

# FORT BELKNAP INDIAN COMMUNITY

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**Department of Energy  
Office of Energy Efficiency & Renewable Energy  
Tribal Energy Program  
FY-2007 Program Review**

**Denver, CO  
November 7, 2007**



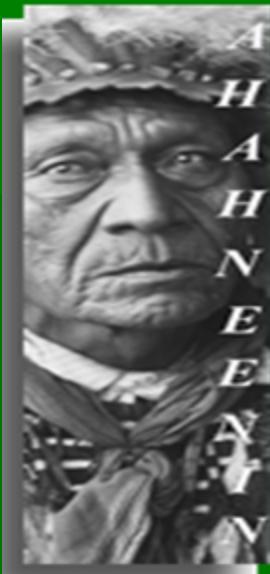
# FORT BELKNAP INDIAN COMMUNITY

- History
  - Location
  - Project Overview
  - Project Participants
  - Objectives
- 

## On-Going Projects

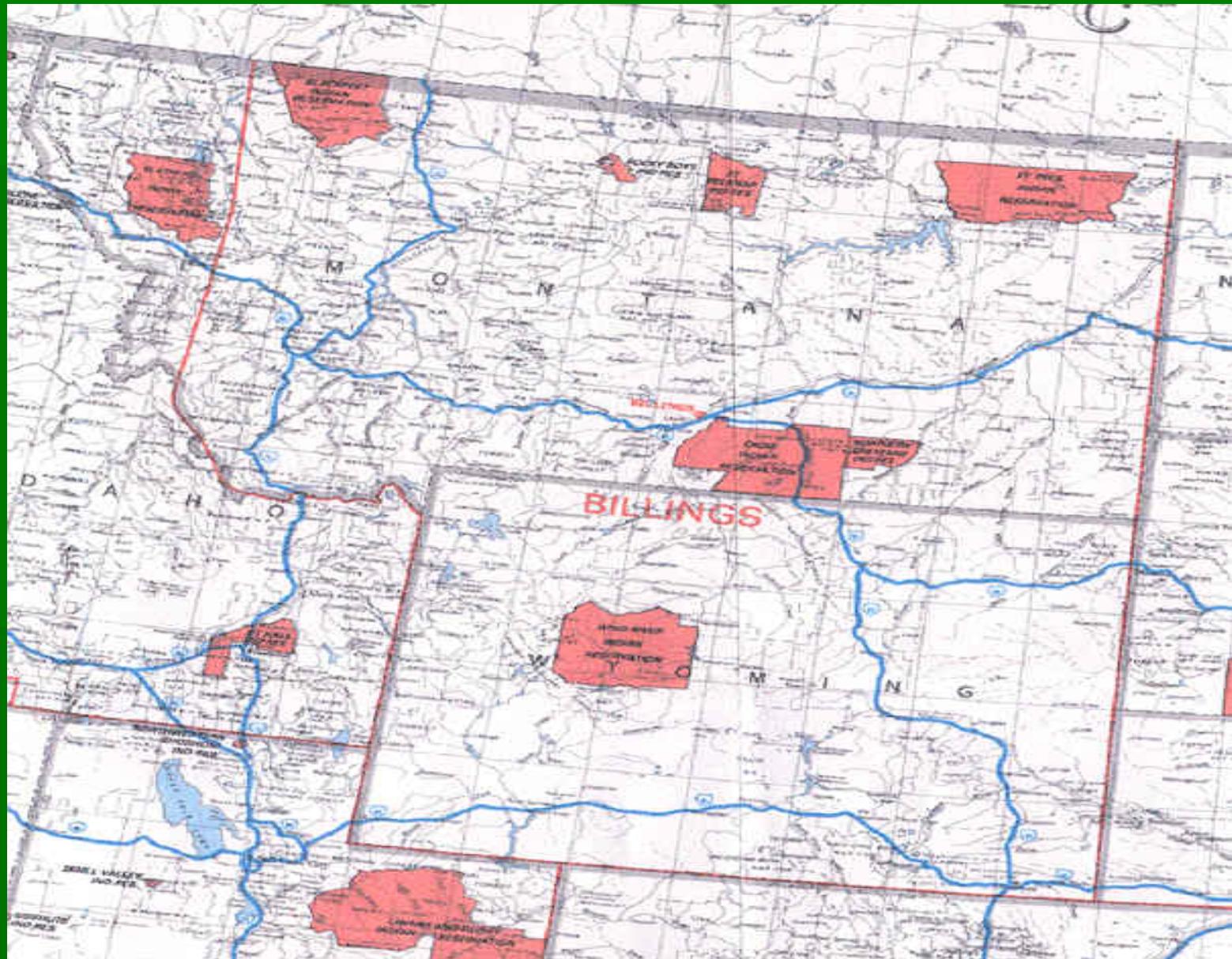
- Project Status
  - Accomplishments
  - Technical or Management Issues
  - Activities Yet to be Completed
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# FORT BELKNAP INDIAN COMMUNITY

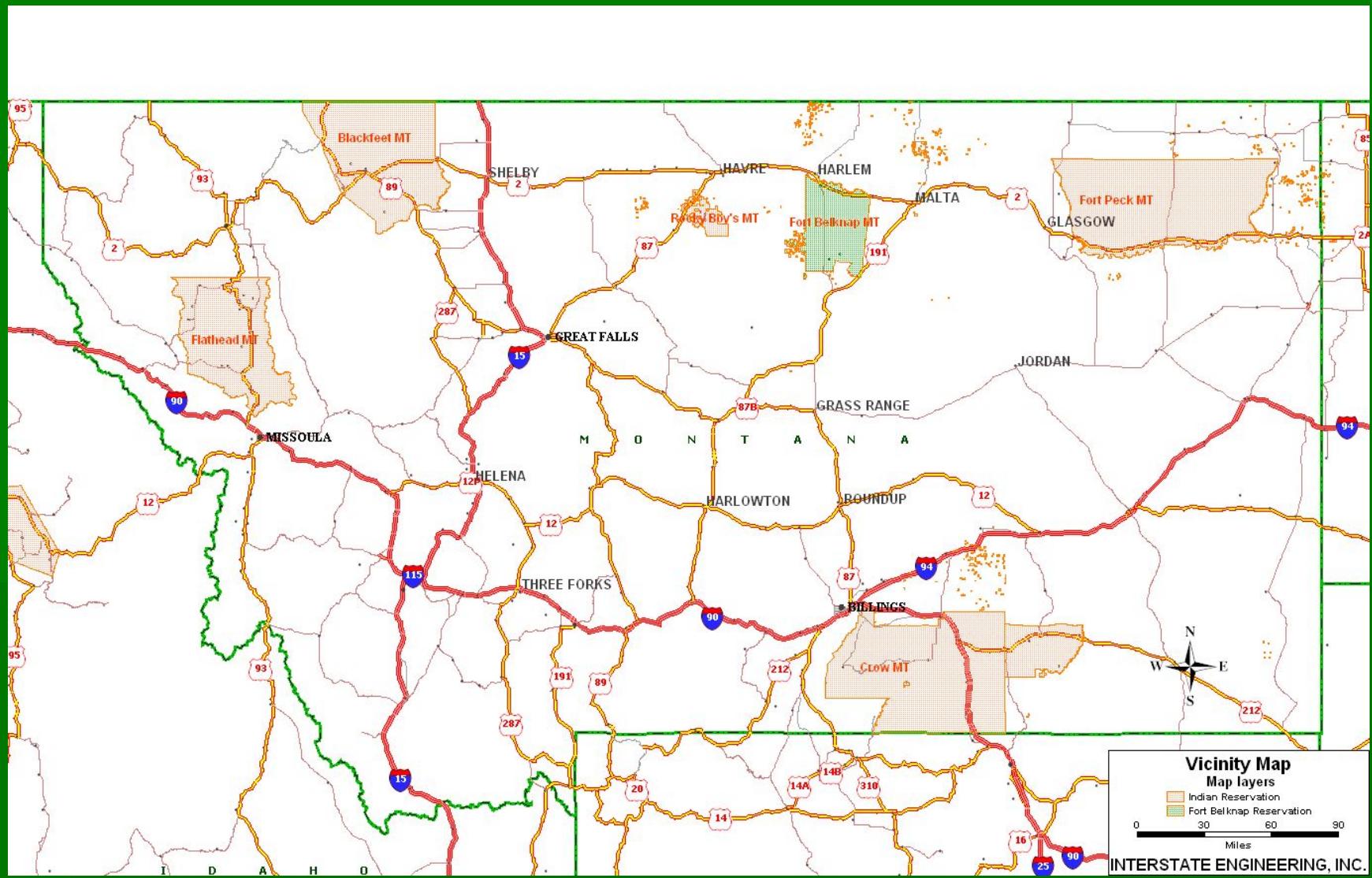


Established in 1869, the Fort Belknap Reservation is the home to two distinct Northern Nations, the Gros Ventre and the Assiniboine tribes. The reservation is located in north central Montana about 36 miles from the Canadian border. Fort Belknap was established in 1869 near the present town of Chinook, Montana. The new fort served as a trading post and became the government agency for the Gros Ventre and Assiniboine Indians living in the area. On May 1, 1888, a congressional act set aside the land for the Fort Belknap Reservation. Later that year, the agency moved from Chinook to its present location five miles east of Harlem, on the northwest corner of the reservation.

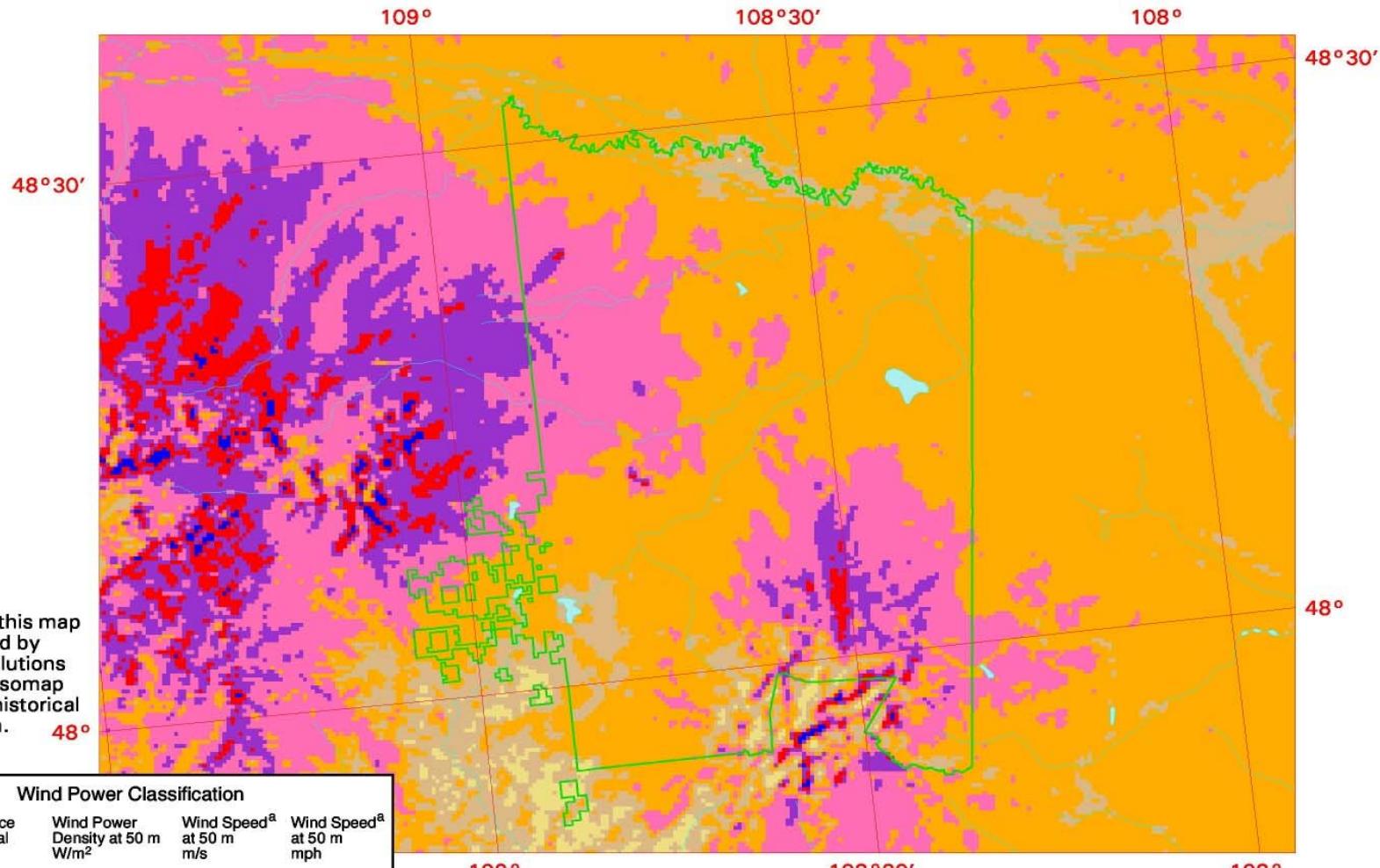
# LOCATION



# LOCATION



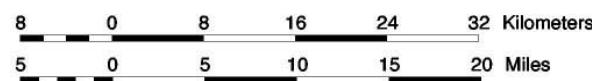
# Fort Belknap Reservation - Wind Power Resource Data



DRAFT  
NOT FOR PUBLICATION

Wind Power Class	Resource Potential	Wind Power Density at 50 m W/m <sup>2</sup>	Wind Speed <sup>a</sup> at 50 m m/s	Wind Speed <sup>a</sup> at 50 m mph
1	Poor	0 - 100	0.0 - 4.4	0.0 - 9.8
1	Poor	100 - 200	4.4 - 5.6	9.8 - 12.5
2	Marginal	200 - 300	5.6 - 6.4	12.5 - 14.3
3	Fair	300 - 400	6.4 - 7.0	14.3 - 15.7
4	Good	400 - 500	7.0 - 7.5	15.7 - 16.8
5	Excellent	500 - 600	7.5 - 8.0	16.8 - 17.9
6	Outstanding	600 - 800	8.0 - 8.8	17.9 - 19.7
7	Superb	> 800	> 8.8	> 19.7

<sup>a</sup>Wind speeds are based on a Weibull k value of 2.0



U.S. Department of Energy  
National Renewable Energy Laboratory



19-JAN-2002 1.1.19

# Fort Belknap Indian Reservation

The Fort Belknap Indian Reservation is located in north central Montana near the town of Harlem. Its northern border runs along the Milk River generally north of US Highway 2 for a distance of about 32 miles. State Highway 66 bisects the reservation on the west side from the Blaine County / Phillips County line (the south border of the reservation) north to US Highway 2. The reservation is approximately 28 miles wide in the east/west direction and approximately 37 miles long in the north/south direction. The total land area of the reservation is approximately 1,011 square miles. Most of the reservation is located in Blaine County, while the eastern most five miles are located in Phillips County.

# **Project Overview**

Recognizing that Montana ranks fifth among all states in wind energy potential the Applicant has chosen to investigate the opportunities for wind energy development on the Reservation. Previously, on November 6, 2002, the Applicant installed a 20 meter meteorological tower in the northwest portion of the Reservation. That installation was accomplished with equipment on loan through the National Renewable Energy Laboratory (“NREL”) Equipment Loan Program and with advice from the NREL staff.

# Project Overview

Contracted with Distributed Generation Systems, Inc. (“Disgen”) of Lakewood, Colorado to assist in the preparation of the DOE application and to conduct the Study in cooperation with the FBICC’s staff.

Install a new 50 meter meteorological tower in the northwest portion of the reservation, move the existing 20 meter meteorological equipment to a location near an elementary school in the community of Lodgepole, in the southern portion of the reservation and to install meteorological equipment on a communications tower near Route 66 in the center of the Reservation.

# Project Participants

- Fort Belknap Indian Community Council
- FBIC Transportation Planning Department
- FBIC EPA
- Disgen Native American Programs and Resources (Cost Sharing Partner)
- Meteorologist Ed McCarthy

# Objectives

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The Study's objective is to fully evaluate the Reservation's potential for wind energy development both for use on Reservation and for export off Reservation. In addition, the FBICC's seeks to evaluate the potential for wind/electric water pumping and modern wind/mechanical water pumping systems for remote areas of the reservation and for wind/hybrid systems that may be used on Reservation in ways that may assist the Applicant in managing its energy costs.

# Fort Belknap Indian Community

## Wind Development Plan

### Goals & Objectives

**Updated: January/2006**

Short-Term Present - 1yr. January/01 to Jan/2002	Mid-Range 1 yr - 3yr. January/02 to Jan/2005	Long-Range 3 yr – 10 yr. January/05 to Feb/2015	Notes:
Letter submitted to Tony Jimenez, NREL, Jan/01 regarding Data Collection.			Wind Technology Project: Research Anemometer Tower for data collection.
February 6, 2001 Marty Wilde, Wilde Coyote Engineering, presentation to Tribal Council, regarding Wind Energy and the data collection phase, on the same day we erected the data collector at a location south of Hays.	Submit for: Announcement Number DE-PS36-04GO94003, Entitled "Renewable Energy Development on Tribal Lands"  Award letter dated January 27, 2006		Data will be collected at this site for a minimum period of one year.  The monitoring site is located about 2 miles southwest of Hays, Mt at an elevation of 1180 m. (N 47.967°, W 108.713°).  Instrumentation consisted of an NRG Wind Explorer system including cup anemometer, wind vane and data logger. The instruments were mounted on a 20-meter (66-foot) tilt-up tubular tower. The data consists of 10-minute average wind speed, wind speed standard deviation and wind direction.  June/2006 "Kick Off Meeting" held w/Tribal Council.
	Re-locate 20 m Anemometer		The monitoring period ran from 7 February 2001 to 6 November 2002. The annual average wind speed (at 20 meters [66']) measured at the site is 5.6 m/s (12.4 mph). The annual average measured wind power density is 205 watts/m <sup>2</sup> .
	Anemometer Tower relocated with the assistance of John Walden, National Center for Appropriate Technology.		New site will be on the Northwest side of the reservation where wind data indicates a good area, and closer to larger transmission line.
		Research Wind Development curriculum for Tribal College Course	Received info from: Timlynn Babitsky, Director, North American Rural Futures Institute MSU-Northern Havre, Mt

		Introduce a Wind Development curriculum at the Fort Belknap Tribal College	Courses will be in the Technical Side & Maintenance Side.
		Feasibility study: how can wind development & proposed ethanol refinery complement each other.	
		Feasibility study: how can wind development & existing Carbon Off Sett Program complement each other.	
		Re-locate 20 meter met tower to Lodgepole on the Southern part of the Reservation	Set up near Lodgepole Elementry School, and get involved in the Green School Program.
		Survey/Poll Questionnaire	Conduct Poll of the community members as to their interest in Wind Development.
	Draft Mission/Purpose Statement For Utilities Commission	Assessment of Mission/Purpose Statement	
	Adopt Goals & Objectives For Utilities Commission	Evaluation of Goals & Objectives Utilities Commission	Eventually the Wind Development Program will be turned over to the Utilities Commission.

# Fort Belknaps Energy Future

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**DRAFT:**

**Energy Policy demonstrates environmental leadership and provides direct economic and environmental benefits to the Fort Belknap Community.**

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# On-Going Project

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## Project Status

# Accomplishments



2006/12/17



2006/12/18



2006/12/18



2006/12/18



2006/12/18



2006/12/18



2006/12/18



2006/12/18

A photograph showing a large, shiny metal pipe structure in a dry, grassy field under a clear blue sky. Two people are standing near the pipe, which is supported by wooden A-frame stands. In the background, there's a small white van and a dark pickup truck. The date "2006/12/18" is overlaid in yellow text in the bottom right corner.

2006/12/18



2006/12/18



2006/12/19



2006/12/19



2006/12/19



2006/12/19

2006/12/19



2006/12/19



2006/12/19



2006/12/21



2006/12/21



2006/12/21



2006/12/21



2006/12/21



2006/12/21

# Accomplishments

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- “Kick-off” Meeting Held
  - Met-tower installation
  - Phase I Avian Screening
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# **Updated Data**

**Site Information:**

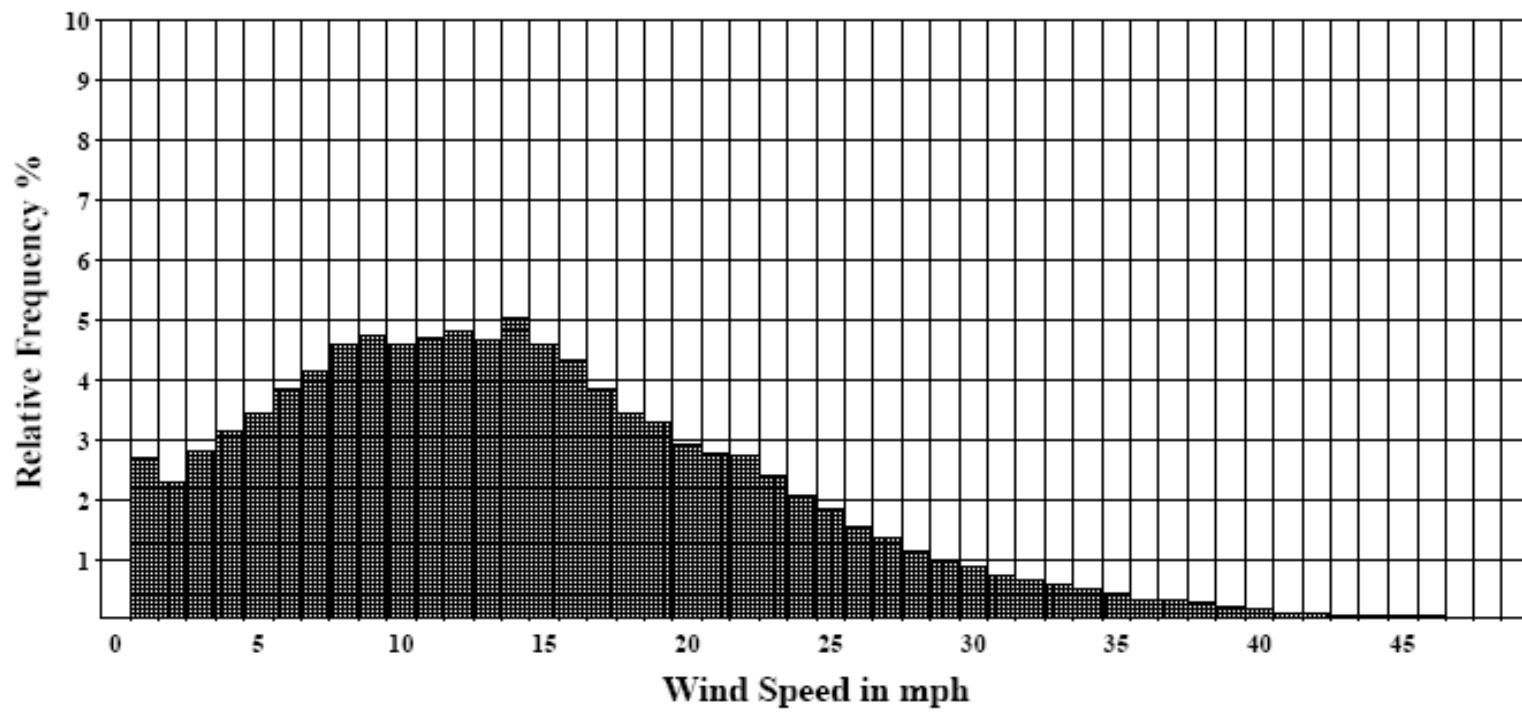
Project: Ft Belknap  
Location: Harlem  
Elevation: 2526

**Sensor on channel 1:**

NRG #40 Anem. mph  
Height: 164 ft  
Serial #: SN:

**12/19/2006 to 10/17/2007**

**Frequency Distribution Ch 1**  
**SITE 1135**  
**Fort Belknap**

**Frequency Distribution**

**Site Information:**

Project: Ft Belknap  
 Location: Harlem  
 Elevation: 2526

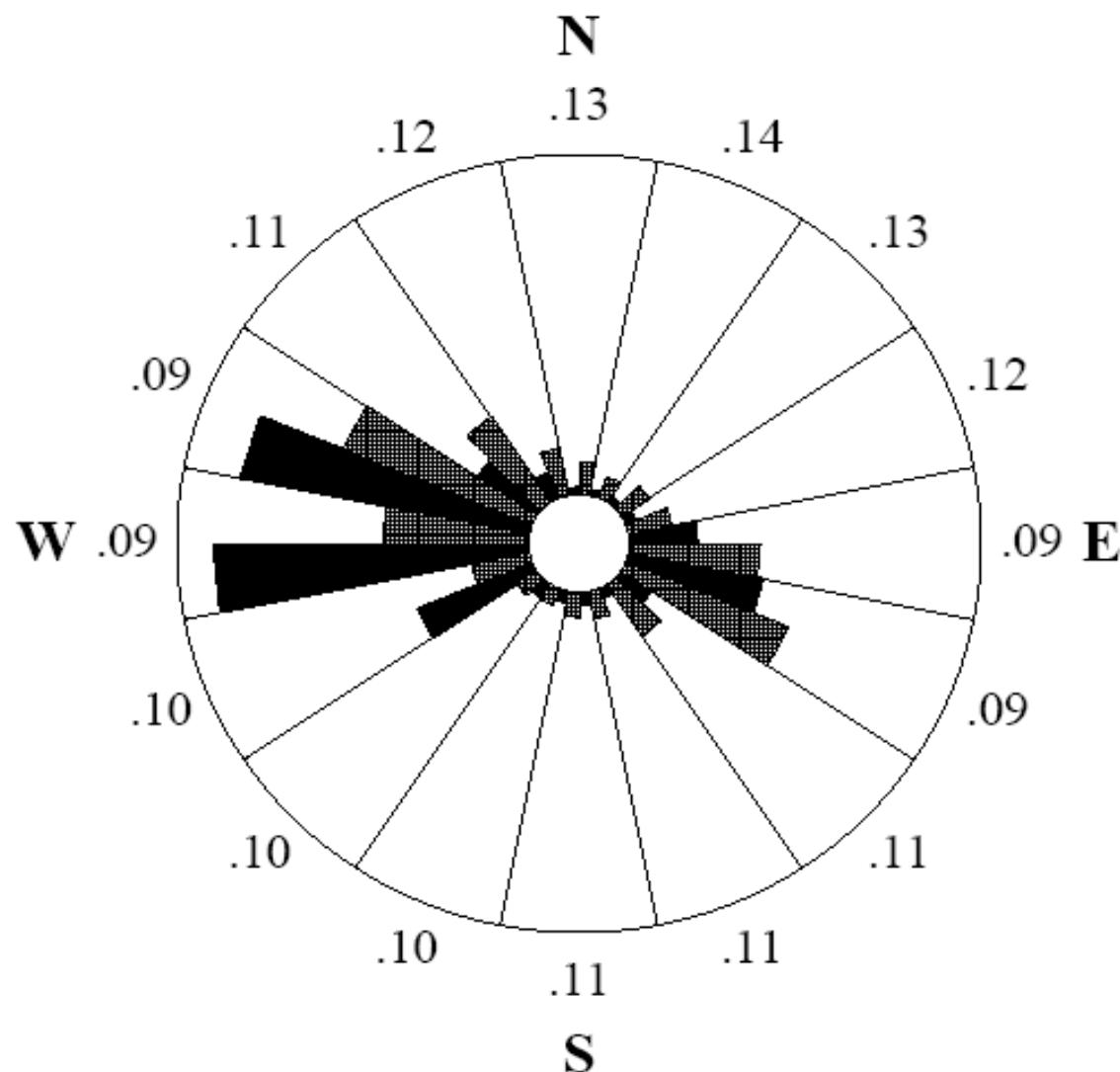
**Sensor Information:**

- |                     |                     |
|---------------------|---------------------|
| 1 NRG #40 Anem. mph | 7 #200P Wind Vane   |
| 2 NRG #40 Anem. mph | 8 #200P Wind Vane   |
| 3 NRG #40 Anem. mph | 9 NRG #110S Temp F  |
| 4 NRG #40 Anem. mph | 10 No SCM Installed |
| 5 NRG #40 Anem. mph | 11 No SCM Installed |
| 6 No SCM Installed  | 12 No SCM Installed |

**12/19/2006 to 10/17/2007**

**Summary Report**  
**SITE 1135**  
**Fort Belknap**

Channel	1	2	3	4	5	6	7	8	9	10	11	12
Height	164 ft	164 ft	131 ft	131 ft	98 ft	-----	161 ft	121 ft	6 ft	-----	-----	-----
Units	mph	mph	mph	mph	mph	-----	deg	deg	F	-----	-----	-----
Intervals with Valid Data	43439	43439	43439	43439	43439	-----	43439	43439	43439	-----	-----	-----
Average Filtered Data	14.38	14.23	14.01	13.5	13.43	-----	310.13	306.53	49.5	-----	-----	-----
Average for All Data	14.38	14.23	14.01	13.5	13.43	-----	310.13	306.53	49.5	-----	-----	-----
Min Interval Average	0.8	0.8	0.8	0.8	0.8	-----	-----	-----	-18.2	-----	-----	-----
Date of Min Interval	1/20/2007	1/20/2007	1/20/2007	1/20/2007	12/20/2006	-----	-----	-----	2/14/2007	-----	-----	-----
Time of Min Interval	9:40:00 AM	9:30:00 AM	9:50:00 AM	7:50:00 AM	2:50:00 PM	-----	-----	-----	7:30:00 AM	-----	-----	-----
Max Interval Average	53.6	52.7	52.5	51.3	51.5	-----	-----	-----	106.2	-----	-----	-----
Date of Max Interval	1/6/2007	1/6/2007	1/6/2007	3/12/2007	3/12/2007	-----	-----	-----	7/23/2007	-----	-----	-----
Time of Max Interval	10:20:00 AM	10:20:00 AM	10:20:00 AM	4:10:00 PM	4:10:00 PM	-----	-----	-----	2:50:00 PM	-----	-----	-----
Average Interval SD	1.55	1.56	1.57	1.6	1.58	-----	8.25	8.85	0.14	-----	-----	-----
Min Sample	0.8	0.8	0.8	0.8	0.8	-----	-----	-----	-18.4	-----	-----	-----
Date of Min Sample	1/20/2007	1/20/2007	1/20/2007	1/20/2007	1/20/2007	-----	-----	-----	2/14/2007	-----	-----	-----
Time of Min Sample	5:40:00 PM	5:40:00 PM	5:40:00 PM	5:00:00 PM	4:50:00 PM	-----	-----	-----	7:30:00 AM	-----	-----	-----
Max Sample	68.4	68.4	66.6	67.5	65	-----	-----	-----	106.9	-----	-----	-----
Date of Max Sample	9/26/2007	9/26/2007	9/26/2007	9/26/2007	9/26/2007	-----	-----	-----	7/23/2007	-----	-----	-----
Time of Max Sample	8:10:00 PM	8:10:00 PM	8:10:00 PM	8:10:00 PM	8:10:00 PM	-----	-----	-----	2:50:00 PM	-----	-----	-----
Average Interval TI	0.14	0.15	0.15	0.16	0.15	-----	-----	-----	-----	-----	-----	-----
Wind Speed Direction						WNW	WNW					



12/19/2006 to 10/17/2007

Wind Rose Ch 1, 7

SITE 1135

Fort Belknap

**Site Information:**

Project: Ft Belknap

Location: Harlem

Elevation: 2526

**Anemometer on channel 1:**

NRG #40 Anem. mph

Height: 164 ft

Serial #: SN:

**Vane on channel 7:**

#200P Wind Vane

Height: 161 ft

Serial #: SN:

Outer Numbers are Average TIs  
for speeds greater than 10 mph

Inner Circle = 0%

Outer Circle = 30%



Percent of Total Wind Energy



Percent of Total Time

# **Technical or Management Issues**

# Activities Yet to Be Completed

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- Phase I Avian Screening
- Permit Process (to be completed)
- Transmission capability review
- Collection of wind data
- Marketing Analysis

# Future Plans

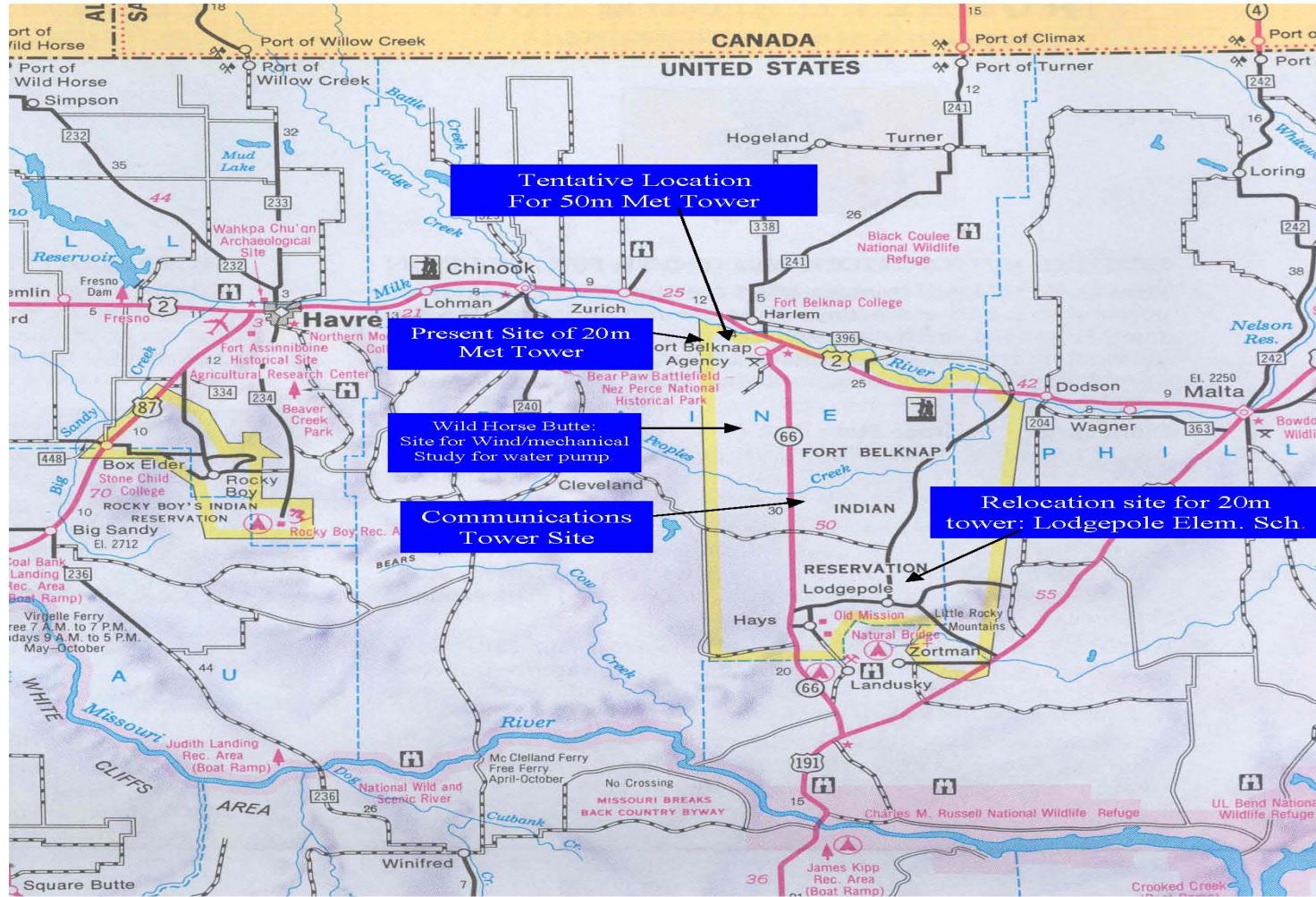
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- This Study will help determine whether the wind resources at specific sites on the Reservation are capable of being developed economically.
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# Future Plans

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- Remote water site  
For Buffalo Pasture
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# FORT BELKNAP INDIAN COMMUNITY

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## Questions?

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Transportation Director**

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