F-Gas Regulation Briefing Note – Domestic Refrigeration

HFCs are not needed in domestic refrigeration

This fact sheet provides information on phasing out hydrofluorocarbons (HFCs) in domestic refrigeration in the European Union. It is intended to inform revisions to the F-Gas Regulation, which are currently under consideration. The term "domestic refrigeration" covers refrigeration products that are broadly used domestically, such as household refrigerators and freezers.

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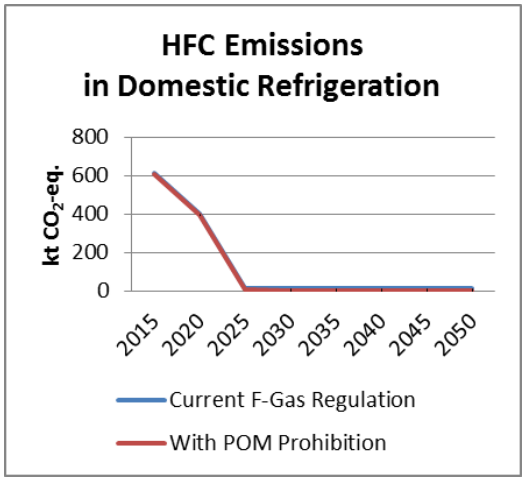
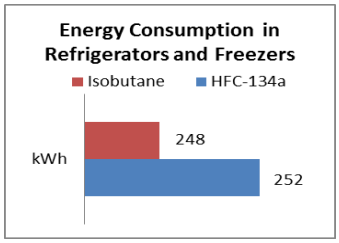
Emission trends and alternatives

HFC emissions from domestic refrigeration are low and expected to decrease over time.[1] Alternatives to HFCs have already achieved considerable market share, and are safe, energy efficient and cost-effective. The predominant replacement technology incorporates isobutane as the refrigerant, although other alternatives relying on carbon dioxide are in development.[2] Given the 15-year lifetime of the average domestic refrigerator or freezer, HFC-based equipment placed on the market today must be recovered in the future to prevent the release of residual HFCs within. Although HFC emissions are trending downward in this sector, additional measures that ban the placing on the market of HFC-based equipment would ensure that this trend is not reversed and prevent a further 285 kt/CO_2-eq. emissions through 2050.[3]





Energy efficiency

HFC-free alternatives are 1.6% more energy efficient than HFC-based equipment.[4] When considering the number of refrigerators and freezers in households, the corresponding energy savings become very significant. This is particularly relevant in light of the EU Energy Efficiency Plan, which sets out a 2020 target of 20% reduction in energy consumption compared to projections.[5] Increased energy efficiency decreases reliance on fossil fuels and reduces running costs for consumers.

Cost effectiveness

On a CO_2-equivalent basis, alternatives are very cost-effective. Banning the use of HFCs in this sector with placing on the market (POM) prohibitions would achieve GHG reductions at much lower costs than containment and recovery measures, as demonstrated in Table 1.[6]

Table 1: Effectiveness of Placing HFC-Based Equipment and Alternatives on the Market

Subsector	Containment and Recovery		POM Prohibition	
	GHG Emissions Abated	Abatement Cost (t/CO_2-eq.)	GHG Emissions Abated	Abatement Cost (t/CO_2-eq.)
Refrigerator/ Freezer	22%	€ 87.7	99.8%	€ 1

* The Environmental Investigation Agency (EIA) is an independent campaigning organisation committed to bringing about change that protects the natural world from environmental crime and abuse. For more information, contact ukinfo@eia-international.org.

From an end-user perspective, consumers save money over the lifetime of non-HFC equipment due to energy efficiency, more than offsetting the negligible additional upfront cost as demonstrated in Table 2.[7]

Table 2: Costs to End Users of HFC-Based Equipment and HFC-Free Alternatives

	Refrigerant	Upfront Costs	Annual Costs	Lifetime Costs	Cost Differential
Refrigerator & Freezer	**HFC-134a**	**€ 401.20**	**€ 35.38**	**€ 931.90**	**---**
	Isobutane	€ 408.30	€ 34.75	€ 929.55	- € 2.35

Requiring HFC-free alternatives is sound public policy.[8]

Policy Recommendations

Policymakers should revise Annex II of the F-Gas Regulation to include a placing on the market (POM) prohibition on HFCs in domestic refrigeration starting in 2015.

Fluorinated Greenhouse Gases	Products and Equipment	Date of Prohibition
Fluorinated GHG gases	Refrigerators/Freezers	1 January 2015

This would ensure reductions in HFC emissions and provide certainty of investment to manufacturers of HFC-free alternatives.

Environmental Investigation Agency
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[1] Öko-Recherche *et al.*, *Preparatory Study for a Review of Regulation (EC) No 842/2006 on Certain Fluorinated Greenhouse Gases, Final Report* (September 2011)[hereinafter "Öko-Recherche Study"], Annex V, p. 244 and Annex VI, p. 274-279 (chart produced from data provided by Öko-Recherche).
[2] Öko-Recherche Study, Annex V, p. 244 and Annex VI, p. 274-279.
[3] *See generally* Öko-Recherche Study, Annex V, p. 244 and Annex VI, p. 274-279 (figure derived from data provided by Öko-Recherche).
[4] Öko-Recherche, Study, Annex V, p. 244 (chart produced from Öko-Recherche data).
[5] European Commission, *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: Energy Efficiency Plan 2011* (8 March 2011), SEC (2011) 280 final, p. 2.
[6] Öko-Recherche Study, Annex V, p. 244 (additional annual cost of the containment and recovery measures in the F-Gas Regulation is €0.1 to abate 0.00114 t/CO_2-eq emissions).
[7] Öko-Recherche, Study, Annex V, pp. 244 (chart produced from Öko-Recherche data; upfront costs represent the initial cost of the hardware plus cost of first fill).
[8] Öko-Recherche Study, Annex V, p. 244.