

# Capturing the Wind

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## Waverly Light & Power

Established 1904



Serves 4,300 customers  
in N.E. Iowa

Glenn Cannon

# Project Description

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- 1991 began wind energy program
- Deed feasibility study
- 1993 installed 80KW (Vestas) Zond Turbine deed grant
- 1<sup>st</sup> public power system in Midwest
- Model and data for all

# Project Description

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- NREL distributed wind generation program grant
- 1999 installed 2 Zond Z-50 turbines
  - 750 kw

# Project Photo



*Wind Energy for Northwest Public Power: Issues & Opportunities  
April 23, 2001 – Portland, Oregon*

# Project Benefits

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**2000**

System Kwh sales	113,332,894
Wind generation	4,201,693

3.71% of system energy

Capacity in MAPP is about 10% of  
nameplate

**WAVERLY LIGHT and POWER  
WIND PRODUCTION  
December 2000**

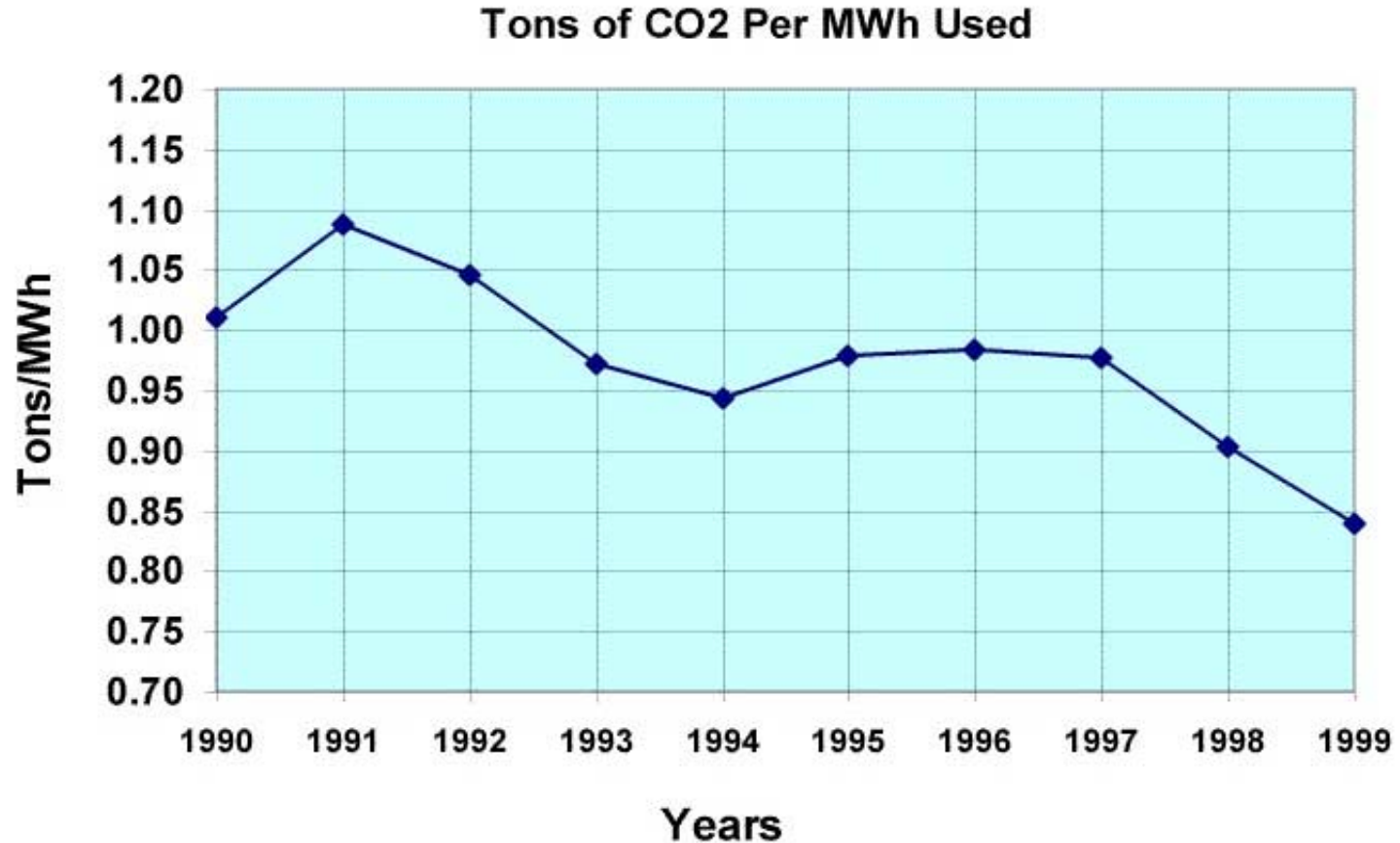
<b>Skeets 1 80 kW</b>	<b>Jan 2000</b>	<b>Feb 2000</b>	<b>March 2000</b>	<b>April 2000</b>	<b>May 2000</b>	<b>June 2000</b>	<b>July 2000</b>	<b>Aug 2000</b>	<b>Sept 2000</b>	<b>Oct 2000</b>	<b>Nov 2000</b>	<b>Dec 2000</b>	<b>Total</b>
Total KWH Generated.	9,241	11,371	11,471	8,237	9,595	9,185	2,793	1,220	7,090	7,638	6,842	5,402	90,085
KWH Used on Standby	56	51	67	25	44	58	78	68	57	56	85	106	751
<b>Total Net Generation</b>	<b>9,185</b>	<b>11,320</b>	<b>11,404</b>	<b>8,212</b>	<b>9,551</b>	<b>9,127</b>	<b>2,715</b>	<b>1,152</b>	<b>7,033</b>	<b>7,582</b>	<b>6,757</b>	<b>5,296</b>	<b>89,334</b>
Total Hours Operated.	539.3	551.2	624.0	379.9	593.1	570.1	422.5	201.5	478.2	461.0	375.6	305.9	5,502.3
Total No. Hours Available	696.0	696.0	840.0	624.0	744.0	768.0	696.0	368.2	743.3	720.0	720.0	747.0	8,362.5

<b>Skeets 2 750 kW</b>	<b>Jan 2000</b>	<b>Feb 2000</b>	<b>March 2000</b>	<b>April 2000</b>	<b>May 2000</b>	<b>June 2000</b>	<b>July 2000</b>	<b>Aug 2000</b>	<b>Sept 2000</b>	<b>Oct 2000</b>	<b>Nov 2000</b>	<b>Dec 2000</b>	<b>Total</b>
Total KWH Generated.	197,183	232,200	185,709	185,710	173,560	173,718	84,671	96,763	158,982	176,837	202,624	137,967	2,005,924
KWH Used on Standby	400	250	200	447	522	520	1,803	1,896	929	1,124	1,229	1,732	11,052
<b>Total Net Generation</b>	<b>196,783</b>	<b>231,950</b>	<b>185,509</b>	<b>185,263</b>	<b>173,038</b>	<b>173,198</b>	<b>82,868</b>	<b>94,867</b>	<b>158,053</b>	<b>175,713</b>	<b>201,395</b>	<b>136,235</b>	<b>1,994,872</b>
Total Hours Operated.	647.0	630.0	684.0	663.0	603.0	657.0	621.0	648.0	606.0	663.0	656.0	425.0	7,503.0
Total No. Hours Available	694.0	670.0		720.0	744.0	710.0	735.0	731.0	675.0	744.0	720.0	645.0	7,788.0

<b>Skeets 3 750 kW</b>	<b>Jan 2000</b>	<b>Feb 2000</b>	<b>March 2000</b>	<b>April 2000</b>	<b>May 2000</b>	<b>June 2000</b>	<b>July 2000</b>	<b>Aug 2000</b>	<b>Sept 2000</b>	<b>Oct 2000</b>	<b>Nov 2000</b>	<b>Dec 2000</b>	<b>Total</b>
Total KWH Generated.	225,150	234,200	182,048	212,200	180,030	156,961	79,500	100,471	154,899	170,346	222,043	187,836	2,105,684
KWH Used on Standby	400	250	200	447	522	643	1,030	997	515	590	530	765	6,889
<b>Total Net Generation</b>	<b>224,750</b>	<b>233,950</b>	<b>181,848</b>	<b>211,753</b>	<b>179,508</b>	<b>156,318</b>	<b>78,470</b>	<b>99,474</b>	<b>154,384</b>	<b>169,756</b>	<b>221,513</b>	<b>187,071</b>	<b>2,098,795</b>
Total Hours Operated.	697.0	640.0	680.0	636.0	636.0	630.0	574.0	641.0	619.0	663.0	659.0	585.0	7,660.0
Total No. Hours Available	744.0	670.0		720.0	744.0	689.0	697.0	740.0	682.0	744.0	720.0	667.0	7,817.0

<b>Total KWH Generated.</b>	<b>431,574</b>	<b>477,771</b>	<b>379,228</b>	<b>406,147</b>	<b>363,185</b>	<b>339,864</b>	<b>166,964</b>	<b>198,454</b>	<b>320,971</b>	<b>354,821</b>	<b>431,509</b>	<b>331,205</b>	<b>4,201,693</b>
<b>KWH Use in Operation</b>	<b>856</b>	<b>551</b>	<b>467</b>	<b>919</b>	<b>1,088</b>	<b>1,221</b>	<b>2,911</b>	<b>2,961</b>	<b>1,501</b>	<b>1,770</b>	<b>1,844</b>	<b>2,603</b>	<b>18,692</b>
<b>Total Net Generation</b>	<b>430,718</b>	<b>477,220</b>	<b>378,761</b>	<b>405,228</b>	<b>362,097</b>	<b>338,643</b>	<b>164,053</b>	<b>195,493</b>	<b>319,470</b>	<b>353,051</b>	<b>429,665</b>	<b>328,602</b>	<b>4,183,001</b>
<b>Total Hours Operated.</b>	<b>1,883.3</b>	<b>1,821.2</b>	<b>1,988.0</b>	<b>1,678.9</b>	<b>1,832.1</b>	<b>1,857.1</b>	<b>1,617.5</b>	<b>1,490.5</b>	<b>1,703.2</b>	<b>1,787.0</b>	<b>1,690.6</b>	<b>1,315.9</b>	<b>20,665.3</b>

# Project Issues and Lessons Learned





# Overall Project Evaluation

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**GREAT!**

# Future Plans Involving Wind

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- Green Tags
  - Website
  - “Sell environmental benefits”
- Board
  - “Are you nuts?!”
- Distributed wind
- 1.5 MW wind turbine
  - “Big Dog”