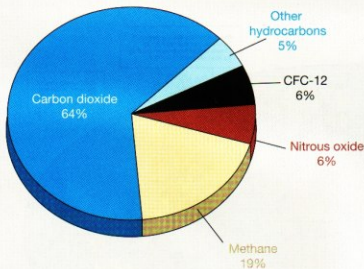


## Global Climate Change and the Kyoto Protocol

Since the 1992 Earth Summit in Rio de Janeiro, the international community has been seeking a way to strike a balance between increasing the pace of economic development without further threatening the global environment. The biggest potential threat to the global environment is the impact that increased energy use will have on global climate. At the Rio Earth Summit, 167 nations ratified the Framework Convention on Climate Change with the aim of solving the problem of how to reduce the amount of greenhouse gases—gases that are leading to the warming of the Earth's atmosphere—that are generated by energy use (Figure 4.E). An equally critical aim is to ensure that the burden of protecting the environment is shared equitably across all nations.

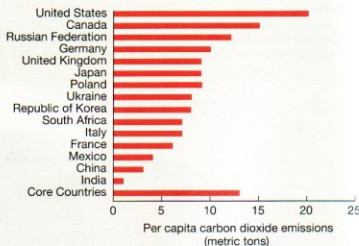
In December 1997 these nations began to address the problem of balancing global economic development and environmental protection more substantively by forging the Kyoto Protocol. The protocol marks the first time that an attempt was made to limit the



**Figure 4.E Greenhouse gases** The most central pollutant involved in global climate change is  $\text{CO}_2$ , carbon dioxide. In addition to  $\text{CO}_2$ , the Kyoto Protocol focuses on five other greenhouse gases: methane ( $\text{CH}_4$ ), nitrous oxide ( $\text{N}_2\text{O}$ ), chlorofluorocarbons (CFCs), and a number of hydrofluorocarbons (HFCs).

amount of greenhouse gas emissions generated by core countries. The aim of the protocol is to cut the combined emissions of greenhouse gases from core countries by roughly 5 percent from their 1990 levels by 2012. (Core countries account for a disproportionate amount of  $\text{CO}_2$  emissions, as Figure 4.F makes clear.) It also specifies the amount each core nation must contribute toward meeting that reduction goal. Nations with the highest  $\text{CO}_2$  emissions—the United States, Japan, and most European nations—are expected to reduce emissions by a range of 6 to 8 percent.

Although the Kyoto Protocol represents a real advance on the 1992 agreement reached in Rio, there are still important issues that have yet to be completely worked out among the 167 nations involved in the protocol. One of the most controversial is whether core countries will be allowed to participate in “emis-

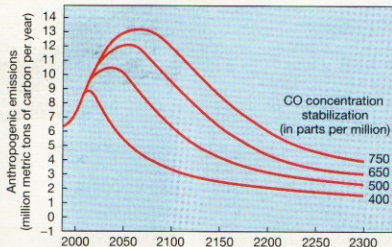


**Figure 4.F Per capita  $\text{CO}_2$  emissions**  $\text{CO}_2$  emissions are a good proxy for all greenhouse gases. The graph shows core countries as a whole, plus several core countries with especially high per capita levels of  $\text{CO}_2$  emissions as well as a few rapidly developing semiperipheral countries. India and China, with very high populations, have relatively low per capita  $\text{CO}_2$  emissions, while the United States and Canada, with populations far lower than India or China, have a massive contribution to  $\text{CO}_2$  emissions. This difference is not surprising, given that energy use is highly correlated with level of wealth.

sions trading." In this scenario, a nation whose emissions fall below its treaty limit will be allowed to sell credit for its remaining emissions allotment to another nation, which in turn can use the credit to meet its own treaty obligations. Those who advocate the emissions trading approach to pollution control believe such a program will help curb the cost of controlling greenhouse gases by allowing emissions cuts to occur where they are least expensive.

A second important, and as yet unresolved, issue is the extent to which peripheral nations will be involved in limiting global emissions. While the original 1992 climate treaty placed the burden of reducing global climate change on core countries, which are unquestionably most responsible for the current buildup of greenhouse gases, peripheral countries are also expected to play a role. The Kyoto Protocol, however, does not set any binding limits on peripheral country emissions, nor does it establish a mechanism or timetable for these countries to take on such limits voluntarily. One interesting way of encouraging environmentally sensitive development in peripheral countries is the so-called Clean Development Mechanism. This would allow core countries to invest in projects in peripheral countries that reduce greenhouse gas emissions and in return receive credit for the reductions. The aim is to help peripheral countries develop their economies without increasing the overall contribution to greenhouse gas emissions.

Although it is unlikely that the Kyoto accord will bring about deep emissions cuts, climate negotiators would like to see a new treaty developed that will enable progress to continue well into the twenty-first century. The hope is to stimulate energy policy reform at the same time as new research and development investments bring low-emission technologies to market. It is also possible that the Kyoto Protocol itself could be expanded to include more comprehensive emission cuts designed eventually to stabilize greenhouse gas concentrations at a safe level. **Figure 4.G** shows the projected levels of CO<sub>2</sub> emissions, which are considered a reliable proxy for all greenhouse gases, under various scenarios. Unfortunately, after nine years of international negotiations, in mid-2001 President George Bush announced that the United States would no longer honor its commitment



**Figure 4.G Impact of proposed reductions in future emissions** To stabilize CO<sub>2</sub> emissions, very deep cuts will be necessary for core countries at the same time that peripheral countries must be allowed to pursue economic development. One important way to make this possible is through the development of low-emission technologies.

to the 1997 Kyoto agreement because he feared the ramifications of the Protocol would negatively affect U.S. energy companies and diminish economic growth in the United States and the rest of the globalizing world. The implications of this decision are that the United States will continue to be the world's largest single generator (over 25 percent) of greenhouse gases—emissions that are leading to worldwide rises in temperature. Such temperature increases—known as global warming—have more potential to damage Earth's web of life than any other factor outside of nuclear war or a collision with an asteroid. In addition to causing rising sea levels throughout the world (which could result in widespread loss of property and livelihoods), global warming is also likely to contribute to increases in heat-related deaths (especially respiratory illnesses) and a widening of the range of disease-carrying rodents and bugs (which would cause increases in malaria, dengue fever, and Lyme disease, among other afflictions).