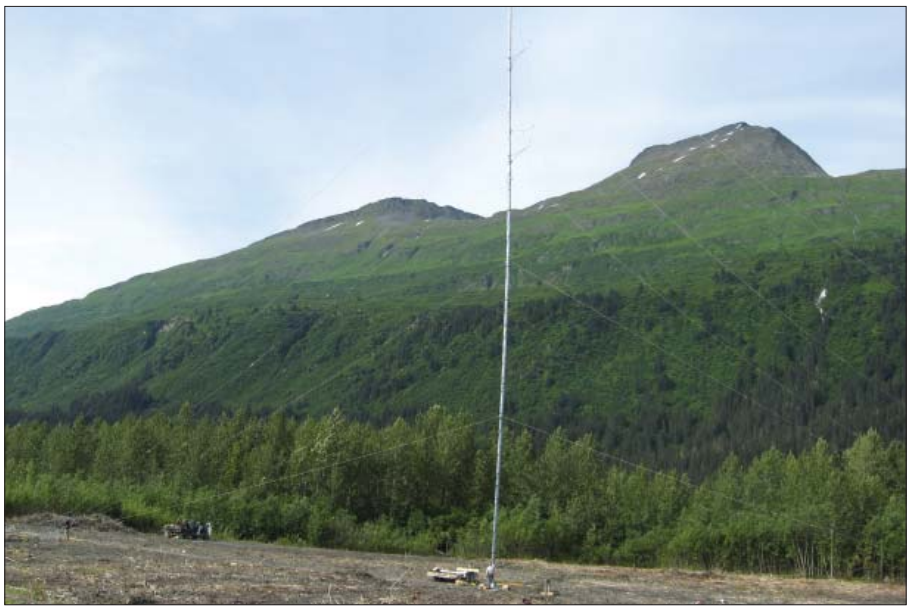
What's Happening With Wind



The CVEA MET tower that was located at 10 Mile in Valdez; data collected at this site determined the site was not good for a commercial wind generation project.

Photo by Tom Kelly

In 2010 CVEA adopted a vision to reduce or eliminate the Cooperative's dependence on fossil fuel and to stabilize the cost of generation with regional, sustainable resources. To accomplish this task, a substantial amount of time and resources have been spent looking at alternative ways to generate electricity.

At the same time, a growing interest in renewable energy alternatives from the CVEA membership caused many to wonder whether wind was a viable generation opportunity.

While it is apparent to everyone that there is a lot of wind in Valdez; what was unknown was whether or not Valdez has the 'right' wind.

The ideal wind for a wind project blows in a consistent direction at a constant speed. Wind turbines are very particular when it comes to wind speed needed to generate electricity.

A typical commercial wind turbine doesn't begin generating electricity until the wind speeds reach 10 mph, and at that speed it only generates 10 percent of the rated output, i.e., a one mega-watt (1,000 kilo-watts) turbine would only produce 100 kilo-watts. In addition the turbine will shut itself down if wind speeds reach between 45 and 55 mph, depending on the model, to prevent damage to the unit.

Also in 2010 CVEA asked for and received a $100,000 grant from the State of Alaska to purchase two 50 meter meteorological (MET) towers, install them, and evaluate the wind potential within the service territory.

In 2011, CVEA began to evaluate wind potential within the Cooperative's service territory to answer the question of whether there was actually good wind that could be used to generate electricity.

The MET towers that CVEA owns have instrumentation installed at the 30, 40, and 50 meter heights. These instruments measure the wind speed using both standard and heated anemometers, wind direction with wind vanes, and the temperature.

The Cooperative installed the first of the two towers at the 10-mile area in Valdez in July 2011. This site was CVEA's second choice, but the first option was removed from consideration due to potential scenic view shed issues voiced by the Valdez Mayor's Energy Task Force.

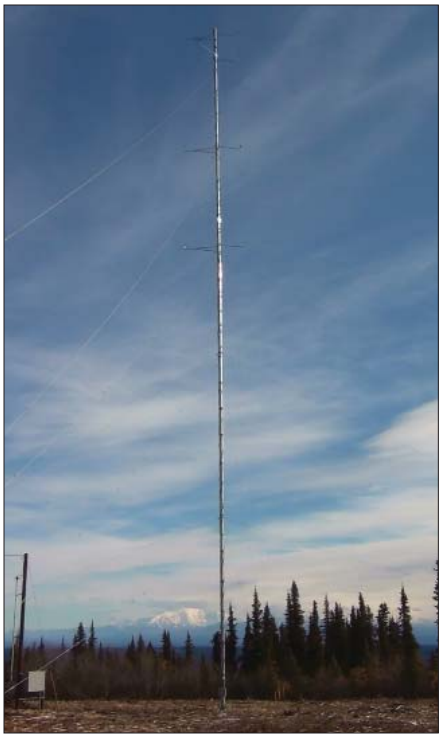
This tower remained installed and collecting data until July 2013. Data was collected by a data logger and analyzed and evaluated by a third party meteorologist and wind power expert to determine if the site is a viable location for a wind project.

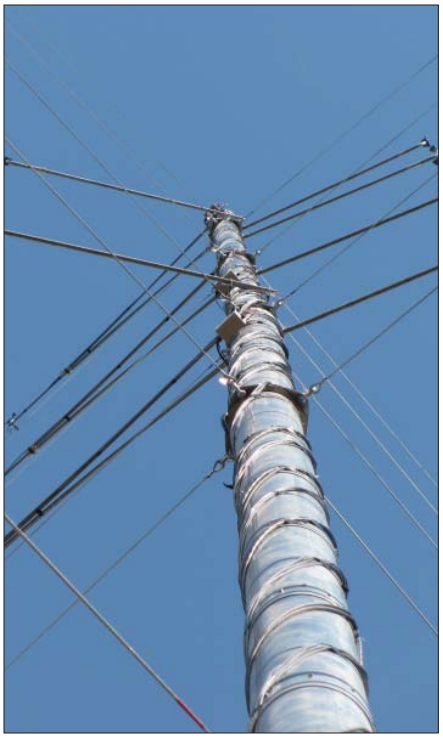
The data indicates that this location is not suitable for a commercial wind project.

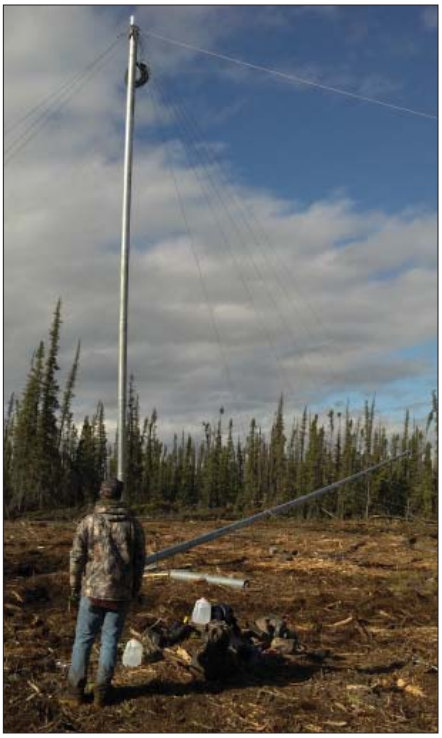
The average wind speed at this location is only 10.8 mph, and the wind speeds were too low 54 percent of the time to cause the turbine to spin.

Another data point that is reviewed for a wind project is the capacity factor, or the percentage of energy you would expect to generate from the turbine compared to the total potential energy it could produce.

For example: a one mega-watt turbine could potentially produce 1,460,000 kilowatt-hours (kWhs) in a year, if the data showed the same turbine would produce 292,000 kWhs the capacity factor would







Above left, the MET tower installed at the Tolsona site. Above Middle, up close view of the MET tower Instrumentation (anemometers and vanes) located at the 30, 40, & 50 meter elevations. Above Right, installation of the newest Met tower, at the Gakona Bluffs site, in September 2013.

be 20 percent. Typically a wind project would need at least a 30 percent capacity factor to even be considered worth pursuing.

The 10-mile location generated capacity factors of 23.8 percent utilizing a GE 1.5 XLE turbine and 27.9 percent with a GE 1.6. Both of these turbines produce the highest capacity factors compared to other turbines on the market. Another factor at this location is the turbulence. It is classified at a category A, which is the highest level of turbulence, indicating a poor location for a commercial wind turbine.

Tolsona Ridge, in the Copper Basin, was the site selected for the second MET tower which was installed in August 2012. Tolsona Ridge is located 20 miles west of Glennallen on the Glenn Highway.

At this site the wind is more consistent from month to month but has relatively low speed, with an average of 12.5 mph, and wind speed is too low to spin the turbine 37 percent of the time.

The capacity factors at this location were 26.2 and 32.9 percent, respectively. The wind direction at this location is not very consistent. Roughly 50 percent of the wind that could generate energy blows from the best direction only 24 percent of the time; this means that 76 percent of the time the wind is blowing from directions unable to generate electricity.

It appears that the Tolsona Ridge site is a much better location than 10-mile for a potential turbine location, however the capacity factor is still very marginal. This tower will remain deployed for at least another year to continue collecting wind data.

In 2013, the tower that was at the 10-mile location in Valdez was redeployed in the Copper Basin near the Gakona Bluffs, two miles north of the Tok Cutoff Junction.

CVEA collaborated with Ahnta Inc. to obtain a land use permit to deploy this tower on Ahtna land.

The tower was erected on September 27, 2013, and like the other locations will collect wind data to determine if there is 'good wind' in the area.

If it is determined that a site has 'good wind', the next step would be to determine the exact location a turbine would be placed; it is unlikely it would reside in the exact location of the MET tower.

A geotechnical review would be conducted to determine if the ground in the area is capable of supporting the type of turbine that might fit CVEA's energy potential.

Finally, once a site has been determined to have 'good wind', and a suitable turbine location can be found, the next step would be to determine what wind energy project might provide the most economic benefit to the CVEA membership.

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