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Co-author: **Affiliation:**

Topic: 1. Building Smart Energy Communities

Paper Level: Academic

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Title of Abstract
Integrating Renewable Energy, Heat, and Water Quality and Quantity for Sustainable Energy and Water Projects for the Canadian Arctic and Remote Regions of Canada

Abstract (522 Words)
The presentation and paper will discuss integrating renewable energy, heat, and water quality and quantity for the Canadian Arctic and remote regions of Canada, in order to support the implementation of sustainable energy and water projects. Northern renewable energy resources and projects will be considered. Existing and potential sustainable energy and water projects in the Arctic and remote regions of Canada will be examined. This integration of energy and water systems, and the use of renewable energy will have multiple benefits for Canadian communities that are located off the electricity grid (off grid communities). Many off-grid communities have significant energy needs, and are currently relying on expensive hydrocarbons for electricity generation. However, renewable energy sources - such as hydro, geothermal, wind, and ocean - may also be available. Many of these communities also have longstanding issues with water quality, sanitation and the treatment of waste water, which may be ameliorated by the integration of energy and water systems, and renewable energy and heat projects. Integrating energy and water systems, and the implementation of sustainable water and energy projects, assists in mitigating and adapting to climate change in Canada. Energy and water systems have carbon footprints, economic costs, and environmental impacts. Integrating energy and water systems allows carbon, economic and environmental aspects to be considered holistically, and assists in identifying opportunities to minimize impacts and maximize benefits. Many off-grid communities in the Canadian Arctic and in remote locations in Canada have Aboriginal, Inuit and First Nation populations. Therefore, any focus on sustainable energy and water development in these communities could include significant benefits for Aboriginal, Inuit, and First Nations populations, as well as drawing on their local and traditional knowledge, and providing models of local engagement. Focusing on off-grid Canadian communities also addresses economic and social development by providing important training and employment opportunities in small communities which may otherwise have limited business opportunities. Small communities with sustainable energy and water projects will be at the forefront of developing and transferring this knowledge for the implementation of sustainable energy and water projects to other communities in Canada, the circumpolar Arctic, northern countries, and globally. There are opportunities for collaboration and the development of strategic alliances on research, project development, technology and capacity development transfer for energy and water. There are also opportunities for building synergies, including local and traditional knowledge and technology exchanges and capacity development, among Canadian communities and those regions of the world which are currently leading in the use of sustainable energy technologies and projects to address energy and water security. Canada, the circumpolar Arctic, and all countries have common needs to integrate energy and water systems, energy and water uses and efficiencies, to address sustainable energy development and poverty alleviation, and to assist in adapting to and mitigating climate change. Sustainable energy and water developments in Canada and the circumpolar Arctic can play a key role in this advancement. These potential circumpolar and global linkages are discussed in the Sustainable Energy Development project (arctic.ucalgary.ca/research/sustainable_energy_development).