



HFC: A lesson on how companies make money to save the world

Centre for Science and Environment



Ozone hole: solutions

- Mid-1980s: British Antarctic Survey discovers hole in ozone layer
- Exposed to harmful UV rays with health impacts – malignant and non-malignant skin cancer
- The cause was chemical – **CFC** (chlorofluorocarbon) used in refrigeration; air-conditioners, solvents, plastic foams

Montreal Protocol



- 1987: Montreal Protocol to phase out CFC is agreed on
- Southern countries given time (roughly 10 years) over rest; promised technology and money for phase out
- **All went well.** Phase out happened; ozone layer repaired. But now issue back. **Why?**

Alternatives are not alternatives



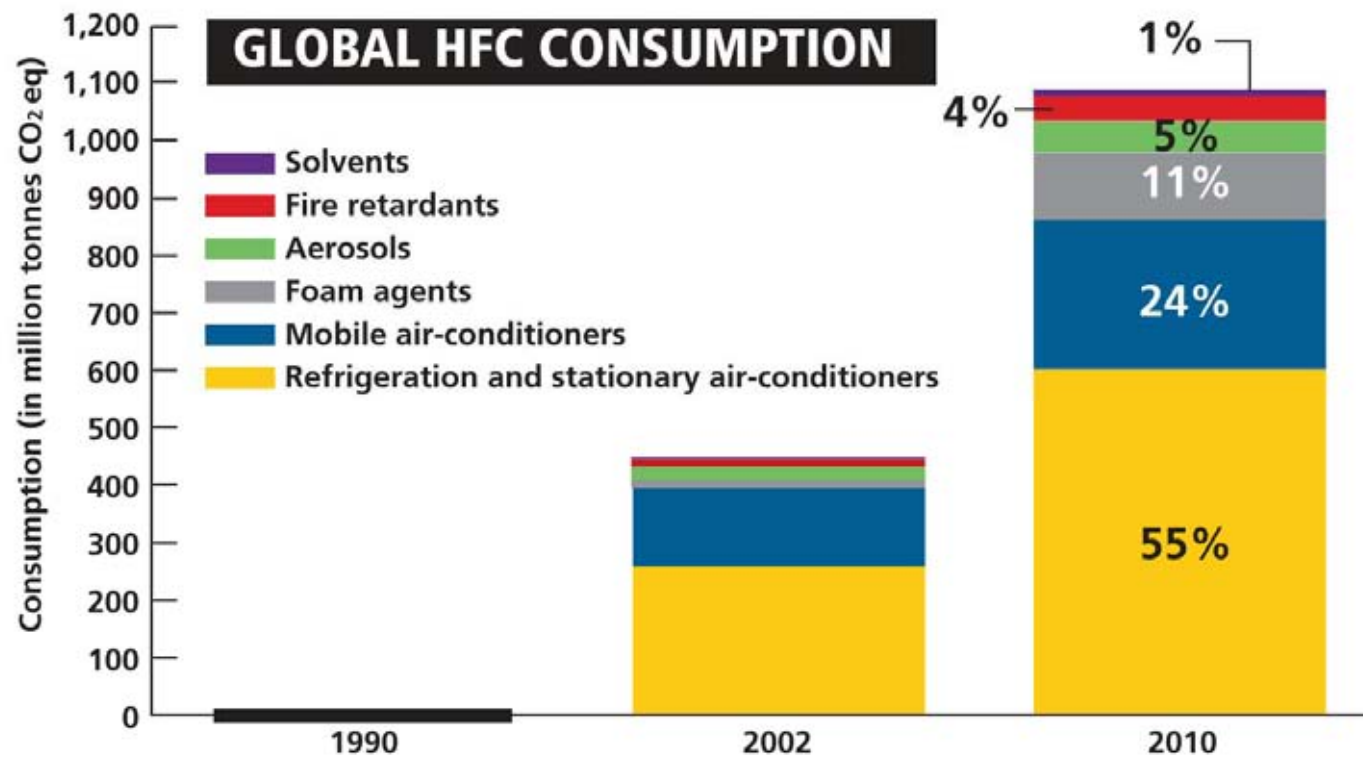
2 alternative to found by chemical manufacturers – DuPont and ICI

a. Partially hydrogenated CFC – **HCFC** (**still destroyed ozone but less**)

b. Non-chlorinated **HFC** (super greenhouse gas – 1000 times more than CO₂)

So the problem starts

HFC use rises/where

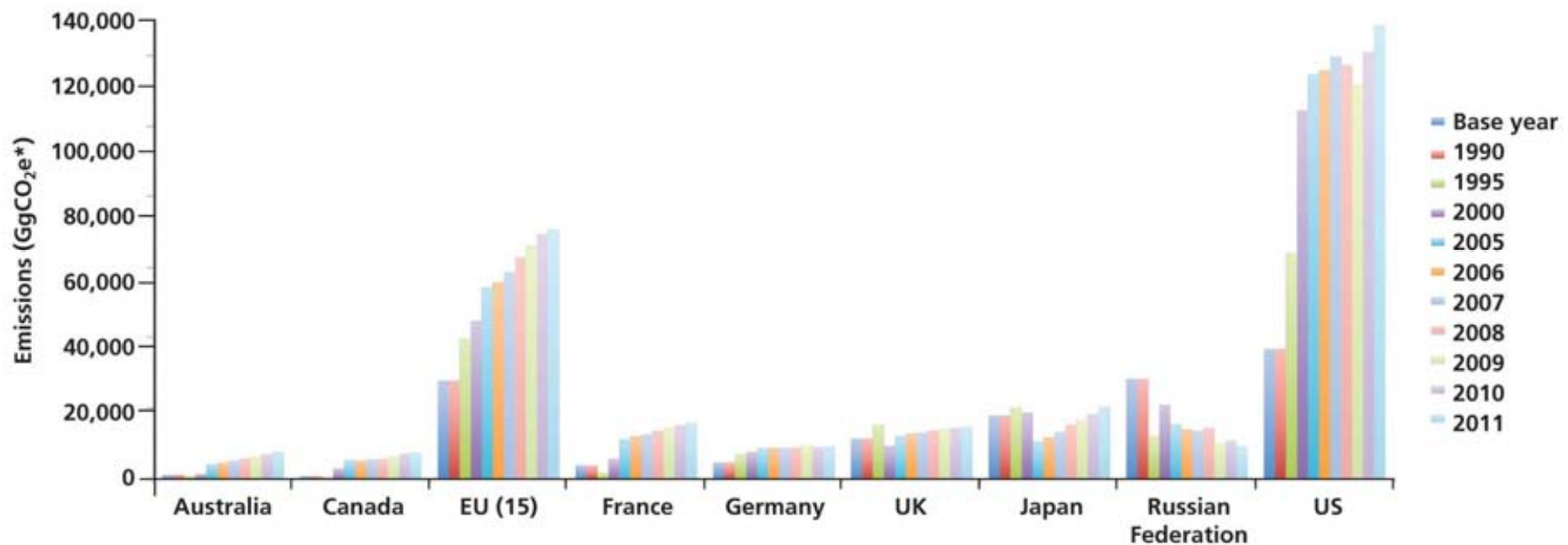


Source: United Nations Environment Programme 2011

HFC use begins; emissions rise



HFC EMISSIONS ON THE RISE



* 1Gg = 1,000 metric tonne

HCFC phase out-to what?



- Developing world moved to HCFC
- Phase out started from 2013 to conclude in 2030
- So, should we move from HCFC (destroys ozone layer) to HFC (bad for climate change)?
- **Big politics. Big guns involved**

High table politics



- US is taking lead. Says HFC is potent climate killer; but with short life
- Wants action
- Wants HFC (greenhouse gas) to move to Montreal Protocol (for ozone) because it is more efficient forum
- All guns out

Big guns



- Obama-Xi Jinping summit discusses HFC
- Kerry-Biden come to India to talk about HFC
- G-20 (St Petersburg/September) agrees to discuss HFC in Montreal
- What is this about? Why Montreal? Why not Montreal?

What? **Business** of alternatives



- Indian-Chinese companies tasted blood
- CFC phase out paid for under Montreal: US\$ 82 million shared between 4 companies (16% of world production)
- Moved to HCFC-22
- Byproduct HFC-23 (potent greenhouse gas – 12,000 times more than CO₂)
- Byproduct had to be destroyed/CDM

Byproduct pays big bucks



- CDM
- Every tonne of HFC 23 destroyed companies earned 11,700 CERs – selling at Euro 12-15 per unit
- 1 tonne of HCFC-22 = 30 kg of HFC-23
- Good business; produce more HCFC; make more potent climate gas; get paid

Gold rush



- China makes 92% of HCFC; got most out of it;
- India followed
- Companies earned 50-100 times more money by selling CERs than cost of incinerating gas (Rs 11 to burn; Rs 800 from selling)

Protecting their Hearth; from the scum of the Universe





CERs gone; what happens

- HFC-23 is still being produced
- But CDM market has collapsed
- What are companies doing now?
- **Incinerating** (from goodness of heart)
- **Storing** (hoping for money in future)
- **Releasing?**
- DTE/CSE filed RTI with PCB/**helpless.**
Not regulated in India

Alternatives: Air conditioners



- CFC-HCFC-to **HFC 410a** and **HFC 407c**
(2000 times more potent than CO₂)
- Now
- US/DuPont pushing HFO (hydrofluoro-olefins) – 4th generation product
- Japan/Daikin pushing HFC-32 (700 times more potent than CO₂; more energy efficient so less in-direct emissions)

Another alternative: Hydrocarbon



- No patent; more energy efficient. But dismissed
- Till now
- GIZ – German agency – works with China to use propane
- In India Godrej goes propane way; Eon
- But resistance – US companies say this is inflammable



Alternatives: Car air con

- CFC-HCFC-22-**HFC 134a** (1500 times more potent than CO₂)
- Big business: 25% of HFC consumption
- Alternative
- US/DuPont and Honeywell: **HFC-1234yf**
- GWP of 4 but mildly inflammable; can contaminate water
- Daimler tested; said no; German car companies followed.
- So US is pushing. EU directive says all cars by 2017 use coolant of GWP of 150 or less); fight is on
- CO₂ possible option (not yet ready); HFC 152a (expensive)

Refrigeration



- CFC-HFC 134a (1500 times more potent)
- Alternative
- Hydrocarbon – 36% new fridges use hydrocarbon (iso-butane) – expected to go to 75% by 2020
- US only allowed hydrocarbon in 2012.
Says inflammable

Gases: ozone or climate killers



HOW POTENT ARE GASES

Refrigerant	ODP	GWP
R-12	1	10,900
HCFC-22	0.05	1,810
HFC-410a	0	2,088
HFC-134a	0	1,430
HFC-32	0	675
HFC-152a	0	124
Hydrocarbons	0	<5
CO ₂	0	1
HFO-1234yf	0	<5

Why Montreal?



- Commercial interests ruling decisions
- Montreal has strong compliance clause
- US is not part of Kyoto
- Has ready alternatives – HFO/HFC 1234yf to push
- Sees quick advantage of first mover
- Will get green credits for saving world

Why not Montreal?



- Worried about precedent this sets – HFC not under Montreal as they are not Ozone depleting substance
- HFC part of F gases; singling out one will leave rest
- Also Indian/Chinese company interest: want both forums; paid for alternative from Montreal and then paid to get rid of alternatives from Kyoto/UNFCCC

What to do?



- Issues of alternatives/patent/cost should be resolved
- Best option is to find ways to incentivize hydrocarbon – no patent
- Single-transition needed – how will this work?
- Industrialised countries should phase out HFC immediately