

HCFC phase-out  
has started.



# HCFC phase-out has started. Are you prepared?

Global phase-out of HCFCs is already underway. This will impact the availability and pricing of ozone-depleting substances such as R22.

You have a number of choices – you can convert your existing equipment to use a retrofit HFC refrigerant, change your equipment or continue to use your current HCFC.

Whatever you choose, Linde can advise you on the best route for your company and supply you with the gases you need – when and where you need them.

## Why phase out?

Ozone forms in the stratosphere between 10 and 50 kilometres above the earth. Although it is rare, ozone is essential to life on earth. The ozone layer absorbs most of the harmful ultraviolet (UV) B radiation from the sun and filters out lethal UV C radiation.

Common HCFC products that cause ozone depletion:  
R22, R123, R401A, R401B, R402A, R402B, R408A and R409A.

In the 1980s, scientists discovered a hole in the ozone layer above the Antarctic. Further analysis showed that a range of man-made chemicals was causing the damage. The amount of damage that chemicals cause to the ozone layer varies depending on their constituents and atmospheric lifetime. This is expressed as the ozone depletion potential (ODP) of the chemical.



## HCFC phase-out facts

The Montreal Protocol treaty was ratified in 1987 with the aim of globally phasing out ozone-depleting substances used in air conditioning and refrigeration systems. It has since been signed by 197 countries.

The first and most urgent priority was chlorofluorocarbons (CFCs), the biggest contributors to ozone depletion. These have since been virtually phased out on a global basis. Now, governments are implementing legislation to meet hydrochlorofluorocarbon (HCFC) phase-out obligations.

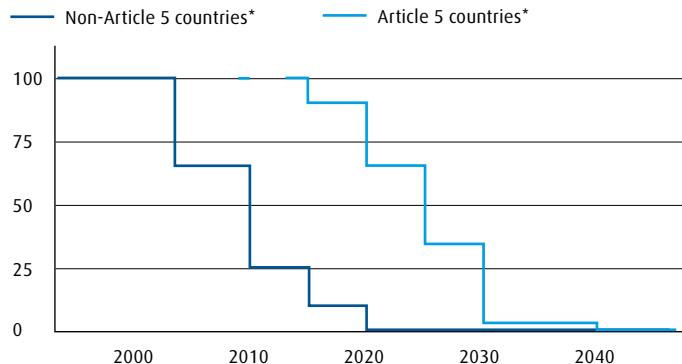
### Article 5 countries

According to the Montreal Protocol, developing countries (Article 5) must freeze their HCFC production and consumption at their 2009/2010 baselines by 2013. Further reductions will come into effect in 2015 (10%), 2020 (35%) and onwards as these countries move towards total consumption phase-out by 2040.

### Non-Article 5 countries

The timeline for developed countries is tighter, providing for complete phase-out by 2020. Some geographies, such as the European Community, have opted for an accelerated schedule and have almost completed the process. Others, such as the USA, Japan and Australia, are making substantial progress through usage and quota restrictions. Most of these nations are therefore already familiar with the challenges involved in phase-out.

## HCFC phase-down schedule (in %)





## Time to act

Countries will be confronted at some stage with the ramifications of phase-out, which include potential product shortages and sharp cost increases as supply and demand move in opposite directions. These shortages may be compounded by rising demand for refrigerant gases fuelled by continued economic growth.

Increasingly, your choice of refrigerant gas will become a strategic factor in your wider air conditioning and refrigeration decision-making processes. Looking beyond the immediate financial impact of supply bottlenecks, it also makes good sense to minimise the environmental impact of your refrigeration and air conditioning systems and to increase operational efficiency.

We strongly advocate using refrigerant gases with zero ODP and fully support the phasing out of these gases in keeping with the Montreal Protocol. We also advocate the use of lower global warming potential gases that help reduce the total equivalent warming impact (TEWI) of air conditioning and refrigeration systems as a result of direct and indirect emissions.

We can help you prepare for upcoming changes as we have extensive global expertise in CFC and HCFC phase-outs.

**HCFC phase-down (in % 2010)**





## Finding the route that suits you best

Linde engineers can advise you on the various options available. Factoring in the age, working life, condition and operating costs of your facility, we can help you identify the phase-out strategy best suited to your application.

### Convert

In many cases, it makes sense to convert your existing system to run on a retrofit HFC refrigerant. Once you have selected the best solution from our wide range of refrigerant gases, the replacement process is relatively quick and simple, as many retrofit products are drop-in replacements that necessitate only a few adjustments, such as expansion valve modifications or oil changes. This route allows you to lower your environmental impact while still providing effective chilling and cooling performance – without having to replace your equipment.

### Change

Alternatively, you could decide to change your current equipment to a system designed specifically to run on a different refrigerant. This option gives you access to the latest technologies, also giving you the widest range of potential solutions. We can provide environmentally friendlier natural or hydrofluorocarbon (HFCs) refrigerant gases suitable for operation with new equipment.

### Continue

And of course you could also decide to continue using your current equipment and refrigerants during the phase-down period. As explained earlier, this option may lead to potential product shortages and cost increases in the future. If this is your preferred route, we also offer support with refrigerant reclaim and recovery services in some markets.

For further information on how Linde can help you meet your environmental and legislative challenges, please contact your local Linde supplier.

Alternatively visit [www.linde-gas.com/refrigerants](http://www.linde-gas.com/refrigerants)

# Getting ahead through innovation.

With its innovative concepts, Linde is playing a pioneering role in the global market. As a technology leader, it is our task to constantly raise the bar. Traditionally driven by entrepreneurship, we are working steadily on new high-quality products and innovative processes.

Linde offers more. We create added value, clearly discernible competitive advantages and greater profitability. Each concept is tailored specifically to meet our customers' requirements – offering standardised as well as customised solutions. This applies to all industries and all companies regardless of their size.

If you want to keep pace with tomorrow's competition, you need a partner by your side for whom top quality, process optimisation and enhanced productivity are part of daily business. However, we define partnership not merely as being there for you but being with you. After all, joint activities form the core of commercial success.

Linde – ideas become solutions.

