



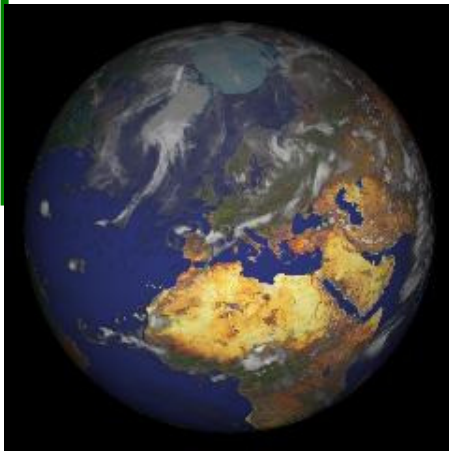
Bundesministerium  
für Umwelt, Naturschutz  
und Reaktorsicherheit



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# Vision Refrigeration and HVAC Technology 2020

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Bonn



International Conference  
Co<sub>2</sub>ol Food

Jerusalemkirche Berlin  
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## Montreal Protocol:

Accelerated phasing out of ODS was made possible by governments exerting the necessary pressure and industry developing alternative substances and procedures.



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1989 UBA report:

“How to Rescue the Ozone Layer”

In many areas it is now possible to increasingly use alternative refrigerants which are also acceptable from the point of view of the “greenhouse problem”.

Refrigerants without ozone depletion potential (e.g. R134a) which are currently developed provide hope that it will be possible to introduce better substitutes in the entire refrigeration sector in the near future.



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Whereas industry considered HFCs to be a long-term solution, environmental organisations, but also policymakers viewed them as a short or at the most a medium-term solution.

They could provide a temporary solution before natural refrigerants became operational.



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BMU concept paper, end of September 2002

“Implementation of the national climate protection programme in the area of fluorinated greenhouse gases (HFCs, FCs, SF<sub>6</sub>)”.



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“(...) Given their elevated GWP, F-gases cannot be considered as a long-term alternative.

It is therefore necessary to take the next steps in substance substitution and switch to substances that do not deplete the ozone layer nor damage the climate.”



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“The Federal Environment Ministry intends to limit the use of F-gases where substitutes/alternative processes are available that are more environmentally benign/more sustainable.”



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UBA February 2004:

“Fluorinated Greenhouse Gases in Products and  
Processes – Technical Climate Protection Measures”



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Plug-in appliances:

“The development of CO<sub>2</sub> compressors for plug-in appliances (...), is an enormous step forward. The new technology is not expected to entail additional costs. In several years from now (2004) – as soon as enough of these compressors are available – it will be possible to replace HFCs by CO<sub>2</sub> in new appliances. Due to their high energy efficiency, HFC-free systems will contribute to a reduction in total greenhouse gas emissions”



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When used in plug-in appliances, hydrocarbons, too, will in future be able to contribute to a reduction in the use of greenhouse gases and their emissions, provided the allowable charges of flammable refrigerants can be elevated from 150 g to 500 g without any additional safety risks.

The use of hydrocarbons in plug-in systems with refrigerant charges of up to 150 g is today state-of-the-art. In these systems hydrocarbons can already replace HFCs.



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Centralised Multicompressor Systems (Supermarket Refrigeration):

Centralised multicompressor systems are the largest HFC emission source in the commercial refrigeration sector; (...) It is therefore particularly important to reduce the emissions from this application. (...)



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## *New Units*

Of all the possible options, the installation of HFC-free systems should always be given preference to protect the climate.

Today, HFC-free systems are already state-of-the-art. In most cases, it is possible to use halogen-free refrigerants. This would enable a 100% reduction of HFC charges and HFC emissions. Based on current emission rates, the TEWI of HFC-free systems is more favourable than the TEWI of other systems.



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HFC substitution will therefore achieve the biggest reduction in greenhouse gas emissions.

Furthermore, there is some indication that some of the systems, which have only recently been placed on the market, have additional potential for optimisation.



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## *Existing Units*

In most cases, the reduction of refrigerant emissions from existing units requires technical measures to improve the tightness of the system and regular leak tests to ensure tightness of the system. Depending on the system, this may require major technical efforts and input of labour and can result in considerably higher operational costs.



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The worst case would be being forced to have a unit completely replaced in order to reduce existing emissions and operational costs.



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Issue on cooling and air-conditioning of January 2005

“The BMU’s guiding model for the use of F-gases with a clearly defined phasing out date!”



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## Definition "guiding model"

A guiding model is a steering tool. It is commonplace to guide political and social processes using a guiding model. A guiding model serves to provide orientation and is an appropriate tool in particular for longer and (more) complex projects.

The guiding model for cooling and air-conditioning has a clearly defined end in the year 2020.



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Regulations on tightness control and on minimum requirements are not the appropriate method to reduce F-gas emissions as much as necessary in the long term.



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Acid test for the sector:

National emission limit values for refrigeration equipment. Taking account of the state of the art as described by VDMA, these should be closer to 2 than to 5%.



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BMU tends towards the use of CO<sub>2</sub> as refrigerant, which is the most natural refrigerant.

This tendency follows the BMU guiding model which is to replace F-gases, synthetic refrigerants as widely and as soon as possible.



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The new refrigerant mixtures do not correspond to our vision of sustainability.

It is unconceivable that synthetic, very expensive refrigerants can be a sustainable solution in developing countries.

A broad introduction of these refrigerants in the industrialised countries would lead to continued use of F-gases in developing countries and therefore accelerate the contribution of these substances to climate change in an unacceptable way.



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BMU/UBA support the TEWI (Total Equivalent Warming Impact) approach.

LCCP (Life Cycle Climate Performance), a slightly wider approach, is also taken into consideration.



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A supermarket using natural refrigerants should not be less energy efficient than other options.

If the energy efficiency is the same, the natural solution should always be given priority.

If this option is less energy efficient, realistic calculations of the global greenhouse effect should be carried out. In this case it is not admissible to use unrealistically low values for the refrigerant emissions.



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When new technologies are developed, industrialised countries need to take their worldwide use into consideration.

If we are not able to guarantee containment or recovery of refrigerants in Germany, how should this work in developing countries?



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We have to set an example with the products we manufacture. We have done so e.g. in the case of domestic refrigerators.

I do hope that we can do the same for supermarket refrigeration or, to name another important area of refrigerant application, for MACs.



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The growing number of air conditioning units around the world is another important issue.

Technologies using natural refrigerants e.g. the hydrocarbon technology – in Europe only marketed for small AC units – are today considered by Chinese manufacturers as a serious alternative for their domestic market with technical assistance from Germany.



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Government statement by Federal Environment Minister  
Sigmar Gabriel

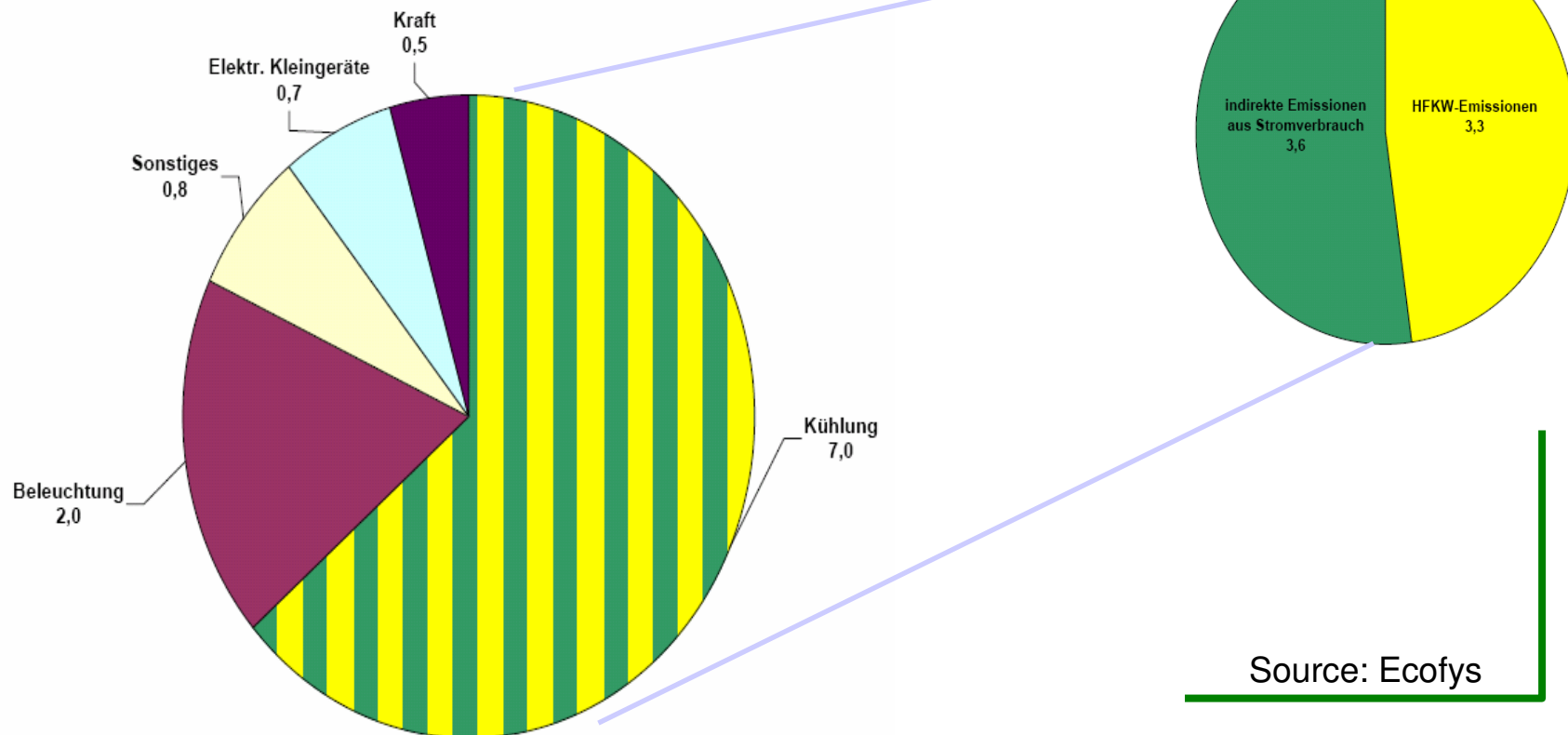
“Climate agenda 2020 – climate protection requires  
reorganisation of industrial society”

Most of the measures mentioned, which aim at saving a  
total of 270 mio t CO<sub>2</sub> compared with 2006, concern  
reductions in CO<sub>2</sub> emissions. Nonetheless, non-CO<sub>2</sub>  
GHGs – such as F-gases – should at least contribute to  
reductions by 40 mio t. This will increase the pressure  
to realise the reduction potential which exists for F-  
gases.



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Emissions in the food retail industry due to electricity consumption and HFCs in Germany in million t CO<sub>2</sub> equiv.



Source: Ecofys



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With a view to implementation, BMU is currently considering

- a drastic reduction in F-gas emissions for mobile and stationary refrigeration and air conditioning equipment and
- an accelerated phasing out of R 134a in MACs.



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It is time to bring together the different initiatives which push the use of natural refrigerants in order to promote the goal of a worldwide transition to natural refrigerants.

20 years of MP and 10 years of KP are an excellent occasion to start such a joint initiative for environmental protection and innovation in supermarket refrigeration this year.



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## Thank you!

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