



Deutsche Umwelthilfe

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Forgotten climate killers: End-of-life fridges are huge burden on Germany's climate change footprint

Just over a third of the chlorofluorocarbons (CFCs) in waste refrigeration equipment in Germany are currently undergoing environmentally compatible disposal – German environmental NGO *Deutsche Umwelthilfe* calculates that the resulting atmospheric burden is equivalent to 4.3 million tonnes of CO₂ per year and demands “an end to the careless disposal of these extreme climate toxins” – Remedy lies in regulatory controls and the inclusion of reliable data into Germany's climate change footprint

Berlin, 7 November 2007: Despite the fact that chlorofluorocarbons (CFCs) has not been used in the production of new refrigerators and freezers since the mid 1990s, the CFCs previously used as refrigerants and in the fridge insulation materials are continuing to have a negative impact on Germany's climate change footprint that is far greater than publicly realized. That is the surprising and sobering conclusion from research recently conducted by *Deutsche Umwelthilfe* (DUH).

Each year fridge recycling activities in Germany result in emissions of CFC refrigerants and CFC foam blowing agents from waste fridge and freezer appliances that are equivalent to the release of around 4.3 million tonnes of carbon dioxide (CO₂) into the atmosphere. The totally inadequate recycling systems still being used to treat end-of-life refrigeration equipment currently recover and destroy little more than one third of the climate critical CFCs. It is instructive to compare this figure with the savings of 900,000 tonnes of CO₂ equivalent that were achieved in Germany in 2006 by the entire government-funded building insulation programme managed by the government-owned development bank KfW. This is almost five times smaller than the annual CO₂ burden arising from fridge recycling activities. The situation in Germany is in stark contrast to countries such as Austria and Denmark, where state-of-the-art recycling technology represents the benchmark against which all recycling plants must be measured. In these countries, it is mandatory that fridge recycling plants recover 90 % of the CFCs from waste refrigeration equipment.

More than ten years after CFCs ceased being used in German fridges, about 80 % of the appliances being sent for treatment contain climatically hazardous CFCs. It is estimated that around 36 million CFC-containing refrigeration appliances are still being operated in Germany.

DUH recently submitted enquiries to the statistical offices of the sixteen federal states (*Länder*) requesting official figures for the disposal and treatment of waste fridges and

the quantities of CFCs recovered. At present, data has been received from ten *Länder*, four federal states responded by stating that some of the data requested are classified as confidential, and in two states no fridge recycling plants are operated. DUH is of the opinion that there can be no justification for classifying climatically relevant data as confidential. Nevertheless, the data collected so far can be used to extrapolate an average figure for the whole of Germany.

On average, a fridge contains a total of about 440 grams of CFCs in its cooling circuit and in the foam insulation. The impact of this comparatively small quantity on global warming is however immense. This is because the CFC used as a refrigerant has a global warming potential (GWP) that is 10720 times that of the greenhouse gas CO₂, while the CFC in the insulation material has a GWP 4680 times as great. CFCs also damage the earth's stratospheric ozone layer and therefore contribute to the fact that the so-called 'ozone hole' is continuing to grow or, at best, is shrinking slower than was expected after the introduction of the blanket ban agreed in the Montreal Protocol.

Since 2006, the German Waste Electrical and Electronic Equipment Act (*ElektroG*) requires waste fridges to be treated using state-of-the-art technology. Specifically, the guidelines on the disposal of refrigeration equipment issued by the German Federal Environmental Agency (UBA) and the quality assurance and test specifications GZ-728 developed by the German Institute for Quality Assurance and Certification (RAL) both stipulate the recovery and environmentally safe destruction of 90% of the CFCs contained in waste refrigeration equipment. This corresponds to the minimum average recovery of about 115 g of CFC from the cooling circuit and approximately 283 g from the insulation materials per appliance.

Approximately 2.4 million waste refrigeration appliances containing CFCs require treatment every year in Germany. These appliances have a total global warming potential equivalent to about 6.8 million tonnes of CO₂ – a figure that clearly demonstrates the extremely negative impact that these avoidable emissions have on the climate. State-of-the-art fridge recycling technology can remove and safely eliminate 90% of these CFCs, equivalent to 6.1 million tonnes of CO₂. The data acquired by DUH show, however, that just over a third (37%) of the CFCs contained in end-of-life refrigeration equipment are being recovered. On average, therefore, more than 275 grams of CFC are being lost from each waste refrigeration appliance. With about 2.4 million CFC-containing refrigeration appliances requiring processing each year, this translates into an annual atmospheric burden of about 4.3 million tonnes of CO₂ equivalent.

"The figures that we have derived are astonishingly poor for a leading industrial nation such as Germany. With barely more than a third of the CFCs in refrigeration equipment being recovered at present and with a continuing downward trend, the situation in Germany is humiliatingly bad compared to other European countries," says DUH National Director Jürgen Rech. The careless treatment of highly dangerous climate toxins must cease as soon as possible. DUH has written to the President of Germany's Federal Environmental Agency (UBA), Andreas Troge, to draw attention to these serious deficien-

cies and to demand that Germany's climate change footprint be amended to include these significant contributions.

When fridges are recycled there are four possible channels through which CFCs can escape into the atmosphere: via the recycling plant's exhaust air stream; as residual CFC in degassed polyurethane insulating foam; via foam residues adhering to the metal and plastic scrap fractions generated during recycling; and through so-called fugitive losses from an improperly sealed plant. Fridge recycling plants operating in Germany must comply with the German air-quality control regulations (*TA-Luft*) that specify emission limits for the plant's exhaust air stream and for the CFCs in the foam residues still adhering to scrap. Annual testing should be carried out by the relevant regulatory authority to confirm that the plants are leak tight. However, a systematic mass balance analysis of all CFC input and output streams has so far not been a requirement of the *TA-Luft* regulations.

"Our data clearly demonstrate that the current regulatory requirements are insufficient to ensure the efficient recovery and subsequent safe destruction of climatically harmful CFCs from waste refrigeration equipment," explained Maria Elander, DUH project head for recycling-based manufacturing systems. *"We urgently need a proper analysis based on actual material flows, in which the total number of waste fridges delivered to recycling sites for treatment and the actual quantities of CFCs recovered are systematically and transparently documented over an entire year. If less than 90 % is recovered, then the fridge recycling activities are failing to meet the required state-of-the-art standard specified in German law and the regulatory authority must intervene."* Elander criticizes the fact that so far input/output figures have only been logged as part of the annual testing of stage I recycling activities (i.e. the vacuum extraction of CFCs from the appliance's cooling circuit). In stage II of the recycling process (i.e. the extraction of CFCs from the insulation materials) three times as much CFC can be recovered, but so far there has been no attempt to record and assess the input stream (number of appliances processed) or the output stream (quantities of CFC actually recovered) over a twelve-month period. As Maria Elander says: *"Thanks to the DUH survey, the data are now available for all to see; it is time for the federal and regional governments to act."*

In a letter to the environment ministers of the sixteen German *Länder*, DUH has demanded that these deficiencies in the fridge recycling sector be addressed and that changes to the available regulatory instruments be made to ensure that the statutorily prescribed "state of the art" is implemented for CFC recovery at the earliest opportunity.

For more information, please contact:

Jürgen Resch, National Director Deutsche Umwelthilfe e.V. (DUH), Hackescher Markt 4, 10178 Berlin, (www.duh.de), Tel.: +49-30-258986-0, Fax: +49-30-258986-19, Mobile: 0171/3649170, E-mail: resch@duh.de

Maria Elander, Deutsche Umwelthilfe e.V., Project manager for recycling-based manufacturing systems, Hackescher Markt 4, 10178 Berlin, Germany Tel.: +49-30-258986-12, Fax.: +49-30-258986-19, Mobile: 0160/533 73 76, E-mail: elande@duh.de