

# MUNICIPALITY LETTERHEAD

STREET ADDRESS  
CITY, PROVINCE, POSTAL CODE  
PHONE NUMBER  
MUNICIPALITY WEBSITE

Date

Wayne Groszko  
Applied Energy Research Scientist  
Nova Scotia Community College

Dear Wayne Groszko,

The municipality of [REDACTED] has been proposing new ways of improving our contributions to the provinces GHG emissions goals while improving our grid resiliency. This project proposed by NSCC provides our municipality the opportunity to achieve both goals.

Reducing demand charges on commercial businesses in our area will be both economically beneficial to that business while alleviating some of the burden on the local electrical grid. Strengthening our electrical grid will enable existing and future commercial businesses to thrive.

Municipality of [REDACTED] is committed to providing the following contributions to this project:

- Support towards marketing the proposed research project to commercial buildings in the area. This marketing support is valued at \$XX.
- A total of XX in-kind hours developing communication and networking potential between NSCC researches, local businesses and municipal building inspectors. In-kind hours are valued at XX \$/hr.
- Aid in acquiring local construction permits where applicable.

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Principal contact signature

Name

Position

Municipality

Phone

Email

# Low Carbon Communities & Connect2 Program Application (2020-2021)

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## BEFORE COMPLETING

Thank you for expressing your interest in the Low Carbon Communities and Connect2 grant program. Please take the time to review the Program Description and Additional Resources section of the website before completing your application:

<https://novascotia.ca/low-carbon-communities/>

## SUBMITTING YOUR APPLICATION PACKAGE:

In addition to the application form you will also need to include the following documentation:

- confirmation of matching funds **(required)**
- proof of permits and/or support from other provincial departments if project involves design/infrastructure/construction **(required)**
- letters/emails of support from community or partners
- visual materials (i.e. map of location)
- any additional relevant information

**NOTE:** Applicants are responsible to provide all the necessary documents at time of submission. Please submit as a word document to the corresponding Program Coordinator at [lowcarboncommunities@novascotia.ca](mailto:lowcarboncommunities@novascotia.ca) or [connect2@novascotia.ca](mailto:connect2@novascotia.ca).

**Deadline to Submit?** We will be accepting and reviewing application submissions on an ongoing basis until September 30, 2020 or until all funds have been allocated. Please note you may be contacted for supplemental information.

**Questions?** Staff are available year-round to discuss potential projects and partnerships.  
Please contact one of the Program Coordinators:

LCC:	C2:
Catherine Chase at 902-424-4073, or <a href="mailto:lowcarboncommunities@novascotia.ca">lowcarboncommunities@novascotia.ca</a>	Gabrielle Riley Gallagher at 902-424-8090, or <a href="mailto:connect2@novascotia.ca">connect2@novascotia.ca</a>

# LOW CARBON COMMUNITIES & CONNECT2

## PROGRAM APPLICATION (2020-2021)

### Important Notes:

The funding of the program is subject to Treasury Board approval following the Provincial official budget day. The Department of Energy and Mines reserves the right to alter or cancel the current process.

Applicants will be scored based on their alignment with the Program Description and Assessment Criteria found on the LCC/C2 website:

<https://novascotia.ca/low-carbon-communities/>

### ORGANIZATION INFORMATION

**Legal Name of Organization:**

Nova Scotia Community College

**Legal Civic Address of Organization:**

80 Mawiomi Pl, Dartmouth, NS B2Y 0A5

**Signing Authority Names:**

Wayne Groszko

**Lead Applicant Organization Type:**

(Note: private sector is not eligible for LCC)

University / Educational Institution

**Mailing Address (if different):**

**Primary Contact Person:**

Riley Cook

**Primary Title:**

Applied Energy Research Associate

**Primary Email Address:**

Riley.cook@nsc.ca

**Primary Phone:**

902-746-0992

**Alternate Contact Person:**

Wayne Groszko

**Alternate Title:**

Applied Energy Research Scientist

**Alternate E-mail Address:**

Wayne.groszko@nsc.ca

**Alternate Phone:**

902-818-5339

**Joint Stocks Registry ID**

(if applicable):

3023980

### 1.0 PROJECT DESCRIPTION (15 POINTS)

<b>Project Title:</b>	Battery Demand Reduction Study for Commercial Business Development
<b>Project</b> <b>Location:</b>	Western Nova Scotia (Yarmouth, Digby, Barrington, Clare, Argyle)
<b>Project Category:</b>	LCC - Clean Electricity and Energy Transformation
<b>Headline Description: <i>What is the issue/challenge/opportunity that your project is responding to?</i></b> <b>(1-2 Sentences)</b>	Commercial buildings pay ~\$10/kW of demand on each bill. This demand is met by burning expensive, imported, natural gas which causes significant GHG emissions. This project proposes a means of quantifying the potential for demand reduction in our province using battery energy storage systems to both save on electricity costs, reduce GHG emissions, facilitate industrial growth in rural areas and improve grid resiliency in western region of Nova Scotia.
<b>Project Summary (Max. 750 Words)</b> <b><i>Be sure to include how your project aims to reduce GHGs.</i></b>	<p>A preliminary analysis of electricity consumption in ~100+ commercial/industrial buildings will be completed to determine the impact of demand charge (\$/kW) on their total electricity bill. From this preliminary study, 10 candidates with the highest ratio of demand charge to total electricity consumption (kWh) will be chosen to undergo a more detailed electrical load study. Preferable these 10 candidates will be diversified across western Nova Scotia. The detailed electrical load study will include logging energy/power consumption data at ~10 second intervals to understand individual building load profiles at a greater resolution than what was available in the preliminary analysis. The detailed electrical load study will provide insight through engineering analysis to select up to three candidates that are best suited to have a hybrid installation of battery energy storage with solar photovoltaic panels.</p> <p>Using the electrical load study data, the three best suited commercial/industrial buildings will have a battery-solar system engineered to reduce demand charge in a way that maximizes GHG emission reductions while remaining economically sustainable. GHG reduction is calculated based on a total offset of green electricity production used to charge the batteries as well as the offset in total demand electricity (kW) which is currently met by NSPI burning natural gas in their turbines. The candidate will be chosen on a basis of GHG reduction potential, capital cost, building to grid peak synchronicity and return on capital investment potential.</p> <p>In Nova Scotia, the relevance of this project is threefold.</p> <ol style="list-style-type: none"> <li>1. Nova Scotia has the goal to reduce its GHG emissions to below 53% of 2005 levels by 2030 and become net-zero by 2050. Installing a battery-solar system that is cost effective and reduces GHG emissions will immediately reduce GHG emissions for the chosen buildings, while incentivizing other buildings and new construction to implement this technology. Economic incentive towards green</li> </ol>

initiatives are critical in achieving net-zero emission by 2050 as they entice public and private industry to become involved.

2. The western region of Nova Scotia has been grid restrained for decades, which has directly affected industrial growth in the area. This project offers an alternative pathway for levitating grid restraints without the need for expensive (~\$10 M) grid infrastructure improvements.
3. Economic incentive to perform battery and solar installations will generate local jobs for solar installers, electricians and engineers while decreasing the demand for imported fuels such as natural gas and pyrolyzed coal products.

Using their team of engineers and technicians, NSCC's Applied Energy Laboratory is fully capable of completing the proposed work in the allotted time (~1 year).

This project has the potential to provide an economical pathway that offers the implementation of renewable electricity generation while reducing GHG emissions. Such a pathway is the key to achieving municipal and provincial goals of improving grid resiliency and industrial growth while reducing our carbon footprint.

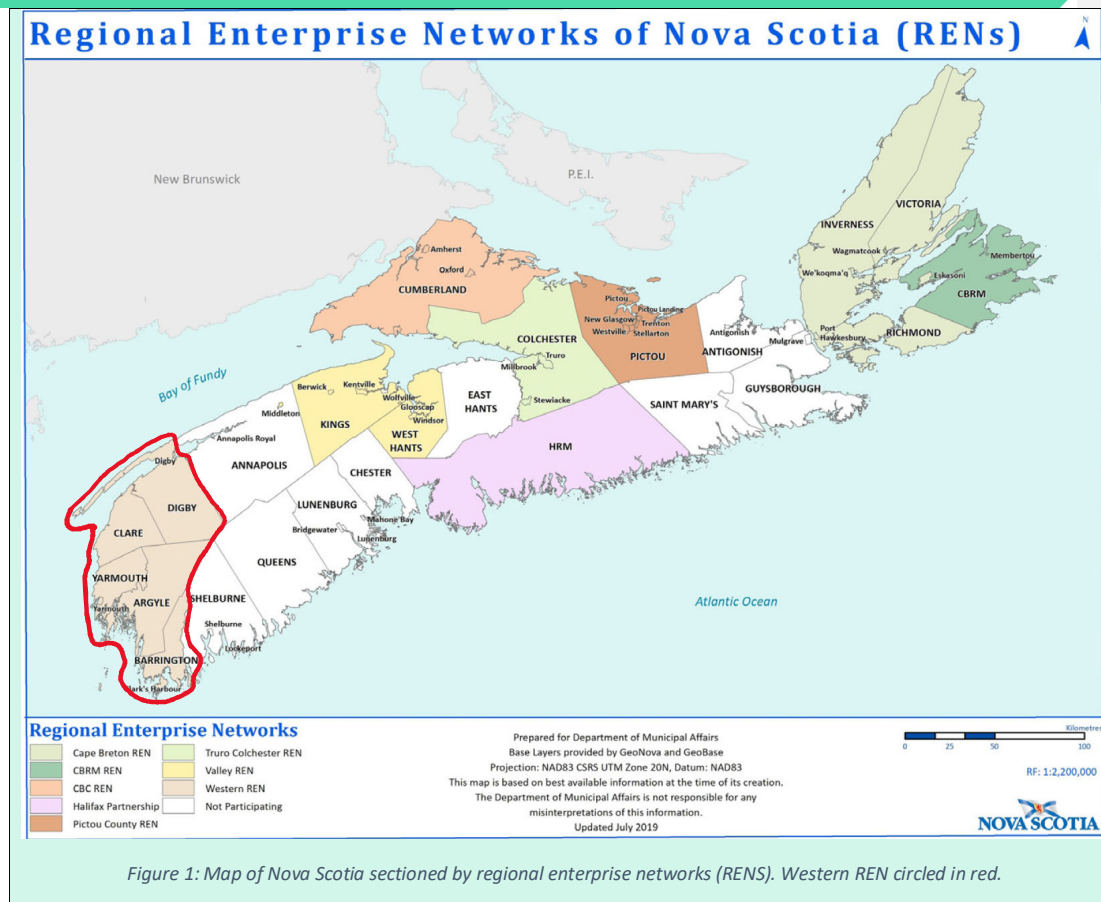


Figure 1: Map of Nova Scotia sectioned by regional enterprise networks (RENS). Western REN circled in red.

LOW CARBON COMMUNITIES and CONNECT2 APPLICATION

List the specific deliverables and estimated completion date

A final report and summary presentation of the study's findings will be delivered upon completion of the project. The report deliverables will include but are not limited to the following:

- Documentation of ~100+ commercial/industrial building analyzed in the preliminary study.
- Detailed analysis of the top 10 candidates that were chosen in the detailed study using computer modelling methodology and engineering methodologies to highlight pros and cons of each building in order to choose the most suitable building to have a battery-solar system designed.
- Analysis of the most suitable candidate building to have a battery-solar system installed. The analysis will provide the engineering to determine battery sizing (kWh, kW) and solar sizing (kW). Quotes on installing both the battery-solar system will be acquired from reputable installers and supplied in the report. Using the designed system, results will be modelled to determine the economic, electrical grid impact, and GHG reduction benefit to the commercial building, the community in which it resides, and the province. Recommendations to whether this approach should be used on this or other buildings in the detailed study will be made.

Total Project Cost:

\$110,000	Funding Request:	\$75,000
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Commented [RC1]: Estimate Budget for now. Adjust before submit

## LOW CARBON COMMUNITIES & CONNECT2 APPLICATION QUESTIONS

*NOTE: SOME MARKED SECTIONS APPLY ONLY TO ACTIVE TRANSPORTATION PROJECTS.  
THE REMAINING SECTIONS APPLY TO BOTH CONNECT2 AND LOW CARBON COMMUNITIES PROJECTS*

### 2.0 PARTNERSHIPS AND COMMUNITY SUPPORT (15 POINTS)

**Please briefly describe the following in relation to your project:**

**Please list project partners and describe the nature of any funding or project partnerships.**

Nova Scotia Power – Support through in-kind hours (200 hrs at 60 \$/hr), data sharing (i.e. load shapes, substation and aggregate generation data), permit support with priority, and expertise support from staff working on their existing smart grid solar storage projects.

Efficiency Nova Scotia - TBD

Western Regional Enterprise Network (WREN) - Support through in-kind hours, data sharing from the Energy Investment Plan for the Western Region of Nova Scotia in order.

Municipality of Yarmouth - TBD

Municipality of Digby - TBD

Municipality of Barrington - TBD

**How have you reached out to stakeholders to collaborate on the project?**

Yes. We have reached out and discussed the project with Jill Searle (Microgrid Project Manager, Nova Scotia Power) and Evan Nemeth (Economic Development Officer – Research Lead, Western Regional Enterprise Network) and Kaelen Keys (Business Development Manager, Efficiency Nova Scotia) to both collaborate and contribute to the project where possible. Letters of support provided with application.

**How have you engaged with all relevant groups impacted by the project?**

We have engaged with the municipality of Digby’s Coordinator Renewable Energy and Climate Change and received support in the form of a letter (attached) and through various other communications. Terry has highlighted potential candidates that would be ideal for this study such as Lewis Mouldings. In addition, communication has been started with the municipalities of Yarmouth and Barrington.

**CONNECT2 - AT Infrastructure Projects Only:**

**Specify the length of the connector to be completed as part of this project.**

**Commented [C2]:** TBD

**Commented [C3]:** Talk to Greg Shay

**Commented [C4]:** TBD

**Commented [C5]:** Talk to Terry Thibodeau

**Commented [C6]:** TBD

**Commented [C7]:** TBD

**Commented [C8]:** Letters of support

**Commented [C9]:** Check in with Municipality of Barrington

What are the hubs this project will connect to?
Is the project connected to or a part of the Blue Route?
<input type="checkbox"/> Yes <input type="checkbox"/> No
Comments:
Identify the type of connector surface (e.g. gravel, paved, crusher dust, etc.).

### 3.0 STRATEGIC ALIGNMENT (40 POINTS)

<p><b>Clearly explain how the project aligns with the five strategic areas below.</b></p> <p><b>*Please utilize the Assessment Criteria found at <a href="https://novascotia.ca/low-carbon-communities/">https://novascotia.ca/low-carbon-communities/</a> *</b></p>
<p><b>GHG Reduction Potential (10 pts):</b></p> <p>This project is a necessary proponent to utilize battery energy storage as a tool in mitigating GHG emissions while supporting the electrical grid. This proposal encompasses the framework required to properly implement a battery energy storage with solar PV generation in order to achieve future GHG emission targets. The final report will however quantify the potential GHG reductions to support the implementation of this project in the next LCC (or other) proposal applications. GHG reduction potential will be presented on a \$/tCO<sub>2</sub>e so that it can be compared to other renewable systems. Since this system has potential for a reasonable payback period (&lt;12 years) the normalized reduction in GHG emissions cost as the potential to be below zero (i.e. saving money and emissions).</p> <p>The battery energy storage will discharge to offset peak electricity which is generated by burning imported natural gas. The photovoltaic solar panels will provide green electricity generation to charge the battery energy storage system at a minimum of net-zero electricity consumption. The combined benefit of battery energy storage and solar power generation make for a business case model that could both economically and environmentally incentivize Nova Scotian businesses to upgrade their commercial buildings in this way. Battery energy storage at scale can help Nova Scotia Power better manage its load curve which helps enable the integration of more renewables on to the grid, further reducing GHG emissions. Since Nova Scotia Power has committed to be carbon neutral by 2050, increased electrification using battery energy storage is necessary.</p>
<p><b>Learning by Doing, Knowledge Transfer, and Innovation (5 pts):</b></p>

## LOW CARBON COMMUNITIES and CONNECT2 APPLICATION

This project will lay the vital framework required to implement battery energy storage infrastructure in the Nova Scotia electrical grid. With insight and guidance from NSPI, this project will serve as a pathway for growing knowledge on installation, operations and savings potential of battery energy storage in the communities that need this technology most. By growing energy storage knowledge and showing its impact, this will lead rural industries and municipalities to instigate change on their own.

As NSCC is an educational institution, this project will develop opportunity for hiring students to both build their understanding and motivation to support the future of Nova Scotia green initiatives.

### **Local Economic Benefits and Employment (10 pts):**

Implementing the combination of these two technologies will lead to present and future commercial and industrial development in rural areas. This project specifically will hire locally where possible for battery, solar and data logging installations. The intent of this project is to lay the pathway for future projects to be installed, if successful, this will cultivate more local jobs and businesses built on managing these battery-solar systems. As NSCC is the proponent of this project, funding will additionally support locally hired researchers at the college. As well, the budget includes a plan to hire two (2) co-op students from a college or university within Nova Scotia to aid in the marketing and analysis portion of the project.

### **Community-Driven Initiative (5 pts):**

In discussion with the municipality of Digby, Yarmouth and Western Regional Enterprise Network (WREN), a community/municipal desire to improve the grid resilience to load demand is critical for these communities to grow industry which supports population growth. The western region of Nova Scotia (Yarmouth, Digby, Barrington, Argyle and Clare) have seen an aggregate decrease in population since 2011 which will continue if industry is forced to develop outside of this region. Data showing this can be found in “Energy Investment Plan for Western Nova Scotia” by WREN (attached in proposal). The investment plan highlights areas need for the following items which align with this proposal.

- Commercial energy storage (75% which should be battery)
- Municipal, commercial and institutional retrofits
- Solar installation on existing non-residential buildings

When referring to renewable infrastructure installations, the investment plan states, “depending on the business case, these actions can be taken on by the public or private sector”. This statement highlights the criticality of government funding such as the Low Carbon Communities grant to fund projects such as this which have potential for developing the business case that incentivises the private/public sector.

### **Equity and Inclusion (10 pts):**

Equity and inclusion are highly valued at NSCC. In order to incorporate this into the project, we will prioritize buildings that house or affect children, youth, families, newcomers, older adult persons with disabilities, women and girls, Mi’kmaq, African Nova Scotians and LGBTQ2+ people. When hiring contractors and students or purchasing equipment, these groups will also be prioritized. As NSCC has already built a strong relationship with the Acadia First Nation communities through past and ongoing projects, buildings located on these communities will be of high interest in this study.

### 4.0 MEASURABILITY, EVALUATION, AND SUSTAINABILITY (15 POINTS)

**Explain how you plan to measure and evaluate the project’s impacts, including engagement with the community, successes, and learnings. We encourage applicants to use a specific, measurable, attainable, relevant and time-based (SMART) approach.**

Project impact and success will be measured using three metrics each evaluated out of 100%.

1. It is desirable that the electrical consumption and demand charge data from NSPI be reviewed for at least 100 buildings, hence each building dataset received and analyzed will contribute 1% to the total evaluation of this proponent. **1% per building.** In future projects, lessons learned from such a large dataset allow for efficient selection of building types that are prone to high demand charges.
2. A detailed electrical load study will be done on 10 buildings out of the full 100+ dataset. To qualify for this phase of the study, buildings from the preliminary study must attain an average demand charge that is 25% of their total electricity bill or greater. It is desirable to collect at least 6 months of high resolution (<10 s) electrical load profile data from each of these 10 buildings (total 60 months of data) prior to the final report being published. **~1.7% per month of data per building.**
3. The final report will deliver 10 individual short analyses of each building studied in the detailed electrical load study. A maximum of three buildings from this study will be selected as ideal candidate for receive a battery-solar storage system as previously described. These selected candidates will be analyzed in detail providing the desirable energy storage and solar panel sizing along with quotes from contractors, a description of work to complete the installation, construction and NSPI permits, and a engineering analysis that reveals potential GHG emission reductions (tCO<sub>2</sub>e/\$/year), total cost savings to the building (\$/year), payback period for the system (years), impact on the local grid and recommendations to whether this technology will provide the desired pathway for increased renewable generation and industrial growth in rural communities. The final report will also draw conclusions from the entire dataset such as which buildings are more or less likely to have high demand:consumption electrical usage ratios. These learnings will help guide future projects to focus on certain industries and building types. **5% per individual short analysis and 50% for the detailed analysis.**

**How will your organization or community provide ongoing support to ensure success over time? Describe planning for the sustainability of the project.**

The work completed as a part of this 1-year study comprises Stage 1 of the full plan. By successfully completing Stage 1, a final report will have been delivered which highlights, assesses, designs and quotes the most suitable candidate building to have a battery-solar system installed. This report will lay the necessary framework to effectively complete the installation of the battery-solar system and measure its efficacy in a second 1-year project (i.e. Stage 2). Having a two-stage project is ideal as it allows for the proper analysis of the battery-solar system prior to committing funds to the installation. Additionally, having Stage 1 complete prior to applying for Stage 2 will increase industry interest and funding potential as a clear pathway and benefit will have been quantified.

It should be noted that this project is a continuation of the work completed by WREN (see attached)

**5.0 PROJECT BUDGET AND WORKPLAN (15 POINTS)**

Provide a summary of the project expenses and expected funding and/or revenue, creating new rows as necessary. Please review the financial guidelines in the Low Carbon Communities and Connect2 program description documents thoroughly for cost breakdown.

Applications with incomplete or insufficient budgets will have points taken away from their final score.

Contact the Program Coordinator if you have questions or need clarification.

**a) PROJECT BUDGET: EXPENSES**

PLEASE REFER TO THE PROGRAM DESCRIPTION FOR FUNDING GUIDELINES PRIOR TO COMPLETING THE BUDGET

Expense Category	Expense Description	Category Total (\$)
Personnel (salary/wages)		
Professional fees (technical, consulting, contracting)		
Equipment/supplies		
Permits/permissions/approvals		
Meeting and convening expenses		
Communications/ marketing		
Travel costs		
In-kind		
Other (please specify)		
<b>Project Total</b>		

**b) PROJECT BUDGET: CONTRIBUTIONS**

PLEASE REFER TO THE PROGRAM DESCRIPTION FOR FUNDING GUIDELINES PRIOR TO COMPLETING THE BUDGET

Description	Contribution (\$)	Percentage of project total	Confirmed?	Tentative Date of Approval?
LCC or Connect2 Program Department of Energy and Mines (Max 75% of total project cost)	\$		Choose an item.	Click or tap to enter a date.
In-kind contribution(s) (Max 25% of total project cost)	\$		Choose an item.	Click or tap to enter a date.
Other cash sources	\$		Choose an item.	Click or tap to enter a date.
<b>Total</b>	\$	100%	Choose an item.	. Click or tap to enter a date.

Please provide explanatory notes, if necessary:

Do you intend to apply to other funding programs to support this stage or future stages of your project? Please be specific and list the program name and organization, any funding deadlines, and briefly how your project aligns.  
**Note:** See examples of "Potential Funders" provided in the Additional Resources link on our website.

**c) PROJECT WORKPLAN AND ACTIVITY SCHEDULE**

PLEASE INDICATE THE SIGNIFICANT TASKS OR PHASES OF YOUR PROJECT AND THE EXPECTED COMPLETION DATES (I.E. 30%, 60%, 90% COMPLETION DATES)

Project Phases	Time Frame
<b>Phase 1: Preliminary data collection of 100+ commercial building NSPI billing data</b>	<b>3 MONTHS</b>
<ul style="list-style-type: none"> <li>ACTIVITIES: MARKETING THE PROJECT TO DEVELOP INTEREST, DATA COLLECTION, ANALYSIS</li> <li>DELIVERABLES: DATASET OF 100+ BUILDINGS WITH TOP 10 MOST SUITABLE CANDIDATES IDENTIFIED</li> </ul>	
<b>Phase 2: Detailed electrical load profile data collection on 10 buildings</b>	<b>7 MONTHS</b>
<ul style="list-style-type: none"> <li>ACTIVITIES: SETUP DATA LOGGERS, DATA COLLECTION, ANALYSIS</li> <li>DELIVERABLES: ENGINEERING ANALYSIS ON EACH BUILDING THAT DETERMINES TOP THREE MOST SUITABLE CANDIDATES FOR BATTERY-SOLAR SYSTEM</li> </ul>	
<b>Phase 3: In-depth Data Analysis on up to 3 buildings</b>	<b>1 MONTH</b>
<ul style="list-style-type: none"> <li>ACTIVITIES: DESIGN, REACH OUT TO CONTRACTORS AND RECEIVE QUOTES TO COMPLETE THE INSTALLATION AT EACH SITE</li> <li>DELIVERABLES: A CLEAR PATHWAY FORWARD IDENTIFIED FOR EACH BUILDING COMPLETE WITH RESPECTIVE ECONOMIC AND ENVIRONMENTAL BENEFITS</li> </ul>	
<b>Phase 4: Final Report &amp; Presentation</b>	<b>1 MONTH</b>
<ul style="list-style-type: none"> <li>ACTIVITIES: WRITING FINAL REPORT AND DELIVER PRESENTATION OF RESULTS</li> <li>DELIVERABLES: FINAL REPORT OUTLINING THE BODY OF WORK COMPLETED IN THIS STUDY, AS WELL AS A DETAILED ANALYSIS AND PATHWAY FORWARD TO EXECUTE THE BATTERY SOLAR INSTALLATION THIS PROJECT AT THREE LOCATIONS</li> </ul>	
<b>Additional phases if needed</b>	

### 5.0 ATTACHMENTS

Please list any supporting documents here. These may include:

**All projects:**

- Letters/emails of support from any partners or financial contributors
- Maps, site plans and/or schematic drawings for proposed walk/bike routes, infrastructure or similar initiatives
- Written permission from the landowner for infrastructure projects (construction and/or design). For projects involving private land, proof of liability insurance might be required.

**Connect2 projects:**

- Written approvals from the NS Department of Lands and Forestry (L&F) if project involves Crown Land.
- Demonstration of support from the Department of Transportation and Infrastructure Renewal’s (TIR) design guidelines and other AT related criteria for projects with an AT design or plan on provincial roads
- Necessary permits from the NS Department of Environment
- Demonstration that the proposed project is identified as a transportation or AT priority in an official municipal document
- Community groups are strongly encouraged to provide a letter of support from their municipality.

File Name	Description
Western Region Energy Investment Plan - August 2020 v3.pdf	Energy Investment Plan for Western Nova Scotia - Analysis has been undertaken to identify a community energy investment plan for the Western Region Enterprise Network (Western REN).
	Letter of Support from Nova Scotia Power
	Letter of Support from Western Regional Enterprise Network
	Letter of Support from Efficiency Nova Scotia
	Letter of Support from Municipality of Yarmouth
	Letter of Support from Municipality of Digby
	Letter of Support from Municipality of Barrington

**CONFIDENTIALITY STATEMENT:**

All information submitted to the Government of Nova Scotia as part of an application to the Low Carbon Communities or Connect2 program will be governed by the provisions of the Freedom of Information and Protection of Privacy Act ([FOIPOP](#)).  
Any information submitted will be retained by the Government of Nova Scotia.