

PERFORMANCE AND ENERGY PRODUCTION OF THE ENERTECH 44<sup>1/</sup>

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<sup>1/</sup> Contribution from USDA, Agricultural Research Service, P.O. Drawer 10, Bushland, TX 79012.

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ABSTRACT

A modern wind machine of the size of agricultural applications was installed on May 28, 1982, at Bushland, Texas. This unit, manufactured by Enertech Corporation, Norwich, Vermont, was the second commercial unit of its design to be operated. It provided electrical power for irrigation pumping and other agricultural loads.

The horizontal-axis wind turbine features a 13.4 m diameter, three bladed, fixed pitch motor on a 24.4-m tower. The blades are fabricated from laminated wood and epoxy, and are attached to a steel hub. A 25-kW induction generator provides 240 v, single phase electrical power.

The wind turbine had operated over 5,700 hours by June 21, 1983, while being available to produce power over 95% of the time. The unit has produced over 60,000 kWh of energy while the average windspeed was 6.0 m/S at 10 m. The blade pitch was originally two degrees from optimum to maintain power production within the limitations of the brake, gearbox, and generator. A maximum output of 23.2 kW for a 15-second average indicated that the system was capable of handling more power. In March, 1983 the blade pitch was changed to one degree from optimum which resulted in a maximum output of 29.3 kW.

Power curves were established for the wind turbine at the two-pitch setting. A comparison is made between the power curve and the actual energy

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production of the wind turbine. Data will be presented to compare the performance of the wind turbine on a diurnal, weekly, and seasonal basis. Data is now being collected in five-minute averages for the purpose of load comparison and matching. Operating experiences of the wind turbine are discussed.