



**Board of Regents Policy: Physical Plan B Section 1003.7**

MSU-Great Falls is requesting Board of Regent authority to construct a wind turbine on campus property and to expend a portion of the College's plant funds for this project. This authority request is for an amount greater than \$150,000 requiring Board approval and the following additional information:

**(a) Project description**

MSU-Great Falls has been actively researching wind energy development and workforce preparation for the wind energy industry. At the same time, the College has been concerned with increasing energy consumption as a result of the recent campus expansion. Working closely with wind developers and Cascade County, the College recognized the opportunity to respond to both circumstances through a wind energy demonstration project.

Modeling its processes after Cascade County's successful implementation of a 50kW wind turbine to power the new county roads and maintenance shop, the College contracted with Western Community Energy (WCE) of Bozeman to conduct a study to test the feasibility of a similar project with the following goals:

1. Serve as a demonstration project in green energy production for public facilities and institutions;
2. Provide a field application site for students in current alternative energy programs, and future students through the planned wind turbine technician program at the College; and
3. Reduce the overall utility costs of the College through green energy generation from wind resources.

The results of the feasibility study (attached) suggest this project would accomplish all three goals. Given these findings, the College initiated the process of seeking Board approval for the project and to expend a portion of the institution's plant funds to finance it. MSU-Great Falls' initial submission for Board approval occurred in November 2008, however based on feedback from the Commissioner's office, the College was asked to provide additional information and resubmit the item. The remainder of this document provides this information.

**Key Findings of the Study**

The following constitute general findings of the feasibility study.

*Wind Resource*

- Computer-generated modeling and the Great Falls Airport weather station indicate the chosen site lies in a Class 1-2 wind resource (11.5-12.5 mph estimated average at 30m).
- A Class 1-2 wind resource is marginal, but will create enough energy to offset a significant portion of the Trade Building's energy usage.

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*Equipment Assessment*

- The Candidate Turbine grading process indicates that the Entegrety EW50, 50 kW turbine best meets the College's objectives for the Project.

*Transmission*

- The wire run from the Project to the likely turbine location will be ~550'-700' depending on the final turbine location and routing of the wire run. WCE recommends that the College take special care to site the turbine and wire run such that the Project has minimal interference with future development.
- The Project should be interconnected to a 480V transformer and meter located on the southwestern edge of the Trades Building.
- The Project should execute a Net-Metering Agreement with NorthWestern Energy.

*Annual Revenue*

- The electricity usage of the Trades Building and chillers metered at the same location was 34,880 kWh for the month of September 2008. WCE estimates that the electricity consumption at this meter will be at least 350,000 kWh/yr.
- The energy expenses that can be net-metered are currently \$0.066937/kWh.
- Assuming a 12 mph average wind speed, and that energy expenses will increase by 5% per year, WCE estimates \$8,747/year in average gross annual cost savings over 20 yrs.

*Project Cost*

- The total recommended Project cost is estimated to be ~\$224,000 using a monopole tower and ~\$212,000 using a lattice tower.
- Applying available USB grants from NorthWestern Energy (\$10,000) reduces the effective Project cost to ~\$214,000 using a monopole tower and ~\$202,000 using a lattice tower.
- The purchase of the recommended EW50 includes a 5-year warranty/operations and maintenance service package.

*Project Financing*

- NorthWestern Energy's Universal System Benefit ("USB") grant program will provide \$10,000 towards the cost of the Project.
- Using USB funds will preclude the College from selling RECs from the Project. WCE recommends, however, that the College should avoid REC market risk and utilize NorthWestern's USB monies to buy the Project cost down.
- WCE sees no potential disadvantage to the College using Plant Funds to finance the Project.

*Financial Pro Forma*

- Based upon WCE's pro forma inputs, the Project's simple payback period is between 22 and 23 years using a monopole tower, and between 21 and 22 years using a lattice tower.

Turbine Selection Criteria

The College provided WCE with a series of criteria for the evaluation of wind turbines. Criteria were established to ensure the turbine’s feasibility in meeting all three of the College’s goals for the project. Upon evaluation, WCE identified the Entegrety EW50, 50 kW turbine as being best suited to meet all goals.

**NOTE:** These findings do not suggest the EW50 is the only turbine meeting these criteria, but rather it establishes the general specifications necessary in a turbine. The College, upon Board approval, will initiate the RFP process according to Board policy 1003.4 utilizing the same criteria established in the feasibility study.

The following represent the criteria utilized by WCE in this evaluation:

Criteria	High Score	Points Available
Energy Generation	The Candidate Turbine will offset a significant portion of the electricity consumption of the Trades Building.	25
Education/Training	The Candidate Turbine will provide observational and hands-on opportunities for students to learn from and interact with modern wind turbine technology.	20
Return on Investment	The Candidate Turbine will achieve a simple Return on Investment of 20 years or less.	15
Warranty	The Candidate Turbine has a comprehensive warranty of at least 3-5 years.	10
Web Monitoring	The Candidate Turbine includes web monitoring and data acquisition capability.	10
Operation and Maintenance	The Candidate Turbine will have low cost, time, and technical proficiency requirement (if required) from by the College for O&M.	10
History/References	The Candidate Turbine will be supplied by a company with a proven track record of customer support, and that is known to be established and reputable.	5
Noise	The Candidate Turbine has a reasonable level of audibility.	5

Community Approval Process

The College was hesitant to initiate various community approval processes until the Board had approved the project. After feedback from the Commissioner’s office though, the College began the process of gaining approval from the City of Great Falls for a Conditional Use permit (CUP) required to install a wind turbine utility within the City limits. This process requires the following steps:

1. Submit a CUP application to the City’s Planning Department along with a \$400 application fee.
2. Meet with the appropriate neighborhood council(s) to describe the project/proposal and gain support or identify concerns.
3. City Zoning Commission public hearing and recommendation to the City Commission.

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4. City Commission announcement of a public hearing.
5. City Commission public hearing on the proposed CUP.

At the writing of this item, the College has submitted the application with the required fee, met with and gained endorsement of Neighborhood Council 5, and scheduled a tentative public hearing with the City Zoning Commission to occur January 13<sup>th</sup>. No major opposition has arisen. The College will continue to progress through the CUP process, but is seeking Board approval to avoid additional work or expenditure of resources in the event the Board should fail to grant authority for this project. With Board approval, the College anticipates the CUP process to be concluded in early February, at which time it will turn the project over to the State A&E division to conduct the RFP and project initiation.

Summary

With Board approval, the work performed under this authority will accomplish the design, bidding and installation of a 50 kW net-metered wind turbine generator on the MSU-Great Falls campus. The turbine will serve as a demonstration project in green energy production for the public facilities. In addition, it will offer educational opportunities for students in mechanical, electrical and construction trade areas in the field of wind power generation within the College's forthcoming Wind Technician program.

**(b) Cost Estimate and Funding Sources**

The College will utilize a portion of existing plant funds to finance this project. In addition it will apply for and anticipates being awarded up to \$10,000 in NorthWestern Energy USB grant funds. Although this funding will be sufficient to cover the entire project, the College will continue to seek alternative funding sources during the project initiation.

Cost Estimates

Turbine/Tower (monopole) 50kW	\$162,000
Geo Technical Report	\$ 3,500
Foundation	\$ 15,950
Foundation (PE stamp)	\$ 1,000
Erection Labor	\$ 2,700
Crane Rental	\$ 1,650
Freight to site	\$ 9,000
Electrical Interconnection (complete)	\$ 11,600
Program Management Fee	<u>\$ 16,592</u>
<b>Total</b>	<b>\$ 223,992</b>

**(c) Programs Served, Enrollment Data, Projected Enrollments**

While ancillary in nature, this project will have an impact on the development and operations of the College's industrial technology and wind technician programs. These programs are currently in the concept and development stages.

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Once implemented though, both would utilize the wind turbine as a laboratory tool and for field experience activities. A portion of the return on investments should be considered through the qualitative return the turbine will have on educational offerings of the campus.

Although conceptual in nature, wind energy programming at the College could enroll anywhere from 15 to 30 students annually. It is anticipated this project would also provide educational opportunities to other units of the MUS as well as high school students in Great Falls. Currently, CMR High School has a fledgling energy and wind program and the district has expressed interest in partnering with the College to utilize the turbine for education purposes, including exploring early college and career pathway opportunities, such as dual credit courses.

**(d) Space Utilization Data**

A proposed site plan is included in the attached feasibility study. Findings and recommendations place the turbine on the currently undeveloped property owned by the campus directly south of existing facilities. The property would only be developed to the extent necessary for the installation of the wind turbine. Minor developments will occur to ensure the turbine will be accessible for students participating in field studies as part of programming at the College or through collaborative efforts with other educational institutions.

The wind turbine will require approximately 500 ft between the site location and any objects that might create wind interference or turbulence.

**(e) Projected use for available residual space**

Not applicable to this request.

**(f) Projected O&M Costs and proposed funding sources**

The provision of O&M would initially be a criterion within the RFP. Therefore, initial O&M costs would be a requirement within the contract with the wind turbine company responsible for the installation of the turbine. It is estimated this will be included for the first five years of the project. After that time, the College would assume O&M expenses and responsibility. No new state funding will be requested for O&M on the wind turbine. The findings of the feasibility study suggest overall O&M on the turbine will have minimal fiscal impact on the campus. Revenue generation estimates within the feasibility study include the anticipated ongoing O&M costs.

**(g) Payback time period**

The Project's simple payback period is between 22 and 23 years using a monopole tower, and between 21 and 22 years using a lattice tower. Wind resources higher than anticipated average MPH will reduce the estimated payback times.