

Saving the Earth: Dealing with Global Warming

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Envision a future full of erratic storms, frequent floods, and wars over food and fresh water. Although such a scenario seems extreme, it is a possibility if mankind continues to abuse the delicate environment. Historically, many human societies have mistakenly considered the earth to be a limitless resource here solely for their convenience. This selfishness has led humans to often blatantly disregard the well-being of other organisms with which we share this planet as well as that of future generations who will inherit it.

The situation, however, is not hopeless. Major environmental damage has only been occurring for the last 150 years or so; thus efforts at improving our attitudes and treatment of the environment could reverse much of it. Additionally, governments and people everywhere have become more environmentally aware over the last 25 years and have become more willing to reconcile the situation.

Still, the task of restoring the environment is daunting. Environmentalists and politicians have had to clearly define their goals; not doing so in the past made it difficult to achieve any observable progress. The world's objective, as it was recently discussed at the World Summit on Sustainable Development in Johannesburg, was stated clearly by Mark Malloch Brown, administrator of the United Nations Development Program (UNDP): "The key now is to put people first and the environment second, but also remember that when you exhaust resources, you destroy people."¹ Bearing this in mind, summiteers discussed a number of current environmental issues including global warming and the underlying energy problems that are leading to it. The following explores possible technological solutions to this specific issue.



Global Warming — The Problem

The major problem of global warming is characterized by worldwide climate change beyond normal levels, thus eventually melting ice caps and changing weather patterns. The long-term implications of global warming are enormous: If it continues at its current rate, earth's average temperature will rise between 4 and 9 degrees Fahrenheit. Already, global warming has decreased the Arctic Sea ice thickness from an average of 9.8 feet (3 meters) between 1958 and 1976 to 5.6 feet (1.7 meters) between 1993 and 1997.² The melting of the ice caps could eventually (within the next 100 years) lead to major flooding of coastal areas such as New York City and Los Angeles. Other possible adverse effects include the extinction of entire ecosystems that are not accustomed to the new climate and a resulting "ice age effect." Although the consequences are dire, there are a number of things we can do to combat the problem.

Mechanism of Global Warming

Global warming stems from high levels of greenhouse gases in the atmosphere, primarily carbon dioxide, which is responsible for about half of the rise in worldwide temperatures in recent years. Warming occurs when greenhouse gases absorb infrared heat reflected by the earth and keep it trapped within the atmosphere. Normally, radiation from the sun hitting the earth is reflected back in the form of light and heat, and some of that heat is naturally trapped by greenhouse gases; however, the percentage of such gases is low, so a major increase in concentration can easily disrupt the reflection-absorbance balance.³ 1.83 billion tons of carbon dioxide was emitted in the United States in 2000, up 400 million tons from 1980. The level of greenhouse gases far exceeds normal amounts, causing the temperature to also increase slowly but steadily (1.3 degrees Fahrenheit since 1900).²

Sources of Greenhouse Gases

Carbon dioxide is produced readily in every developed and developing country. Automobile admissions and industry produce enormous amounts each year. Plants absorb carbon dioxide and use it in their metabolism. However, such high amounts as are emitted by the world overwhelm these natural diffusive mechanisms. Additionally, deforestation, another environmental issue, only compounds the problem.



Renewable Energy

Our reliance on fossil fuels (such as oil), the burning of which yield carbon dioxide, is the reason behind global warming. Tackling global warming requires first finding methods to curtail the use of fossil fuels, and then finding inexpensive, nonpolluting, and renewable replacement sources.

Reducing Emissions

Many countries have been requiring greenhouse gas emission standards since the 1970s. Power plants in industrialized countries are required to have scrubbers that limit the output of carbon dioxide and sulfur dioxide (a smog and acid rain culprit). Cars in most industrialized but not many developing countries are required to have emissions tests.

Alternative Energy Sources

The ultimate solution to global warming (and air pollution) lies in non-fossil fuels, as such fuels produce no greenhouse gases and are for the most part environmentally safe. Forms of alternative energy include nuclear, wind, hydroelectric, geothermal, hydrogen fuel cells, and solar. These forms are renewable and clean, but often difficult to harness.

Nuclear Energy

Nuclear energy is the most controversial of the listed sources of alternative energy, but also has the greatest energy potential, carrying more energy per ounce than conventional fossil fuels. Although harmless if functional, power plants risk meltdowns such as those in Chernobyl and Three Mile Island, which pose very serious health hazards to people in the surrounding area. Thus many countries such as Germany consider nuclear energy to be unsafe and are unwilling to harness it. In the United States, however, 20 percent of all energy is produced by nuclear power.⁴

Wind and Solar Energy

The other forms of renewable energy, while

tougher to implement because they are less established, hold the key to our future: They are truly renewable, environmentally safe, and carry no health hazards. Wind energy is the fastest growing and most common of these. Experts say that in two decades wind could provide up to 12 percent of the earth's electricity. A decade ago, Denmark required utilities to purchase any available renewable energy at a premium price. Today, 18 percent of its energy is provided by wind. The European Union, led by Germany and Spain, accounts for 70 percent of today's wind energy.⁵

A major challenge faced by environmentalists and proponents of renewable energies is integration with the current system. Many governments subsidize fossil fuel plants, and thus give them an advantage over other energy sources. Other countries, however, such as Germany, have reversed this trend by offering major cost incentives to renewable energy plants. As a result, Germany is the leading generator of alternative power. Wind and solar energy are used there extensively.⁵

Geothermal Energy and Hydrogen Fuel Cells

Iceland is another major center for renewable energies, thanks to the extensive geothermal activity there. Geothermal energy accounts for 90 percent of the energy consumption. This clean form of energy harnesses the heat deep in Iceland's volatile crust. The country plans to use geothermal and hydroelectric power to produce hydrogen in the near future for use in fuel cells.⁵ Hydrogen fuel cells utilize the energy released from the reaction of pure hydrogen with oxygen to produce water. Thus, their only by-product is

pure (drinkable) water. A number of automobile prototypes have been designed to be powered by fuel cells. Some experts suspect that portable hydrogen fuel cells, due to their compact size but high energy potential, may replace power plants altogether. Currently, scientists are excited by the prospects of storing extra energy (solar, wind, geothermal, etc.) in fuel cells for later use.⁵ Therefore, energy would be available during low wind or cloudy days, for example.

Conclusion

Although global warming is a grave environmental issue, the vigilance of environmental groups, scientists, and governments will most likely lead to a revolution akin to the Industrial Revolution of the nineteenth century. This energy revolution will lead to the replacement of fossil fuels, an artifact of the Industrial Revolution, with clean, environmentally friendly, and renewable fuels. Recent history shows that the price of this new technology is sometimes cheaper than the old technology. Oil prices are generally very high, and the scrubbers required in power plants are expensive. Thus, some private groups and governments are currently trying to exploit the economic advantages of using renewable sources of energy.⁵ As the technology improves, these economic advantages will become more substantial.

Nonetheless, the current environmental issue is grave enough so that steps must be taken now. There are simply some things such as nature and life, both of which are intricately connected to the global warming issue, that should not be left to exploitation. ❏

References

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