

Inuvik Wind Summary Report 2015

Introduction

Since 2005, the Aurora Research Institute (ARI) has researched the wind energy potential for communities in the NWT that are served by diesel. In Inuvik, ARI has studied the feasibility of wind energy at both Storm Hills and High Point and compared them to each other. Storm Hills is 60 km north of Inuvik and High Point is 13 km east of Inuvik.

Assessment of Wind Speed

Measurements by ARI showed that the average wind speed at High Point was 5.6 m/s at 30 m above ground, whereas Storm Hills showed an average of 7.3 m/s at 39 m above ground. Projected to a 74 m hub height for a proposed wind turbine, the estimated long term wind speeds are 6.48 m/s and 7.92 m/s at High Point and Storm Hills, respectively. Both sites show stronger winds during the winter time, but instrument icing is also evident at these sites.

Proposed Wind Projects

The use of wind turbines with tower heights of 74 m and generators sizes of 2.3 MW were assessed for Inuvik. The authors used the same Enercon wind turbine models (E-70 2.3 MW) that are presently installed at Diavik Diamond Mine north of Yellowknife, and at the Raglan Mine in northern Quebec. While there are other excellent turbines on the market, the E-70 offers a cold weather package with heated blades to handle icing and temperatures to -40°C , and has proven performance in the north.

Three sizes of wind projects, ranging from 4.6 to 9.2 MW, were assessed for Storm Hills and High Point. These are high penetration wind projects which would displace 20% to 40% of the fossil fuel power generation. The average power load in Inuvik is 3.5 MW so there would be excess wind energy which the authors

propose could be used to replace fuel used for space heating and other applications.

Production and Cost of Wind Energy

A wind project at High Point would have lower capital costs than one at Storm Hills, but because Storm Hills has a substantially higher wind resource, the economics of both sites are very close.

A 9.2 MW project of three E-70 turbines with a 74 m hub height at High Point would displace fossil fuel generated power at a cost of \$0.411 per kWh (levelized over 25 years, with a 4.87% cost of capital). A similar project at Storm Hills would displace fossil fuel generated power at a levelized cost of \$0.406 per kWh. Diesel generated power over the same 25 year period would cost \$0.390 per kWh and natural gas generated power would cost \$0.305 per kWh. Subsidies and careful planning could make wind energy competitive with fossil fuel. Project economics could also be improved through the sale or use of excess wind power for space heating and other applications, or through larger initiatives such as the introduction of carbon pricing.

Conclusions

If Inuvik is considering alternative energy developments, the use of wind energy generation would be a great option. Wind can be cost-effective alternative compared to diesel generation.

The full *Inuvik Wind Energy Pre-Feasibility Analysis: 2015* report is available for download at www.nwtresearch.com

For more information on this or other wind energy studies in the NWT, contact the Aurora Research Institute at:

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