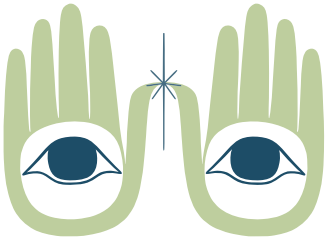


Non-Integrated Areas Strategy

Powering communities with clean, reliable, and affordable electricity

STRATEGY TO FISCAL 2030

BC Hydro
Power smart

Artist contribution

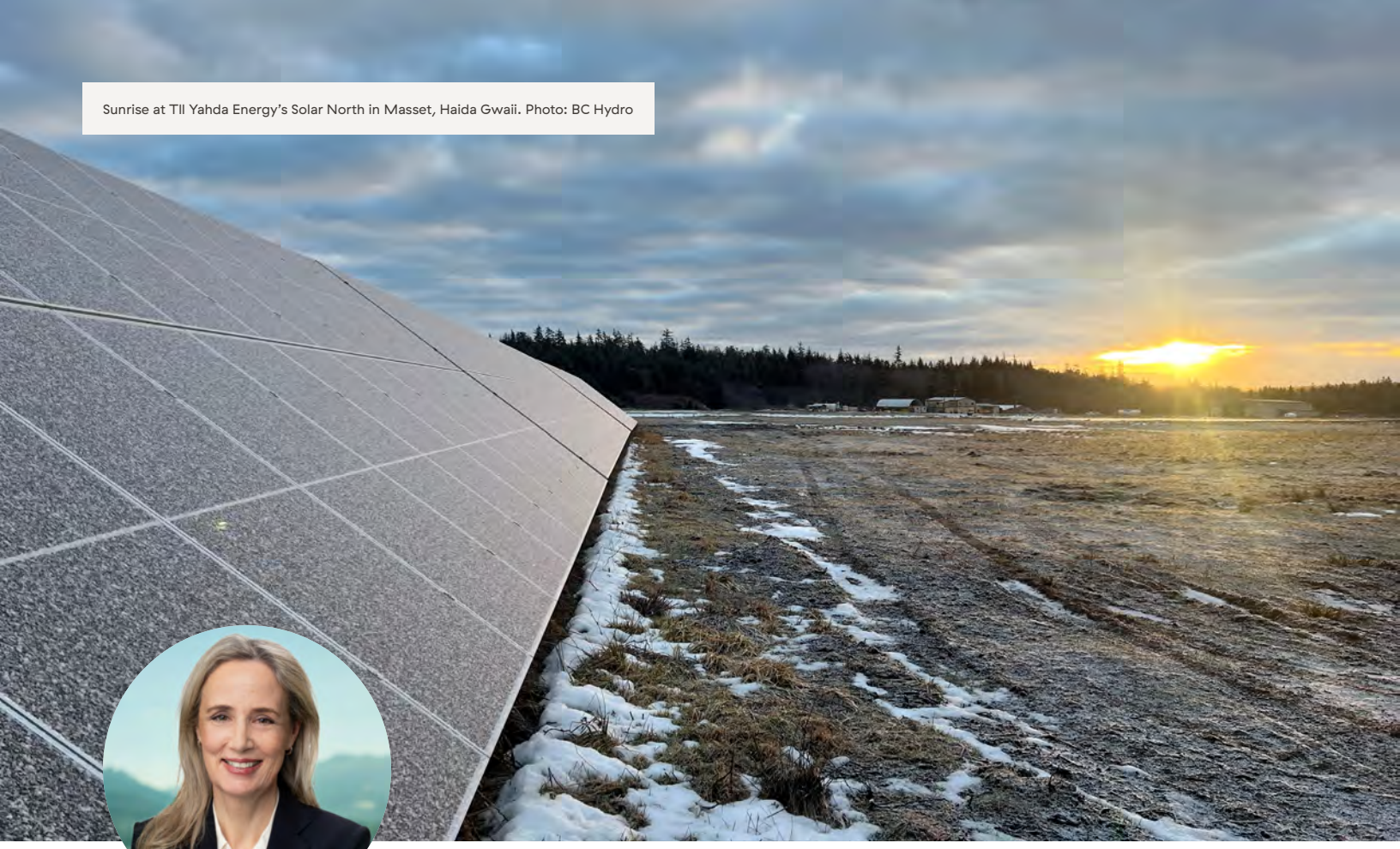
A special thanks to Kashka Clellamin for contributing her artwork to the NIA Strategy.

Kashka is a Nuxalk Artist from Bella Coola, British Columbia. Her traditional Nuxalk name is Ximximana—since being given her name she's worked to build it as strong as she can. Her work began at the age of 11 where she continued to learn and pursue her goals and aspirations as a young artist. She worked all throughout her high-school years learning from her mentors and role models in her community. Kashka completed her course at the Freda Diesing School of Northwest Coast Art in April 2026, receiving her Diploma in First Nations Art in Terrace, British Columbia. From attending Freda Diesing she's learned from instructors Nathan Wilson and Phil Gray, and is apprenticing under master carver Dempsey Bob. Inspired and encouraged by her family, friends, community and ancestors, she will continue to learn all she can to pass down knowledge to the next generations.

Kashka provided the following summary of her work, which was inspired by the five focus areas of the NIA Strategy—clean, reliable, affordable, work openly and transparently in partnership, and evolve BC Hydro's organizational capacity.

"The elements of the world are controlled and guided by the sun and the moon. The sun gives energy, light and warmth to the world and provides us with the ability to grow. The moon provides the light in the night sky, stabilizes earth's climate, and its gravity controls our tides. Both forces are essential to survive and grow.

Surrounding the sun and moon, the eulachon represent reliability with their return in early spring, keeping our people fed and nourished after a long winter. They require clean waters, a protected environment and respect for our lands to remain ever giving and resilient. Salmon berries remind us to protect our land to ensure our traditional foods stay protected to grow and feed us. Snx (sun) provides the balance to create a healthy and peaceful space to evolve our capacity. The hands represent working together to achieve a shared goal, the gentleness of looking past challenges, and reaching the stars. The raindrop represents clean and protected waters, and the beauty, healing and freshness it has to offer."



Sunrise at Tll Yahda Energy's Solar North in Masset, Haida Gwaii. Photo: BC Hydro

President and CEO, Charlotte Mitha

We are pleased to share the Non–Integrated Areas (NIA) Strategy, which is a roadmap for delivering clean, reliable, and affordable electricity to remote communities in British Columbia that are served by individual BC Hydro microgrids.

The NIA Strategy is particularly meaningful for what it represents and how it was created. BC Hydro and its employees who serve the NIAs feel a very strong sense of commitment every day in their work to keep community power safe and reliable. The NIA Strategy also represents a shift in how we work with these communities. We are extremely grateful to the NIA First Nations for their participation in the engagement process and development of the NIA Strategy.

Providing electricity in the NIAs presents unique and evolving technical challenges, requiring new approaches, new capabilities, and a willingness to learn as we go. The NIA Strategy will fundamentally change how the electrical microgrid systems are planned, designed, and operated, and will position British Columbia at the forefront of clean energy innovation in remote communities. This work is, in every sense, transformational.

BC Hydro cannot implement the NIA Strategy alone. Progress depends on strong and enduring partnerships with NIA First Nations, as well as close collaboration with government, civic communities, and industry partners. Together, we each bring critical knowledge, experience, and leadership. We intend to work openly and transparently to build the shared understanding and trust required to do the hard things together.

Together with NIA First Nations, who are developing renewable energy projects in their communities, we have built considerable momentum. The path ahead will not always be straightforward. There will be uncertainty, there will be challenges, and adjustments will be needed. We will, however, remain committed to the fundamentals of the NIA Strategy. We are inspired by the positive, lasting impact we can create together in the NIAs.

Atlin. Photo: BC Hydro

Statement of recognition and appreciation

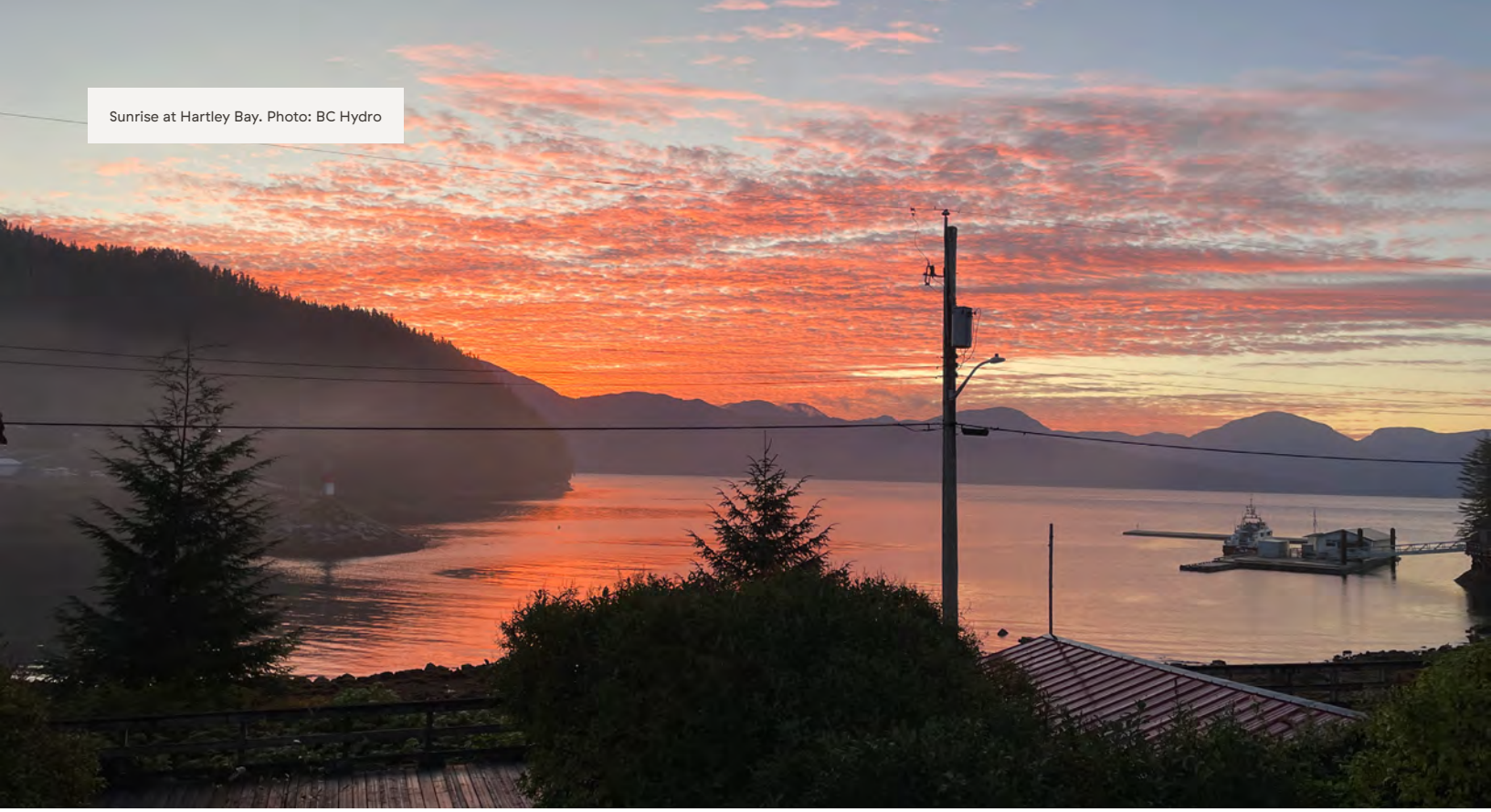
BC Hydro recognizes and appreciates the clean energy leaders from across NIA First Nations for their passion, wisdom, and unique perspectives in advancing clean energy and diesel reduction within their territories.

Their tireless commitment to, and focus on, truth and reconciliation has brought light to their unique lived experiences in these standalone microgrids and has demonstrated the importance of clean, reliable, and affordable electricity in support of the principles outlined in the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP).

NIA First Nation representatives have generously offered their depth of knowledge and passion into the personal relationships, discussions, and engagements with BC Hydro staff over the years which has served to deeply inform the NIA Strategy.

These experiences and perspectives have been built and leveraged through partnerships within their own communities, across BC Hydro, with federal, provincial, and municipal governments, and with other First Nations to advance their vision of 100% clean, reliable, and affordable electricity.

We are grateful to be a part of this journey.



Sunrise at Hartley Bay. Photo: BC Hydro

What is the NIA Strategy?

The NIA Strategy (or 'Strategy') sets the direction for how BC Hydro will work with NIA First Nations, civic communities, government, and others to advance clean, reliable, and affordable electricity in the 14 NIAs. It provides the focus areas, objectives, and actions that will guide our efforts as we form the detailed plans, prioritization, and schedules to implement the Strategy.

Many of the actions in the Strategy are new, technically challenging, and transformational. To support shared understanding, this Strategy includes details about the progress made over the past several years, as well as context on what we have been learning—technically, operationally, and through our engagement and work with NIA First Nations.

BC Hydro does not drive this work alone. Progress depends on many parties, including the NIA First Nations and government, and on evolving technology. As a result, the Strategy focuses on the path forward rather than definite timelines.

Executive summary

Here in British Columbia, we are in a favourable position with an abundance of clean, reliable, and affordable electricity. BC Hydro provides this electricity to 95 percent of the population through an integrated system. However, not everyone in BC Hydro's service area is connected to the integrated system. BC Hydro provides electricity service through standalone microgrids in 14 Non–Integrated Areas (NIAs) that power 28 remote communities in British Columbia.

Our vision for the NIA Strategy (or 'Strategy') is that by working together with NIA First Nations, civic communities, and government, we will power remote, standalone microgrids with the clean, reliable, and affordable electricity that is foundational for thriving communities. The Strategy acknowledges that while there are unique challenges of providing electricity to customers in the NIAs, it is essential for these communities to thrive. The Strategy recognizes that BC Hydro is committed to making progress, learning and adapting. The Strategy reflects the progress that has occurred and sets out a path for the actions BC Hydro will take to the end of Fiscal 2030—March 31, 2030. Our vision emphasizes working together with many different entities because it will not be up to BC Hydro alone to realize the objectives of the Strategy. We are reliant on NIA First Nations, civic communities, government, and others working in partnership with us to execute on the Strategy.

The NIAs are remote, standalone microgrids made up of individual, separate electrical generation and distribution systems that are not connected to the integrated system. Operating standalone microgrids is inherently different than a large integrated system. Electricity generation options for standalone microgrids are very limited and while approximately 45% of the energy produced in the NIAs is renewable, diesel is currently used to generate the remaining 55%[1]. Some NIAs, however, are 100% reliant on diesel. Due to geography and remoteness, customers in these communities also experience more frequent and longer outages compared to customers on the integrated system. Community growth in the NIAs has accelerated in recent years, increasing the importance of sufficient electricity to support their needs.

Since 2018 we have been working directly with First Nations living in the NIAs to reduce reliance on diesel generation. Between 2023 to 2026, BC Hydro engaged with representatives from these First Nations through a multi–phased process to ensure that the Strategy reflects their priorities and how we should work together. We are profoundly grateful for being on this journey with the NIA First Nations. BC Hydro thanks them for their participation in the engagement process[2] and for their advocacy, commitment, and unique expertise to bring clean, reliable, and affordable electricity to their communities. What we have learned through the engagement sessions and our work together has deeply informed this Strategy. We have learned that how we work together is important, and there continue to be barriers and challenges that need to be addressed.

As we have been moving through this journey together with NIA First Nations to reduce reliance on diesel generation, we have also been learning more about what it means to increase the integration of renewable energy in standalone microgrids from a technical perspective. This work is often unprecedented and challenging given the unique technical requirements of each standalone microgrid, evolving technology and industry experience that is in its infancy.

There is a combination of factors that contribute to making this work challenging:

- In most of the NIAs, the sources of renewable energy are variable[3], meaning that the amount of energy they produce changes throughout the day and/or year.
- Current battery energy storage systems can only provide a few hours of storage.
- Integrating variable renewables into standalone microgrids is still relatively new and there are a limited number of experts with the required knowledge and skills, and a limited number of equipment choices.

As a result, there are only a handful of somewhat similar projects in remote, standalone microgrids in other parts of Canada, and most have become operational only in the last few years. No other jurisdiction in Canada has the number, size, or targeted renewable integration levels of community renewable energy projects in planning and implementation as there are in the NIAs. This all means that the work we are doing together with NIA First Nations to integrate variable renewables is transformational.

1 Note the proportion of renewable and diesel fluctuates somewhat year to year. In 2025, the NIAs used 46% renewable and 54% diesel.

2 Additional detailed information can be found in the appendix and in the **Engagement Summary Report**.

3 In the Strategy, the term 'variable' energy also includes 'intermittent' energy.

Today in many BC Hydro NIA stations, the equipment and operations are relatively simple and straightforward. Going forward, these stations will need new types of equipment to integrate variable, renewable energy and the whole station will be reimagined and remodelled to become a 21st century modern, digital microgrid.

Since 2023, as we have been engaging on and further developing the Strategy, BC Hydro has also taken the following actions[4]:

- We have been working with nine NIA First Nations on their First Nations owned community renewable energy projects, including supporting technical decisions and project planning. We have signed two Community Electricity Purchase Agreements [as of March 31, 2026] and have others in progress.
- We have developed a program approach to upgrade the microgrids to integrate renewable energy and streamline our delivery.
- We have improved the reliability of the microgrids serving the NIAs and are investing to expand available generation and enable community growth.
- We have eliminated the higher rates that customers pay in the NIAs, and they now have the same rates as customers on the integrated system.
- We have supported increased participation in energy efficiency and self-generation[5] programs through incentives unique to the NIAs.
- We worked with the Province to create an amendment to the Greenhouse Gas Reduction Regulation that provides more certainty on the cost recovery of Community Electricity Purchase Agreements for renewable energy and the related BC Hydro microgrid capital investments to integrate this energy.
- We have launched a structured and robust load forecast program specific to the NIAs and are developing Community Context Reports designed to support collaborative energy planning particular for each NIA. We have completed one Community Context Report [as of March 31, 2026] and have others in progress.

The Strategy sets out objectives and actions within five focus areas that have been informed by engagement sessions with NIA First Nations. Three of these link to the outcomes of improving the accessibility to clean, reliable, and affordable electricity to BC Hydro's customers in remote areas of the province. Two focus areas are foundational to enabling success: 'work openly and transparently in partnership' and 'evolve BC Hydro's organizational capacity'. These two focus areas are a direct response to what we have learned through our engagement with First Nations about 'how' we approach our work in the NIAs.

4 NIA Progress Report (2022–2025): **NIA progress report—September 2022–September 2025**

5 Self-generation refers to privately generated renewable energy most often through rooftop solar installations.

NIA Strategy summary

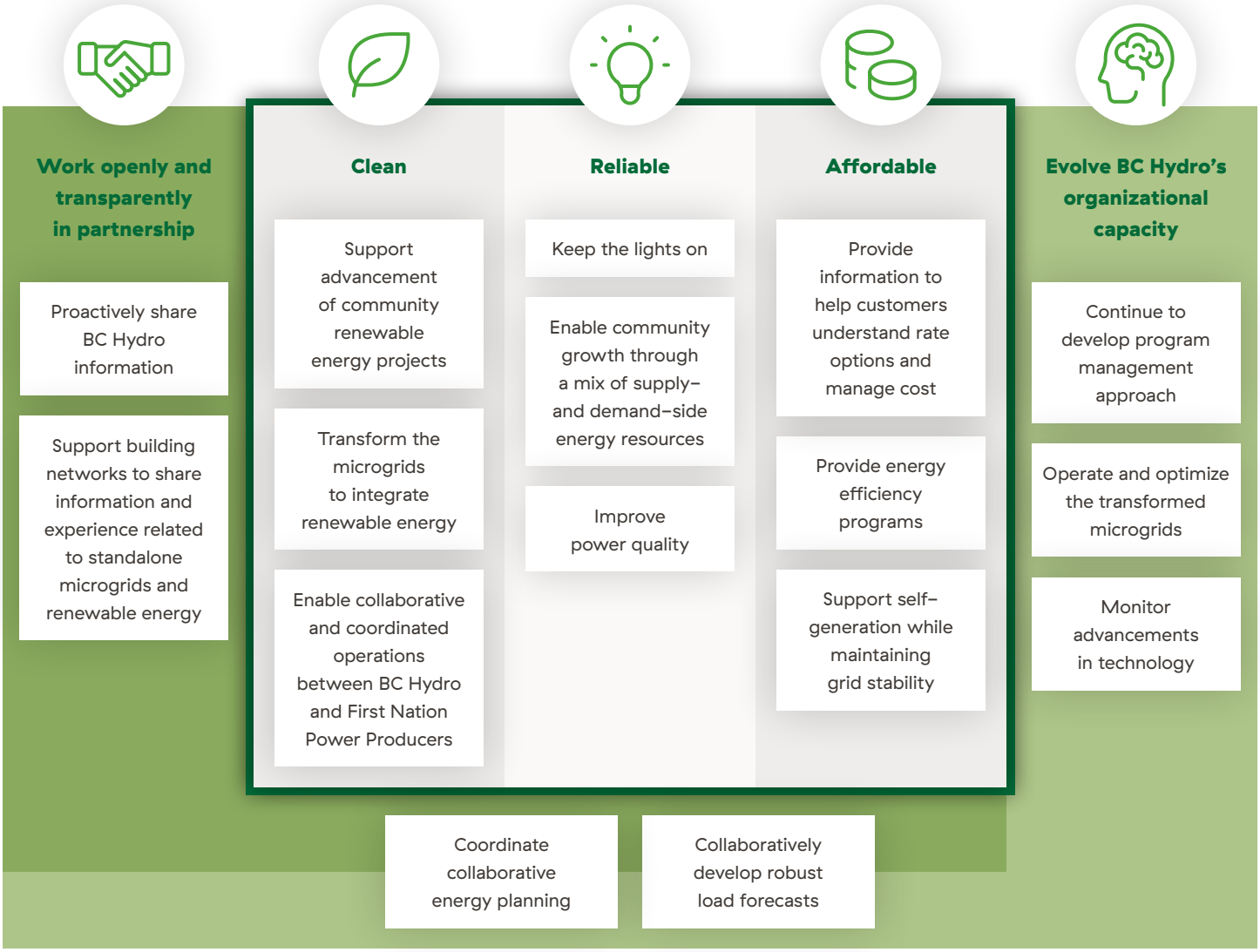
Vision

Working together with First Nations and civic communities in the NIAs, we will power remote, standalone microgrids with the clean, reliable and affordable electricity that is foundational for thriving communities.

Guiding principles

- Shared responsibility
- Adapt as we learn
- Aspiring and pragmatic
- Respect and resilience
- Celebrate progress

FOCUS AREAS AND OBJECTIVES



Given the significant progress made in the ‘reliable’ and ‘affordable’ focus areas in recent years, much of our effort over the coming years will be the ‘clean’ focus area, particularly for NIAs that remain reliant on diesel. In the next few years, BC Hydro will be focusing on advancing, as much as possible, clean projects that are already underway. This means supporting advancement of the initial grouping of 9 First Nations community renewable energy projects, integrating them into the microgrids, and working to fine–tune, likely over several years, the microgrid operations and system to optimize the amount of diesel that can be displaced while keeping the grid stable. BC Hydro will take the learnings from these first projects and consider additional renewable projects as initial projects are completed and there is capacity within our organization and the market. Due to the interplay among community needs for and technical considerations of increased capacity for growth, power quality and diesel reduction, the next diesel reduction opportunities will be considered holistically along with these other planning objectives. Going forward, opportunities for future community renewable energy projects will be part of the collaborative energy planning process and developing Community Context Reports that will consider how best to meet each NIA’s needs for reliable capacity, power quality and diesel reduction.

This Strategy is not only about clean, reliable, and affordable electricity. It is a transformation in ownership of generation assets and how we operate the standalone microgrids with close coordination with First Nation Power Producers. To achieve this vision, BC Hydro needs to work differently than we have in the past and we cannot do it alone. That is why the Strategy has two foundational focus areas that will support building internal BC Hydro technical and organizational capabilities and evolving how we will work with NIA First Nations, civic communities, and other stakeholders across all our work in the NIAs. These focus areas are key enablers for progress in the other focus areas of the Strategy and are important in themselves.

We are undertaking a clean energy transformation in the remote, standalone microgrids to increase the amount of renewable energy from current levels. Through our work we have realized that no one, including BC Hydro, has all the answers—and the industry is new and evolving. We are learning together. Working towards our objectives will put us at the forefront of the clean energy transformation in remote communities across North America.

Contents

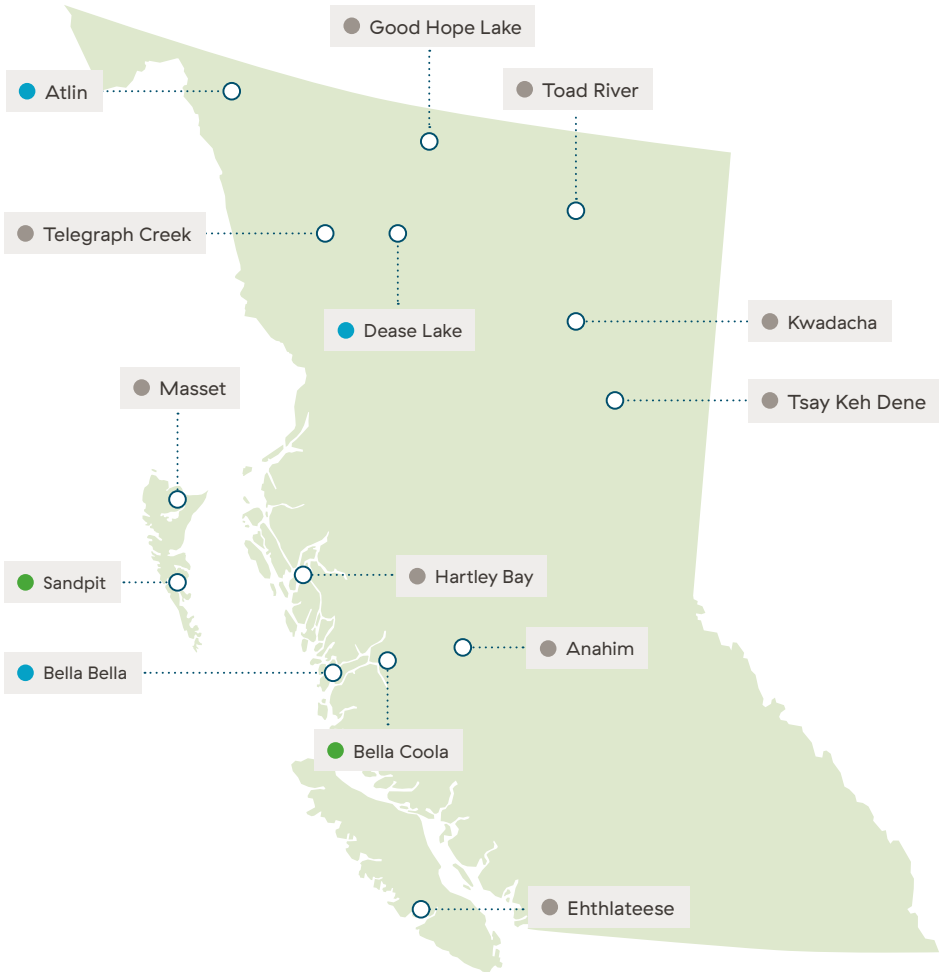
1. Introduction

1.1 Electricity service in remote areas is both challenging and critical

BC Hydro provides electricity service in 14 Non-Integrated Areas (NIAs). The NIAs are remote, standalone[6] microgrids made up of individual, separate electrical generation and distribution systems that are not connected to the integrated system. Rather, they are powered by a combination of diesel and renewable energy sources, with some NIAs using diesel as the main power source and others using diesel as a co-generation or primarily as a backup power source.

NIA quick facts

- 14 NIAs which are standalone microgrids not connected to any other grids
- Serve nearly 7,500 customer accounts in 28 communities and 12 First Nations
- Total annual load of approximately 120 GWh
- Powered by a combination of diesel and renewable energy sources
- In 2025, 46% of the electricity came from hydro generation and 54% came from diesel generation



Current generation mix

- Diesel generation only
- Hydro and diesel co-generation
- Primarily hydro generation

6 In this context, "standalone" means the microgrid is not connected to the main, integrated electrical grid.

Each of the communities within the NIAs is unique and has its own history, experiences, and perspectives. Some NIAs span a large geographical area with many communities such as on Haida Gwaii, whereas others are small villages such as Ehthlateese on Vancouver Island.

This Strategy recognizes that as the electrical utility, BC Hydro has an obligation to provide safe and reliable electricity to all customers served by the microgrids in remote parts of the province. It also recognizes that many of these communities are predominantly First Nations and that improving access to clean, reliable, and affordable electricity is an important way that we can work together to advance reconciliation. Working with First Nation Power Producers to implement community renewable energy projects is one of the fundamental ways we are working towards achieving this objective.

Operating standalone microgrids is inherently different than a large integrated electricity system. Even small, minute-to-minute changes in customer electricity usage can have a substantial impact on the stability of the microgrid. Generation needs to be load following[7] so it can be ramped up or down quickly to respond to these fluctuations in electricity use and keep the lights on.

Remote, standalone microgrids are fundamentally different than urban areas of British Columbia. Due to the remoteness and geography of the NIAs, customers experience longer and more frequent interruptions to electricity service when compared to most customers on the integrated system. It is often difficult for BC Hydro operations crews to access the microgrid during an outage, because of limited roads or boat-only access, making restoration times longer. Outages in the NIAs can have an amplified impact compared to the integrated system due to remoteness and the cold northern winters where many NIAs are located. During engagement sessions with NIA First Nations, we heard that food storage and spoilage during outages are a key concern that can contribute to food insecurity in remote communities.

Globally, electricity generation options in remote, standalone microgrids like the NIAs have historically been technically limited, and it is not unusual for diesel to be used for electricity in these situations. Fortunately, almost half of the total electricity in the NIAs is currently produced through renewable sources like the BC Hydro-owned Clayton Falls hydro facility, and four hydro generation facilities owned by independent power producers from whom BC Hydro purchases energy. The remainder of the electricity is produced by burning diesel fuel in BC Hydro-owned diesel generating stations. Most of the NIAs (11 of 14) are considered "diesel reliant" which means that diesel generation is either the sole source of electricity (called "prime") or diesel generators and renewable resources operate together (called "co-generation"). The NIAs of Bella Bella, Atlin and Dease Lake[8] are hydro generation reliant with diesel generators for back-up only if the hydro facility is unavailable.

Community growth in the NIAs has accelerated in recent years as investments made in community infrastructure and housing are creating additional electricity demand and increasing the importance of sufficient electricity to support their needs.

Affordability is also a concern in the NIAs. Rates in the NIAs have historically been set higher than on the integrated system because the cost to generate electricity in each NIA and distribute it in remote areas to a small customer base drives a relatively higher average cost per customer. In addition, the housing supply has not always been built for the cold, damp climatic conditions of the north and coastal regions where many NIAs are located. The combination of inefficient buildings and higher rates can drive higher energy bills in these remote communities.

While standalone microgrids have unique challenges and considerations in the NIAs, electricity is critical. A move towards electrification and community expansion leads to an increasing expectation that BC Hydro has reliable and resilient microgrids with the capacity to support the growing electricity demand.

Diesel generation in the 14 NIAs is currently used in one of three ways:

Prime—diesel generators are the sole source of electricity for the community

Co-generation—diesel generators and renewable resources are operated together to provide electricity to the community year-round

Backup—diesel generators operate only when the storage hydro facility has a planned or forced outage. When used as backup, diesel typically provides less than 5% of the community's energy needs

7 "Load following" means the generation source can adjust its power output as customer demand for electricity fluctuates throughout the day.

8 Each of these microgrids is served by a hydrogeneration facility that can supply more than 95% of the communities' annual energy needs.

1.2 The Strategy is shaped by a broader set of objectives

1.2.1 Advancing reconciliation

This Strategy recognizes that many of the communities in the NIAs are primarily First Nations. Some NIA First Nations such as Tsay Keh Dene Nation and Kwadacha Nation have been deeply impacted by BC Hydro's historic infrastructure and this has had a lasting effect on the communities. BC Hydro's Statement of Indigenous Principles commits to finding solutions to improve the accessibility of clean, reliable, and affordable electricity to communities in remote areas of the province.

We have heard from First Nations living in the NIAs that using diesel to generate electricity creates tension between their deeply held values driven by their role as stewards of the land and their simultaneous need for electricity to support their wellbeing and the future of their community[10]. By working with NIA First Nations to reduce diesel generation through integrating new sources of renewable energy, as well as improving reliability and affordability, BC Hydro can help to support communities to grow and thrive in a way that is aligned with their cultural and societal values.

First Nations in remote communities have shown tremendous leadership in the clean energy sector. Our relationships with NIA First Nations need to endure beyond any one project or action in this Strategy.

BC Hydro's core approach towards diesel reduction is advancing First Nations owned community renewable energy projects, entering into purchase agreements for the energy, and investing in upgrades to the microgrids to integrate the renewable energy. In this way, BC Hydro is supporting the aims of the Province's Indigenous Clean Energy Opportunities (ICEO) initiative, which seeks to enable Indigenous peoples to fully participate in current and future opportunities in British Columbia's clean energy sector.

BC Hydro's UNDRIP Implementation Plan[9]

The BC Hydro UNDRIP Implementation Plan identifies the concrete actions we have taken and will take going forward, together with the First Nations we work with and serve. The Plan includes 29 actions where we can advance reconciliation within the context of our business, which are grouped into five themes:

1. Respectful relations
2. Social and cultural well–being
3. Decision making
4. Water, land, and environment
5. Economic relations

Advancing the NIA Strategy provides a significant opportunity to address the social, economic, and environmental concerns created by less access to clean, reliable, and affordable electricity and offers an opportunity to advance lasting and meaningful reconciliation with NIA First Nations. Action 4.8 of the Plan focuses on reducing reliance on diesel generation in communities not connected to BC Hydro's integrated system. Other places that that the NIA Strategy aligns with UNDRIP include things such as:

1. Supporting economic partnerships in the renewable energy sector (Action 5.8);
2. Focusing on greater involvement and collaboration in planning, including multi–year regional planning and at the earliest stages of BC Hydro projects (Action 3.3); and
3. Collaborating on the social and economic benefits associated with improving energy performance in their homes and buildings through our energy management programs (Action 2.6).

9 This Strategy is guided by and is complementary to BC Hydro's UNDRIP Implementation Plan but it does not constitute an UNDRIP Implementation Plan specific to the NIA, rather it seeks to support the broader actions BC Hydro is taking to implement UNDRIP.

10 Additional detailed information can be found in the appendix and in the **Engagement Summary Report**.

Big House in Bella Bella. Photo: BC Hydro

1.2.2 Addressing climate change and protecting the environment

Reducing the use of diesel for electricity generation helps achieve multiple environmental objectives shared by BC Hydro, NIA First Nations, civic communities, government, and customers. For NIA residents there are the benefits of improved local air quality and less noise from diesel generators. More broadly, everyone benefits from reduced greenhouse gas emissions, reduced fuel spill risk, less pollutants, and a heathier environment. This Strategy supports BC Hydro's overall greenhouse gas reduction efforts in alignment with the Province's climate objectives.

First Nation led community renewable energy projects also support the values of environmental stewardship, energy security, capacity building and economic development. We have heard that these are all things that are important values to First Nations living in the NIAs[11].

11 Additional detailed information can be found in the appendix and in the **Engagement Summary Report**.

2. What we have learned

This Strategy has been informed by what BC Hydro has learned through our engagement with NIA First Nations, what we've learned from other jurisdictions and industry experts, and our own experience as we have taken actions to provide clean, reliable and affordable electricity in the NIAs[12].

2.1 What BC Hydro heard from First Nations living in the NIAs

BC Hydro has been working directly with First Nations since 2018 to reduce reliance on diesel generation in the NIAs. To ensure that the Strategy truly reflects the priorities of these First Nations and how we should work together, BC Hydro undertook a three-phase engagement process with NIA First Nations from March 2023 to May 2026. During this engagement, First Nations living in the NIAs emphasized that clean, reliable, and affordable electricity is essential for community well-being, economic development, and environmental stewardship. NIA First Nations stressed that success requires respectful, transparent relationships grounded in reconciliation, trust, and alignment with UNDRIP principles that affirm Indigenous self-determination. NIA First Nations identified diesel reduction as their top priority and highlighted that transitioning to clean energy supports broader community goals such as improved home comfort, sustainable growth, food security, and energy sovereignty. Limited funding, administrative complexity, and limited local resources were identified as major challenges to advancing community renewable energy projects. NIA First Nations expressed a need for streamlined funding processes, greater collaboration across governments and utilities, and more training and resources to build sustainable, long-term energy capacity.

DEVELOPMENT OF THE NIA STRATEGY

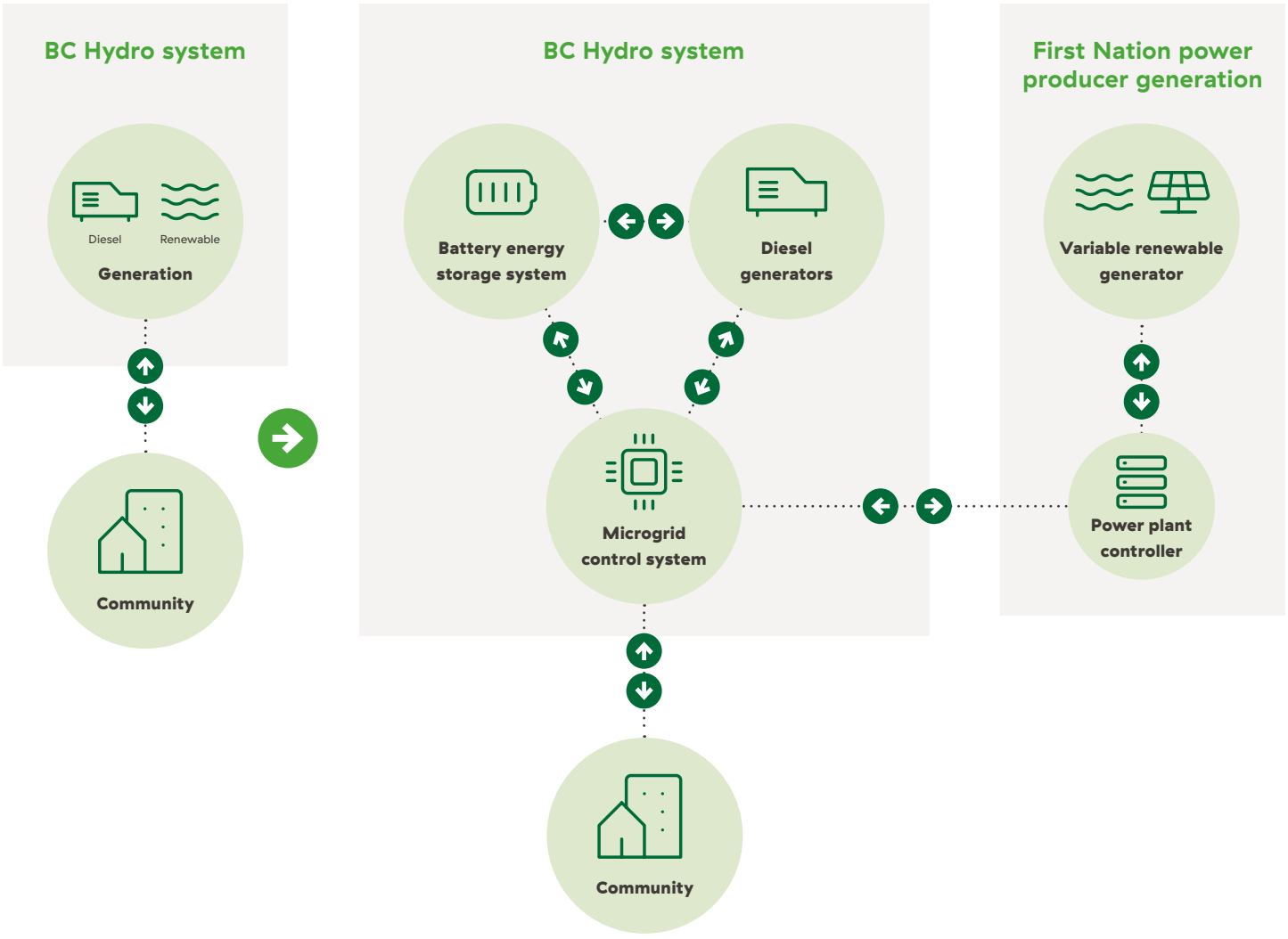
12 Additional detailed information can be found in the appendix and in the **Engagement Summary Report**.

2.2 Integrating variable renewables in standalone microgrids is tricky and transformational

Integrating variable renewables such as solar and run–of–river or seasonal lake hydro into standalone microgrids is technically complex, with challenges rooted in the limited availability of firm capacity, the timing mismatch between variable renewable generation and community energy use patterns, and limited industry experience with the unique technical considerations of standalone microgrids. Since the type of renewable energy normally available in NIAs is variable, and current battery storage can only shift energy over short periods, diesel generation continues to be the only reliable option for firm capacity, especially as community loads continue to grow. Industry experience with high–integration of variable renewable into standalone microgrids is still emerging, and each microgrid's unique characteristics require custom engineering solutions and careful, incremental integration to maintain grid stability. Integrating variable renewables at high levels while maintaining grid stability requires specialized resources and a fundamental transformation from legacy analog systems to digital microgrids with advanced microgrid control and battery energy storage systems, and new operational processes.

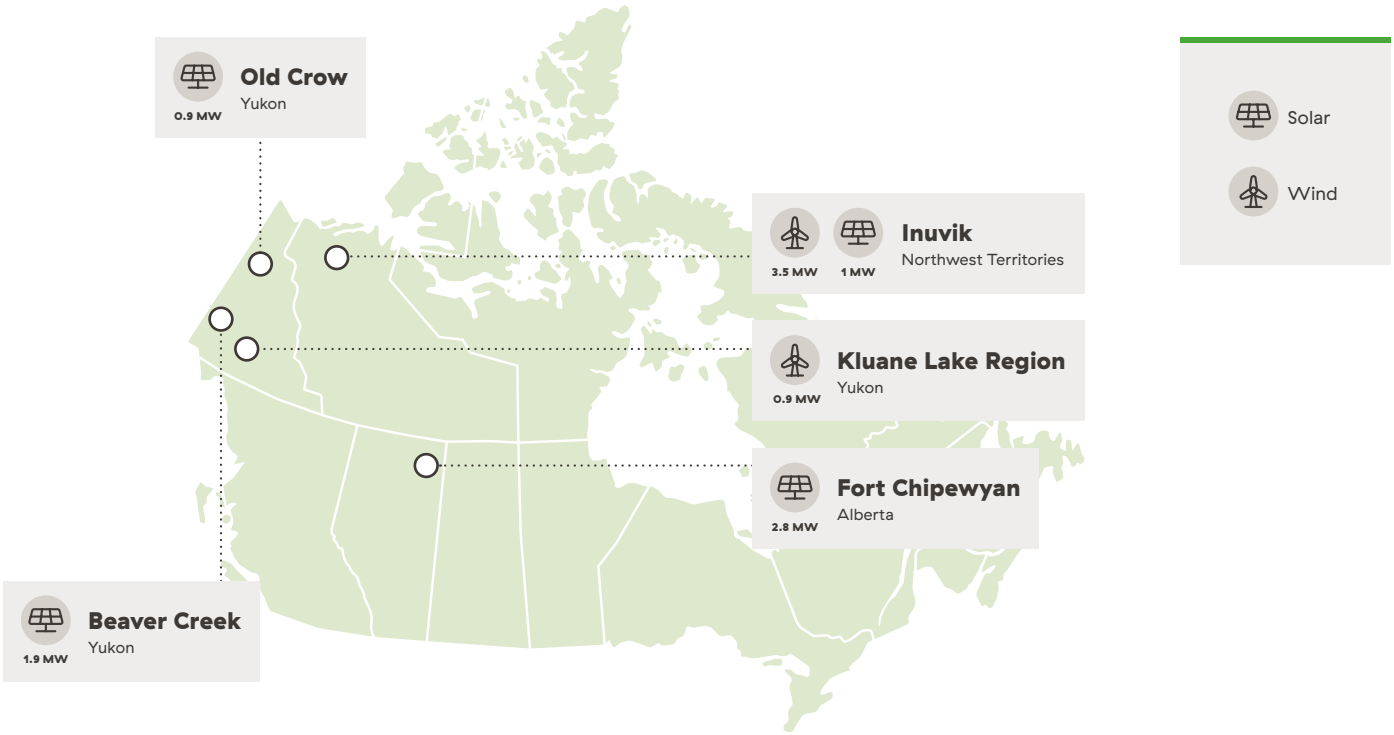
TRANSFORMATION OF THE NIA MICROGRIDS—ILLUSTRATIVE

Today, the microgrids in the NIAs are simple and straightforward. Moving forward, they are going to be completely transformed.



As of early 2026, there are only five projects in operation elsewhere in Canada that are somewhat comparable[13] to the projects that BC Hydro and First Nations are implementing in the NIAs. Most of these have become operational only in the last few years, which demonstrates how new and emerging this work is.

OTHER COMPARABLE, COMMUNITY-OWNED RENEWABLE ENERGY PROJECTS IN OPERATION



2.3 Energy planning has become more complex

As renewable energy is integrated into standalone microgrids, there continues to be the fundamental requirement for firm capacity to ensure reliable service. As described above, with no other firm capacity options in the NIAs, this means diesel generation must continue, and often be increased, to meet the needs for reliability as communities grow—even while renewables are also added. Electrification trends are increasing the challenge of having adequate firm capacity by increasing the peak load. Even if the peak load only lasts a few minutes in the year, the system must be designed to meet those peaks to ensure a safe and reliable energy supply. This drives firm capacity additions that are cost intensive since they have limited use.

With the advancement of various technologies, more people are also interested in pursuing self-generation. In standalone microgrids the impact of self-generation on maintaining grid stability is amplified and needs to be done carefully—especially as the amount of variable energy from community renewable energy projects is also coming online[14]. Different technologies have also provided additional mechanisms to manage energy and demand, such as targeted demand-side actions or customer programs.

Energy planning in the NIAs is complex and needs to consider the interplay among many different factors. Diesel reduction opportunities need to be integrated into overall energy planning alongside the other objectives of sufficient firm capacity and power quality. As energy planning, resource options and the interplay among various actions and decisions all become more complex, the importance of transparent, collaborative energy planning with NIA First Nations and civic communities increases.

13 As of early 2026, there are five projects in operation in Canada that are somewhat comparable to the projects that BC Hydro and First Nations are implementing in the NIAs. Somewhat comparable means: the renewable generation is variable (i.e., solar, wind, run of river hydro) and is owned by the community, is at least ~1 MW and often larger, has been operating for at least one year, integrates into the utility owned grid through an energy purchase contract, and the utility has added energy storage to optimize variable energy utilization. There could be other situations where variable renewable energy and energy storage are being used in standalone microgrids in Canada (e.g., commercial entities like mines or resorts, or self-generation by small communities or in government installations)—but these are not comparable from a technical, contractual or operational perspective.

14 See information on self-generation: **Self-generation and diesel reduction**

3. The Strategy

3.1 Overview

Vision

Working together with First Nations and civic communities in the NIAs, we will power remote, standalone microgrids with the clean, reliable, and affordable electricity that is foundational for thriving communities.

Guiding principles

These guiding principles will direct how we will operate and make decisions as we move forward to implement the Strategy. They have been developed based on what we heard from NIA First Nations during engagement, what we have learned through our experience and from other utilities and industry leaders, and what we believe is required to be successful as we move forward.

Shared responsibility: BC Hydro, NIA First Nations, civic communities, and governments each have a role and a unique contribution to meeting the objectives of the Strategy.

Adapt as we learn: Key parts of this Strategy are transformational and leading edge. We will learn, share experiences, reflect, and adjust as we go.

Aspiring and pragmatic: We will hold an aspirational vision while prioritizing and focusing to get things done and make progress. We will look for process efficiencies to ensure prudent use of limited resources from First Nations, civic communities, and BC Hydro.

Respect and resilience: When we encounter challenges, which we inevitably will, we will remember we are all working together on common objectives and respectfully find solutions to keep moving forward.

Celebrate progress: This work is exciting, hard, and transformational. We will be intentional in recognizing and celebrating the progress that we are making together.Strategy focus areas.

We have five focus areas to drive the Strategy

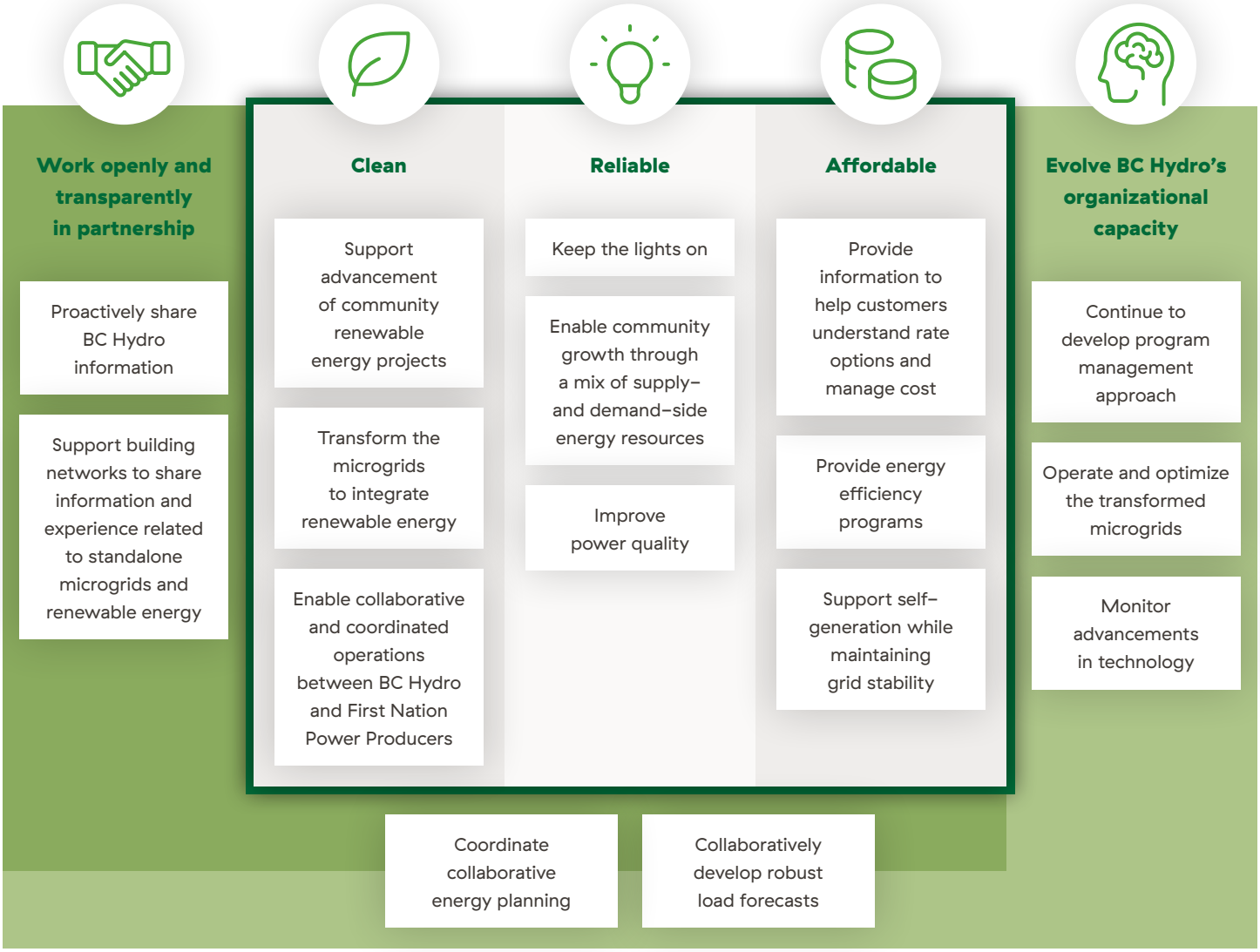
These link to the outcomes of improving the accessibility of clean, reliable, and affordable electricity to BC Hydro's customers in remote areas of the province. Two focus areas are foundational to enabling success: work openly and transparently in partnership and evolve BC Hydro's organizational capacity.

For each focus area, we have identified the objectives and actions[15] we will take over the next few years to the end of Fiscal 2030—March 31, 2030, recognizing:

- the progress that has been made in the past several years,
- how BC Hydro will work with NIA First Nations and civic communities going forward, and
- what is achievable in this timeframe—actions will be underway but not everything in the Strategy will be completed in the next few years.

The objectives and actions will guide how BC Hydro will continue to make progress towards cleaner, reliable, and affordable electricity in the future, ensure we are developing relationships built on partnership and trust, and growing our capacity to deliver the vision of the Strategy.

15 Objectives and actions are described within a single focus area in the sections below. However, in many cases, they advance more than one focus area.



We have reflected on the progress over the last few years, the feedback we have received from First Nations living in the NIAs, and what we have learned to date. Within the Strategy, BC Hydro will be concentrating most of our effort over the next few years on the clean focus area, specifically for NIAs that are currently diesel reliant. A high level of effort is needed because this work is transformative and technically challenging. The reliable and affordable focus areas remain important. Given the improvements and key accomplishments in reliability and affordability in the last few years[16], the emphasis in these focus areas over the next few years will be on sustainment and opportunities for continuous improvement.

This prioritization of most effort being placed on clean activities aligns with what we have heard from NIA First Nations—that their number one priority for the Strategy is diesel reduction in their communities.

Two foundational focus areas support building capabilities and evolving how we will work internally and with NIA First Nations, civic communities, and other stakeholders across all of our work in the NIAs. These foundational focus areas are both key enablers for progress in all the other focus areas of the Strategy and important in themselves. Through them we want to build the collective understanding, capability, and trust to do the new, hard things required in the Strategy.

16 NIA Progress Report (2022–2025): **NIA progress report—September 2022–September 2025**

What are the ways to meet a community's energy needs: supply- and demand-side energy resources?

Supply-side energy resources are those that generate energy.

Demand-side energy resources are actions focused on reducing energy consumption, such as building codes, more energy efficient technologies, and customers installing energy efficient lighting and appliances.

3.2 BC Hydro's work in the NIAs: past, present, and future

Over the past several years, BC Hydro has increased our focus on planning and operating the remote, standalone microgrids in the NIAs. Results show that progress has been made and we will continue our focus and efforts. While this Strategy outlines actions through March 2030, some objectives will take longer to achieve and will continue beyond this period.

Focus area	Past	Present	Future vision
Clean	○ Approximately 45% of energy in the NIAs is generated by clean and renewable sources. ○ 55% of the energy in the NIAs is generated by diesel, with some communities relying on 100% diesel generation.	○ Community renewable energy projects and microgrid upgrades are underway.	○ Microgrids are powered by a higher percentage of renewable energy.
Reliable	○ Long and frequent outages. ○ Limited capacity for community growth.	○ Improved reliability. ○ Investing in generation capacity increases to enable community growth.	○ Continued ongoing reliability improvements with fewer and shorter outages and improved power quality. ○ Working together to proactively plan for future needs and community growth.
Affordable	○ Higher Zone IB/II rates in the NIAs. ○ Limited participation in energy efficiency programs. ○ Self-generation limits of 10% of average community load.	○ Eliminated Zone IB/II higher rates in the NIAs and introduced more rate choices. ○ Energy efficiency and self-generation offers tailored to each NIA. ○ Higher self-generation limits—15% of average community load.	○ Customers have the information they need about rate choices to make the best decisions for themselves. ○ Increased participation in energy efficiency programs. ○ Self-generation limits specific for each NIA to enable greater participation.
Work openly and transparently in partnership	○ Limited engagement. ○ Limited information provided by BC Hydro about current state metrics in the NIAs.	○ Engagement and collaboration through multiple processes such as: NIA Strategy engagement, community renewable energy project technical working teams, joint project coordination processes. ○ Information and data sharing including cost of diesel.	○ Working together openly and transparently with NIA First Nations and civic communities to coordinate the planning and operation of the microgrids. ○ Progress updates and tracking of metrics under the Strategy.
Evolve BC Hydro's organizational capacity	○ Fewer resources, processes, and programs.	○ Increased people and financial resourcing, increased internal and external coordination.	○ Full and mature organizational capacity and capability (people, budget, process, and technology) to manage the transformed microgrids.

Work openly and transparently in partnership

3.3 Work openly and transparently in partnership

Achieving the objectives of this Strategy, and in particular reducing reliance on diesel generation, is an objective that BC Hydro cannot drive alone. Integrating more variable renewable energy in remote, standalone microgrids requires a technological, multi-organizational, and societal transformation that is not fully within the control of BC Hydro. We need to collaborate with NIA First Nations, who are leading the development of renewable energy projects in their communities, government, who are providing funding and policy support, parties like service and equipment suppliers, and others focused on different aspects of clean energy. We do, however, have a critical utility role, knowledge, and expertise. So, while BC Hydro cannot do it alone, we recognize that we have an important role to play, and to enable others to play their role, we need to be open, transparent, and clear with sharing information, requirements, and expertise.

We are focused on being more open and transparent with information in the interest of establishing and working in partnerships built on a foundation of joint understanding and trust. BC Hydro acknowledges that historically we have not always had the capacity or focus to share planning, operational and financial information externally about the NIAs. Sometimes not clearly stating our requirements and limitations has led to frustration and a questioning of our commitment.

What we have accomplished

- Worked with nine First Nations to help them advance nine community renewable energy projects. Activities include participating in technical working groups and sharing expertise, data, and financial information.
- Shared detailed financial information including the avoided cost of diesel as part of efforts to explain the Community Renewable Energy Offer.
- Continued to engage on a regular basis with regards to the capital and maintenance work we are undertaking in the community.
- Established a new tool for collaborative energy planning called Community Context Reports and completed the first one for the Bella Coola microgrid in collaboration with the Nuxalk Nation.
- Supported the Indigenous Climate Action Network through the Coastal First Nations Great Bear Initiative which focuses on building capacity for energy and climate action through training, mentorship and peer networking.

Former Chief of Ulkatcho First Nation Lynda Price and Former CEO of BC Hydro Chris O'Riley sign the CEPA in Anahim Lake in April 2024. Photo: BC Hydro

Our focus to March 2030

BC Hydro believes sharing more information about financial costs, operational challenges and technical requirements in the NIAs will allow us to collaboratively advance planning, prioritization, and changes needed for all elements of the Strategy. This is particularly needed for the difficult and transformational actions related to integrating variable renewables from community renewable energy projects while ensuring reliability of the microgrid.

Objectives	Actions	Our approach
Proactively share BC Hydro information	○ Provide updates on investments and operations in the microgrid.	○ Share information about the upcoming capital and maintenance work plans and ongoing operations for the microgrids that serve each NIA.
	○ Publish regular updates on performance metrics.	○ Publish performance metrics associated with the Strategy as well as information related to specific NIAs such as reliability statistics and the percentage of renewables and diesel used to generate electricity in each NIA.
	○ Provide updates on the cost of operations and asset investments.	○ Share information on the portfolio cost of diesel, the overall cost of service and expected changes over time with the integration of renewables in each NIA.
Coordinate collaborative energy planning	○ Develop Community Context Reports.	○ Collaborate with NIA First Nations and civic communities to develop Community Context Reports which are energy resource plans that lay out what BC Hydro will do to meet each microgrid's needs for capacity, renewable energy/diesel reduction, and power quality. ○ Collaborate with NIA First Nations and civic communities to schedule energy planning activities based on which NIA microgrids have the greatest and most urgent reliability need for capacity generation increases with additional consideration for where diesel reduction potential is the highest. ○ BC Hydro, in collaboration with NIA First Nations and civic communities, will assess supply– and demand–side energy resources that balance energy planning objectives including firm capacity, diesel reduction, and power quality.
Support building networks to share information and experience related to standalone microgrids and renewable energy	○ Identify opportunities for BC Hydro to openly share experience and lessons learned with NIA First Nations and other parties.	○ Be open in sharing our experience as we integrate renewables into the microgrids and install new technologies like microgrid control and battery energy storage systems.
	○ Support NIA First Nation interests in learning about clean energy from one another and the broader industry.	○ Use processes that bring Indigenous clean energy leaders, industry, and BC Hydro subject matter experts together to share information and discuss the technical and project considerations for community renewable energy project development, and requirements for sustained operations and maintenances.

Installing solar panels at Tll Yahda Energy's Solar North in Haida Gwaii. Photo: BC Hydro

Indigenous voices

Tll Yahda Energy

"Since 2019, BC Hydro and the Haida Nation have worked closely to move Solar North—a 2 MW solar farm near Masset, British Columbia—from development into successful operation. Developed by Tll Yahda Energy, a partnership between Old Massett Village Council, Skidegate Band Council and the Council of the Haida Nation, and supported by technical expertise from BC Hydro, the project demonstrates how shared planning, engineering support, and long-term energy purchase agreements can enable reliable renewable generation in standalone microgrids. Together, we are integrating new solar generation into the Masset microgrid, upgrading microgrid controls and adding battery energy storage to safely increase renewable use and reduce diesel consumption over time. Through a 20-year Community Electricity Purchase Agreement and future expansion options, the partnership supports local economic benefits, advances Haida energy sovereignty, and creates a scalable model for transitioning other remote communities from diesel to clean energy as projects move into full operation."

Evolve BC Hydro's organizational capacity

Validating new equipment at Tll Yahda Energy's Solar North in Masset. Photo: BC Hydro

3.4 Evolve BC Hydro's organizational capacity

This Strategy is ambitious and will transform how electricity is provided in the NIAs. We have recognized that we need to grow the internal organizational capacity at BC Hydro—including people, budget, processes, and technology—to both implement the actions and sustain a new way of operating in the future that includes more joint planning and operations with the NIA First Nations.

What we have accomplished

- Established a dedicated NIA Planning and Strategy department at BC Hydro with a Director level manager leading the group with accountability to an Executive team member.
- Consolidated the responsibility for commercial management of Community Electricity Purchase Agreements (CEPAs) within the team responsible for strategy and planning in the NIAs.
- Increased staffing and budget levels within the organization to lead and coordinate activities related to the NIAs.
- Improved alignment and understanding across the multiple departments that work on the Strategy through more Indigenous cultural awareness training, communications, and planning.
- Started processes such as robust and collaborative community load forecasting to improve data and insight for energy planning to meet community electricity needs.

Our focus to March 2030

Over the past few years, we have increased staffing, strengthened internal coordination, and established new ways of working. As we move forward, we will continue to mature our processes and capabilities so we can plan and operate the transformed microgrids and deliver on the objectives of this Strategy.

Objectives	Actions	Our approach
Continue to develop a program management approach	○ Develop 'fit for purpose' processes, tools, and templates for the work we are doing with NIA First Nations and civic communities related to the Strategy, such as community renewable energy projects, load forecasts and community energy planning.	○ Develop and share processes and documentation with NIA First Nations and civic communities to bring clarity on requirements, sequencing, and timelines. ○ Create joint working plans and a 'plan, do, check' approach to tracking and communicating progress so all parties are aware of status and next steps. This will help to ensure that we are all making the best use of limited resources.
	○ Expand BC Hydro's expertise and capacity to develop the technical standards, analysis and energy modelling needed to inform planning and operational decisions.	○ Conduct the technical studies and analysis to support key aspects of the Strategy including key outputs needed for integrating community renewables, energy planning and self-generation limits. This includes determining the optimal size of community renewable energy projects, identifying the design and equipment requirements needed to reliably integrate renewables into standalone microgrids while keeping the grid stable, and analyzing actual performance once in operations. ○ Develop staff, add tools, and leverage third party expertise and the experience of other utilities.
	○ Create the capability to manage the ongoing commercial relationship between BC Hydro and First Nation Power Producers related to the community renewable energy projects and electricity purchase agreements.	○ Design and implement efficient and effective tools and processes for all elements of ongoing commercial management including joint operations coordination meetings, invoice payment and contract administration. ○ Take learnings and focus on continuous improvement.
Collaboratively develop robust load forecasts for all NIAs	○ Mature BC Hydro's NIA-specific load forecasting capability including establishing a cycle of regularly monitoring actual loads and updates.	○ Proactively collaborate with communities to understand expected growth and shifts in energy use. Discuss baseline, low and high forecasts, and risks. ○ Based on learnings, refine, and strengthen our load-forecasting methodology to better anticipate future demand and volatility. ○ Work closely with the community to monitor signposts to know when load forecasts need updating. Establish a guideline of minimum every 5 years, so that load forecasts continue to provide reliable information on the future energy needs of the community.

Objectives	Actions	Our approach
Operate and optimize the transformed microgrids	○ Develop the skills to own, manage and operate new assets such as microgrid control and battery energy storage systems.	○ Ensure sufficient, properly trained personnel and service providers are in place to operate and maintain new technologies and new ways of operating the microgrids. ○ Plan differently for new asset management practices that work together from generation through to distribution to the customer.
	○ Support NIA First Nations' efforts to build capacity in their communities to operate and maintain their community renewable energy projects.	○ Leverage the following to support First Nations capacity building to operate and maintain their generation plants: development of Joint Operating Orders; advising on operational role requirements and training; holding joint operations training exercises before energization; using Joint Operating Committees as ongoing forums to share information and learnings; developing templates and providing training for invoicing and reporting monthly maintenance activities.
Monitor advancements in technology to manage peak demand, support renewable integration/ diesel reduction, and improve power quality	○ Keep track of emerging technologies, evaluate solutions and pilot where they support energy resource requirements.	○ Continue to monitor the market for new commercially available renewable energy technologies that may prove useful for remote, standalone microgrids in the future. ○ Evaluate solutions that can help reduce the need to build more diesel capacity, such as small batteries in homes and businesses, smart thermostats, and programs that reward customers for reducing electricity use during short peak periods. ○ Pilot potential solutions where appropriate.

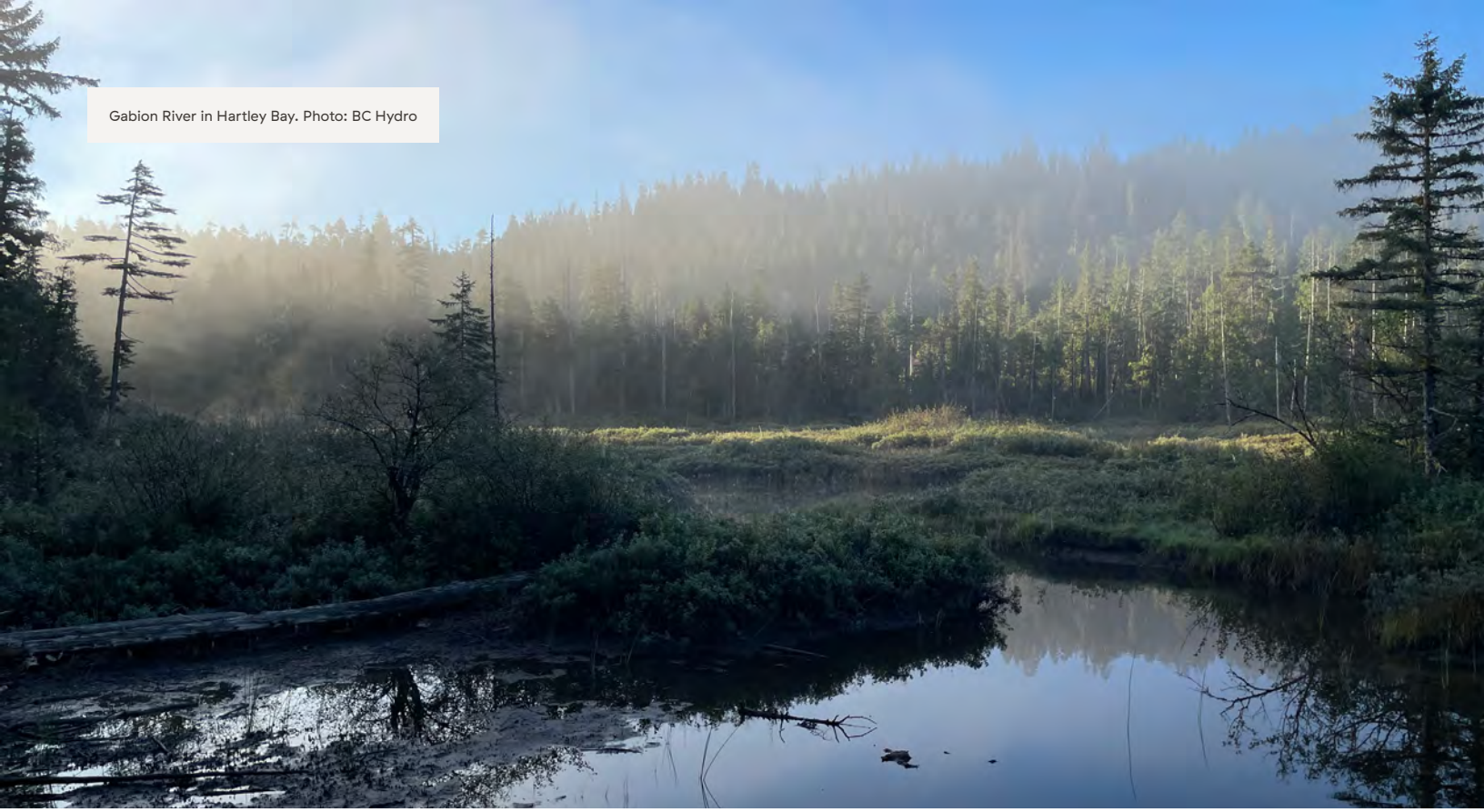
Sputc pole on River Road, downtown Bella Coola. Photo: BC Hydro

Indigenous voices

Elijah Mecham, Director of Clean Energy, Nuxalk Nation

"When first looking into clean energy and climate change solutions in your territory you must do a literature review. Find all of the historic information about where you live, collaborate with stakeholders such as Elected Council, Community Elders, BC Hydro, British Columbia Utilities Commission, Ministry of Energy and Climate Solutions, Ministry of Forests, Ministry of Water, Land and Resource Stewardship, Ministry of Transportation and Transit, University of British Columbia, Indigenous Clean Energy Network, and any relevant society in good standing with your nation. This will happen over the course of years, in tandem with community engagement, which is the most important step. Your insights into the various stakeholders in your region will allow for long-term high-level technical planning, only once your community engagement has informed your Community Energy Plan (CEP) and has been passed by hereditary and elected leadership. At this point in your development when, if you're like me, you live in a community burning diesel to power your community, your engagement and CEP will have identified areas for power generation (e.g., wind, solar, hydro), retrofits to commercial and residential buildings and you will understand the impacts and importance of your work from a numbers perspective. I would suggest that you begin a deeper collaboration with BC Hydro. Work with them and your leadership to develop long-term planning to accommodate future growth, plan for generation, plan for system upgrades with BC Hydro, immerse yourself at a level you're comfortable in your networks to ensure proper flow from the ministerial level down to the linesmen working on the powerlines. This at least is my lived experience, the flow of your community, the politics, your circular economy all change how and when things happen so be patient. Do not rush these projects, do not push your people, instead try to bring them to your level of understanding through time and engagement as they haven't spent uncounted hours of literature review. Don't be disappointed when projects fail, or you lose control of a project as it is for the betterment of your people so it may be time to set your ego aside. Smaw Ti Slq'ilh—With One Heart and Mind."

Clean



Gabion River in Hartley Bay. Photo: BC Hydro

3.5 Clean

BC Hydro shares the aspirations of NIA First Nations to power the remote microgrids with 100% clean energy. Fortunately, we are already partway there and positioned to make more progress. Today, approximately 45% of the aggregate electricity generated on the microgrids comes from hydroelectricity. Bella Bella, Atlin and Dease Lake are predominantly served by clean energy with diesel generators for back-up only if the hydro facility is unavailable. Three other microgrids—Masset, Sandspit and Bella Coola—are partially served by clean energy (solar or hydroelectricity).

Powering the remote, standalone microgrids with a reliable source of 100% clean energy, where storage hydro is not available, is not currently feasible with existing technology and local renewable resource options. However, BC Hydro is committed to moving along this path, prioritizing efforts to the microgrids that are fully or largely reliant on diesel. Rather than building BC Hydro owned renewables, our core approach is to support NIA First Nation efforts to develop community renewable energy projects, enter into purchase agreements for the energy, and then invest in upgrading the microgrid to integrate the renewable energy. This approach aligns with what we have heard from NIA First Nations as their preference for owning community renewable plants to provide economic and community benefits. Significant progress has been made in recent years by working together with NIA First Nations, government, and other partners.

Provincial government lends support by amending the Greenhouse Gas Reduction Regulation

In June 2024, Cabinet approved an amendment to the Greenhouse Gas Reduction Regulation. The amendment increases regulatory certainty regarding cost recovery for CEPAs that displace diesel in the NIA and related station upgrade capital projects.

NIA First Nations and BC Hydro now have greater confidence to move forward together on these projects.

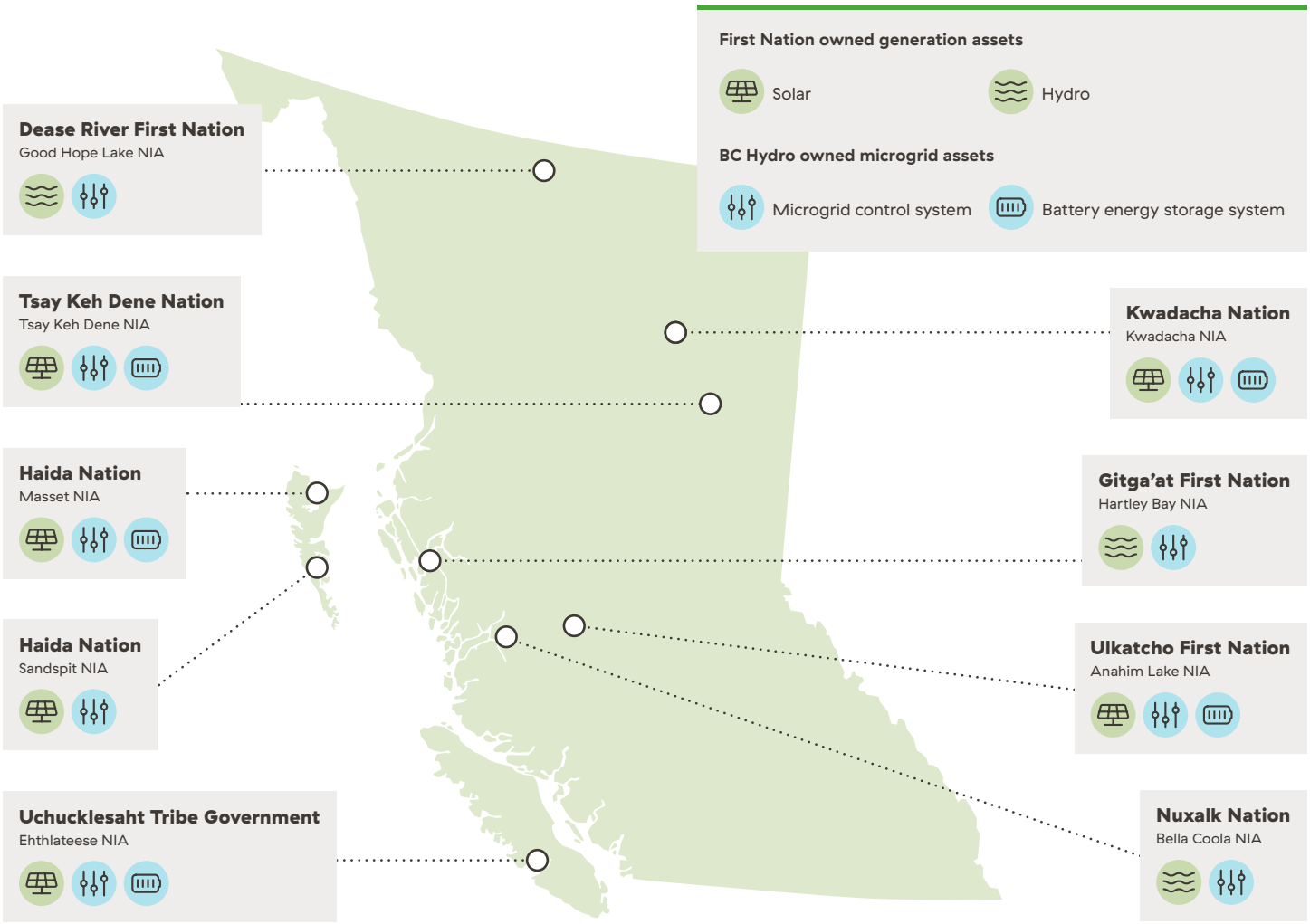
What we have accomplished

- We are working with NIA First Nations to advance nine community renewable energy projects (as of March 31, 2026).
  - Projects relate to nine NIAs, seven of which are currently 100% reliant on diesel. There are six solar projects and three small hydro/run-of-river projects.
- BC Hydro will fund, own, and operate microgrid control and battery energy storage systems, and other infrastructure to support the integration of community renewable energy projects into the microgrids.
  - Allocated approximately $200 million in station upgrade projects in the NIAs as part of BC Hydro's 10-Year Capital Plan.
  - Established contracts for supply, installation, and integration of microgrid control and battery energy storage systems and other required station upgrade equipment.
  - Established a program delivery approach with internal and external resources to facilitate the ramp up and efficient delivery of interconnections and station upgrade projects needed for renewable project integration and to meet anticipated timelines.
- Developed a tailored contracting approach to purchase renewable energy in the NIAs called Community Electricity Purchase Agreements (CEPAs).
  - Designed to manage the unique risks of community renewable energy projects and help ensure their long-term sustainability.
  - CEPAs provide predictable revenue streams, contract terms that reflect the unique nature of small community-owned plants rather than large commercial entities and reduce risk for First Nations, and provide for additional coordination, capacity building and support.
- We have signed two CEPAs with NIA First Nations (as of March 31, 2026).
  - In April 2024, we signed the first CEPA with Ulkatcho Energy Corporation—a 100% Ulkatcho First Nation owned corporation—in Anahim Lake to purchase electricity from the solar farm they are constructing.
  - In December 2025, the second CEPA was signed with Tll Yahda Energy, a partnership of Skidegate Band Council, Old Massett Village Council and the Council of the Haida Nation.
  - Additional CEPAs are in active development.
- Community renewable energy projects are energized and integrated into the system.
  - Solar North—a 2 MW solar plant—came online and started to deliver clean electricity to the Masset microgrid in December 2025. The plant is British Columbia's first First Nations-owned and operated solar plant in the NIAs.

In January 2026, the Ulkatcho Solar Farm was integrated into the Anahim Lake microgrid with full commercial operations expected to commence when the BC Hydro station upgrades are complete later in 2026.

INTEGRATING COMMUNITY RENEWABLES IN THE NIAS

To reduce diesel use, the First Nations are advancing community renewable energy projects in nine NIAs and BC Hydro is upgrading these microgrids to integrate the renewable energy. Most of the projects are in the ~2 to ~4 MW range with some smaller projects under 1 MW. On aggregate these projects, once in-service, paired with microgrid control and battery energy storage systems, and operating at the full modelled potential, could displace approximately 6.4 million litres of diesel every year.



NIA	First Nation community renewable energy project	Expected annual diesel displaced[17] (million liters)	Annual diesel used in 2025 (million liters)
Masset	Solar, 4.0 MW	1.0	7.1
Sandspit	Solar, 2.0–3.0 MW	0.3	2.1
Bella Coola	Run-of-river, 2.2 MW	1.6	3.2
Ehthlateese	Solar, 750 kW	0.1	0.2
Anahim Lake	Solar, 3.8 MW	1.0	1.5
Tsay Keh Dene	Solar, 3.5 MW	0.8	1.2
Kwadacha	Solar, 3.5 MW	0.8	1.0
Good Hope Lake	Run-of-river, 250 kW	0.3	0.4
Hartley Bay	Hydro, 950 kW	0.5	0.6
Total		**6.4**	**17.3**

17 Estimates are directional and based on models, current load forecasts, and current information about the First Nation community renewable energy projects. Actuals may be different.

Our focus to March 2030

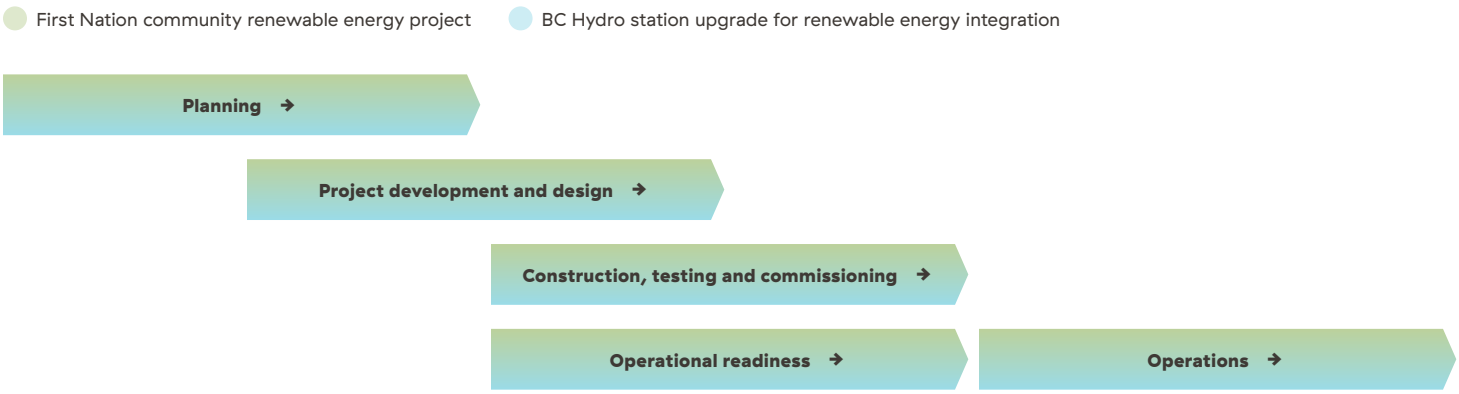
For the next few years, BC Hydro's primary focus will be advancing, as much as possible, the projects that are already underway. This means supporting advancement of the initial grouping of nine First Nation community renewable energy projects, integrating them when ready into the microgrids, and working to fine-tune, likely over several years, the microgrid operations and systems to optimize the amount of diesel that can be displaced while keeping the grid stable.

Focusing on the projects already underway represents the best opportunity for meaningful reduction in diesel generation in the coming years. BC Hydro will consider additional projects as the initial projects are completed and there is capacity within our organization and the highly specialized supplier market (i.e., engineering resources and equipment suppliers experienced in standalone microgrids) required for this work. Opportunities for future community renewable energy projects will be studied as part of the NIA's collaborative energy planning process and development of Community Context Reports that will consider the capacity, energy and power quality needs of the specific microgrid and assess a range of potential solutions including supply- and demand-side energy resources.

No other Canadian jurisdiction has the number, size or targeted renewable integration levels of the community renewable energy projects underway in the NIAs. As we progress, British Columbia will be a leader in integrating community renewable energy into remote, standalone microgrids.

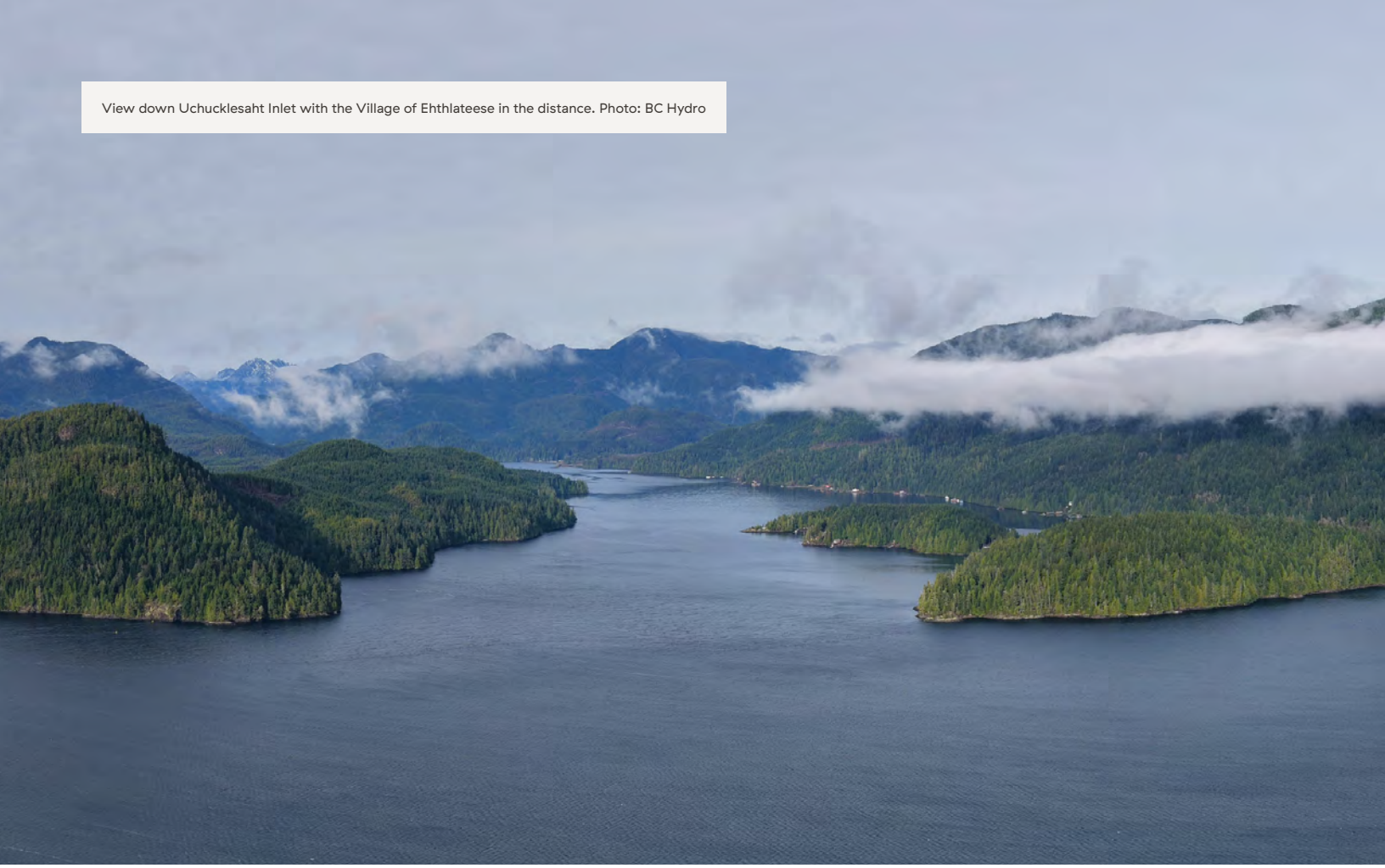
The level of change and work to upgrade the BC Hydro NIA stations and transition to a completely new way of operating—internally and jointly with First Nation Power Producers—is unprecedented. While completing this work is very technically and logistically challenging, BC Hydro is committed to moving forward, learning and adapting as we go.

CLOSE COLLABORATION FROM PLANNING TO OPERATIONS IS REQUIRED FOR SUCCESS



Joint coordination between BC Hydro and the NIA First Nations as their respective projects are designed, built and commissioned is a technical requirement to ensure the different aspects of their projects will work together for the long term. Various processes including a Joint Project Oversight Committee and a Joint Operating Committee provide the framework for this coordination.

Objectives	Actions	Our approach
Support advancement of community renewable energy projects	○ Support the design, construction, testing, commissioning and integration to the microgrid.	○ Support each of the projects throughout their development and operating life through Technical Working Groups, Joint Project Oversight Committees, and Joint Operations. ○ These committees will ensure a whole system approach is taken so that there is the high level of joint planning and coordination needed for the successful achievement of commercial operation date for the renewable energy facility, the in-service date for the station upgrades, and safe, reliable operations throughout the asset life of these systems.
	○ Purchase renewable energy from First Nation owned projects.	○ Use CEPAs which are NIA-specific and designed to assist both parties with managing the unique risks and operating requirements of community renewable energy projects in standalone microgrids and ensuring their long-term sustainability.
Transform the microgrids where required to support integration of renewable energy	○ Invest to upgrade microgrids for the integration of renewables and ensure optimal performance.	○ BC Hydro will initiate projects to upgrade stations and add equipment (including microgrid control and battery energy storage systems) needed to integrate renewable energy while keeping the grid stable. We will have asset management strategies that ensure appropriate maintenance for reliable operations and sustainment of the equipment for its asset life. ○ We will monitor performance in terms of renewable integration, diesel reduction and reliability. We will start with conservative levels of renewable integration to test systems and ensure reliability and then increase the levels overtime.
	○ Use a program delivery approach for the efficient and timely delivery of station upgrade projects.	○ Deliver station upgrade projects using a program delivery approach and leverage external service providers to supply needed capacity and skills to deliver these station upgrade projects on-time. With the challenges of remote construction, this will require extensive planning and coordination among BC Hydro, NIA First Nations, and contractors. ○ Where possible, leverage procurement opportunities from BC Hydro projects to provide economic opportunities for NIA First Nations. ○ Learn as we go and apply the lessons to subsequent projects.
Ensure coordinated operations between BC Hydro and First Nation power producers to integrate renewable energy	○ Create Joint Operating Orders for day-to-day operations.	○ Put in place joint operating orders that are needed for the day-to-day safe and reliable operation of variable renewables on remote microgrids.
	○ Establish Joint Operating Committees to facilitate longer-term coordination of how community plants and BC Hydro assets operate together.	○ Establish Joint Operating Committees that will be responsible for the ongoing operational coordination needed to enable the safe, reliable and optimal operation of both the community renewable energy project and the microgrid. Topics are expected to include items such as maintenance planning and scheduling and issue management.
	○ Support work by NIA First Nations to build their capacity to operate and maintain their plants.	○ BC Hydro will support work by First Nation Power Producers, government, and others to build capacity to ensure required skills are available to operate and maintain their plants.



View down Uchucklesaht Inlet with the Village of Ehthlateese in the distance. Photo: BC Hydro

Looking beyond March 2030

It is uncertain how many community renewable energy projects will be complete, integrated and operating by 2030. Projects take multiple years to complete and there are technology, resource capacity, supply chain and funding risks that can impact both NIA First Nations that are developing the projects, and BC Hydro as we work to integrate the projects into the microgrids.

As projects complete and as there are available resources, BC Hydro will collaborate with the NIA First Nations to assess additional diesel reduction opportunities.

We will leverage the collaborative energy planning process and development of Community Context Reports to identify future potential for diesel reduction alongside other objectives such as adequate firm capacity and power quality to support growing communities.

Ulkatcho Energy Corporation's 3.8 MW Solar Farm in Anahim Lake. Photo: Ulkatcho Energy Corporation

Indigenous voices

Stephen James, CEO, Ulkatcho Energy Corporation

"In 1995, the Ulkatcho First Nation got into the forestry industry and had a very good experience, bringing jobs, revenue and forging partnerships. There was a fair amount of logging, and as a town and community of about 1,200 people, the industry was a prominent employer. That continued until about 2015, when things got very, very tough. The lumber market, the mountain pine beetle, and a bunch of other things brought serious challenges, and it was one of the first areas hit by the beetle. There was also concern around diesel power generation when a spill contaminated some soil years prior, so that was top of mind for the community. Fast forward to January 2026, when we commissioned the solar project. It wasn't always easy—there were some difficult moments along the way, but we had a common goal, and the word is trust. The first phase is going to displace diesel 65% of the time, with some variability throughout the year. The question now is how do we get to solar generation 100% of the time. The solar farm is an amazing thing that's happened because of good people, good companies and good management."

Melissa Cahoose, Climate Action Coordinator, Ulkatcho Energy Corporation

"It goes back to our people's history, where we come from and what we overcame, including residential schools, day schools, the Sixties Scoop and being forced into the reserve system. We were forced out of our traditional village, and we're protectors of our land, our resources and everything. The name Ulkatcho means 'fat of the land,' and it refers to an abundance of resources in our area. It's our job to protect those resources, and a project like this, which reduces diesel use in the community, is so important for the community. Many projects have already been completed because of the solar farm, like our new skating rink. Before that, the kids had nowhere to go, nothing to do. We have a new skating rink and new bleachers, renovations to the community hall, and now it's warm and there are ball hockey games and community events. The Ulkatcho group of companies are able to contribute to almost every event that happens, and there's a new sense of pride."

Reliable

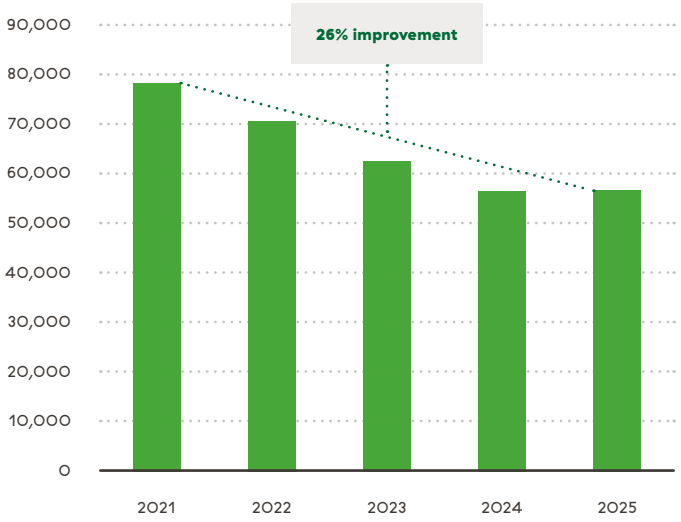
3.6 Reliable

Given the remoteness and nature of standalone microgrids in British Columbia, there will be different reliability in the NIAs than, for instance, in urban areas. Nevertheless, BC Hydro recognizes the importance of reliable electricity to residents in remote communities. Electricity is required for many aspects of daily life, including lighting, heating, hot water, food storage, and working. It is also important that the microgrids have the capacity to enable increased housing and critical community development projects that will expand and improve services through medical clinics, schools, big houses, community centers and elders' residences.

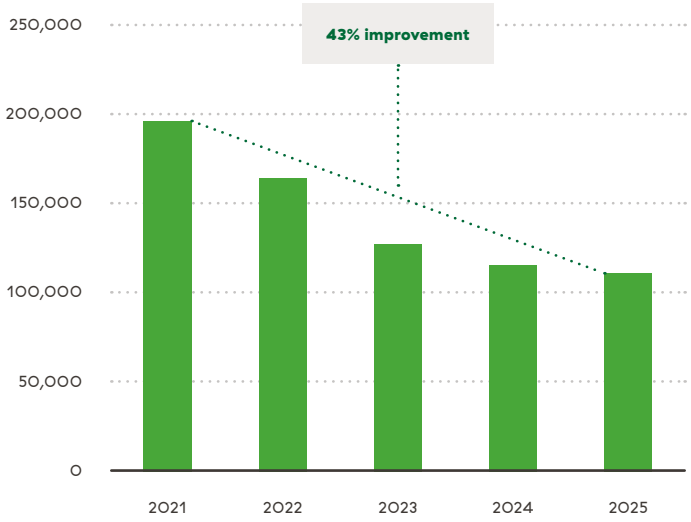
What we have accomplished

- Improved customer reliability.
  - BC Hydro is investing ~$50 million/year in capital and maintenance for ongoing reliability in the NIAs. This has more than doubled from past years.
  - Over the past couple of years, we have also initiated a NIA Reliability Action Plan that will invest $8 million in targeted improvements in the remote microgrids. Actions have included replacing end of life equipment, adding automated reclosers to improve visibility and control of the system, as well as more vegetation management.
  - In recent years there has been an overall improvement in the number of customer outages and their durations. The figure below shows a gradually decreasing trend in the number of aggregate customer interruptions and customer hours lost in the NIAs. Customer interruptions and customer hours lost have improved by 26% and 43% (respectively) since 2021.
- Investing to keep up with community growth.
  - Initiated projects in nearly half of the microgrids to add additional firm capacity through the addition of diesel generators to meet community needs. At this time the only technology available to provide firm capacity is diesel generation.
  - Implemented an approach of modular, mobile diesel generator configurations that make it faster to add capacity in response to community growth compared to traditional powerhouse designs.

Customer interruptions (CI)



Customer hours lost (CHL)



Our focus to March 2030

Due to targeted efforts, there has been an improvement in reliability compared to past years. Our approach over the next three years will be to focus on sustainment and identifying opportunities for additional improvement. We will also be implementing planned capital projects to ensure adequate capacity and will seek ways to improve power quality.

Objectives	Actions	Our approach
Keep the lights on	○ Continue to monitor reliability performance and implement corrective actions where necessary.	○ Focus on customers experiencing the most frequent and longest outages. Deploy solutions like wildlife mitigation and installation of automated reclosers to improve reliability.
	○ Continue to invest in vegetation management.	○ Strategically plan vegetation management on an annual basis leveraging local knowledge, capacity, and expertise where possible.
Enable community growth by ensuring adequate energy capacity through a mix of supply- and demand-side energy resources	○ Upgrade the microgrids to meet load growth by adding diesel generation capacity.	○ Complete the current set of capacity increase projects and initiate additional projects as identified through the energy planning process.
	○ Improve the energy efficiency of diesel generators.	○ Look to upgrade and size the diesel generators appropriately for co-generation with renewable energy.
	○ Assess other ways to manage peak demand.	○ Investigate opportunities to deploy battery energy storage, targeted customer programs, managed heating, and other peak management tools to reduce or defer the need for new diesel generation.
Improve power quality	○ Understand the current power quality in the microgrids and seek ways to improve where needed.	○ Assess the current power quality as part of energy planning. This will include conducting studies to determine the types of disturbances on the microgrids and install meters to identify issues in real-time. ○ Assess the impact of new generation resources on power quality, and solutions to improve power quality and plan to implement as possible. ○ Educate customers on the impacts of customer loads on power quality and what they can do to prevent issues and mitigate impacts.

What is the difference between reliability and power quality?

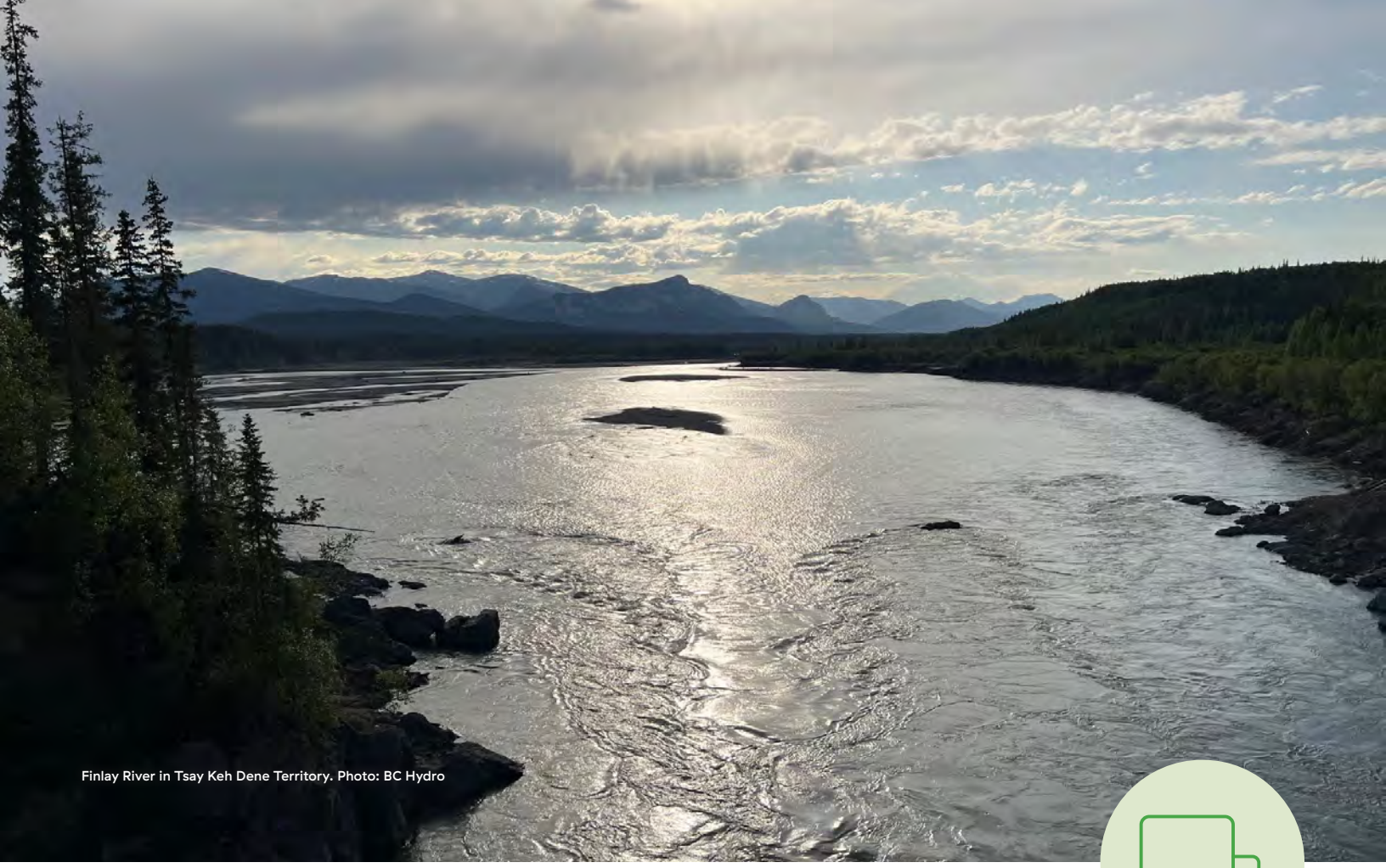
Although reliability and power quality are somewhat related, they are really two separate issues.

Reliability is whether electricity is there when it's needed

Power quality is the condition of the electrical power supplied to customers

Why is power quality important?

Poor power quality can cause flickering lights, malfunctioning appliances, or even damage to sensitive electronics. Power quality is particularly challenging on remote, standalone microgrids because relatively small changes in customer's load (e.g., energy demand) or the energy supply can cause disturbances that impact the overall system such as voltage unbalance resulting in degradation of power quality.



Finlay River in Tsay Keh Dene Territory. Photo: BC Hydro

Indigenous voices

Deeanna Izony, Executive Director, Tsay Keh Dene Nation

"Tsay Keh Dene Nation's priority is to plan for a sustainable future that supports a strong community, protects the environment, and prepares for the needs of future generations. Our energy vision is grounded in environmental stewardship, thoughtful development, and community-led dialogue so that decisions made today are reflected in future developments. We see energy planning as inseparable from community health, housing, cultural continuity, and economic resilience. Tsay Keh Dene Nation's future development planning requires careful consideration of what is needed to support long-term growth. Energy solutions must be scalable, reliable, and aligned with the community's expected infrastructure and housing needs over the next 20+ years."

Affordable

3.7 Affordable

BC Hydro is working to help customers reduce their energy bills by offering more rate choices to best meet customer needs and providing opportunities to improve energy efficiency in the NIAs. As electricity becomes more affordable and more renewable energy is introduced into the microgrids, customers in the NIAs may be more inclined to move away from other types of fuel such as propane, heating oil and wood heat to improve health and safety, as well as to achieve cost savings, improve home comfort, and reduce greenhouse gas emissions.

What we have accomplished

- Eliminated higher rates in the NIAs.
  - Customers across the NIAs now pay the same rates as those on the integrated system.
- Partnered with the Province of BC and the New Relationship Trust to provide funding to communities for energy efficiency programs and capacity building.
  - This partnership increases demand side management support and has resulted in higher incentives for energy efficient upgrades and increased the total funding available for projects (maximum funding increased from $300,000 to $500,000 per project).
- Supported energy efficient upgrades in community homes and buildings across many communities which directly improves affordability and comfort for families.
- Provided funding for full time Climate Action Coordinators in 8 communities through partnership with the Coastal First Nations Great Bear Initiative.
  - Coordinators are helping customers reduce energy bills and plan, implement, and manage energy efficiency, renewable energy generation, and climate change adaptation projects in their communities.
- Launched an NIA–specific solar and battery rebate program to help customers generate and store solar electricity and lower their bills.
- Increased the self–generation limit on the microgrids from 10% to 15% of average loads.

Rooftop solar panels installed on the Nuxalk Nation Band Office. Photo: Nuxalk Nation

Our focus to March 2030

By eliminating the higher rate structures specific to the NIAs, BC Hydro has already taken the action that is the most impactful way we can improve affordability for customers in the NIAs. In the coming years, BC Hydro will continue to look for ways to support community participation in energy efficiency programs, which will result in cost savings for customers, improvements in home comfort, and reduce greenhouse gas emissions in the community.

Objectives	Actions	Our approach
Communicate new rate approach	○ Help customers lower their energy bills by understanding rate choices.	○ Provide ongoing and specific communications to ensure that customers have the information they need about rate choices to make the best decisions for themselves
Provide energy efficiency programs	○ Implement programs and initiatives to improve sustainable energy practices in the community.	○ Continue our partnership with the Coastal First Nation Great Bear Initiative to fund Climate Action Coordinators in the NIAs. ○ Collaborate with the Climate Action Coordinators to implement a community focused approach to address unique challenges and opportunities.
	○ Identify opportunities for increased participation in energy efficiency programs.	○ Assess current energy efficiency programs, offers, and initiatives to identify barriers and work closely with funding partners to identify ways to increase participation.
Support self-generation on the microgrid while maintaining grid stability	○ Monitor self-generation levels and their impact on microgrid stability to guide future adjustments to NIA-specific limits.	○ Track installations against the 15% limit and assess microgrid performance. ○ Take learnings from industry and our experience. ○ Work collaboratively with NIA First Nations to understand the benefits and risks of increasing the limits versus other objectives.

Community of Hartley Bay. Photo: Gitga'at First Nation

Indigenous voices

Hayden Keating, Climate Action Coordinator, Gitga'at First Nation

"Electricity service is an existential issue to the Gitga'at Nation who call Hartley Bay home. As my nation's Climate Action Coordinator, I am proud to be part of the team ensuring we have the most robust and secure electricity generation system possible. A cornerstone of that is fostering a positive working relationship with the Provincial government and their crown, BC Hydro. My goal is to work toward a cleaner, more sustainable future for our people and our territory, Wai Wah."

4. How we will track and report on progress

Improving reliability and affordability in remote, standalone microgrids and reducing diesel use is a multi-year transformation. Results that matter most to communities—like sustained diesel displacement, improved power quality, and increased participation in energy efficiency programs—will take time to materialize.

In the near term, we will track clear progress metrics which measure activities that move us closer to the objectives of the Strategy (e.g., CEPAs signed or in active development, studies completed, status of BC Hydro station upgrade projects), while also tracking result metrics which measure the outcomes of the Strategy (e.g., litres of diesel displaced, customer reliability).

4.1 Metrics

BC Hydro will monitor the following progress and result metrics.

Focus area	Progress metrics		Result metrics	
	Description	Unit of measure	Description	Unit of measure
Foundational	Studies complete	total	—	—
	Load forecasts up to date	total	—	—
	Community context reports complete	total	—	—
	Completion of Indigenous awareness training	# people resources trained	—	—
Clean	Community renewable energy project—sizing and integration studies	total	Total installed renewable capacity	kW or MW
	Community electricity purchase agreements	# signed and in active development	Renewable energy (by NIA and on aggregate)	annual %
	BC Hydro station upgrade projects	status	Diesel displaced	litres/year
	Community renewable energy projects	status	—	—
Reliable[18]	Capital and OMA invested to address reliability	$/year	Customer interruptions	#/year
	—	—	Total firm capacity	kW or MW
	—	—	Customer hours lost	#/year
Affordable	Dollars invested in demand-side management and capacity building programs	$/year	Energy savings	MWh/year
	Rebates issued in solar/battery program	$/year	Capacity savings	MW

4.2 Reporting

BC Hydro will establish a cadence for reporting on progress and result metrics and publish an annual summary. In some years that may look like a comprehensive progress report and in other years it may be a streamlined summary of metrics. All information will be available on the public website[19].

18 BC Hydro will start to investigate ways to track and report on power quality.

19 Link to NIA Website: **Non-Integrated Areas**

View from Daajing Giids, Haida Gwaii looking out into Bearskin Bay. Photo: BC Hydro

5. Continuing forward together

Reducing diesel use and improving reliability and affordability in remote, standalone microgrids is a shared vision, and BC Hydro cannot achieve it alone.

The work ahead is technically complex and unprecedented. Integrating variable renewables into remote, standalone microgrids requires new equipment, new operating practices, and new skills, and today's technologies still have real limits. As we have learned, there is no playbook for integrating variable renewables at this scale in remote, standalone microgrids, and much of this work is new for everyone involved. To make progress now, we will focus on what is feasible with the technology, resources, and funding currently available.

Although uncertainty remains, important progress has been made. We have meaningfully improved the reliability and affordability of electricity in the NIAs. Together with NIA First Nations, government, and other partners, we are advancing community renewable energy projects, preparing microgrids for renewable energy integration, and strengthening the foundations needed for sustained change.

We will stay focused on what we can control within an uncertain world: learning, adapting, sharing information openly, and maintaining strong partnerships. By building on our progress, supporting each other through the hard work, and keeping momentum, we can continue moving toward the shared vision of providing clean, reliable, and affordable electricity in the NIAs.

Appendix

What we have learned

We have been increasing our focus on the NIAs over the last several years to improve customer access to clean, reliable, and affordable electricity[20]. In July 2023, an initial draft of the Strategy was shared with representatives from NIA First Nations. In 2023 and 2024 we engaged to seek input that would help us further refine and develop the Strategy. In parallel, we continued to work in partnership with NIA First Nations and others like the provincial and federal governments to make progress.

We now find ourselves further down a path that began several years ago. Appendix A outlines what we have heard through our engagement with NIA First Nations, and what we have learned, from others and through our experience, as we have acted. All of this is informing the Strategy and our implementation path forward.

1. What BC Hydro heard from First Nations living in the NIAs

BC Hydro has been working directly with First Nations in the NIAs since 2018 to reduce reliance on diesel generation. To ensure that the Strategy truly reflects the priorities of these First Nations we undertook a three-phase engagement process with NIA First Nations. During the first engagement phase, BC Hydro engaged from March 2023 to September 2024 with NIA First Nations. We produced an Engagement Summary Report from these sessions that was then reviewed with the NIA First Nations for feedback before finalization. Below describes some of the key themes and feedback we received during that engagement. The Engagement Summary Report can be found on the public website[21].

1.1 Clean, reliable, and affordable electricity is critical for communities

First Nations from the NIAs told us that environmental stewardship is of utmost importance and this is their responsibility as traditional stewards of the land since time immemorial. Many articulated a desire for microgrids to be served by 100% clean and renewable resources. Overall, diesel reduction was the number one priority for these clean energy leaders representing First Nations in the NIAs.

These First Nations stated that the Strategy needs to recognize that they believe diesel reduction activities can provide broader benefits to the community beyond just diesel reduction, such as economic development opportunities, capacity building, and clean energy expertise. We also heard that clean, reliable, and affordable energy are essential for growing and thriving communities and goals such as community development, home comfort, and food sovereignty.

1.2 How we work together is important for the success of the Strategy

First Nations living in the NIAs shared that reconciliation is central to the work of diesel reduction; not only to ensure prosperous, and sustainable futures, but also to rectify ongoing and historical injustices arising from systematic racism within British Columbia and Canada.

We heard that trust is foundational for partnership and to achieve this BC Hydro needs to be more open and transparent in sharing information and engaging in dialogue before making decisions. We heard a deep desire for all of our work together to be anchored in the principles and framework of UNDRIP, which means that we must build relationships based on respect and recognition of Indigenous self-determination and self-governance.

1.3 Acknowledging and learning from the barriers and challenges

Funding was named as the top barrier faced by NIA First Nations when advancing community renewable energy projects. Some communities want BC Hydro to provide support by advocating to government to streamline processes to access funding and provide certainty on applications.

20 BC Hydro's initial work with NIA First Nations on diesel reduction was called the Diesel Reduction Strategy. In October 2022, BC Hydro expanded the scope to also include improving reliability and affordability of electricity and updated the name to the NIA Strategy.

21 Link to NIA Website: **Non-Integrated Areas**

Many NIA First Nations noted that their community capacity is a challenge, with often only one or two individuals working on energy related activities. This leads to trade–offs between capacity for engagement with relevant parties and progressing their clean energy activities. More funding and training are needed to access and develop the required expertise in the communities.

NIA First Nations want to form new relationships with government, utilities, and regulatory bodies—and have greater collaboration amongst these parties.

2. Integrating variable renewables in standalone microgrids is challenging and transformational

This section outlines how unprecedented and challenging the integration of variable renewables into remote, standalone microgrids remains given the unique requirements of these types of microgrids, evolving technology and limited industry experience.

2.1 Variable renewables pose opportunities and challenges for standalone microgrids

Renewable technologies such as solar, microgrid control systems, and battery energy storage systems have evolved in the last decade. This has created opportunities for community renewable energy projects and made it somewhat more feasible to integrate this variable type of renewable energy into standalone microgrids at higher levels while keeping the grid more stable. However, many challenges still exist, some of which are detailed below.

2.1.1 There are very limited firm capacity resource options

Standalone microgrids need to always have firm capacity resources available equal to the peak energy demand in the community to provide reliable service and to remain stable. The current renewables being developed by First Nations in the diesel reliant NIAs, such as solar and run–of–river or small lake hydro, are 'variable' or 'intermitten' resources, meaning that the amount of energy they produce changes throughout the day and year. When the sun is not shining, or water levels are low, little or no electricity will be generated. This means that these renewables cannot be relied upon to provide electricity 24 hours a day / 365 days a year. Battery technology can store and dispatch a few hours worth of energy. However, these variable renewable energy resource types remain 'non–firm' capacity resources even when they are combined with the use of batteries installed on the microgrid.

What is the difference between energy and capacity?

Energy

The amount of electricity we produce and consume throughout the year

Capacity

The maximum amount of electricity that can be provided at any moment. Also known as "peak demand" from a customer electricity use perspective

What is a firm capacity generation resource?

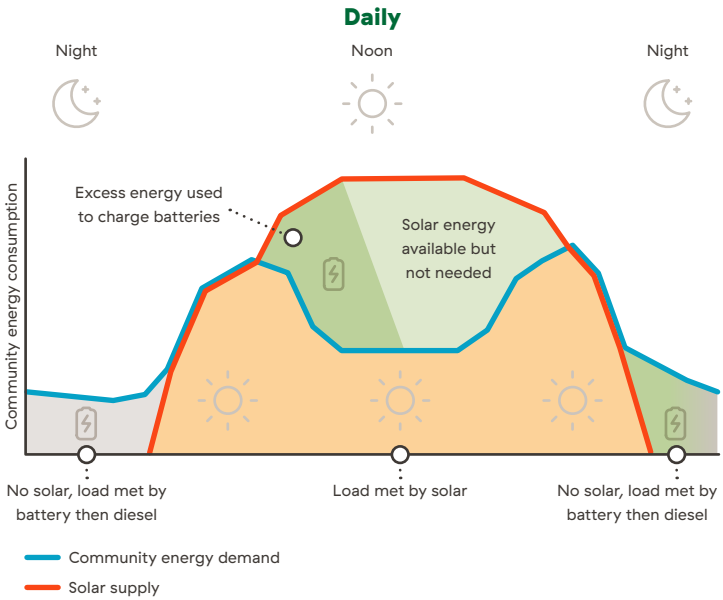
- A firm capacity resource is a predictable and reliable source of energy that can operate consistently
- It is available at any time (known as 'dispatchable') and can reliably respond on an instantaneous basis when additional energy is needed (known as 'load following')
- Electrical grids need to always have firm capacity resources available to meet peak demand to maintain reliability
- Typical technologies currently available to provide firm capacity for remote microgrids are storage hydro and diesel

Given these factors, the only technology currently available that provides firm capacity for standalone microgrids, where storage hydro generation is not available, is diesel generators. In conclusion, while variable renewable energy sources will decrease the amount of diesel generation, diesel generation capacity continues to be needed as variable renewables are added, to cogenerate with or provide back up for the renewables. In fact, diesel capacity will need to be added going forward in many NIAs to ensure reliable service in these growing communities.

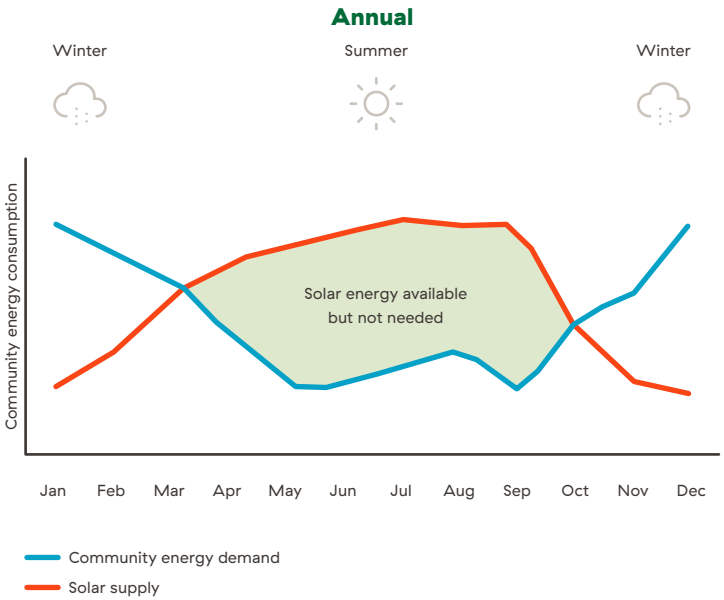
2.1.2 There is a timing mismatch between variable renewable energy availability and customer energy usage patterns

One of the biggest challenges with integrating renewable resources into the standalone microgrids is the timing misalignment of when the renewable power generation is most abundant and when the community needs the energy. Specifically, in northern and coastal British Columbia where most NIAs are located, more electricity is consumed by customers during the winter period and early morning and evening hours. Many renewable resources, especially solar, provide their peak output(s) during the spring/summer and in the middle of the day, which presents an energy alignment challenge. Battery energy storage systems can help overcome this mismatch to some degree by storing excess energy during the day and allowing it to be used at night. However, at best they can be used to shift variable renewable energy across a 24–hour period. Currently there is no technically and commercially feasible solution to shift energy over weeks, months, or seasonal periods.

TIMING MISMATCH: SOLAR GENERATION VS. COMMUNITY ENERGY DEMAND



Solar generation provides most of its output midday. However, customers' energy consumption peaks in the early morning and evening hours. This creates an energy misalignment between solar supply and community energy demand.



On an annual basis, solar generation is greatest in the summer. Customers use more electricity during the winter when it's cold and there is less sunlight. This creates an annual misalignment between solar supply and community energy demand.

2.2 Renewable energy in remote microgrids is in its infancy

BC Hydro has been learning from the experience of other utilities and jurisdictions who are also striving to reduce reliance on diesel generation in remote, standalone microgrids by integrating community renewable energy projects. Most have just started down the path in the last few years. Generally, most of the community renewable energy projects implemented and integrated into remote, standalone microgrids across Canada have been relatively small in terms of installed capacity (or size in kW). As of early 2026, there are only five projects in operation elsewhere in Canada that are comparable to the projects that BC Hydro and First Nations are implementing in the NIAs.

Examples of community renewable energy projects currently operating in remote, standalone microgrids

Remote microgrid	Number of residents	Renewable technology[22]	Targeted % renewable[23]	Year started operation
Vuntut Gwitchin FN (Yukon)	~250	Solar (940 kW)	~25%	2021
Kluane First Nation (Yukon)	~150	Wind (900 kW)	~50%	2025
Beaver Creek (Yukon)	~100	Solar (1.9 MW)	~50%	2025
Town of Inuvik (Northwest Territories)	~3,200	Wind (3.5 MW) and Solar (1 MW)	~30%	2023 (Wind) 2024 (Solar)
Fort Chippewan (Alberta)	~800	Solar (2.8 MW)	~25%	2021

Based on industry experience, the integration of variable renewables into remote, standalone microgrids is technically complex and challenges are to be expected. Microgrid control systems, battery energy storage systems, and related technologies are evolving quickly, making previous experience and practices obsolete. Added to this, the broader industry is completely focused on large scale grid connected applications. Equipment that works in a standalone microgrid context is difficult to find and may need to be customized to ensure microgrid compatible deployment. Every microgrid is different in terms of energy use patterns, energy resource mix, existing assets, and configuration. This means that the electrical studies and engineering needed to determine how to integrate variable renewables and keep the grid stable is specific to each project, site and NIA. The impacts of variable energy in a standalone microgrid needs to be carefully studied and managed. One common practice is to start with lower levels of renewable penetration and then gradually increase while monitoring and adjusting components to ensure the grid is stable. Some goals like having the diesel generators completely off for long periods rely upon certain battery energy storage system and inverter functionality with which few jurisdictions and technology/vendors have experience.

In summary, industry experience in this area is only just emerging. Everyone is learning. Working together with First Nation power producers in the NIAs and learning from other utilities and jurisdictions to achieve our shared diesel reduction objectives will put British Columbia at the forefront of the clean energy transformation in remote communities in North America.

22 Solar and wind installations are generally paired with battery energy storage solutions.

23 Actual renewable integration levels may be different than what was targeted.

2.3 Integrating renewables in standalone microgrids is transformational

The changes that utilities need to make in diesel generation and substations to integrate variable renewable energy in standalone microgrids are significant in scope and transformational in outcome. Today in many BC Hydro NIA stations, the equipment and operations are legacy, simple and straightforward with primarily analog equipment and manual controls. Going forward, BC Hydro will be installing microgrid control systems which will be the 'brains' of the microgrid—the equipment will be responsible for sensing the community load, making decisions to control complex scenarios of which energy resource to use when, and being able to react in milliseconds to changes in load to keep the lights on and the grid stable. We will also generally be adding battery energy storage systems in stations where we are integrating solar to optimize the amount of diesel that can be displaced. However, this new equipment is not 'plug and play'. Rather the whole station needs to be reimagined and remodelled as it moves from analog to a 21st century modern, digital interface. Ultimately, the integration of community-scale variable renewable energy projects into standalone microgrids will create a transformational shift in asset management, operations, and maintenance. This shift will necessitate new utility processes, planning approaches, skills and resources. All these changes to the microgrids mean it is a true energy transformation that we are undertaking together with First Nations living in the NIAs.

2.4 Operational readiness needs to be a focus early and throughout the project lifecycle

Both BC Hydro and the First Nation Power Producers will need the capacity and skill sets to ensure the ongoing successful operation of the upgraded microgrids and the NIA First Nations owned community renewable energy plants. Our discussions with NIA First Nations and various stakeholders have indicated that this ongoing operations capacity building often has not yet been a primary focus for many First Nations because their first focus was necessarily on project development. Learnings from other projects operational elsewhere in Canada indicate that there is a need for early planning, training and capacity building given the need for specialized expertise. Planning for operations cannot wait until the project is ready to be commissioned.

3. Energy planning has become more complex

As renewable energy is integrated in the NIAs, there continues to be the fundamental requirement for firm capacity to ensure reliable service. As described above, solar and run-of-river or small lake hydro resources are variable, and current battery energy storage systems only shift energy within comparatively short timeframes. With no other firm capacity options, this means diesel generation must continue and often be increased to meet the needs for reliability as communities grow—even while renewables are also added.

Electrification trends are increasing the challenge of having adequate firm capacity. As more homes and community buildings shift to electric heating through heat pumps, winter peak demand has grown—especially during extreme cold snaps. Often, these peaks can occur for only a few hours or even minutes each year, yet the system must still be expected to meet the peak to ensure a safe and reliable energy supply. This creates a need for firm capacity additions that are cost intensive since they have limited use.

With the advancement of various technologies, more people are also interested in pursuing self-generation. BC Hydro has increased the limit for self-generation in the NIAs to enable more self-generation participation. However, in standalone microgrids the impact of self-generation on maintaining grid stability is amplified and needs to be done carefully—especially as the amount of variable energy from community renewable energy projects is also coming online[24]. Different technologies have also provided additional mechanisms to manage energy and demand, such as targeted demand-side actions or customer programs.

All these dynamics make energy planning more complex in the NIAs. Energy planning needs to consider the interplay among many different factors. Consideration of various diesel reduction opportunities needs to be integrated into overall energy planning alongside the other planning objectives of sufficient firm capacity and power quality. As planning, resource options and impacts become more complex, the importance of transparent, collaborative energy planning with NIA First Nations and civic communities increases.

24 See information on self-generation: **Self-generation and diesel reduction**

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