Montana Department of Transportation
Research Programs
November 2011

EXPERIMENTAL PROJECT INSTALLATION REPORT AND ANALYSIS TO DATE

EVALUATION OF A TOWER-MOUNTED WIND TURBINE FOR THE GENERATION OF SUPPLEMENTAL POWER FOR THE ANACONDA INTERCHANGE REST AREA

Location:	Montana Highway 1; adjacent to Interstate 90, Approximate Mile-Point 208; Butte District, Deer Lodge County
Project Name:	Anaconda Interchange Rest Area
Project Number:	IM 90-4(48)208 CN 4296
Type of Project:	Experimental trial of tower-mounted 10 kW Bergey wind turbine for supplemental power supply
Principal Investigator:	Craig Abernathy, Experimental Project Manager

Objective

Determine the cost-effectiveness in the reduction of grid-line power service in the installation of a tower-mounted utility grid interconnected wind turbine to provide supplemental power to an interstate rest area. In addition to determine if annual maintenance and/or any mechanical or electrical problems that may be an issue over long-term use.

Experimental Design

Deployment of a 30 meter (98 ft.) in height, free-standing lattice tower supporting a 3 blade, 6.7 meter (22 ft.) rotor diameter, Bergey Windpower model 10 kW wind turbine. The estimated cost is at approximately $68,000.

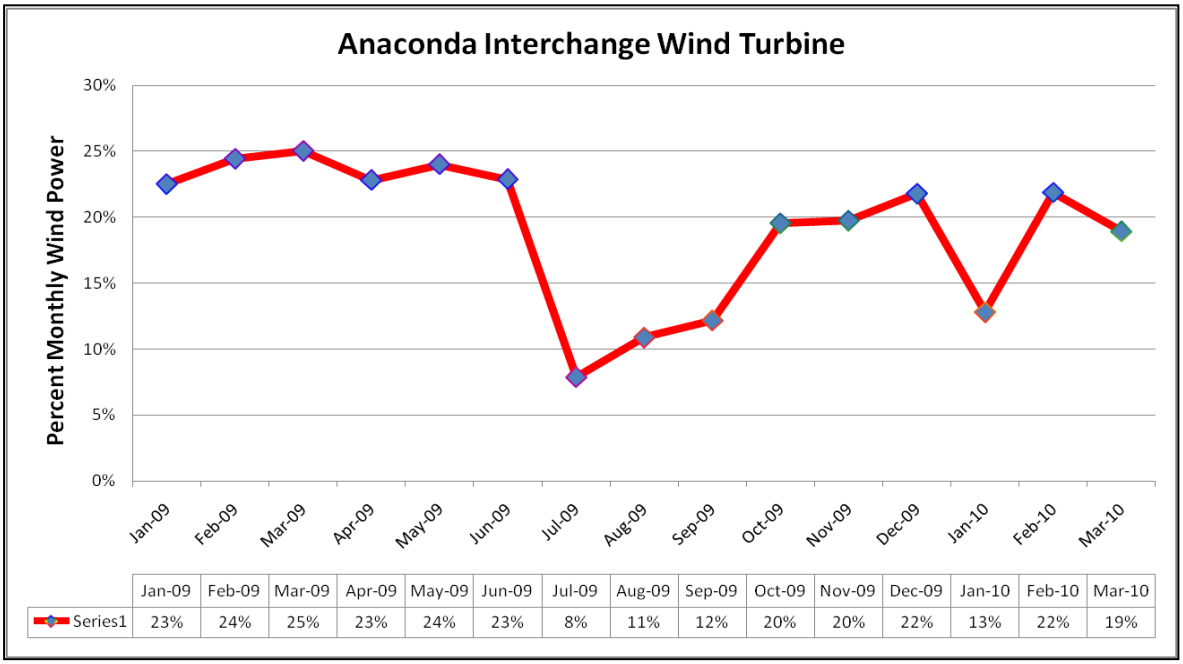
Installation

The Bergley wind turbine installation was completed the summer of 2008. No problems were reported with the construction of the unit. The following are several images of the completed structure.

Operation to Date

Note: Refer to the Supplemental section of the report for a current status of the Bergley unit.

The Butte District has reported, based on percent of months documented wind power that the Bergley unit is supplementing, the rest area power consumption at approximately 20%. The following chart shows the rate of supplement power from January 2009 to March of 2010.



	Jan-09	Feb-09	Mar-09	Apr-09	May-09	Jun-09	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10
Series1	23%	24%	25%	23%	24%	23%	8%	11%	12%	20%	20%	22%	13%	22%	19%

The substantial dip in July and August of 2009 wind power supplement is attributed to lights in and around the rest area that were inadvertently left on continually during that time period due to a faulty sensor which would have normally shut them off at required intervals. September of 2009 as well as January of 2010 low readings were reported as minimum-wind event for power generation. The readings reported for the months of January 2009 to June 2009 may represent normal production values, which may increase the overall percent of supplemented electrical power. Long-term reporting of wind power monthly percent data should offer a more conclusive indication of the effectiveness of the Bergley unit.

Pending information will report on actual utility costs per month to be compared to several other similar designed rest areas (without supplemental power) in an effort to better define the cost savings. This report will be updated as that information becomes available. To date the Bergey unit is performing well.

Supplemental

The District has reported that since January of 2011 the Bergley unit has not been in operation due to a component failure of the electrical distribution equipment. The unit may be back in service sometime in December 2011. Statistically when in operation the unit still supplements 20% annually to the rest area power consumption.