386,000,000,000,000,000,000,000,000 watts. By any measure, that is a lot of power, and that is the sun's power output every second of every day (Fig. 11.1). To make this number easier to work with, scientists write it as $3.86 \times 10^{26}$ watts, or 3.86 followed by 26 zeros. The amount of that energy reaching Earth, which is 93 million miles away from the sun, is $1.74 \times 10^{17}$ watts, or approximately 1368 watts per square meter. By way of comparison, in 2005 the total power output of the entire human race was approximately $1.5 \times 10^{13}$ watts! In that year, we generated a mere 0.009 percent of what the sun sends to Earth each second. If we can tap into this tremendous energy source, then surely the global energy problem can be solved.

The truth is, we do use this energy already. As taught in author Les Johnson's daughter's seventh grade science class, all living things on Earth derive their energy from the sun, though we humans do so indirectly. In photosynthesis, Earth's plants convert sunlight to carbohydrates for use in their growth and for their ultimate consumption as food by animals. We are near the top of the food chain, yet all of the foods we eat derived their stored energy from the sun. Do you like steak? The cow from which the steak is cut consumed some sort of grain, which grew using sunlight in the photosynthesis process.

We use the sun's energy in other ways as well. Fossil fuels are formed by the long-term decay of plants and animals that existed on Earth in its ancient past. The energy they collected during their lifetimes is stored in the coal, oil, or natural gas—all of which are called fossil fuels, since they are derived from fossils. When we burn the oil, we are releasing the energy stored chemically in that ancient plant. Think of it as a battery.

The recent trend toward biofuels is yet another example of how we use the sun's energy for power. Biofuels are simply artificial fossil fuels that are