



# EFCTC NEWSLETTER

## An update on fluorocarbons and sulfur hexafluoride

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### **ENERGY EFFICIENCY AND REFRIGERANT EMISSIONS REDUCTION: THE KEY ELEMENTS OF SUSTAINABLE REFRIGERATION**

Energy efficiency and the reduction of direct refrigerant emissions are the key elements of sustainable refrigeration, according to the International Institute of Refrigeration (IIR) in its note "[Global Warming: Refrigeration-Sector Challenges](#)" (also available in [French](#)) distributed at [COP 11 in Montreal](#), and showing the role of [refrigeration](#) in Sustainable Development.

#### **Socially and Economically**

- The refrigeration sector employs approximately 2 million people worldwide;
- annual sales of refrigeration equipment amount to around 200 billion Euros;
- in the food sector, the [cold chain](#) contributes to reducing post-harvest losses preserving food quality at all stages from production to consumption;
- chilled and frozen foodstuffs value amounts to more than 1000 billion Euros;
- many different fields require refrigeration technologies: industry, heating (heat pumps), health (vaccine storage, cryosurgery, superconductivity used in scanners), biodiversity (cryobiology).

#### **Environmentally**

Up to 90 % of the climate impact of refrigeration and air-conditioning is due to [indirect CO<sub>2</sub> emissions](#) originating in the production of the energy used: generally electricity, but also direct use of fuel. In developed countries, approximately 15% of all electricity use is for refrigeration and air conditioning.

Consequently, [energy efficiency](#) and [reduction of direct refrigerant emissions](#) are the key elements of sustainable refrigeration.

*"The IIR highlights that the objective in this domain is to halve the impact of emissions by 2020, using the year 2000 as baseline."*

- In the context of emissions reductions, refrigerants containment is crucial, and needs to be applied to [all phases in the life cycle](#) of a refrigerating plant: design, installation, servicing, end-of-life recovery or recycling, reclaiming or destruction, are being progressively implemented and must be continued.
- In order to further reduce energy consumption, systems optimization needs to be pursued, making use of high-performance technology and improving components efficiency. Equipment standardization and certification, energy labelling are also valuable tools that can further reduce energy consumption. The increased use of heat pumps expands the benefits of the refrigeration cycle by converting low-grade heat into useful heating energy.  
*"Reducing the unitary energy consumption of refrigerating plants by 30-50%"*



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*— according to applications —by 2020, using the year 2000 as baseline, must be a goal to be achieved.”*

To enable the [overall climate impact](#) to be quantitatively measured, [LCCP](#) (Life Cycle Climate Performance) takes into account both indirect emissions of CO<sub>2</sub> as well as direct emissions of refrigerants and also integrates emissions throughout the life cycle — from “cradle to grave”. For certain applications, the HFC option will prove to be better because of the limited indirect emissions achieved through higher energy efficiency.

Finally, IIR points out that [user safety and cost effectiveness](#) must also be taken into account.

### **SF<sub>6</sub> EMISSIONS FROM EU ELECTRICAL INDUSTRY DOWN 40% SINCE 1995**

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SF<sub>6</sub> emissions from EU Electrical Industry have decreased by 40% since 1995, and their use avoided emissions of about 1.7 Mt CO<sub>2</sub> across the EU-25+3, after a [study](#) commissioned by [CAPIEL](#). This study, carried out by an independent consultant in order to assess the reduction of SF<sub>6</sub> emissions from EU manufacturing and use of [electrical equipment](#), concludes that voluntary actions taken by all stakeholders (including manufacturers and users of electrical equipment) have resulted in significant emission reductions.

Since 1995, [voluntary actions](#) by the European electricity industry have resulted in a reduction of 40 % of SF<sub>6</sub> emissions in the EU-25 + Switzerland, Norway and Iceland (EU 25+3).

The study stresses [Life-cycle-assessments](#) which show that the use of SF<sub>6</sub> in electrical equipment can reduce the overall CO<sub>2</sub>-emissions from the electricity systems due to reduced network losses. In 2003, this effect is estimated to have avoided emissions of about 1.7 Mt CO<sub>2</sub> across the EU-25+3.

The analysis was carried out on request of [CAPIEL](#), in cooperation with the Union of the Electricity Industry – [EURELECTRIC](#), representing the main utilities in the European Union.

### **HFC FIRE FIGHTING AGENTS DO NOT REQUIRE EXPENSIVE PRESSURE RELIEF VENTING**

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[HFC fire fighting agents](#) do not require expensive pressure relief venting necessary with other oxygen depleting gases.



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Early gas fire-suppression systems using [Halons](#) involved the introduction of relatively low volumes of gas to extinguish fires. Concentrations of around 5% were sufficient to achieve the desired reactive effect to extinguish fire. The effect on room pressure of these systems was generally negligible, as rooms are never likely to be completely leak proof.

Using HFC fire fighting agents, with a typical design concentration of 7-8 %, leads to a similar situation.

By contrast, as inerting gases act by reducing the oxygen concentration, they would require the addition of about 40% of the volume of the room of inert gas. This makes necessary to foresee pressure relief venting.

This is another [advantage of HFCs in fire fighting](#), which will therefore allow the installation to be made easier and cheaper.

Source : [http://www.bsee.co.uk/news/fullstory.php/aid/2675/Halon\\_phase-out\\_puts\\_new\\_pressures\\_.html](http://www.bsee.co.uk/news/fullstory.php/aid/2675/Halon_phase-out_puts_new_pressures_.html)

### **US ENERGY POLICY ACT SETS MINIMUM EFFICIENCY STANDARDS FOR AIR CONDITIONING AND REFRIGERATION EQUIPMENT**

The [US Energy Policy Act of 2005](#) sets Minimum Efficiency Standards for Air Conditioning Equipment and Commercial Refrigeration 26 % above Present Standards.

[ARI](#) (American Air Conditioning and Refrigeration Institute) [welcomes this Energy Policy Act](#), which was negotiated with ARI and energy efficiency groups.

The Act establishes national minimum efficiency standards (effective by 2010) which will save energy in commercial [air conditioning equipment](#) and heat pumps, [commercial refrigeration](#) equipment, automatic commercial ice-making equipment, used in restaurants, convenience stores, grocery stores, and other commercial buildings.

The minimum efficiency standards for packaged air conditioners and heat pumps used in many commercial buildings represent a 26 percent improvement.

Altogether, implementing all the efficiency improvements contained in the law should reduce peak power needs by an estimated 8,000 MW by 2020.

Besides, the Energy Efficiency part of [the law](#) addresses:

- Federal building energy use, to be reduced by 20 percent by 2015;
- public buildings energy efficiency programs;
- the Energy Star program, promoting energy efficient products, to be expanded.