

Wind Resource Summary for Green River Site

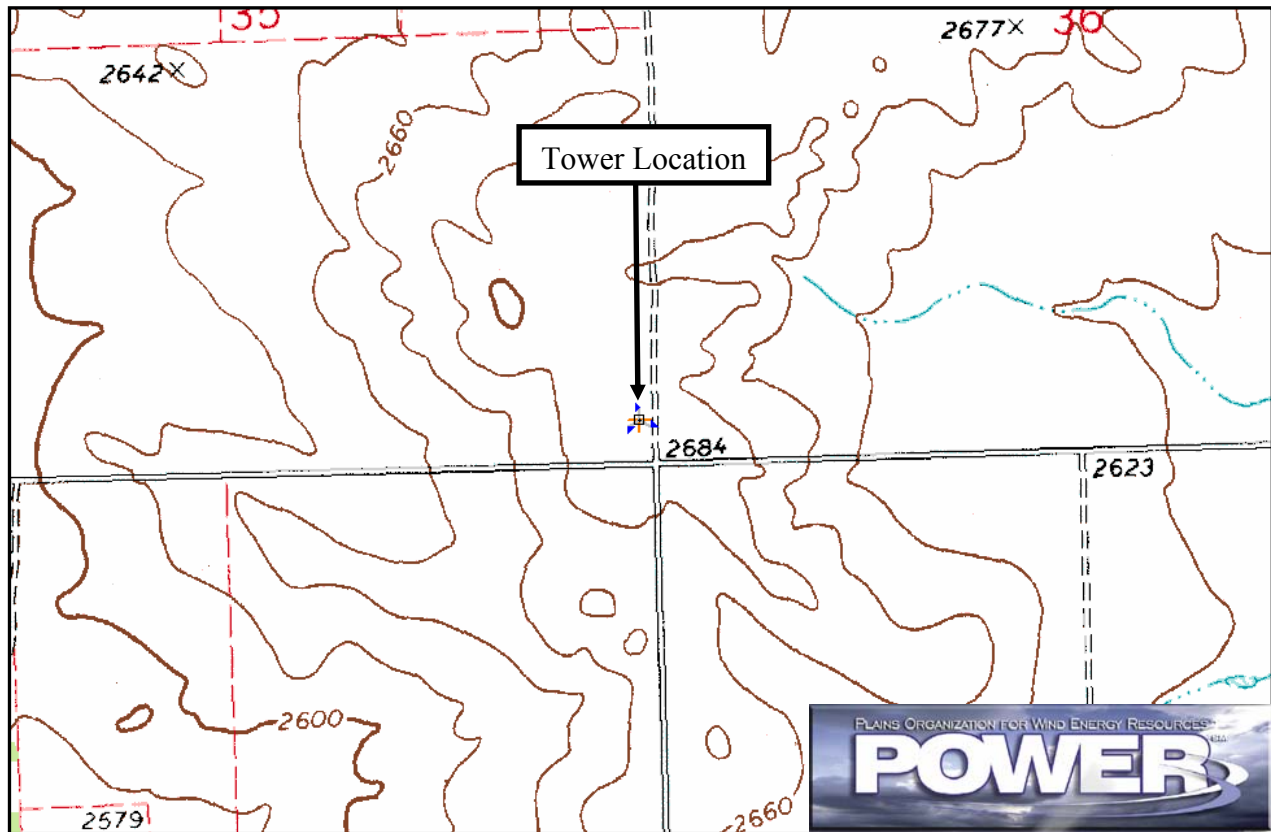
North Dakota Utility Study

Winters^a 1994, 1995 & 1996

Site Description:

Latitude: N 47° 4' 5"	Township: 142 N
Longitude: W 102° 55' 38"	Range: 97 W
Elevation: 2684 feet	Section: 18
Tower Type: Lattice Tower	Tower Height: 271 feet

The monitoring site was 14.3 miles north-northeast of the town of South Heart, North Dakota. An existing tower was used and instrumented at four levels: 33 ft (10 m), 82 ft (25 m), 131 ft (40 m), and 180 ft (55 m). The tower is located on a top of a small hill with good exposure to the wind in all directions. Cultivated fields characterize the area's landscape.



Summary Wind Data:	33 ft AGL^b	82 ft AGL	131 ft AGL	180 ft AGL
Mean Wind Speed	12.4 mph	14.5 mph	16.4 mph	17.3 mph
Maximum, 60-min Mean Wind Speed	58.0 mph at 180 ft AGL – 2/10/1996 5:00 a.m.			
Estimated Wind Power Class^c	Class 4 (434 W/m ² at 180 ft AGL)			

^a Winter is defined as the months of December, January, and February. Winter 1994 begins with December 1994.

Data recovery rates at 33, 82, 131 and 180 feet were 81%, 80%, 80% and 79%, respectively.

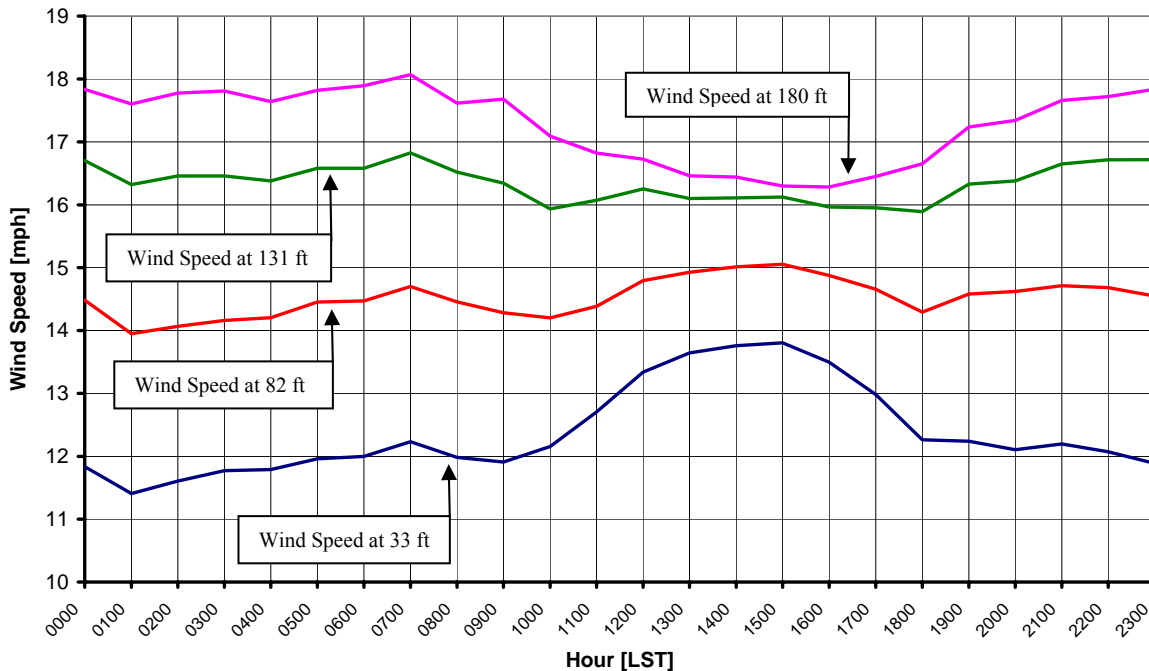
^b Above ground level.

^c Air temperature was not factored into calculations.

Average Hourly Wind Speeds

LST ^d	180 ft AGL		131 ft AGL		82 ft AGL		33 ft AGL	
	mph	m/s	mph	m/s	mph	m/s	mph	m/s
0000	17.8	7.97	16.7	7.47	14.5	6.47	11.8	5.29
0100	17.6	7.87	16.3	7.30	13.9	6.24	11.4	5.10
0200	17.8	7.95	16.5	7.36	14.1	6.29	11.6	5.19
0300	17.8	7.96	16.5	7.36	14.2	6.33	11.8	5.26
0400	17.6	7.89	16.4	7.32	14.2	6.35	11.8	5.27
0500	17.8	7.97	16.6	7.41	14.5	6.46	12.0	5.35
0600	17.9	8.00	16.6	7.41	14.5	6.47	12.0	5.36
0700	18.1	8.08	16.8	7.52	14.7	6.57	12.2	5.47
0800	17.6	7.88	16.5	7.39	14.5	6.46	12.0	5.36
0900	17.7	7.90	16.3	7.31	14.3	6.38	11.9	5.32
1000	17.1	7.64	15.9	7.12	14.2	6.35	12.2	5.43
1100	16.8	7.52	16.1	7.19	14.4	6.43	12.7	5.68
1200	16.7	7.48	16.3	7.27	14.8	6.61	13.3	5.96
1300	16.5	7.36	16.1	7.20	14.9	6.67	13.6	6.10
1400	16.4	7.35	16.1	7.20	15.0	6.71	13.8	6.15
1500	16.3	7.29	16.1	7.21	15.1	6.73	13.8	6.17
1600	16.3	7.28	16.0	7.14	14.9	6.65	13.5	6.03
1700	16.5	7.36	16.0	7.13	14.7	6.55	13.0	5.80
1800	16.7	7.44	15.9	7.10	14.3	6.39	12.3	5.48
1900	17.2	7.71	16.3	7.30	14.6	6.52	12.2	5.47
2000	17.3	7.75	16.4	7.32	14.6	6.54	12.1	5.41
2100	17.7	7.90	16.7	7.44	14.7	6.58	12.2	5.45
2200	17.7	7.92	16.7	7.47	14.7	6.56	12.1	5.40
2300	17.8	7.97	16.7	7.47	14.5	6.50	11.9	5.31

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^d Local standard time.



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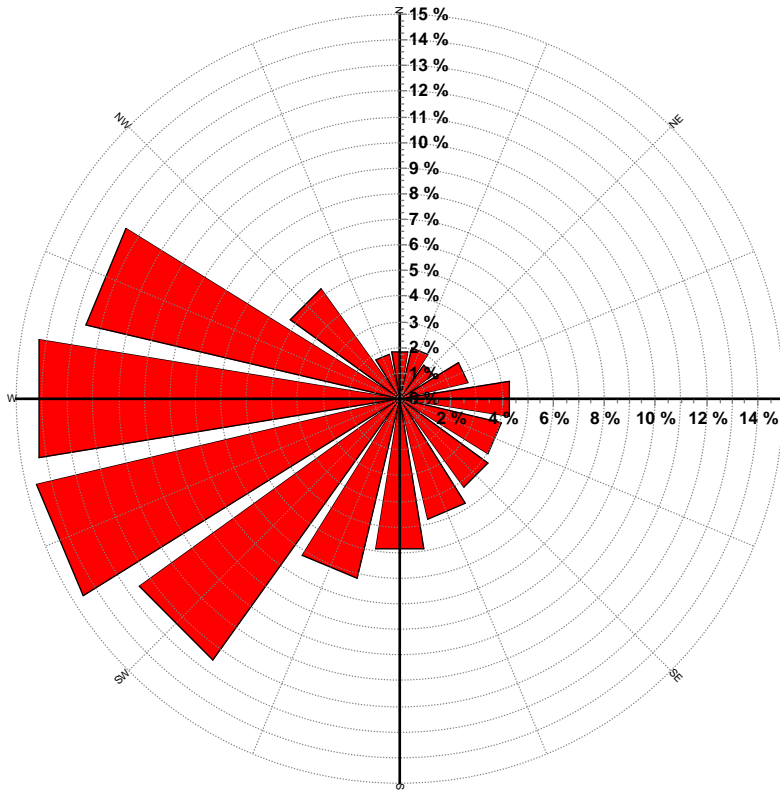
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Wind Directional Frequency

Winds from the... Frequency (%)

NNW	1.8
NW	5.3
WNW	12.6
W	14.3
WSW	14.6
SW	12.5
SSW	7.2
S	5.9
SSE	4.8
SE	4.3
ESE	4.1
E	4.3
ENE	2.7
NE	1.6
NNE	2.0
N	1.9

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Wind Rose for 180 ft AGL
Winters 1994, 1995 & 1996



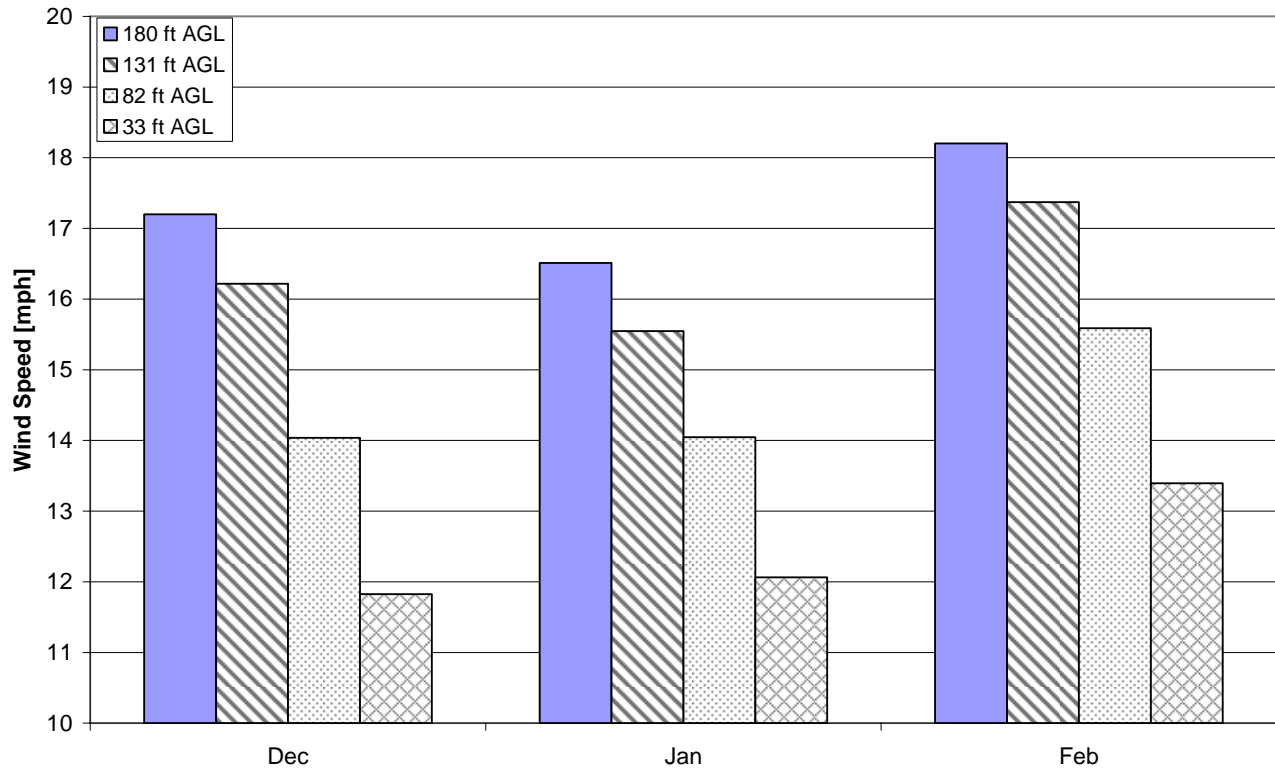
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Monthly Wind Speed Averages

Month	180 ft AGL		131 ft AGL		82 ft AGL		33 ft AGL	
	mph	m/s	mph	m/s	mph	m/s	mph	m/s
Dec	17.2	7.69	16.2	7.25	14.0	6.28	11.8	5.29
Jan	16.5	7.38	15.5	6.95	14.0	6.28	12.1	5.39
Feb	18.2	8.14	17.4	7.77	15.6	6.97	13.4	5.99

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