Ozone Protection: A Walk Through History

The ozone layer in the upper atmosphere acts like a shield—protecting life on Earth from the sun's harmful ultraviolet radiation. In 1985, scientists observed a thinning of the ozone layer over Antarctica. Since then, research has shown that ozone depletion occurs over every continent.

In 1987, world leaders signed a landmark environmental treaty, the Montreal Protocol on Substances That Deplete the Ozone Layer. Today, almost every country in the world has ratified the treaty and is phasing out the production and use of chlorofluorocarbons (CFCs) and other ozone-depleting substances.

Science

1928
Scientists synthesize chlorofluorocarbons (CFCs).

1973
Scientists detect CFCs in atmosphere.

1974
Nobel prize winners Mario Molina and Sherwood Rowland discover that CFCs can break down stratospheric ozone.

1975
Scientists discover that bromine, used in fire-retarding halons and agricultural fumigants, is a potent ozone-depleting substance.

1985
British Antarctic Survey team discovers Antarctic ozone hole (7.3 million square miles), marking the first evidence of stratospheric ozone depletion.

Scientific research reveals stratospheric ozone layer depletion has adverse environmental and human health effects.

1991
International scientists agree that CFCs are depleting the stratospheric ozone layer in the northern and southern hemispheres.

2000
Japan Meteorological Agency reports the hole in the stratospheric ozone layer over the Antarctic is at its largest to date—more than twice the size of Antarctica.

2006
The ozone hole is reported to be the biggest ever, exceeding that of 2000.

2060-2075
Earliest timeframe projected for the ozone layer to recover.

Action

1975
SC Johnson announces corporate phaseout of CFCs as aerosol product propellants.

1976
United Nations Environmental Programme (UNEP) calls for an international conference to discuss an international response to the ozone issue.

1978
U.S. bans non-essential uses of CFCs as a propellant in some aerosols (e.g., hair sprays, deodorants, antiperspirants). Canada, Norway, and Sweden follow with a similar ban.

1981
UNEP develops a global convention to protect the ozone layer.

1987
Twenty-four countries sign the Montreal Protocol on Substances That Deplete the Ozone Layer.

1989
All developed countries that are parties to the Montreal Protocol freeze production and consumption of CFCs at 1986 levels.

1990
Clean Air Act Amendments, including Title VI for Stratospheric Ozone Protection, signed into law.

1992
U.S. announces an accelerated CFC phaseout date of December 31, 1995, in response to new scientific information about ozone depletion.

1993
DuPont™ announces that it will halt its production of CFCs by the end of 1994.

1994
U.S. eliminates production and import of halons.

1996
U.S. eliminates production and import of CFCs, carbon tetrachloride, trichloroethane, and hydrobromofluorocarbons.

2002
All developing countries that are parties to the Montreal Protocol freeze methyl bromide production at 1995–1998 average level.

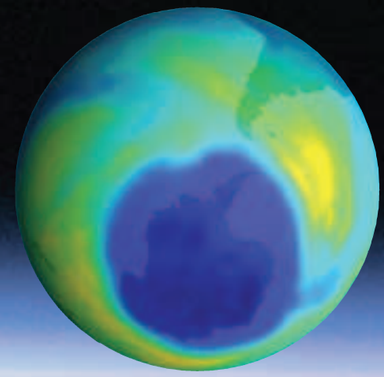
2004
All developed countries reduce consumption of hydrochlorofluorocarbons (HCFCs) by 35 percent from baseline levels.

2010
All developed countries reduce consumption of HCFCs by 65 percent from baseline levels.

2015
All developed countries reduce consumption of HCFCs by 90 percent from baseline levels.

2030
All developed countries scheduled to complete the phaseout of ozone depleting substances.

2040
All developing countries that are parties to the Montreal Protocol scheduled to completely phase out HCFCs.



EPA
United States Environmental Protection Agency

Stratospheric Protection Division
Office of Air and Radiation

www.epa.gov/ozone
EPA-430-H-07-002
April 2007

Then and Now: Progress in Ozone Protection

Prior to the 1980s, ozone-depleting substances were all around us. But now, individuals, businesses, organizations, and governments worldwide are developing and using substitutes that are safer for the ozone layer, the environment, and human health.

CFCs - Chlorofluorocarbons
HCFCs - Hydrochlorofluorocarbons
HFCs - Hydrofluorocarbons

Computers

Then: Solvents containing CFCs and methyl chloroform were used to clean circuit boards during their production.

Now: Some companies have eliminated the need to clean circuit boards during their production. Others use water or have temporarily switched to HCFCs.

Polystyrene Cups and Packing Peanuts

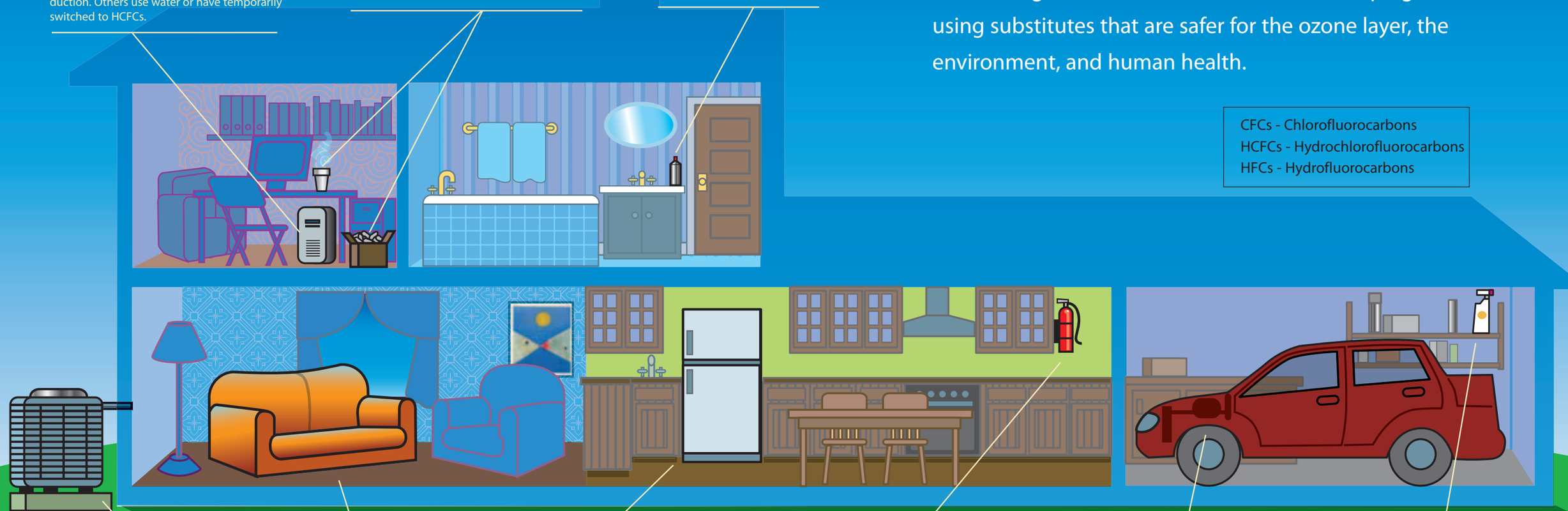
Then: Some polystyrene cups and foam packing "peanuts" were made using CFCs.

Now: These products are made with materials that do not deplete the ozone layer.

Aerosol Cans

Then: CFCs were the propellant used in various spray cans.

Now: Pumps and alternative propellants using hydrocarbons are being used.



Central Air Conditioners

Then: CFCs were used as the coolant in household air conditioners.

Now: HCFCs and HFCs have replaced CFCs.

Furniture

Then: Foam-blowing agents containing CFCs were used in furniture making.

Now: Water-blown foam is being used.

Refrigerators

Then: CFCs were used in refrigerator coolants and foam insulation.

Now: HFCs have replaced CFCs, and substitutes are on the horizon that will not deplete the ozone layer.

Fire Extinguishers

Then: Halons were commonly used in hand-held fire extinguishers.

Now: Conventional dry chemicals, which don't deplete the ozone layer, and water have replaced halons. HFCs are also used.

Car Air Conditioners

Then: CFCs were used as the coolant in automobile air conditioners.

Now: HFCs have replaced CFCs.

Degreasers

Then: CFCs or methyl chloroform were used in many solvents for degreasing.

Now: Water-soluble compounds and hydrocarbon degreasers that do not deplete the ozone layer are available for many applications.