

# Jean Marie River Wind & Solar Energy Pre-feasibility Analysis Summary

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## **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 Jean Marie River the ARI has studied the feasibility of both wind and solar energy and compared them with diesel generation.

## **Assessment of Wind and Solar**

The five-year (2007-2011) average wind speed in Jean Marie River was estimated to be 2.0 m/s, which is too low for wind energy to be cost effective in the community. The average solar energy potential was estimated at 2.9 kWh/m<sup>2</sup>/day (daily insolation), which is considered to be good for solar electricity production.

## **Proposed Solar Projects**

Solar systems are flexible, and so project sizes of 1 to 5 kW (home base grid connected) and 18 kW (utility scale) using generic solar modules on either a fixed frame (adjusting the angle of the modules seasonally is recommended) or on a solar tracker were considered for the solar assessment.

## **Production and Cost of Solar Energy**

A home-based solar system in Jean Marie River will produce from 1,130 (on a fixed frame, adjusted seasonally) to 1,475 (on a one axis solar tracker) kWh per kW installed. The cost of solar electricity is calculated at \$0.75 (one axis tracker) to \$0.80 (fixed frame) per kWh.

A home-based 2 kW solar system on a fixed frame (adjusted seasonally) will cost \$20,000 and will displace 2,260 kWh of electricity and 822 litres of diesel fuel a year. With a revised rate of \$0.49 per kWh for the Jean Marie River home owner, the electricity savings represent \$1,107 per year (simple payback of 19 years).

With the unsubsidized electricity rate of \$1.487 per kWh the net savings are \$3,360 per year (the simple payback is 6 years).

A utility scale solar system of 18 kW will produce the same amount of energy per kW installed as the home-based system but will cost about \$0.72 (fixed frame, adjusted seasonally) per kWh. This cost is 37% more than diesel savings of \$0.526 per kWh that the utility needs to realize for the solar project to be economical. The simple pay back for an 18 kW system is about 17 years.

## Conclusions

If Jean Marie River is considering alternative energy developments, the use of solar energy generation would be a better option than wind energy. Subsidies would be required to make the solar project cost-effective compared to continued diesel generation.

**The full Jean Marie River Wind and Solar Energy Pre-feasibility Analysis Report is available for download at [www.nwtresearch.com](http://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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