

Out of the Greenhouse

By Yoichi Kaya

Global warming has recently become a major international problem. Iraq's occupation of Kuwait and the resulting destabilization in the Middle East is, of course, a problem that affects our immediate daily lives, but there is still the prospect that it can be resolved before long. Global warming is different, not only because no solutions are in sight but also because it threatens to have a dramatic impact on the lives of future generations.

Such is not to imply that nothing has been done. The Intergovernmental Panel on Climatic Change (IPCC) issued an interim report last August and the Second World Climate Conference was held at the end of October. International negotiations aiming at agreement on a framework for preventing global warming have started.

Immediate policy responses

Since the accumulation of CO₂ and other greenhouse gases in the atmosphere is an irreversible phenomenon, we must apply ourselves to this problem as soon as possible. Yet at the same time, we should not forget that the process of devising measures and achieving real results takes time. As the world economy has grown, the fact that we have relied on fossil fuels for nearly 90% of our energy needs has inevitably meant releasing CO₂ into the atmosphere. While energy demand in the industrial economies has shown slower growth in recent years, the accelerating pace of economic growth in the developing economies means steadily growing energy demand and further complicates the task of reducing CO₂ emissions.

World opinion is divided on what policies are needed. Most West European countries are calling for stabilizing CO₂ emissions at specific target levels and establishing specific policies to reduce CO₂ emissions, as seen in the Noordwijk Declaration adopted at the November 1989

Ministerial Conference on Atmospheric Pollution and Climatic Change. The U.S. government has expressed opposition to such targets on the grounds that we still do not know enough about the greenhouse effect, that efforts to reduce the release of CO₂ emissions could well mean limiting energy consumption and impeding economic growth, and that it is essential to adopt a comprehensive approach that covers both the release and the absorption of all of the greenhouse gases.

Busy rebuilding their domestic economies, the Soviet Union and the Eastern European countries have been quiet on this issue. However, the Soviet Union has been somewhat negative on the idea of controls, citing the lack of scientific certainty and suggesting that global warming also has its up side. With world opinion so broadly divided and two of the largest producers of CO₂ gas, the U.S. and the Soviet Union, either reluctant or uninterested, it is clear that this is not a problem lending itself to a quick solution.

The reality is that CO₂ is an almost-inevitable by-product of burning fossil fuels. While there is hope that technologies for removing CO₂ from fossil-fuel exhaust will be developed, such technology is not now available and the only way to reduce CO₂ emissions is to curtail fossil-fuel consumption. Much has been written about the potential of fuel conversion and energy conservation, but I would like to focus here on the gap between technical and economic feasibility and social reality.

As British environmentalist Amory Lovins has stated, households could achieve substantial energy savings if more vigorous efforts were made to promote the use of fluorescent lighting and other energy-efficient technologies that have not taken hold in many industrial economies. What is preventing the spread of such devices is not ignorance of the technology but the fact that people still prefer less energy-efficient incandescent bulbs as light sources.

Energy efficiency and economic efficiency are only two of the many factors that are considered in the decision on what device or piece of equipment to select for the home or the factory. It is thus unrealistic to assume that simply calling for the prevention of global warming or explaining the technological and economic possibilities alone can fundamentally advance energy conservation and fuel conversion.

Realistic idealism

Rather than looking simply at the technology, it is important to look at the past record for an indication of what is possible. In the 13 years from the first oil crisis in 1973 to 1986, Japan reduced its energy consumption per unit of GDP at an average annual rate of 2.8%. In the peak years around 1980, right after the second oil crisis, energy consumption per unit of GDP was reduced by more than 4% per year. These results are, however, only for the last decade or so, and longer-term data indicate that it is possible to reduce energy consumption per unit of GDP by about 1% a year.

Given that the present Gulf crisis, unlike the oil crises, is not expected to cause a long-term, major increase in oil prices and that substantial progress has already been made in energy conservation, it will be extremely difficult to reduce CO₂ emissions much below present levels. Though the Japanese government's energy demand outlook released in June 1990 assumes that it will be possible to achieve energy savings over the next 20 years comparable to the savings achieved following the oil crises, I do not think this is a realistic assumption unless there are dramatic new economic incentives.

All things considered, it may be possible to adopt stringent CO₂ emission reduction targets, but it will not be possible to ensure that they are met. Thus it would be more realistic to choose the less flamboyant strategy of setting realizable goals



An increasing number of seminars are being held to discuss changes in climate.



Photos: Kyodo News Service and RITE

that will encourage the participation of the countries that pump out most of the world's CO₂ and that are currently reluctant to set targets.

At the IPCC experts' meeting convened in London last June to review the Noordwijk Declaration, one proposal suggested that, rather than setting common targets, each country ought to determine its own targets. Although less ambitious, this proposal is probably the most realistic approach.

Long-term measures

Much more important than such short-term measures is the question of how to deal with this problem in the long term. Global warming will haunt mankind as long as the accumulation of greenhouse gases in the atmosphere continues to build. This situation has to be resolved at the earliest possible date—which means stabilizing the amount of CO₂ in the atmosphere. It is estimated that even stabilization at present levels would require a 60% reduction in CO₂ emissions.

Given the present growth rate of the world population and the aspirations for economic growth, this is an extremely daunting target. According to the IPCC, stabilizing CO₂ at present levels would require reducing per-capita CO₂ emissions by three-quarters over the long term. We do not now have the technology needed

to achieve this goal. It is vital that there be major technological advances and that these new technologies be widely used.

Recognizing the importance of long-term targets, the Ministry of International Trade and Industry (MITI) recently announced its "New Earth 21" action program for the 21st century. The problem now is how to implement the international cooperation envisioned in this program. Composing a grand strategy is the first step but only a first step. Until the rest of the world climbs on board, it is up to Japan to lead the way. The establishment of the Research Institute of Innovative Technology for the Earth is one initiative in the right direction, but Japan must also contact researchers worldwide and explain the need for a basic solution to this problem.

International conferences should be held, and an active effort should be made to contract research out to the leading research institutes in the other industrial countries or to set up joint research projects with them. If we can stimulate more research projects throughout the world, the technical means for solving this problem will be achieved more readily and the world will be in a much better position to prevent global warming.

Because of the long-term nature and extreme difficulty of this problem, ambitious ideas formerly thought of as in the realm of science fiction should be serious-

ly reconsidered. The development of space-based solar electric energy generation; the use of deep-geothermal heat; redesigning building structures, materials and even our urban centers for solar energy usage; and the use of cogeneration to link the industrial and household sectors have been hampered in the past by legal regulations, distribution contacts and problems associated with heat transport and storage.

Yet the very long-term imperative of achieving a CO₂-free society mandates reconsideration of these possibilities. Some of these ideas will turn out, on closer examination, to be mere dreams. Yet others will prove feasible, and these projects are no more complex than research into nuclear fusion, coal liquefaction and other technologies. They are certainly worth further research.

Since the beginnings of history, mankind has been burning carbon fuels to power the advance of civilization. The effort to substantially reduce CO₂ emissions is thus nothing less than an attempt to alter the course of human history. Yet it is essential that we recognize the overriding importance of this issue and start looking for bold solutions.

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