

CVEA Proposed MET Tower Site Assessment

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Executive Summary

After an in-depth review of four potential meteorological (MET) tower locations, two sites have been identified as requiring further evaluation and two sites have been removed from the potential site list. The two sites that have been eliminated from the list are the Valdez Glacier Stream bridge area and the Valdez Glacier Stream basin area. The two sites that are being evaluated in greater detail are the Ski Hill area near Robe Lake and the area around mile 12 of the Richardson Highway. The Ski Hill site ranks more favorably than two different scenarios at the 12-Mile location and is CVEA's recommendation as the location to install a CVEA owned and operated MET tower.

Evaluation factors used in this review were transmission accessibility, public safety, public acceptance, avian issues, road accessibility, existing soil conditions, existing wind data, and estimated cost to integrate into the transmission system.

Introduction

After evaluating four possible MET tower sites, CVEA determined that the two highest ranked locations should be further reviewed to determine the feasibility of constructing electric facilities needed to connect a wind turbine into CVEA's system.

Technically speaking, the Meals substation is the most logical location to connect the wind energy into CVEA's system. The system voltage at the Meals substation is used to regulate the output of CVEA's generators throughout the system. For a large-scale wind energy project, the energy input into the system should be near to the transmission level of the system in order to predictably maintain stable system voltage.

The four sites previously reviewed and ranked are as follows:

1. Robe Lake (Ski Hill Area)
2. 12-Mile Area
3. Glacier Stream Bridge (Trap Range Area)
4. Valdez Glacier Stream Basin Area (Near Valdez Glacier)

Of these four sites, Ski Hill and 12-mile stood out as the most promising locations to evaluate further.

The purpose of this assessment is to add more detail to the evaluation of the top two sites and to look at the economics behind a project at the prospective locations.

Ski Hill Area (Robe Lake)

While not publically acknowledged as a high wind area, the Ski Hill area has been identified as a good location for a potential MET tower installation. The first identifier that clued CVEA in on this location was the Alaska Energy Authority's (AEA) power density map of the state. There is a small pocket of potential class 4 wind on the north side of the ski hill peak. Further evaluation revealed that this site is in a good location to catch any wind coming to or from Port Valdez through the Lowe River basin. This site is also positioned to somewhat catch northerly winds coming from the Valdez Glacier area.

The site is approximately 5 miles from the Meals substation when following the distribution system. The estimated cost to upgrade the existing line and install new line where applicable is the least of the three scenarios evaluated in this assessment. A very rough estimate to get the wind energy to the Meals substation is \$1.5 million.

The MET tower location lies within property managed by the City of Valdez. Currently the State of Alaska owns the property but the City of Valdez is in the process of obtaining title to the land. According to one city official, the City will own the land soon but not until a survey is completed and submitted to the state. The surveyor is working on the project but a completion date is unknown. If it is City land, we should be able to construct barriers that will limit access to the site. By limiting access we should be able to minimize any risk associated with public safety and security issues. If it is State of Alaska land, we may be limited as Kodiak Electric Association (KEA) was limited in constructing barriers around the MET tower and turbine. It appears that the City will be the property owners soon but it may be six months to one year from now.

Since this site is not currently a publically recognized potential wind resource location, there may be an adverse reaction to a 50m (165') tower installed within the view shed of some residences. The public relations aspect of the MET tower location may be best handled by the City of Valdez since it is going to be their land and they currently have management rights on the property.

At this point, there is a potential for avian issues at this location. CVEA understands that the City of Valdez has conducted a study that located every bald eagle nest in the area that will play a significant role in the feasibility of this site. CVEA will attempt to gain access to the report to provide insight as to potential avian issues.

In order to build a MET tower and access the data logger, an access road must be available or built. This proposed location currently has a four wheel drive access road identified on topographical maps. The distance between the road and the proposed location is approximately 2,000 feet. Depending on the existing grade of the slope and terrain features the road improvements could be a significant hidden factor. CVEA recommends the responsibility of road improvements lies with the City of Valdez as well as maintaining the road throughout the year for data access.

The site appears to be on bedrock. After the land clearing is complete, some blasting or rock excavation may be required to set anchors for the MET tower. More significant earth work would be required for the foundation of a wind turbine. Bedrock would best support the foundation of a wind turbine. A more detailed analysis of the soils would need to be performed prior to the design of a wind turbine foundation.

Pros

Class 4 power density identification.

Close to existing distribution system (approx. 2,000 feet).

Relatively close to Meals substation (approx. 5 miles).

Site should have solid bedrock for foundation work.

The City of Valdez has management rights and soon ownership of land, which should help speed up the process for a MET tower installation.

Lowest integration cost (\$1.5 million).

Cons

Limited area, not enough land to allow more than one wind turbine.

Robe Lake has a sea plane base that will have particular aviation requirements for the MET tower and turbine.

Possible public acceptance issue.

12-Mile Area

This is the location that everyone that drives to or from Valdez has identified as a high wind area. The AEA power density map categorizes the location between classes 2 – 4 depending on the location. The north side of the Lowe River is listed as class 2 and 3 while the southern side of the Lowe River is mostly class 3 with a couple class 4 locations. Depending on the location chosen for the MET tower installation, there could be varying road improvement requirements. Meals substation is approximately 11 miles from the gravel pit located on the north side of the river.

There are two options to integrate a wind energy project back into the CVEA system. The first option would be to upgrade the existing distribution system back to the Meals substation and install new line where applicable. A rough estimate for this work would be \$2.7 million. The second option would be to find a suitable location for a new substation under the transmission line. This would entail constructing a new feeder circuit from the MET tower site location to the new substation. A rough estimate for this work would be \$3.5 million. The estimate for the new substation scenario does not reflect additional costs for acquiring the land or building a year round access road, which could significantly increase the cost.

According to a city official, this area (the gravel pit) is owned by the State of Alaska – Department of Natural Resources. Since it would be considered public land, any barrier may be minimal as was the case with the KEA turbine locations. This would increase CVEA's exposure to risk associated with safety and security.

A MET tower in this location would most likely be met with broad acceptance from the public. It should be out of the view shed of most residential locations.

According to some locals, there should not be significant avian issues in this area. The confluence of Lowe River and Brown's Creek is not conducive to predation by protected avian species. This is not scientific evidence and the study conducted by the City of Valdez should shed more light on this issue.

If the MET tower is located near the gravel pit area, the existing road would not require a significant upgrade project. If the MET tower is located on the other side of the river an access road would be a significant factor in the economic analysis. The requirements for the access road to install a MET tower are significantly less than the requirements for the access road to install a wind turbine. Even though the land is not owned by the City of Valdez, CVEA recommends that the responsibility of road improvements and accessibility issues be placed on the City of Valdez.

A major unknown at this time is the existing soil conditions. The soil requirements for a MET tower are significantly less than those for a turbine. This area is comprised of glacial till. The depth of the glacial till is unknown and will require a geotechnical engineering review along with bore samples in order to identify the earth work and foundation requirements. This could be an extremely significant factor in the economical analysis of the project.

Pros

DOT wind data from RWIS site indicates a potential wind resource from near ground level measurements.

Publically recognized wind resource location.

Larger land footprint than Ski Hill area meaning the potential for multiple units exists.

Most likely well received by public and no view shed issues.

Cons

DOT wind data from RWIS site indicates significant wind gusts from near ground level measurements.

11 miles from Meals substation will require either a new substation or significant upgrade project.

Unknown soil stability for turbine foundation.

State of Alaska – DNR land may slow the process to get a MET tower installed.

Greatest integration cost (\$2.7 million to upgrade line to Meals, \$3.5 million to build new feeder and substation in order to integrate into transmission system)

MET Tower Cost

A rough cost for a MET tower from NRG Systems is \$30,000. This is inclusive of all parts, data loggers, shipping, and installation equipment necessary. The unit CVEA reviewed was the NRG 50m XHD NOW system. This system consists of the 50m tower with anchors, six anemometers (horizontal), two wind vanes, one temperature sensor, one data logger, and all miscellaneous parts required to install the tower. CVEA also recommends at least one addition anemometer to measure the vertical component of the wind as well as heated anemometers and vanes. In addition to the MET tower components already listed, this price also includes a ginpole and

winch rated specifically to raise and lower the tower. The ginpole and winch will negate the need to hire a crane for the installation of the MET tower.

CVEA Recommendation

CVEA recommends the Ski Hill area as the first site in Valdez to pursue a wind assessment project due to the integration cost, existing wind power density identification, proximity to existing power, soil stability, and it is the least likely to have land use issues. Before any work is started that will commit CVEA to this location, a more thorough avian review must be completed.