

# WIND TURBINE PROJECT



## Project Description

3/3/11 Edition



**CUYAHOGA COUNTY**  
**DEPARTMENT of PUBLIC WORKS**



CUYAHOGA COUNTY AGRICULTURAL SOCIETY  
P.O. Box 135  
164 Eastland Road  
Berea, Ohio 44017-0135  
Phone (440) 243-0090 – FAX (440) 243-0344  
Web Site – [www.cuyfair.com](http://www.cuyfair.com)

## CUYAHOGA COUNTY AGRICULTURAL SOCIETY

### RESOLUTION

Whereas, the most significant development affecting our country's economy is that of Renewable Energy, as represented by wind, solar, bio-mass and geothermal sources, and

Whereas, Cuyahoga County, as evidenced by its creation of an Energy Task Force, wishes to take a leadership role in the promotion of renewable energies as a means of creation of new manufacturing jobs in the County, and

Whereas, the mission of the Fair Board is to educate and demonstrate, and

Whereas, the County Fairgrounds presents ample, open space, an opportunity to install electricity-generating equipment utilizing renewable energy sources, and thousands of visitors to view such equipment and become educated on the benefits of developing renewable energy sources to reduce our dependence on oil & gas, to reduce air pollution, to reduce global warming, to create wind turbine manufacturing jobs which will improve the area's economy, and

Whereas, an installation at the Fairgrounds would be the first for the County,

Therefore, be it resolved that the Fair Board provide leadership in the County's goal by initiating and pursuing a program directed at the installation of demonstration-scale Wind Turbine and Solar Array on the County Fairgrounds, and

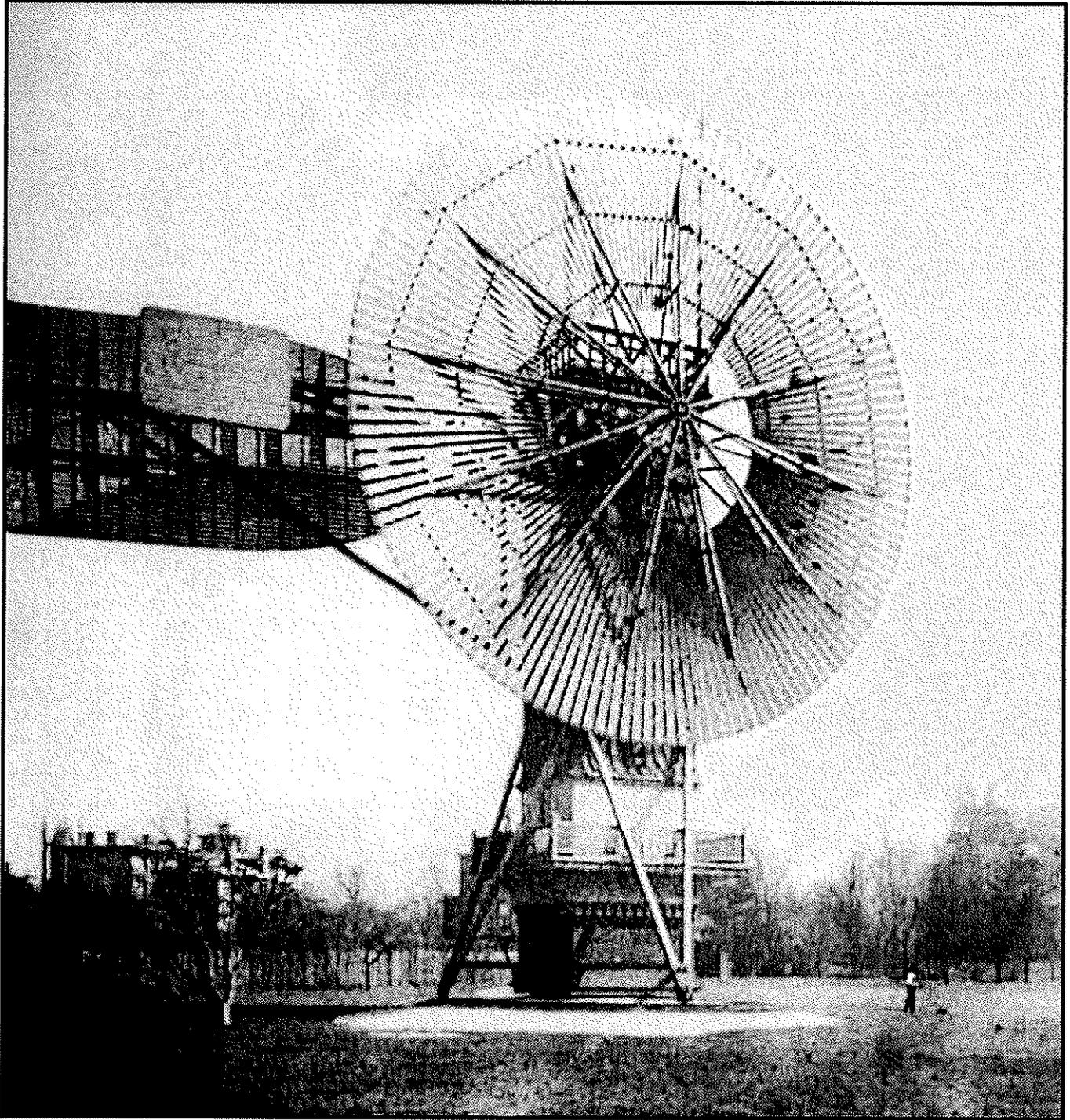
Furthermore, form a Renewable Energy Committee to develop the programs. The committee to be chaired by Joanne Scudder and including Stan Trupo, governmental; Nick Willis, technical; Jeff Collins, facilities and Kate Renaud, education.

Respectfully submitted by: Joanne Scudder, Director

Date: January 24, 2008

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Charles F. Brush's Automatic Wind Turbine 1888  
**It all started in Cuyahoga County, Ohio.**

# **PROJECT DEFINITION**

## **Location:**

- Cuyahoga County Fairgrounds (Cleveland, OH suburbs)
- 115-acre urban site, surrounded by residential and business

## **Sponsors:**

- Cuyahoga County Agricultural Society (Fairgrounds Managers) and Cuyahoga County government (Fairgrounds Owners)

## **Equipment:**

- Single 500 kW wind turbine

## **Educational Facility:**

- 2,000 s.f. Energy Center, with exhibit space and classroom
- Collaboration with college and career center

## **Benefits:**

- Public promotion of wind Renewable Energy
- Attract wind manufacturing jobs to Cleveland area
- Save \$50,000 per year in Fairgrounds' electricity cost

## **Project Team:**

- Joanne Scudder, Fair Board Director
- Nick Willis, County Project Manager
- Aaron Godwin, The Renaissance Group, Owner's Rep



## CUYAHOGA COUNTY DEPARTMENT of PUBLIC WORKS

### FAIRGROUNDS WIND TURBINE PROJECT

#### PROJECT FEATURES

##### **Intent**

Cuyahoga County and the Cuyahoga County Agricultural Society (Fair Board), wish to install a 500 kW wind turbine generator on the grounds of the Cuyahoga County Fairgrounds in Berea, with construction starting in May 2011 and completing by February 2012.

##### **Purpose**

The purpose of the installation is to promote the utilization of Renewable Energy in Northeast Ohio, by the installation of wind turbines and solar arrays. The immediate benefits will be the reduction in the burning of fossil fuels to generate electricity. This will result in less air pollution, a slowing of global warming and a reduction in America's dependence on foreign oil & gas.

##### **Goal**

The ultimate goal of such installations is to project a wind-friendly image and to attract wind industry manufacturing expansions to locate in Northeast Ohio, creating new manufacturing jobs in this depressed area.

##### **Other Benefits**

The wind turbine would be seen by the 400,000 visitors to the Fairgrounds each year, and would attract even more, thus increasing the attendance and the economic viability of the Fairgrounds. As a medium-size utility turbine, the unit would be twice the size and twice the electricity production of the turbine at the Great Lakes Science Center in downtown Cleveland. With the moderate winds at the Fairgrounds, it is expected to generate an amount of electricity to result in a \$50,000 per year savings in the Fairgrounds' electricity bills. After maintenance costs, this savings will be re-invested in improvements to the Fairgrounds, thus assuring longevity to that historic, community-friendly operation.

##### **Community Benefits**

The residents of the City of Berea will see this wind turbine as a symbol of a progressive, leading, eco-friendly city. We expect they will point with pride to this icon of Renewable Energy.

## **Supporters & Funding**

The State of Ohio and DOE have awarded this project \$1,275,000 in a competitive grant encouraging the deployment of wind energy installations. Another \$400,000 in federal DOE funds has been obtained from an EECBG award to the County. The County will fund the balance of \$476,000.

## **Scope**

The proposed project would consist of the erection of a 500 kW generator in a nacelle mounted on a 200' monopole tower. The generator would be wind-driven, by a 3-blade rotor with each blade being 61' long. The overall height to tip of rotating blade would be 261'. The proposed location is in Berea, in the center of the horse track, opposite the Gate #2 entrance (Center Drive).

Because there are no U.S.-manufactured turbines in this size range, the turbine will be obtained from Germany, where it is currently in operation and is scheduled to be decommissioned and replaced by a larger turbine. It will be shipped to the USA and re-manufactured in the USA. The tower will be shipped to Ohio where a 50% extension will be fabricated. The tower extension and the construction will add jobs in Ohio and will prepare workers and shops for the wind industry.

## **Cost**

The total cost of the turbine installation is \$2,076,000. Spending this amount of money in Berea and Northeast Ohio will certainly help the local economy.

## **Jobs**

Fabricating a tower extension in Ohio will create jobs and will prepare the fabricator for future wind business. Construction of the massive foundation (about 400 cubic yards of concrete), the electrical installation and the turbine erection will create other jobs, which will be temporary, but will prepare workers and companies for future opportunities.

## **Design Precautions**

People are free to be under the turbine, as they are at all installations, including the Science Center. Turbines on a properly designed foundation can withstand winds up to 110 mph. Turbines do not fall over. But, as a prudent precaution, the turbine will be located so as to be at least 287' (1.10 x o.a.h.) from any structure or power line.

## **Safety**

The safety record of wind turbines in their 25 years in Europe and about 10 years in the U.S. is excellent. Virtually, all incidents have involved construction workers not following strict U.S., OSHA safety procedures, principally, not being tied off when working on top of the nacelle mounted on the 200' tower. Even with the incidents that have occurred, the safety record for erection of wind turbines is many times better than for construction in general.

## **Insurance Coverage**

As Owner of the Fairgrounds and its improvements (including a wind turbine), Cuyahoga County carries a Property Damage policy through FM Global with a \$1 million deductible. The County is self-insured for Public Liability.

## **Studies**

A Feasibility Study was prepared by The Renaissance Group. Winds were monitored for 14 months by Green Energy Ohio.

## **Approvals**

FAA, ODOT Aviation and MedEvac approved the installation at a 295' height. Actual will be 261'. The new coordinates will be submitted. U. S. Fish & Wildlife has no issues; Western Reserve Audubon Society supports the clean-air project. FirstEnergy has signed agreements for Interconnection and Net Metering.

## **Objectors**

Quadax Inc. on Old Oak Drive was opposed; their CEO did not want to see the turbine, nor have his workers distracted by seeing it. In the revised location, existing trees will block views from their offices.

Century Oak Care Center on Old Oak Drive was opposed, again not wanting to view the turbine. In the revised location, the turbine will be another 600' away from them, reducing the visual impact.

American Tower, of Woburn Massachusetts, which has a land lease from the Fairgrounds for their cell phone transmission tower, was opposed, claiming possible radio frequency interference. As part of the Environmental Assessment, a microwave study concluded that there would be no interference. American Tower's main concern is not degradation of signal, but unfavorable perception by potential lessees for tower space (i.e., reduced marketing potential).

Mayor and Council of the City of Middleburg Heights were not receptive to our application to locate the turbine in the Fairgrounds main parking lot, where the wind was expected to be somewhat better. Consideration of future availability of that land may have been a factor.

## **Proponents**

The Sun News poll indicates 80% of residents favor approval of this project. A Middleburg Heights councilman reported that he has received about 80 letters, with 90% in favor. Baldwin-Wallace College and Polaris Career Center are very enthusiastic about collaborating on this educational project. The City of Berea welcomed the project.



## CUYAHOGA COUNTY DEPARTMENT of PUBLIC WORKS

### FAIRGROUNDS WIND TURBINE PROJECT

STATUS REPORT (3-3-11)

#### Project Description

The Fairgrounds Wind Turbine Project consists of a 500 kW wind turbine, re-manufactured in Ohio, and a 2,000 sq. ft. Energy Center building with exhibits and teaching space. The project continues to move forward, though heretofore slowed by DOE funding prerequisites.

#### Purpose/Benefits

The wind turbine and Energy Center will be utilized to educate the 400,000 annual visitors on Renewable Energy, to provide Sustainability degree credit by Baldwin-Wallace College, to provide jobs training for the wind industry by Polaris Career Center and to reduce by half the Society's single largest expense, its electricity bills of about \$90,000 per year.

#### Funding

\$1,675,000 in grants has been obtained for this \$2,151,000 project and the County will fund the balance, which will cover the Energy Center.

#### Project Execution

A feasibility study was prepared by The Renaissance Group. Winds were measured by Green Energy Ohio from a 50 meter met tower for 14 months. Electrical Interconnection and Net Metering agreements have been approved by FirstEnergy. \$1,275,000 million in an ARRA-SEP grant and \$400,000 in an EECBG grant have been obtained. City and FAA approvals for the Berea site have been obtained. The project's "substantial transformation" qualification for Buy American was approved. The Renaissance Group gathered data for the Environmental Assessment and have been contracted to be the Owner's Rep. The Environmental Assessment has received all approvals and a Finding Of No Significant Impact (FONSI) letter is being prepared by DOE, which will trigger release of grant funds. A turbine contract will then be awarded.

#### Timetable

The DOE-required NEPA Environmental Assessment, including wildlife, noise, flicker and historical potential impacts was basically approved on February 11, 2011. Construction of the turbine foundation and the Energy Center building are now expected to start in August 2011. The turbine would be re-built, then erected and commissioned in December 2011.



Focal Plane Photography, LLC  
12 Aug 2007

BEREA FAIRGROUNDS WIND TURBINE

## **SUPPORT LETTERS**

International Brotherhood of Electrical Workers Union

Building Laborer's Union

Iron Workers' Union

Western Reserve Audubon Society

US Fish & Wildlife Service

Polaris Career Center

Baldwin-Wallace College

Cuyahoga County Commissioners

Lake Erie Offshore Wind Task Force

# PROJECT COSTS & FUNDING

## COSTS

### Turbine Installation

500 kW Turbine, used & re-built	\$	600,000
Tower Extension		200,000
Design & Bond		100,000
Foundation		200,000
Electrical		150,000
Installation & Commissioning		100,000
Construction Allowance		50,000
<b>Turbine Contract</b>	<b>\$</b>	<b>1,400,000</b>
County Project Management		80,000
Owner's Rep, Consultants, Geotech		120,000
Environmental Assessment		75,000
<b>Turbine Subtotal</b>	<b>\$</b>	<b>1,675,000</b>

### Energy Center

Design & Field Observation		76,000
Building & Exhibits		400,000
<b>Energy Center Subtotal</b>	<b>\$</b>	<b>476,000</b>

**PROJECT TOTAL COSTS** **\$ 2,151,000**

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## FUNDINGS

ARRA-SEP Grant (ODOD/DOE)		1,275,000
EECBG Grant (DOE)		400,000
Cuyahoga County (Energy Center)		476,000
<b>PROJECT TOTAL FUNDING</b>	<b>\$</b>	<b>2,151,000</b>

## **FUNDING DELAYS**

- Tried private foundations, but no, due to bad economy
- Obama's ARRA "Stimulus" program –  
Applied in September 2009  
Awarded in November 2009  
Official Agreement date: April 2010
- DOE added requirement to prepare a NEPA Environmental Assessment (+8 months). Expect to complete & be approved in December 2011. Finalizes the grant.
- Can then Award turbine contract, with 8-month delivery

# **SCHEDULE MILESTONES**

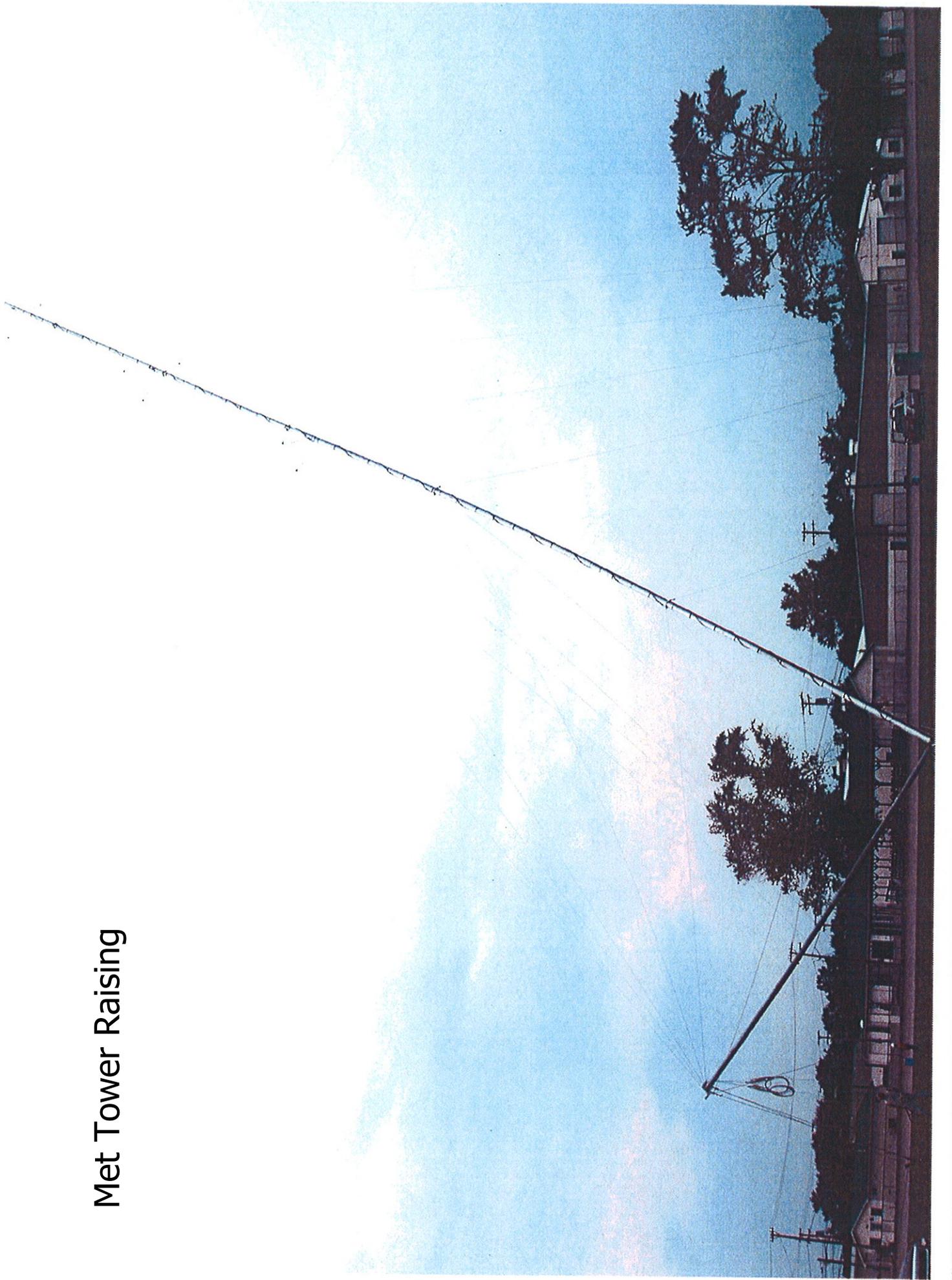
## **PAST**

Idea Conceived	January 2008
Feasibility Study	August 2008
Wind Monitoring	June 2008 - August 2009
FAA Approval	August 2008
Private Grants Sought	Fall 2008
Power Company Agreements	July 2009
Federal Grants Obtained	November 2009
City Approval Obtained	May 2010
Environmental Assessment	February 2011

## **FUTURE**

Contracts Awarded	April 2011
Foundation & Electrical	September 2011
Turbine & Tower Delivered	October 2011
Installation	November 2011
Commissioning	December 2011
On the Grid	December 2011

# Met Tower Raising



# **APPROVAL HURDLES**

## **CITY**

- Neighboring business CEO: "don't want to look at a wind turbine & don't want employees to be distracted from their work"
- Nursing home: "too close" (700')
- Cell tower owner: "will cause interference" (800')
- Mayor & Council denied project after 22 months of hearings
- Moved site to other host city; quickly approved

## **FAA**

- Approved application for 280'.
- Relocated turbine 600' and received Notice of Potential Hazard. Airport had meanwhile amended planning to add another runway. Choices: **1)** shorten to 107', **2)** relocate 300' away, or **3)** request further review ("Circ").
- Approved new location at height of 295', after two (2) months.

## **BUY AMERICAN**

- Unless, 1) if the item is not made in USA, 2) if U.S.-made would increase project costs more than 25%, 3) if Buy American would be inconsistent with the public interest
- Or, "Substantial Transformation" (**Yes to either 1, 2, or 3**)
  1. Made and assembled in U.S.? – **No**
  2. Change of character? – **No**
  3. Were U.S. processes complex and meaningful? – **Yes**
    - a) Substantial amount of time? – **Yes**
    - b) Costly? – **Yes**
    - c) Require high-level skills? – **Yes**
    - d) Require a number of different operations? – **Yes**
    - e) Substantial value added? – **Yes**
- Approved for first proposed turbine
- Seeking approval for current turbine

## **ENVIRONMENTAL ASSESSMENT**

- Noise, flicker, visibility: all okay
- Indiana bats: new USFWS regulation requiring 1000' from woodlot (ours is 750'); approved
- Historical Impact: turbine in city with (4,000) pre-1950 buildings; approved
- EA approved after eight (8) months preparation

## **PUBLIC HEARINGS**

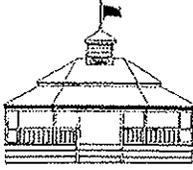
DATE	CITY	WITH	PURPOSE	RESULT
05/22/08	<b>Middleburg Heights</b>	Mayor	Introduction	Proceed
09/17/08	Middleburg Heights	BZA	250' Zoning	Approved
10/29/08	Middleburg Heights	Planning	Project	Approved
11/24/08	Middleburg Heights	Council Comm.	Zoning	Approved
12/02/08	Middleburg Heights	Council & Mayor	Final	<b>Approved</b>

(09/16/09 – Middleburg Heights 12-month Zoning approval expired)

12/16/09	Middleburg Heights	BZA	280' Zoning	Approved
03/10/10	Middleburg Heights	Planning	Project	Approved
03/23/10	Middleburg Heights	Council & Mayor	Final	<b>Denied</b>

(03/25/10 – Relocated turbine to City of Berea portion of Fairgrounds)

03/26/10	<b>Berea</b>	Mayor & Law Director	Introduction	Apply
04/21/10	Berea	Arch. Board	Architectural	Approved
05/06/10	Berea	Planning	Final	<b>Approved</b>



# CITY OF BERE A

*"The Grindstone City"*

Cyril Kleem  
*Mayor*

11 Berea Commons  
Berea, Ohio 44017  
440) 826-5800  
Fax. (440) 826-4800  
Website [www.bereaohio.com](http://www.bereaohio.com)

August 2, 2010

Mr. Nick Willis, Project Manager  
Cuyahoga County  
1642 Lakeside Ave.  
Cleveland, OH 44114

Re: Wind Turbine Project  
Cuyahoga County Fairgrounds

Dear Mr. Willis:

This letter is being written to establish that the Wind Turbine Project at the Cuyahoga County Fairgrounds came before the Berea Municipal Planning Commission on May 6, 2010 for Conditional Use Approval and the Berea Municipal Planning Commission voted unanimously to grant the Conditional Use Approval, please see copies of the minutes of that meeting enclosed herewith.

Should you have any further questions regarding this issue, please do not hesitate to contact me at 440-826-5803.

Very truly yours,

CITY OF BERE A

Matthew J. Madzy  
Building, Engineering, Planning





Federal Aviation Administration  
 Air Traffic Airspace Branch, ASW-520  
 2601 Meacham Blvd.  
 Fort Worth, TX 76137-0520

Aeronautical Study No.  
 2010-WTE-4616-OE

Issued Date: 07/06/2010

Dave Stephan, President  
 Cuyahoga County Agricultural Society  
 164 Eastland Road  
 Berea, OH 44017

**\*\* DETERMINATION OF NO HAZARD TO AIR NAVIGATION \*\***

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure: Wind Turbine Fairgrounds Wind Turbine  
 Location: Berea 44017, OH  
 Latitude: 41-21-59.50N NAD 83  
 Longitude: 81-50-21.10W  
 Heights: 295 feet above ground level (AGL)  
 1095 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure would have no substantial adverse effect on the safe and efficient utilization of the navigable airspace by aircraft or on the operation of air navigation facilities. Therefore, pursuant to the authority delegated to me, it is hereby determined that the structure would not be a hazard to air navigation provided the following condition(s) is(are) met:

As a condition to this Determination, the structure is marked and/or lighted in accordance with FAA Advisory circular 70/7460-1 K Change 2, Obstruction Marking and Lighting, white paint/synchronized red lights - Chapters 4,12&13(Turbines).

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be completed and returned to this office any time the project is abandoned or:

- At least 10 days prior to start of construction (7460-2, Part I)
- Within 5 days after the construction reaches its greatest height (7460-2, Part II)

See attachment for additional condition(s) or information.

This determination expires on 07/06/2012 unless:

- (a) extended, revised or terminated by the issuing office.
- (b) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit has been filed, as required by the FCC, within 6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for completion of construction, or the date the FCC denies the application.

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## Sample Foundation for a Spread Footer Type





## FAIRGROUNDS WIND TURBINE DEMONSTRATION PROJECT

### EDUCATION INITIATIVES

#### 1. Interpretive Center

Construct a building and install interactive displays to educate visitors about electricity production from renewable energies.

- a. New building, inside Fairgrounds gates. Office & restrooms
- b. Interactive educational modules on wind, solar and sustainability
- c. Visual, with touch-screen technology
- d. View of wind turbine
- e. Classroom facility available for large groups

#### 2. Collaborations

Develop working relationships and joint projects with area organizations with similar interests

- a. Polaris Career Center
- b. Baldwin Wallace College
- c. Case Western Reserve University
- d. Cuyahoga Community College
- e. Lorain Community College
- f. Cleveland State University
- g. Parker Hannifin Corp.
- h. Lincoln Electric
- i. Great Lakes Offshore Wind Turbines Project

#### 3. Website (implemented)

Have already added a Renewable Energy page to the Fairgrounds' website [www.cuyfair.com](http://www.cuyfair.com) . Some of the future components will be:

- a. Photos & progress reports from the design & construction activities
- b. Live read-outs of wind, solar and electricity from the completed installation.
- c. Net metering status
- d. Community involvement
- g. Search engine, links to related sites, FAQ

#### 4. Community Outreach

Create Energy events, conduct workshops, transport students to the Fairgrounds, participate in other similar conferences, fairs, seminars. Provide speakers.

8/13/09

**Doty & Miller Architects**

600 Broadway Avenue  
Cincinnati, OH 45202  
tel: 440-399-4100  
fax: 440-399-4111  
www.dotyandmiller.com



view of exhibit space  
scale : none

**Cuyahoga County Fairgrounds Energy Building**

January 15, 2010



**Doty & Miller Architects**

600 Broadway Avenue  
Beavercreek, OH 45317  
tel: 440-399-4100  
fax: 440-399-4111  
www.dotyandmiller.com



NORTHWEST ELEVATION  
SCALE: 1/4" = 1'-0"

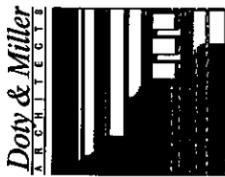
SOUTHWEST ELEVATION  
SCALE: 1/4" = 1'-0"

exterior elevations

**Cuyahoga County Fairgrounds Energy Building**

January 13, 2010





800 Brownway Avenue  
 Bedford, OH 44118  
 Tel: (440) 884-1111  
 Fax: (440) 884-4111  
 www.doyandmiller.com

**PRELIMINARY**  
 DRAWINGS  
 NOT FOR CONSTRUCTION

PLANS AND  
 WALL TYPES

12.08.10 CLIENT REVIEW  
 08.22.10 CLIENT REVIEW  
 04.20.10 CLIENT REVIEW  
 01.13.10 PLANNING COMMISSION  
 01.07.10 DESIGN REVIEW

**A2.00**

