation Climate mitigation	Most are 100% Indigenous owned (Indigenous governments, development corporations, communities and/or developer)	Community-scale generation: 250 kW to 3 MW	Avoided diesel PPA: PPA price is based on the avoided diesel; does not factor RE costs. High-risk PPA with varying investment returns.
Interconnected provincial grids	Economic reconciliation Climate mitigation	Most are equity partnerships with private developers	Utility-scale generation: 50 to 200 MW	Competitive procurement: PPA price is based on market value of RE. Bankable PPA, with investment return of 8–15%

In the absence of such mechanisms, Indigenous IPPs in remote communities often face a situation where projects that are technically viable and align with community priorities remain unprofitable and financially risky. The combination of capped revenues and high fixed costs increases sensitivity to even modest deviations in performance or cost assumptions. This dynamic can discourage community ownership, limit the scale of projects, or require communities to accept lower economic returns in order to participate in the clean energy transition.

In summary, the business case for Indigenous IPP projects in remote diesel communities is shaped by small scale, low IPP prices, elevated costs and limited financing options. Together, these conditions create persistent revenue and capital gaps that cannot be closed by project efficiencies alone. The next section outlines how federal funding has been used to address these economic gaps, and what should be considered in shaping future funding support programs.

Diesel subsidies and unintended impacts on IPPs

In most remote communities, the true cost of electricity is partially obscured by a range of direct and indirect diesel subsidies.¹³ These typically include the cost of fuel and its transportation, capital funding for diesel infrastructure and operating subsidies that allow utilities to recover costs without fully passing them on to local ratepayers. The indirect costs of diesel include the environmental, health and social impacts that are difficult to quantify and are generally not accounted for.

While these subsidies play an important role in maintaining affordability and reliability for remote communities, they also shape how avoided diesel PPA rates are calculated (Figure 2) and can disadvantage IPPs by:

- Lowering avoided diesel benchmarks used to set PPA rates
- Masking the long-term economic benefits of reducing diesel dependence
- Shifting the financial burden of clean energy transitions onto IPPs and communities rather than the electricity system as a whole

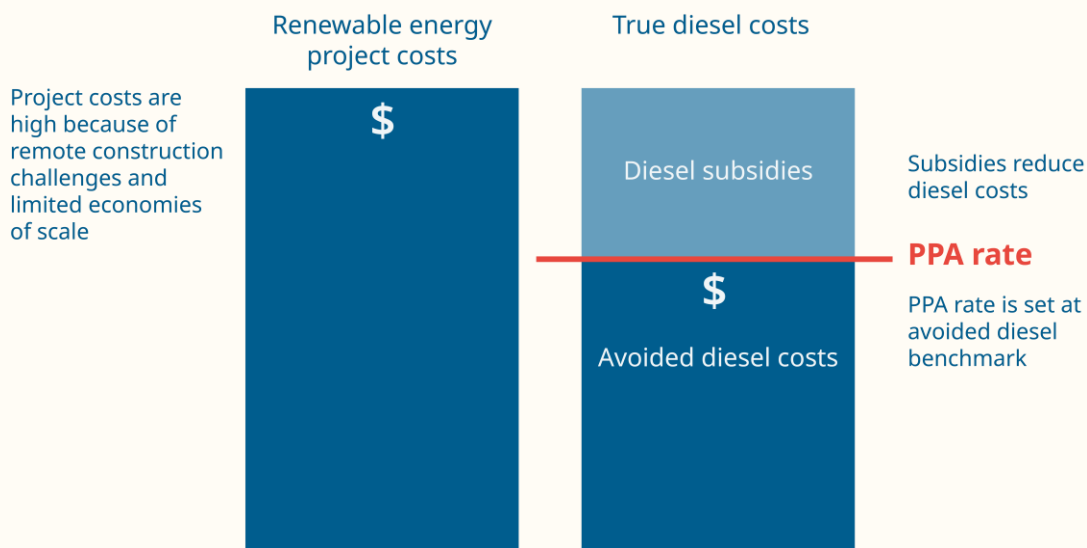


Figure 2. How diesel subsidies can disadvantage IPPs

Renewable energy in remote communities is expensive to develop and will rarely be economical without accounting for existing diesel subsidies and redirecting a portion of that support toward renewable energy alternatives.

¹³ Dave Lovekin, *Diesel Subsidies – Simplified, Part 1* (Pembina Institute, 2021) <https://www.pembina.org/pub/diesel-subsidies-simplified-part-i>

2.3 The role of federal funding

Federal support has been a strong catalyst for IPP renewable energy project development in remote communities.¹⁴ Together, an array of programs has been used to help make IPP projects financially viable on small, isolated grids by providing upfront capital contributions to lower project costs, and by supporting capacity needs to strengthen Indigenous ownership and governance.¹⁵

Why federal support matters for remote Indigenous IPPs

The federal government plays a central role in supporting clean energy development in remote communities, one that cannot be filled by territorial governments or utilities alone.

Territorial governments contend with small tax and ratepayer bases, borrowing limits and high per-capita infrastructure costs, which limits their ability to fund large-scale or sustained clean energy investment programs. At the same time, remote diesel communities sit at the intersection of key federal priorities, including climate action, diesel reduction and Indigenous economic participation.

The federal government also has a direct fiscal stake: more than \$300 million is spent annually to subsidize diesel use in remote communities.¹⁶ Redirecting a portion of existing public expenditures toward clean energy solutions will help reduce long-term costs, emissions and diesel dependence.

Finally, remote diesel communities are located across multiple provinces and territories and face similar technical and economic challenges. This national footprint supports a coordinated federal policy approach, rather than relying solely on jurisdiction-by-jurisdiction solutions.

Since 2022, the federal government has committed over \$300 million to support clean energy projects in Indigenous, rural and remote communities as part of its efforts to reduce diesel

¹⁴ Government of Canada, “Wah-ila-toos: Clean Energy Initiatives in Indigenous, rural and remote communities” <https://www.canada.ca/en/services/environment/weather/climatechange/climate-plan/reduce-emissions/reducing-reliance-diesel.html>

¹⁵ Government of Canada, “Northern REACHE Program.” <https://www.rcaanc-cirnac.gc.ca/eng/1481305379258/1594737453888>

¹⁶ *Diesel Subsidies – Simplified, Part 1*

reliance.¹⁷ While this funding has enabled some early project deployment, it remains grant-intensive and has not materially shifted most projects, particularly smaller ones, toward debt financing or self-sustaining business models. Over time, the delivery of funding programs has moved toward Indigenous-led or co-designed models, bundling capital with capacity and technical support and simplifying access with single-window application processes.¹⁸ The outcome has been project development that is heavily reliant on grant funding with some provincial/territorial or utility contributions, but with limited participation from private lenders or investors. Most small IPP projects rely almost entirely on public grants and contributions.

While federal funding has been effective for incentivizing early deployment, a grant-intensive approach is difficult to scale and offers limited leverage of private capital. As federal priorities move toward emphasizing scalable, market-based mechanisms that improve bankability and reduce long term public funding requirements, there is a growing need to complement capital support with mechanisms that provide greater revenue certainty.

Policy and financial tools to advance progress

Currently, government funding programs provide the majority of financial support for renewable energy projects in remote communities but fall short of unlocking private financing. This reflects a notable gap, as Indigenous-owned clean energy projects in remote areas face chronic pronounced economic, institutional, and technical barriers to accessing private capital for renewable energy development.¹⁹

Federal, territorial, and provincial governments have a suite of policy tools available to help IPPs address these financial barriers. These policies have varied impacts on the business case of projects, as described Table 2.

¹⁷ Government of Canada, “Government of Canada Investing \$300 Million in Clean Energy Projects in Indigenous, Rural and Remote Communities,” media release, April 25, 2022. <https://www.canada.ca/en/natural-resources-canada/news/2022/04/government-of-canada-investing-300-million-in-clean-energy-projects-in-indigenous-rural-and-remote-communities.html>

¹⁸ “Wah-ila-toos: Clean Energy Initiatives in Indigenous, rural and remote communities”

¹⁹ Katarina Savic, *The case for investing in clean energy in remote communities*, (Pembina Institute, 2022). <https://www.pembina.org/reports/case-for-investing-in-clean-energy-in-remote-communities.pdf>

Table 2. Policy tools to support renewable energy

Policy and financial tools	Description	Impact on the business case for renewables	Canadian example
IPP policies and power purchase agreements	Establishes diesel-displacement tariff and rates, technical requirements and contract terms for the sale of electricity generated by the IPP to the utility. ²⁰	Reduces risk to the utilities by setting an IPP price and conditions that will not impact rates for utility customer. Reduces risk to IPPs by establishing a set PPA price that can be used for financial planning.	Qulliq Energy Corporation, Independent Power Producer Policy ²¹ Yukon's Independent Power Production Policy ²²
Grants and contributions	Provides upfront capital funding to support capex and capacity	Shifts financial risk from the IPP to the government.	Northern REACHE: Northern Responsible Energy Approach for Community Heat and Electricity CERRC: Clean Energy for Rural and Remote Communities
Concessional financing	Provides long term, low-cost debt.	Reduces upfront cash requirements but may come with a high administrative burden. Reduces financial risk to IPP by making the project more attractive to private investment	Canada Infrastructure Bank's Indigenous Community Infrastructure Initiative
Production incentive	Increases IPP revenue over the long term.	Reduces financial risk making the project more attractive to private investment. Shifts some financial risk from the IPP to the government.	Wind Power Production Incentive ecoEnergy for Renewable Power See Section 3.1
Tax incentive	Provides refundable tax credits equal to a portion of the capital cost of eligible investments.	Reduces upfront capital costs	Clean Electricity Investment Tax Credit

²⁰ Rosa Brown, *Independent Power Producer Policies: Why they matter in the North and how they support community-led clean energy projects* (Pembina Institute, 2026). <https://www.pembina.org/pub/independent-power-producer-policies>

²¹ Qulliq Energy Corporation, *Independent Power Producer, Policy Section: Corporate, Policy #:9.01*. https://www.qec.nu.ca/sites/default/files/ipp_policy_final_19dec2023_eng.pdf

²² Government of Yukon, *Yukon's Independent Power Production Policy, Updated October 2018*. <https://yukon.ca/sites/default/files/emr/emr-yukon-independent-power-production-policy.pdf>

The least explored of these policy mechanisms is the production incentive — a tool that, when used in concert with other existing policies, could address barriers to private capital and widen the path for community-led clean energy development. We explore production incentives further in the next section.

Considering the unique role the federal government plays in the remote energy landscape, we focus on the federal applicability of production incentives and how they can be used to strengthen the existing policy regime for diesel reduction and local and Indigenous clean energy leadership.

3. Production incentives

The term *production incentive* can refer to a wide range of financial and regulatory tools used by governments to improve the business case for renewables in markets where fossil fuel is the lowest-cost energy source. In this paper, the term *production incentive* is used to mean a long-term, federally funded contribution that increases the amount an independent power producer receives for each unit of electricity produced. This funding is provided as a per-kWh top-up to an existing power purchase agreement and is intended to compensate IPPs for the actual energy they generate so they can achieve sufficient revenues to make their projects financially viable.

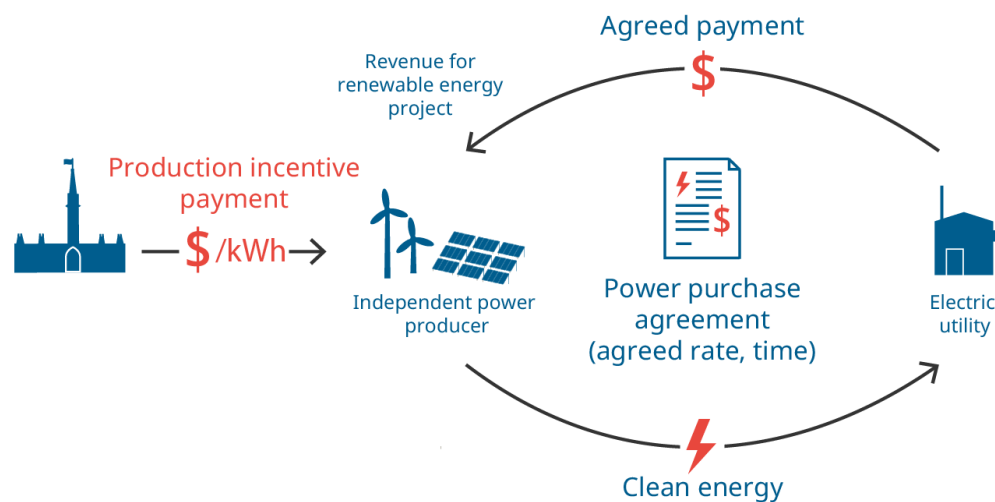


Figure 3. How production incentives support independent power producers

3.1 Canadian production incentive programs

Canada's experience with production incentives is limited but offers several instructive models. These programs use per-kWh payments to close revenue gaps, attract investment and accelerate early deployment of renewable energy.

3.1.1 Renewable Energy Deployment Program (2002)

Natural Resources Canada introduced the Renewable Energy Deployment Program (RED) in 2002 to help build a sustainable market for renewable energy in Canada. Two production incentive programs within RED helped narrow the cost gap between renewable and conventional energy generation: the Wind Power Productive Incentive (WPPI) and ecoEnergy for Renewable Power (ecoERP).

Wind Power Production Incentive (2002-2007)

WPPI was the first federal program under RED to offer a production incentive, providing \$0.008-\$0.012/kWh for the first 10 years of a project's operation. It aimed to support up to 1,000 MW of new wind capacity and ultimately approved 22 projects at about 924 MW.²³

WPPI was designed to cover roughly half the cost premium of wind relative to conventional energy. The program included special eligibility provisions for northern and remote communities, allowing projects as small as 20 kW; however, there were no projects built in remote diesel communities under this program.²⁴

ecoEnergy for Renewable Power (2007-2011)

ecoERP, which replaced WPPI, included a wider scope of eligible renewable energy sources, including wind, low-impact hydro, biomass, solar PV and geothermal. It offered a \$0.01/kWh production payment for the first 10 years of operation for eligible projects. The program invested approximately \$1.4 billion over its duration and supported 104 projects, contributing to 4,460 MW of new renewable capacity across Canada.^{25,26}

Remote Community Wind Incentive Program

In 2006 the Canadian Wind Energy Association (now known as the Canadian Renewable Energy Association) proposed the Remote Community Wind Incentive Program (ReCWIP) to extend federal production incentives to diesel-dependent northern communities and industrial sites.

ReCWIP proposed an incentive of \$0.15/kWh for the first decade, structured so that roughly one-third would be delivered upfront as a capital grant and the remainder as a production-based payment, mirroring effective incentive levels under ecoEnergy for southern-based, large-scale projects. Although never implemented, ReCWIP provides meaningful insight into

²³ Natural Resources Canada, "Wind Power Production Incentive Contribution Program." <https://natural-resources.canada.ca/corporate/planning-reporting/departmental-plan/rpp-2015-16/wind-power-production-incentive-contribution-program>

International Energy Agency, "Wind Power Production Incentive (WPPI)," March 2013. <https://www.iea.org/policies/3771-wind-power-production-incentive-wppi>

²⁴ Timothy Weis and Adrian Ilinca, "Assessing the potential for a wind power incentive in remote villages in Canada," *Energy Policy*, 38, no. 10 (2010).

<https://www.sciencedirect.com/science/article/abs/pii/S0301421510003137?via%3Dihub>

²⁵ Government of Canada, "ecoEnergy for Renewable Power." <https://natural-resources.canada.ca/ecoenergy-renewable-power>

²⁶ International Energy Agency, "ecoEnergy for Renewable Power". <https://www.iea.org/policies/4575-ecoenergy-for-renewable-power>

the much higher incentive levels required to make renewable energy projects financially viable on remote diesel grids.²⁷

3.1.2 Alberta's Renewable Electricity Program (2017-2019)

Alberta's Renewable Electricity Program (REP) used a competitive contract for differences mechanism to provide long-term price certainty to renewable energy producers in a deregulated electricity market. Under this structure, renewable energy producers with the lowest bids were awarded long-term contracts. When the wholesale electricity price fell below that bid price, the government paid the renewable energy generator the difference. When prices exceeded the bid price the renewable energy generator paid the difference.²⁸ In this way, the REP acted much like a price adder.

The program delivered some of the lowest renewable electricity prices recorded in North America and procured more than 1.3 GW across three rounds before its cancellation in 2019.²⁹

3.2 International production incentive programs

The deployment of renewable energy has been accelerated in international markets through production-based top-ups that bridge the gap between renewable generation and prevailing electricity prices. While these programs were designed primarily for competitive electricity markets rather than utility-procured systems, they offer useful examples of how targeted production incentives can improve revenue certainty, reduce investment risk and accelerate deployment of renewable energy sources.

²⁷ Sean Whittaker, *Canada's Opportunity for Wind Energy in Northern and Remote Communities*, presentation, 2009 International Wind-Diesel Conference, June 1, 2009. <https://www.pembina.org/reports/wind-diesel-1-sean-whittaker.pdf>

Tim Weis and John Maissan, *Assessing the Potential Uptake for a Remote Community Wind Incentive Program in Canada* (Pembina Institute, 2007). <https://www.pembina.org/pub/assessing-potential-uptake-remote-community-wind-incentive-program-canada>

²⁸ Pembina Institute, *Alberta's Renewable Electricity Program*. <https://www.pembina.org/reports/renewable-electricity-program-background.pdf>

²⁹ Sara Hastings-Simon, Andrew Leach, Blake Shaffer and Tim Weis, *Alberta's Renewable Electricity Program: Design, Results, and Lessons Learned*. <https://aleach.ca/publications/rep.pdf>

3.2.1 Europe: Sliding premiums

Spain: Sliding feed-in premium

Spain was one of the earliest adopters of feed-in premium (FiP) incentives, introducing a system in which renewable generators sold electricity into the market and received an additional premium payment on top of the market price.^{30,31} Unlike a feed-in tariff, which is a fixed price incentive for renewable energy, the FiP structure exposed projects to real electricity prices while still providing a predictable revenue uplift, functioning effectively as a per-kWh price-adder. Developers could choose between a fixed feed-in tariff or the FiP for many technologies, with larger projects required to use the FiP model. In recent years, Spain has updated its approach through competitive renewable energy auctions, where the winning bids receive a sliding feed-in premium. This evolution preserves the core concept: governments provide production-based payments that stabilize revenues while maintaining a link to market conditions. This makes Spain's FiP system a long-standing international example of a production-based price-adder approach.³²

Germany: Market premium

As Germany's renewable energy sector grew and became more established, the country, like Spain, moved away from offering a feed-in-tariff and required renewable energy generators to participate in spot market energy sales. The market premium system better reflected actual electricity prices and compensated generators for extra costs.³³ Under this approach, renewable energy generators sell their electricity into the power market and then receive a premium payment from the grid operator based on a pre-determined support level compared to the average market price for electricity each month. For larger projects, the support level is set by competitive bid processes while smaller projects use a statutory value. If the market prices are low, the premium rises. If prices are higher, the premium falls. In this way, the support acts as a sliding per-kWh price adder rather than a fixed tariff. The market premiums allow renewable

³⁰ Energypedia, "Feed-in Premiums (FiP)." https://energypedia.info/wiki/Feed-in_Premiums_%28FiP%29

³¹ International Energy Agency, "Feed-in tariffs for electricity from renewable energy sources (Special regime)," May 1, 2017. <https://www.iea.org/policies/4555-feed-in-tariffs-for-electricity-from-renewable-energy-sources-special-regime?country=Spain>

³² Elise Martins, "Energy Procurement made simple," *Synertics Energy Analytics*, October 8, 2024. <https://synertics.io/blog/144/electricity-market-concepts-feed-in-premiums>

³³ Vattenfall, "Market premium model, market premium and market value." <https://energysales.vattenfall.de/en/publications/market-premium-model>

energy generators to operate in a competitive market environment without losing financial stability.

3.2.2 Europe: Contracts for difference

Contracts for difference (CfDs) were introduced by the U.K. government in 2014 as the primary mechanism for supporting large-scale, low-carbon electricity generation.³⁴ They are widely regarded as a successful policy model and have since influenced similar approaches across Europe.³⁵ More recently, Canada has adopted the CfD model through the Canada Growth Fund to stabilize carbon credit revenues and reduce investor exposure to policy and market volatility.³⁶

The strike price under a CfD is established through a competitive auction, where developers bid the minimum price at which they are willing to build and operate a project. When the wholesale reference price of electricity is below the strike price, the renewable energy producer is paid the difference, and when it is above, the producer returns the surplus. By guaranteeing stable revenues and insulating developers from price volatility, CfDs reduce investor risk, improve project bankability and attract private capital to renewable energy.

3.2.3 U.S.: Production tax credits

The Renewable Electricity Production Tax Credit (PTC), used in the United States, is a production-based federal tax credit for electricity generated by qualified renewable energy resources, providing up to \$0.0275/kWh for electricity generated from wind, closed-loop biomass and geothermal resources. The credit applies for 10 years after the equipment becomes operational. The PTC is a direct reduction of the final tax bill owed to the IRS, unlike a tax deduction, which only reduces taxable income.³⁷ A direct pay option allows Tribal governments,

³⁴ U.K. Department for Energy Security and Net Zero, “Contracts for Difference,” December 16, 2025. <https://www.gov.uk/government/collections/contracts-for-difference>

³⁵ Florence School of Regulation, “CfDs for renewables deployment: multiple design choices to support them all” July 4, 2024. <https://fsr.eui.eu/cfds-for-renewables-deployment-multiple-design-choices-to-support-them-all/>

³⁶ Department of Finance, Government of Canada, “Deputy Prime Minister welcomes the Canada Growth Fund’s first carbon contract for difference,” news release, December 20, 2023. <https://www.canada.ca/en/department-finance/news/2023/12/deputy-prime-minister-welcomes-the-canada-growth-funds-first-carbon-contract-for-difference.html>

³⁷ Legal Clarity, “Understanding the Production Tax Credit Under IRC Section 45.” <https://legalclarity.org/understanding-the-production-tax-credit-under-irc-section-45/>

as non-taxable entities, to directly monetize the PTC, in which it becomes more like a grant contribution that can be used for upfront project development costs.³⁸

3.3 Strengths and limitations of production incentives

Production incentives present compelling opportunities to support, or, where appropriate, substitute for existing funding programs that support Indigenous IPPs in remote diesel communities. Understanding how production incentives compare to other support mechanisms, such as grants and contributions, concessional financing and tax-based incentives, provides insight into their potential application. Production incentives offer potential benefits for remote communities, but they also present limitations, which are described below.

Strengths of production incentives

Production incentives offer several features that may make them a useful tool for supporting Indigenous IPPs in remote communities:

- **Measurable, performance based and outcome driven:** Funding is tied to the actual energy produced by an IPP project, creating a measurable and transparent link between program spending, diesel displacement and GHG reductions.
- **Supports long-term operational success:** Ongoing production-based revenue can help communities manage operations and maintenance requirements.
- **Improves project bankability:** Predictable and adequate long-term revenue helps projects reach financial viability where PPA rates alone are insufficient. This increased revenue reduces risk and may improve access to private financing.
- **Scalable and technology-neutral:** Incentives can be applied to a variety of renewable energy technologies and can be calibrated to community specific conditions, such as resource quality, project scale and local implementation capacity, thereby supporting diverse remote contexts in a consistent manner.
- **Allows for consumer protection:** Design features such as floor and ceiling prices can be built into pricing formulas to balance risk between IPPs and utilities.

³⁸ United States Environmental Protection Agency, “Renewable Electricity Production Tax Credit.” <https://www.epa.gov/lmop/renewable-electricity-production-tax-credit-information>

Limitations of production incentives

Production incentives also present several limitations that would need to be addressed for effective use in remote diesel communities:

- **Complex reference pricing:** Diesel subsidies and cost structures vary significantly across jurisdiction, making it difficult to establish a consistent and transparent benchmark for incentive rates.
- **Insufficient as a stand-alone tool:** Production incentives do not address the high upfront capex costs (capital and capacity) of projects in remote diesel communities.
- **Greater benefit for larger projects:** Larger systems generate enough electricity to produce meaningful production-based revenue, making a production incentive more likely to improve project feasibility. Smaller projects may not generate sufficient output to benefit in the same way and therefore will continue to rely heavily on upfront capital funding, especially in remote communities with small loads and limited renewable energy potential.
- **Dependence on policy longevity:** Performance-based revenue requires stable, predictable policies to support long-term investment decisions.
- **Reliance on supportive IPP policies:** Effective implementation depends on clear and fair roles for renewable energy integration, including how operational and financial risks are allocated between IPPs and utilities.

Production incentives are just one of a suite of policy tools available to governments to support Indigenous IPPs. The optimal approach could be a combination of these tools, as outlined in Table 3.

Table 3. Production incentives compared to other financial support mechanisms

Tool	Function	Strength	Weakness
Production incentives	Increases and stabilizes project revenue for IPPs	Rewards renewable energy production, supports long term O&M, creates bankable cash flow	May not be enough to overcome high capex Requires long-term policy stability Not as effective for small projects
Performance incentives	Rewards utilities for fuel savings, and integrating renewable energy and storage	Aligns utility decisions with clean energy goals	Complex to design and administer
Grants and contributions	Reduces upfront capex	Addresses the primary barrier to community-led renewables: very high upfront capital costs	No assurance of project performance
Concessional financing	Reduces cost of capital		Adequate cash flow is needed to service the debt High administrative burden
Tax incentives	Lowers cost of capital equipment	Helpful to taxable developers	May not be available to Indigenous entities

3.4 Insights on designing production incentives for remote diesel communities

Designing a production incentive for remote diesel communities requires practical considerations that ensure the mechanism is transparent, effective and suited to small, isolated energy systems, while also aligning with federal program objectives and the priorities of Indigenous IPPs. A review of global, national, and sub-national production incentive structure offers several key considerations for the design of an effective incentive:

Production incentives can rebalance financial risk

IPPs in remote diesel communities operate under structurally constrained revenues, typically capped at avoided diesel costs, while facing elevated costs and delivery risks linked to small project scale and complex system integration. This combination creates a mismatch between the risks borne by project owners and the revenue certainty available under existing PPA structures, with distinct implications for Indigenous-owned projects.

A production incentive functions as more than a revenue supplement. By adding a predictable per kWh payment to the avoided diesel PPA price and tying support to actual electricity

delivered, the mechanism stabilizes operating cash flows and limits exposure to early-stage financial stress in small systems. The performance-based structure aligns support with realized output while maintaining existing protections for utilities and ratepayers embedded in diesel-based rate design. In effect, part of the cost and performance uncertainty not addressed through PPA pricing is absorbed by the production incentive, improving bankability and widening access to financing on more favourable terms. This dynamic enables Indigenous equity participation without concentrating financial risk beyond community capacity or control.

Design implication

A production incentive designed to support diesel reduction and clean energy development in remote communities will be most effective with: predictable, output-linked payments that stabilize cash flow and reallocate a portion of cost/performance risk away from project owners, while preserving ratepayer protections inherent in diesel displacement PPAs.

Long-term revenue support aligns with lifecycle costs and financing in remote diesel contexts

In remote diesel systems, revenue constraints persist across the full operating life of projects. Short-term support can help during construction, but O&M, performance risk and debt service continue for decades, while PPA revenues remain capped by avoided-diesel pricing rather than project specific costs. In this setting, production-based support improves the stability of operating cash flows and targets the period when projects actually face ongoing financial pressures.

Long-term, output-based instruments are commonly used internationally to match how projects are financed and operated. For example, the U.K.'s contract for differences framework recently extended to 20 years to better align risk, cost of capital and operating life. Sliding feed-in premiums in Europe similarly provide market-integrated, production-based revenue over multiyear terms to support bankability.

Canada's prior production incentives demonstrate that simple per-kWh payments are financeable and administratively workable, but their 10-year payment windows (e.g. WPPI and ecoEnergy) were conceived for large, grid-connected contexts with broader market or tariff options. In remote diesel systems, where PPAs are anchored to avoided diesel costs, short incentive windows may leave a residual life-cycle revenue gap through later years of operation.

Access to long-term, low-cost debt (for example, the Canada Infrastructure Bank's Indigenous Community Infrastructure Initiative) further underscores this financing–revenue alignment

challenge: loans are explicitly positioned as long-term instruments, so predictable operating-phase cash flow becomes critical to meet lender requirements without overreliance on upfront grants.

Design implications

Production incentives should match the project's operating and financing horizon, providing predictable, production-based revenue over a multi-year term that aligns with debt service and O&M, rather than concentrating support in short construction-phase windows.

Without a reference price, production incentives cannot meet the needs of all community energy projects

Remote diesel communities differ widely in population, remoteness and season access, grid readiness, ownership models and access to capital. These factors drive substantial variation in project costs, risk profiles and financing needs. A uniform (flat) production incentive, although relatively straightforward and simple to administer, can therefore over-support some projects while under-supporting others, leading to uneven outcomes across communities and limiting bankability where costs and risks are highest.

An alternative is to anchor the reference price to a common benchmark, for example, a clearly defined national avoided-diesel reference based on true avoided-diesel costs rather than subsidized utility costs, while allowing the production incentive to fill the gap between that benchmark and the project's actual PPA revenue. Borrowing the logic of strike and reference frameworks used in revenue-stabilizing mechanisms like CfDs, a benchmark approach can reduce systematic disadvantage for communities with lower baseline PPA rates or higher development costs, thereby supporting more equitable access to finance.

Since community conditions vary (load profiles, site design and interconnection costs, logistics, governance structures), the appropriate reference price and the required incentive term may differ by project. A tailored structure, whether PPA-anchored or benchmark-based, can still be transparent and predictable if the way prices are set and adjusted is defined upfront.

Design implications

To address equity considerations, a production incentive must anchor incentive pricing to a tailored, published revenue target and calculate the production top-up as the difference between the PPA revenue and the target, based on metered actual generation.

Production incentives will work best when they are designed alongside existing utility systems and regulations

Utilities are central to the success of renewable energy projects in remote diesel communities. Production incentives that do not account for utility costs, responsibilities and risk exposure may face resistance or fail to deliver system-level benefits.

While production incentives reward renewable electricity generation, performance incentives reward utilities for system outcomes such as fuel savings, reliability and effective integration of renewables and storage. Tying compensation to measured performance can align utility behaviour with clean energy goals.

Furthermore, some utilities have expressed concerns that IPP projects can increase system costs or operational complexity. These concerns are heightened when utilities do not share in the financial benefits of renewable generation. A production incentive that flows to IPPs without recognizing utility cost exposure may therefore be perceived as shifting risk rather than reducing it.

Better integration between IPP projects and utility system planning can materially improve diesel reduction outcomes and cost effectiveness. In many microgrids, battery storage and generator-cycling optimization can deliver greater diesel savings than renewable generation alone by keeping generators operating in their most efficient range and enabling them to turn off entirely. These outcomes depend on system-level design and dispatch decisions that sit squarely within utility control. Incentive structures that encourage early utility involvement in project design and system integration can therefore improve both fuel savings and overall project economics.

Design implication

Production incentives should be designed to work with both IPPs *and* utilities and consider a performance reward so that operational decisions and incentives are aligned with collaborative planning, fuel savings, reliability and long-term project viability.

4. Recommendations and next steps

Production incentives could complement existing federal supports in remote diesel communities, strengthen Indigenous participation, and improve the value and impact of federal spending. The paragraphs below combine the core findings with practical next-step implications for federal policy and program design.

1. Close the revenue gap with production incentives

As explained above, existing pricing structures create a persistent revenue gap for renewable energy projects in remote communities. This revenue gap is exacerbated by the cost structure of renewable energy projects on remote diesel grids. Production incentives can help close this revenue gap by strengthening project revenues.

Next step

Create a federal, production-based top-up for renewable electricity on remote diesel grids that raises project revenues above avoided-diesel PPA rates to a clear, bankable target.

- Design the production incentive as a per-kWh credit paid on metered generation for a defined contract term (e.g. 15-20 years) to provide long-term revenue certainty.
- Set a transparent revenue target that can be applied across jurisdictions, with the federal top-up covering the difference between the avoided diesel PPA rate and the target, regardless of local PPA pricing.
- Prioritize Indigenous participation by including an additional price adder for projects with meaningful Indigenous ownership and governance.

2. Co-design a production incentive with Indigenous partners

The success of a production incentive will depend on meaningful Indigenous leadership in program design, governance and implementation. To support this, the federal government could establish a time-limited Indigenous Clean Energy Incentive Task Force, modeled on the approach used for the federal Task Force on Just Transition for Canadian Coal Power Workers. A task-force structure would formalize Indigenous participation, bring together federal departments with shared responsibilities, and ensure utilities and territorial governments are engaged in a coordinated way. Another option is to utilize an existing Indigenous advisory body, such as the Wah-ila-toos Indigenous Advisory Council, expanding its mandate to focus specifically on incentive design, regional equity, administrative simplicity and risk allocation.

This approach would embed Indigenous perspectives and lived experience directly into the design process, reduce implementation barriers, and support the legitimacy and long-term durability of the incentive.

Next step

Establish a dedicated mechanism, such as a taskforce, to co-design the production-incentive program with Indigenous partners and coordinating federal departments, with a mandate to:

- develop a distinctions-based governance model building on Wah-ila-toos mechanisms
- define pricing and settlement design (strike/reference methodology, term alignment, consumer-protection features)
- set eligibility and access rules tailored to remote system conditions
- produce an implementation roadmap, including a pilot portfolio and evaluation framework.

Membership should include representatives from Indigenous organizations, utilities and federal departments.

3. Redirect part of federal diesel supports into performance incentives

Federal, provincial and territorial governments collectively spend an estimated \$300–\$400 million annually to keep diesel-generated electricity affordable in remote communities.³⁹ Rather than continuing to commit substantial public resources to recurring diesel subsidies, a portion of expenditures governments expect to incur over time could be redirected now to establish a dedicated, long-term clean energy transition fund, with investment returns or annual allocations directed toward a renewable energy production incentive.

Redirecting even a share of this ongoing spending into a transparent, performance-based production incentive would shift federal support from diesel consumption toward verified diesel displacement, improving value for money while supporting community economic development and energy security.

³⁹ Dave Lovekin, *Diesel Subsidies – Simplified: Part 1*, (Pembina Institute, 2021).
<https://www.pembina.org/pub/diesel-subsidies-simplified-part-i>

Next step

Conduct a federal costing and reallocation analysis to determine how existing diesel support programs could be progressively redirected toward a production incentive, gradually reducing reliance on diesel subsidies while maintaining energy affordability in remote communities.

4. Maintain dedicated federal funding for remote and northern clean energy

Remote Indigenous communities remain diesel dependent and face high energy costs, yet territorial utilities with small customer bases, high fixed costs and aging infrastructure cannot raise rates or absorb additional risk to make renewable energy projects viable without compromising affordability. Major federal funding programs are nearing full allocation and policy attention is shifting toward larger, nationally significant projects and private capital. Access to grants and contributions, and capacity funding for smaller remote projects, is becoming uncertain, although the need remains acute.

Existing federal supports should therefore remain available, particularly for small and mid-scale projects in remote and northern communities. First-of-kind commercial projects carry front-loaded cost premiums that grants and contributions are uniquely suited to bridge. While production incentives can close revenue gaps, they are often insufficient, especially for small projects in small communities with limited generation, where taking on debt or agreeing to shared equity arrangements will reduce community benefit and may not be seen as a viable pathway for advancing a project. Continued access to dedicated grants and contributions that support capital costs and capacity-building is essential to enable near-term projects and build conditions for a more viable market over time.

Next step

Maintain and replenish dedicated federal funding programs to ensure the continued development of Indigenous-led energy systems in remote communities, delivering local economic benefits, energy security and emissions reductions.

Together, these steps can ensure that production incentives strengthen, rather than dilute, federal support for Indigenous-led clean energy and contribute meaningfully to the transition away from diesel in remote communities.



Photo: David Dodge, Green Energy Futures

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