



RETScreen® International

Clean Energy Decision Support Centre

CASE STUDY

ASSIGNMENT

01

WIND ENERGY PROJECT

REMOTE COMMUNITY / YUKON TERRITORY, CANADA

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Customer Support

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DESCRIPTION OF ASSIGNMENT

You have been hired by a northern Canadian utility to prepare a preliminary feasibility study on their behalf. The utility wants to explore wind energy for its remote grid. This grid has base load generation by hydroelectric sources, with winter peak supply from diesel generators. The local grid peaks at 78 MW, and about 450 GWh are consumed annually. The firm wants to use a modestly sized, proven wind turbine. The Nordex N27 150 kW model is one possibility.

Among the challenges of the project are the steep and difficult access to the site, complicating transportation, construction, and power transmission, and the significant rime icing experienced in the area, which may cause losses approaching 10%.

SITE INFORMATION

The site is located in the community of Whitehorse, Yukon Territory, Canada, on the end of a low mountain ridge. The ridge reaches an elevation of nearly 2,000 m; the site is at roughly 1,400 m. The nearest location for which weather data is available is Whitehorse, YT; the weather station is in the valley below, at about 700 m, and the wind speed that would be measured on a 10 m tower at the site is estimated to be about 2.2 m/s higher than the station. There already exists a power line to the site, but it is too small for the power produced by the turbine, and must be upgraded. Being close to Whitehorse, the cost of travel and accommodation to the site is modest.

FINANCIAL INFORMATION

Financial figures for the analysis are provided by the utility (inflation at 2.5%, debt ratio of 60%, debt interest rate of 8%, discount rate of 8%, and a debt term of 20 years). The utility is a government-owned corporation and therefore does not pay taxes. The project is expected to last for 25 years. The price for the energy from the wind turbine is compared to the system marginal price for diesel power in the winter, which is \$0.10/kWh.

This is considered a research & development project, rather than a commercially viable project. It is still important to reduce costs and maximise benefits. The principal justification for the project will be the opportunity to learn about the operation and viability of wind energy in such a situation.

Prepare a RETScreen study, documenting any assumptions that you are required to make, and report on the significant conclusions from this analysis.



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