INTERNATIONAL INSTITUTE OF REFRIGERATION

IEA Energy Efficiency

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Deputy Director General

INTERNATIONAL INSTITUTE OF REFRIGERATION (IIR) — www.iifiir.org

Mission

Founded in 1908

The International Institute of Refrigeration (IIR) is the **only independent intergovernmental science and technology** based organisation which **promotes knowledge of refrigeration and associated technologies** that improve quality of life in a cost-effective and environmentally sustainable manner including.

Refrigeration is Everywhere!

- Cryogenics - petrochemical refining, steel…
- Industry, space industry, nuclear fusion…
- Medicine and health products - cryosurgery, anaesthesia, scanners, vaccines…
- Air conditioning - buildings, data centres…
- Food industry and the cold chain
- Energy sector - heat pumps, LNG, hydrogen…
- Environment - carbon capture and storage, public works, leisure activities…

Key Domains

The key domains of the IIR include:

- Food quality and safety from farm to consume
- Comfort in homes and commercial building
- Health products and service
- Low temperature technology and liquefied gas technology
- Energy efficiency
- Use of non-ozone depleting and low global warming refrigerants in a safe manner

The Network

58 member countries worldwide

over 400 experts

More than 500 corporate and private members

Intergovernmental Organisation Partners

Food and Agriculture Organization of the United Nations

World Health Organization

United Nations Framework Convention on Climate Change

OzonAction

CIHEAM

UNEP

OECD
BETTER POLICIES FOR BETTER LIVES

UNIDO

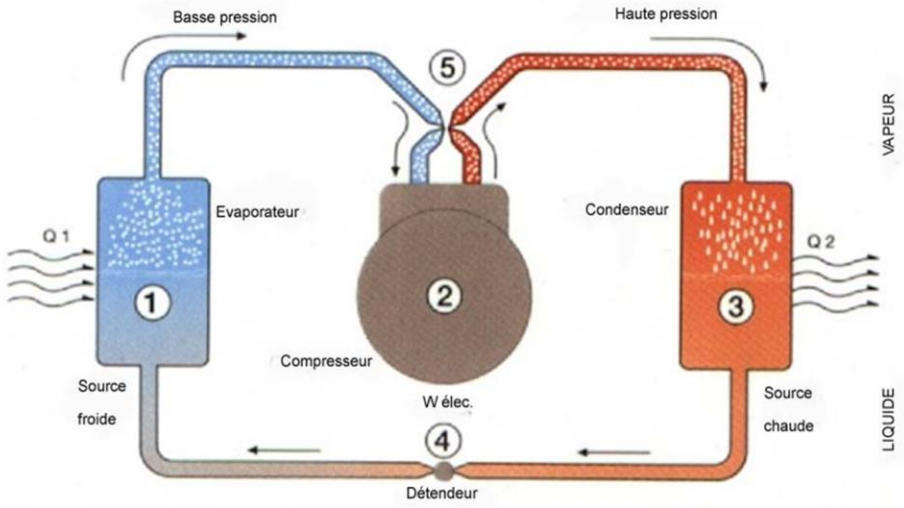
International Meetings

- Conference of the Parties (**COP**) to the United Nations Framework Convention on Climate Change (**UNFCCC**)
- Meeting of the parties (**MOP**) to the Montreal Protocol

Impact of Refrigeration

IN 35 Impact Of The Refrigeration Sector On Climate Change
IN 29 XXX

- Electricity consumption for refrigeration and air conditioning has been increasing over the last few years in both developed and in developing countries.
- The refrigeration sector (including air conditioning) consumes about 17% (IIR IN 29) of the overall electricity used worldwide.
- According to IIR estimates, 7.8% of global greenhouse gases (GHG) emissions are attributed to the refrigeration sector, or 4.14 GtCO2eq (IIR IN 35) .
- These emissions can be divided into two groups:
  - direct emissions : caused by system leaks of high GWP refrigerants. 37% of the total GHG emissions of the refrigeration sector.
  - indirect emissions: production of energy required to drive refrigeration systems. 63% of the total GHG emissions of the refrigeration sector.



Two International Goals

- Climate Change: Paris agreement (2015)
  - CO2 , CH4, N20, HFCs, PFCs, SF6
  - Temperature below +2°C or even +1,5°C
  - “National Determined Contributions”+3/3,5°C

- Montreal Protocol
  - Phase out of CFCs, HCFCs (total PO in 2030 for developing countries)
  - Phase down of HFCs (Kigali Amendment)
  - Multilateral Fund

- European Union: Region in advance
  - F-gas regulation
  - EU Ecodesign Directive

Kigali Amendment

- Agreed in October 2016, the Kigali Amendment adopted by the 197 Parties to the Montreal Protocol, in order to gradually reduce global production and consumption of HFCs. So far 71 countries have ratified, and took effect since January 2019.
- There are many alternatives to high-GWP refrigerants with comparable or superior energy efficiencies that can help reduce direct emissions.
- Such ammonia, CO2, hydrocarbons, HFOs and lower GWP "classical " HFCs (R32) and mixtures.
- It should be taken into account, however, that these alternative refrigerants may present certain disadvantages such as safety hazards (flammability, toxicity), environmental risks (decomposition products), high working pressures, or higher cost.
- Such disadvantages and risks should be considered, from the design of refrigeration facilities, to the training and certification of operators.

	A2 countries	A5 countries (Group 1)**	A5 countries (Group 2)***
Baseline	2011-2013	2020-2022	2024-2026
Formula	Average HFC consumption	Average HFC consumption	Average HFC consumption
HCFC	15% or 25% baseline*	65% baseline	65% baseline
Freeze	-	2024	2028
1st step	2019 – 10%	2029 – 10%	2032 – 10%
2nd step	2024 – 40%	2035 – 30%	2037 – 20%
3rd step	2029 – 70%	2040 – 50%	2042 – 30%
4th step	2034 – 80%		
Plateau	2036 – 85%	2045 – 80%	2047 – 85%

Multilateral Fund

- It was established in 1991 to assist developing countries meet their Montreal Protocol commitments to Phase out HCFCs
- MLF should now finance projects which aim would be to replace HCFCs and high GWP HFCs by low GWP HCFs, or natural refrigerants .
- In Kigali in 2016, there was a general commitment to consider the energy efficiency of the projects as key criteria to be accepted.
- However, the Executive Committee of the MLF was not able to reach agreement until now: establishing rules on the definition and measures of energy efficiency of refrigeration systems is difficult , politically and financially sensitive.

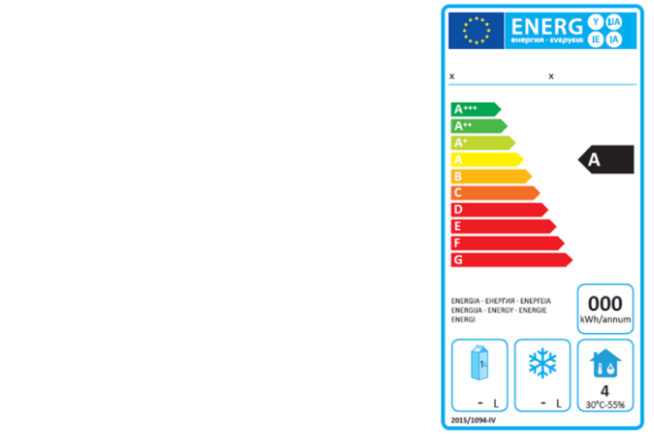
EU F-Gas Regulation: A phase down of HFC consumption

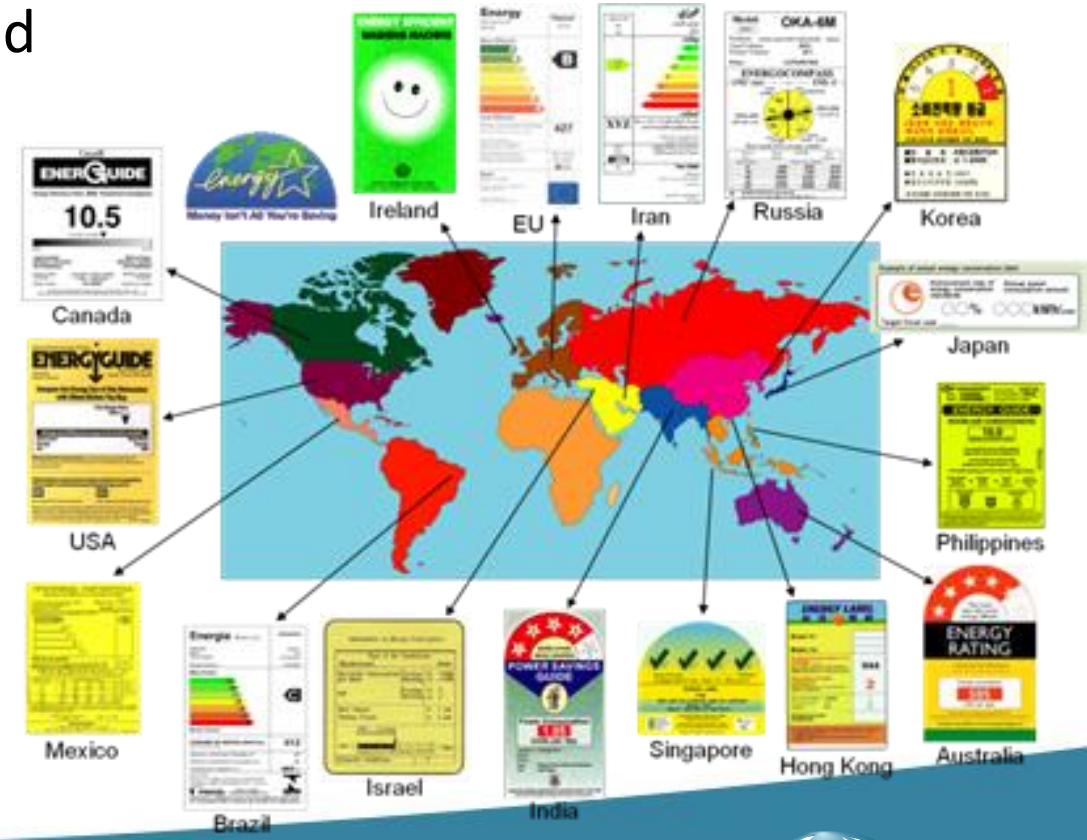
IN 26 Overview of Regulations Restricting HFC Use, Focus on the EU F-Gas Regulation
IN 29

- "Fgas" Regulation on certain fluorinated GHG aim to reduce the emission of HFCs, PFCs and SF6, which contribute to climate change if emitted to the atmosphere. The regulation concerns all 28 EU member states.
- The new regulation anticipated the Kigali Amendment and complies with it.
- The "F-gas" Regulation requires all personnel and companies to have a certification proving their ability to manipulate systems using «Fgases".
- This new Regulation calls for:
  - A phase down of HFC consumption
  - Certain marketing bans as well as restrictions in service and maintenance of existing plants with virgin F-Gases.
  - Increased leakage control for systems containing high-GWP refrigerants,

EU Ecodesign Directive

- The EU Ecodesign Directive (Directive 2009/125/EC) is a framework directive that obliges manufacturers of energy consuming products to reduce the energy consumption and sometimes also other negative environmental impacts occurring throughout the product life cycle.
- The Directive is complemented by the Energy Labelling Directive (Directive 2010/30/EU).
- Both domestic refrigerated appliances and professional refrigerated cabinets are included under the directives.





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