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OKLAHOMA'S WIND RESOURCE: ECONOMIC ANALYSIS

Oklahoma is ranked 8th in the country for potential wind energy resource [1]. While Texas, for example, is ranked higher (at number 2), Oklahoma in fact has about 2.3 times more wind energy potential per square mile. Texas is expected to add 2000 Megawatts (MW) of utility scale wind capacity well before the deadline set by the state's Renewable Portfolio Standard, representing almost a \$2 billion capital investment. Annual landowner lease payments associated with this development will approach \$5 million, while annual benefits to local tax bases will run about \$50 million in the early years [2]. In an attempt to gauge potential economic benefits to Oklahoma, the following analyses are offered. Figures 1 and 2 are OWPI's latest resource maps of wind class and qualitative ranking for the industry standard level of 50 meters (164 feet) - a height that corresponds to hubs on many utility scale turbines.

The maps were generated from two different computer models.

Oklahoma has several prime areas for potential wind energy development. For each resource map, a table lists six prime areas and gives an approximation for wind power development potential in each area (*assuming transmission capacity is not a limiting factor*). For Table 1, it is assumed that 15% of the area with class 4 or better (good to excellent) wind resource is developed with 9 MW installed per square mile (*an exception is made for the Slick Hills area - see note 3). Capital investments are based on \$0.8 million per MW installed nameplate capacity [4]. Gross annual revenues (GAR) are estimated using

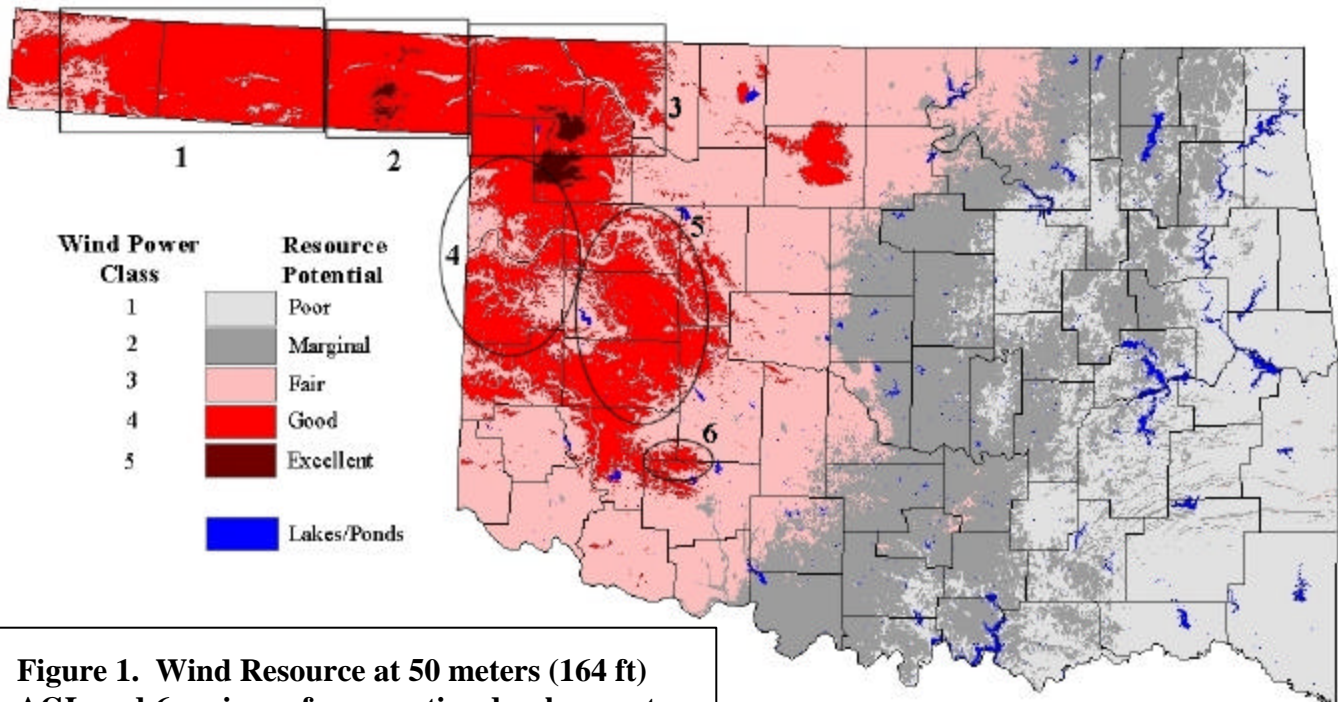


Figure 1. Wind Resource at 50 meters (164 ft) AGL and 6 regions of prospective development. WindMap™ Computer Model (version: 03/02)

benchmark figures from wind farms in existence scaled by MW nameplate capacity. GARs are based on \$30/Megawatt-hour wholesale rate, 33% capacity factor, and 95% turbine average availability. In the far right column, estimated annual lease payments (EALP) are calculated assuming 3% of GAR.

Table 1.

Key	Region	MW capacity [5]	Capital investment	GAR	EALP
1	Texas/Cimarron Cos.	3870	\$ 3096 M	\$ 319 M	\$ 9.6 M
2	Beaver Co.	2460	\$ 1968 M	\$ 203 M	\$ 6.1 M
3	Woodward-Buffalo-Alva	4350	\$ 3480 M	\$ 358 M	\$ 10.8 M
4	Cheyenne-Arnett	2810	\$ 2248 M	\$ 232 M	\$ 7.0 M
5	Weatherford-Hobart	3240	\$ 2592 M	\$ 267 M	\$ 8.0 M
6	Slick Hills	520 *	\$ 416 M	\$ 43 M	\$ 1.3 M
	Totals:	17250	\$13800 M	\$1422 M	\$ 42.8 M

The second computer model (Fig. 2) appears to better isolate areas with class 4 or better wind resource due to its enhanced ability to reflect terrain. Accordingly, the assumption is made that a larger percentage of the area is developed. For this model, it will be assumed that 30% of the area with class 4 or better (good to excellent) wind resource will have 9 MW installed per square mile. All other assumptions remain the same.

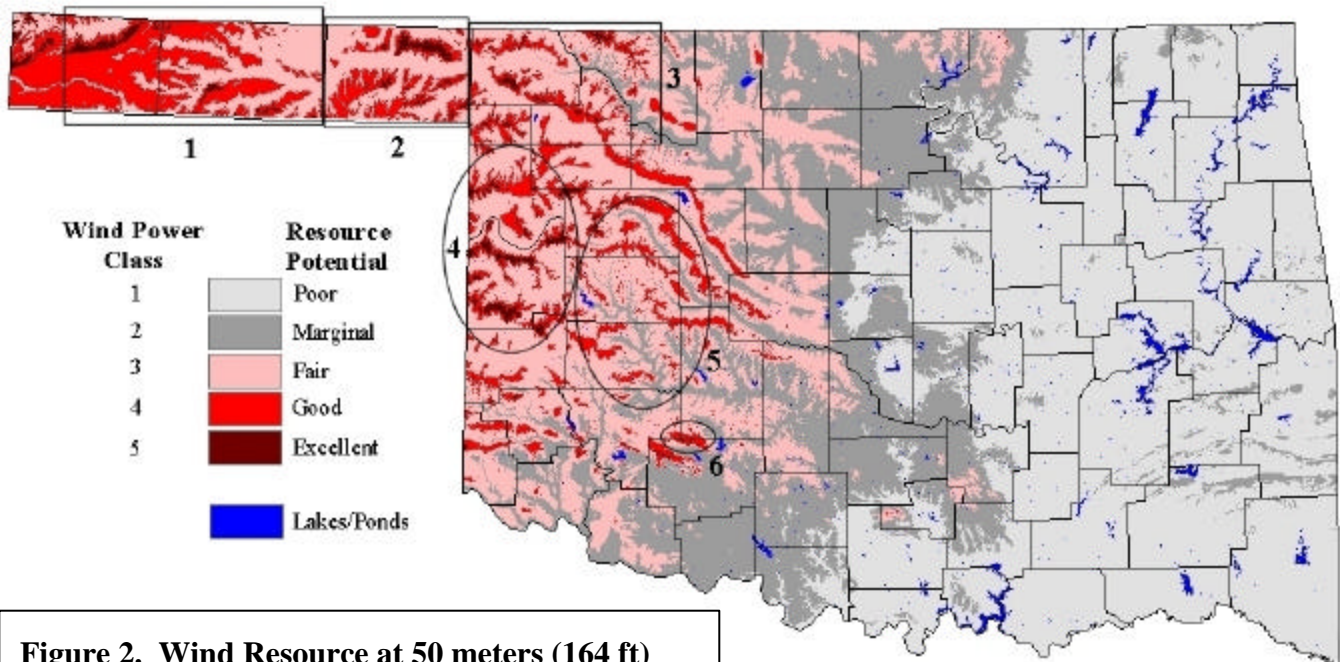


Figure 2. Wind Resource at 50 meters (164 ft) AGL and 6 regions of prospective development. Neural Network Computer Model (vers.: 03/02)

Table 2.

Key	Region	MW capacity [5]	Capital investment	GAR	EALP
1	Texas/Cimarron Cos.	4910	\$ 3928 M	\$ 405 M	\$12.1 M
2	Beaver Co.	1890	\$ 1512 M	\$ 156 M	\$ 4.7 M
3	Woodward-Buffalo-Alva	2320	\$ 1856 M	\$ 191 M	\$ 5.7 M
4	Cheyenne-Arnett	2460	\$ 1968 M	\$ 203 M	\$ 6.1 M
5	Weatherford-Hobart	1970	\$ 1576 M	\$ 162 M	\$ 4.9 M
6	Slick Hills	240 *	\$ 192 M	\$ 20 M	\$ 0.6 M
	Totals:	13790	\$ 11032 M	\$ 1136 M	\$34.1 M

NOTES:

1. Source: American Wind Energy Association. See <http://www.awea.org/windinfo.html>.
2. Assumes a 2.5% property tax rate. This value will vary by county and negotiated tax incentives.
3. While the Slick Hills area is by far the smallest region depicted on the OWPI map, this area is likely a lead candidate for development of 200-500 MW of utility scale wind farms. Unofficial reports indicate the wind resource in this area is especially good, likely due to special terrain influences. Also, good transmission access and capacity is a big plus for the area. Because an excellent wind resource exists in a relatively small and unpopulated region and two major developers have already signed lease-rights on a significant portion of this area, a fraction of 50% (of area with class 4 or greater) is used to estimate potential developable area.
4. Source: personal correspondence with Wayne Walker, Zilkha Renewable Energy, LLC (July 2001)
5. Note that nameplate or rated capacity is not the same as average output. For example, 13790 MW of rated capacity installed in areas with an average capacity factor of 33% would yield about 4550 MW output on average.