Wind for Schools
Program Overview

Jerry Hudgins, NE Wind Applications Center Director
Dan McGuire, NE Facilitator

Presentation to
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Developed by NREL and NWAC
NREL: Ian Baring-Gould and Larry Flowers, Marguerite Kelly, Trudy Forsyth & Tony Jimenez
Project Objectives

Engage rural America in the concept that wind offers an alternative energy and economic future for rural America

Engage rural school teachers and students in energy education, specifically wind

Equip college juniors and seniors in wind energy applications and education to provide the growing U.S. wind industry with interested and equipped engineers

Long-term economic development in rural areas is tightly linked to schools

20% energy from wind will require on the order of 2,750,000 FTE job years over a 20 year project life

– We need to start training the people who will make this happen

We hope to meet these objectives by installing small wind turbines at K-12 schools in rural communities with the help of local institutions of higher education
Project Approach

- Low-cost replicable system
- Assist community and local utility to implement a sustainable school wind project
- Work with American Wind Energy Association/National Energy Education Development (AWEA/NEED) on K-12 curriculum
- Build in-state capacity to provide technical assistance for community-scale projects
- Work with State Universities on college-level program and curricula
- Work collaboratively with all community organizations to implement successful projects

Walsenburg, CO
Project Finances

Sample financial arrangement

- Reduced system cost ~$10,000
- $1,500 from the school
- $2,000 from selling lifetime green tags through a broker
  - Community Energy
- $2,500 from a buy-down fund or other grant source
- $4,000 provided in-kind by the community and utility

Payback - The real payback is in the education

- Skystream @70ft in a class 3 wind resource will produce about 6000 kWh/year
- At a retail rate of $0.05 / kWh this amounts to ~$300 per year in reduced energy costs
- Simple payback to school ~5 years
Supply organization, oversight, financial assistance, and training to state organizations implementing Wind for Schools projects

- Provide initial/seed funding for the Wind Application Center (3 years)
- Provide funding for the State Facilitation (3 years)
- Host a yearly week long training program at NREL on wind applications
- Assist in the identification of candidate schools and final school assessment (resource analysis, siting and interconnection, installation guidance etc)
- Support the development of wind specific energy curricula
- Development of project documentation, legal information, and other logistical support

**Education Curricula:**

- Work with partners (e.g. NEED, KidWind) to develop K-12 Curricula incorporating data from the wind turbine for projects
- Development of college curriculum with WACs
State Facilitators

In-state person with knowledge of local issues and organizations to engage with the variety of stakeholders needed for successful school projects

- Engage with the variety of stakeholders needed for successful school projects: community, school, science teachers, local co-op/utility, WAC, NREL
- Help assemble financial package that will work
- Goal: Install 3 to 5 systems per year at rural schools
- Assist in the development of the Wind Applications Center

Nebraska: Dan McGuire, American Corn Growers Foundation

Colorado: Tom Potter, All American Energy
Idaho: Brian Jackson, Renaissance Engineering
Kansas: Dan Nagengast, Kansas Rural Center
Montana: Mike Costanti, Matney-Frantz Engineering
South Dakota: Steve Wegman, SD Public Utilities Commission
Wind Application Centers

Establish a training and implementation center to educate engineers in wind applications and analysis:
- Modeled after the DOE Industrial Application Center
- Develop a long-term program on wind energy applications; NREL/DOE will help for first 3 years but additional funding will be needed
- Provide data analysis, technical assistance, implementation support for Wind for Schools Program
- Become the “go-to place” for technical assistance for school and community wind
- Train engineers to enter the wind marketplace/industry

University of Nebraska-Lincoln
Colorado State University
Boise State University
Kansas State University
Montana State University
South Dakota State University
Nebraska Wind Applications Center works in collaboration with the Nebraska Center for Energy Sciences Research

- Funded by Nebraska Public Power District
- Research
  - 2 wind projects among 19 funded
- Education
  - 4 efficiency and renewable projects funded
  - 1 developed an Energy Sciences Minor
  - Seminars
- Vision for Energy Sciences at UNL
  - 21st Century Power Generating Systems
**Nebraska Wind Applications Center**

- Skystream 3.7 specifications:
  - 1.8 kW (2.4 kW peak)
  - Weight 170 lbs.
  - Rotor Diameter is 12 feet
  - Cut-in Wind Speed 8 mph (3.5 m/s)
  - Rated Wind Speed 20 mph (9 m/s)
  - Survival Wind Speed 140 mph (63 m/s)
  - Rated Speed 50-325 rpm
  - Wireless 2-way interface remote system

Shown: nacelle and single blade
• UNL Skystream Turbine Installation Location at Roger’s Memorial Farm

• Rebar Assembly for Turbine Foundation
• Pouring the foundation for the monopole tower

• Monopole Ready to be Raised
Elkhorn Valley High School, Tilden, NE
- School Board, Community, and Local Utility Support Garnered
- Site Selected
- Initial Budget and Engineering Specifications Delivered

Hayes Center High School, Hayes Center, NE
- School Board and Community Support Garnered
- Site Selected
- Initial Project Budget Delivered
NREL Program Expansion Plans

2007 Pilot Rollout
- Initial Pilot underway in Colorado
- Contracts in place for the first five pilot expansion states
- First Wind for Schools applications training workshop in September
- First potential school systems were analyzed this past fall
- Power systems being implemented in late 2007 and through spring 2008

2008 Phased Rollout
- Funding looking constrained in FY2008 - Congress still needs to act
- With appropriate funding – expect to roll out to 5 additional states in the spring of 2008
- Process of determining where rollout will take place is unclear - priority states, regional focus, competitive competition…
- Hope to expand to approximately 5 new states each year

There are many other State based programs to develop educational opportunities in schools – feel free to use our support services, but don’t feel you have to wait for our program
Carpe Ventem

http://windpoweringamerica.gov
Click on Schools under Program Areas
Carpe Ventem Magnus Rutilus

http://engineering.unl.edu/academicunits/electricalengineering/
http://www.ncesr.unl.edu/