emissions of greenhouse gases or sequestering carbon. Current analysis suggests the following:

- **Competing Uses of Land, Water, and Other Natural Resources.** A growing population and expanding economy will increase the demand for land and other natural resources needed to provide, *inter alia*, food, fiber, forest products, and recreation services. Climate change will interact with the resulting intensified patterns of resource use. Land and other resources could also be required for mitigation of greenhouse gas emissions. Agricultural productivity improvements throughout the world and especially in developing countries would increase availability of land for production of biomass energy.
- **Geoengineering Options.** Some geoengineering approaches to counterbalance greenhouse gas-induced climate change have been suggested (e.g., putting solar radiation reflectors in space or injecting sulfate aerosols into the atmosphere to mimic the cooling influence of volcanic eruptions). Such approaches generally are likely to be ineffective, expensive to sustain, and/or to have serious environmental and other effects that are in many cases poorly understood.

4.4. Policy Instruments

Mitigation depends on reducing barriers to the diffusion and transfer of technology, mobilizing financial resources, supporting capacity building in developing countries, and other approaches to assist in the implementation of behavioral changes and technological opportunities in all regions of the globe. The optimum mix of policies will vary from country to country, depending upon political structure and societal receptiveness. The leadership of national governments in applying these policies will contribute to responding to adverse consequences of climate change. Governments can choose policies that facilitate the penetration of less greenhouse gas-intensive technologies and modified consumption patterns. Indeed, many countries have extensive experience with a variety of policies that can accelerate the adoption of such technologies. This experience comes from efforts over the past 20 to 30 years to achieve improved energy efficiency, reduce the environmental impacts of agricultural policies, and meet conservation and environmental goals unrelated to climate change. Policies to reduce net greenhouse gas emissions appear more easily implemented when they are designed to address other concerns that impede sustainable development (e.g., air pollution and soil erosion). A number of policies, some of which may need regional or international agreement, can facilitate the penetration of less greenhouse gas-intensive technologies and modified consumption patterns, including:

- Putting in place appropriate institutional and structural frameworks
- Energy pricing strategies (e.g., carbon or energy taxes, and reduced energy subsidies)

- Reducing or removing other subsidies (e.g., agricultural and transport subsidies) that increase greenhouse gas emissions
- Tradable emissions permits
- Voluntary programs and negotiated agreements with industry
- Utility demand-side management programs
- Regulatory programs, including minimum energy efficiency standards (e.g., for appliances and fuel economy)
- Stimulating RD&D to make new technologies available
- Market pull and demonstration programs that stimulate the development and application of advanced technologies
- Renewable energy incentives during market build-up
- Incentives such as provisions for accelerated depreciation and reduced costs for consumers
- Education and training; information and advisory measures
- Options that also support other economic and environmental goals.

Accelerated development of technologies that will reduce greenhouse gas emissions and enhance greenhouse gas sinks—as well as understanding the barriers that inhibit their diffusion into the marketplace—requires intensified research and development by governments and the private sector.

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