Defence R&D Canada (DRDC) recently began the four-year project, “Alternative Power and Energy Options for Reduced-Diesel Arctic Infrastructure”. The project provides expert advice to the Arctic Management Office and Air Force decision-makers regarding the use of sustainable technologies to provide alternative power and energy options for reducing diesel use in arctic infrastructure.

Communities in Canada’s North face the challenges of a harsh environment, the extreme Arctic climate, and their remote location. Such communities also face the challenge of providing sustainable electrical power and heat in order to maintain operations. To meet these energy demands, diesel generators are commonly used for which every litre of fuel has to be delivered by either barge or aircraft - both costly and complex logistical operations.

The primary outcome of the DRDC project, which is being delivered to the Arctic Management Office of 1 Canadian Air Division, is to reduce the operational costs and environmental impact of Air Force operations by reducing the massive amounts of fuel consumed each year to sustain operations for arctic infrastructure. The project specifically focuses on CFS Alert, which is located on the northeastern tip of Ellesmere Island, Nunavut. Established in the 1950's, it is a signals listening unit of the Canadian Forces. Each year fuel supplies are airlifted by the Canadian Forces through...
Operation BOXTOP at significant costs in order to meet the electrical and thermal energy demands at this site.

To achieve the desired outcome, the project has identified four main objectives:

1. Completion of a baseline audit of current energy use at CFS Alert
2. Assessment of the viability of wind, solar, deep-well geothermal, various hydro- and sea-water heat pump technologies plus other alternative options
3. The development of a strategy to reduce the use of diesel for electrical power and thermal energy based on baseline energy use
4. The derivation of a common methodology for identifying alternative sustainable power and energy options that can be applied to other Arctic locations such as Resolute Bay, Eureka or the North Warning System.

PARTNERSHIPS

Defence R&D Canada is leveraging expertise, existing activities and resources within other government departments (OGDs) as well as academia for project delivery. These include Natural Resources Canada (CANMET Energy, Geological Survey of Canada), Environment Canada, and the National Research Council.

The results of this work are significantly relevant to arctic civilian communities, which also face similar constraints and challenges for energy. DRDC is interested in partnering with OGDs on similar initiatives.

DRDC APPLIED RESEARCH PROJECTS (ARP)

ARPs are designed to advance the defence science knowledge base, investigate new and emerging technologies and explore the military application of those technologies. To know more, visit [www.drdc-rddc.gc.ca](http://www.drdc-rddc.gc.ca) under the Science and Technology section.

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Example of alternative power and energy options under investigation (wind, solar and deep-well geothermal power)