Enthusiasm for renewable energy coupled with a politics in which each nation tries to gain brownie points for its diligence in meeting the Kyoto limits is an unhappy mixture. It will fail and bring discredit both to the greens and to the politicians foolish enough to adopt renewables as a major source of energy before they have been properly developed.

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All renewable energy (RE) sources produce significantly less greenhouse gases than fossil fuel sources when generating electricity. This makes them potentially attractive as solutions to climate change.

We basically have three core RE resources that can be used to make electricity: the sun, gravity, and the Earth’s hot core. We will refer to these as renewable resources because they are essentially inexhaustible—they will not run out while ever man lives on the Earth.

The sun is the most powerful energy resource available to us. It provides direct heating and direct radiation, both of which can be turned into electricity. The solar heating of the atmosphere creates winds and waves which can drive electricity generators. The sun also evaporates water to produce rain and snow that can be used for hydro-electricity. Plants grow that can be burned to produce heat or converted into other usable forms (like gas) which can produce electricity. Even our coal came from the sun’s ancient radiation because it is derived from plants or other life-forms that lived millions of years ago.

The rate of solar radiation intercepted by the Earth’s surface is about 7,000 times the total current rate of world energy consumption, so from that point of view, there is no shortage of solar resources.

Gravitational forces of the sun and moon create the tides that can be used to drive turbines and electricity generators. The Earth’s hot core heats water and rock and this heat can also be turned into electricity.

Over the years we have developed technologies that can take these resources and generate significant quantities of electricity. Some of these technologies, like
hydro and wind, are mature and widely used. Others like deep hot rocks and wave power are still in development. Continuous improvements are being made to these technologies to improve their usefulness and we can expect many of the current technologies will be producing more and more electricity over the next few decades.

RE technologies will make a growing contribution to the world’s energy supply. How big that contribution will be is uncertain and that is what we will explore in this part of the book.