

An engineering researcher's journey through the Nunavik energy transition

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ABSTRACT

Isolated and remote Indigenous communities in the Canadian Arctic face major energy transition challenges, but the situation can also present some opportunities for them.

Over the last decade, our team has been involved more specifically in the region of Nunavik, which is the northern portion of the province of Quebec. Nunavik has a population of 14,000 (90% of whom identify as Inuit) living in 14 small villages located along the Hudson Bay, Hudson Strait, and Ungava Bay. These Inuit communities are not connected to the provincial power grid, and each one relies on a diesel power plant to supply electricity to the buildings. Space heating is provided from fuel oil furnaces. Due to the local context, the ongoing energy transition resonates differently in Nunavik. Inspiring decarbonization efforts are intertwined with objectives such as self-determination aspirations and energy security issues.

In this talk, we will start by summarizing the current energy situation in Nunavik, focusing on climatic, geographical, and social context, energy sources, building characteristics and energy demand profiles, and ongoing initiatives related to the energy transition.

We will then discover some of the recent research works related to the energy transition in Nunavik, including ours and that of others. The results from a detailed building monitoring campaign will be described, showing the role of occupants and of envelope thermal anomalies on the energy demand. Other tests conducted in the field will be discussed (e.g., PV, geothermal). Different analyses and simulation results offering decarbonization avenues will be explored, including waste heat recovery options. We will show the importance of qualitative research, for example, with semi-structured interviews and workshops, to inform and guide engineering decisions and research efforts.

Research with, for, and by Indigenous communities often requires a different approach or stance than what engineers are used to. We will humbly share some of our personal experiences in that respect.