Regional Community Energy Plan: An Online Platform

Jordan Beardy, Independent First Nations Alliance
Mariano Arriaga, Mohawk College
28-April-2022

IFNA

mohawk IDEAWORKS
ENERGY & POWER INNOVATION CENTRE

Mohawk College

- Provides expertise and facilities to industry and communities with their challenges in power & energy, data integration & analysis.
- Services:
  - Energy and resources challenges.
  - Demonstration and validation.
  - Technology adoption.
  - Capacity building.
  - Involve students.

IFNA

mohawk
IDEAWORKS
ENERGY & POWER
INNOVATION CENTRE

Independent First Nation Alliance (IFNA)

- Serving 5 communities in northern Ontario.
- Advisory and resource building support.
- Services:
  - Technical.
  - Education.
  - Health.
  - Communications.
  - Finance.
  - Emergency Operations.

IFNA

mohawk IDEAWORKS
ENERGY & POWER INNOVATION CENTRE

Whitesand First Nation (WSFN)

- Drive-in community.
- 2.5 hours North of Thunder Bay, Located 1 min North of Armstrong, ON.
- Although there is year round access, WSFN is diesel dependent.
- On-reserve population ~ 300 people.
- Ojibway Speaking.

Whitesand First Nation

IFNA

mohawk IDEAWORKS
ENERGY & POWER INNOVATION CENTRE

Lac Seul First Nation

- Comprised of 3 communities: Kejick Bay, Whitefish Bay & Frenchman's Head.
- All accessible by road.
- 40-60km from Sioux Lookout Ontario.
- Grid-connected.
- On reserve population ~ 1,000 people.
- Ojibway speaking.

IFNA

mohawk IDEAWORKS
ENERGY & POWER INNOVATION CENTRE

Muskrat Dam First Nation

- Fly-in remote community , or accessible by winter road.
- 370km North of Sioux Lookout.
- Diesel dependent.
- On reserve pop 415 people.
- Oji-cree speaking.

IFNA

mohawk IDEAWORKS
ENERGY & POWER INNOVATION CENTRE

Kitchenuhmaykoosib Inninuwug – Big Trout Lake First Nation

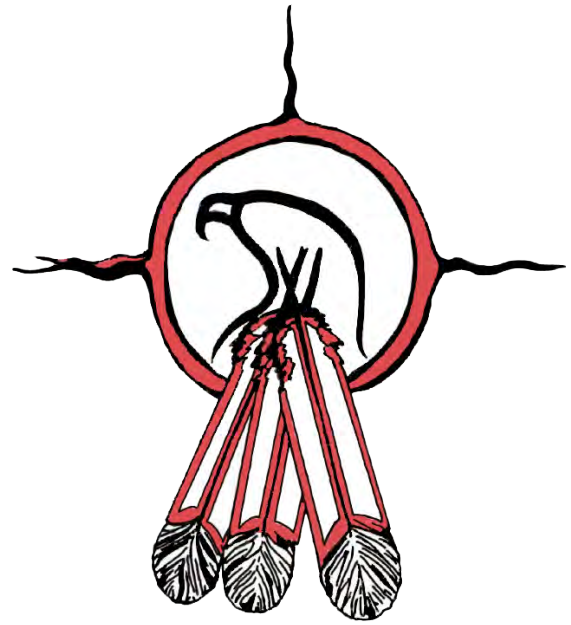
- Fly-in remote community, or accessible by winter road.
- 400km Northeast of Sioux Lookout.
- Diesel dependent.
- On reserve population ~ 1,000 people.
- Ojibway and Cree speaking.

IFNA

mohawk IDEAWORKS
ENERGY & POWER INNOVATION CENTRE

Pikangikum Lake First Nation

- Fly-in remote community, or winter road access.
- 100km Northwest of Red Lake, Ontario
- On reserve population ~ 2,300 people.
- Ojibway speaking.



IFNA

mohawk IDEAWORKS
ENERGY & POWER INNOVATION CENTRE

Pikangikum Facts

- 80-85% of the population is under 25.
- Pikangikum received electricity for the first time in 2018 and is the only Ontario First Nation community connected to the Watay Transmission Line at the moment.
- Whole community is Ojibway fluent, most do not understand English.
- No running water in most of their houses.

Why are we here?

- Housing is a key priority for communities.
- Energy, fuel & housing are part of the same challenge and/or solution.
- Having all up-to-date accurate information is a challenge.




IFNA

mohawk IDEAWORKS
ENERGY & POWER INNOVATION CENTRE

General Housing/Energy Challenges

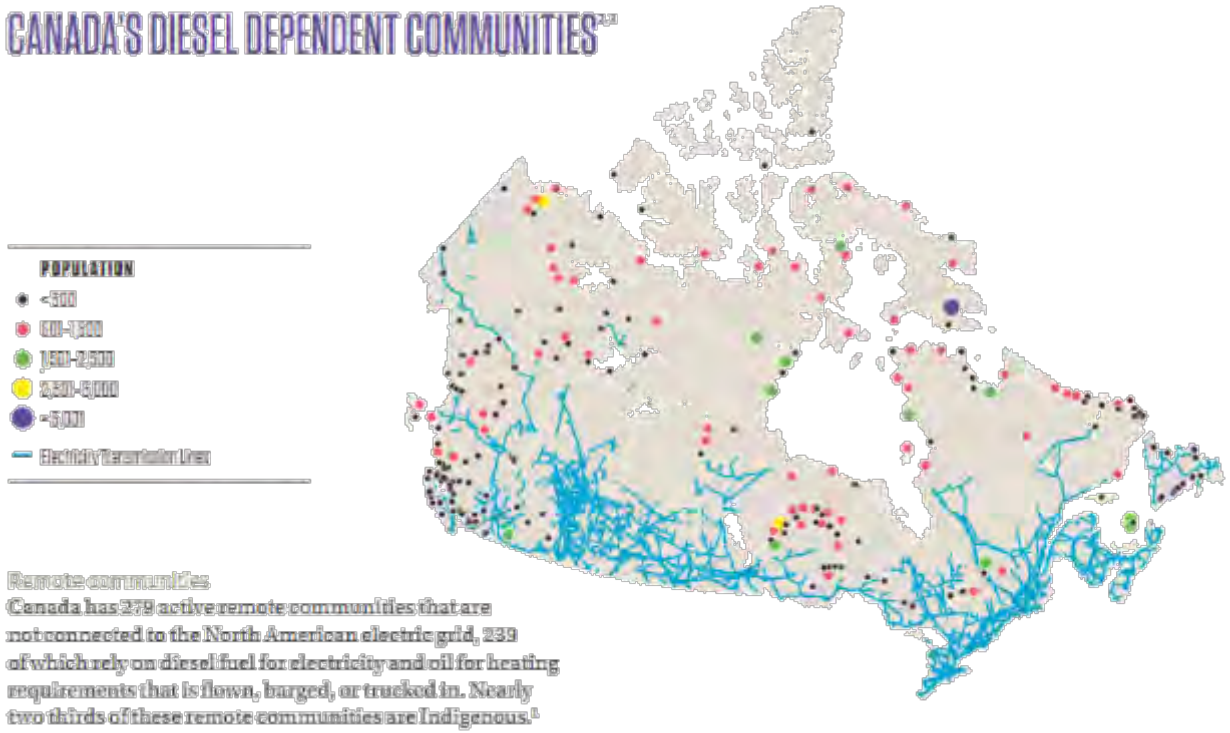
- For context, these are some of the challenges:
  - Remoteness of communities.
  - High outside contractor prices, leading to FN's using their own inexperienced labour.
  - Shortened construction seasons for remote communities.
  - No proper record keeping of previous renovations, building projects, inspections, and site visits.
  - Complex funding and not sufficient funding to address the overall issue with housing (e.g. FN will only get enough funding to fix windows and doors).
  - Winter road season becoming shorter and shorter due to climate change.
  - Lack of communication between FN's and stakeholders for building projects.
  - No proper tools & equipment accessible.
  - Old houses without proper maintenance.


GlasRock


PEX
EXTRUDED
POLYSTYRENE
INSULATION

Big Problem

- Houses & buildings in remote communities are usually not to standard.
- Approx. 450 million liters/year of diesel were used for fuel in 2020.



Arriaga, M.; Brooks, M., Moore, N.; "Energy Access – The Canadian Context," [online] https://wise.uwaterloo.ca/documents/events/wise_and_affiliate_publications/energy_access_canadian_context_infographic_spread_and_section_openac
Pembina Institute, "Diesel Reduction Progress in Remote Communities," [online] https://www.pembina.org/reports/diesel-reduction-progress-research-summary-pdf.pdf

IFNA

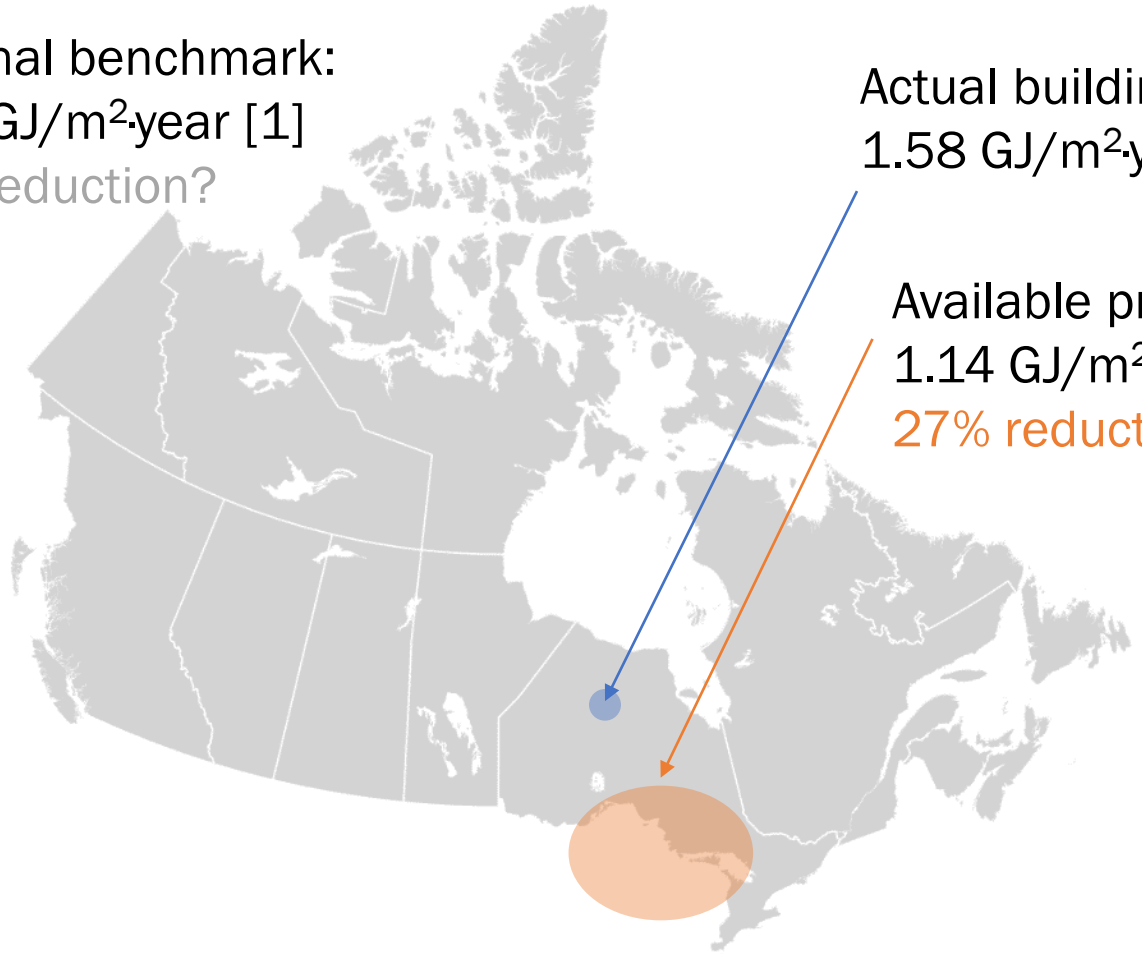
mohawk IDEAWORKS
ENERGY & POWER INNOVATION CENTRE

Big Problem – Office Building Example

- Energy intensity measure allows to compare or rate building energy performance by area, m^2 for example.
- An office buildings spent 1.58 GJ/m^2 in 2019.
  - Heating: 1,541 liters of fuel.
  - Electricity: 23,784 kWh.
  - Area: 124 m^2
- What is the reference, is it high/low?

Big Problem – Office Building Example (cont.)

National benchmark:
0.99 GJ/m^2·year [1]
37% reduction?



Actual building value:
1.58 GJ/m^2·year

Available provincial benchmark:
1.14 GJ/m^2·year [2]
27% reduction?

- Existing benchmarks may not be the best reference.
- No available regional benchmark.
- No regional or community value/target for an energy efficient building.
- How much fuel should we **consistently aim (and proof)** to reduce with improved buildings?

[1] Natural Resources Canada (2021) Canadian Energy Use Intensity by Property Type. (Site EUI) Retrieved from: https://portfoliomanager.energystar.gov/pdf/reference/Canadian%20National%20Median%20Table.pdf
[2] Natural Resources Canada (2012). *Survey of Commercial and Institutional Energy Use – Buildings 2009*. Retrieved from: http://oee.rncan.gc.ca/publications/statistics/scieu09/scieu_e.pdf

IFNA

mohawk IDEAWORKS
ENERGY & POWER INNOVATION CENTRE

Existing Community Energy Reports

- One-time snap shot.
- Report in someone's desk.
- Does not get updated.
- All or nothing update effort.
- Usually not fully done by the community.
- When information is required information is mostly outdated.
- No single place with all the required information.

Our Goals

- Bring awareness of some solutions to the complex associated challenges.
- Address these two related issues, housing & energy, together by simplifying the process of information access, providing:
  - **Information:**
    - **Accurate.**
    - **Available.**
    - **Up-to-date.**
  - **Support to:**
    - **Share.**
    - **Learn.**
    - **Compare.**
    - **Connect.**

Potential Benefits for the Community

Up-to-date Information

Have accessible updated information of your community to help the making decisions

Applying for Project Funding

Project proposals require building and community energy and cost information

Look in One Single Place

Integrate information from different sources & help with existing reporting requirements

Renewable Energy Projects

Integrate generation data from renewable energy systems & other energy metering poitns

Identify Opportunities

An accessible historical building & community baseline helps identify project opportunities

Compare Buildings

Compare buildings with similar use in your community, your region or across the country

Community Involvement

- Work with communities and organizations to identify outcomes.
- Community led.
- Alignment with their goals.
- Help us understand the community.
- Work together to gather information and simplify the update process.
- Plan ahead for potential projects and quantify/validate project results.

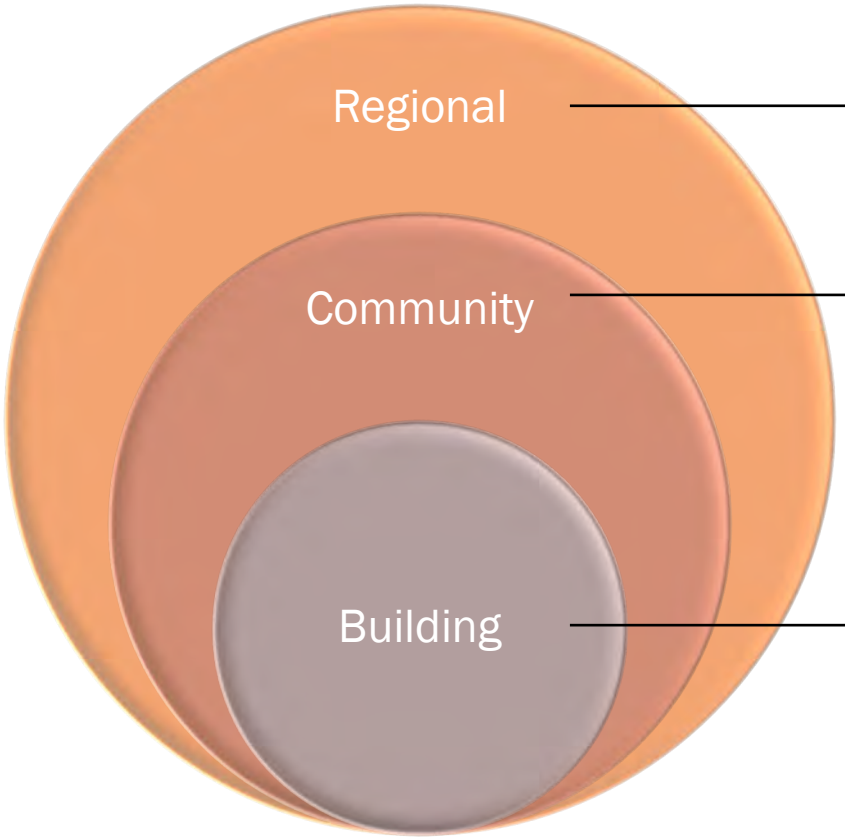
IFNA

mohawk IDEAWORKS
ENERGY & POWER
INNOVATION CENTRE

Engaged & Participating Communities

- Participating Communities:
  - Whitesand First Nation.
  - Kitchenuhmaykoosib Inninuwug (KI) First Nation.
- Engaged Communities:
  - Muskrat Dam First Nation.
  - Lac Seul First Nation.

Different Views



Compare, share, baseline, joint opportunities, …

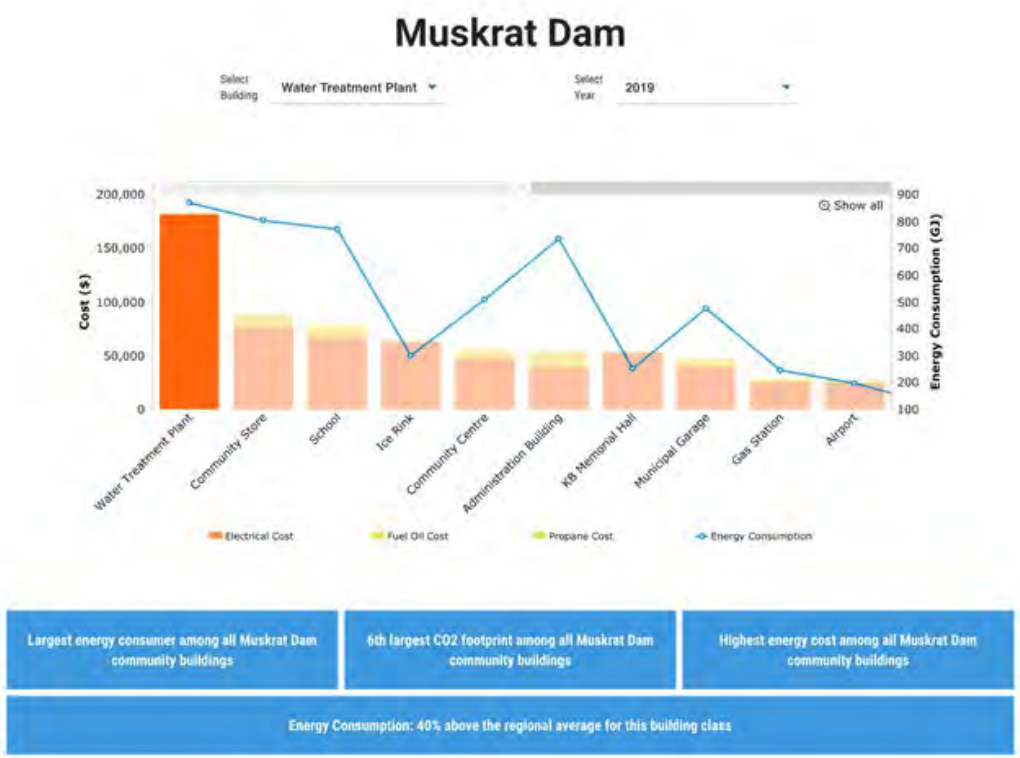
Align with community plan, set goals, information for funding proposals, …

Create specific energy/housing improvement plans, verify long-term impact of project, …

IFNA

mohawk IDEAWORKS
ENERGY & POWER INNOVATION CENTRE

Building & Community Level



* Values presented are **NOT** community numbers, data generated for testing and visualization purposes.

IFNA

mohawk IDEAWORKS
ENERGY & POWER INNOVATION CENTRE

Regional Level

Top Ten Consumption: All Building Types

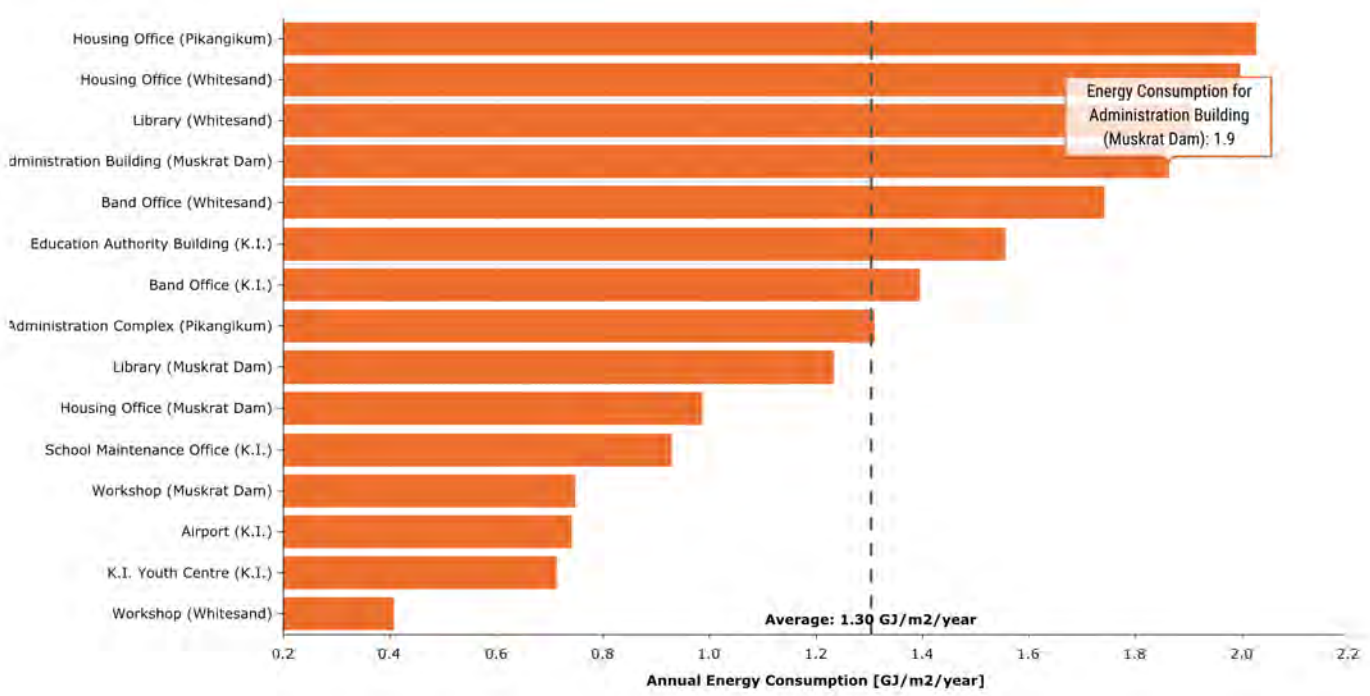
Show Totals | Show Per Meters Squared

Select Building Class: All Building Types

Select Year: 2019

Select Data Type: Consumption

Community	Building Name	Consumption
Pikangikum	Eenchokay Birchstick School	6,338.32 GJ
Kitchenuhmaykoosib Inninuwug	Aglace Chapman Education Centre	3,647.71 GJ
Pikangikum	Hockey Arena	2,689.50 GJ
Kitchenuhmaykoosib Inninuwug	Arena	2,240.96 GJ
Pikangikum	Water Treatment Plant	1,260.23 GJ
Kitchenuhmaykoosib Inninuwug	K.I. Community Hall	864.64 GJ
Muskrat Dam	Water Treatment Plant	834.51 GJ
Kitchenuhmaykoosib Inninuwug	Teacherage #1-8	813.67 GJ
Muskrat Dam	School	785.58 GJ
White Sand	Water Treatment Plant	744.96 GJ



* Values presented are **NOT** community numbers, data generated for testing and visualization purposes.

IFNA

mohawk IDEAWORKS
ENERGY & POWER INNOVATION CENTRE

What is next?

- Continue to work with communities to make sure the information aligns/informs best with their priorities.
- Discuss with communities/organizations:
  - How (and what level) of information sharing and lessons learned is meaningful?
  - Create some sample cases.
  - Communities own their information.
- Finalizing prototype 1 and working on version 2 aiming to be flexible (still manageable) to bring in other organizations, communities, instrumentation technology.
- **Looking to collaborate!**

IFNA

mohawk IDEAWORKS
ENERGY & POWER INNOVATION CENTRE

Thanks

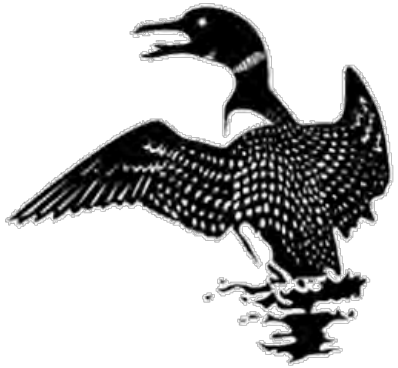
- Funding support:

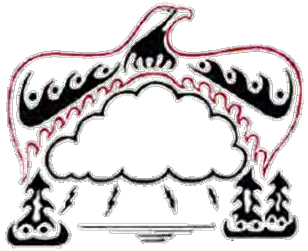
Clean Energy for Rural and Remote Communities Program

Natural Resources Canada | Ressources naturelles Canada

Canada

- Communities





Contact Info & Project Link

- https://epic-ideaworks.github.io/regcep/
- Jordan Beardy: jordanbeardy@ifna.ca
- Mariano Arriaga: mariano.arriaga@mohawkcollege.ca

IFNA

mohawk IDEAWORKS
ENERGY & POWER
INNOVATION CENTRE