



*Climate change: melting glaciers, diminishing water resources, trapped sunrays increase global warming*



# **THE HEATING, COOLING AND VENTILATION INDUSTRY TACKLES THE CHALLENGES OF FUTURE GENERATIONS**

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## THE HEATING, COOLING AND VENTILATION INDUSTRY TACKLES THE CHALLENGES OF FUTURE GENERATIONS

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### **Abstract**

With the entry into force of the F-Gas Regulation, European Industry has started to move towards the use of lower GWP alternatives. Since the HFC phase-down is expressed in CO<sub>2</sub>-equivalent, it leaves some flexibility to do so but its targets are nevertheless very ambitious with major cuts in the coming two to three years.

The EPEE HFC Gapometer is a 2-stage project to understand and monitor the phase-down in Europe. The first stage – a roadmap to emphasize priorities in achieving the phase-down – has already been accomplished. The second stage, a reality check in the form of dedicated surveys aims to measure market reality and to identify gaps.

This presentation will concentrate on key outcomes of the surveys and resulting priorities for the market to act upon in order to ensure the achievement of the phase-down. It will also touch upon the role of energy efficiency to reduce overall greenhouse gas emissions and interactions between the F-Gas Regulation and energy efficiency policies such as Ecodesign and Energy Performance of Buildings.

### **The Epee Gapometer: an Innovative Tool to Show How to Achieve the HFC Phase-Down in Europe**

The new EU F-Gas rules entered into force in 2015. A key element of the Regulation is the HFC phase-down, which will reduce the consumption of HFCs by 79% by 2030. But it will not be an easy task. To help track and measure how to meet the objectives of the phase-down, EPEE has developed the EPEE Gapometer, which has three main roles to play: It sets out a roadmap on ways to achieve the phase-down, measures progress in implementation, and identifies potential gaps. The hotspots are commercial refrigeration and stationary air-conditioning.

“The EU phase-down grants flexibility to users and industry on how to reduce the consumption of HFCs. As EPEE, we strongly support this principle, because, in addition to environmental aspects, it also takes into account energy efficiency, safety, and affordability. However, flexibility does not mean sitting back and doing nothing. Rather the opposite: the market needs to act now if we do not want to face refrigerant shortages! This is why we have developed the EPEE Gapometer”, explains Andrea Voigt, EPEE Director General.

The HFC phase-down represents the main innovation of the new F-Gas rules. It is based on CO<sub>2</sub>-equivalent and therefore does not specify the types of refrigerant that need to be phased-down. However, it will more strongly impact refrigerants with a high GWP than those with a lower GWP, since the number of CO<sub>2</sub>-equivalents is calculated by multiplying the GWP value of the refrigerant with the number of kilograms used. This principle results in a certain degree of flexibility when selecting a refrigerant for a given application.

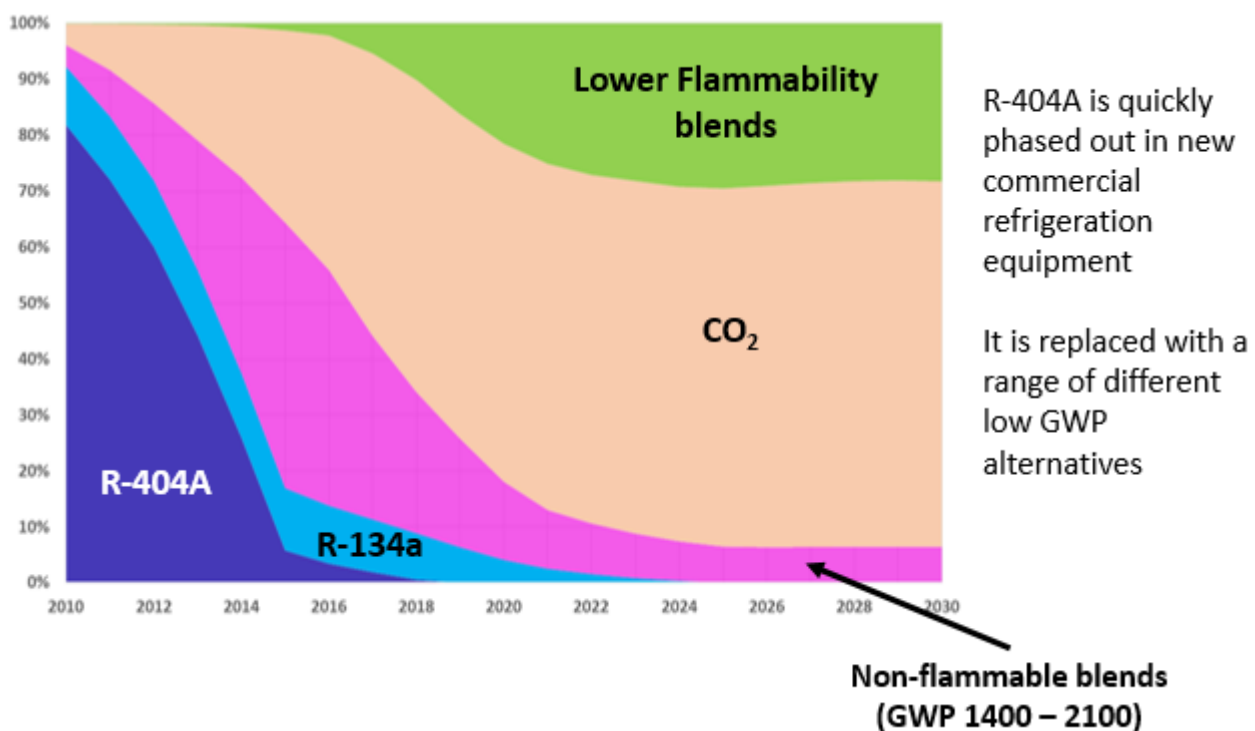
But the challenge remains huge, particularly in the short-term, when HFC consumption will need to be reduced by over one third in 2018 and more than halved by 2021. So how to make sure that these ambitious goals will be achieved? This is exactly what the Gapometer Roadmap is about.

### Three Core Areas for Action

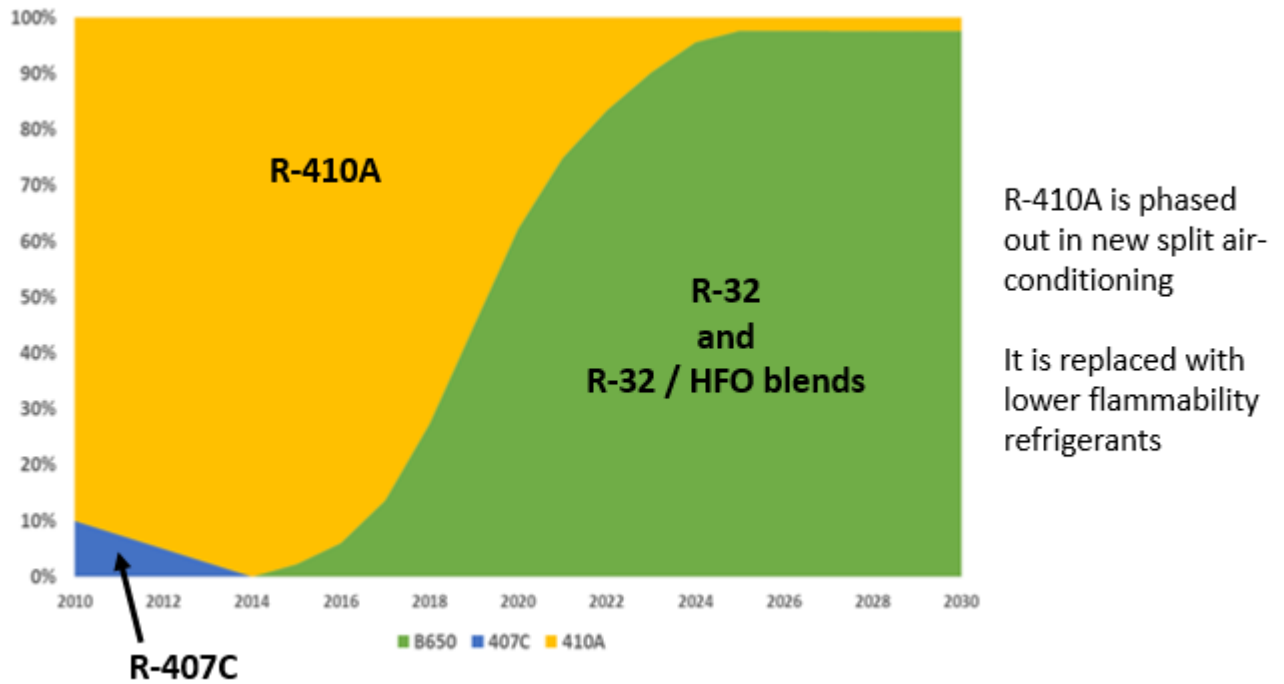
The Gapometer Roadmap shows that actions in three core areas are necessary to achieve these huge cuts, and each has a major role to play. These core areas are new equipment, existing equipment, and the use of reclaimed refrigerant. The highest contribution will need to come from new equipment with some 40% CO<sub>2</sub>-equivalent reduction, directly followed by existing equipment with 33%.

### Commercial Refrigeration

Making up around one third of the total HFC demand in Europe, commercial refrigeration is one of the main drivers of HFC consumption. By 2018, HFC consumption in this field will need to be reduced by over 50%. In other words, the end is near for high GWP refrigerants such as R-404A, and the transition to lower GWP solutions in both, new and existing equipment is a top priority – with immediate effect (Graph 1). Failing to achieve this switch means risking achieving the phase-down. The greatest challenge? In practice, nearly half of all the supermarket packs in Europe need to be retrofitted to lower GWP refrigerants by the end of next year. Reducing the average leakage rate in Europe to less than 10% represents another crucial milestone. (Graph 2)



Graph 1: % of total tonnes of refrigerant used in new commercial refrigeration equipment



Graph 2: % of total tonnes of refrigerant used in new small/medium split air-conditioning equipment

### Stationary Air-Conditioning & Heat Pumps

After commercial refrigeration, stationary air-conditioning and heat pumps are the second largest driver of HFC demand in Europe (23%). In the short term, small split air-conditioning systems need to switch from R-410A to refrigerants with a lower GWP such as R-32 and HFC/HFO blends. This implies a switch to mildly flammable and/or flammable refrigerants. Therefore, the relevant standards and building codes need to be adapted accordingly to make the new F-Gas rules a success.

### Recycling and Reclaim

Recycling and reclaim of HFCs are also part of the equation to achieve the phase-down steps. Assuming that the proportion of reclaimed HFCs represents today some 6% of the total available quantities of CO<sub>2</sub>-equivalents, this proportion of reclaimed HFCs should increase to around 30% in 2021. The biggest challenge in this field is the current lack of infrastructure in Europe to collect and re-process recovered refrigerants, and a lot still needs to be done to improve the situation.

Andrea Voigt summarises: “The Gapometer roadmap shows that it is feasible to achieve the phase-down, but it will be very challenging, in particular in 2018 and 2021. There are a number of factors that could mean we miss these targets, such as the continued use of R-404A in new and existing equipment, safety concerns over using mildly flammable and flammable refrigerants, and a lack of adequately trained installation and maintenance engineers. On the other hand, there are also opportunities including for example a faster introduction of HFOs, hydrocarbons, or ammonia in chillers. Our gapometer raises awareness on both the risks and the opportunities.”

In the second half of 2016, the second phase of the Gapometer will start. During this phase, EPEE will launch several surveys in Europe to collect market data to verify the assumptions of the Roadmap, identify weak spots, and measure potential gaps. The surveys will focus on OEMs and supermarkets. The first results of the second phase are expected by the end of 2016.

The EPEE Gapometer has been developed by EPEE together with Ray Gluckman from Gluckman Consulting. Ray Gluckman has already worked with EPEE on previous studies, such as the 2012 SKM Enviro study which assessed HFC phase-down scenarios in Europe. The Gapometer follows this SKM Enviro study which analysed more than 40 application segments, building on parameters such as refrigerant types, refrigerant charge size, equipment lifetime, and leakage rates. More information on the Gapometer can be found on the [EPEE YouTube Channel](#) (videos in French, German, English, Italian, and Japanese, with Spanish soon to come) and on the EPEE website [www.epeeglobal.org](http://www.epeeglobal.org)

### **Energy, Eco Design and Eco-Labeling**

The HVACR sector cuts across various legislative measures and, more importantly, has been identified and projected in the long-term as Europe's biggest energy-consuming sector. A forward-looking policy approach is therefore required for this industry to bring substantial benefits – energy efficiency, sustainability and comfort – for both the economy and consumers.

Minimum Efficiency Standards (MEPS) under the Eco design Framework, the Energy Performance Directive for Buildings (EPBD) and the Energy Efficiency Directive (EED) are just some examples of the EU's climate and energy framework which strongly impact the HVACR sector. To turn these challenges into opportunities and to think further ahead and how HVACR can contribute to a sustainable future, EPEE (heating, cooling, refrigeration) and EVIA (ventilation), two major industry associations based in Brussels, have created EUREKA, an innovative and participatory conference entirely dedicated to the role of the HVACR sector for society and future generations. EUREKA took place for the first time end of 2016 in the Netherlands. In 2017, it will be followed by EUREKA ITALY on September 15 in Mestre, and by EUREKA 2017 on December 11 & 12 in Berlin.

EUREKA addresses four key areas which are not only at the heart of the HVACR sector and the policies that impact it, but which also have a major impact on the lives of the generations to come: food waste, refrigerants, energy efficiency in buildings, and indoor air quality. Participants play an active role in brainstorming on how the sector needs to adapt to the challenges of the future.

The outcomes of the brainstorm of the first EUREKA edition in 2016, were integrated into the *Visionary Paper*, a unique tool aiming to help the industry adapt their products and services to the requirements and demands of future consumers. Future generations will have to cope with multiple challenges, including climate change, a growing world population with increasing energy needs, and spending more time inside buildings.

Altogether these trends will fundamentally change the way the HVAC-R industry operates and maintaining the status quo is not an option. Only by identifying these changes and anticipating them, the sector can turn challenges and changes into opportunities and continue to provide heating, cooling, refrigeration and ventilation every day across the globe.

For instance, the digitalization of society and the need for simple, intuitive, tailored, connected, and collaborative solutions stood as a key priority during last year's EUREKA. This trend is very likely to drive the development of smart homes and appliances. These appliances will be able to communicate with each other and be connected to high-speed internet as well as the grid to, for example, respond to price signals and shift the power load. These devices will also be able to react to up-to-date information to control and tailor their applications to the exact needs of customers. Coupled with the future generations' appetite for transparency and data, HVACR products will have to provide a range of information in a user-friendly way to empower consumers, help them make informed choice and maximize their comfort & wellbeing. Manufacturers will have to think about new ways of communicating about their products' performance (e.g. indicators on Indoor Air Quality or low-impact refrigerants). Not only will the industry have to innovate to meet the expectations of future generations, but also strike the right balance between standardisation and customization at an affordable price.

Societal trends will also spill over to the HVACR sector and emerging concepts such as the sharing economy will have to be taken on board by manufacturers to develop new business models that fulfil consumers' expectations but remain economically viable. For instance, collaborative schemes may spread in the building sector with the rise of decentralized, and potentially renewable-based energy networks. Neighbours will be able to pool energy resources and purchase power from each other's solar panels and share micro-generation and storage facilities. Challenging the classic ownership concept, consumers will not any more focus on a "product" – e.g. an air-conditioner or a ventilation unit – but rather on a function – e.g. cooling or indoor air quality. In this context, rental services are likely to flourish and pricing will shift from a pay-per-product to a pay-as-you-use principle. Consumers will increasingly lease and buy packages that include the function as well as service, maintenance and continuous commissioning options.

EUREKA 2016 and the Visionary Paper were only the start of the journey.

On the 15<sup>th</sup> of September 2017, EPEE and EVIA will partner with Centro Studi Galileo to organise EUREKA ITALY, the first stop of a EUREKA Roadshow to continue the journey towards a more sustainable future, with a specific focus on the Italian market.

On December 11 & 12, EUREKA 2017 will take place in Berlin. To ensure that European and national policy frameworks evolve to be able to cope with a fast-changing and complex world, EPEE & EVIA will cooperate with decision-makers, academia, civil society and industry in what promises to be an exciting and enriching event, aiming to develop a true roadmap for our sector.

For more information, please visit: [www.eureka-hvacr.eu](http://www.eureka-hvacr.eu)



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