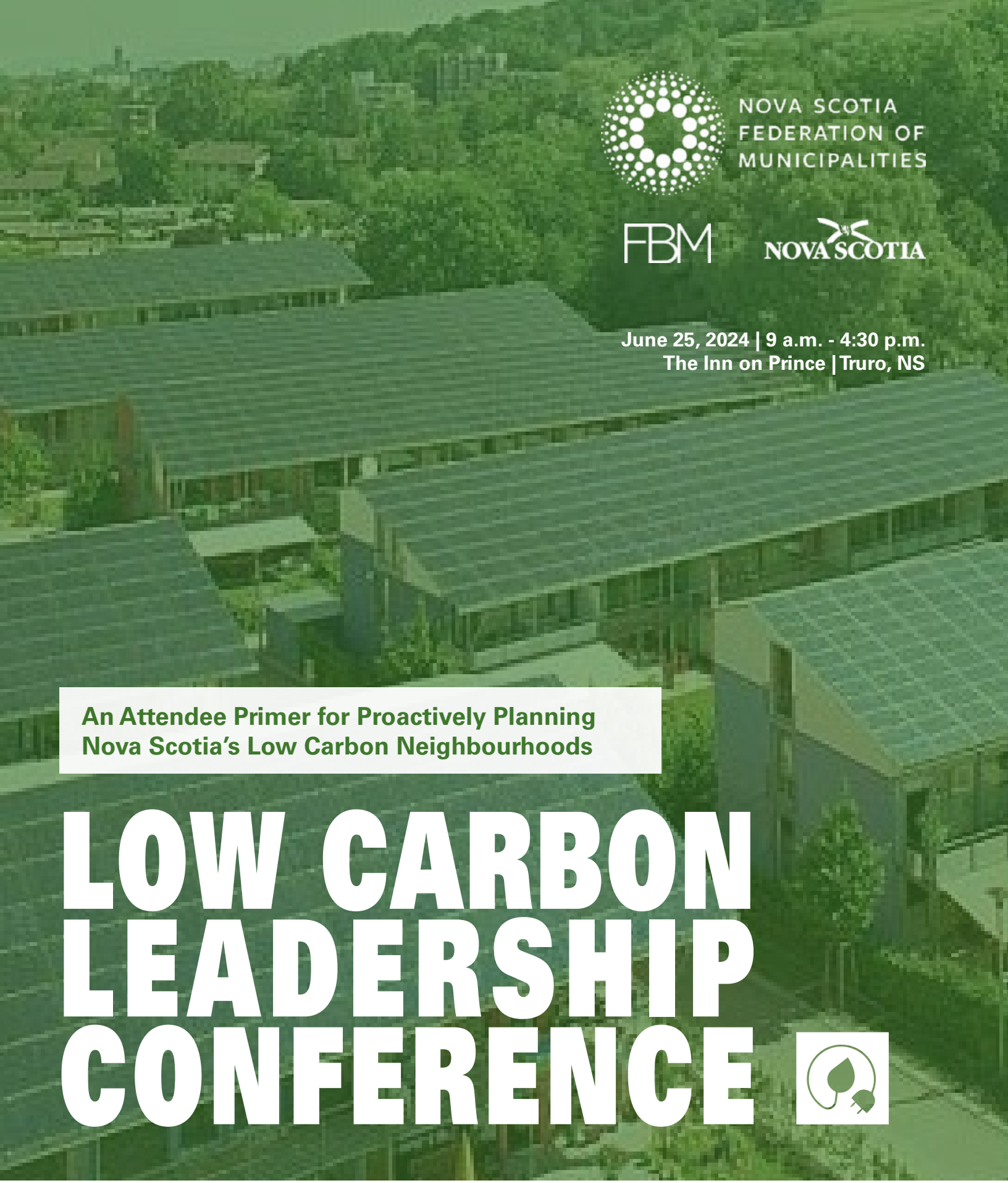

NOVA SCOTIA FEDERATION OF MUNICIPALITIES

FBM

NOVA SCOTIA

June 25, 2024 | 9 a.m. - 4:30 p.m.
The Inn on Prince | Truro, NS

An Attendee Primer for Proactively Planning Nova Scotia's Low Carbon Neighbourhoods

LOW CARBON LEADERSHIP CONFERENCE

Generously sponsored by:

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LAND ACKNOWLEDGEMENT

Our communities are located in Mi'kma'ki, the ancestral and unceded territory of the Mi'kmaw. We are all Treaty people. We also acknowledge the histories, contributions, and legacies of the African Nova Scotian people and communities who have been here for over 400 years.

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- Meghan Doucette *(Town of Bridgewater)*
- Rachel Mitchell *(Clean Foundation)*

Thank you to everyone who shared their insights, ideas and feedback with us in the creation of this primer and the conference content.

WELCOME!

This is your go-to resource for navigating low carbon projects at the community and neighbourhood scale in Nova Scotia.

Welcome to the Nova Scotia Federation of Municipalities (NSFM) Low Carbon Leadership Conference Primer. This guide is your go-to resource for navigating low carbon projects at the local level in Nova Scotia. Both the primer and the conference explore how neighbourhood land use planning, and energy policies and decisions can support carbon emissions reductions and climate mitigation and adaptation efforts.

This event is an opportunity for community leaders to come together to share ideas on how communities across Nova Scotia can adapt to a changing climate while supporting sustainable neighbourhoods. Within this primer, you'll be presented with emerging ideas, informative resources, funding opportunities, and an adaptable quick-start guide for project development(s).

This project is generously funded by the Province of Nova Scotia's Low Carbon Communities Program. The information contained herein does not represent the views of the Province of Nova Scotia.

Who is this Primer for?

- Municipal Elected Officials
- Sustainability Professionals
- Community Planners
- Non-Profit Organizations
- Community Groups
- Private Sector Partners
- Residents
- Students
- Anyone with an Interest in Low Carbon Communities

This primer strives to ensure a shared understanding of what is needed to promote low carbon communities and neighbourhoods. We encourage all attendees to review this primer in advance of the conference and bring questions and ideas to share and explore. Building upon existing climate action plans, this guide aims to spark interactive conversations and encourage collaborative actions between municipal and community leaders, presenting a range of solutions for complex issues.

Municipal leaders in many regards have the greatest ability to influence local change as they have the most direct connection to residents. Across Canada, municipalities have both direct and indirect control of over 45% of greenhouse gas (GHG) emissions (FCM, 2022). This connection emphasizes the importance of leading by example and being at the forefront of low carbon initiatives across the province.

Opportunities outlined in this guide are intended to be tangible actions for Nova Scotian municipalities, highlighting components of a low carbon community, the benefits they provide, why municipal action is crucial, and the resources needed to realize positive changes. It explores ideas for balancing short- and long-term needs, acknowledging diverse community capacities in adapting to climate impacts. Meaningful action starts with education and commitment, helping to support local leaders, and ensure long-lasting positive impacts.

What's in this Primer?

PART 1
SETTING THE STAGE

WHAT ARE LOW CARBON COMMUNITIES & NEIGHBOURHOODS?

Low carbon communities are a foundational element of municipal climate adaptation and mitigation efforts.

Low carbon communities, or climate resilient communities, have the potential to be more equitable communities. Successful low carbon projects are ones that enhance community capacity to progress climate initiatives, provide shared benefits, and help manage uncertainty of future impacts. Low carbon communities seek to eliminate all or nearly all human-generated GHG emissions while enhancing overall sustainability and livability (Boswell et al, 2019). **The intent of this guide is to help Nova Scotian municipalities enable and develop projects at the neighbourhood and community scale to reach GHG emission reduction targets and support long-term community resilience.**

Sustainable neighborhoods are a foundational element of municipal climate adaptation and mitigation efforts. As the building blocks of towns and cities, they serve as localized hubs which play a vital role in fostering social interaction within towns, cities, suburbs, and rural areas (Hajer et al, 2019). They are spatial units of a larger picture that people can relate to, and everyone has a connection with. Despite variations in size and geography, all neighbourhoods share community infrastructure and possess the potential to support low carbon initiatives.

When the climate crisis is approached from a neighbourhood scale, projects emerge that are tangible and reap localized benefits. In this sense, public support and local buy in can be enhanced, low carbon goals can be achieved, and citizen well-being can be supported.

In land use planning terms, neighbourhoods can be defined as a recognizable cluster of parcels spanning one or more land uses such as residential, commercial, institutional, or industrial. From a humanized perspective, neighbourhoods are distinct areas in communities that either foster or hinder personal, economic, and social well-being and resilience.

By tackling projects on this smaller scale, communities can more easily customize solutions and measure local success. This approach recognizes the unique strengths, dynamics, and needs of each neighbourhood, contributing to the overall advancement of low carbon initiatives at the community level while furthering emissions reduction.

Key Terms Review

Adaptation is the process of adjusting to the current and future impacts of climate change that are already taking effect while **mitigation** addresses the causes of climate change, seeking to lessen the severity of impacts through reduction of greenhouse gas emissions. Both responses to a changing climate are linked and necessary for meaningful action.

WHAT ARE THE BENEFITS?

Low carbon communities foster a wide range of environmental, social, and economic benefits while reducing GHG emissions.

By approaching low carbon initiatives on a neighbourhood level, projects can be actionable, attainable, and reflective of the local context. Together, these networks of neighbourhood-scale projects can make up a low carbon community, with each addressing the specific needs and capacity of the neighbourhood involved. Low carbon communities foster a wide range of environmental, social, and economic benefits all stemming from long-lasting GHG reduction and contributing to a more sustainable, equitable economy. Some of these include:

Energy Cost Savings

Research shows that in the long run, climate inaction is more costly for all levels of government, as well as property and business owners (Canadian Climate Institute, 2022). These financial impacts can include both direct and indirect costs associated with repairs, increased operations and maintenance, disruptions to service delivery, and economic loss to businesses. Proactive adaptation strategies can reduce future losses and generate positive economic gains.

Localized Economic Benefits

Investments in clean energy promote new job creation in the green economy, stimulate economic, growth, and drive innovation that supports business opportunities.

Improved Air Quality and Public Health

By minimizing the use of polluting energy sources and decreasing reliance on internal combustion engine (ICE) vehicles, low carbon neighbourhoods contribute to improved air quality and improved health of residents. Land use patterns that support access to green space and active transportation can contribute to promoting walkable communities, which in turn can enhance both social and ecological health of the neighbourhood.

Community Resilience to Climate Change

Low carbon communities are better equipped to respond to the impacts of climate change including extreme weather events, such as increasing temperature and changing participation patterns. It has become apparent that social and ecological solutions go hand-in-hand. Emphasizing land use policy changes, improving building standards, and retrofitting older buildings can all contribute to enhancing quality of life and reducing GHG emissions at a localized scale (Lu et al., 2023).

Community Building and Collaboration

Collaboration between municipal departments, private and public sectors, NGOs, educational institutions, and community groups is critical to maximizing the positive impact of low carbon community and neighbourhood initiatives. Collaboration can also foster a sense of shared responsibility, furthering community commitment to sustainable practices.

Solarsiedlung am Schlierberg, Germany (Source: InHabitat)

ENERGY LITERACY BASICS

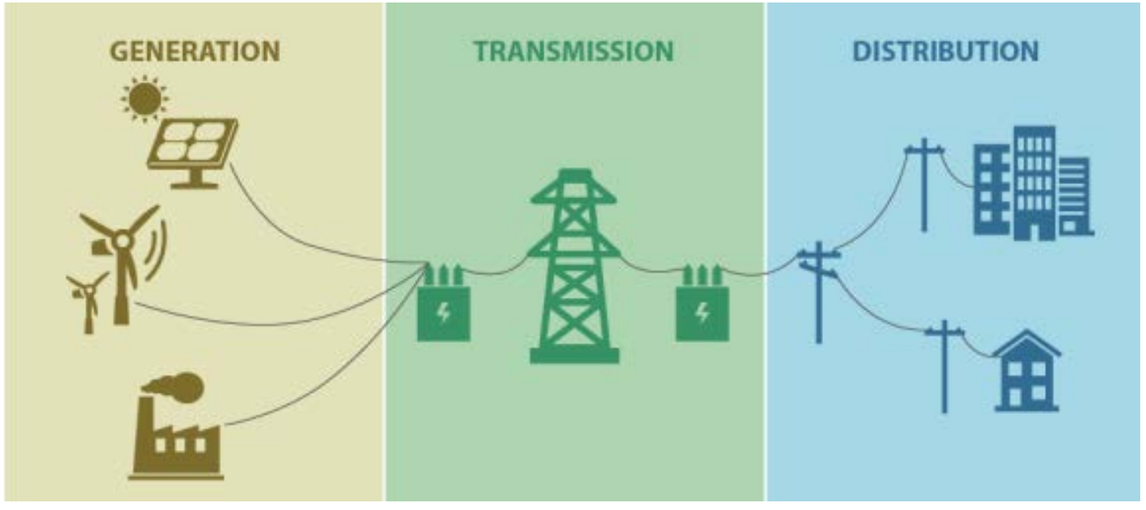
Energy conversations don't need to be complicated.

Entering community energy conversations can be difficult and overwhelming without a foundational understanding of energy terminology and processes.

At a system level, energy is generated through renewable and non-renewable sources such as solar, wind, nuclear, and fossil fuels. It is then transmitted via the electrical grid, long distances at a high voltage before it is distributed to individual buildings over shorter distances at lower voltages (CETF Final Report).

Nova Scotia Power as the province's main utility company provides 95% of these services, reaching over 540,000 customers. There are also independent power producers (IPP) who generate electricity in the province. Most of Nova Scotia's 300 commercial wind turbines are owned by IPP's (CETF Final Report).

Solar and wind are the most common small scale renewable energy generation resources (distributed energy resources) in Nova Scotia. Their viability varies by geographic location and there are technical considerations involved in establishing them. Energy generated through solar and wind is most likely to become part of Nova Scotia Power's energy grid unless agreements are made with alternative transmission and distribution systems.



Simplified Schematic of Electric Power Sector Systems from Congressional Research Service (CRS)

NS Energy Reform Act

As of April 2024, the provincial government of Nova Scotia is in the process of proclaiming the Energy Reform Act after three successful readings in the NS Legislature. This Act transitions the oversight of the sale, production, and storage of energy from the Utility and Review Board to the new Energy Board. The Act also transitions the system operator function of Nova Scotia Power (NS Power) to the new Independent Energy System Operator (IESO). Together, these changes set the stage for a new era of energy governance in Nova Scotia.

Under this new legislation, NS Power remains Nova Scotia's standard energy service provider. As the new system operator, the IESO will create opportunities for more organizations to provide a range of services in pursuit of a more sustainable, innovative, and competitive energy system. These services include energy production, energy transmission, energy storage, among others.

Future opportunities for municipalities will depend on future decisions made by the Energy Board and IESO. Nevertheless, the mandate of these new organizations to create a more competitive, reliable, sustainable, and innovative energy system in Nova Scotia will certainly open opportunities for more renewable energy production, distribution, and storage.

Key Terms Review

Capacity: the maximum amount of electricity that a power station, or multiple power stations are capable of producing.

Community Energy and Emissions Plan: document that outlines how a community will reduce its GHG emissions in line with municipal plans and provincial, national and international targets.

Demand or Load Management: a system that matches energy demand to electricity supply for a consistent supply of power when needed.

Demand Response: "balancing the demand on power grids by encouraging customers to shift electricity demand to times when electricity is more plentiful or other demand is lower, typically through prices or monetary incentives" (IEA)

Distributed Energy Resources (DER): small-scale energy resources such as rooftop solar panels and battery storage which are located near sites of electricity use.

Hosting Capacity: the amount of DER that the established electricity distribution system can reliably accommodate without significant grid upgrades.

Electrical Load: any component of an electrical circuit that consumes energy. The load is measured in Watts.

Municipal Energy

There are only a few municipal electrical utilities in Nova Scotia which purchase power wholesale from Nova Scotia Power. These include the Berwick Electric Commission, the Riverport Electric Light Commissioners, the Canso Electrical Utility, and electric utilities in the Town of Antigonish, the Town of Lunenburg, or the Town of Mahone Bay. These municipal electrical utilities are established in the 2004 Electricity Act. In 2020/2021, municipalities cumulatively invested $22.9 million in these utilities and generated $25.5 million in consolidated revenue. In some cases, these energy purchasers can make use of the Green Choice Program to purchase 100% of their energy from renewable sources.

Under the provincial Municipal Government Act, municipalities are not able to provide direct financial assistance to private businesses which prevents them from engaging in public-private partnerships to provide energy production. Municipalities must own 100% of the utility before they can access financing through Municipal Affairs and Housing. This comes with considerable costs and risk. These requirements have not changed under the Energy Reform Act.

Measuring Electricity

1 Watt (W) x 1,000 = 1 kilowatt (kW)
100 kW powers 30 homes

1 kW x 1,000 = 1 megawatt (MW)
1 MW powers 300 homes

1 MW x 1,000 = 1 gigawatt (GW)
1 GW powers 300,000 homes

Electricity use is measured in the time it takes to use one watt of energy over one hour (Watthours: Wh) or one kilowatt of energy over one hour (kWh) (US EIA).

Resources

- Nova Scotia Clean Electricity Solutions Task Force: Modernizing Energy from Transition to Transformation (2024)
- Nova Scotia Electricity Factsheet - Electricity System Overview
- Quest - Community Energy and Emission Planning Resource Hub
- Australia's Climate Council - Watt's Watt? A Guide To Renewable Energy Capacity And Generation (2018)

MUNICIPAL UTILITIES SPOTLIGHT

Alternative Resource Energy Authority (AREA)

The Towns of Antigonish, Berwick and Mahone Bay form the Alternative Resource Energy Authority (AREA). Using 100% municipally owned assets, they continue to pursue opportunities in wind and solar.

The Town of Lunenburg owns and operates the Lunenburg Electric Utility which provides service to the Town and seven surrounding communities.

Riverport Electric Light Commission (RELC)

The Riverport Electric Light Commission (RELC) is the smallest load-serving entity in North America. Created through provincial legislation in 1920, RELC serves over 700 customers with its unique community-owned utility cooperative. Approximately 40% of RELC's electricity comes from AREA's Ellershouse Windfarm while the remaining 60% is provided by Nova Scotia Power.

Ellershouse Windfarm

The Ellershouse Wind Farm was built over four years and three different construction phases. Each phase was carefully evaluated for investment risk and environmental impact, resulting in a total cost of $51 million. In 2018, the 23.5MW, ten-turbine Ellershouse Wind Farm was finished on time and on budget. Since then, the Wind Farm has consistently met the financial performance expectations set at the time of the investment decision by the partnering municipalities.

Today, the wind farm supplies 40% of their customers' electrical needs. RELC considers this project an outstanding achievement, and just the beginning for renewable energy projects in the area.

Ellershouse Windfarm (Source: AREA)

Berwick Community Solar Garden

Owner: Town of Berwick

Project Address: 157 Willow Avenue

Site Area: Approximately 15 Acres

System Size (AC / DC): 3.45MWac / 4.8144MWdc

Berwick Community Solar Garden (Source: AREA)

Mahone Bay Community Solar Garden

Owner: Town of Mahone Bay

Project Address: 918 Main Street

Site Area: Approximately 6 Acres

System Size (AC / DC): 1.500MWac / 1.816MWdc

Mahone Bay Community Solar Garden (Source: AREA)

Town of Antigonish Solar Garden

Owner: Town of Antigonish

Project Address: 1623 Brierly Brook Road

Site Area: Approximately 11 Acres

System Size (AC / DC): 1.65MWac / 2.197MWdc

Antigonish Solar Garden (Source: AREA)

Alternating current (AC) electricity is used on the grid and devices, while direct current (DC) energy is stored in a battery

EQUITY, DIVERSITY, AND INCLUSION

Low carbon communities can provide more equitable access to local affordable energy solutions.

Climate change does not impact everyone equally. People who are already disproportionately affected by structural and systematic social, environmental and economic issues commonly have a reduced ability to cope with unforeseen climate-driven events. Those currently experiencing energy poverty, homelessness, and/or food insecurity are particularly at risk in Nova Scotia's communities. Viewing climate change impacts through an equity, diversity, inclusion and climate justice lens is increasingly encouraged and necessary in municipal climate change efforts.

Low carbon communities present opportunities for economic reconciliation, fair allocation of community infrastructure investments, and equitable access to affordable energy solutions. It is imperative to engage equity-seeking groups in the planning process and collaboratively identify opportunities for impactful climate investments. Low carbon communities have the potential to provide shared benefits across communities while offering equitable access to energy and other resources.

The planning process should ask who benefits from low carbon initiatives, and how these projects can directly benefit equity deserving groups. As Nova Scotia's Climate Change Risk Report highlights, socially just climate adaptation must consider the causes of systemic injustice and take a long-term approach to addressing climate equity. Those identified to be the most affected by climate change should have the opportunity to be involved in adaptation decisions that help build resilience while supporting human rights.

Key resources on the following page have been identified to help municipalities reflect on their current understanding of diversity, equity, and inclusion and how it relates to climate action projects.

Key Terms Review

Equity ensures fairness and justice in policies, processes and outcomes for historically and/or currently underrepresented and/or marginalized people and groups (FCM).

Diversity is a combination of differences and similarities among people. It is more than race, ability, sexual orientation, language, gender or any other descriptive category. Diversity means understanding and utilizing different views, ideas, life experiences, skills and knowledge (HRM).

Inclusion is the practice of providing everyone with equal access to opportunities and resources (Climate Change Committee).

Climate Justice "means putting equity and human rights at the core of decision-making and action on climate change" (UNDP)

FIRST NATIONS OF MI'KMA'KI: LEADING BY EXAMPLE

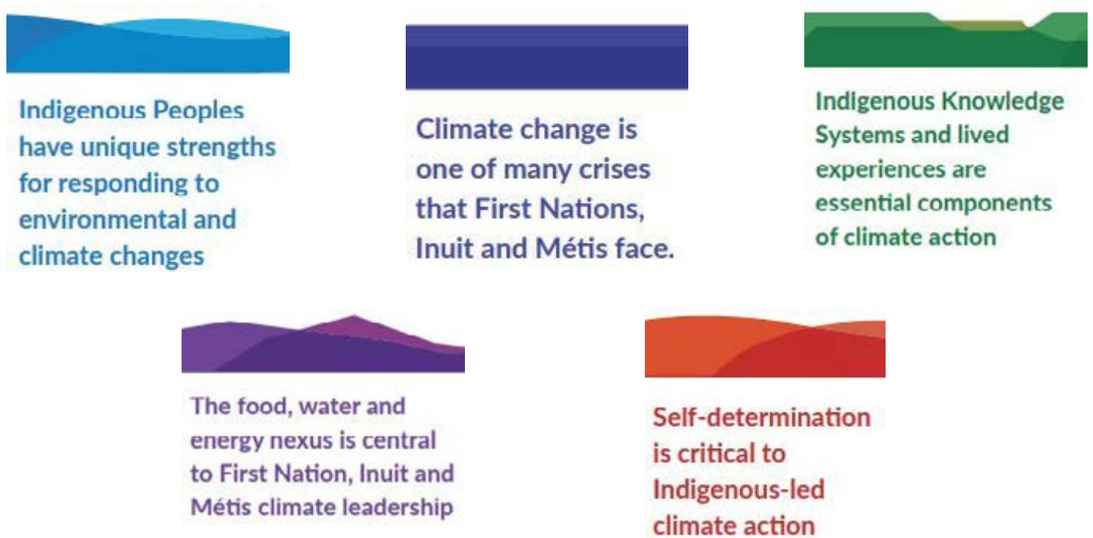
Across Mi'kma'ki, Mi'kmaq communities are leading the transition to lower carbon energy. Between 2017 and 2019, 16 small-scale solar energy projects were established through Nova Scotia's Solar Energy for Community Buildings program, across 12 First Nations communities (Clean Foundation). Solar continues to be a major economic contributor to Atlantic Indigenous communities and there is strong interest in wind and solar as clean technologies supporting economic self-sufficiency (AIEDIRP, 2022).

Recently, the Wskijinu'k Mtmo'taqnuow Agency Ltd (WMA) has partnered with Nova Scotia Power with funding from the Canadian Infrastructure Bank to create Atlantic Canada's largest energy storage facilities in White Rock, Bridgewater and Waverley (CIB, 2024 & CityNews, 2024). This exciting development represents a significant milestone and step towards economic reconciliation which could pave the way for energy developments of various sizes.

Resources

- For Our Future: Indigenous Resilience Report (2024)
- FCM - Integrating Equity, Diversity and Inclusion into Municipal Climate Action (2022)
- Local Governments for Sustainability - Equitable Climate Adaptation: Considerations for Local Governments (2022)
- Indigenous Climate Hub

Key Messages from For Our Future: Indigenous Resilience Report (2024)



THE TIME IS NOW

Municipalities play a crucial role through proactive land use planning and enabling policies

Impacts of climate change can already be felt locally, nationally, and globally. The increasing frequency and severity of wildfires, droughts, floods, and extreme storms, is a reminder that the time to act is now.

The connection is clear between climate events and humanities historic over-reliance on fossil fuels. Steps towards decarbonization are necessary, and municipalities play a crucial role in leading their communities towards change through proactive land use planning and enabling policies.

Aligning with Nova Scotia's Climate Change Plan for Clean Growth, municipalities can contribute to meeting the 28 provincially established goals spanning the following four categories:

- Responding to climate impacts
- Reducing GHG emissions
- Fostering a cleaner sustainable economy
- Monitoring and reviewing progress

Additionally, this presents an opportunity to build upon existing projects, furthering the efforts outlined in Municipal Climate Change Action Plans (MCCAP).

With major legislative reforms being made to improve and modernize Nova Scotia's electricity and energy sectors, we are embarking on an exciting time for municipalities to undertake new low carbon projects aligned with Nova Scotia's Clean Power Plan (2023). Changes in the structure and regulation of these systems will help remove barriers for municipality owned energy while encouraging energy generation across the province. Amendments to the Electricity Act and Public Utility Act in particular are designed to support solar energy through improvements to the Community Solar and Green Choice Programs.

Additionally, with Launch of the provinces Community Solar Program in March 2024, non-profits, co-operatives, First Nations communities, municipalities, businesses, universities and colleges will now be able to access greater supports and resources for building and operating solar gardens.

Nova Scotia Clean Power Plan (2024) Highlights

- Commitment to phase out coal and reach 80% renewable energy generation by 2030.
- Reduce GHG's from electricity by more than 90% of 2005 levels (10.7 MT) and help cut Nova Scotia's total GHG's by more than 53%.
- Improved grid resiliency and reliability.
- Renewed focus on Made-in-NS electricity utilizing Nova Scotia's solar resources and on and offshore wind capacity.
- Spurs job growth in communities through solar, heat pumps and wind.
- Puts competition at the heart of energy generation and grid management in NS.
- Enables household and business energy bill savings and limits ratepayer risk from capital costs.

Low carbon communities require a range of leaders to help achieve climate targets and increase local energy resilience

Municipal Elected Officials Can...

- Advocate for climate policies and initiatives.
- Approve and allocate budgets for climate projects.
- Engage with the community to gather input on climate-related decisions.
- Advocate for the inclusion of diverse perspectives in decision-making.
- Approve zoning changes to encourage sustainable development.
- Enact climate policies and regulation.

Community Planners Can...

- Incorporate climate considerations into land use planning.
- Proactively plan for, and reduce barriers to, low carbon projects.
- Incorporate climate resilience policy in due diligence planning.
- Develop and oversee climate action plans and programs.
- Promote sustainable and low carbon transportation options.
- Develop climate action implementation and evaluation plans and metrics.

Private Sector Partners Can…

- Invest in and implement sustainable business practices.
- Offer expertise, resources, and support for climate projects and municipal initiatives.
- Collaborate on public-private partnerships for climate projects.

Residents and Community Organizations Can…

- Show support for climate action and local low carbon projects.
- Participate in community outreach and education programs.
- Lead or participate in low carbon projects in their neighbourhood or community.
- Implement sustainable practices in their homes, organizations and businesses.

Resources

- Natural Resources and Renewables – Legislation to Modernize Electricity System, Improve Regulation (February 2024)
- Urgent Times, Urgent Action: The Annual Progress Report on the Environmental Goals and Climate Change Reduction Act and Nova Scotia's Climate Change Plan (July 2023)
- Nova Scotia - Weathering What's Ahead: Climate Change Risk and Nova Scotia's Well-Being (2022)

PART 2
TAKING ACTION

QUICK START APPROACH TO LOW CARBON COMMUNITIES

Your guide to starting neighbourhood and community scale low carbon projects and initiatives

There is no single approach to planning for low carbon projects. While this guide is directed to municipalities and their role in supporting and leading sustainable land use and renewable energy, it is important to recognize the role community partners, Indigenous communities, not-for-profits, and the private sector play in facilitating climate leadership and project implementation. Oftentimes these will be the groups at the forefront of new research, information sharing, and taking the initiative to implement work at a community level.

We refer to this section as a quick start approach as it outlines a high-level overview of the steps that can support new project ideas through adaptive capacity. It also highlights the importance of first understanding the work that's already being done and how projects can be strengthened through collaborative networks of public-private partnerships. While all projects will take time to implement, the intent of this guide is to jump start the process and assist leaders in mapping out a plan towards low carbon neighbourhoods. This guide is intended as a starting point for action and does not replace a community energy and emissions plan.

Referencing the Partners for Climate Protection Program (PCP) methodology, this guide simplifies the five milestones: initiate, research, plan, implement, and monitor or review. These steps can be referenced as a framework for advancing current and future projects. In addition to drawing inspiration from the PCP program, we have also assembled a range of supportive resources to enhance current understanding and address knowledge gaps surrounding renewable energy and land use.

This approach was also informed by knowledge gaps and research needs outlined as specific to the Atlantic provinces by Canada in a Changing Climate 2020-2022 Regional Perspectives Report. Some of these include: a need to better understand and address viewpoints of Indigenous communities, development of monitoring and evaluation tools, and strengthening effective communication measures. Additionally, this report outlined improvements that could be made in policy planning, budgeting for adaptation, and increasing understanding of planning for extreme weather events.

As a starting point, this quick start guide connects emerging projects with completed work and lessons learned in other jurisdictions, offering a comprehensive quick start for your low carbon community journey.

Key Term Review

Adaptive capacity is the ability of individuals, institutions and systems to adapt and thrive to changing conditions. Access to economic resources, social inequities and other factors can influence adaptive capacity. Structured processes that identify current or baseline capacity help institutions and systems build their capacity to adapt together (Canada in a Changing Climate, 2022).

1. Assessing Opportunities and Barriers

Municipalities across the province will have different ideas about the types of low carbon projects they want to pursue, enable or implement and the scales that make sense for them. Defining the scale of your project can start from pinpointing the unique challenges and opportunities specific to the communities and neighbourhoods within your jurisdiction. Those challenges and opportunities will vary based on geographic location, population size, and financial capacity of the municipality.

With so many existing projects, as a first step, municipal leaders should understand what's already being done within the region, the organizations that exist, and how decarbonization initiatives can be strengthened through government support. This step is critical in reducing project overlap and empowering neighbourhood and community scale efforts. By connecting with existing groups across the province, municipalities can better understand what is important to a diverse range of communities and ensure shared benefits.

Key Municipal Resources

1. Municipal Planning Strategy
2. Climate Action Plan
3. Community Energy & Emissions Plan
4. Council Strategic Plan
5. Land Use By-Law

Questions to consider when narrowing down the list of project ideas include:

- **Where are your neighbourhoods?** Are they rural, suburban, or urban? What opportunities or challenges does this present? What is the geographic scope of potential project?
- **What types of low carbon projects are possible in your neighbourhoods?** Is it permitted under the current provincial legislation, land use by-laws, and MPS? Do changes to municipal plans and policies need to be made to enable these projects?
- **Who benefits from this work?** What are the positive and negative impacts to local residents, equity-deserving groups, and broader community?
- **Who could be an owner or shareholder of this project?**
- **Can current or planned municipal infrastructure support this project?**
- **Are there successful examples of similar projects?**

The following project categories were highlighted through consultation with NSFM's Organizing and Advisory Committees. They contain opportunities that were identified through brainstorming and workshop sessions. This list is not complete or exhaustive but rather an overview of what may be possible on a municipal neighbourhood scale. Opportunities and barriers for each of these topics will be different for each municipality.

Opportunities

Thinking about each of the following examples from a neighbourhood-scale perspective can highlight the opportunities and barriers faced within a municipality. It can also foster ideas of where projects can be implemented and what the differing needs of a community are, both geographically and socially.

Renewable Energy Generation

- **Co-op Geothermal**: A form of renewable energy generated by harnessing the natural heat of the earth's crust. Provides opportunity to be co-operatively owned by neighbouring residents.
- **Solar Gardens/ Energy Gardens**: A collection of several solar panels mounted on the ground and clustered within a specific area, such as shared between multiple homes.
- **District Energy**: Networks of hot and cold-water pipes that are used to deliver or remove thermal energy to efficiently heat and cool buildings.
- **Agrivoltaics**: The use of land to generate both solar energy and agricultural food production.
- **Smart Grids**: Smart grids use two-way communication to detect and react to local energy demand.
- **Energy Storage**: Capturing energy at different points on the grid to use at a later time.

Panel Construction (Source: UnSplash)

Improved Energy Efficiency/ Maximizing the Carbon Budget

- **Building Retrofits**: An energy conservation measure that improves a buildings efficiency and performance. Seeks to maximizing use of materials, measuring, and limiting embodied carbon.
- **Supporting Intensification of Building Use**: Reduces carbon emissions through sustainable urban development, reducing urban sprawl, and allows for flexibility in building use and design.
- **Planning for Sustainable Future Growth**: Aligning urban development plans with modernized energy grids.

Reduce Carbon Demand

- **Building Envelope Upgrades**: Upgrading insulation, doors, and windows to minimize thermal heat loss, thereby improving building efficiency.
- **Improved New Building Standards**: Adoption of regulations and guidelines that enhance energy efficiency, reduce energy consumption, and minimize negative environmental impact of construction.
- **Conservation Subdivision Design**: Land development approach that preserves and protects natural features, promotes ecological connectivity, and supports green infrastructure.
- **Supporting Walkable Design and Active Transportation**: Land use patterns that promote pedestrian mobility, reducing reliance on personal vehicles.

Recover: Carbon Capture/ Carbon Neutrality

- **Nature Based Solutions**: Promoting the sustainable management and use of natural features, providing benefits to both natural and human communities.
- **Bioswales and Rain Gardens:** Channels designed to catch and concentrate stormwater runoff while filtering pollutants and recharging groundwater.
- **Street Trees and Urban Forestry**: Urban landscaping techniques or retention of trees that capture carbon, reduce air pollution, and mitigate the urban heat island effect.
- **Wildfire Mitigation Planning**: Proactive measures to reduce fuels in wildland urban interface areas and educating property owners on emergency planning to minimize damage to property.
- **Maintaining Ecological Corridors**: Keeping significant ecological resources intact to connect wildlife populations and promote protection of carbon sinks.
- **Food Production and Accessible Greenspace**: May include community gardens and food forests that support urban agriculture, promote local food security, and reduce urban heat island effect.

Energy Reform Opportunities

Aside from mounting the challenge of creating and maintaining an electrical utility, municipalities looking to plug in and take part in the IESO-led transition to more renewable energy production can consider the following:

- By engaging in the Community Solar Program, municipalities can build and own solar gardens, and offer subscriptions to residents for a reduced rate. Municipalities can also engage in intermunicipal agreements to broaden the benefit of solar power generation. Increasing the number of solar gardens will be part of the IESO plan to harness more renewable sources of energy.
- Municipalities can host wind turbine facilities and apply a special taxation to these facilities under the 2006 Wind Turbine Facilities Municipal Taxation Act. The number of these facilities is already quickly increasing and could continue to increase under the IESO.
- Battery and Energy Storage Stations will be sought by the IESO as an important part of a sustainable and reliable energy system. Municipalities could consider investing in a Battery Storage Station to complement their utilities, or solar gardens like the award-winning project in the Town of Berwick.

Resources

- FCM Tool: Climate Adaptation Maturity Scale
- FCM Tool: Greenhouse Gas Emissions Reduction Maturity Scale
- Local Governments for Sustainability Canada - Getting Started: Exploring Various Entry Points into Adaptation (2022)
- The CEP Crosswalk: A community energy planning tool for inter-departmental alignment and stakeholder engagement (2021)

Municipal Barriers to Low Carbon Community Projects

Municipalities may encounter some barriers to pursuing low carbon community projects. These may include but are not limited to:

Current Policies

- Provincial and municipal plans and policies may not include enabling policies for low carbon projects, which can add complexity and uncertainty to the planning and development process.
- Utility regulations, particularly for projects which share energy between properties, can be difficult to navigate and overcome.
- Ongoing updates to energy legislation has the potential to mitigate some of these barriers.

Existing Built Form

- Existing neighbourhoods can be difficult to retrofit and present historic challenges such as limited pedestrian or cycling connections, and higher dependence on automobiles.
- There may also be underutilized lands such as vacant buildings, lots, and parking lots which may present opportunities for energy generation, especially when tied with other land uses such as housing.
- Neighbourhood energy projects are flexible in size and scale, and can cover multiple lots if the underlying bylaws allow. This can increase efficiencies in the energy systems while maximizing available land.

Jurisdiction and Authority

- Municipal Government Act prevents public-private partnerships and requires municipalities to own 100% of energy assets prior to accessing funding. This increases project risk.

Capacity

- Different sized municipalities have varying levels of capacity to adopt new projects.
- Climate resilience planning includes understanding the current municipal capacity for taking on new projects and identifying what competency gaps need to be filled. This can relate to internal knowledge, skills, funding, and time constraints that may require external collaboration.
- A helpful starting point to understand this is through the Community Climate Resilience Assessment Tool, which provides a community readiness score for subcategories relevant to municipal climate action.

Competing Priorities

- Municipalities, already grappling with housing, healthcare, and transportation challenges, face heightened risks due to the climate emergency.
- Recognizing the interconnectedness of these sectors, an interdisciplinary approach is essential.
- Climate change plans for example have the potential to address a range of community priorities while directing investments in training and knowledge sharing to increase municipal capacity.
- Identifying multiple value propositions for any given action increases the likelihood of it being implemented.

Resources

- Natural Resources Canada - Building Regional Adaptation Capacity and Expertise Program
- Climate Data – Learning Zone

2. Building Relationships and Finding Collaborators

As municipalities move forward in reducing GHG emissions, collaboration will be essential to furthering climate action and community resilience. With so many existing projects, an early step should include gaining an understanding of what's already being done within the region, which organizations are leading decarbonization efforts, and how these initiatives can be strengthened through government support.

This step is critical in reducing project overlap and empowering neighbourhood and community-scale efforts. Making these connections can help municipalities understand the types of low carbon projects communities value and ensure shared benefits.

By strengthening these partnerships, low carbon leaders can leverage collective expertise, and share resources and perspectives to develop and implement innovative solutions. These collaborative efforts not only amplify the work already being done but cultivate a sense of shared ownership and commitment to building a more sustainable future for all.

The following partnership opportunities have been identified as a starting point for meaningful collaboration in low carbon efforts in Nova Scotia. This is not an exhaustive list and we encourage you to explore partnership opportunities with other organizations in your community.

Partnership Opportunities

- Clean Energy and Equity Network (CEEN)
- Wskijnu'k Mtmo'taqnuow Agency Limited
- Confederacy of the Mainland Mi'kmaq (Mi'kmawey Green Communities)
- Ulnooweg Development Group
- Eskasoni Renewables
- African Nova Scotia Road to Economic Prosperity
- Clean Foundation
- CLIMAtlantic
- Alternative Resource Energy Authority (AREA)
- Partners for Climate Protection
- Canadian Climate Caucus
- Low Carbon Cities Canada
- The Halifax Climate Investment, Innovation, and Impact (HCi3) Fund
- Centre for Indigenous Environmental Resources (CIER)
- QUEST Canada – Pathways to Net Zero
- Quest Canada – Low Carbon Energy Innovation Community of Practice
- Sustainability Solutions Group
- Solar Nova Scotia
- Research Nova Scotia
- Jeff Dahn Research Group
- Dalhousie University School of Planning
- Dalhousie University College of Sustainability
- Dalhousie University Department of Earth and Environmental Sciences
- Nova Scotia Community College

3. Develop an action plan and secure funding

Now that you've identified the opportunity you want to pursue and your support network, it's time to plan out the project. Each project will require specific criteria to be met as per localized land use by-laws and provincial regulations. Project plans that are positioned to align with funding are often more successful. This can include aligning project objectives, outcomes, and strategies with the funder's priorities and goals. Often, this will include demonstrating the project's environmental or decarbonization benefits, leading to several common questions that arise at this stage.

If you're a **municipality** enabling low carbon projects through policy changes or financial incentives, consider:

- What types of projects are we looking to enable? What financial incentives are we considering? How do other municipalities do this?
- Do we currently have the jurisdiction to implement policy changes or create policy incentives?
- What barriers or opportunities currently exist in our municipal plans and policies?
- How have other jurisdictions overcome these barriers?
- Who has the capacity and expertise to champion this work?
- Who can we partner with to further this work and maximize existing resources?
- What more information do we need to get started?
- What information will be shared with the public?
- What is our timeline and next steps?

If you're a **community organization, private company or municipal department** starting a low carbon community project, consider:

- Have similar projects been attempted or completed in Nova Scotia? What opportunities did they capitalize on and what challenges did they encounter?
- Which provincial regulations will impact our project? (e.g. utility regulations)
- Which municipal policies will impact our project?
- Which provincial or municipal staff can be contacted for assistance?
- Can this project be tested as a pilot?
- What applications need to be made?
- How will we fund the work?
- How will any proceeds be used?
- Who do we need involved for the project to be successful?
- What does success mean for this project?
- What more information do we need to get started?
- What information will be shared with the public?
- What is our timeline and next steps?

Funding

- ICLEI Local Governments for Sustainability – Getting Ready to Finance Toolkit
- FCM Green Municipal Fund- All Municipal Funding Opportunities
- CLIMAtlantic Funding Opportunities
- Province of Nova Scotia Community Solar Program Details and Application (2024)
- NS Department of Natural Resources- Low Carbon Communities
- Nova Scotia Federation of Municipalities - Sustainable Communities Challenges Fund
- Halifax Climate Investment, Innovation and Impact (HCi3) Fund

4. Community Communication, Education and Buy-In

This step in the process represents an opportunity to gain public support and interest in the work before full implementation. Throughout any project development process, communication with partners and the public should be ongoing, transparent, and meaningful. Public perceptions can vary depending on the community and location, which can be influenced by geography, social and historical contexts, and the processes leading to implementation.

Communication and engagement will look different between municipalities and non-governmental actors. Municipalities will likely have an established set of guidelines and practices for when, why and how community engagement occurs, while other organizations may be starting with more flexible and adaptive approaches.

When engaging in climate adaptation conversations, there will also be disagreements and opposing viewpoints that facilitators must be prepared to navigate. It is important to clearly communicate each stakeholders role in the decision-making process, and consider how knowledge and ideas can be understood and exchanged.

Questions to consider when preparing to engage with the public about low carbon projects include:

- What does the average person in your community know about climate change, low carbon communities and energy?
- What do you wish the average person in your community understood about your project or initiative? What is the minimum amount of information they need to know to understand and support your project or initiative?
- What is your reason for engaging with the public? What is your promise to the public throughout the project?

Important topics to consider when communicating about decarbonization projects with communities include:

- Clarity and transparency in the messaging
- Maintaining communication throughout and beyond the project
- Communicating the tangible benefits
- Education and awareness
- Storytelling and personalization
- Fostering partnerships for collaboration

Resources

Newsletter Links

- Ecology Action Centre Newsletter Signup and Ecology and Action Magazine
- FCM Connect- Weekly Newsletter
- NS Community Solar Program Updates Newsletter

Communication and Educational Resources

- Centre for Research on Environmental Decisions - The Psychology of Climate Change Communication: A Guide for Scientists, Journalists, Educators, Political Aides, and the Interested Public (2009)
- FCM Green Municipal Fund: Talking it Through: Guide for local government staff on climate adaptation
- Local Governments for Sustainability – Having the Climate Conversation: Strategies for Local Governments (2012)
- Climate Risk Institute - Climate Change Adaptation Resource Pathway (ARP): Land Use, Regional and Urban Planning (2022)

5. Refine, Implement, and Evaluate

The fifth and final step in the quick start guide involves refining the initiative or project based on community and stakeholder feedback and conducting additional research as needed. For policy changes or financial incentive initiatives, this may look like a change in wording, scope, or application process. For low carbon communities' projects, this may be a change in design, location, partnerships and more. Projects and initiatives naturally evolve and change throughout the planning process and it's important to take time to meaningfully integrate these changes into the overall design.

This is also an opportunity to build monitoring and evaluation metrics into the project or initiative. These may be required as part of your funding (if applicable) and could include, for example, showing evidence of carbon emissions reductions, carbon capture and/or energy produced. Municipal leaders should also consider how climate adaptation can be integrated into council priorities, key performance indicators (KPI's), and existing climate action tracking.

Once an initiative is implemented or a project is operational, it's time to celebrate with your community and project supporters! Share your successes, discuss lessons learned and build momentum for the next project.

You did it!

Resources

- Climate Change Adaptation Resource Pathways (ARP): Land Use, Regional, and Urban Planning – *See section Reflect: Monitoring and Evaluation*
- Equity and Justice in Climate Action Planning: The Challenge of Evaluation
- Canadian Planning and Policy - Community Energy Planning In Canada: Insights At The Nexus Of Research And Practice

WHAT'S NEXT?

Join us at the Low Carbon Leadership Conference to dive deeper into proactively planning for low carbon neighbourhoods.

A lot of fantastic work is being done across Nova Scotia and Canada to further low carbon community projects and bring localized energy systems into communities. This work is crucial to supporting climate mitigation and adaptation efforts and has the potential to become widespread across Nova Scotia's communities.

Municipalities have a key role to play in enabling and initiating low carbon community and neighbourhood projects and providing financial incentives. Other project initiators such as non-profit organizations, private sector actors, residents, and Mi'kmaq communities also have an important role to play as subject matter experts, landowners, leaders, and potential partners for the work.

Further discussion is needed across Nova Scotia on how neighbourhood scale low carbon projects can be proactively planned for and supported in our communities. Join us at the Low Carbon Leadership conference to dig into these topics and more!

ALL RESOURCES

Getting Started with Low Carbon Communities

- Reducing the Costs of Climate Impacts in Canada - Canadian Climate Institute (2022)
- FCM Tool: Climate Adaptation Maturity Scale
- FCM Tool: Greenhouse gas emissions reduction maturity scale
- Local Governments for Sustainability Canada - Getting Started: Exploring Various Entry Points into Adaptation (2022)
- The CEP Crosswalk: A community energy planning tool for inter-departmental alignment and stakeholder engagement (2021)
- Community Energy Association – A Local Government Guide: Policies, Programs, and Incentives to reduce Embodied Emissions in the Built Environment [British Columbia Example] (December 2022)
- FCM Green Municipal Fund - Sustainable Land Use Practices in Canadian Municipalities (March 2019)
- FCM Green Municipal Fund – Factsheet: Governance Strategies for Deep Decarbonization (2020)
- Climate Atlas of Canada
- Natural Assets Initiative - Natural Asset Management Roadmap Program
- Natural and Nature-Based Climate Change Adaptation Community of Practice: Worksheet Tool
- Simon Fraser University –The Natural Solutions Initiative Summary, Volume 1 (2023)

Opportunity Specific Guides

- Nova Scotia Community Solar - Program Guide
- Climate Caucus Handbook- A Toolkit for Local Climate Action: Buildings
- FCM Green Municipal Fund- Toolkit: Navigating energy efficient affordable housing projects
- FCM- Operations and Maintenance for Climate Resilience (2022)
- The University of British Columbia- Neighborhood Low Carbon Energy Strategy
- Ecology Action Centre – Panelized Retrofit Toolkit (2024)
- FCM Green Municipal Fund – Planning an Emissions Reduction Pathway for Community Buildings

Energy Literacy

- Community Energy and Emission Planning Resource Hub
- Australia's Climate Council - Watt's Watt? A Guide To Renewable Energy Capacity And Generation (2018)
- Nova Scotia Power - Solar Distribution Hosting Capacity Interactive Map and Table
- Nova Scotia Clean Electricity Solutions Task Force: Modernizing Energy from Transition to Transformation (2024)
- International Energy Agency - Unlocking the Potential of Distributed Energy Resources: Power system opportunities and best practices (2022)
- Climate Data – Learning Zone
- Nova Scotia Electricity Factsheet - Electricity System Overview
- Community Solar Garden Factsheet- Nova Scotia

Nova Scotia Specific Reports and Announcements

- Natural Resources and Renewables – Legislation to Modernize Electricity System, Improve Regulation (February 2024)
- Natural Resources and Renewables – Amendments to the Electricity Act, Public Utilities Act (April 2022)
- Nova Scotia Legislature - Energy Reform Act – Bill 404 (2024)
- Nova Scotia Legislature - Environmental Goals and Climate Change Reduction Act (2021)
- What Nova Scotia is Doing - Climate Change NS
- Urgent Times, Urgent Action: The Annual Progress Report on the Environmental Goals and Climate Change Reduction Act and Nova Scotia's Climate Change Plan (July 2023)
- Nova Scotia Department of Natural Resources and Renewables - Nova Scotia's 2030 Clean Power Plan
- Nova Scotia - Weathering What's Ahead: Climate Change Risk and Nova Scotia's Well-Being (2022)
- Canada in a Changing Climate – Regional Perspectives 2020-2022 - Chapter 1: Atlantic Provinces
- Province of Nova Scotia: Municipal Climate Change Action Plan Guidebook: Canada-Nova Scotia Agreement on the Transfer of Federal Gas Tax Funds

Equity, Diversity, and Inclusion

- Integrating Equity, Diversity and Inclusion into Municipal Climate Action (2022)
- Equitable Climate Adaptation: Considerations for Local Governments (2022)
- Energy Poverty and Equity Explorer Map (2021)
- Climate Change is a matter of justice – here's why (UNDP, 2023)
- FCM Green Municipal Fund – Climate Change Adaptation through an Equity Lens [Case Study]
- Deep retrofit training and capacity building for African Nova Scotians (Low Carbon Cities Canada, 2023)

Indigenous Leadership

- For Our Future: Indigenous Resilience Report (2024)
- Indigenous Climate Hub
- Reconciliation Canada - Reconciliation Dialogue Toolkits – Kitchen Table Dialogue Guide for Municipal Leadership
- The Confederacy of the Mainland Mi'kmaq - Mi'kmawey Green Communities
- Clean Foundation - Clean Energy in the First Nations of Mi'kma'ki
- Atlantic Policy Congress of First Nations Chiefs: Climate Change & Energy Webpage

- Atlantic Indigenous Economic Development Integrated Research Program - Cleantech in Atlantic Indigenous Communities – PROJECT REPORT (2022)
- Atlantic Policy Congress of First Nations Chiefs - Atlantic First Nation Environmental Awareness Project: Assessing Challenges and Needs for First Nations Economic and Renewable Energy Opportunities (2017)
- AAEDIRP - How the Unama'ki First Nations lever government and corporate sector partnerships: Lessons learned and critical success factors from the Mi'kmaw Economic Benefits Office (Atlantic Aboriginal Economic Development Integrated Research Program (2016)
- BioNB - Carbon Literacy: Carbon and the Impact on your Business (2022)

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- FCM Green Municipal Fund: Talking it Through: Guide for local government staff on climate adaptation
- Local Governments for Sustainability – Having the Climate Conversation: Strategies for Local Governments (2012)
- Climate Risk Institute - Climate Change Adaptation Resource Pathway (ARP): Land Use, Regional and Urban Planning (2022)
- Nova Scotia Green Choice Program
- Climate Story Network

Funding Guide and Opportunities

- CLIMAtlantic Funding Opportunities
- Nova Scotia- Financing and Funding for Community Solar Projects
- Province of Nova Scotia Community Solar Program Details and Application (2024)
- NS Department of Natural Resources
- ICLEI Local Governments for Sustainability – Getting Ready to Finance Toolkit
- Nova Scotia Federation of Municipalities - Sustainable Communities Challenges Fund
- Natural Resources Canada - Building Regional Adaptation Capacity and Expertise Program
- Halifax Climate Investment, Innovation and Impact (HCi3) Fund
- FCM Green Municipal Fund- Sustainable Municipal Buildings
- FCM Green Municipal Fund- Community Energy Systems
- FCM Green Municipal Fund- Organic Waste-To- Energy
- FCM Green Municipal Fund- Municipal Fleet Electrification
- FCM Green Municipal Fund- Net Zero Transformation
- FCM Green Municipal Fund- Community Efficiency Financing Market Guide
- FCM Green Municipal Fund- All Municipal Funding Opportunities

Pilots and Case Studies

- Smart Grid Atlantic WhitePaper: Managing the energy transition by creating the grid of the future (2020)
- Community Solar Gardens Pilot – Nova Scotia Power
- Drake Landing Solar Community Okotoks, Alberta
- Sonnenschiff: Solar City - Inhabitat (2011)
- FCM Green Municipal Fund - Case study: A novel approach to geothermal energy systems in Canada
- Canada in a Changing Climate - Incorporating Climate Resilience for Municipal Infrastructure into the Updates of Existing Atlantic Canada Water and Wastewater Design Guidelines

Monitoring and Evaluation

- Canadian Institute for Climate Choices- 11 Ways to Measure Clean Growth (2020)
- Copenhagen Centre on Energy Efficiency- Healthy and Efficient Retrofitted Buildings Tool (2023)
- Partners for Climate Protection- 5 Step Milestone Framework
- Equity and Justice in Climate Action Planning: The Challenge of Evaluation

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