Request for Proposal (RFP)

FINANCE, DESIGN, BUILD, and OPERATE a WIND TURBINE GENERATING FACILITY

LOCATED AT OAKLAND UNIVERSITY, ROCHESTER, MICHIGAN

Oakland University
2200 N. Squirrel Road
Rochester, Michigan 48309

Contact
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Due Date: March 18, 2011
By 5 PM

Submit proposals electronically to:
ebnersmi@oakland.edu

TABLE OF CONTENTS

1.0 PROJECT INFORMATION

1.1 Introduction

A two year wind power study was conducted by Oakland University for the purposes of determining the economic viability of a utility scale wind turbine on the Rochester, Michigan campus. The wind data showed that a low wind speed optimized turbine on a 100 meter tower is viable over a long term financed project.

This Request for Proposal (RFP) is issued by Oakland University (the University) to solicit proposals from developers to finance, design, construct, operate, and maintain one or two utility scale Wind Turbine Generators (WTG(s)) on a 100 meter tower on the University's campus.

The University intends to supply site improvements, roadway access to the site(s), electrical distribution and utility company connections, and permitting.

This project will be awarded on the merits of the technical and business proposal provided as a response to this RFP. It is anticipated that this RFP process will result in execution of agreement(s) providing for the construction, start-up, testing, operation and maintenance of one or two WTG(s) resulting in the sale of electrical energy to the University and Renewable Energy Credits (REC) to other parties. The University anticipates that there will be negotiations with the selected vendor to be able to finalize an agreement(s). The selected vendor will be known as the "Wind Project Developer".

The Wind Project Developer and the University shall enter into a Power Purchase Agreement (PPA) for the sale of electricity. The Wind Project Developer shall also receive a land lease for the use of the University property occupied by the WTG(s) for the duration of the PPA. Oakland University will not sell any land for use in this project, but will provide a land lease.

The University intends to directly or indirectly facilitate the sale of REC's to a third party or multiple parties, with the intent to pass these funds to the Wind Project Developer to assist with financing the project.

For the purposes of this bid process and RFP, a proposed PPA is included with a requested cost of electricity (with escalation) to the University. The University wishes to enter into a long term PPA for $0.08 per kW-hour for electricity purchase for either a 10, 15, or 20 year term. The value of the REC will also be given to the Wind Project Developer, either from a direct sale to a third party or as a pass through from the University. The University is actively seeking buyers and soliciting pricing proposals for these REC's. The Wind Project Developers are requested to specify a lump sum dollar amount the University would pay to the Wind Project Developer in order to implement the $0.08 per kW-hour PPA for 10, 15, or 20 years. Please refer to the Bid Form included in this RFP.

The University desires the selected Wind Project Developer to use sound, state-

of-the-art engineering practices in designing and operating the WTG facilities. It is anticipated that the results of the life cycle cost analysis of the selected technology and operational alternatives will be a significant factor in determining the successful proposer.

1.2 General Expectations for Proposals and the Project

- The University will not sell any real property for this project. Proposals that include the sale of University real property will not be considered.
- The University will consider all business structures that do not involve the sale of University real property, such as a ground lease transaction; provided however that if the project is built on University real property, in no event can title to the WTG(s) pass to any person or entity other than the University (or without the University's prior approval) and therefore the creation of a bankruptcy remote by the Wind Project Developer may be required. The proposal must satisfy all requirements of this RFP, but all innovative project delivery methods and partnering options will be considered. The business structure can include any combination of University ownership; a ground lease (subject to the above caveat); a PPA that guarantees electricity costs; multiple parties may be proposed to deliver or perform services relative to the project; and possibly sales to third parties.
- The business structure and proposal must guarantee that the University will be the primary and preferred user/customer of the WTG(s) electrical output.

1.3 Renewable Energy Credits

The University is presently working to obtain a buyer and price commitments on the sale of wind energy REC's for this project. It is the intent of the University to negotiate in good faith with any REC buyers and the Wind Project Developer to facilitate the sale of these REC's from the wind project owning entity and a third party REC purchaser. It is requested that these transactions for sale of REC's will be between the wind project owning entity and the REC purchaser, however, the University could potentially retain ownership of the REC's, the sale of which would be directly passed through to the Wind Project Developer.

It is anticipated that the University will have some pricing and offers for REC's to provide to the Wind Project Developers prior to submission of proposals to the University. An addendum will be released at date shown in Section 2.1 describing the REC pricing activity up to that date. Any assistance with this effort from prospective Wind Project Developers would be appreciated. For this effort, please contact Jim Leidel, Energy Manager, via email at: leidel@oakland.edu.

For proposal development, please use a REC price of $20 per MWhr for the full term of the PPA without escalation. This will result in an effective revenue to the Wind Project Developer of $0.10 / kWhr for Year 1 of the PPA.

1.4 Project Description

This RFP is for one or two utility scale wind turbines to be installed on the customer side of the electric meter on the University's campus in Rochester, Michigan. Electric power will displace some portion of this 4 to 8 MW University load, and will not require export to the local distribution utility company grid. The University will supply the electrical connection, including underground 13.8kV cable, a switch, and transformer of requested size and voltage. The University will also provide site improvements allowing for truck and crane access to the selected sites, utility/campus electrical connection, Detroit Edison connection agreement, electrical engineering and design, FAA permitting, environmental impact studies, and construction permitting.

The Wind Project Developer shall supply and install one or two complete WTG(s), including nacelles, blades, foundations, electrical transformer, and primary voltage switch at the turbine site, and a remote monitoring system. The Wind Project Developer shall only be responsible for providing a point of interconnection at each wind turbine base per the requirements of the University's electrical distribution system as well as national and local electric codes.

The project shall commence power delivery and normal operation, fully complete and acceptable to the University as defined in section 2.1 (subject to negotiation).

The work under these specifications shall include supplying to and installing one or two WTG(s) meeting the following criteria:

1. Appropriate for installation at Site 1 and Site 2 on the University's campus in Rochester, Michigan. If only one WTG is to be installed, Site 1 will be used.
2. Appropriate electrical interconnection equipment for interface with the University's distribution system (on the WTG(s) side of the University supplied transformer).
3. Remote monitoring and control with a web based graphical user interface system.

The bid shall be based on a turn-key design and build basis that will include the supply of the equipment, all site engineering and design work, the installation of the equipment at the project site and necessary training of University and/or other operating personnel.

1.5 Site Description

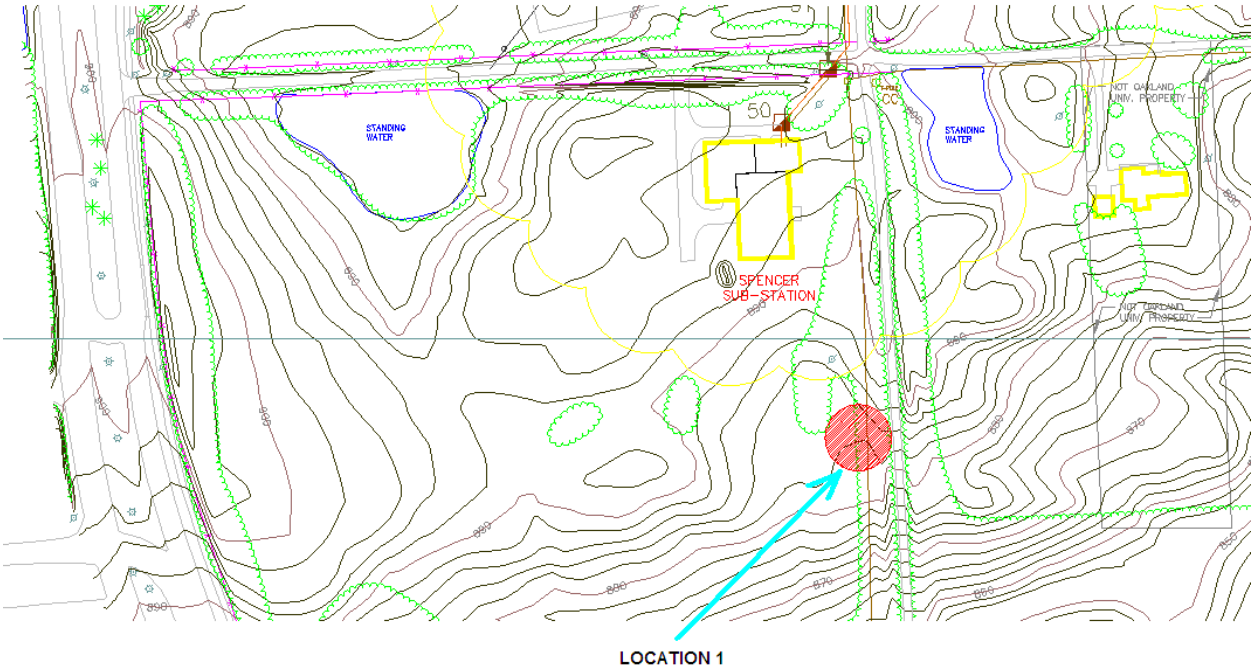
The latitude and longitude locations for the turbines are:

Site 1 "Substation"	42° 39.988'N	83° 12.963'W
Site 2 "Pioneer Drive"	42° 40.141'N	83° 12.671'W

Site 1 – Southeast of Spencer Substation

This location was selected first due to its close proximity to existing campus electrical infrastructure. It is approximately 300 ft south of the Detroit Edison general purpose Spencer Substation where electrical distribution feeders radiate from the north side of the substation facility shown below. Spencer Substation receives two ITC 120kV feeders from the west (from underground runs up Squirrel Road). Edison owns and operates two 40MVA to 13.8kV transformers as well as a general purpose switchgear and capacitor bank. The northeast section of Spencer Substation is University property consisting of a double-ended 13.8kV switchgear with eight feeder breakers to serve campus. Geotechnical information for the area is on file, and new surveys will be conducted for the locations described here.

If only one WTG is to be installed for this project, Site 1 will be used.

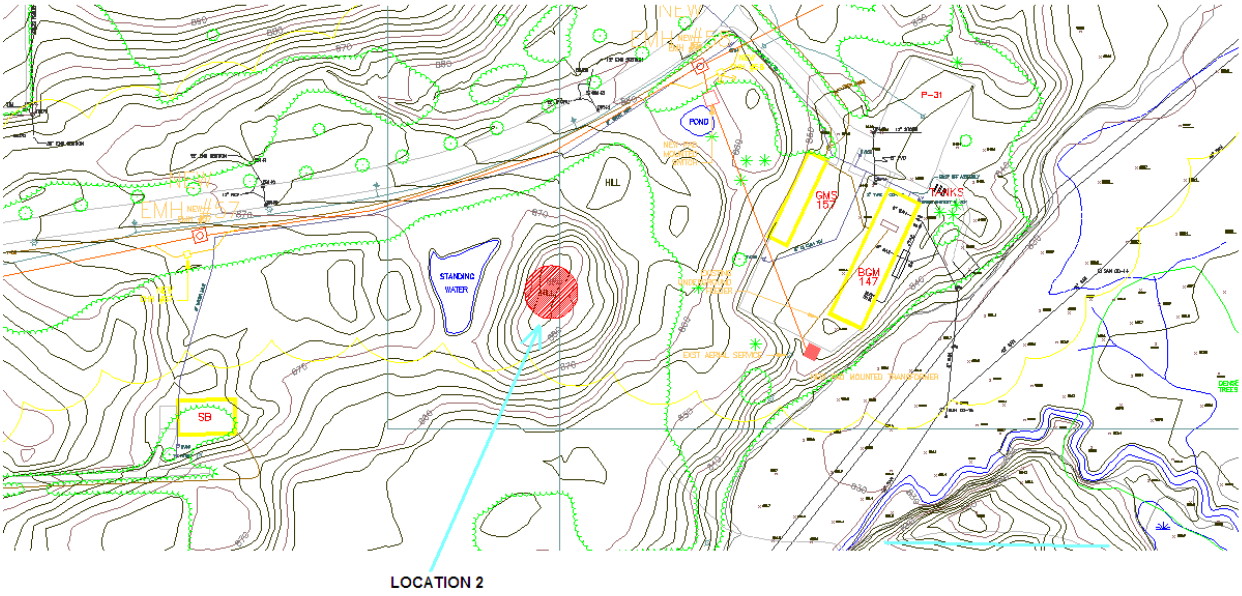


Heavy equipment maneuverability and the available area for staging wind turbine components prior to assembly were deemed to be adequate. Minor clearing of trees and overgrowth will be required before delivery of wind turbine components and commencing construction.

Please note that a concurrent project to install a Bio-Energy Center will be underway to the southwest of Site 1. Additional information will be provided in the coming months. Care will be taken to ensure that any construction on this new Bio-Energy Center will not impact or impede work on the wind turbine Sites 1 or 2.

Site 2 – Pioneer Drive, West of Buildings and Grounds Maintenance (BGM)

Site 2 is on a small hilltop approximately 298 ft. south of Pioneer Drive opposite of the Storage Building (SB) and west of the Buildings and Grounds Maintenance (BGM) facility. The hilltop is covered by small trees, grass and shrubs. This site option has the advantage of having the shortest distance from a proposed wind turbine location to feeder conductors at Electrical Manhole # 58.



1.5.1 Climate Information

Our wind consultant created a wind resource assessment using twenty-two months of wind data collected by a fifty meter tall meteorological (MET) tower located just south of our campus electrical substation. The tower was erected in February 2006 and data was collected from mid - February 2006 through February 2008. The wind assessment utilized the site collected data, the Michigan Wind Energy Map, and the Canadian Wind Atlas. Energy capture computations were performed using an industry standard Windographer software package. The annual average results of the site collected data are shown below:

Height	**Wind Speed**	**Method**
30 m	3.0 m/s	measured
40 m	3.6 m/s	measured
50 m	4.1 m/s	measured
75 m	5.2 m/s	calculated (for a 75 meter tower)
80 m	5.4 m/s	calculated (for an 80 meter tower)
100 m	6.2 m/s	calculated (for a 100m tower)

The MET tower was located at coordinates 42° 39’ 59.66” North
83° 13’ 07.52” West

This site is approximately 200 meters west, and slightly north, of the proposed construction Site 1.

1.5.2 Meteorological Tower Data Compilation and Analysis

Wind resource data was collected from a 50 meter tall meteorological tower located on University property for a two year period. The report was completed on February 19, 2008. The wind data was collected at 30, 40, and 50 meters by Alternate Energy Solutions, Inc. of Grosse Point, Michigan. AES also prepared the wind data compilation and analysis.

1.5.3 Obstructions

The primary obstructions near both sites are trees, rolling terrain, and University buildings. University buildings are to the north and west of both sites.

1.5.4 Electrical Interconnection

The University will be responsible for interconnecting the wind turbine sites to their system. This includes all necessary substation and collection systems equipment and design. The Wind Project Developer is responsible for a 13.8kV to WTG step up transformer (if needed), and a 13.8kV disconnect switch. The University will connect its 13.8kV service to this disconnect switch at each wind turbine. The details of the interconnection will be finalized between the Wind Project Developer and the University at the time of contract negotiation.

2.0 THE PROPOSAL

2.1 Procurement Schedule

The University intends to conduct the procurement process expeditiously. Proposers are expected to comply with the procurement schedule, including any modifications thereto which may be made by the University. The University will notify proposers of any and all such modifications. Proposers who fail to comply with the schedule may not receive further consideration. The anticipated procurement schedule is as follows:

All questions regarding this RFP are to be directed through fax or email to Maria Ebner-Smith, Purchasing Manager at: ebnersmi@oakland.edu or faxed to 248.370.3175. The questions must clearly reference the project name of "Finance, Design, Build, Own and Operate a Wind Turbine Generating Facility", and must be submitted no later than fifteen business days prior to the proposal due date. All questions will be answered in writing and sent in the form of an addendum within five business days following the receipt of the questions.

Answers to questions may be issued in the form of addenda or amendment to this RFP. All responses to the RFP must be prepared with full consideration of the responses to questions issued prior to the submission deadline.

Vendor shall submit two copies of a concise sealed proposal to the Oakland University Purchasing Department, Police and Support Services Building, Room 13 by the date and time listed on the cover page as well as an electronic copy. The receipt of the electronic copy will be viewed as an on time submission and paper copies may come later if needed.

Tentative Schedule of RFP Process:

Issue Request for Proposal	Feb 3, 2011
Last Questions Regarding RFP Due	Mar 2, 2011
Last Addendum Issued to Vendors	Mar 11, 2011
REC Pricing Information Issued	Mar 11, 2011
Responses to RFP Due	Mar 18, 2011 at 5 PM
Review & Selection of Proposal	Mar 31, 2011
Contract Negotiations	April 2011
University Approval	May 2011
Begin Construction	Summer 2011
Operation of Systems	Fall 2012

2.2 Terms and Conditions

1. No oral interpretation, instruction or information concerning this RFP given by any employee or agent of the University may be considered, and proposals responding to such oral information may have their proposal deemed unresponsive by the University. Only written information supplied by the University should be considered when responding to this RFP.
2. The University can accept or reject any proposal; reject all proposals; waive any formalities or irregularities contained in a proposal that do not comply with the terms and conditions of this RFP; modify or cancel the RFP at any time and in any manner including modifying specifications; select the proposal that, in the exclusive and absolute discretion of the University is in the University's best interests, without limitation.
3. This RFP in no manner obligates the University to the eventual Wind Project Developer, if any, or anything that may be proposed or negotiated, until a written contract acceptable to the University is developed and approved by the University's Board of Trustees. The University may terminate this RFP without penalty or obligation at any time prior to the approval of a contract by the University's Board of Trustees.
4. Expenses for developing and presenting proposals are the sole responsibility of the proposer and are not chargeable to the University. All supporting documentation and manuals submitted with this proposal will become the property of the University.
5. Proposals will be evaluated and awarded as noted in the RFP. All information must be legible, in order, and easily interpreted. All questions or requests for information must be responded to completely. Product pricing, ability to meet University needs, and the benefit to the University of the proposer's contracting processes should be clear and concise. Incomplete packages may be rejected if any relevant information is not included in the proposal.
6. The University (including its employees and consultants) may visit any of the facilities referenced in the RFP and/or proposals and/or to observe the operations of such facilities.
7. Proposers waive all claims against the University and all of its employees and consultants for any damages resulting from the solicitation, collection, review or evaluation of proposals.
8. The proposers will send representatives to the University to be interviewed, upon the University's request.
9. The University may also conduct investigations of the proposers and their RFP responses, to clarify the information provided pursuant to this RFP, and to request additional evidence to support the information included in any response.

10. The University may at any time exclude a proposer from further participation in the negotiation process if it determines, in its exclusive and absolute discretion, that the negotiation is failing to progress or if the terms of a proposal are less advantageous than those of other proposers.
11. Submission of a proposal is the proposer's acknowledgement that the proposer has read, understood and agreed to all terms and conditions contained in this RFP.
12. No changes can be made, no invoices for extra changes, alterations, modifications, deviations and extra orders can be submitted and none will be paid except upon a written, signed change order issued by the University. The University will not authorize payment of changes, alterations, modifications, and deviations, etc. that are a result of the Wind Project Developer's error.
13. The University is a public institution and all of its employees and public officers must conduct all University affairs solely to promote the best interests of the University rather than a personal interest. Consistent with this concept, the University has a conflict of interest policy that prohibits employees and public officers from having a personal financial interest in transactions with the University unless certain disclosure requirements are met. The policy also prohibits employees and public officers from accepting gifts from entities with which the University engages in commercial transactions. Any violation of said policy or Michigan laws governing the conduct of public officers and public employees will be grounds for terminating the contract
14. The Wind Project Developer will not discriminate in any manner on the basis of race, creed, color, national origin, age, religion, sexual orientation, marital status, veteran status, disability or any class of individuals protected by law.
15. The Wind Project Developer must represent and warrant that no one acting for or on its behalf on University property appears on the Michigan Public Sex Offender Registry or has ever been convicted of a felony, criminal sex offense, forcible assault or a crime against a minor.
16. Indemnification and Insurance. The Wind Project Developer, at its sole cost and expense, must defend, indemnify and hold the University, and the University's trustees, directors, officers, employees, agents, representatives and designees, in their official and personal capacities, (collectively University Indemnified) harmless from and against any and all claims, demands, suits, damages, judgments, liabilities, losses and expenses, including without limitation personal or bodily injury to or death of any person, defamation, infringement of copyright, trademark, patent or other intellectual property, and reasonable attorneys' fees and expenses of litigation (collectively Liabilities), to which the University Indemnified may become subject actually or allegedly arising out of, relating to or resulting from the Wind Project Developer's services and/or use of University facilities and/or the willful misconduct and/or negligence of the Wind Project Developer or its directors,

members, officers, employees, volunteers, agents, representatives and designees. If necessary, Wind Project Developer will name the University as an additional insured on its applicable and appropriate insurance policies for the purpose of effectuating the contractual indemnification; provided however, that the Wind Project Developer's obligation to indemnify the University Indemnified is not limited by the amount of any such insurance coverage. The indemnification must survive expiration or termination of the contract.

The Wind Project Developer's personal property of every kind nature and description that may at any time be at the University must be kept at the Wind Project Developer's sole risk, cost, and expense. The Wind Project Developer is responsible for the security of its personal property and any loss or damage to said personal property from any cause whatsoever, including without limitation, theft, vandalism, steam, electricity, water, rain, snow, ice, or fire.

The Wind Project Developer must be insured for claims and damages arising out of Wind Project Developer's performance of the services and/or use of University facilities, errors, omissions and negligent or wrongful acts, for an extended reporting period of not less than five calendar years if written on a claims-made basis. The insurance must include general liability insurance, excess umbrella insurance, automobile insurance, professional liability insurance if applicable, workers compensation insurance andemployer's liability insurance, all in amounts acceptable to the University's Risk Manager and evidenced by a written insurance policy and/or certificates of insurance issued by an insurer licensed to do business in the State of Michigan and acceptable to the University. If the Wind Project Developer fails to secure or maintain such insurance, the University will not be required to perform any obligations under the contract, but the Wind Project Developer will pay the University for any actual costs incurred by the University in connection with the contract upon demand. In the alternative, the University may but is not required to, secure such insurance for the University, and if so secured by the University, the Wind Project Developer will reimburse the University the actual costs for said insurance premiums upon demand.

17. The University requires that the Wind Project Developer and all its sub-contractors and service providers adhere to all federal and State environmental, health and safety regulations and local fire and building code ordinances when performing any work on University property or delivering any service to the University. The University reserves the right to suspend any work or delivery that violates any federal or State regulation or local ordinance until further notice.
18. Michigan law, including without limitation the Michigan Persons with Disabilities Civil Rights Act, the Michigan Elliott-Larsen Civil Rights Act and the Michigan

Governmental Tort Liability Act (Act), all as may be amended from time to time, including the provision that illegal discrimination by the Wind Project Developer may be considered a material breach of the contract, governs the validity, construction and performance of all contracts. Michigan will be the forum for any legal or equitable proceedings in connection with this RFP and any contract. Notwithstanding anything contained in this RFP or any contract to the contrary, whether express or implied, no provision of this RFP or any contract waives the University's rights under the Act or effectively creates any direct or indirect liability for the University otherwise prohibited by the Act.

19. The University complies with the Michigan Freedom of Information Act (FOIA) and the University may provide confidential information to other persons or entities upon receipt of a FOIA request.
20. All activities related to the project are subject to all applicable federal, State and local laws, regulations, rules and/or requirements.

2.3 Insurance Requirements:

The Wind Project Developer will be required to provide the following proof of insurance:

Commercial General Liability:	$1,000,000
Automobile Liability	$1,000,000
Umbrella Excess	$1,000,000
Worker's Comp	Statutory Limits

Oakland University must be listed as a certificate holder. Vendor must provide insurance certificates before commencing the contract and must keep those certificates up-to-date.

2.4 Proposal Requirements (2 paper copies and one electronic copy)

Proposers shall submit proposals in the following format.

1. Cover letter
2. Scope of supply
3. Pricing proposal on RFP supplied bid form.
    a. Design and build standard package pricing, including all required equipment.
    b. Extended warranty pricing for 5 year warranty.
4. Wind Turbine Specification – this will include the following at a minimum:
    a. Hub height, rotor diameter, and rotational speed
    b. Density adjusted turbine power curves, thrust (CT) curves and noise curves in tabular form
    c. Cut-in, rated, and cut-out wind speeds
    d. Maximum noise level at ground level

e. Reactive capability curve to indicate generator excitation requirements at various loads
f. Gearbox configuration
g. Generator electrical specification
h. System power factor curve
i. Climate operational range

5. Description of remote monitoring and control system
6. Foundation loading
7. Weights and transport protocols
8. Conceptual design of wind turbine foundation
9. Conceptual design or approach of 13.8 kV interconnection point
10. Comparable project experience
11. Safety statistics for proposer and all identified subcontractors for a minimum of the past 3 years – including an OSHA 300 form
12. A list of all intended sub-contractors for the project and their respective scopes of work
13. Proposed project schedule
14. All proposal cost information and terms must be held firm and valid for one hundred eighty (180) calendar days from the date of the submission.

2.5 The University Energy Project Team

The primary participants in this procurement on behalf of the University will include the following: Chief Financial Officer, Purchasing Manager, General Counsel, Facilities Management, Environmental Heath and Safety, and an Energy Consultant.

Some or all of the above will comprise the Energy Project Team during the procurement process; other University personnel and consultants may assist as requested by the University.

2.6 Evaluation of the RFP

The University, along with its consultants and advisors, will evaluate the proposals submitted based on this RFP. Evaluation of the RFP will address the business and technical merits related to the requirements of the University. The University will conduct a detailed review and evaluation of the principal company and all entities and/or organizations participating in providing the services contemplated in this RFP. The evaluation of proposals has one basic objective: to determine whether the proposer meets the requirements set forth in this RFP and has the best value proposal for the University.

2.7 Mandatory Bid Form

For a PPA @ $0.08 per kW-hr for Year 1, with a 2% annual escalation.

Wind Project Developer Company Name _____

Contact Person _____

Contact Phone _____

Contact Email _____

WTG Manufacturer _____

WTG kW nominal rating (@ rated speed) _____(@ m/s)

WTG Location of Manufacture _____

Tower Height (100m tower must be base bid) _____

(Towers under 100m may be bid as voluntary alternates. Each offer should used a separate bid form)

One Turbine at Site 1

Lump sum cost for 10 year PPA @ $0.08 / kWhr _____

Lump sum cost for 15 year PPA@ $0.08 / kWhr _____

Lump sum cost for 20 year PPA@ $0.08 / kWhr _____

Two Turbines

Lump sum cost for 10 year PPA @ $0.08 / kWhr _____

Lump sum cost for 15 year PPA@ $0.08 / kWhr _____

Lump sum cost for 20 year PPA@ $0.08 / kWhr _____

Wind Project Developer will provide WTG(s), site improvements as need for construction, foundation(s), tower(s), 13.8kV electrical switch, transformer, construction, financing, insurance, maintenance and operations throughout the term of the PPA, insurance.

Oakland University will provide 13.2kV to primary side of switch, low voltage conduit with communications cable or fiber optic, FAA permitting, environmental permitting, a gravel road access to site, utility protective relaying, and utility company interconnect approval.

Selection criteria for the proposals will consist of the following:

20	Experience of developer and team with wind turbine plant construction
10	Experience of developer and team with wind turbine or other energy plant ownership and operations
10	Experience of developer and team with the specifically selected WTG(s)
10	General experience and proven expertise of developer and team members
20	Proposing company's financial security and strength (including strength of business plan and business proposal)
30	Cost
100	**Points Total**

3.0 DESIGN and PERFORMANCE SPECIFICATION

3.1 Summary of Work

The response to this RFP must specify all the equipment and materials for the WTG system as specified below. The work shall include delivery of all equipment and materials to the job site, off-loading, receiving, and proper storage. The minimal equipment and materials required by this RFP include, but are not limited to, the following major items:

1. Towers, 100 meters high or taller
    a. The winds at this site make a shorter tower a poor choice.
    b. If tower Wind Project Developer wishes to propose a shorter tower, this can be done as voluntary alternate. In this case, please provide a separate mandatory bid sheet, completely filled out with the alternate tower proposed.
2. Nacelles
3. Blades
4. Remote monitoring and control system and all related instrumentation
5. Lightning protection
6. FAA lighting
7. Foundations, foundation anchor bolts, bolt sleeves, and concrete equipment bases
8. Turbine switchgear
9. Warrantees (include scopes, required durations, and acceptable limitations) and/or maintenance agreement terms. Warrantees shall cover scheduled and unscheduled maintenance during the warranty period and be offered for a minimum of 5 years.
10. Shipping and import fees
11. All nuts, bolts, gaskets, special fasteners, backing rings, etc., between components and equipment furnished under these specifications

12. Coupling guards for all exposed shafts and couplings
13. First fill of lubricants and fuels for operation
14. Solvents and cleaning materials
15. Finish painting of all equipment
16. Manufacturer's recommended spare parts
17. Training of on-site personnel in WTG system operation and basic maintenance
18. Operating personnel for witness of startup and tests
19. Complete operating manuals for the WTG(s) and related equipment
20. Complete set of as-built drawings for the wind energy conversion system

The equipment will be tested by the Wind Project Developer under observation by the University or designated engineer after erection to demonstrate full operational status for commercial generation and fulfill the required guarantees. If the equipment fails to meet guaranteed performance, the Wind Project Developer shall make additional tests and modifications at no additional costs to the University. When the equipment is shown to be fully operational and within the limits of the performance guarantee, the University will accept the equipment for use. Any power that is generated during the testing and/or modifications shall be the property of the University.

3.2 Codes and Standards

All materials, equipment, and fabrication procedures shall be in accordance with the latest applicable laws of the United States of America, the State of Michigan, and all local ordinances. In the case of conflict between standards, the more stringent standards shall apply.

All required stamps shall be affixed to denote conformance to the appropriate codes. Code requirements shall be based on codes and standards in effect at the contract date for the WTG unit(s) and support structures.

Data reports required by the applicable codes shall be submitted to the University or designated engineer.

International Electrotechnical Commission (IEC) Standard 61400-1 shall be used as the minimum acceptable design criteria. Any turbine design offered shall be certified as meeting 61400-1 requirements by Germanischer-Lloyd, Det Norske Veritas, or equivalent certifying agency.

3.3 Permits

Wind Project Developer shall obtain all necessary permits for transport and construction of a one or two WTG(s). The University is a publicly funded State University,

and is not under the jurisdiction of the local municipal authorities. A State construction permit and FAA permitting will be obtained by the University for both WTG(s). Any other permits deemed necessary are the responsibility of the Wind Project Developer.

3.4 Transportation

Wind Project Developer shall be responsible for coordinating and performing all transport of equipment and materials to the site, whether directly or through a transportation subcontractor.

3.5 Design Criteria

All equipment shall be designed to operate reliably and continuously for a minimum useful life of 20 years of service.

Each WTG unit, including the rotor, generator, excitation system, yaw system, pitch system (if applicable), and related ancillary equipment shall operate at rated capacity, safely, reliably, continuously, and without undue maintenance under the environmental conditions (temperature, air density, wind speed, salinity, etc.) of this project.

3.6 Design Submittals

The Wind Project Developer shall submit individual sets of calculations as requested by the University. All sets shall be of similar format, self-explanatory and clear to review. Sets of calculations shall be submitted both electronically and in hardcopy, bound, titled, given unique numbers and indexed.

When required, the Wind Project Developer shall provide an explanation together with evidence to validate computer programs used for design calculations. Calculations and drawings shall always be submitted with document number, revision suffix and date of issue. All drawings shall be to scale and fully detailed, dimensioned and legible.

The Wind Project Developer will be responsible for the submission of calculations and drawings to the local authority for planning and building regulation approval. Immediately prior to such submission, the Wind Project Developer shall provide the University with a complete set of all documents intended for inclusion in the submission.

Construction will not be permitted on site until the relevant designs and drawings have been reviewed and approved by the University and the relevant local authority approvals have been obtained.

The Wind Project Developer shall support, cooperate with, and participate in the pre-design meetings or teleconference for every aspect of the project's design. The Wind

Project Developer shall use reasonable effort to accommodate the University's preferences for the project's design. The Wind Project Developer shall also submit the design drawings and calculations for each aspect of the project's design to the University for its review and comment at a point roughly equivalent to being 60 and 100 percent complete. Upon initial completion of each of the project's design, all project designs and calculations shall be submitted to the University for its review and approval prior to construction. In all cases, the University may engage an independent engineer to further review and approve design documents and calculations.

Review and approval of design documents by the University or the University's independent engineer shall not relieve Wind Project Developer of any responsibilities for completeness and sufficiency of the design nor in any way transfer the Wind Project Developer's responsibility for sufficiency of the work to the University or the University's independent engineer.

3.7 Performance Criteria

1. Complete performance data on the WTG units shall be submitted as requested herein.
2. Power output vs. wind speed
3. Thrust coefficient vs. wind speed
4. Critical speed of rotor generator
5. Detailed information on the capability of the turbine generator to respond to a system upset situation, where a large portion of the system load is applied to the unit and load shedding is required
6. Reactive power requirement vs. real power capability curve
7. Detailed information on the ability of the yaw system to respond to wind direction changes and turbulent wind conditions
8. If variable pitch rotor blades are included, detailed information on the ability of the pitch system to respond to the wind speed changes and overspeed conditions
9. Detailed information on the ability of the braking system to respond to overspeed conditions and shutdown.

3.8 Performance Guarantees

The WTG(s) to be supplied shall be guaranteed by the supplier to operate at or above the power curve supplied with the bid package.

3.8.1 Availability Guarantee

The WTG availability is the responsibility of the Wind Project Developer to ensure a up and functional wind plant. It is recommended that the WTG(s) shall be guaranteed by

the supplier to be ready to run at a minimum availability of 95 percent on a time basis during the turbine warranty period.

3.9 Testing

A complete Commissioning and Testing Plan shall be submitted to the University or the designated engineer for approval. The Wind Project Developer shall provide notice, in writing, to the University or its representative and to the local utility of its intent to start the system one week prior to the proposed startup date. After receiving written permission to start the system from the University or its representative and the local utility the Wind Project Developer shall commission the system in keeping with all requirements of the Commissioning and Testing Plan.

Testing includes operational testing and performance testing. Operational testing shall be completed within the first 30 calendar days that the WTG(s) are available for operation and conclude with a 168 hour continuous unmanned operation test.

The Wind Project Developer shall verify that the data acquisition/display system is connected to and communicating properly with the University's Central Heating Plant operator control room.

The Wind Project Developer shall correct any deficiencies uncovered by testing prior to completion of commissioning of the system.

3.9.1 Wind Project Developer Retesting and Turbine Modifications

In the event the WTG(s) do not meet the Performance Guarantees specified in the contract, the Wind Project Developer may perform an additional power output performance test to verify the results of the previous test. There shall be no tolerances or allowances for testing error applied to the test results. The Wind Project Developer shall bear the "test related expense" costs for the test.

If the unit has not met the performance guarantees, then the Wind Project Developer shall, without cost to the University, make such alterations and modifications as necessary to obtain the guaranteed performance. The alterations and modifications shall be completed in a manner that is convenient to the University. The schedule for alterations and modifications shall be subject to review and approval by the University. The alterations and modifications shall be completed within 30 calendar days following the performance test. After the alterations and modifications have been made, the WTG(s) shall be re-tested. The "entire expense" of the additional test demonstrating the effect of such

alterations and modifications shall be borne by the Wind Project Developer.

The “entire expense” means all charges incurred by the Wind Project Developer during the retesting other than University-furnished energy and the University’s normal operating personnel. Furnishing and installation of additional instrumentation, instrument costs, data logging, computations, reports, and similar requirements necessary for the retest will be included as part of the “entire expense” cost.

The University shall have the right to review the Wind Project Developer’s test data, test calculations, all test data corrections, and test results. Disagreements or differences between the University’s and Wind Project Developer’s calculations and analysis shall be resolved in a manner acceptable to the University.

3.10 System Interconnection

3.10.1 General

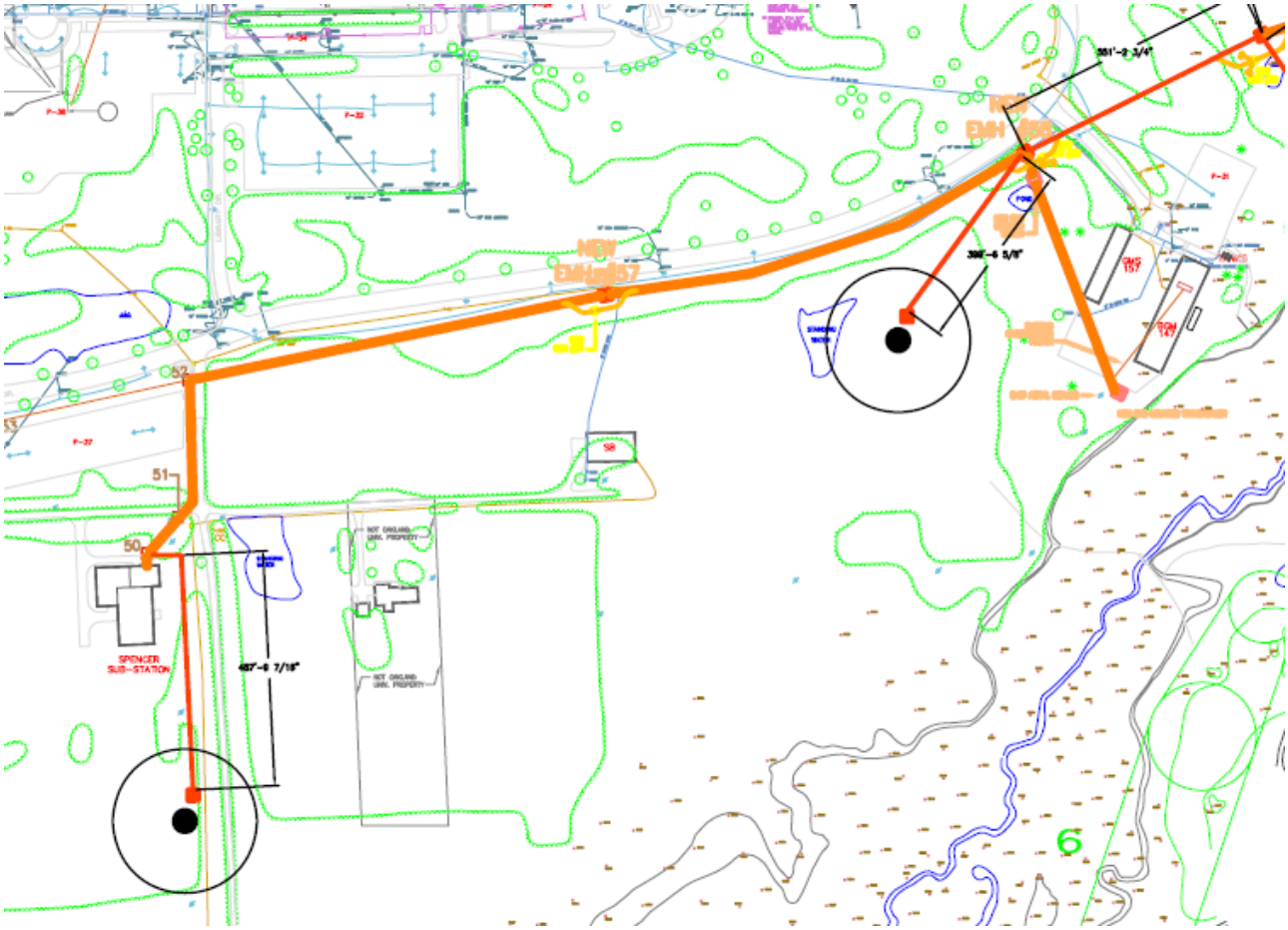
The Wind Project Developer supplied equipment must interface with the University’s 13.8kV distribution system. Wiring for systems operating at less than 50 volts shall be in separate metal enclosures from power system wiring, or in metal conduit if nearby power circuits at 120 volts and above are present in the same enclosure.

3.10.2 Grounding

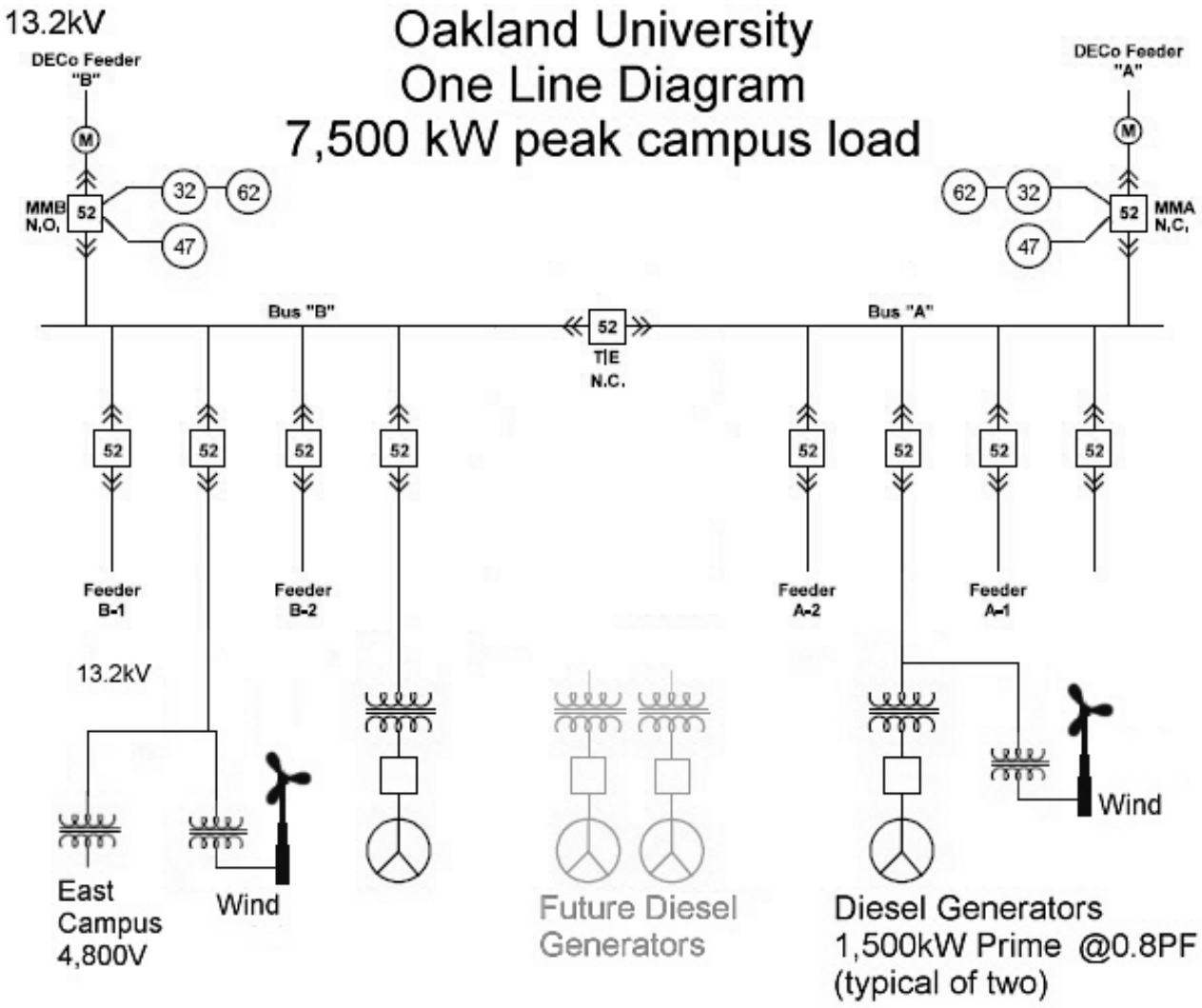
The Project Developer shall provide lugs installed at the tower base for grounding cable connections.

3.10.3 Interconnection

The WTG(s) must interconnect to the University distribution system at 13.8 kV connection points at the base of the tower. If connection points are not available external to the tower, the University will bring buried conductor to the base of the tower and Wind Project Developer will then install that cable into the tower and connect it as needed. The Wind Project Developer shall supply all necessary equipment and labor to complete the interconnection.



Preliminary 13.8kV duct bus layout
(red is future, orange is existing)



3.10.4 Protection

A protection system shall be installed at the interconnection point to protect the University's power system and equipment in the case of system malfunction. This system must meet the requirements of both the University and the local utility.

3.11 Generator and Accessories

3.11.1 General

This subsection describes the requirements for the generator and associated accessories.

3.11.2 Type and Design

The generator shall be an alternating current generator and operate at 60 Hz. The generator shall be constructed especially for connection to a wind turbine unit of the type described in these specifications. The generator and exciter shall be of protection class IP54 minimum and shall also be enclosed in an overall weatherproof nacelle structure. The cooling system shall be sufficient for operation at the project site. Generator and accessories construction shall conform to applicable IEC, NEMA, and ANSI standards. Generator windings shall be of copper or all welded aluminum.

The generator will operate with a step-up transformer to 13.8 kV and operate within the University electrical system.

All system wiring shall be of an MEC approved wiring method. All conductors shall have a temperature rating of 90° C or higher.

All inside conduits shall be rigid galvanized steel (RGS).

All outside conduits shall be PVC coated rigid galvanized steel.

All outdoor electrical enclosures shall be 4XSS(316) and have watertight connections.

Exposed cables shall be listed as sunlight resistant.

3.11.3 Terminals

All six generator terminals shall be brought out of the generator to an enclosed junction box which shall be accessible without dismantling nearby structures or equipment. The Wind Project Developer shall provide all terminal equipment.

3.11.4 Electrical Insulation and Temperature Rise

The insulation of the armature windings and field windings shall be Class F. The maximum temperature rise for the insulation system shall be Class F rise as defined in ANSI C50.13, Table 1, for the generator rating and conditions at the site. In addition, the maximum temperature rise shall not exceed Class B rise as defined in ANSI C50.13, Table 1, when the generator is at any operating condition defined in the specifications.

3.11.5 Telephone Influence (Harmonic) Factor

The telephone harmonic factor of the generator shall be as defined by ANSI C50.13 or IEC 34-1.

3.11.6 Generator Voltage Waveform

The generator line-to-line voltage waveform deviation shall comply with applicable requirements of ANSI C50.10.

3.11.7 Over-speed

The generator and exciter rotors shall be capable of withstanding, without mechanical injury, and over-speed of 25 percent.

3.11.8 Voltage Variation

The generator shall operate at rated kVA, power factor, and frequency at any voltage between 10 percent above and 5 percent below rated voltage.

3.11.9 Short Circuit Requirements

The generator shall be capable of withstanding a 3-phase short circuit across its terminals without damage.

3.11.10 Nameplate

The nameplate of the generator shall contain the applicable information according to ANSI C50.12.

3.12 Power Factor Correction

3.12.1 General

Power factor correction shall be provided for the generator in order to supply the excitation requirements of the wind turbine generator.

3.12.2 Components

Power factor correction shall be achieved either through use of power electronics, by the use of capacitors switched by automatic switching equipment, or by any other means sufficient to meet the criteria of article 12.3. Control of the power factor control equipment shall be by the main system computer.

All capacitors shall be standard units with indicating fuse protection for each unit.

Capacitors shall meet NEMA and ANSI or IEC standards.

Switching devices shall meet NEMA or IEC standards. Switching devices shall be specifically rated for capacitor switching and shall be designed and rated for long life. Capacitors and switches shall be located in one dedicated cabinet or cubicle of the main control cabinet. The capacitor enclosure shall be designed such that the failure or rupture of a capacitor shall not cause damage to equipment in the same control cabinet. Switches and capacitors shall be readily accessible for inspection and maintenance.

3.12.3 Power Factor

The control system shall switch the capacitors in and out such that the system power factor is maintained at approximately 1.0 for all generator loading conditions.

3.12.4 Capacitor Circuit

The capacitors shall be connected to the main power circuit between the main power circuit breaker and the main power.

The capacitor switches shall be interlocked with the main breaker automatic control trip circuit such that the main power circuit breaker cannot be opened until all capacitor switches are opened, under normal shut down conditions. This trip circuit shall be in parallel with the power system fault trip and other control system automatic emergency trips.

3.13 Instrumentation and Control System

3.13.1 General

Wind turbines must be supplied with a Supervisory Control and Data Acquisition (SCADA) system capable of monitoring and recording the performance of the turbines and

status of critical sensors. Data must be recorded and be available for at least the previous 1 year. Data must be exportable to a format compatible with Microsoft Excel. The Wind Project Developer shall provide a control and monitoring connection for remote access by the University.

3.13.2 Description

The control system shall automatically control all operations of the wind turbine, optimize output of the generator, process all alarms, log events and performance data, and transmit real-time performance data and alarms to a remote location.

The instrumentation and control system shall operate automatically under all operating conditions and conditions of power availability. This operation shall include automatic startup and shutdown for normal operations. Upon loss of utility power interconnection or failure of utility power, restart of the instrumentation and control system to a full functioning condition shall require no local manual operations.

3.13.3 Anemometers and Wind Vanes

The anemometers and wind vanes supplied with the wind turbines shall provide control and display data for the system.

The anemometers shall provide output for system shutdown in the event of excessive wind speeds and system restart when wind speed is within acceptable levels.

The wind vanes shall provide output for yawing of the turbines. The vanes shall provide for system shutdown in the event of wind vane measurement differences outside of normal range and system restart when differences between observed wind directions are within normal range.

3.13.4 Connection with Plant Control System

The SCADA system shall be connected and integrated into the University's fiber loop connecting their substations to the remote University control room. The Wind Project Developer shall provide all necessary hardware, and installation and integration services required to allow theUniversity to connect an Ethernet line to the turbine, and make an OSI PI capable interface connection. Wind Project Developer shall also install a stand-alone SCADA service and workstation at the University control room to allow remote monitoring and control.

3.13.5 Operation

The control system shall function in definitive operational states, such as the following: Run, Pause, Stop, and Emergency.
Local control shall be available. A key operated switch or software protected command shall be provided to select Remote or Local control.

3.13.6 Indications and Alarms

The indications and alarms shall include real-time performance parameters, operation counters, and alarms. These indications and alarms shall be sent to the remote location and also logged and displayed locally at the operations or control panel.

3.14 Main Power Switching

3.14.1 General

The Wind Project Developer shall provide main power hard and soft switching.

3.14.2 Description

The main power switching shall be performed in such a manner as to limit the inrush current. The Wind Project Developer shall provide a description of the main power switching scheme.

If thyristors are used, they shall meet the applicable requirements of IEEE 444. The thyristors shall be fully rated for the application and shall not be damaged due to failure of the power Wind Project Developer to perform its function. Failure of the thyristors shall cause an alarm to be indicated.

3.15 Main power Connection Switchgear

3.15.1 General

The Wind Project Developer shall furnish and install switchgear connected to the University electrical system.

3.15.2 Description

The switchgear shall consist primarily of a main circuit breaker unit, along with associated equipment. All equipment and its installation shall meet applicable NEMA and ANSI or IEC standards.

The equipment shall be provided in a dedicated steel enclosure and be readily accessible for inspection and maintenance. The circuit breaker compartment shall have a hinged door and dead front construction. No exposed buswork or cable connection shall be present with the breaker door open. Plexiglass barriers may be used to prevent contact with live parts.

3.15.3 Main Circuit Breaker

The main circuit breaker shall be an electrically operated low voltage type of standard manufacturer. The trip unit shall be fully adjustable solid state type, designed for the protection of the all equipment. The circuit breaker ampere rating shall be at least 125 percent of the generator full load rating with no power factor correction. The minimum interrupting rating shall be the larger of the generator fault current or the utility supplied fault current, based on the wind turbine generator rating.

Circuit breaker insulation and voltage ratings shall be coordinated with the Wind Project Developer’s complete generator and cabling system.

3.15.4 Auxiliary and Control Power Supply

The Wind Project Developer shall provide the necessary auxiliary and control power supplies for all modes of wind turbine operation. All auxiliary and control supplies shall be from circuits with their own circuit protective device.

3.16 Rotors

Rotor, hub, tower, and all components shall be constructed of new and unused materials. The blades and hub shall be designed to operate at the site conditions specified in Section 1 of this RFP for the design life of the wind turbines. Blades shall be manufactured with UV protection as an integral part of their construction. To minimize blade wash frequency, blades shall be manufactured such that they are resistant to roughness degradation.

3.16.1 Rotor Braking System

The rotor braking system shall be designed to stop the rotor at wind speeds up to the overspeed wind condition without damaging the wind turbine. The rotor braking system

shall be capable of preventing rotor rotation at wind speeds up to the rated turbine survival speed.

3.17 Towers

3.17.1 Tower Type and Material ***(100 meter minimum is requested)***

The wind turbine tower shall be a steel tower of the mono-pole tubular type. The tower shall support the entire wind turbine assembly without the use of guy wires. Tower height shall place the nacelle at 100 meters or higher above the foundation.

If the Wind Project Developer wishes to propose a tower height of less than 100 meters in height, this can be done as a voluntary alternate using a separate bid form.

3.17.2 Tower Access

The tower shall be accessible through a lockable access door at the base of the tower. Permanent metal stairs shall be provided if the access door is above grade level.

3.17.3 Tower Ladder Plus Lift

Provide both a ladder and lift. The tower ladder shall be of the manufacturer's standard type. The tower ladder shall meet all OSHA standard requirements for safety and construction. The tower ladder shall allow access to all equipment. The lift shall be constructed of sound design and conform to all applicable State of Michigan standards. Please clearly describe any exceptions to the Michigan Code as outlined in 1967 PA 227 and 1976 PA 333, Executive Reorganization Order Nos. 1996-2 and 2003-1, MCL 408.808 and 445.2011.

3.17.4 Lighting

The tower and nacelle shall be of the manufacturer's standard type. Lighting shall provide adequate visibility for day or night work inside the tower and shall be operational from the bottom or top of the tower. Tower lighting shall meet OSHA requirements for working environments. Emergency lighting shall provide up to four hours operation on battery. Emergency lights shall be provided for the nacelle, ladder, and ground level interior locations.

3.17.5 Nacelle

The nacelle shall house and protect the generator, drive train, lubrication system,

and associated equipment. The nacelle shall provide adequate working space for service and maintenance work. Access to the rotor hub and system instrumentation shall be safely achievable from inside of the nacelle.

3.17.6 Ventilation

The tower and nacelle shall be provided with ventilation.

3.17.7 Aviation Lighting

Each wind turbine shall be equipped with aviation lighting as required by the Federal Aviation Administration and all other applicable standards. Lighting shall be a red flashing light, type L-864 or equivalent, on each turbine. Flashing of lights shall be synchronized.

3.18 Foundations

The Wind Project Developer shall engineer, design, and install foundations for the WTG(s). The Wind Project Developer shall perform all necessary geotechnical work for proper design of the foundations. Foundations will be designed to meet all WTG manufacturer's required loads. Preliminary geotechnical information will be made available on the project bidding web site. Full geotechnical surveys per site will be done by the University. The Wind Project Developer is responsible to specify in the proposal any further geotechnical investigations necessary for design of turbine foundations. The proposal should include a ten percent buffer for foundation design to account for any changes in geotechnical information.

3.19 Training

The Wind Project Developer shall provide 40 hours of on-site training of University personnel. Operation and maintenance training of University's personnel will take place during construction and testing phases. Training will be sufficient to allow for the University's personnel to handle day to day operations of the WTG(s). Training shall include off-shift hours approved by the University. Training shall cover:

1. Wind turbine basics
2. Turbine operation
3. Start-up
4. Shut-down
5. Mechanical maintenance
6. Electrical maintenance

7. Troubleshooting and fault clearing

3.20 Uninterruptible Power Supply (UPS)

The wind turbines shall be equipped with an uninterruptible power supply (UPS) for storage of data in the controller and for safe egress in the event power from the grid is lost. The UPS shall provide a minimum of 4 hours of uninterrupted power for these functions. In the event of long-term power loss, the wind turbine controller must not lose previously collected data.

3.21 Lightning Protection

The wind turbines shall be furnished with lightning protection covering all aspects of the turbine, including but not limited to blades, generator, gearbox, and control system. The system shall comply with the current edition of the following codes and standards:

1. IEC 61024-1 or IEC 61400-24
2. National Fire Protection Association, NFPA 780, “Lightning Protection Code.”
3. Underwriters’ Laboratories, Inc., UL 96A, “Installation Requirements for Lightning Protection Systems.”
4. Underwriters’ Laboratories, Inc., UL 95, “Lightning Protection Components.”
5. NEC.
6. Any applicable local codes.

The Wind Project Developer’s design and equipment furnished shall meet all requirements to receive the Master Label of the Underwriters’ Laboratories, Inc., for the site. The Wind Project Developer’s lighting protection system design and equipment furnished will not be considered acceptable prior to attachment of the Master Label plate at the site.

3.22 Corrosion Protection

All ferrous materials shall be supplied with coating systems adequate to protect the equipment from corrosion for the design life of the turbines at the proposed locations.

3.23 Scheduled Maintenance

Scheduled maintenance shall be performed at manufacturer’s recommended intervals in accordance with manufacturer specifications. If manufacturer’s recommended intervals are longer than 6 months apart, maintenance shall be performed at a minimum of 6 month intervals.

4.0 Proposed Power Purchase Agreement (PPA)

The University wishes to enter into a PPA with the wind turbine owner for the terms of $0.08 per kW-hour in year one of operation, with a 1.5% annual escalation in each successive year to cover rising costs of operation & maintenance. The University and Wind Project Developer will work in good faith to come to terms on a mutually agreeable PPA during the development of this project. The University is willing to enter into a Development Agreement while the PPA is negotiated in order for the Wind Project Developer to obtain financing for the purchase of the WTG(s).