ENVIRONMENTAL POLICY

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Contents

Summary

Greenhouse gases in the atmosphere act like the glass in a greenhouse: they are transparent to sunlight, which warms the earth, but they prevent some heat from escaping into space, keeping the earth warmer than it otherwise would be. The atmospheric concentrations of several greenhouse gases are rising as a result of human activity. The increase in such gases in the atmosphere, which contributes to global warming, is a result of the burning of fossil fuels, the emission of pollutants into the atmosphere, and deforestation. Many nations are now committed to reducing greenhouse gas emissions over the next few years. Most economists, scientists, and policy makers agree that rational development of policy towards climate change requires information about the impact of change and the costs of adapting to, preventing, or mitigating it. However, both costs and benefits are very uncertain because the ultimate effect of policies adopted today will be unclear for several decades.

1. Introduction

The greenhouse effect is the progressive, gradual warming of the earth's temperature, caused by carbon dioxide (CO2) and other gases that have proportionately increased in the atmosphere. The greenhouse effect disturbs the way the earth's atmosphere maintains the balance between incoming and outgoing energy by allowing radiation from the sun to penetrate through to warm the earth, but preventing the resulting radiation from escaping back into the atmosphere. Greenhouse gases include the common gases CO2 and water vapor, but also rarer gases such as methane and

chlorofluorocarbons (CFC), whose properties relate to the transmission or reflection of different types of radiation.

Greenhouse gases in the atmosphere act like glass in a greenhouse: they are transparent to sunlight, which warms the earth, but they prevent some heat from escaping into space, keeping the earth warmer than it otherwise would be. Most of this greenhouse effect is natural, maintaining the earth's average temperature at about 60°F (15°C). Without the natural greenhouse effect, the earth's average temperature would be closer to 0°F (–18°C). The atmospheric concentrations of several greenhouse gases are rising as a result of human activity. The concentration of CO2, the most important human-made greenhouse gas, has risen by nearly 30% over pre-industrial levels. Concentrations of other greenhouse gases have also risen; methane levels have more than doubled and nitrous oxide levels are increasing as well. The increase in such gases in the atmosphere, which contributes to global warming, is a result of the burning of fossil fuels, the emission of pollutants into the atmosphere, and deforestation. Scientists have expressed fears that global mean temperatures could rise by up to 5°C by the end of the twenty-first century and clearly this has severe implications for the environment and life on earth. Remember that the difference in global average temperature between modern times and the last ice age, when much of Canada and the northern United States were covered with a thick ice sheet, was only about 9°F(–13°C). A temperature rise of similar magnitude could have serious, potentially devastating effects on society and ecosystems.

Many nations are now committed to reducing greenhouse gas emissions over the next few years. However, as with any important policy issue, this view has its detractors. Some research has failed to find a significant human effect on the environment. Moreover, most economists, scientists, and policy makers agree that rational development of policy towards climate change requires information about the impact of change and the costs of adapting to, preventing, or mitigating it. However, both costs and benefits are very uncertain because the ultimate effect of policies adopted today will be unclear for several decades. Section 2 of this article focuses on the problems of greenhouse gas emissions and the policies designed to combat greenhouse gases. However, environmental problems do not arise from greenhouse gases alone. In Section 3 we examine protocols designed to combat other kinds of environmental problems. In particular, we examine three basic protocols: the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES), the Montreal Protocol against the use of ozone-depleting substances, and the Basel Protocol against transboundary movement of hazardous wastes.

2. Greenhouse Gas Emissions

It is now accepted that CO2 emissions are the biggest cause of global warming, even though the Kyoto Protocol (see below) on greenhouse gas emissions acknowledges six gases that add to the greenhouse problem. Many measures have been suggested to restrict the emission of CO2. We list a few below.

(i) The progressive introduction of new energy-saving technology and reducing energy consumption per unit of production. Such policies include the substitution of fuels that

yield less CO2 per unit of output (for example, the substitution of natural gas for coal), increasing use of alternative energy sources such as hydropower, solar power, wind power, the use of waste methane to generate electricity, more rapid retirement of old and inefficient production units, and the introduction of energy standards.

(ii) The removal of energy subsidies worldwide. Such subsidies tend to reduce the price of fossil fuels, which results in increased usage.

(iii) The imposition of carbon taxes on emissions, the utilization of nuclear power in remote locations (that do not emit any CO2), the promotion of plantations and plantation-based industries, revegetation projects to develop carbon sinks, the reduction of emissions from land clearing and deforestation, measures to enhance CO2 sinks such as oceans, and the reduction of methane emissions from livestock.

(iv) The acceleration of research and development into new sources of energy and loans and grants to support renewable energy initiatives.

(v) Improvements in the design of buildings and houses to achieve energy conservation, the promotion of viable recycling, improvements in public transport systems, and restricting the use of cars.

One of the Kyoto proposals for combating greenhouse gas emissions was voluntary reduction in emission levels of CO2 and other greenhouse gases like methane and nitrous oxide. At the International Climate Change Conference held at Kyoto in Japan, developed countries agreed for the first time on a reduction of greenhouse gas emissions. The agreements reached in that conference are termed the Kyoto Protocol. We next turn to these agreements.

2.1. Key Elements of the Kyoto Protocol

The Kyoto Protocol is an international agreement struck by 159 nations attending the Third Conference of Parties (COP-3) to the United Nations Framework Convention on Climate Change (UNFCCC), held in December 1997 in Kyoto, Japan, to reduce worldwide emissions of greenhouse gases. Delegates to COP-3 agreed to several specific provisions: 38 developed countries (Annex I countries) agreed to reduce their emissions of six greenhouse gases. Collectively, developed countries agreed to cut back their emissions by a total of 5.2% between 2008 and 2012 from 1990 levels. The six gases were CO2, methane, nitrous oxide, and three ozone-damaging fluorocarbons not covered by the Montreal Protocol that banned global CFC (hydrofluorocarbon, perfluorocarbon, and sulfur hexafluoride). The European Union agreed to reduce emissions by 8% below 1990 levels, the United States agreed to a 7% reduction; and Japan agreed to a 6% reduction. Some countries, including Russia and Ukraine, were not bound to make any reductions, while countries with smaller economies such as Iceland, Norway, and New Zealand were allowed to increase their emissions. Australia was also allowed to increase greenhouse gas emissions. Countries undergoing the process of transition to a market economy but that were also classified along with the E.U., Japan, and the U.S. as Annex I parties to the convention (including the Czech Republic, Hungary, and Poland) faced smaller reductions. Developing countries

(including India and China) had no formal binding targets, but had the option to set voluntary reduction targets.

Countries could comply using any, all, or a combination of the following mechanisms. First, countries could reduce emissions at the source (through domestic environmental regulations). Second, in principle countries could use human-induced carbon sequestration as a way of meeting legally binding greenhouse gas emissions targets. Third, countries could participate in an international permits trading program.

There is nothing new with trying to reduce emissions at the source. Such compliance methods include standard command and control methods like emission restriction and the imposition of tax on emissions, for example, a carbon tax (see Environmental Regulation, International Trade, and Transboundary Pollution). In this article we will therefore focus on the other two options: carbon sequestration and the development of an international emissions trading program. Compared to compliance at the source, these programs are less costly because they allow compliance based on comparative advantage.

In March 2001, the U.S. government withdrew its support of the Kyoto agreement, arguing that it was harmful to the U.S. economy. In February 2002, President George W. Bush announced the new environmental policy of the U.S. government. The policy was presented as the American alternative to Kyoto and argued that the new policies would produce emissions comparable to those that would be achieved under Kyoto if the policies went into effect in the rest of the world.

The primary goal of this policy is to "create a credible and transparent program to report and credit real reductions that support the national goal of reducing U.S. emissions by 18% by 2012." The key aspect of the policy was the dependence on voluntary cooperation of all sectors of the economy to achieve the firm goals for controlling greenhouse emissions.

However, despite the emphasis on voluntary cooperation, the new plan conveys the notion that it could eventually be replaced by mandatory requirements if the policy does not produce the desired results. The new plan would broadly be market based and would encourage firms to earn credits by cutting their emissions and these credits could be traded or banked for later use. Credits will be available not only to industrial producers but also to farmers, to encourage the use of conservation techniques that would significantly increase the amount of carbon stored in the land.

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Biographical Sketch

Pushkar Maitra is a senior lecturer in the Department of Economics, Monash University, Australia. He completed his Ph.D. in economics from the University of Southern California, Los Angeles, in 1997 and since then has held faculty positions at the University of Sydney, Australia, and Monash University. His primary areas of research are development economics, economic growth, and population economics. He has presented papers at a number of well-known general and field conferences in the United States, Australia, India, and Europe and has been invited to present seminars in several universities in those countries. He has served as a referee for a number of respected international journals and was on the organizing committee of the 27th Conference of Economists held at the University of Sydney in September 1998 and is a member of the organizing committee for the Econometric Society Australasian Meetings to be held at Monash University in 2004.