

Tightening the Rules

By Hisashi Shingai

Chlorofluorocarbons (CFCs) have become a social issue in regard to the ozone layer destruction since Prof. F. S. Rowland of the University of California raised the question in 1974. His scholastic paper, titled "Stratospheric Sink for Chlorofluoromethanes: Chlorine Atomic-Catalyzed Destruction of Ozone" and printed by a science journal, presented the following points:

a) When CFCs used in refrigerators, aerosols and the like get into the atmosphere, they pass through the troposphere, without being cracked, to the stratosphere. There, the CFCs are cracked by ultraviolet rays, generating chlorine atoms.

b) Chlorine atoms cause a chain reacting destruction of ozone molecules in the stratospheric ozone layer. As a result, the harmful ultraviolet rays reaching the earth increase in volume, causing the probability of skin cancer to rise and affecting the environment in various other ways.

c) A massive volume of these CFCs are already trapped in the troposphere. That

The Montreal Protocol

The Montreal Protocol covers CFC-11, -12, -113, -114 and -115 as well as Halon (bromochlorofluorocarbon)-1211, -1301 and -2402.

The Schedule for CFC and Halon Reduction (1986 as the base year; 1986=100%)

Materials	Deadline	Annual consumption	Annual production
CFCs	After July 1, 1989	Below 100%	Below 100%
	After July 1, 1993	Below 80%	Below 80%
	After July 1, 1998	Below 50%	Below 50%
Halons	After Jan. 1, 1992	Below 100%	Below 100%

Notes: Consumption = Production + Imports - Exports
Production = Actual production - Volume destroyed

could mean serious adverse effects on the earth unless the release of these CFCs comes to an end.

Cuts and bans

Prof. Rowland's points were later discussed in such forums as the United Nations Environment Program (UNEP) and

the United States and European nations adopted measures such as cutting and banning the use of CFCs in aerosols, and freezing their production capacity. Similarly, Japan froze its capacity and decided to reduce CFC use in aerosols under the guidance of the Ministry of International Trade and Industry (MITI) in 1980.

The CFC and ozone problem persisted, and the Vienna Convention aimed at protecting the layer was therefore created in March 1985. In September 1987, the Montreal Protocol materialized the aim to reduce substances harmful to the ozone layer.

The Japanese government acceded to the protocol and in May 1988 enacted a law to protect the ozone layer by regulating certain substances. The Japanese law covers overall measures for the implementation of both the Vienna Convention and the Montreal Protocol appropriately and smoothly. Specifically, the law a) regulates the production of CFCs according to the protocol so that Japan can control output and consumption, which is defined as production plus imports minus exports, and b) sets guidelines for users that cover emission control and rational consumption. The guidelines set out guidance and advice for the users so that CFC use can be reduced.



"Eco Mark," approved by an Environment Agency-related organization, symbolizing Japan's efforts toward environmental protection. The mark is placed on various consumer products to make both manufacturers and consumers more aware of the importance of the issue.

Photo: Mainichi Shinbun

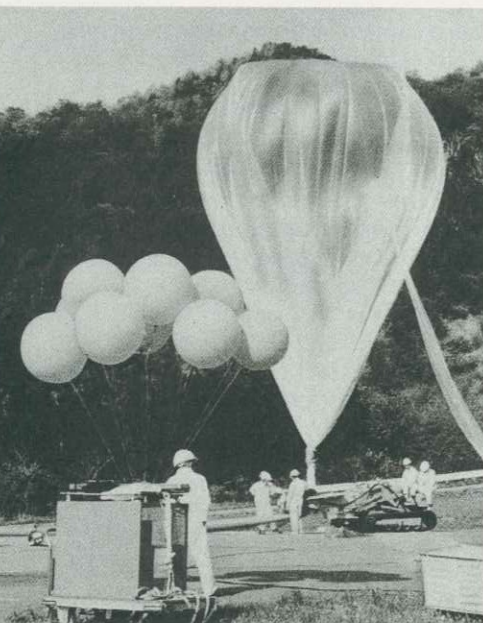


Photo: Asahi Shimbun

A hot-air balloon being prepared for observation of CFCs in the atmosphere — one of Japan's efforts to protect the environment

In order to control the volume consumed, users must obtain ministry import licenses as required by the Foreign Exchange and Foreign Trade Control Law. The MITI minister has the power to control producers' output for export.

Present policy

(1) Disclosure of basic matters

Article 1 of the law states that it aims to protect both the people's health and the environment by appropriate and smooth execution of the measures contained in both the convention and protocol.

Article 3 states that the following data must be made available to the public:

a) Standards and limits on the production and consumption of CFCs, to which Japan adheres under the protocol.

b) Measures to seek the Japanese people's understanding and cooperation.

c) Other important measures for the protection of the ozone layer.

Based on these provisions, the ministry disclosed basic policy matters on January 4, 1989.

(2) Production and licenses

CFC producers must obtain production-volume approvals from the MITI

Table 1 Outline of CFC Control Measures Taken by MITI in Fiscal 1989

Fiscal Measures
<p>Measures related to international regulations</p> <p>1) Examination and execution of measures in regard to the supply-demand, distribution and rational use of CFCs, and development of related technology.</p> <p>2) Investigation of basic physical properties, such as temperature-pressure relations and viscosity, to provide basic data for the development of alternative substances. Measurement of acute toxicity of alternative substances.</p> <p>(¥48 million)</p>
<p>Survey and research for the development of cleaning equipment using ethanol as a CFC alternative</p> <p>(¥70 million)</p>
<p>CFC research as part of antipollution efforts</p> <p>1) Photoreaction for conversion/cracking of CFCs</p> <p>2) Research into controlling emission of organic chloride solvents</p> <p>3) Research into the cracking process of alternative substances in the troposphere</p> <p>(¥84 million)</p>
Financing Measures
<p>Loans from the Japan Development Bank</p> <p>Loans with 5.05% per-year interest are available for users who plan to employ cleaning equipment with built-in or attached facilities effective in curbing CFC emission or recovering used CFCs. Loans will finance up to 40% of total equipment costs. Loans will be part of the Bank's antipollution loans totaling ¥65 billion.</p>
<p>Loans from the Small Business Finance Corp. (SBFC) and People's Finance Corp. (PFC)</p> <p>Those who plan to install CFC recovery/recycling equipment such as cleaning equipment with recovery/recycling capability or recovery/purification equipment qualify for SBFC loans with 4.85% per-year interest (5.35% per year in and after the fourth year). Loans are also available to those who replace or modify such equipment.</p> <p>SBFC loans will be available from its industrial antipollution loans totaling ¥35 billion. PFC loans will be part of its safety/pollution abatement loans totaling ¥2.5 billion.</p>
<p>Loans from the Small Business Corp.</p> <p>Organizations that lease CFC-based cleaning equipment with emission control mechanisms or lease recovery facilities for attaching to such equipment qualify for low-interest (2.7% per year) loans. Loans can finance up to 65% of total leasing costs.</p>
Tax Measures
<p>Corporate and income tax depreciation</p> <p>Special corporate and income tax depreciation (21% in the first year) is available for the CFC-based cleaning equipment with built-in or attached CFC emission or recovery control mechanisms.</p>
<p>Lower appraisal for fixed-property tax</p> <p>Fixed-property appraisal for CFC-based cleaning equipment with built-in or attached CFC emission or recovery facilities will be lowered by three-fifths for the first three years following installation of such equipment.</p>
<p>Exemption from volatile oil and local road taxes</p> <p>Exemption from these two taxes will be given on volatile oils used for the manufacture of CFC and oil blends (¥53,800 per kiloliter).</p>

minister each year. The minister regulates the production volumes of both CFCs and "Halons" (bromochlorofluorocarbons, which are similar to CFCs). For CFCs, the regulation started on July 1 this year, with the regulation year running July 1 to June 30. The minister's power is based on Articles 4, 5 and 8-15. The minister is also due to regulate Halon output, starting on January 1, 1992. The regulation will be based on calendar years. The minister is authorized to regulate Halon volumes by Articles 16, 17 and 19-21.

Users who plan to import CFCs are subject to the Foreign Exchange and Foreign Trade Control Law, also starting July 1. The import volume quota is set by the July 1-June 30 regulation year. Imports from non-protocol members are prohibited.

There is an agreement that annex documents will be compiled which will list the products containing CFCs within three years from the date the protocol took effect. Importing of the products on the list will be prohibited within one year after the documents take effect.

(3) CFC destruction technology

The protocol also stipulates that when a nation develops a technology to convert CFCs into harmless substances and wins approval from other protocol member

countries, the "destroyed" (or converted) CFC volume will be deducted from the production volume.

This point is mentioned in the Japanese law, too. When a company destroys CFCs with the means regulated by Articles 11 and 19, it will be allowed to produce an equal volume following confirmation and approval from the MITI minister.

The destruction technology will hopefully crack (or decompose) CFCs already in the atmosphere, thus reducing the effect of these chemicals on the ozone layer. Japan is making technological efforts which were compiled by a committee at the Chemical Product Council and submitted to UNEP's Helsinki meeting.

(4) Emission control and rationalization of usage

Article 23 of the law allows the director general of the Environment Agency and MITI minister to set guidelines for CFC emission control and rationalizing consumption. Based on the provision, the two announced the guidelines on January 4 of this year.

The guidelines do not force primary users into rational use of CFCs. Instead, they give the primary users broad advice on how they could rationalize the use of CFCs. Japanese CFC users are being called on make strenuous efforts so that

Japan can honor the convention and the protocol in anticipation of stringent regulations in the years to come.

(5) Government support

Article 24 of the law states that the government will strive for the development of alternative products and equipment effective in emission control and rational use. MITI developed various measures for these objectives for fiscal year 1989, as mentioned in Table 1.

Articles 25 and 26 encourage the observation of the ozone layer and other surveys and research projects. The efforts in this area include development of equipment that will be put in the ADEOS (advanced earth observing satellite) to observe the layer.

(6) Other efforts

MITI designated the month of July "CFCs Month" to promote rational use of CFCs. Publicity campaigns will be conducted to urge the private sector to cut CFC consumption and introduce alternative substances. Various industrial organizations have formed a joint group to promote rational CFC use. ■

Hisashi Shingai is an officer at the CFCs Policy Office of the Basic Industries Bureau of the Ministry of International Trade and Industry.

Seeking a Substitute

By Yasumasa Ogawa

Japan began to regulate chlorofluorocarbons (CFCs) from July 1 under a law to protect the ozone layer enacted in May 1988.

CFCs are widely used both in the home and in industry as coolants in refrigerators and automobile air-conditioners, as blowing agents for polyurethane

and polystyrene, as cleaning agents for semiconductors and precision machine parts and as propellants in aerosols. Industrial users alone are said to total more than 30,000 companies.

CFC consumption had been growing at an annual rate of over 10%, which means the consumption volume has to

be cut by 30% during 1989 because the rule stipulates that this year's use has to be held to the 1986 level. The regulations cover CFC-11, -12, -113, -114 and -115. The consumption of these CFCs as of 1986 is shown in Fig. 1, which indicates that efforts for cutting their use have to be made in various fields.