

3 - Environmental Ozone Indicators

A. Introduction:

- Ozone (O₃) is a triatomic allotrope of oxygen. It is naturally occurring process called photochemical analysis; the ozone exists throughout the year over the equatorial belt, and moves toward the Polar Regions by the movements of air in the stratosphere that is filled by ozone on the altitudes ranging from 10 to 35 kilometers, Its thickness ranges between 2 to 8 kms. The stratospheric ozone is in natural dynamic equilibrium balance. It is being destroyed and resurrected in a balanced and continues manner, which sustain the stability of life on the globe
- The Ozone Layer acts like a shield and guard for the planet from the Ultra Violet UV-B ray which comes from the sun reaching the earth's surface has harmful effects such as; human skin cancer and eye cataract; effect on photosynthesis in green plants, reducing plant growth and affecting agricultural crops; and impact on aquatic environment, all of which leads to an unbalanced general system of nature and life on earth, which, in turn, affects the global climate change; hence, threatening human health and environment safety.
- A group of chemicals was created as a result of the industrial evolution. Those chemicals considerably had a negative effect on the ozone layer. Some of the chemicals have low Ozone Depleting Potential (ODP), but in the other hand, have relatively high Global Warming Potential (GWP).
- The Ozone Depleting Potential (ODP): is the ratio between the effect of a substance on the ozone layer and the effect of the same amount of CFC-11 on the ozone layer, which has an ODP=1
- The Global Warming Potential (GWP): is the ration between the amount global warming caused substance compared with the amount global warming caused by the same amount of Carbon Dioxide, which have a GWP=1
- ODS's consumption is reported in line with the commitment to gradually phase out the use of ODS's according to the reduction schedules of Montreal Protocol and its amendments. The phase out of those substances is achieved without affecting the development programs and

the priorities set by the country to achieve sustainable development. This is done through implementing projects set by the national program. It include providing technical and financial support to the national enterprises among the following procedures:

- Continue the implementation of Recovery and Recycling of ODS's.
- Concentrate awareness campaigns for Environmental friendly alternatives for all community sectors.

- Cooperate with all monitoring authorities in the country and providing it with gas analyzers and training programs in order to prevent illegal trade in ODS refrigerants and to control the markets.

- The daily alternation of total Ozone amounts is measured with Dobson unit (DU), which is equal to 0.1 mm. And compare it with registered data for previous years.

- The main target of ozone concentration measurement policy is to determine its ability to absorb the harmful part of the UV rays and insure the success of the efforts to phase out the consumption of Ozone Depleting Substances.

B. The indicator:

Annual consumption rates Of Ozone Depleting Substances

- **Description:**
The annual consumption of Ozone Depleting Substances measured with Ozone Depleting Potential (ODP Tons) specify how Egypt is committed with the control measures of Montreal Protocol to phase out the use of Ozone depleting substances (ODS's).

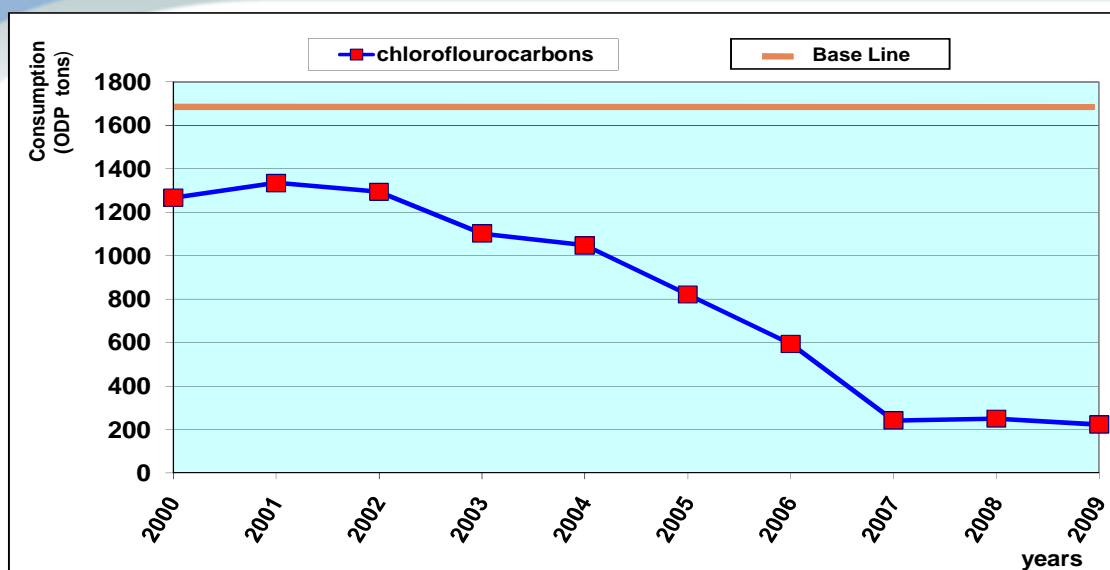
- **Measuring unit:**
Ozone Depleting Potential (ODP) Tons.

- **Source of information:**
Ministry of State for Environmental Affairs

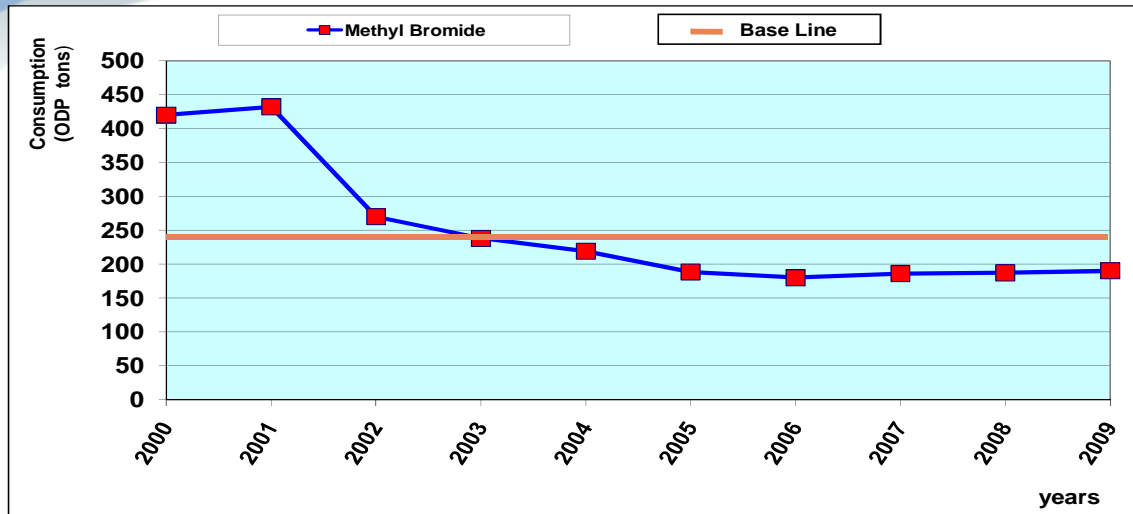
- **Rate of indicator update:**
Annually

- **Justification of Indicator selection:**
Verifying the decrease of annual consumption of controlled limits according the gradual phase out schedules of Montreal Protocol in order to reach the total phase out of the Ozone Depleting Substances.
- **Target in accordance with the legislations:**
The limit of Annual rate of consumption for each Ozone depleting substance is less than the base line according to the gradual phase out schedules of Montreal Protocol.
 - The annual rate of consumption for the Chlorofluorocarbons (CFC's) is 1668 Ton.
 - The annual rate of consumption for Halon Gases is 705 Ton.
 - The Annual rate of consumption for Carbon Tetra Chloride (CTC) is 38.5 Ton.
 - The annual rate of consumption for Methyl Chloroform is 26 Ton.
 - The annual rate of consumption for Methyl Bromide gas is 238.1 Ton.

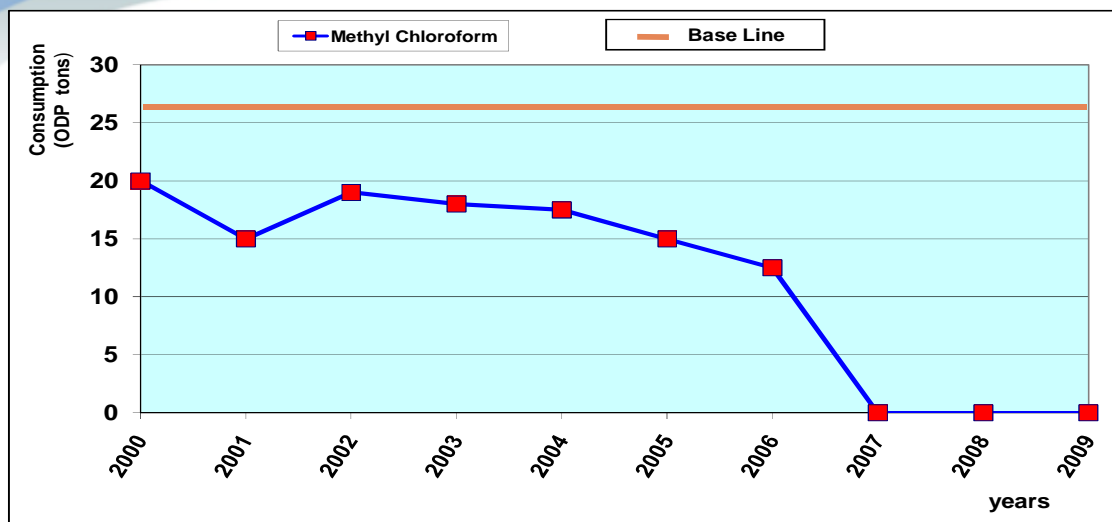
Annual consumption rate of Chlorofluorocarbons



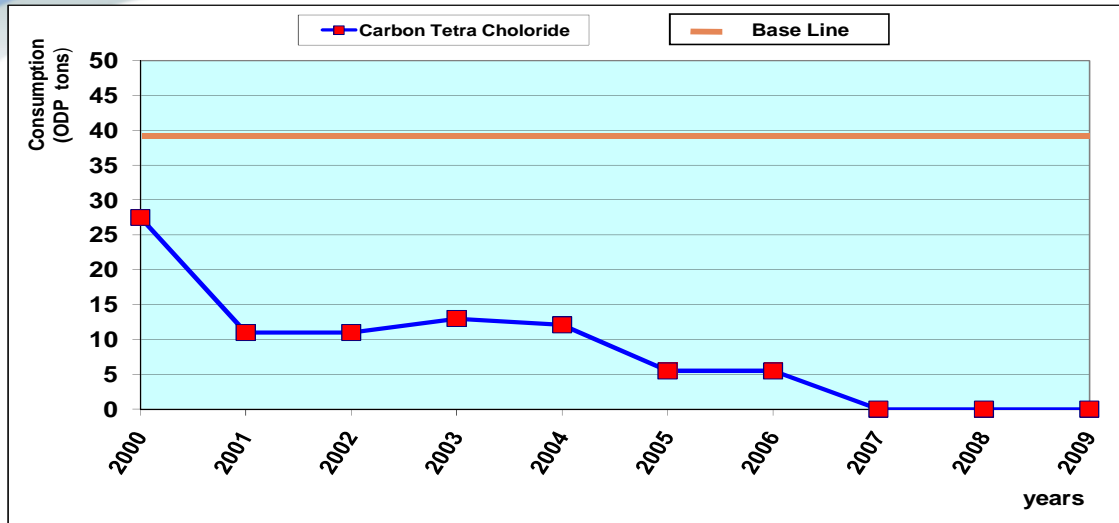
Annual consumption rate of Methyl Bromide



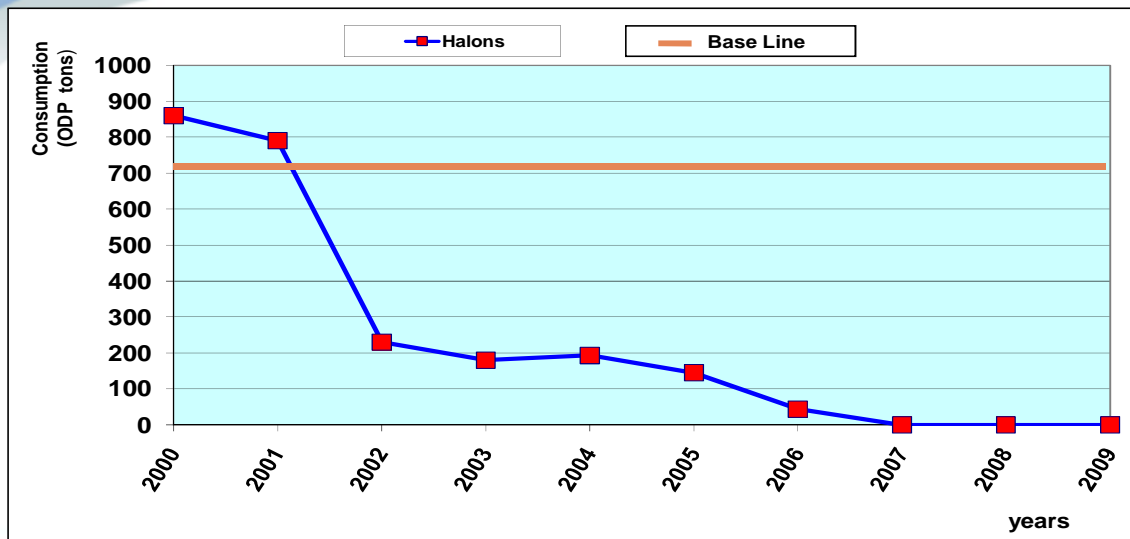
Annual consumption rate of Methyl Chloroform



Annual consumption rate of Carbon Tetra Chloride



Annual consumption rate of Halons



- Comments on tables and diagrams:

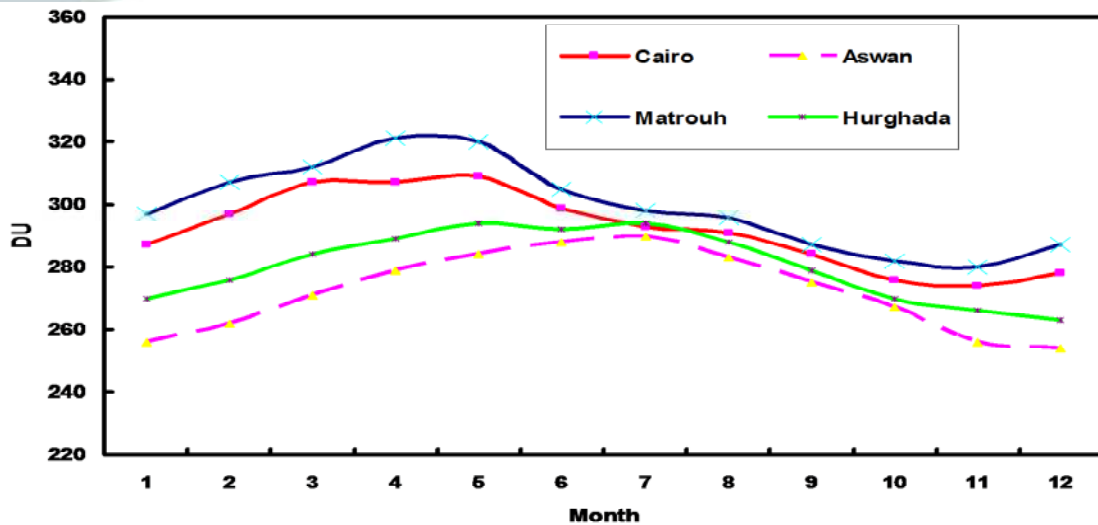
The data shows that the rates of annual consumption for the Ozone Depleting Substances is less than the allowed limits according to the gradual phase out schedules for the use of these substances which achieves Egypt's compliance with Montreal Protocol control measures.

C. The indicator:

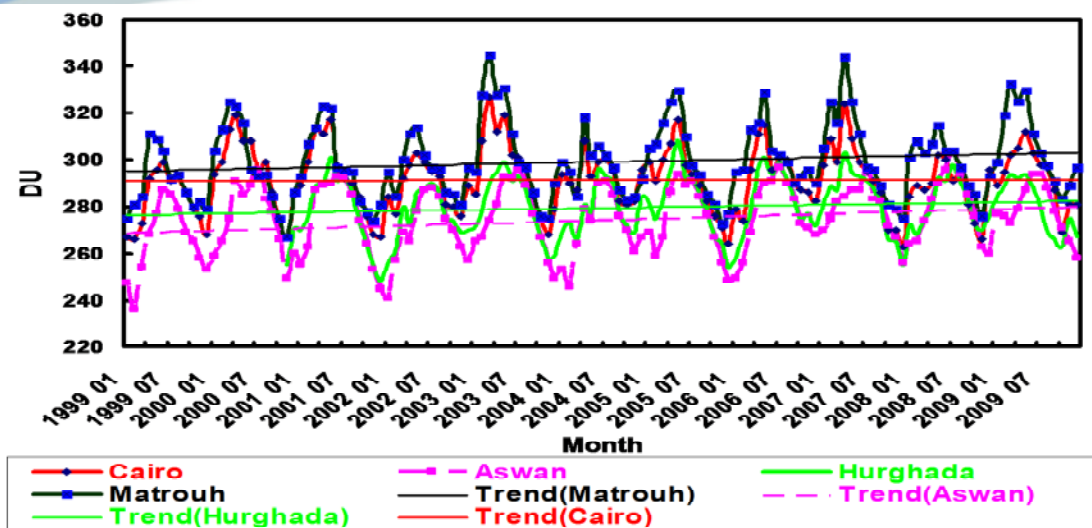
Ozone measurements in Egypt

- **Description:**
The indicator describes the change and deviation of ozone over Cairo and Aswan, Matrouh, Hurghada, and identifies the average thickness of the ozone layer, and the change in the ozone layer and its ability to absorb the harmful UV rays.
- **Measurement unit:**
Dobson units, which is equal to 0.1 mm.
- **Sources of information:**
Ozone Database Regional Center - the General Department of Scientific Research - Meteorological Authority - Ministry of Civil Aviation
- **Updating indicator rate:**
Annually
- **Justification of Indicator selection:**
Measuring the change in daily total quantity of ozone and vertical distribution over Cairo and Aswan, Matrouh and Hurghada, and comparing with measurements recorded in previous years.
- **Target in accordance with the legislation:**
Measuring the change in the ozone layer and to stand on its ability to absorb part of the harmful ultraviolet radiation, and verification of the success of efforts to stop the consumption of substances that deplete the ozone layer.

Ozone measurements over Egypt



The change and deviation of ozone over Egypt



- Comments on the tables and figures:
Data shows that the change in total amount of ozone in Egyptian Ozone stations Network until 2009 tended to slightly increase, and this indicates that the ozone above Egypt Area is not much affected by what happens of reduction in north and south regions.