

Renewable energy resource assessment

Is renewable energy suitable for all locations?

Key messages

- POLAR aims to help northern communities reduce dependency on fossil fuels for energy generation.
- Local resource assessments are essential to determine if renewable energy sources are suitable for development, for example:

Wind: An average annual wind speed of 3 to 6 metres per second is needed for a wind project to be economically feasible in remote northern communities.

Solar: Due to atmospheric conditions, some areas are subject to better solar irradiance than others. This will dictate the placement of solar panels in suitable communities.

Geothermal: Exploration and deep drilling requirements add significantly to overall project costs to develop this energy source.



Cambridge Bay resource assessment

Wind energy

In 2014, POLAR erected a wind tower on the edge of town to measure prevailing wind conditions, in partnership with Natural Resources Canada (NRCan) and the Wind Energy Institute of Canada (WEICan). The study, conducted between 2014 and 2017, showed that a wind project for the community could be technically and economically viable. In 2020, POLAR and WEICan upgraded the sensors on the tower and began wind monitoring again with a view to upgrade data and determine if climate change is having any impact on wind speeds and direction.

Solar irradiance

To evaluate the suitability of solar power for Cambridge Bay, POLAR is conducting solar irradiance monitoring in partnership with NRCan and Campbell Scientific.

POLAR and the Canadian technology provider Spectrafy are collaborating to test and demonstrate direct solar spectral irradiance technology called Solarism. This technology is inexpensive and easy to use, which makes it a viable option for many northern communities. One of seven Solarsim devices was deployed as part of the Build Canada program in Cambridge Bay. The Cambridge Bay project is the most northerly deployment and the only one operating in the Arctic.

Project leader: Rob Cooke, POLAR, info@polar.gc.ca



Water Lake Road Resource Monitoring Site, Cambridge Bay:
POLAR



Community resource assessments

POLAR has provided funding to several northern communities to complete small-scale renewable energy projects and has assisted with resource assessments for potential community-scale projects.

Arviat

The Hamlet of Arviat worked with NRStor, an energy storage company, to install both wind and solar monitoring equipment. The community hopes to develop a wind/solar/storage hybrid project to reduce diesel use.



Arviat solar and wind monitoring: NRStor

Tidal study

Changing sea ice patterns, a consequence of climate change, could present an opportunity to use marine energy in the Canadian North. Since 24 of Nunavut's 25 communities are coastal, POLAR and the National Research Council (NRC) are working together to learn whether tidal energy in strategic locations could meet the year-round energy needs of some communities. NRC is investigating five Nunavut communities that showed the greatest potential in table-top studies.

Sanikiluaq

In Sanikiluaq, the Qikiqtaaluk Business Development Corporation (QBDC) relied on community engagement to choose an optimal location to install a wind tower close to the community. The results from this monitoring program allow QBDC to develop a robust business case to support a future 400-kilowatt wind project.



Wind tower positioning in Sanikiluaq, NU: QBDC.