



Figure 2-2. Relative size. Wind turbines today span the gamut from micro turbines only 1 meter (3.3 feet) in diameter to very large turbines with rotors greater than 100 meters (328 feet) in diameter. Very large wind turbines intercept 1,000 times more of the wind stream than micro turbines.

For conventional wind turbines—those whose rotor sweeps a circle—the shorthand for the area swept by the wind turbine is its rotor diameter. In wind energy, size—especially rotor diameter—matters. Thus, wind turbine size classes depend primarily upon the diameter of the rotor (see Table 2-1. Wind Turbine Size Classes).

The size classes used in *Wind Energy* are somewhat arbitrary. These classes differ from that used by the International Electrotechnical Commission (IEC). The IEC defines small wind turbines as those that intercept less than 200 square meters (m^2) of the wind stream. This is equivalent to a conventional wind turbine with a rotor less than 16 meters (52 feet) in diameter. The IEC defines medium-size turbines as those with a swept area greater than 200 m^2 but less than 1,000 m^2 or conventional wind turbines

with rotor diameters from 16 meters (52 feet) to 36 meters (117 feet).

In *Wind Energy*, small wind turbines include micro, mini, and household-size turbines. Micro and mini wind turbines are almost solely used in battery-charging applications. Household-size wind turbines are available for both battery charging and for use connected to the grid.

Micro turbines as those from 0.5 to 1.25 meters (2–4 feet) in diameter. These machines include the 200-watt Air Breeze as well as the Ampair 300. Both use rotors 1.2 meters in diameter and intercept about 1 square meter (m^2) of the wind stream (see Figure 2-3. Micro wind turbine). Installed on a tall tower at a good site, such a wind turbine should generate up to 500 kWh per year.

Table 2-1. Wind Turbine Size Classes

	Rotor Diameter		Nominal Swept Area	Standard Power Rating*
	m	~ft		
			m^2	kW
Micro	0.5-1.25	2-4	0.2-1	.04-0.25
Mini	1.25-3	4-10	1-7	.025-1.4
Household	3-10	10-33	7-80	1.4-16
				Typical Manufacturer Power Rating
Small Commercial	10-20	33-66	80-300	10-100
Medium Commercial	20-50	66-164	300-2,000	100-1,000
Large Commercial	50-100	164-328	2,000-8,000	1,000-3,000
Very Large Commercial	100-150	330-500	8,000-18,000	2,000-10,000

*Std. Power Rating for micro, mini, and household-size wind turbines assumes a specific power of 200 W/ m^2 .