

HFCs must be part of industry's future

Richard Longden, of Ineos Fluor, puts the case for the defence for HFC's

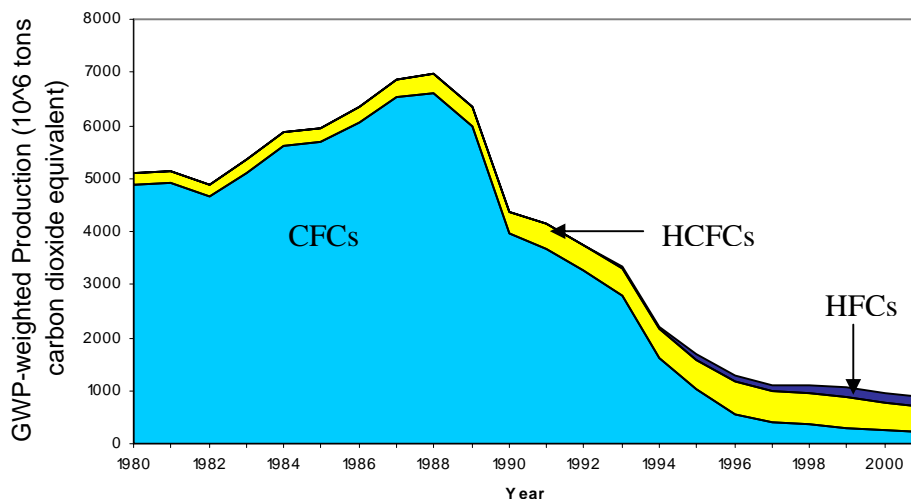
Constant attacks may have lead many people to believe that HFCs are almost as bad as the CFCs they replaced. This position does not stand up to an examination of the facts, which show maintaining refrigerant choice, including HFCs, is the best way forward for the industry and the environment.

In 2002 a report by the title 'F for Forgotten?', cited by the Multisectoral Initiative in Potent Industrial Greenhouse Gases (MIPIGGs), had to be corrected because of misleading claims about F-Gas emissions. The assumption of the report, that HFC emissions would cause at least 7–13 per cent more global warming by 2050, was shown to be wrong, using the report's own data. In fact, when the errors in arithmetic had been corrected, HFC emission values in the report were restated as 1.8 per cent to 3.5 per cent by 2050.

Little has changed since 2002, yet it seems those determined to see HFCs replaced, whatever the cost to society or the environment, are once again revisiting F-Gas emission forecasts and attempting to suggest that, although they are largely ignored, the impact of F-gases will soon overwhelm any progress made under the Kyoto Protocol.

To suggest that the F-gases are largely ignored is strange, given their focus in the Kyoto Protocol, the European Climate Change Programme (ECCP) and the European F-Gas Regulation. Of greater concern is the misguided suggestion that their impact will overwhelm any progress made under Kyoto, which, once again is, wrong.

Global warming potential



'Use of HFCs is lower than the CFCs they have replaced'

Significant

HFCs have already made a significant and positive contribution to reducing greenhouse gas emissions by replacing CFCs, which had significantly higher Global Warming Potential (GWP). A subtlety that is conveniently overlooked by those who want us to believe HFCs are worse than the CFCs they replaced.

Although CFCs are not included in the Kyoto Protocol, because they are to be phased out under the Montreal Protocol, their replacement by industries such as refrigeration and air conditioning has reduced the impact both on the ozone layer and climate change.

In 1990, CFCs represented 25 per cent of greenhouse gas emissions. By 2010, the HFCs replacing them will represent only 2 per cent. This reduction represents about four times the objective of the Kyoto Protocol.

Efficient

In reality the global contribution of HFCs is likely to remain at or below a maximum of 2 per cent by the middle of the century, significantly lower than the progress to be made under the Kyoto Protocol by as early as 2012.

In addition, many refrigeration and air conditioning applications using HFCs are much more efficient than in 1990. Far from overwhelming any progress made by Kyoto, the responsible use of HFCs in energy efficient, cost effective, applications will help to achieve its targets.

A recent MIPIGGS briefing stated that the Intergovernmental Panel on Climate Change (IPCC) said in 2001 : 'HFC-134a emissions have grown from near zero in 1990 to an estimated 0.032 Tg/yr in 1996. The abundance continues to rise almost exponentially as the use of this HFC increases'.

This statement, which is correct but misleading, is frequently quoted by those who would see an end to HFCs.

Emissions of R134a were zero in 1990, so an initial 'exponential' growth rate is not surprising. The 1996 emission rate is actually only 0.1% of all global GHG emissions in the base year for the Kyoto Protocol, and emissions of 0.032 Tg/yr of R134a can be compared to the approximate 30,000 Tg/yr of CO₂ emitted annually.

The claim that containment of HFCs has already failed, has been presented by some commentators as a reason not to pursue a regulation based on containment. This is based on a claim that HFCs leak as rapidly as did CFC's.

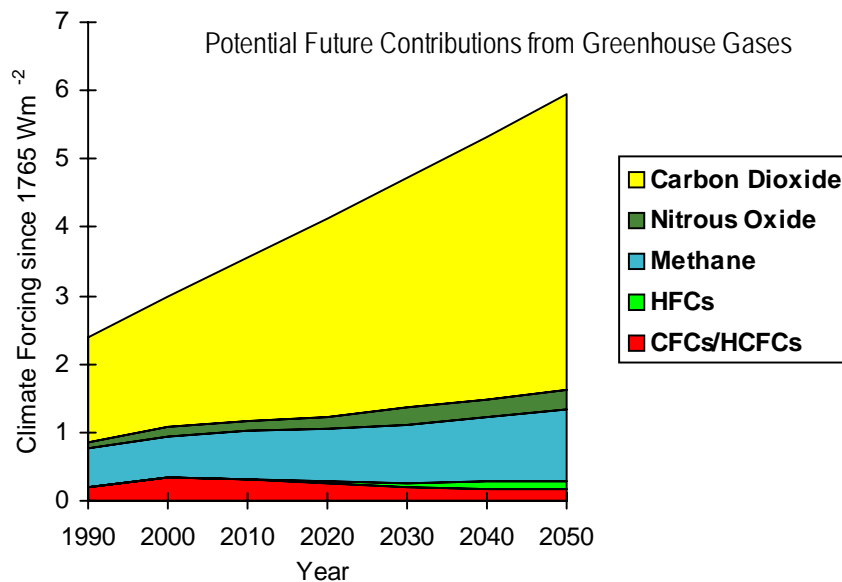
Misinterpretation

In reality the 'containment has already failed' argument is a misinterpretation of a recent publication 'Releases of refrigerant gases to the atmosphere', which concluded that significantly less HFC would be used to replace the same amount of CFCs for refrigeration and air conditioning.

In reaching its conclusions, the report raised three important points :

- Use of HFCs is considerably lower than the CFCs they have replaced. 'An 80 per cent reduction in CFC requirement has been substituted only to the extent of 25 per cent by R134a. This is consistent with improved technology to curtail leakage and so enable lower system charges that, in turn, translate into less demand.'
- HFCs are being made to work much harder as technology is developed, so more refrigeration and air conditioning is achieved by each tonne of gas used.
- The current emission rates are 10-15 per cent annually for all refrigeration and air conditioning (including MAC), not the 25 per cent that has been claimed.

Comparative Impact



Referring to the replacement of CFCs and HCFCs by HFCs, MIPIGGS says :

'So far only about 30 per cent of uses have been so substituted, and resulting HFC emissions comprise about 1.5 per cent of total global warming. If all HCFCs and CFCs are replaced with HFCs, the figure will not be 1.5 per cent, but 4.1 per cent (the impact over 100 years), and over the critical next 20 years, 5.2 per cent.'

This statement is wrong. The cooling carried out by CFCs, and to an extent HCFCs, is now being replaced by a whole range of technologies, including HFCs, ammonia and hydrocarbons. Consequently, there is not a void comprising 70 per cent of the CFC and HCFC use that has yet to be filled.

In addition, each system contains less refrigerant than comparable systems 10 years ago, and system designs have been improved to reduce refrigerant losses so there is not a one for one replacement.

The resulting emissions from the use of HFCs were about 0.5 per cent of total global GHG emissions in 2002. The global contribution of all HFC emissions is likely to remain at or below a maximum of 2 per cent by the middle of the century.

MIPIGGS refer to '[HFC emissions] over the critical next 20 years, 5.2 per cent,' and 'By 2050, a 20-year time horizon, HFCs are expected to make up 8.6 per cent of total global warming'

Discredited

The use of a 20-year time horizon (the impact over only the next 20 years) has been discredited as a sensible measure of global warming impact. It stops counting any effect after 20 years, which is close to the natural environmental lifetime of those HFCs commonly used, but ignores the major part of the global warming impact (96 per cent) for CO₂, which has an environmental lifetime of hundreds of years.

Taking the accepted 100-year time horizon as a basis for an assessment of climate impact, the global contribution of all HFC emissions is likely to remain at or below a maximum of 2 per cent by the middle of the century.

A wide range of refrigeration and air conditioning systems and refrigerants are used to provide an appropriate balance of cost and energy efficiency. Many companies use HFCs and other refrigerants in the systems they supply, and purchase systems using a range of refrigerants to meet the specific requirements.

Innovation is not limited to those developing non-HFC technologies. HFCs are demonstrating improved energy efficiency across a range of applications and equipment designers are taking advantage of this. In Japan, between 1995 and 2004, room air conditioners have become twice as efficient, which translates into approximately 10 million tonnes of CO₂ prevention.

'Refrigerant choice is the best way of delivering future improvements'

Choice

Maintaining refrigerant choice is the best way of delivering future improvements in performance, including energy efficiency.

Direct comparisons have shown HFCs have better energy efficiency than hydrocarbons for some air conditioners, heat pumps, and commercial refrigeration applications. For district cooling and heat pump systems, for example, HFCs provide the right balance of properties, which result in major energy savings compared to other approaches.

R134a and isobutane (R600a) are the two refrigerants of choice for domestic fridges and freezers. Equivalent product efficiencies can be obtained with these refrigerants, and energy efficiency improvements have been driven by energy labelling and energy standards in recent years. These systems are hermetically sealed and operate with very small charges, which means hydrocarbons are a good solution.

However, the same features mean that HFCs are also a good solution, as the systems have very low losses of refrigerant and, as refrigerant has to be recovered at end-of-life, energy use completely dominates overall environmental performance.

Containment has been shown to work. In the Netherlands, the STEK scheme, which ensures holders of the STEK mark work to the required standards of care, clearly demonstrates this. From leakage rates of 30 per cent in the early 90s, emissions in the Netherlands are now at the average of 4.8 per cent, with 92 per cent of installations having no emissions in 1999.

The proposed F-Gas Regulation will provide a comprehensive framework for the reporting of data on refrigerant emissions. Perhaps only then will the true picture of the responsible use and impact of HFCs be available, so that informed decisions can be made on their future use.