

## EPEE Position on Refrigerant Selection

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EPEE members use a wide range of refrigerants including HFCs and alternatives. Due to this wide experience EPEE can objectively comment on the use and merits of these products. EPEE stresses that the choice of refrigerant should be based on its intended application with appropriate regard paid to proven energy efficiency, safety, technical viability, direct and indirect GHG emissions, and environmental and economic viability in a life cycle approach. Local regulations and climate conditions must also be taken into account.

In EPEE's opinion it is therefore important to use the TEWI concept (Total Equivalent Warming Impact) which is based on direct GHG emissions through leakages and indirect GHG emissions through energy production, thereby taking into account the energy efficiency of a system. This is very important: for example in air conditioning systems roughly 89%<sup>1</sup> of the global warming impact is generated by the energy it uses. In addition, the concept of eco-efficiency<sup>2</sup> should not be ignored, as it provides guidance on selecting the most appropriate solution taking into account the need to maximise cost effectively environmental performance.

**Technically, there is clearly no single ideal refrigerant for all applications.**

**EPEE therefore favours, for all refrigerants:**

- measures contributing to emission prevention and containment;
- proper training and qualification;
- measures facilitating, when appropriate, their recovery, recycling, and reclamation,
- measures that enable their safe use
- compliance/compatibility with national standards and regulations
- the ability to maximise energy efficiency in their applications

The F-gas Regulation provides the framework to achieve these conditions for fluorocarbon refrigerants, and when fully and properly implemented the entire sector and our environment will benefit – independently of the refrigerant used.

Timescale is of the essence: whether it concerns the implementation of the F-gas Regulation or the technical and financial maturity of alternative solutions. If the industry is given enough time to adapt, both fluorinated and alternative refrigerants will be technically, economically and environmentally viable, depending on their application.

Meanwhile, several aspects need to be taken into account:

### **Competitiveness**

The refrigeration and air-conditioning markets are extremely competitive and increasingly global in character. In this context it is important to note that the user community has already made substantial investments to comply with the F-Gas Regulation through inspections, required qualifications, improved designs for leak-tightness and continuing investment in energy efficiency etc. While alternative refrigerants will benefit indirectly from these investments, they must also prove themselves in the competitive HVACR market – as has been the case for HFCs - where eco-efficiency<sup>3</sup> is also an important factor.

### **Safety**

EPEE feels that the safe use of all refrigerants (flammability, toxicity, operating pressures, corrosiveness) needs to be addressed as a priority, especially when considering that most

<sup>1</sup> Source: March 2009 Preparatory study on the environmental performance of residential room conditioning appliances (airco and ventilation) carried out by Armines, France

<sup>2</sup> The eco-efficiency concept takes into account the Total Equivalent Warming Impact (TEWI), investment and the operating cost, energy cost, regional energy sources, ease of maintenance, reliability, handling of the systems and used refrigerant and safety aspects.

<sup>3</sup> Ibid

stationary air-conditioning and refrigeration equipment is installed close to the building occupants for example on the roof, in a plant room, or even in the conditioned space itself. Whilst some alternatives with substantially lower GWP already exist or are being developed, and several may look attractive from an efficiency point of view, they may require modifications with regard to safety as they are flammable or toxic. The evolution of system safety and safety regulations may make these alternatives attractive options for GHG emission reduction. However, the safety standards which could make the use of flammable and toxic refrigerants in applications used in occupied buildings more affordable and practical have yet to be adapted and will be necessary before any move is made away from HFCs. Even then the described safety consideration might continue to limit the use of alternative refrigerants in some applications.

Moreover, it should also be mentioned that some other alternatives which fall under the same safety category as today's refrigerants (A1) and still offer substantial GWP reductions are currently being developed.

### **Costs**

The ultimate objective is to deliver affordable refrigeration, heating and cooling while achieving optimal environmental performance. Each refrigerant should be used where appropriate, and environmentally and economically viable in a life cycle approach. Therefore direct costs such as the pure investment costs incl. eventually additional "safety costs" as well as indirect costs such as energy costs, insurance premiums for buildings or maintenance requirements, have to be taken into account. In this respect, the eco-efficiency concept could be a useful assessment tool.

### **Performance**

The choice of refrigerant in a given application substantially influences the performance of the system. Therefore EPEE wishes to underline once more that proven energy efficiency is extremely important to reduce the indirect GHG emissions associated with energy consumption. When selecting a refrigerant, not only its performance in cooling or refrigeration is important, but also its performance for heating buildings or providing domestic hot water, and such evaluation needs to be made for various climate conditions. For residential heat pump for example, currently no other compound than HFCs can deliver the specific thermodynamic properties in combination with the A1 safety classification required.

### **Incentives**

National HFC tax or fee systems may seem an interesting tool to provide incentives for the adoption of refrigerants with a lower GWP, however, EPEE highlights the potential contradiction between a straight tax based on GWP only which could lead to the use of inappropriate fluids, and the need to focus on life-cycle efficiency. A deposit system could however be an interesting tool to encourage the recovery and re-use of HFCs.

### **In conclusion:**

**All efforts to reduce GHG emissions have to balance a number of criteria (safety, energy efficiency, GWP, thermodynamic properties, leakage etc.) and therefore have to allow for technological flexibility and progress, and carefully consider the ease and speed of achievable improvements. EPEE does not support a blanket phase out of HFCs as this is costly, neither market- nor environmental orientated and therefore counter productive.**

**EPEE believes that better regulation will result if decision-makers understand the importance of allowing the HVACR sector to be able to carefully and responsibly select the most appropriate refrigerant for a given application among those available on the market in order to achieve energy efficient and climate compatible systems, rather than constraining that choice.**