

4 Protection of the Ozone Layer

Introduction

Ozone (O_3) is a triatomic allotrope of oxygen. It exists naturally in the stratosphere, a layer of the atmosphere. Ozone layer surrounds planet Earth fully at a height of 10-50 kms from earth surface. Its thickness ranges between 2 to 8 kms.

It acts as a natural filter or shield, protecting the Earth against the harmful component of the Ultraviolet rays (i.e. UV-B) which grossly damages human and animal health alike. UV-B also reduces plant growth and crop production; and negatively affects water ecosystems.

Human activities and man's development of synthetic chemicals led eventually to depleting some portions of the Ozone layer.

Ozone-depleting gases often contain chlorine or Bromine atoms which, as result of UV-B effect, are released and move freely

towards the nearest ozone unit. It snatches one oxygen atom, thus turning it into an oxygen unit (O_2) which cannot prevent penetration of UV-B. Chlorine moves on with an oxygen atom until it finds another single oxygen atom to form an oxygen molecule, thus releasing the chlorine atom to repeat the same vicious circle.

Chemicals Destructive of the Ozone Layer and their Classification

1. Chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs), used in the refrigeration and air-conditioning units installed at homes, businesses, factories, central and car air-conditioning sets.
2. CFCs used in aerosols, which are released from sprayers of perfumes, insecticides and certain pharmaceutical

products.

3. Some solvents used in cleaning mechanical and metal parts and electronic circuits.
4. Halons used in fire extinguishing systems.
5. Methyl Bromide used as a fumigant at crop store-houses and as a soil-sterilizing agent.

Environmental and Health-Related Harms Resulting from Ozone Depletion

Erosion of the Ozone layer is, in itself, a glaring example of a common menace facing all inhabitants of the Earth Planet, no matter how different their environmental conditions may be. The international community moved away from the approach of counseling and advice to streamlining the issue in a purely legal shape, associated with penalties. International compliance thus has become a commitment to an objective: *to get rid, sooner or later, of ozone-depleting substances.*

To this effect, the Vienna Convention for Protection of the Ozone Layer and the Montreal Protocol on Ozone-Depleting Substances were concluded. Health hazards associated with ozone depletion are skin cancers, impaired natural immunity and some ophthalmic diseases such as glaucoma, if living creatures, humans or animals, are exposed to large quantities of UV-B.

Table (4-1) shows the quantities of ozone-depleting products (ODP) used in Egypt. The level of consumption is taking a downward trend, except for Methyl chloroform, albeit the consumption of this substance has been continuously decreasing since 2002.

Egyptian Program for the Protecting of the Ozone Layer

The Egyptian program covers various industrial and commercial activities which require alternatives to ODPs. Decrees and general rules have been approved to ensure fulfillment of Egypt's obligations.

Table (4-1) Annual Consumption of Ozone-depleting Products (ODP)/Ton

Year	Chlorofluro-carbons CFCs	Carbon Tetra-chloride CTC	Methyl chloro-form TCA	Methyl Bromide MBr	Halons
2001	1334.8	11	15	432	790
2002	1294	11	19	270	230
2003	1102.2	13	18	238	180
2004	1047.6	12.1	17.5	219	193
2005	821.2	5.5	15	188.4	145

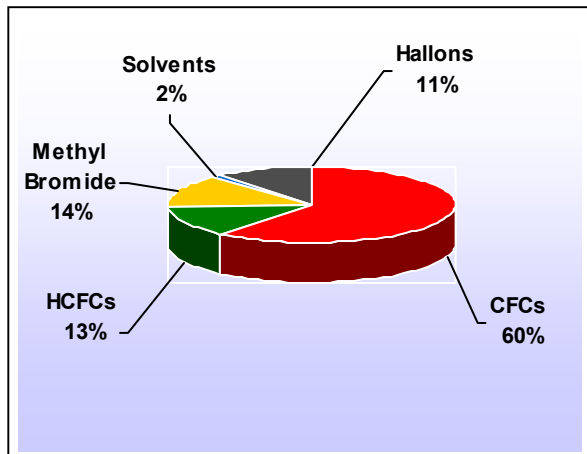


Figure (4-1) Ratios of Domestic Consumption of ODPs in 2005.

The Egyptian Program for Protecting the Ozone Layer involves numerous industrial and agricultural activities including:

1- Foam Sub-sector

The Multi-lateral Fund of the Montreal Protocol for the Protection of Ozone has agreed to subsidize the replacement of CFCs at the factories of this sub-sector, which habitually consumed 1302.8 tons annually of ODPs. Alternative technologies and equipment are made available, together with training and financial support to operation cost. Until May 2005, replacement projects have been completed for 36 factories.

2- Refrigerators' Sub-sector

A Strategy has been developed for this sector (household, commercial and industrial) to introduce the new insulation technology and the refrigeration circuit for industries using cooling units such as food industries. Ozone-friendly products are now in the domestic market especially for home- used refrigeration products. Until 2005, replacement projects have been completed for 28 large-scale national companies operating in

this sub-sector, which were consuming 1094.6 tons of ozone-depleting products.

3- Refrigeration and Air Conditioning Maintenance Sub-sector

A national plan was initiated in 2005 to provide O&M inputs for refrigeration and air-conditioning units wherein products liable to regulation by the International Convention are used. The program includes providing service centers with the necessary equipment for the treatment and recycling of refrigeration gases during maintenance. Staff training is a salient feature of the program to ensure proper implementation of the national strategy which aims at reducing CFCs consumption by 112 tons. By the end of 2006, the strategy will have been completed.

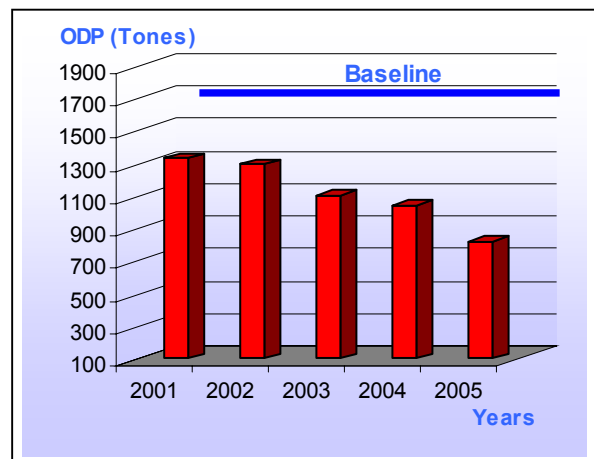


Figure (4-2) Annual Consumption of CFCs

4- Solvents' Sub-sector

This sub-sector relates to the use of some Convention-regulated substances such as solvents for optics, electronics, metal works, certain plastic products and a special application for Aluminum purification. During 2005, alternative replacements were provided to (9) national companies. ODP consumption was reduced by 439.9 tons. By the end of 2006, replacement pro-

jects will have been completed for 5 companies, thus reducing the volume of ODPs by an additional 40.8 tons.

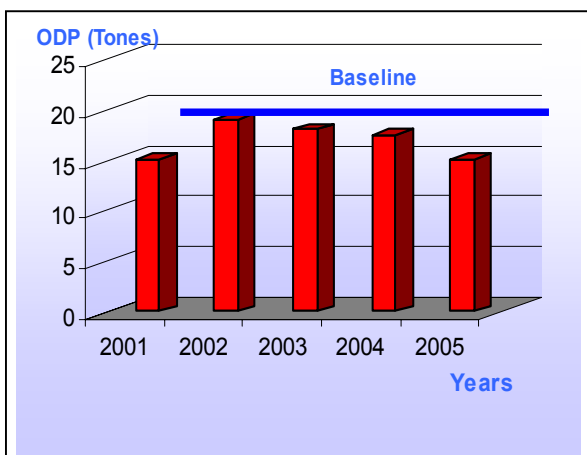


Figure (4-3) Annual Consumption of Methyl Chloroform (TCA)

the Ministry of Military Production has been selected to manage the Halons' Bank Project, under the supervision of MSEA.

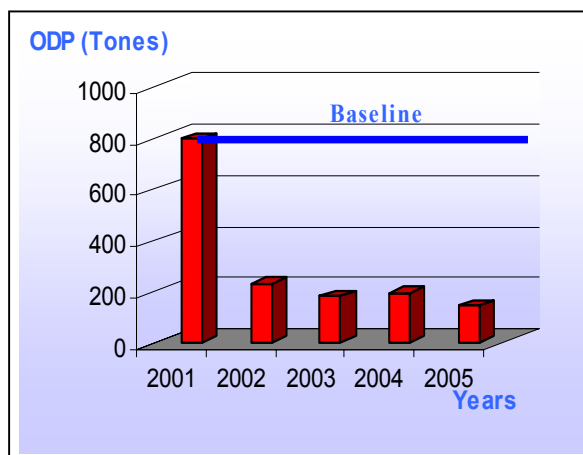


Figure (4-5) Halons' Annual Consumption

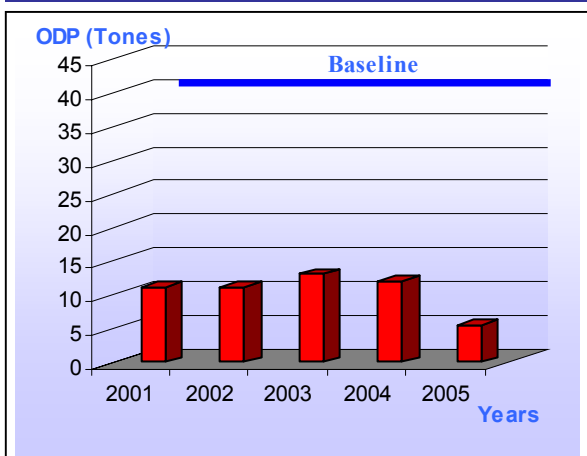


Figure (4-4) Annual Consumption Carbon Tetra Chloride (CTC)

6. Methyl Bromide Sub-sector

Methyl Bromide is used in soil sterilization and fumigation of crop storehouses. In 2005, a project was initiated, in collaboration with MALR, to specify alternatives to Methyl Bromide. The project involves staff training workshops and providing the needed equipment for experimenting the proposed alternatives. Phase-1 is expected to be completed by the end of 2006.

5. Halons' Sub-sector

A national strategy has been developed for Halons' Sub-sector. By 2010, the risk of importation will have been addressed and domestic demand will have been met through recycling and reuse. The Multilateral Ozone fund will provide the necessary funding to establish Halons' Bank in Egypt for recycling and reuse in the vital sectors of the economy. A company within

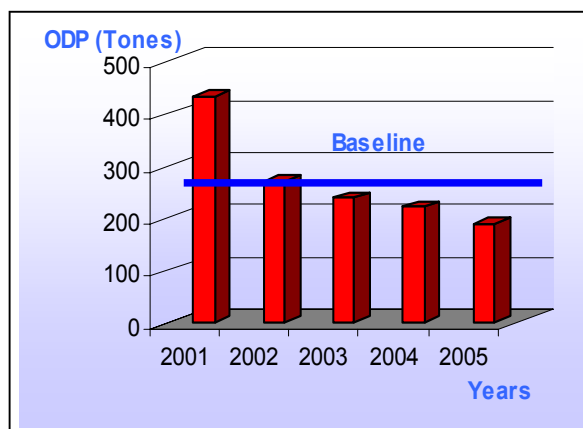


Figure (4-6) Annual Consumption of (MBr)

Figure (4-1) illustrates the relative distribution of ODPs consumed domestically in 2005. It particularly indicates that CFCs represent the largest ratio of ODPs used in Egypt.

Future Plan 2007 – 2012

1. Reduce importation and use of CFCs by 85% of the permissible limit by 2007; so that those ODPs are completely eliminated from the import bill by 2010.
2. Manage Halons' Bank in collaboration with Helwan Company for Engineering Industries, with a view to meeting the demand of the State's vital sectors for Halons used in fire extinguishing systems. Halons amassed at the Halons Bank are to be treated and recycled as of 2007. Imported volumes will be reduced until they are completely eliminated from the import bill by 2010.
3. Establish a national network to recover and recycle ODPs. Equipment will be made available to maintenance workshops and service centers, free of charge. Technicians will be trained in the use of recovery and recycling equipment.
4. Intensify awareness-raising campaigns and programs for ODP alternatives. Awareness must reach out to the entire segments of the society.
5. Cooperate with all the State's monitoring agencies and provide them with the needed equipment for analyzing refrigeration gases. Training courses will be organized in the use of such equipment to address illegal practices in the refrigeration gas trade and to strictly regulate its market.

References

- (1) Production and Consumption of Ozone-depleting substances under the Montreal Protocol 1986-2004.
- (2) Twenty Questions and Answers About the Ozone Layer, Scientific Assessment of Ozone Depletion, David W.Fabey Lead Author (2002).
- (3) Handbook for the Vienna Convention of the Ozone Layer, Seventh Edition (2006).