

ATTACHMENT I
Statement of Work
Wind for Schools – New State Programs

October 5, 2009

Background:

Wind Powering America (WPA) launched a wind for (rural) schools (WfS) pilot project in FY'05 in Colorado which resulted in one school small turbine project and many lessons learned. In FY'07 WPA replicated the pilot in 5 neighboring states, as well as expanding the CO pilot to additional rural CO schools. This current effort expands activities beyond the 6 original states. The WfS program's first long term objective is to develop in-state technical assistance capacity through the development of Wind Applications Centers (WAC) located at a college or university in each state, which will educate engineers in wind applications analysis and development. The second objective of the WfS program is to educate students in wind energy and engage communities in a discussion regarding applications and benefits of a robust wind future for America.

Implementing a school wind project is complex and involves many stakeholders. Based on experience, WPA program has determined that it is prudent to engage an in-state person to interact with the variety of stakeholders that become involved in a school wind project. The key stakeholders are the schools' administrations, the schools' science teachers, the associated communities, the state energy office, local power supplier and in-state sponsorship. Over time it is expected that the WAC leadership would take over this vital role, becoming the main facilitator for WfS and community wind development within the state.

Although activities will initially focus on schools typically in rural areas, the expectation of WPA is that through the development of WfS activities and agricultural outreach, individuals, businesses and utilities will become interested in wind energy as a supply options for their homes, farms, businesses, and communities. The WAC', through direct activities and the education of students who enter the work force, will then be able to address these other markets. It is also expected that the WAC leadership will become a center of wind expertise that can support local governments, state regulators and other state officials as needed to appropriately address the deployment of wind energy in the state.

Objective:

Establish and facilitate the development of an education, training, and implementation center focused on wind energy applications at a state based 4 year university or college and then to implement a state wide wind energy program to support the installation of wind turbines and wind energy educational curricula at interested K-12 schools.

Tasks:

The Subcontractor shall perform the following tasks:

1. Wind Application Center formation: Working with NREL, DOE, and in some cases the state energy office, formulate the Wind Application Center as an entity within the university or college system at a 4 year educational institution within the state. This shall include, but is not limited to, the coordinated development or implementation of a college level wind curricula, development of formal or informal graduate or undergraduate program activities relating to wind energy, such as senior projects, a

small wind applications laboratory or small wind student group, and the development of infrastructure to support the analysis and installation of small wind systems for the WfS program.

2. Demonstration system installation: Working with NREL and the university/college, install a demonstration WfS wind system (defined as a Skystream 3.7 wind turbine and associated system monitoring) at a location in close proximity to the campus as a platform for WAC training and research.
3. State coordinator assistance: Provide assistance as needed in meetings with the school administration, school boards, and local communities where WfS projects are being considered/implemented.
4. Technical Support: Understand and communicate the basics of wind energy and provide to students and host school stakeholders information on wind energy and its appropriate implementation, especially regarding small wind systems.
5. Select schools: Generate and maintain a list of candidate schools who, based on wind resource, teacher and administration interest, and land use constraints, shall be considered to host the installation of a Wind for Schools system. Furthermore, together with NREL and other state based organizations as appropriate, select 3-5 schools/year for actual project analysis and installation.
6. Community coordination: Work with the identified communities of host schools to address any questions and educate them on wind and the WfS program in particular.
7. Science teacher coordination/support: Coordinate the interaction of NREL's and other educational materials and training with the host school science (or other appropriate) teacher. In collaboration with the WAC, facilitate support for the teacher in the development of the project, specifically relating to the host school administration and local Co-op/utility.
 - a. Support (in funding and logistics as appropriate) the holding of wind energy teacher training workshops to be held in a state on a regular basis, being at least every 2 years.
 - b. Support the upkeep and distribution of NREL provided teacher training kits loaned to K-12 schools to facilitate the implementation of educational programs.
 - c. Provides technical assistance as needed to input a defined data acceptance and reporting program based on the WfS data model developed by the program.
8. Turbine installation support: Working with the school, community and a wind turbine supplier, support the installation of 3-5 small wind turbines per year at host WfS K-12 educational institutions.
9. Fundraising Support: In collaboration with the state energy office, school and other state entities, identify state based funding for the implementation of small wind turbines at identified K-12 educational institutions through direct grants, donations, such as in-state WfS green tag purchasers, and/or through in-kind support from local organizations, such as the power company or cooperative.
10. Anemometer loan program: Support the implementation, upkeep, and data processing of wind speed measurement towers provided by NREL to allow assessment of schools without a clearly defined wind resource.
11. Attendance as available to a yearly multi-day Wind for School Summit, typically held in September of each year in Colorado.

Each year it is expected that the following activities will take place:

1. Analyze schools: Based on the candidate list of identified host schools, typically in the area of 10, conduct initial screening analysis on the suitability of sites and schools for WfS system implementation.
2. Select schools: In collaboration with the state WfS program and in some cases the state energy office, down-select to 3-5 host schools for detailed project analysis and installation. Review final selections with NREL staff.
3. WfS turbine analysis and installation: Support as appropriate the installation of 3-5 WfS systems per year at host K-12 schools. This would include, but is not limited to, providing analysis support, support in pursuit of needed permitting, identifying sources of funding, students and staff to assist in the physical installation of the turbines (including foundations), and provide follow up support services to the school as needed.

Government furnished Equipment:

Under this activity it is expected that NREL will provide the following equipment:

- 1) Three (3) 34m anemometer towers and associated logging equipment from Earthturbines Inc. (\$5,155 each or \$15,465)
- 2) One NRG Symphony data logger communications packages (\$1,080)
- 3) Six (6) Exploring Wind Energy Kits, Six (6) Energy From the Wind Kits, six (6) The Wonders of Wind Kits and three (3) The Wind is Energy Kits to be used during appropriate teacher training workshops and left with host states. (total value \$6,000)

Deliverables due from the subcontractor:

- 1) Quarterly progress reports describing project status, student activity, and outreach efforts. Quarterly from start of subcontract
- 2) Annual program summary including information about program accomplishments, outreach activities, student involvement, implemented educational programs and anemometer loan activities, due at end of July of each year.
- 3) Report detailing the organizations structure, leadership, course work, laboratory space and administration of the WAC. This will be the basis for a WAC development and business plan to be developed as a later part of this contract. Due within twelve (12) months from subcontract award.
- 4) Annual analysis and installation report for each of the Wind for Schools pilot projects implemented including but not limited to host system and school information, such as school size, system cost, permitting challenges. Due at the end of September of each year.
- 5) Annual WfS system operational summary providing status of all WfS systems installed in the state to date. The contents of the report will be developed in coordination with NREL but would include indications of system operational status, performance, and service needs. Due at the end of December of each year starting in the 2nd year of the subcontract.

Electronic Reporting Requirements for Subcontract Report Deliverables:

As set forth in Department of Energy Order 241.1A, NREL is required to submit in an electronic format all scientific and technical information, including subcontract report deliverables intended for public distribution, to the DOE Office of Scientific and Technical Information (OSTI). In addition, it is NREL's intention to post subcontract report deliverables containing publicly available information (e.g. non-confidential, non-protected, non-proprietary information) for distribution on the NREL Intranet or the Internet.

The Subcontractor shall provide the final approved version of report deliverables intended for public distribution as specified in the deliverables schedule of this Statement of Work in accordance with the following electronic reporting requirements:

a. The Subcontractor shall submit all report deliverables intended for public distribution (including status, annual, or final reports) as electronic files, preferably with all graphics and images embedded within the document. The electronic files shall be submitted along with an accompanying hard (printed) copy(ies) of the report. Limited exceptions allowing some graphics and images to be submitted as hard copies only may be granted on a case-by-case basis. The exceptions process for graphics and images is described in Paragraph E below. It shall be made clear in the deliverable transmittal letter that certain graphics and images are supplied in hard copy only.

b. All final approved version submissions shall be delivered to NREL on PC or MAC-formatted media (3.5 inch disks, Zip and Jaz cartridges, or CD-ROM). Files of 1 Mb or less can be sent via e-mail to: 1) NREL technical monitor, 2) the NREL Subcontract Administrator or Associate (as specified in the Statement of Work).

c. The preferred format is a single electronic file that includes all of the text, figures, illustrations, and high-resolution digital photographs (or photographs should be scanned and incorporated in the text). Acceptable file formats are:

- Microsoft Word (v.6.0 or newer for PC or MAC)
- WordPerfect (v.6.1 or newer for PC)
- Microsoft PowerPoint
- Microsoft Excel

d. If it is not possible to include all of the graphics and images (figures, illustrations, and photographs) in the same file as the text, NREL will accept the text in one of the above formats and the graphics and images as separate electronic graphic or image files*. The native files for any page layout formats submitted shall be supplied. The following software is supported on both Mac and PC platforms:

- QuarkXPress (.qxd)
- Photoshop (.psd)
- Freehand (.fh)
- Framemaker (.fm)
- Pagemaker (.pm)
- Illustrator (.ai)
- Corel Draw (.cdr)
- Microsoft Publisher(.pub)

*The acceptable graphic or image file formats are: .eps, .tif, .gif, .jpg, .wpg, .wmf, .pct, .png, .bmp, .psd, .ai, .fh, .cdr. The preferred resolution for graphics or images is 150 to 300 dpi. Include all fonts that were used in creating the file.

e. In the rare case that the graphics or images cannot be supplied electronically, either incorporated within the text or as a separate electronic file, original hard copies will be accepted. The Subcontractor shall obtain prior approval from the Subcontract Administrator before submitting graphics or images in hard copies. It shall be made clear in the deliverable transmittal letter that certain graphics and images are supplied in hard copy only.

f. For all calculations in support of subcontract reports that are conducted in ASPEN+, an electronic copy of INPUT, REPORT and BACKUP (if Model Manager is used) must be submitted with all reports. Additionally, if costing or sizing calculations are conducted in a spreadsheet [no process calculations (heat and material balances) in spreadsheet format are permitted], a copy of the fully documented MS Excel file shall be supplied. Note that vendor quotes and other non-original material can be supplied in hard copy.

g. A fully executed release shall be supplied to NREL with all photographs, regardless of whether such photographs are delivered to NREL electronically or in hard copy. Such release shall certify that the National Renewable Energy Laboratory and the United States Government is granted a non-exclusive, paid-up, irrevocable, worldwide license to publish such photographs in any medium or reproduce such photographs or allow others to do so for United States Government purposes.

h. The Subcontractor may contact NREL Publication Services at (303) 275-3648 with questions regarding technical guidance concerning the submission of subcontract report deliverables as electronic files or exceptions to electronic files for graphics and images.

Deliverable Addresses - The Subcontractor shall clearly label all deliverables with the subcontractor name, NREL subcontract number, NREL Technical Monitor name, date, and the deliverable description (e.g., First Monthly Report, Draft Final Report). Deliverables shall be sent to the following addresses:

National Renewable Energy Laboratory

Attn: *****, MS 3811

1617 Cole Blvd.

Golden, CO 80401

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