

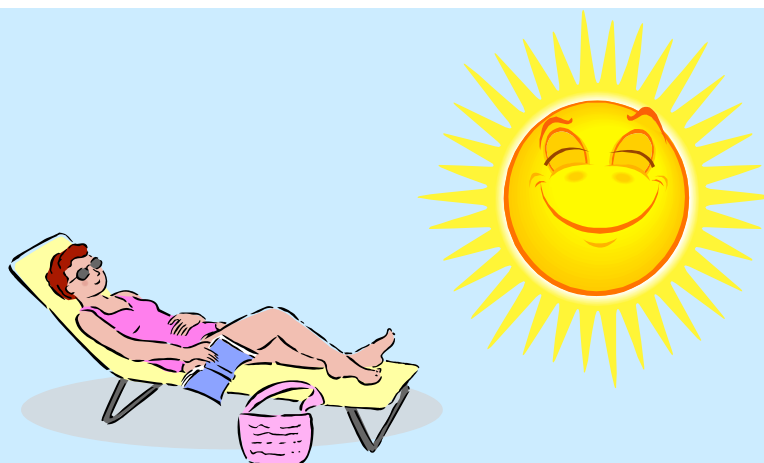


Introduction to the challenge of ODSs and F-gases – trends and international policy responses

human
dynamics
public sector consulting

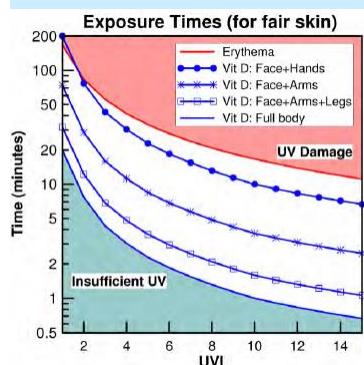


Róbert Tóth
Hungarian Meteorological
Service



Production of vitamin D

Indicative exposure time for skin damage or for sufficient vitamin D production

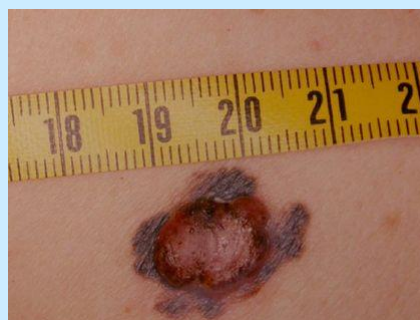


Note the wide brimmed hat, wrap-around glasses and textile clothes. The face and exposed arms should be protected by the use of the correct sunscreen.

Basalioma



Melanoma



Superficialis basalioma



Ulcus rodens



Spinalioma



Cataract in a human eye



The scientific problem of ODSs and F-gases

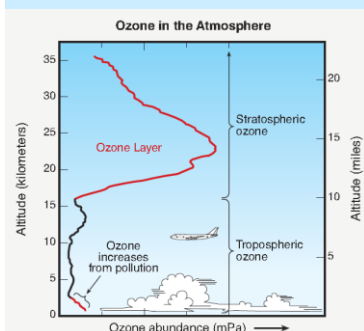


Figure 1a: Formation of atomic oxygen

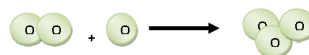


Figure 1b: Production of ozone

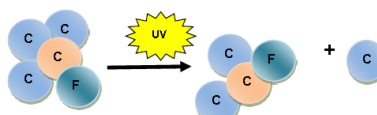


Figure 1c: Formation of atomic chlorine

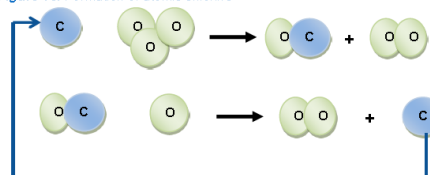
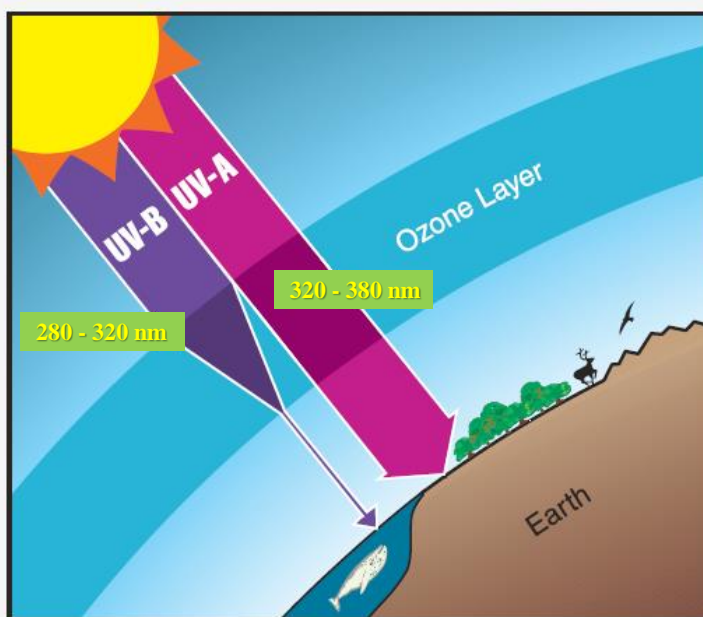
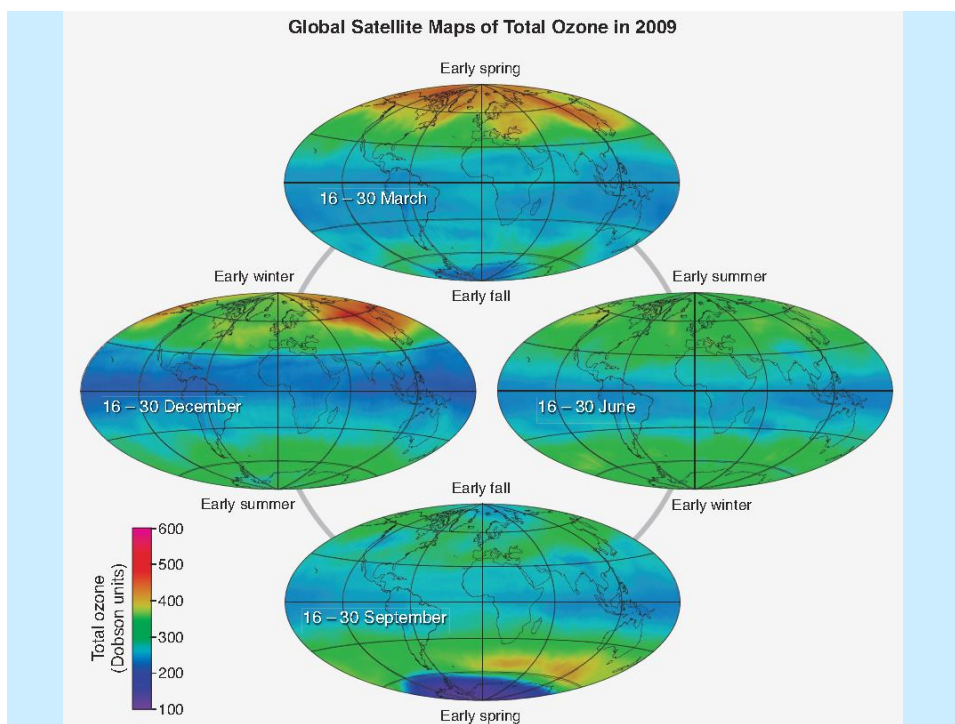


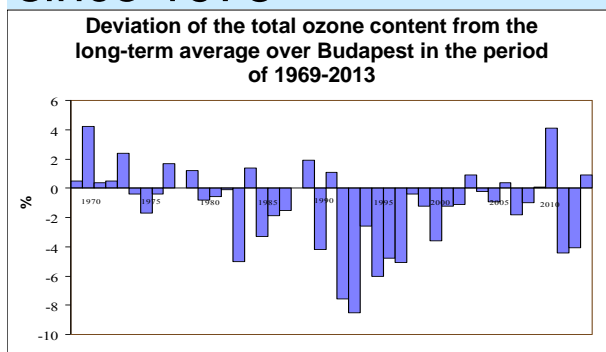
Figure 1d: Destruction of Ozone – The last two reactions are repeated many times. Figure 1 presents only one of the chemical processes responsible for the destruction of Ozone in the Stratosphere. In the example CFC 11 (CCl₃F) is used. (Figure provided by Dr P J Aucamp, Ptersa)

UV Protection by the Ozone Layer

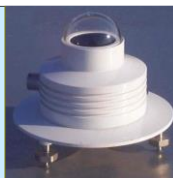




Budapest, a WMO Regional Centre for Solar Radiation since 1978



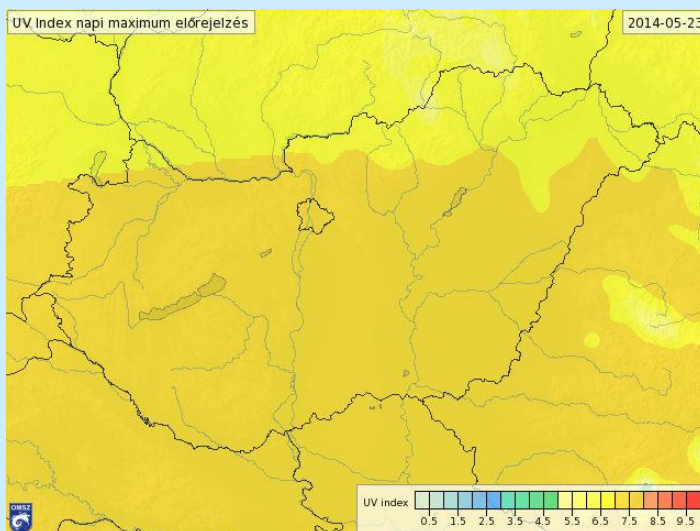
**Solar Light
UVBiometer (broad
band detector)**



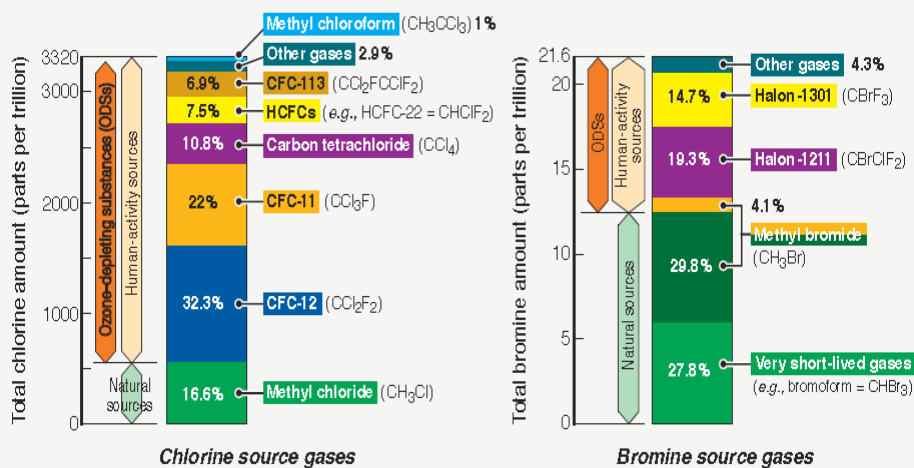
**Brewer MKIII
spectrophotometer
(NO. 152)**



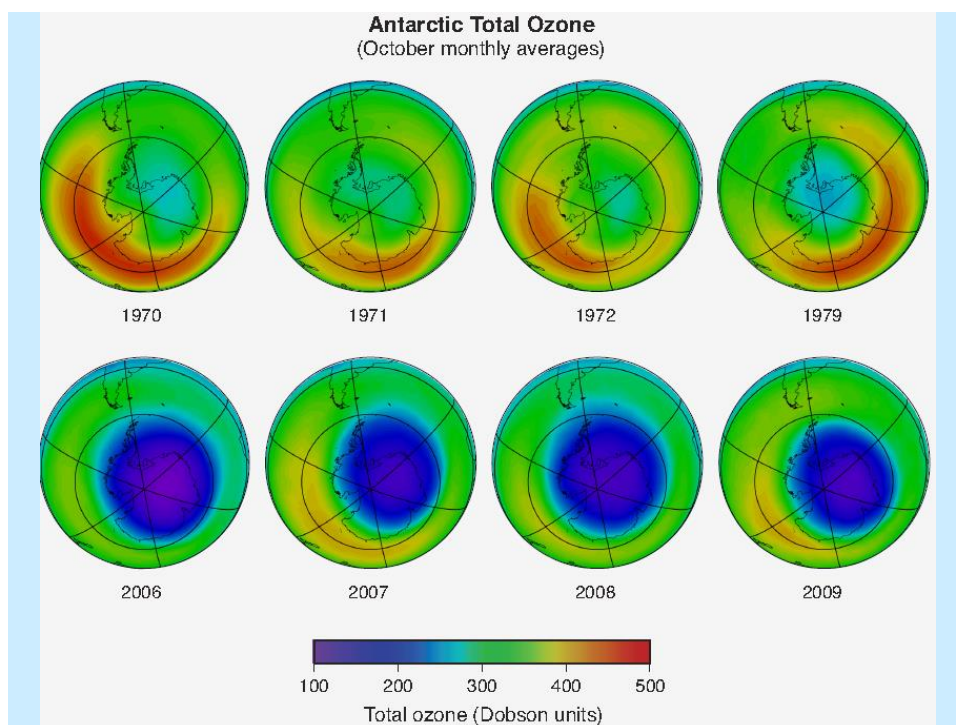
Forecast of the diurnal maximum UV-index (>7.5 → UV alert)

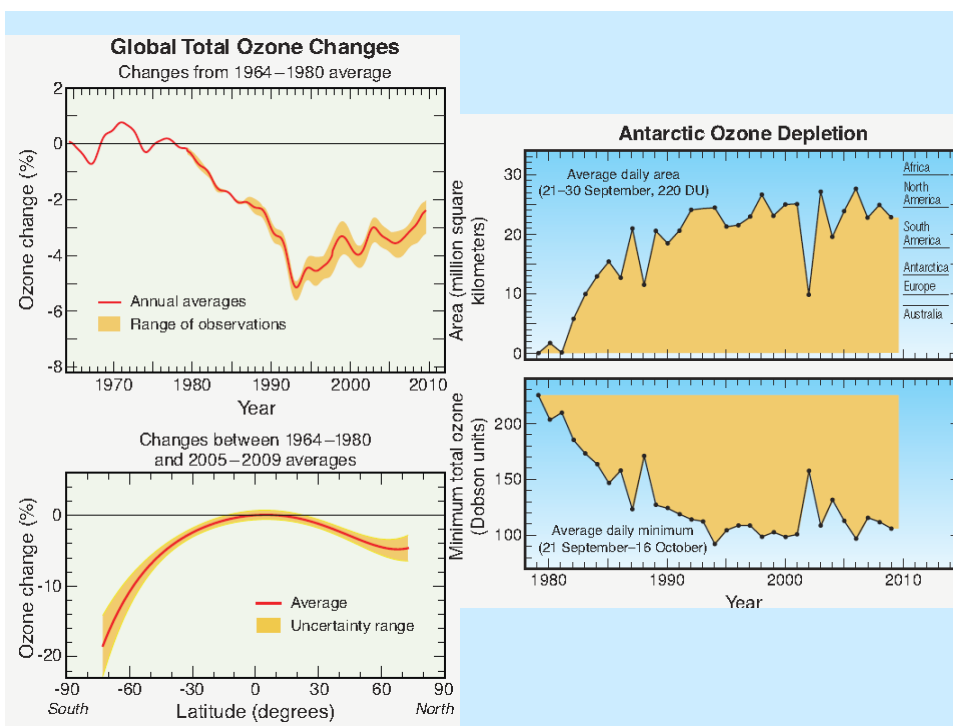


Halogen Source Gases Entering the Stratosphere in 2008

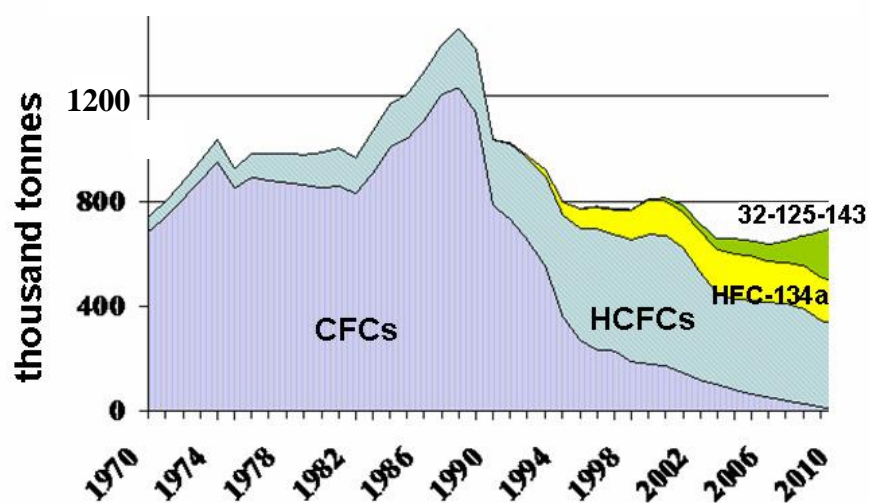


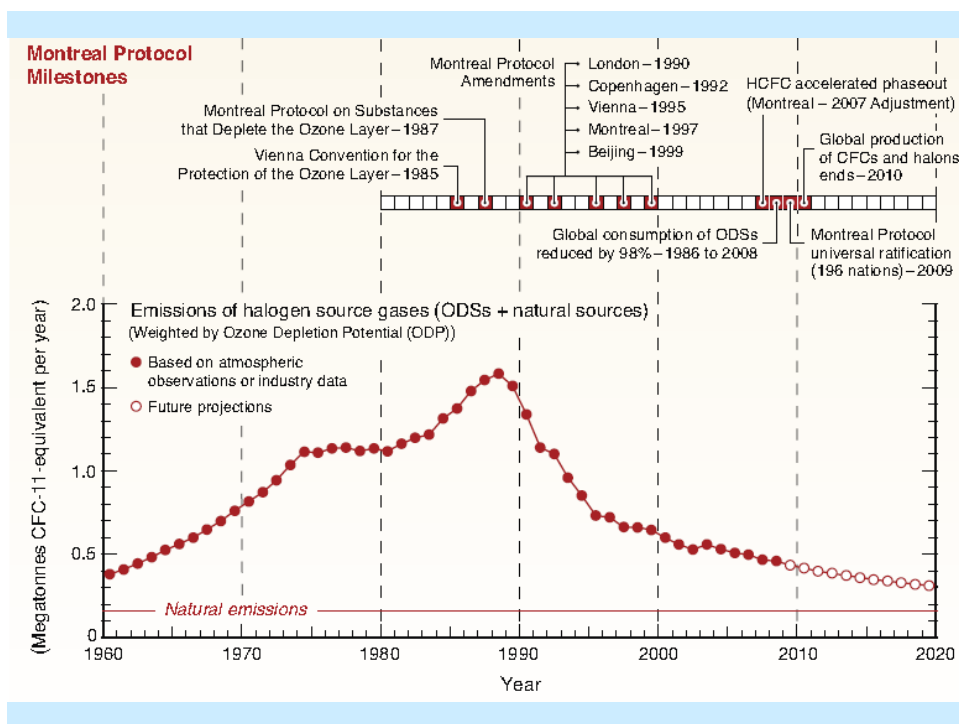
Gas	Atmospheric Lifetime (years)	Global Emissions In 2008 (Kt/yr) ^a	Ozone Depletion Potential (ODP) ^c	Global Warming Potential (GWP)
Halogen source gases				
SAP-2010, FAQs				
Chlorine gases				
CFC-11	45	52–91	1	4750
CFC-12	100	41–99	0.82	10900
CFC-113	85	3–8	0.85	6130
Carbon tetrachloride (CCl ₄)	26	40–80	0.82	1400
HCFCs	1–17	385–481	0.01–0.12	77–2220
Methyl chloroform (CH ₃ CCl ₃)	5	Less than 10	0.16	146
Methyl chloride (CH ₃ Cl)	1	3600–4600	0.02	13
Bromine gases				
Halon-1301	65	1–3	15.9	7140
Halon-1211	16	4–7	7.9	1890
Methyl bromide (CH ₃ Br)	0.8	110–150	0.66	5
Very short-lived gases (e.g., CHBr ₃)	Less than 0.5	^b	^b very low	^b very low
Hydrofluorocarbons (HFCs)				
HFC-134a	13.4	149 ± 27	0	1370
HFC-23	222	12	0	14200
HFC-143a	47.1	17	0	4180
HFC-125	28.2	22	0	3420
HFC-152a	1.5	50	0	133
HFC-22	12.3	2.0	0	716





Global consumption of CFCs, HCFCs and HFCs





The Vienna Convention for the Protection of the Ozone Layer

- Adopted in 1985
- Entered into force on 22 September 1988
- Universal ratification in 2009
- To promote cooperation
 - On systematic observation of ozone
 - Research and information exchange
 - Adopt legislative or administrative measures

Montreal Protocol

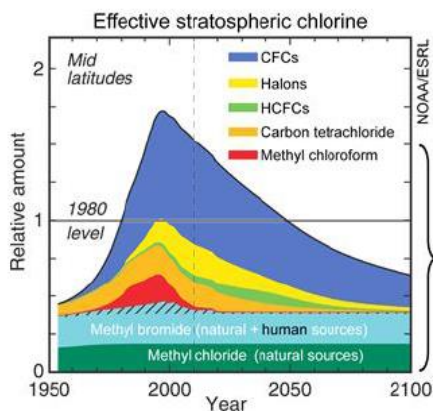
- ☐ Agreed on 16 September 1987
- ☐ Entered into force on 1 January 1989
- ☐ Universal ratification in 2009 > 196 Parties, now 197



Status of Ratification

- [Vienna Convention](#) (1985) 197
- [Montreal Protocol](#) (1987) 197
- [London Amendment](#) (1990) 197
- [Copenhagen Amendment](#) (1992) 197
- [Montreal Amendment](#) (1997) 197
- Beijing Amendment (1999) 195
 - Mauritania, Kazakhstan

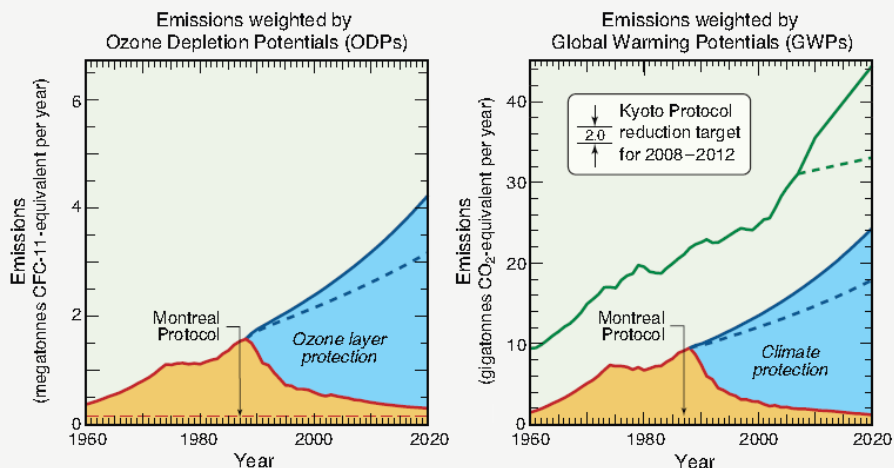
Control measures in the Montreal Protocol are working



The Montreal Protocol has **slowed and reversed** the accumulation of ozone depleting substances (ODSs) in the stratosphere as measured by **effective stratospheric chlorine** amounts.

The Montreal Protocol Protection of Ozone and Climate

From global emissions of all ozone-depleting substances (ODSs) and CO₂





EU legislation on ODS



- 3093/94/EC Council Regulation (12 MS)
- 3037/2000/EC EP and Council Reg. (15 MS)
- 1005/2009/EC EP and Council Reg. (27 MS)

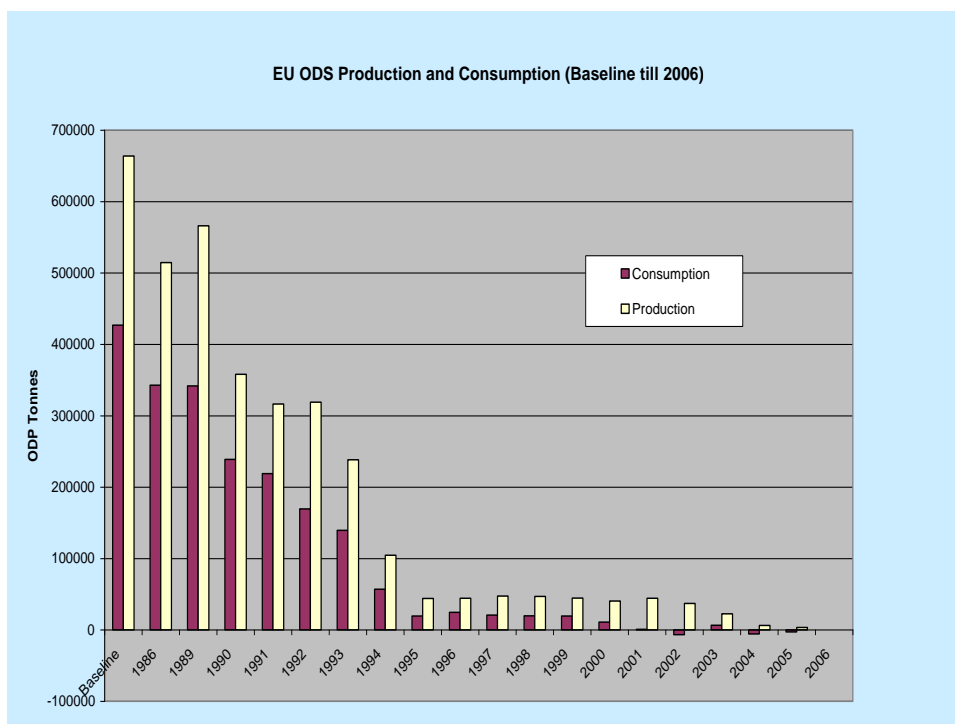
amended by: 744/2010/EC on replacement of Annex VI

291/2011/EC on essential use for lab. and anal.
for other than HCFCs

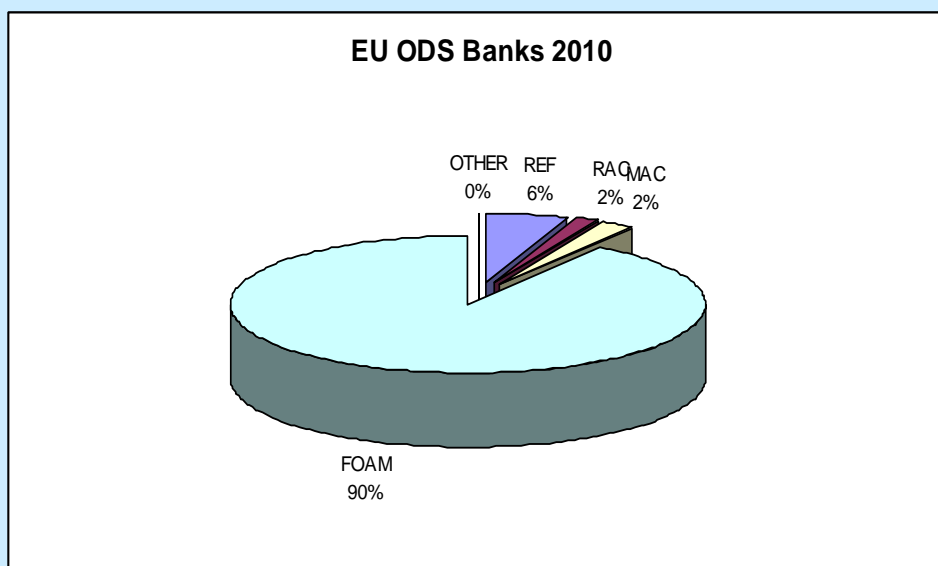
537/2011/EC on mechanism for lab. and anal. uses

New substances

- | | |
|-----------------------------------|-------------|
| • Restricted: | ODP: |
| – Halon-1202 | 1,25 |
| • To be reported: | |
| – N-propyl bromide | 0.02-0.1 |
| – Ethyl bromide | 0.1-0.2 |
| – Trifluoromethyl iodide | 0.01-0.02 |
| – Methyl chloride (use: 21,000 t) | 0.02 |



ODS in products in the EU



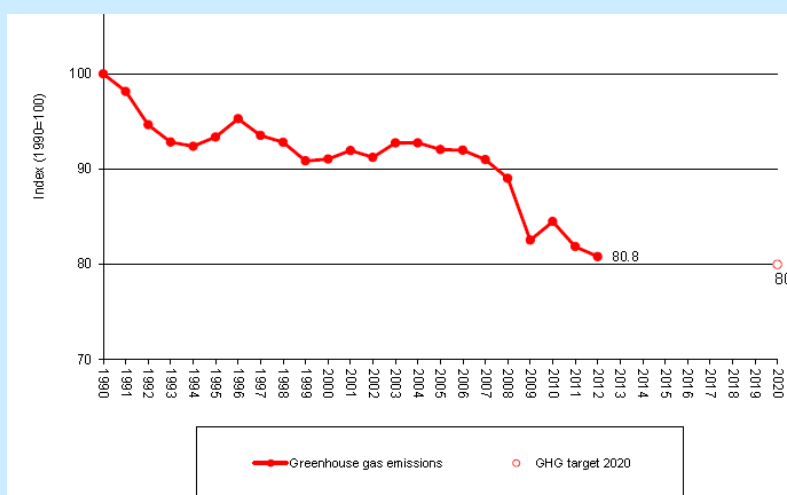


Penalties must be

- effective
- proportionate
- dissuasive



EU-28 GHG emissions



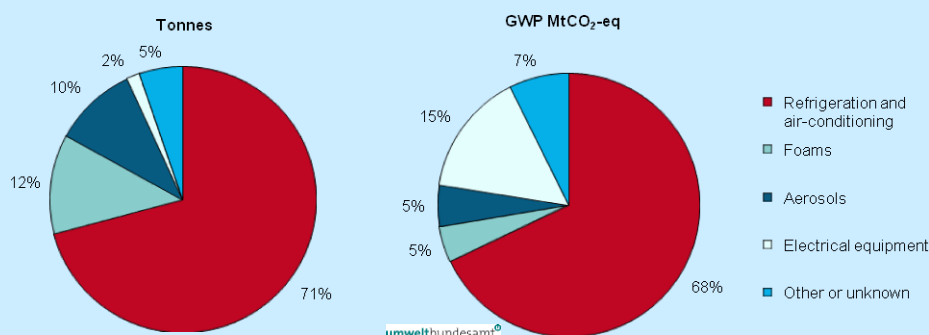


EU legislation on F-gases



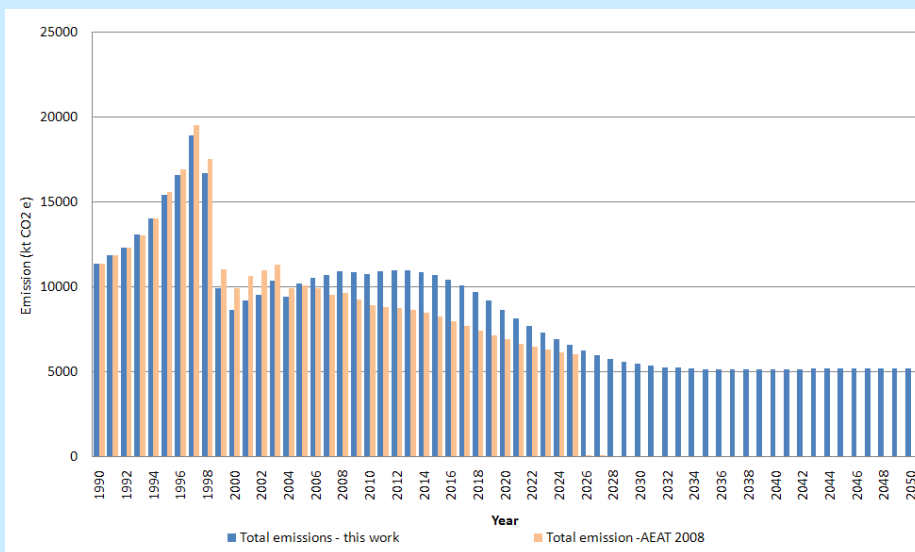
- 842/2006/EC EP and Council Regulation (25 MS)
- 2006/40/EC EP and Council Directive (25 MS)
 - 10 implementing Commission Regulations
- **REGULATION (EU) No 517/2014 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 April 2014 on fluorinated greenhouse gases and repealing Regulation (EC) No 842/2006 (28 MS)**

Intended applications for F-gases in the EU in 2010

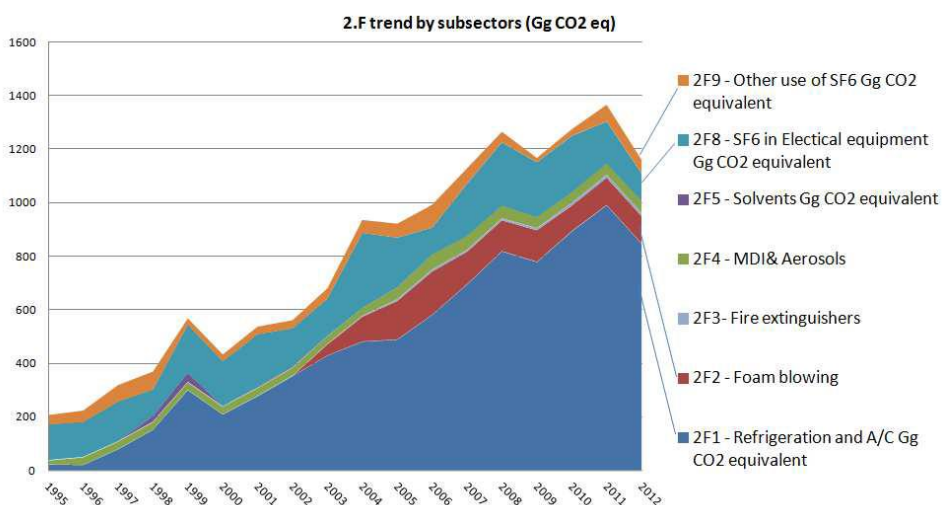


Small changes only from 2009: Refrigeration/AC ↑, foams ↓

Total emissions of HFC in the UK (AEA Group, DEFRA)

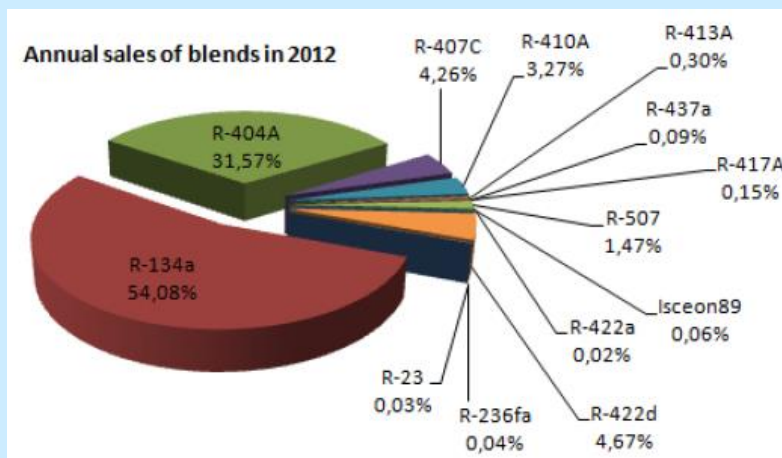


Emission of F-gases from sub-sectors in Hungary



Hungary 2012 RACHP sector

Import of F-gases: 815.5 t
Export of F-gases: 214.4 t



MSs going beyond the F-gas provisions:

- AT and DM are allowed to maintain stricter restrictions until the end of 2012
- Leak checks for stationary equipment smaller than 3 kg (AT)
- Leak checks for mobile sources as well (ES, FR, HU, NL)
- Maximum allowable leakage rates for stationary equipment (GE)
- Extended record keeping by the operators (HU)
- Extension of certification for other staff (HU)
- Compulsory registration of equipment (HU)
- Mandatory take-back of the HFCs for recycling, reclamation and destruction (FR).

Truck refrigerators were under the F-gas Regulation

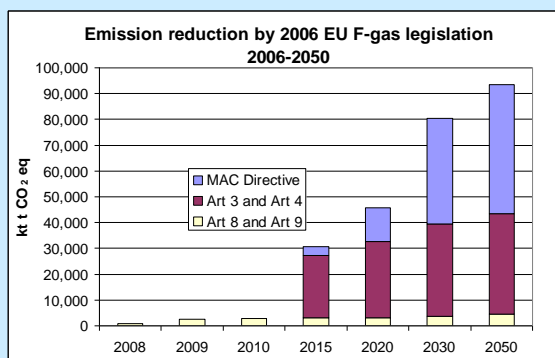
- France
- Holland
- Spain
- Hungary



Effect of the F-gas Regulation

Measuring effectiveness & efficiency

- Regulation's bans already delivering but potential almost exhausted
 - 2020: 3 Mtonnes CO₂-eq
 - 2050: 4 Mtonnes CO₂-eq
- Regulation's containment measures yet to deliver but high potential in the mid-term, if fully applied
 - 2020: 29 Mtonnes CO₂-eq
 - 2050: 38 Mtonnes CO₂-eq
- MAC Directive's ban the most effective measure in the long term
 - 2020: 13 Mtonnes CO₂-eq
 - 2050: 50 Mtonnes CO₂-eq



Regulation's emission reductions are expected to come at an average cost of ~41 € per tonne CO₂-eq

7th ECA network meeting in Tirana, 26 March 2008



Tirana, 27 March 2008



- Thank you for your attention
- Ju faleminderit për vëmendjen tuaj
- Děkuji vám za pozornost
- Dziękuję za uwagę
- Hvala za vašo pozornost
- Hvala na pažnji
- Хвала вам на пажњи
- Ви благодариме за вашето внимание
- Děkojame už Jūsų dėmesį
- Σας ευχαριστώ για την προσοχή σας
- Vă mulțumesc pentru atenție
- İlginiz için teşekkür ederiz
- Köszönöm szíves figyelmüket!