

Wind Resource Summary for Benedict Site

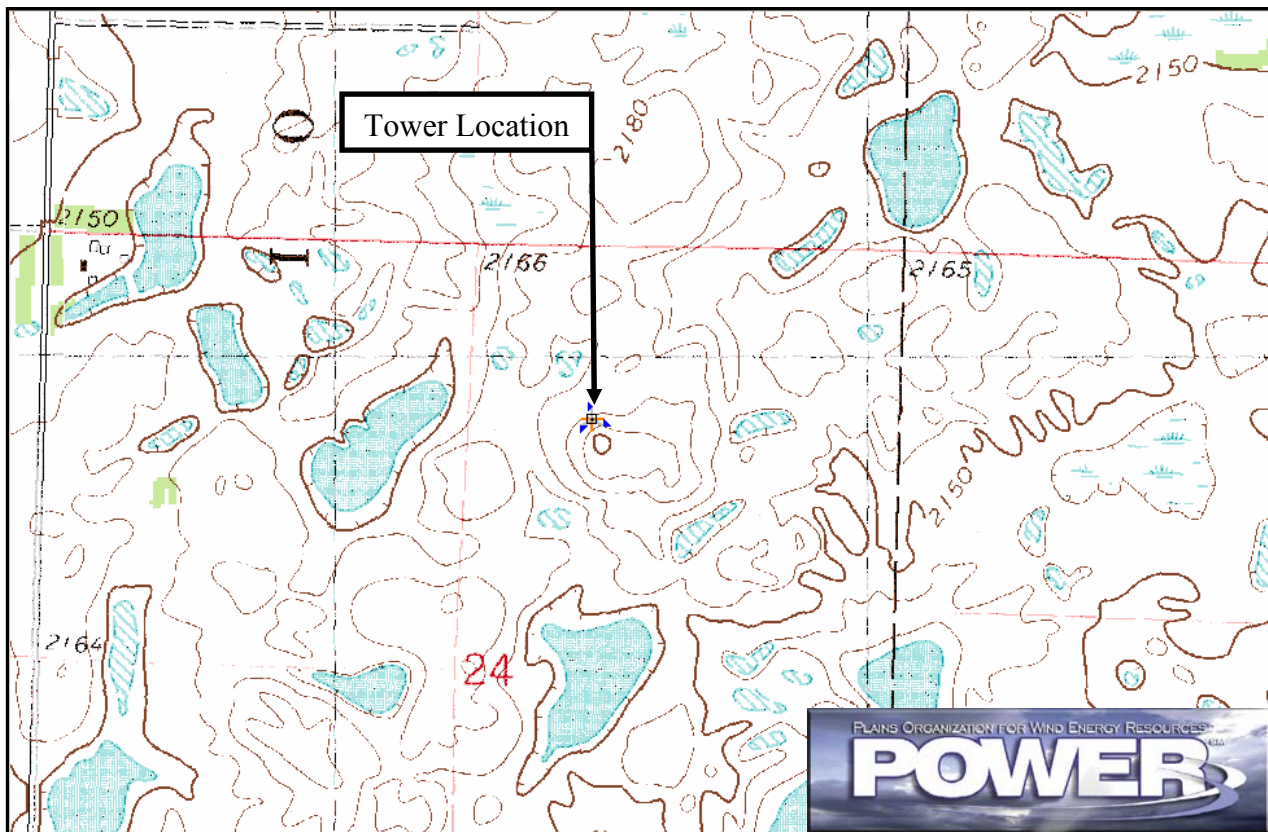
North Dakota Utility Study

Falls^a 1994, 1995, 1996 & 1997

Site Description:

Latitude: N 47° 53' 20"	Township: 151 N
Longitude: W 101° 6' 25"	Range: 82 W
Elevation: 2185 feet	Section: 24
Tower Type: NRG Tilt-Up	Tower Height: 131 feet

The monitoring site was located on the Missouri Escarpment roughly 4.2 miles north-northwest of the town of Benedict, North Dakota. The tower was instrumented at three levels: 33 feet (10 m), 82 feet (25 m), and 131 feet (40 m). The land around the site was primarily cultivated fields with several small ponds and lakes in the area.



Summary Wind Data:	33 ft AGL^b	82 ft AGL	131 ft AGL
Mean Wind Speed	14.2 mph	16.4 mph	18.5 mph
Maximum, 60-min Mean Wind Speed	48.5 mph at 131 ft AGL – 10/29/1996 9:00 p.m.		
Estimated Wind Power Class^c	Class 5 (520 W/m ² at 131 ft AGL)		

^a Fall is defined as the months of September, October and November. Fall 1994 begins with September 1994. Data recovery rates at 33, 82, and 131 feet were 56%, 76%, and 76%, respectively.

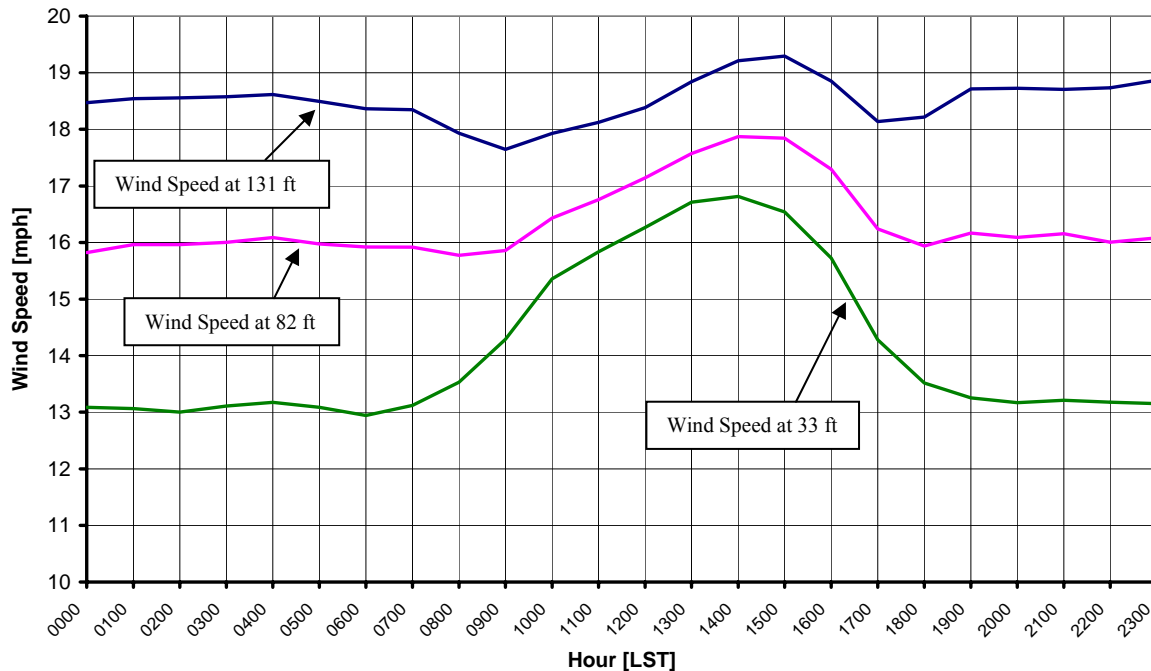
^b Above ground level.

^c Air temperature was not factored into calculations.

Average Hourly Wind Speeds

LST ^d	131 ft AGL		82 ft AGL		33 ft AGL	
	mph	m/s	mph	m/s	mph	m/s
0000	18.5	8.26	15.8	7.07	13.1	5.85
0100	18.5	8.29	16.0	7.14	13.1	5.84
0200	18.6	8.30	16.0	7.14	13.0	5.81
0300	18.6	8.30	16.0	7.15	13.1	5.86
0400	18.6	8.32	16.1	7.19	13.2	5.89
0500	18.5	8.27	16.0	7.14	13.1	5.85
0600	18.4	8.21	15.9	7.12	12.9	5.79
0700	18.3	8.20	15.9	7.12	13.1	5.86
0800	17.9	8.02	15.8	7.05	13.5	6.05
0900	17.6	7.89	15.9	7.09	14.3	6.39
1000	17.9	8.01	16.4	7.35	15.4	6.87
1100	18.1	8.10	16.8	7.49	15.8	7.08
1200	18.4	8.22	17.1	7.66	16.3	7.27
1300	18.8	8.42	17.6	7.86	16.7	7.47
1400	19.2	8.59	17.9	7.99	16.8	7.52
1500	19.3	8.63	17.8	7.98	16.5	7.39
1600	18.9	8.43	17.3	7.73	15.7	7.03
1700	18.1	8.11	16.2	7.26	14.3	6.38
1800	18.2	8.14	15.9	7.12	13.5	6.04
1900	18.7	8.37	16.2	7.23	13.3	5.92
2000	18.7	8.37	16.1	7.19	13.2	5.89
2100	18.7	8.36	16.2	7.22	13.2	5.91
2200	18.7	8.38	16.0	7.16	13.2	5.89
2300	18.9	8.43	16.1	7.19	13.2	5.88

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^d Local standard time.



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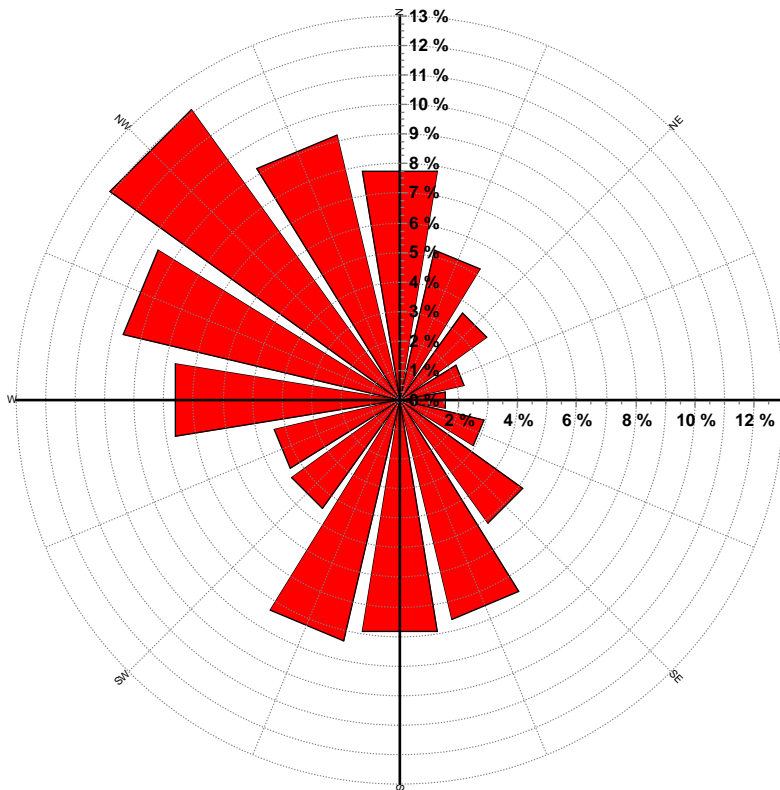
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Wind Directional Frequency

Winds from the... Frequency (%)

NNW	9.2
NW	12.1
WNW	9.6
W	7.7
WSW	4.4
SW	4.5
SSW	8.4
S	7.9
SSE	7.6
SE	5.1
ESE	2.9
E	1.6
ENE	2.2
NE	3.6
NNE	5.2
N	7.8

North Dakota Utility Study – Benedict Site
Wind Rose for 131 ft AGL
Falls 1994, 1995, 1996 & 1997

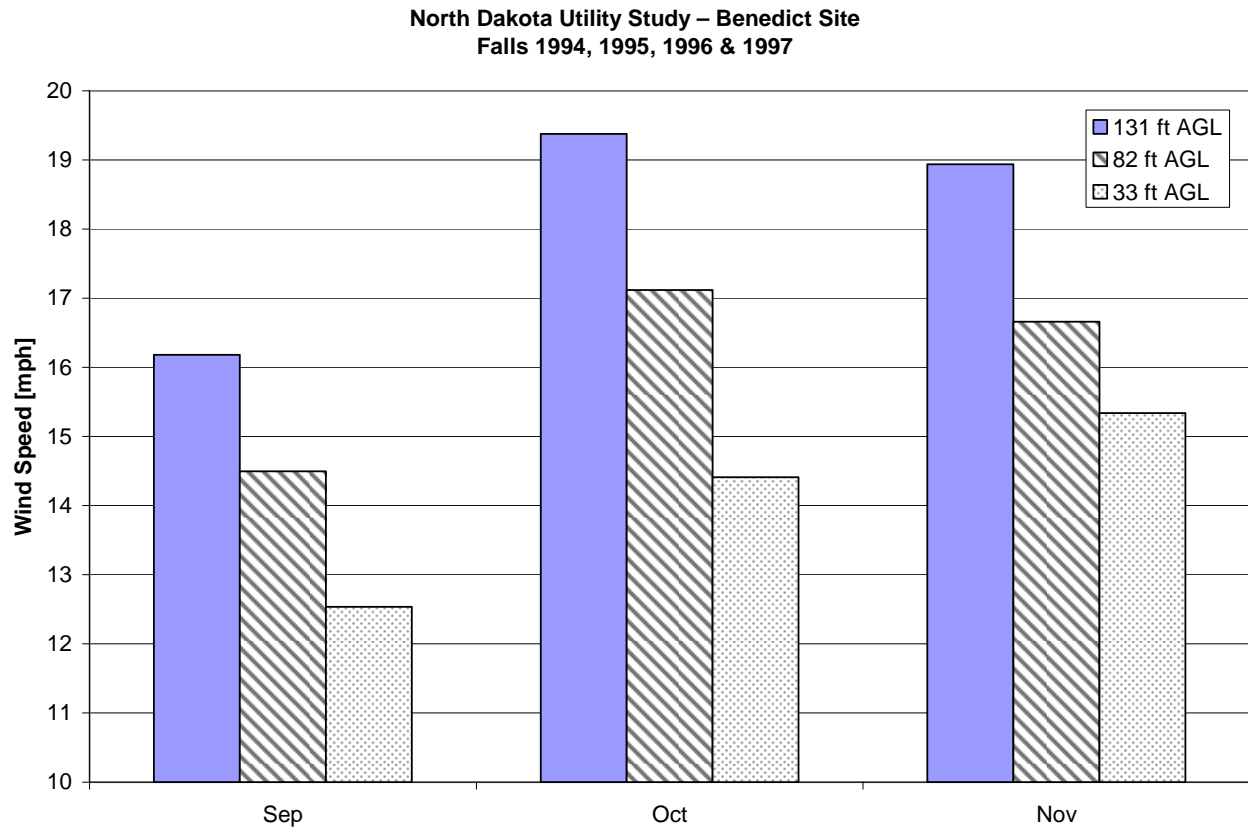


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Monthly Wind Speed Averages

Month	131 ft AGL		82 ft AGL		33 ft AGL	
	mph	m/s	mph	m/s	mph	m/s
Sep	16.2	7.23	14.5	6.48	12.5	5.60
Oct	19.4	8.66	17.1	7.65	14.4	6.44
Nov	18.9	8.47	16.7	7.45	15.3	6.86



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