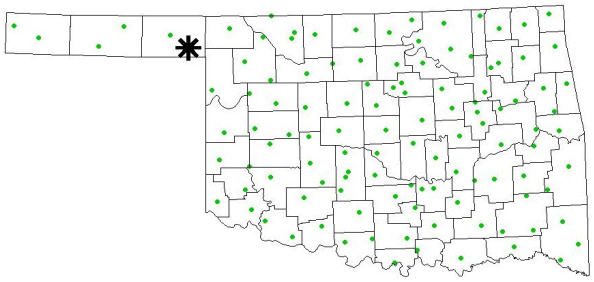
Wind Climatology
Slapout Mesonet Station
Station ID: SLAP

Oklahoma Wind Power Initiative

High Class 2 Site (January '94 – December '02)
Average 10 m Wind Speed = 5.17 m/s (11.6 mph)
Average 10 m Power Density = 145 W/m^2



SUMMARY – The Oklahoma Mesonet is a world-class network of environmental monitoring stations. The map to the left shows the spatial density of the Mesonet stations in Oklahoma; the black star indicates the station of interest. The following figures were created using 9 years (January 1994 to December 2002) of 10-meter wind data from the Slapout (SLAP) Mesonet site.

FIGURE A – The average monthly wind power density (WPD) is plotted for the period at 10-meters. WPD is a value used to determine the amount of energy in the wind, and its computation is independent of turbine type. The chart illustrates fluctuations in WPD for each month as well as each season. Typically in Oklahoma, WPD is highest during the spring and lowest during the summer.

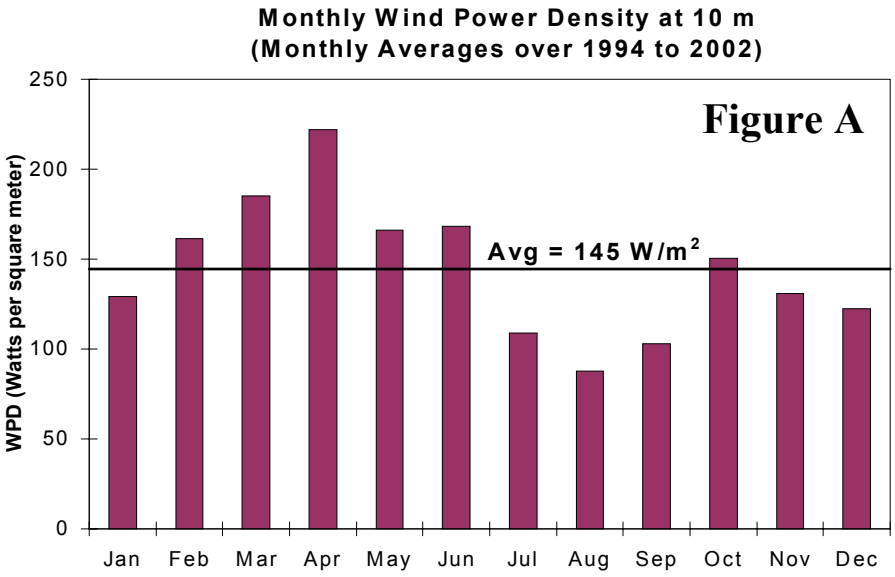
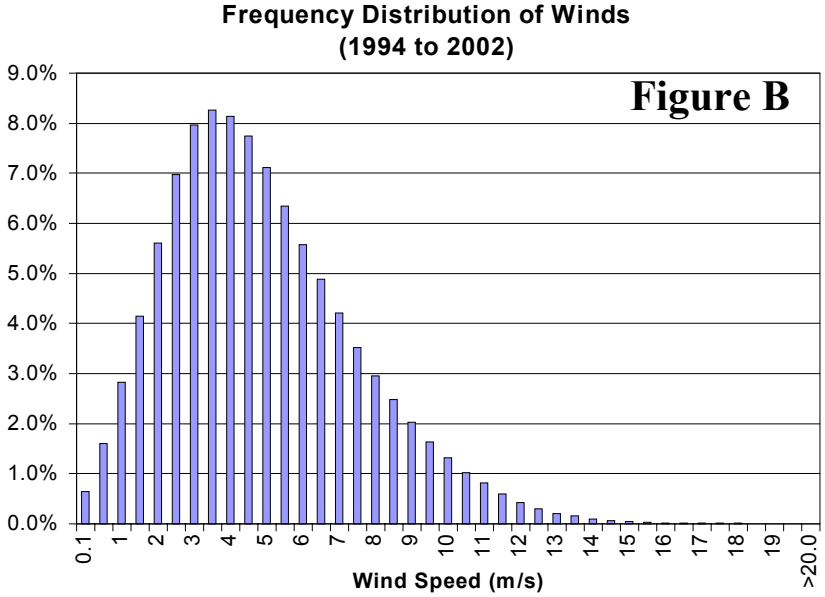


FIGURE B – The frequency distribution of wind speeds is plotted for the period at 10-meters. The shape of the graph can be used in conjunction with a wind turbine power curve to estimate the energy that could have been generated from a wind turbine. Wind speeds greater than 6 m/s occurred 33% of the time.

(More on the back)



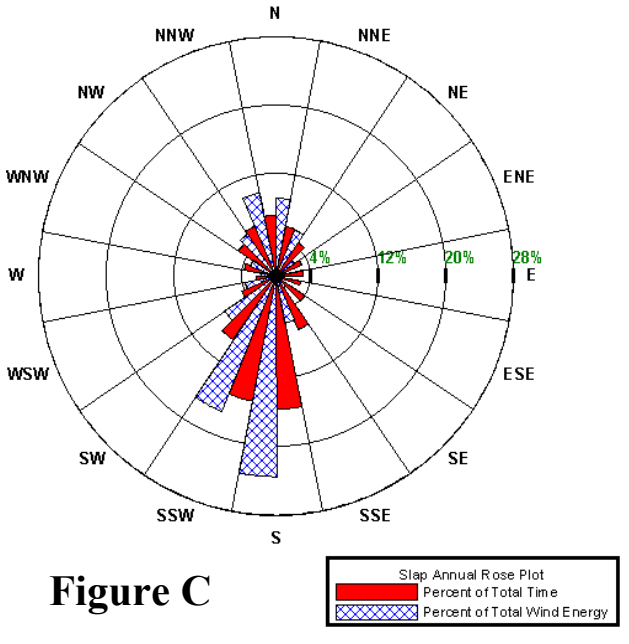
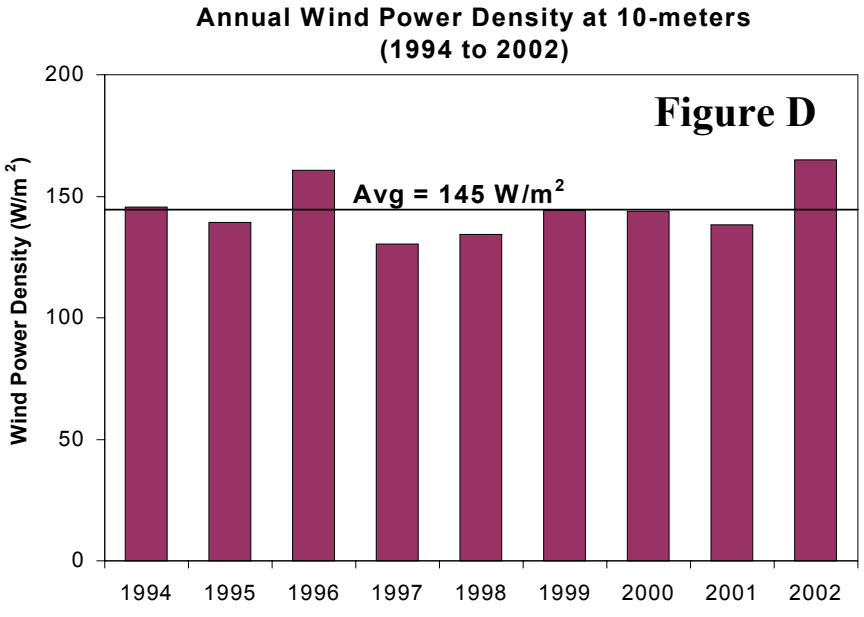


Figure C

Version date: 6/1/03



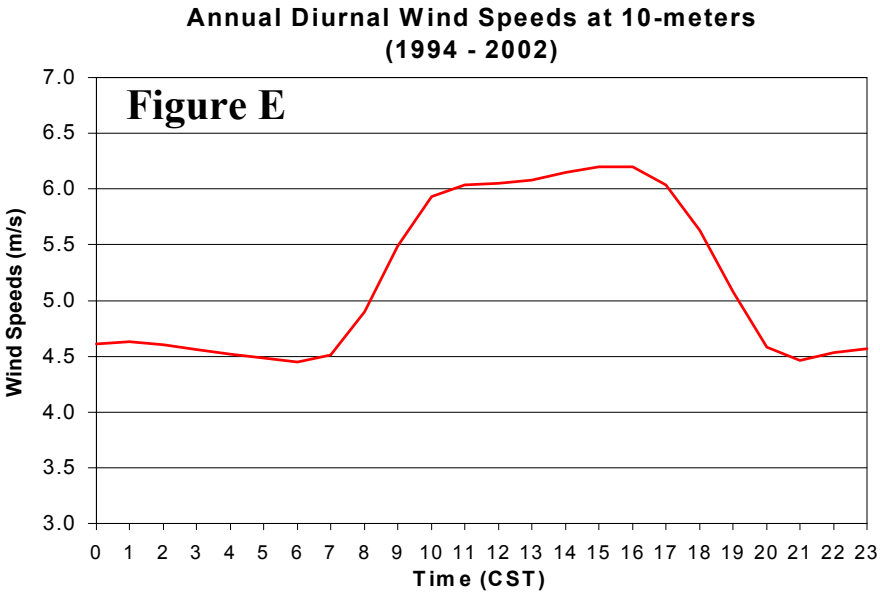


FIGURE C – The wind rose shows the directional distribution of wind speeds and wind energy for the period at 10-meters. The winds were from the south-southeast, south, and south-southwest 37% of the time and accounted for 46% of the wind energy.

FIGURE D – The average annual wind power density (WPD) is plotted for each of the 9 years. The figure shows that most years vary slightly from the average; however, in 2002, the WPD was 14% greater than the average. Wind developers typically collect data for 1 or 2 years. This graph demonstrates that short-term data collection (i.e. 1 or 2 years) may not be representative of the long-term average and can be used by wind developers to determine whether their period of data collection is representative of the long-term average.

FIGURE E – The average wind speeds for each hour, also known as diurnal wind speeds, are plotted for the period at 10-meters. The graph shows the variation in wind speeds throughout the day. Typically near the surface (i.e. 10-meters) wind speeds increase during the day and decrease at night. This trend may be quite different for winds speeds at higher levels in the atmosphere and for winds speeds in different geographic locations.

NOTES:
m – to convert meters to feet multiply value by 3.28.
m/s – to convert meters per second to miles per hour multiply value by 2.24.

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