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Environmental Investigation Agency: Press Release: 01 February 2009

CHILLING FACTS: SUPERMARKETS SLAMMED IN NEW EIA GLOBAL WARMING & REFRIGERATION SURVEY

BUDGET supermarket Iceland has come bottom in a new EIA survey examining the global warming impact of supermarket in-store fridges and freezers.

The Chilling Facts survey, carried out by the Environmental Investigation Agency (EIA) asked supermarkets about the global warming impacts of their refrigeration.

See the full report at our special Chilling Facts website HERE

Marks & Spencer came top of the league table, mainly for efforts to improve. But overall, none of the 10 major supermarkets fared well in the EIA survey.

Listen to the BBC Radio 4 programme on the issue & our survey Costing the Earth

Tesco came second largely because of their investment in climate-friendly refrigeration – but they were also the supermarket with the largest carbon footprint from their cooling because they have the most stores.

Refused

Worst of all was negative-scoring Iceland, closely followed by the other budget stores, Aldi and Lidl who all refused to provide any information about what they were doing.

Waitrose scored worst amongst the major players. Their responses were vague and uninformative giving the impression that they were apathetic and didn't take the issue seriously. Morrisons also seemed to be lagging because they refused to participate in the survey.

Asda and Co-op scored points for energy-efficiency targets but had problems with leakages of the highly potent greenhouse gases. Sainsbury also had good energy-efficiency targets but overall, carbon dioxide equivalent emissions are still rising.

Slow to shift

The HFC gases (hydrochlorofluorocarbons) used in supermarket fridges and freezers have a far greater global warming impact than carbon dioxide – commonly over 4,000 times as much. Furthermore, supermarkets are the UK's biggest source of HFC emissions.

But there are viable alternatives that can be used. These climate-friendly alternatives have been adopted in countries like Germany and Denmark and by major

multinationals like McDonalds and Coca Cola. But UK supermarkets are being slow to make the shift.

Fionnuala Walravens of EIA said: "*Our survey results are hugely disappointing. Even though supermarkets know that their refrigeration chemicals are a major contributor to climate change, they're not yet doing anything much about it."*

Carrier bags

EIA's Chilling Facts campaign is supported by Julia Hailes, a sustainability consultant and author of The New Green Consumer Guide. She said: "*As much as 30% of the climate change impact of supermarkets can come from refrigeration cooling gases. If we can get them to switch to climate-friendly alternatives it would be vastly more significant than cutting back on carrier bags."*

One of the main findings of the survey was uncovering a shortage of engineers qualified to work with climate-friendly refrigeration.

EIA is now calling for supermarkets to commit to all new refrigeration being climate-friendly by the end of 2009 and all equipment by 2012. They should also require all refrigeration engineers used to be trained to work with climate-friendly gases. And join Refrigerants Naturally initiative, which is helping big companies to ditch climate-unfriendly gases.

**EIA's survey and HFCs will be the main topic on BBC Radio 4's Costing the Earth programme on Monday 2nd February, 2009 at 9pm, and repeated on Thursday 5th February 1.30pm.*

Notes for Journalists:

• The Environmental Investigation Agency is an independent campaigning organisation committed to bringing about change that protects the natural world from environmental crime and abuse.

• The Chilling Facts Campaign has been set up by EIA to highlight the global warming impacts of refrigeration and air conditioning gases and promote climate-friendly alternatives.

• The Chilling Facts survey was conducted in the Summer of 2008 by sending a out a questionnaire asking supermarkets about their refrigeration in-store, behind the scenes and for transport – as well as about leakages, energy-efficiency, training of refrigeration engineers and future plans.

• The Chilling Facts Campaign Steering Group reviewed the information from the survey and awarded points. Its members were: Fionnuala Walravens from EIA; refrigeration expert, Nick Cox from Earthcare Products; and sustainability consultant, Julia Hailes.

• Leaking refrigerants accounts for about a quarter of a supermarket's direct climate change emissions. In 2005 the global warming impact of these emissions were equivalent to producing 10 billion plastic carrier bags, taking 2 billion car trips to the

supermarket or flying from London to New York over 2.5 million times.

• Emissions from HFCs (used in refrigeration and air conditioning) are predicted to triple by 2015, which means that their impact on climate change would be more than double that of CO2 (using 2006 CO2 levels).

• Refrigerants, Naturally! is a global initiative of companies committed to combat climate change and ozone layer depletion by substituting harmful fluorinated gases ("F-gases", such as CFCs, HCFCs and HFCs) with natural refrigerants and with a focus on their point-of-sale cooling applications. Refrigerants, Naturally! is supported by Greenpeace and the United Nations Environment Programme and recognised as a "Partnership for Sustainable Development" by the UN Commission on Sustainable Development.

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2008/12/16 BBC News VIEWPOINT

http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/7784531.stm

Ozone protection feels the heat Fionnuala Walravens

Former UN chief Kofi Annan described the 1989 Montreal Protocol to protect the ozone layer as "probably the most successful environmental agreement to date". But in this week's Green Room, Fionnuala Walravens considers how the complex interactions of ozone depletion and climate change in the atmosphere are mirrored in the global political debate.

The Montreal Protocol, the international agreement designed to protect the ozone layer, has reached a major crossroads.

Last year's 20th anniversary meeting of the global framework to protect the ozone layer agreed to significantly accelerate the phasing-out of ozone-depleting hydrochlorofluorocarbons (HCFCs).

This was applauded worldwide as an historic achievement that could also save billions of tonnes of greenhouse gas emissions, because HCFCs are many thousands of times more potent than carbon dioxide.

However their likely replacements, the ozone-benign hydrofluorocarbons (HFCs), are also potent global warming gases, often more destructive than the HCFCs they are replacing.

Despite this, HFCs are widely marketed by the refrigeration industry as environmentally friendly.

They have also been readily accepted as replacements to ozone depleting gases in many industrialised countries.

As a result, scientists have found atmospheric concentrations of HFCs are increasing at such a rate that by 2015 their emissions will be over 1.2 billion tonnes of carbon dioxide equivalence (CO2-eq).

This appears to place the Montreal Protocol directly at odds with the goals of the Kyoto Protocol, which controls emissions of global warming gases including HFCs.

Montreal vs Kyoto

To the bystander, these treaties are heading ominously down very different roads.

As the Montreal Protocol speeds up the phase-out of HCFCs in developing countries, it is clear that serious intervention is needed to ensure that they do not end up in an HFC cul-de-sac.

If action isn't taken, last year's milestone agreement could actually result in increased global green house gas emissions - and certainly we will not see anything like the 12-15 billion tonnes of CO2-eq savings being widely quoted by the United Nations.

So far, the Kyoto Protocol has yet to wake up to the fact that HFC emissions are likely to continue rising considerably in the foreseeable future.

Climate meetings are dominated by the larger debates over deforestation and emissions trading, while the deliberate production of potent greenhouse gases, such as HFCs for refrigeration and air-conditioning, tend to slip under the radar.

The good news is that there are sustainable, climate-friendly, alternatives to HFCs: so-called natural refrigerants like carbon dioxide (ironically), ammonia and hydrocarbons.

Unlike HFCs, they are not man-made and importantly they do not have global warming potentials thousands of times greater than CO2.

Additionally, equipment using these gases is often more energy efficient than those using HFCs, thus delivering a double climate benefit.

Companies producing these natural refrigerants tend to be far smaller than the big chemical giants that produce HFCs and it has been a challenge selling these natural refrigerants to a market resilient to change.

However, the tide may be beginning to turn. Some large multinational corporations are turning their backs on HFCs in favour of natural alternatives.

For example, Unilever has fitted more than 200,000 hydrocarbon chiller units in Europe, Asia and South America, while the Coca Cola Company recently confirmed plans to install 100,000 CO2 bottle coolers by 2010.

It's often the accepted viewpoint that businesses try to discourage governments from adopting more stringent environmental regulations, but the actions of this group of companies clearly demonstrate that big business is sometimes ahead of government policies.

Of course, these businesses are keen to improve their public image, and right now mitigating climate change is probably the most pressing environmental issue in the minds of their consumers.

But the reality is they have cottoned on to the fact that moving away from HFCs is a relatively cheap and simple way of reducing their carbon footprint.

Pulling together

Phasing out HFCs doesn't involve changing lifestyles, it's just a case of changing the refrigerant used and ensuring that technicians dealing with them are trained to do so.

Furthermore, many companies have reported increased energy efficiency of natural refrigerant-based equipment, making the switch more financially attractive.

Despite the HFC problem, it must be acknowledged that the Montreal Protocol has so far proved enormously successful in reducing emissions of greenhouse gases, whether intentionally designed to or not.

Ozone-depleting substances, in particular CFCs, are potent greenhouse gases. Over the past 20 years the Protocol has phased out over 95% of their production, reducing greenhouse gas emissions by an estimate 135 billion tonnes CO2-eq between 1990 and 2010, and arguably delaying global warming by up to 12 years, according to scientists.

When compared to the Kyoto Protocol's estimated 10 billion tonnes CO2-eq savings between 2008 to 2012, it's clear to see why many have lauded the Montreal Protocol as the "most effective climate treaty to date".

What makes the Montreal Protocol a successful global agreement is that it offers financial assistance towards replacement equipment and chemicals, ensuring that measures can be taken in developing countries.

What it needs to do now is ensure that the HCFC phase-out in developing countries results in the uptake of natural and climate-friendly alternatives, not HFCs.

Consumers can also play a role here by showing business and governments that we don't need HFCs.

As you walk down the cold and frozen aisles of your local supermarket (which by the way account for over half the UK's HFC emissions from refrigeration and air-conditioning), think about asking your supermarket retailer if their refrigeration is HFC-free.

But we also need leadership from the top. The common goal of both the Kyoto and Montreal Protocols is, surely, protection of the planet.

In which case, it is imperative the two start talking about a global phase-out of HFCs and stop pulling in opposite directions.

Fionnuala Walravens is part of the Environmental Investigation Agency's (EIA) global environment campaign team

The Green Room is a series of opinion articles on environmental topics running weekly on the BBC News website

Do you agree with Fionnuala Walravens? Is the Montreal Protocol the most successful environmental agreement to date? Does allowing the use of HFC, a potent greenhouse gas, place the global ozone agreement at odds with the Kyoto Protocol? Or should HFCs go the same way as CFCs and be outlawed?

Dear Dave in Lancs, you are an idiot. You have no qualifications to discuss the evidence of or not as you need to understand the subject first. Believe me, I know lawyers think they know everything - Im married to one. The biggest problem preventing workable solutions to slow climate change is transparency of information and a fair sided argument.
john, London

Dave from Lancs. Yawn.... You are a lawyer who apparently can't use punctuation or spell. How does this make you more qualified? Actually, now I think about it, I might have received an email from you telling me I had inherited $15 million. Well, it was written in your style...
Alasdair, Edinburgh, UK

Kyoto is a great piece of green propaganda from the lefties apart from dodgy computer models, there isnt any evidence whatsoever of "human induced dangerous climate change" im a lawyer not a scientist, so im more qualified than any scientist to discuss the evidence, or lack there of switching to CFC free things didnt close the hole in the ozone but again a great piece of propaganda dream on greenies
dave, Lancs

This is a fascinating and thought provoking article which makes me wonder how many other similarly simple win-win solutions which President Elect Obama could make rapid and

significant economic and environmental gains with. I just hope that he is prepared to spend some serious money and to inject some urgency and ambition into the world's political class and business community. If he is then who knows what might be possible!
Dr Matt Prescott, Oxford, UK

December 2008, UN-Business Focal Point letter,
http://www.enewsbuilder.net/focalpoint/e_article001294799.cfm?x=bdS3hTr,bcdVHW2j

Refrigerants, Naturally! Taking Non-HCFC Technologies to the People

by Linda Ederberg and Rajendra M. Shende

Multinational companies that compete with each other in the marketplace can be on the same side of the game when it comes to protecting the environment. Here is an emerging example of a group of such companies joining together to protect the ozone layer and climate.

Hydro chlorofluorocarbons (HCFCs) and hydro fluorocarbons (HFCs) are fluorinated gases that are used in refrigeration and air conditioning applications worldwide. HFCs are the most commonly used type of F-gases to replace chlorofluorocarbons (CFCs) and HCFCs — two substances being successfully phased out under the Montreal Protocol because of their ozone-destroying properties. All of these substances are extremely potent greenhouse gases with a very high global warming potential (GWP) and HFCs are controlled under the Kyoto Protocol.

Industries and consumers using these substances have a great challenge: how to make the transition away from these refrigerants to safe, economical and environmentally-sound alternatives?

One group of major companies is showing leadership in this area by blazing the trail away from fluorinated refrigerants to what is known as “natural refrigerants”. Natural refrigerants are naturally occurring substances, such as hydrocarbons (propane, iso-butane), CO_2, ammonia, water and air. These substances can be used as cooling agents in refrigerators and air conditioners and do not harm the ozone layer and are benign for the climate.

Known as “Refrigerants, Naturally!” partnership promotes a shift in “point-of–sale” cooling technology in the food, drink and retail sectors towards refrigeration technologies that do not use fluorinated refrigerants. Member companies - Carlsberg, The Coca-Cola Company, IKEA, McDonald’s, PepsiCo and Unilever - are reducing their impact on climate change and ozone depletion by replacing HCFC and HFC refrigerants with natural refrigerants, by using HCFC and HFC-free insulation material and by reducing the energy consumption of new refrigerating equipment. This is done through substantial efforts or investments to progressively replace fluorocarbons with natural refrigerants including research and development, testing, financial investment, staff time or public engagement. The members are committed to developing prospective timetables to move their operation towards these goals and to periodically share technical information about alternative refrigeration within the initiative via regular meetings, special events/workshops, and bilateral exchanges. Further, data and results are shared with external stakeholders, such as their wider supply chain, their industry peer groups, government decision makers and the public.

Currently, more than 300,000 hydrocarbon-based freezers by Unilever for ice cream have already been installed throughout Europe, Latin America and Asia, as well as more than 15,000 bottle-coolers and vending machines in China, Europe and Latin America from The Coca-Cola Company, Carlsberg and PepsiCo, either operating with CO_2 or hydrocarbon

refrigerants. McDonald's opened a completely HFC-free pilot restaurant in 2004 which allowed it to monitor and test HFC-free equipment and performance.

The United Nations Environment Programme (UNEP) and Greenpeace International are official supporters and take an active role in the management of the initiative.

Roles of each partner

The six companies have committed to reduce their climate and ozone impact of their point of sale refrigeration technologies. Their role is consequently to regularly report to the members of the partnership about their progress to fulfil their commitments.

The supporters UNEP and Greenpeace contribute through investment of personnel resources, communication tools and their specific know-how to communicate the initiative's goals and achievements to the public, in particular industry stakeholders, policy-makers and the media.

The unique partnership enables an open and constructive dialogue between the different partners, i.e. the six global corporations, the international organization UNEP and the NGO Greenpeace.

History of Refrigerants, Naturally

UNEP (through its Paris-based Division of Technology, Industry and Economics OzonAction Programme) and USEPA were instrumental in organizing the Alternative Refrigerants Forum in Illinois to promote the adoption of non-CFC and non-HFC refrigerants by multinational corporations, including McDonald's, The Coca-Cola Company and their competitors. UNEP and Greenpeace were requested to provide advice on commonly available alternatives refrigerants that are ozone as well as climate friendly. The collaboration resulting from that forum became an ongoing dialogue between UNEP, Greenpeace, McDonald's, The Coca-Cola Company and Unilever that later gelled into the Refrigerants, Naturally! partnership, first manifesting itself publicly in the 2004 conference in Brussels. Since that time, Refrigerants, Naturally! has been officially recognized as a Partnership for Sustainable Development by the UN Commission on Sustainable Development as a voluntary, multi-stakeholder initiative that contributes to the implementation of Agenda 21, Rio+5 and the Johannesburg Plan of Implementation.

How the partnership has been coordinated and how the partners work together

Since its inception the partnership has been coordinated through regular meetings and internal communication tools. General meetings have been organized at least twice a year, where the partners have discussed forthcoming activities and outreach to suppliers, companies, which fall within the scope of the initiative, policy-stakeholders and media. Through annual meetings of the initiative's technical working group the partners shared their technical data and experiences with the implementation of natural refrigerants in their point-of-sale cooling equipment. In January 2007, the partnership has contracted a consultancy to provide secretariat functions. This has helped to improve the management and administration of the network, which grew in 2006 when PepsiCo, IKEA and Carlsberg joined Refrigerants, Naturally!

On a regular basis, Refrigerants, Naturally! invites other companies which operate point-of-sale cooling technologies to participate in the technical exchange meetings. The initiative has the potential to induce a real shift in the implementation of point-of-sale cooling technology in the food and drink, food service and retail sectors towards natural refrigerants, but a critical

mass of companies is crucial to exert a substantial impact on suppliers and policy makers. The more companies follow suit, the more accepted HFC-free refrigeration will be and the more likely natural refrigerants will move into the mainstream refrigeration

For more information, please contact Linda Ederberg, Refrigerants, Naturally! Secretariat, or Rajendra M. Shende, Head of UNEP Division of Technology, Industry and Economics OzonAction Branch or visit the following websites:

www.refrigerantsnaturally.com or www.unep.fr/ozonaction

Telegraph 21 Nov 2008: Carbon Action must be done together

http://www.telegraph.co.uk/sponsored/business/carbontrust/3497017/Carbon-Action-must-be-done-together.html

Maintaining the momentum of carbon reduction is difficult when it is done alone. Fortunately it doesn't have to be. Some companies have found industry bodies a useful forum for exchanging best practice among peers.

Last Updated: 5:02PM GMT 21 Nov 2008

Andrew Stanley of the Hilton Hotels group

Maintaining the momentum of carbon reduction is difficult when it is done alone. Fortunately it doesn't have to be. Some companies have found industry bodies a useful forum for exchanging best practice among peers.

Andrew Staley, UK director of property and utilities at Hilton Hotels, for example, is on the sustainability committee of the British Hospitality Association, where members share knowledge, meet with government departments such as Defra, and help each other to understand how regulations such as the Carbon Reduction Commitment will affect their businesses. But isn't this sharing what might be competitive advantage?

"We might be tempted to think that, but this is an issue we need to tackle by pulling together," says Mr Staley.

Inter-company initiatives need not be with competitors from the same industry, but may work just as well with companies facing similar issues. For example, McDonalds, Coca-Cola and Unilever created the Refrigerants Naturally group, supported by the United Nations

Environment Programme and Greenpeace, to find alternatives to refrigerant gases, which deplete the ozone layer.

Not everyone has the clout of these three giants, which is where working with organisations such as the Carbon Trust can make a real difference. Business in the Community also offers companies the opportunity to network and share best practice and experience

October 2008

22. October 2008 Ben & Jerry's chills ice cream - and the planet

A refrigeration breakthrough from the popular ice cream maker could change the business of cooling.

http://money.cnn.com/2008/10/22/technology/ben_jerrys.fortune/index.htm?postversion=2008102210

By Marc Gunther, senior writer
Last Updated: October 22, 2008: 10:07 AM ET

(Fortune) -- No one wants melting ice cream. Nor do we want melting polar ice caps. The trouble is, keeping our ice cream cold warms the planet because powerful greenhouse gases are used in most refrigerators and freezers in the U.S.

That's why environmentalists at Greenpeace have been working with some of the world's biggest food makers - among them Coca-Cola (KO, Fortune 500), McDonald's (MCD, Fortune 500) and Unilever - to deploy refrigerators in supermarkets and convenience stores that are free of hydrofluorocarbons (HFCs), which are potent greenhouse gases.

Just last month, Ben & Jerry's, the Vermont-based ice cream maker owned by Unilever, announced plans to roll out the country's first HFC-free freezers.

"A company can be responsible in terms of the environment, it can be proactive in terms of solving problems, and it can make money at the same time," said company co-founder Ben Cohen when he introduced the freezers at an ice-cream store in Washington, D.C. "That's what we should expect from all corporations in this country."

The newfreezers are a rare example of a global warming solution that actually saves money. They cost about the same as conventional refrigerators - the price depends on the size - and are 10% more efficient, meaning they use less electricity. So far, more than 300 million HFC-free freezers, which use hydrocarbons like propane and butane as refrigerants, have been sold in Europe, Asia and Latin America, but not the United States.

Why is that? The answer, surprisingly, lies with the Environmental Protection Agency.

First a fix, then a new problem

Bear with me, because this gets complicated. It's an example of how an attempt to solve one environmental problem can exacerbate another, and how bureaucracies can (no surprise) stand in the way of change.

You may recall a mostly-forgotten environmental problem that goes back to the 1980s and was often described as the hole in the ozone layer. In 1995, a global treaty called the Montreal Protocol banned chemicals known as CFCs (chlorofluorocarbons) after scientists learned that CFCs depleted the ozone layer of the atmosphere, which shields life from the sun's harmful radiation.

Instead of using CFCs, the refrigeration industry turned to so-called F-gases - HCFCs and HFCs - which did less damage to the ozone layer but contributed to global warming.

Greenpeace blames F-gases for about 16% of man-made global warming; the chemical industry, which makes the gases, says it's much less. It depends on what you're measuring, but big users of refrigerants like Nestle, one of the world's biggest food companies, have committed to phasing out HFCS.

"F-gases are the worst greenhouse gas you've never heard of," said Amy Larkin, who runs Greenpeace Solutions, which works with businesses to address global warming. (Disclosure: My wife works for Greenpeace USA.)

Refrigerators, it turns out, are big polluters. Greenhouse gases are emitted during the manufacturing process, when air conditioning fluid leaks, and when refrigerators are disposed of improperly.

Greenpeace has been working on climate-friendly refrigeration since the 1990s, when it persuaded a German manufacturer to make refrigerators cooled by hydrocarbons. Since then, Whirlpool (WHR, Fortune 500), Bosch, Panasonic, LG, Miele and Siemens (SI) have all developed HFC-free refrigerators - or what they like to call "natural refrigerants."

In 2004, Unilever, Coca-Cola and McDonald's formed a coalition called "Refrigerants Naturally!" to develop HFC-free vending machines, coolers and display cases. Carlsberg, Ikea and PepsiCo (PEP, Fortune 500) have signed onto to the initiative. (Yes, PepsiCo and Coca-Cola, fierce rivals in the beverage business, are cooperating to solve this environmental problem.)

Some of the technology they are developing is quite sophisticated. Coca-Cola, for instance, has deployed "smart" vending machines that learn how to cool drinks only at times when customers want them. Those in office buildings, for instance, power down over night, saving electricity and reducing emissions.

Convincing the regulators

For its part, Unilever says it has deployed more than 300,000 climate-friendly refrigerators overseas.

But U.S.-based companies like Ben & Jerry's that want to deploy so-called natural refrigerants have been stymied, until now, by the EPA. The agency says on its Web site that refrigerants made from hydrocarbons like propane and butane are flammable and therefore unsuited for use in anything other than industrial applications.

Only after considerable efforts did Ben & Jerry's get EPA permission to install its hydrocarbon-based freezers, which use butane, in the United States. The EPA said Ben & Jerry's can test up to 2,000 freezers.

If the EPA allows the test to expand, Ben & Jerry's estimates it could convert more than 100,000 ice cream cabinets in eight to 10 years. "If we get approval from EPA, we will roll them out in large numbers," said Allen Gerard, a Unilever engineer who has been working on the effort. Greenpeace hopes the trial run will open the door to wider use in the United States of so-called natural refrigerants.

Said the group's research director, Kert Davies: "The great thing is, we've got some momentum now."

October 2008

Refripro Refrigerants, Naturally! - 4 Jahre später

http://www.refripro.eu/include/pdf_contenu.php?lg=de&id_nav=0006&contenu=classique&id_par=0190

Vor vier Jahren haben sich die drei Giganten Coca Cola, Unilever und McDonalds zusammengefunden, um sich für den Einsatz natürlicher Kältemittel in den eigenen Reihen stark zu machen. Was hat sich seither getan? Ehrlich gesagt - nicht viel. Darüber konnte weder die Brillanz hinwegtäuschen, mit der John Gummer, ehemaliger britischer Secretary of Environment, durch das Seminar führte, noch die Tatsache, dass sich dererlesene Kreis inzwischen um Pepsico, Ikea und Carlsberg erweitert hat.

Wirklich aussagekräftige Ergebnisse hatte eigentlich nur Unilever vorzuweisen, die inzwischen 330.000 von weltweit 2 Millionen Kühltruhen, also ca. 1/6 des gesamten Parks, auf Kohlenwasserstoffe umgestellt und konkrete Pläne dafür haben, wie sie ihre Kohlenwasserstoff Kühltruhen auch auf dem US-amerikanischen Markt etablieren wollen.

Coca Cola hat seither ein paar Testreihen durchgeführt, die darauf hindeuten, dass CO2 diekünftige Lösung für Getränkeautomaten sein könnte. Bis Ende 2008 will das Unternehmen ganze 40.000 Anlagen von weltweit rund 9,5 Millionen (!) umgestellt haben.

Ungeheuer beeindruckend auch die Zahlen von Pepsico und Carlsberg. Pepsico befindet sich noch im Teststadium und kommt auf ca. 1400 Getränkekühler mit CO2 oder Kohlenwasserstoffen, Carlsberg hat derzeit ca. 1100 Geräte mit Kohlenwasserstoffen in Betrieb. Über McDonalds gibt es eigentlich gar nichts Neues zu sagen und IKEA ist so frisch dabei, dass sich jeglicher Kommentar erübrigt.

Fazit: Auch 4 Jahre später drängt sich der Verdacht auf, dass die Kampagne "Refrigerants, Naturally!" in erster Linie ein Paradebeispiel für cleveres Marketing ist. Aber wer weiß, vielleicht werden wir ja in vier Jahren eines Besseren belehrt. Denn schließlich "steht dem Ausstieg aus den HFKWs nichts mehr entgegen", wenn man den Worten von John Gummer Glauben schenken darf. Das sagte er allerdings auch schon vor vier Jahren...

Andrea Voigt 10/2008

September 2008

Ozone Action Special Issue dedicated to HCFC phase-out

Refrigerants, Naturally !Taking Non-HCFC Technologies to the People

About the initiative R e f r i g e r a n t s , Naturally! Promotesa shift in the pointof - s a l e cooling technology in the f o o d and d r i n k and retail sectors towards F-gasfree refrigeration technologies. Member companies a r e reducing their impact on climate change and ozone depletion by replacing HCFC and HFC refrigerants with natural refrigerants, by using HCFC and HFC-free insulation material, and by reducing the energy consumption of new refrigerating equipment. This is done through substantial efforts or investments to progressively replace fluorocarbons with natural refrigerants in point-of-sale cooling applications, including R and D, testing, financial investment, staff time or public engagement. The members are committed to develop prospective timetables to move their operation towards
these goals and to periodically share technical information about alternative refrigeration within the initiative via regular meetings, special events/workshops, and bilateral exchanges. Further, data and results are shared with external stakeholders, such as their wider supply chain, their industry peer groups, government decision makers, and the public. Currently, more than 300,000 hydrocarbon-based freezers by Unilever- Ice cream have already been installed throughout Europe, Latin America and Asia, as well as more than 15,000 bottle-coolers and vending machines in China, Europe and Latin America from The Coca-Cola Company, Carlsberg and PepsiCo, either operating with CO2 or hydrocarbon refrigerants. McDonald's opened a completely HFC-free pilot restaurant in 2004 which allowed it to monitor and test HFC-free equipment and performance. When launched 4 years back Refrigerants, Naturally! Had three partners, i.e. the Coca-Cola Company, McDonald's and Unilever. Presently three more multinationals have joined-in – Carlsberg, Pepsico, and IKEA. Greenpeace and the United Nations Environment Programme (UNEP) are official supporters and take an active role in the management of the initiative1.

Background

Hydrochlorofluorocarbons (HCFCs) and Hydrofluorocarbons (HFCs) are fluorinated gases (F-gases) that are widely used as refrigerants in refrigeration and cooling industry. In particular, HFCs are the most commonly used type of F-gases to replace CFCs and HCFCs—two sorts of gases to be phased out by the Montreal Protocol due to their ozone- destroying properties. But, like CFCs and HCFCs, HFCs are extremely potent greenhouse gases with a very high global warming potential (GWP). They are regulated by the Kyoto Protocol.

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September 2008

Press Coverage on the GLC Seminar.

Duurzaam-ondernemen: 17 September 2008

http://www.duurzaam-ondernemen.nl/detail_press.phtml?act_id=8255

Drankproducenten, McDonalds en Unilever gaan natuurlijke koeling propageren

Zes wereldwijd bekende consumentenmerken gaan het gebruik van natuurlijke koudemiddelen verder promoten bij hun collega-bedrijven. Die belofte deden Coca-Cola, PepsiCo, McDonalds, Unilever, Carlsberg en IKEA op de Gustav Lorentzen Conferentie in Kopenhagen. Ze waren al langer verenigd in het 'Refrigerants, Naturally!' initiatief om het klimaatbeleid te ondersteunen. Alle zes erkenden dat CO2 als koudemiddel de toekomst heeft.

Rajendra Shende van de UNEP waarschuwde dat als de koelindustrie niet verandert, de bijdrage van HFC's aan opwarming van de aarde is gestegen van 1.5% nu tot 8% in 2050. Initiatieven van bedrijven om als rolmodel voor verandering te dienen zijn erg belangrijk. In 2009 zullen groene milieuorganisaties focussen op afschaffing van alle HFC's, stelde Greenpeace, met nadruk op China en de VS.

Coca-Cola meldde dat ze eind 2008 40.000 CO2 koelers heeft staan. 70.000 R744 units staan gepland voor 2009-2010. Een vergelijking tussen CO2 en R134a toont aan dat bij 40.6°C en 75% relatieve vochtigheid, CO2 24% meer efficiënt is dan het chemische koudemiddel. De techniek is goed - bij de 14.000 koelunits die al in bedrijf zijn werden koelproblemen niet veroorzaakt door fouten in het CO2 circuit.

PepsiCo past CO2 en koolwaterstoffen toe in koelvitrines en verkoopmachines. Veldtesten hebben bewezen dat CO2 een hogere energie-efficiency en capaciteit heeft dan R134a units, bij gebruik van kleinere compressoren. Toepassing van natuurlijke koelmiddelen noemt PepsiCo vanaf nu puur een commerciële beslissing. PepsiCo doet in 2009 veldtesten met ruim 3.000 units voor CO2 en koolwaterstoffen. Deskundigen menen dat PepsiCo snellere voortgang maakt in de ontwikkeling van natuurlijke koelmiddelen dan concurrent Coca-Cola.

McDonalds bevestigt dat het voor koeling van winkels nu vooral kijkt naar CO2. Bij IKEA is de ontwikkeling nog priller en worden zowel CO2 als ammoniak bekeken.

Same Article appeared at

Food Holland: 17 September 2008

http://www.foodholland.nl/nieuws/artikel.html?id=94177

MVO Nederland: 17 September 2008

http://www.mvonederland.nl/nieuws/7118

R744: 9 September 2008:

http://www.r744.com/article.view.php?Id=760&latest=1

Gustav Lorentzen – Refrigerants, Naturally! workshop

R744.com - 2008-09-09
Six of the world's leading consumer brands have met to discuss latest progress in using natural refrigerants in point-of-sale cooling applications. All agreed that CO2, hydrocarbons & Co. would be the way forward, calling on others to join their efforts.
The event Monday evening brought together representatives from some of the world's most renowned retail and consumer brands, united in the "Refrigerants, Naturally!" (RN) initiative. During the workshop, held within the framework of the Gustav Lorentzen Conference, The Coca-Cola Company (TCCC), PepsiCo, McDonalds, IKEA, Unilever, and Carlsberg reconfirmed their commitment to promote natural refrigerants. More than 100 participants attended the highly popular event summarizing the technical and commercial state of play in the field of non-HFCs cooling technologies.

Chairing the session, John Gummer, former UK Environment Secretary, highlighted the power of sustainable partnership between business, NGOs and the United Nations, demonstrated in the RN project: "Looking back 5 years, only few cared about refrigeration as a major source of greenhouse gas emission. Today, nobody would question climate change and the role the retail industry needs to play. The Refrigerant, Naturally! project has been a successful example of how refrigeration could be made interesting to the general public", he said.

Concerning the choice of refrigerant to avoid to leakage, Gummer stated that "it is always better to have the safer option in your system", showing its support for CO2 over HFCs.

The Presentations

Following a welcome address and Gummer's keynote speech, all RN members and the two official sponsors Greenpeace and the United Nations Environment Programme (UNEP) provided an outlook on the future of natural refrigerants in the retail industry:

UNEP: Rajendra Shende, head of the OzonAction branch of UNEP, confirmed that the RN project has proved a success with all members still actively committed to its original targets. Being in a "constant revolution", the refrigeration industry would now have to work on a further improvement of natural refrigerants' energy efficiency. Most importantly, Shende warned that if current industry trends continue, HFCs' overall contribution to global warming pollution could increase from 1.5% today to up to over 8% by 2050. F-gases could thus do as much environmental harm as all passenger cars combined today. He insisted that applying the role

model of sustainable business initiatives, such as Refrigerants, Naturally!, also to other industries would be key in preventing a further increase in HFC concentrations.

Greenpeace: Alternatives to HFCs with proven energy efficiency are already available today, and “the time to shift away from F-gases has come”, Paula Tejon from Greenpeace stated. In 2009, the green NGO will therefore focus on the elimination of all HFCs, working with regulatory bodies, driving media campaigns, and helping to bring companies working with natural refrigerants together. Greenpeace’s campaign will target specifically China and the USA.

The Coca-Cola Company: Reporting on recent progress in applying HFC-free technologies for cold drink equipment, TCCC confirmed that by end-2008, it will have a total of 40,000 CO2 coolers running. An additional 70,000 R744 units are planned for 2009-10. Latest comparisons between CO2 and R134a have shown that at 40.6°C and 75% relative humidity, CO2 is 24% more efficient than the chemical. For the 14,000 CO2 units already in service, refrigeration failures have been well below current standards for R134a, being moreover limited primarily to quality issues or peripheral devices, not the CO2 circuit.

PepsiCo: Michel Saba, also reported on positive proges on behalf of PepsiCo. Since joining the initiative in 2006, the beverage company has developed CO2 and hydrocarbons in counter top, single door and open air coolers, as well as vending machines. Field tests have shown that CO2 achieves higher energy efficiency and capacity levels than R134a units while using smaller compressors. So far, no technical problem has been recorded, making the use of natural refrigerants a purely “commercial issue” now. Before deciding about next steps, PepsiCo will field test 3000+ units for CO2 and hydrocarbons in 2009.

Interestingly, when R744.com spoke with participants after the event, there was a feeling that PepsiCo is progressing faster in their development of natural refrigerants than competitor Coca-Cola.

McDonalds / IKEA: The food chain McDonalds, having tested R744 in its restaurants already some years ago, confirmed that it is now “looking mainly at CO2”. IKEA, still in the development stage, will focus on CO2 and ammonia as the two main solutions for its retail business.

About Refrigerants, Naturally!

The Refrigerants, Naturally! Initiative was founded by TCCC, McDonalds, and Unilever in 2004. Two years later, Carlsberg, IKEA and PepsiCo joined the project to promote a shift in the point-of-sale technology towards natural refrigerants, to develop timetables to progressively replace fluorocarbons (CFCs, HCFCs, HFCs), and share technical information.

Refrige: 4 September 2008

http://www.refrige.com/industry-news/refrigerants-naturallyiniciative-organizes-technical-session-at-iir-gustav-lorentzen-conference/menu-id-2528.html

Die Kälte:

http://www.diekaelte.de/QUlEPTIwOTc1NSZOQl9CSUxEX1NFVFRJTkc9MTAzMDg5Jk1JRD0zMDAwNw.html

Gustav-Lorentzen Konferenz: Coca Cola, McDonalds, IKEA u.a. geben sich die Ehre

Vom 7. bis 9. September findet die 8. IIF/IIR Gustav-Lorentzen Konferenz zum Thema "Natural Working Fluids" in Kopenhagen statt. 137 Vorträge sind eingeplant sowie ein Seminar der Initiative „Refrigerants Naturally – It works!" und verschiedene technische Besuche. Erwartet werden über 300 Besucher.
Im Rahmen des Seminar „Refrigerants Naturally – It works!", das am 8. September stattfindet, sprechen die sechs Unternehmen Unilever, PepsiCo, Coca-Cola, McDonalds und IKEA über den Status, den natürliche Kältemittel bei ihnen einnehmen. Der Schwerpunkt liegt dabei auf den Kühlanwendungen am „point-of-sale", das heißt dort, wo die Produkte der Unternehmen verkauft werden. Außerdem werden die Industrie- und Handelsgiganten über Sicherheitsaspekte und Möglichkeiten der Anwendung von Kohlenwasserstoffen in großen Anlagen sprechen sowie über künftige Möglichkeiten, aus den HFKWs auszusteigen.

Die Refrigerants Naturally Initiative wurde in 2004 ins Leben gerufen mit der Unterstützung von Greenpeace und dem Umweltprogramm der Vereinten Nationen UNEP (United Nations Environmental Program). Die Gründungsmitglieder waren Unilever, Coca-Cola und McDonalds.

Seit 2004 und bis zum 3. Quartal 2008 hat Unilever bereits fast 300.000 Kohlenwasserstoffbetriebene Eiscremetruhen in ganz Europa, Lateinamerika und Asien eingesetzt. Coca-Cola, Carlsberg und PepsiCo haben ihrerseits über 15.000 Getränkekühlautomaten in China, Europa und Lateinamerika eingesetzt, die entweder mit CO2 oder mit Kohlenwasserstoffen als Kältemittel betrieben werden. McDonalds eröffnete in 2004 ein HFKW-freies Pilotrestaurant.

12. August 2008

ACR News:
http://www.acrnews.com/news/news.asp?id=1019&title=World+tastes+Coca%2DCola%27s+Refrigerants+Naturally+work

World tastes Coca-Cola's Refrigerants Naturally work

COCA-COLA, McDonalds and Ikea are three of the big names gearing up to face academics and suppliers to report what progress they have made towards phasing out HFC-use.

Representatives from the network of six corporate giants Unilever, Carlsberg, PepsiCo, Coca-Cola, McDonalds and IKEA will meet for the "Refrigerants Naturally-It works!" seminar in Copenhagen on September 8.

Refrigerants, Naturally! is a global initiative of companies who aim to substitute F-gases, (such as CFCs, HCFCs and HFCs) with natural refrigerants with a focus on point-of-sale cooling applications.

At the seminar, the six companies will present the status of natural refrigerant use in different point-of-sale cooling applications, the challenges faced and planned ways forward for going HFC-free.

The key issues when implementing natural refrigerants, such as safety issues and possibilities for application of hydrocarbon technology in large equipment, will also be discussed.

Alan Gerrard, global project leader at Unilever and Eskild Andersen, environmental manager at Carlsberg will speak on the subject of "Hydrocarbons - for Cleaner Greener Coolers and Freezers".

Antoine Azar, eKOfreshment program manager at Coca-Cola and Michel Saba, director of equipment development at PepsiCo will present "HFC-Free Technologies For Cold Drink Equipment"

Speakers Else Krueck, director Environment and CSR, at McDonald’s Europe and Tom Pedersen at IKEA will present "Natural Refrigerants in a Retail Environment - the IKEA & McDonald's Challenge".

Following the technical updates, a panel discussion of the corporate members will discuss case studies, lessons learned and best practices.

The Refrigerants Naturally initiative was set up in 2004 with the support of Greenpeace and the United Nations environment programme and began with three companies Unilever, Coca-Cola and McDonalds.

Since 2004 and by Q3 2008, Unilever placed nearly 300,000 hydrocarbon-based ice cream cabinets throughout Europe, Latin America and Asia. More than 15.000 bottle vending machines were installed in China, Europe and Latin America by Coca-Cola, Carlsberg and PepsiCo, (either operating with CO2 or hydrocarbon as refrigerant).

In 2004, McDonalds opened a HFC-free pilot restaurant which allowed the fast food giant to monitor and test HFC-free equipment and performance.

The "Refrigerants Naturally" seminar takes place at the Gustav Lorentzen conference on Natural Working Fluids in Copenhagen.

http://www.raglanroadplaygroup.co.uk/green-news.html?news_id=6679

Green News: Corporates outline progress on CFCs

Article Date: Thursday 14th August 2008

Coca Cola, McDonalds and Ikea are three of the big names gearing up to face academics and suppliers to report what progress they have made towards phasing out HFC-use.

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In 2004, McDonalds opened a HFC-free pilot restaurant which allowed the fast food giant to monitor and test HFC-free equipment and performance.

The "Refrigerants Naturally" seminar takes place at the Gustav Lorentzen conference on Natural Working Fluids in Copenhagen.

Source: edie.net

Same Article on

http://www.edie.net/news/news_story.asp?id=15127.

http://www.acrnews.com/news/news.asp?id=1019&title=World+tastes+Coca%2DCola%27s+Refrigerants+ Naturally+work

http://www.raglanroadplaygroup.co.uk/green-news.html?news_id=6679

May 2008

http://www.greenbiz.com/news/2008/05/28/coca-cola-deploy-hfc-free-coolers

Coca-Cola to Deploy 100K HFC-Free Coolers

By GreenBiz Staff
Published May 28, 2008

BEIJING, CN -- The Coca-Cola Co. plans by 2010 to have 100,000 hydrofluorocarbon-free refrigerators and vending machines operating around the world.

The announcement came from CEO Neville Isdell at a Greenpeace-organized conference in Beijing this week, according to Cox News Service.

The machines will be cooled with compressed carbon dioxide instead of hydrofluorocarbons (HFCs), which are more potent than CO2 in terms of trapping heat. Coca-Cola operates about 10 million vending machines and coolers worldwide.

Coca-Cola has spent about $40 million researching cleaner cooling technology, and has deployed HFC-free vending machines at major events in recent years.

For the Athens 2004 Summer Olympics, Coca-Cola, along with Unilever, McDonald's, Greenpeace and the United Nations Environment Program, created the Refrigerants Naturally coalition to eliminate the use of HFCs.

Coca-Cola used HFC-free machines for the Torino 2006 Winter Olympics and the 2006 World Cup. The company has committed to using only HFC-free coolers for the Beijing 2008 Summer Olympics. For the event, Coca-Cola will deploy more than 6,300 units that have HFC-free insulation and refrigerant along with technology to make them 35 percent more energy efficient than previous vending machines.

April 2008

Cooling: Rethinking Refrigerants
Appliance Design Magazine
Posted: April 1, 2008

Global warming concerns creating divergent paths.

The first major phase change for refrigerants has not even been completed yet and already many are urging yet another. The long, hard, costly journey away from ozone-depleting chlorofluorocarbons (CFCs), which began in the early 90s, continues, with a 2010 step down in production and eventual phase out of hydrochlorofluorocarbon (HCFC)-22 refrigerant in new HVAC/R applications. But soon after hydrofluorocarbons (HFCs) became the established alternative, many in Europe began urging yet another costly, arduous trek – away from HFCs and toward "natural refrigerants." The igniter behind all the commotion is the hot topic of the day – global warming.

HFC refrigerants have no chlorine on the molecule, which gives them a zero ozone depletion potential (ODP) versus chlorine-containing refrigerants like CFC-12 (ODP=1) or HCFC-22 (ODP=0.05). But the new environmental concern in the air, global warming, casts HFCs in a less favorable light due to their relatively high global warming potential (GWP) values. While the change from CFCs to HFCs drastically reduced refrigerant-related contribution to global warming (for example, one kg of CFC-12 has the same global warming contribution as 8500 kg of CO2 while one kg of HFC-134a is equivalent to 1400 kg of CO2), the intensifying focus on global warming has created pressure to find alternatives with even lower GWPs including use of natural refrigerants like CO2, hydrocarbons and ammonia which have no ODP and very low GWP.

While many European air conditioning and refrigeration manufacturers are hot on natural refrigerants, North American OEMs are cool to them. On this side of the pond, the industry is satisfied with HFCs. The industry here is happy with HFCs performance and their ability to work with most of today's equipment designs. More importantly, OEMs here are leery of investing in another costly conversion adventure for what they see as negligible return.

"There is quite a divide between and across the Atlantic," says Daniel Colbourne, a refrigeration consultant with Refrigerants, Naturally!, a European-based initiative promoting the use of natural refrigerants. When the CFC phase-out was being considered, natural refrigerants were considered as a replacement, but the alternatives that were considered – ammonia and hydrocarbons – are flammable and toxic and in North America this led to safety concerns and litigation fears, he says. Those refrigerants were put on the back burner while HFCs became the prominent material. In Europe R&D on these fluids and their implementation were ongoing. In fact, more than 200 million refrigerators in Europe are charged with isobutane, a natural hydrocarbon refrigerant, Colbourne says.

Still, HFCs are the dominant alternative to CFCs because they are a proven and established efficient technology. HFC-134a has replaced CFC-12 and is now used extensively in refrigerators and mobile air conditioners (MAC). Other HFCs, like HFC-410a are replacing HCFC-22 in unitary air conditioning systems and HFC-404a is the alternative for commercial refrigeration applications. At the recent AHR Expo, a number of HVAC/R companies released

new equipment using HFC-based refrigerants including Amcor, HeatCraft, Johnson Controls, and Lennox.

And, the use of HFCs is growing, especially as the final deadlines for CFC and HCFC phase out rapidly approaches. Kevin O'Shea, North American marketing manager for DuPont Refrigerants, says that today's HFC products such as DuPont's Suva R-404A are environmentally acceptable because they have no ODP, they work efficiently with little energy waste, and can use existing design platforms.

Echoing this idea is Peter Geosits, Americas Commercial Director for INEOS Fluor Americas in St. Gabriel, La., who says that R-134a, a refrigerant that his company sells, is a non-ozone depleting, non-toxic fluid that can be used in a range of applications today from automotive A/C to residential refrigerators and air conditioners.

For those worried about GWP, Geosits says that the industry has already reduced GWP with the HFC products. "CFCs were very potent global warmers and when replacing them with HFCs there was a reduction in GWP on the order of 7 to 8 fold," he says.

Another manufacturer that believes that there is a place for HFC refrigerants is Arkema, a Paris-based refrigerant supplier with U.S. operations based in Philadelphia. The company produces R-410a refrigerant, which the company markets as Forane 410A. R-410a is a blended-HFC refrigerant that uses a 50/50 blend of R-32 and R-125, and is a replacement for R-22. R-32 is a highly efficient refrigerant, but slightly flammable, and R-125 is completely non-flammable, which helps to neutralize the flammability issues regarding R-32, says Craig Thomas, market manager for Arkema's North American refrigerants. The R-32 is made at the company's new plant in Calvert City, Ky., and in 2010 Arkema will make the R-125 component in China in a joint venture with Daikin.

Forane 410A has zero ODP and a GWP of 1,890. It has a boiling point of –61.6 DegF. He adds that R-410A does have a higher operating pressure than R-22, and may require changes to compressors, condensers and other components.

While Arkema's product does have a GWP rating, Thomas says that it is a highly efficient product, which cuts down on indirect emissions, and is safe and non-toxic. "GWP is obviously on our minds because fluorocarbon chemicals have a GWP and they might be a target for a phase out," says Thomas. "And, we are developing low-GWP products. But, the products we have now are good products for today's users. Not for 10 or 15 years down the road."

The group Refrigerants Naturally! is pushing for faster implementation of natural refrigerants. The group was cofounded by The Coca-Cola Company, Unilever and McDonalds, and now counts PepsiCo, Carlsberg and IKEA as members. According to Linda Ederberg of the Refrigerants, Naturally! Secretariat, natural refrigerants are cheap, easily available, and are climate and ozone friendly. She says that the practice among the members of Refrigerants, Naturally! has demonstrated the safe use of natural refrigerants and that they can be more efficient than HFCs.

The natural refrigerants family includes carbon dioxide, ammonia and hydrocarbons, which can include isobutane and propane.

Carbon dioxide has no ozone depletion potential (ODP = 0) and negligible direct global warming potential when used as a refrigerant in closed cycles. It is more efficient at lower ambient temperature. (HFCs tend to be more efficient at higher ambient temperatures relative to CO2.) Carbon dioxide has a GWP of 1 as compared to 1,430 for R-134a.

Ammonia has no ODP and zero GWP. Ammonia is toxic and flammable, but these characteristics have proven to be controllable. In the U.K. and elsewhere in Europe, ammonia is often used in a secondary coolant system in which the material is used in an externally located chiller, which cools a secondary refrigerant such as a glycol, brine, or CO2, which is then pumped around a secondary circuit to display cases and cold rooms. Supermarkets in the UK such as Tesco, Sainsbury's, ASDA/Wallmart, and Marks & Spencer have committed to such an approach, says Colbourne.

Hydrocarbons are flammable refrigerants and include propane (R-290), isobutane (R-600a) or hydrocarbon blends as working fluids in their equipment. The hydrocarbon refrigerants have no ODP. The GWP rating is considered negligible. Most hydrocarbon refrigerants have a GWP of <3. They are often used in applications that require low temperature levels, which is one of the reasons that companies such as Unilever selected the hydrocarbon, propane.

Suppliers of fluorocarbons, or F gases, agree that natural refrigerants have direct low GWP emissions, but claim that that doesn't tell the whole story. They claim that natural-refrigerant based systems are less efficient, and thus require more energy to run them. They point to Life Cycle Climate Performance as a better measure of global warming potential because it takes into account both direct and indirect effects. An appliance with a low-GWP hydrocarbon refrigerant can still have a total high GWP value if it is inefficient and causes more indirect CO2 emissions at the power plant.

According to a policy statement from INEOS Fluor regarding refrigerants, the main environmental impact of most refrigeration systems is the amount of energy that they use. On average, 80 percent of the climate impact from refrigeration and air conditioners is caused by indirect emissions of carbon dioxide. The energy efficient properties offered by HFCs are a significant advantage to designers, the company says.

Fluorocarbon suppliers also point to some of the engineering challenges involved with natural refrigerants, such as the high operating pressure required for carbon dioxide, which would require redesign of cooling systems. C02 has dramatically higher operating pressures even compared with other natural refrigerants and these differences grow with increases in ambient temperature. For instance, at –69 DegF, the C02 pressure is 76.6 psia, while ammonia is 4.078. At –40 DegF, the CO2 pressure is 145.69, as compared to 10.093 for ammonia.

Still, HFC refrigerant suppliers are aware of the GWP issues and a number of companies are already working to develop low-GWP refrigerant products. These products will initially be used for the automotive industry in the European Union, an industry that faces an EU deadline of 2011 to phase out HFC -134a refrigerant use in cars. INEOS Fluor is working on such a refrigerant that it believes will have a GWP below the 150 threshold for automotive refrigerants used in new cars that was set by the European Union's F-Gas regulation.

In March 2007, DuPont announced a joint development agreement with Honeywell to develop a low-GWP refrigerant for use in the automotive air conditioning industry in Europe. They are working with automotive OEMs on the development and commercialization of hydrofluoro-olefin (HFO)-1234yf, which would meet the European Union's 2011 MAC Directive and could potentially replace HFC-134a in MAC systems. The HFO-1234yf has a GWP of 4 so it is close to C02, says O'Shea. "The results are very similar to R-134a, so we could use it without having to make drastic changes to the car's design that would add weight and create servicing challenges," O'Shea says. "This same technology could also be applied eventually to

stationary air conditioning and refrigeration applications."

Despite these efforts, the drumbeat to replace HFCs with natural refrigerants can be heard. Denmark, in 2007, passed a law that limits an HFC charge and Austria is following suit. In the U.S., California has targeted HFC emissions from cars and commercial refrigeration. According to a report by the California Air Resources Board, approximately 500,000 vending machines are in use in California that have leak rates of about 30 percent per year or about 2.7 MMTCO2 (million metric tons of carbon dioxide). These could be a target application for a low GWP refrigerant.

Perhaps the biggest push is coming from those companies that come closest to dealing with consumers such as Unilever and The Coca-Cola Company.

The Coca-Cola Company is working to phase-out HFC refrigerant-based equipment and replace it with CO2 equipment. The company is focusing on emissions from its vending machines and coolers after an audit of their carbon footprint. What they found surprised them, says Bryan Jacob, energy and climate protection manager for The Coca-Cola Company. They found that equivalent CO2 emissions from this type of equipment far outstripped emissions from manufacturing and fleet operations. In 2000, more than 15 million metric tons equivalent of carbon dioxide was released from this source as compared to about 5 MMT from the company's 900 manufacturing operations, and 3 MMT from the company's 200,000 diesel-powered trucks.

This led the company into making cabinet and refrigeration efficiency a priority. They looked at all of the refrigerants on the market and chose CO2 after conducting a survey analyzing the worldwide regulatory landscape. They felt that CO2 would be the best refrigerant in the long-term.

In efficiency testing, natural refrigerants did better than they initially expected, says Jacob. He says that the CO2 systems compared to the HFC systems were 4 to 7 percent better. Their testing found that CO2 systems work better at somewhat lower ambient temperatures, below 35 DegC, than did the HFC systems.

While Coca-Cola chose CO2, Unilever chose the hydrocarbon, propane. In 1994, Unilever, one of the world's biggest ice cream manufacturers, was one of the first company's to transition to HFC-based freezer cabinets and have already moved to phase these systems out. By the end of 2007, about 200,000 hydrocarbon-based freezer cabinets were installed throughout Europe. According to the company, lab tests suggest these hydrocarbon cabinets are energy efficient, using up to 12-17 percent less energy than previous units. According to Alan Gerrard, Unilever's Global Project Leader for this project, field-testing showed efficiency gains of around 9 percent.

While the company had planned all along to phase out HFCs, it was uncertain about which natural refrigerant to choose. After testing many alternatives, they decided to back propane for a couple reasons. As an economic decision, they chose propane because at the time there were a large number of low-cost compressors on the market that could handle the natural refrigerant as compared to CO2 compliant compressors, which were not as available and cost more.

The second, more important reason, dealt with thermodynamics. Gerrard says that to reach the operating temperature that they require (–18 DegF) using a CO2 system would have meant using two compressors in order to reach the same energy efficiency as the hydrocarbons.

When choosing propane, they were initially concerned about safety issues. "The first question we had was the flammability of the refrigerant," he says. "But, we knew that isobutane and

propane have approximately the same flammability rating and that in the year 2000, there were about 120 million domestic refrigerators and freezers using isobutane and we weren't aware of any accidents."

Unilever undertook a number of risk assessments before the introduction of the hydrocarbon cabinets. The company also did leak testing and found that the leak rates for hydrocarbons in operation were "very, very low," he says, in line with HFC refrigerated cabinets.. Leak rates are in the range of grams per year, he says, and at this rate it was highly unlikely that flammable mixtures could be formed.

Unilever's environmental work is not just a matter of good citizenship, but economics and it may point to a new paradigm for the industry – making design and engineering decisions based on the impact of a consumer's awareness of how well a company acts as an environmental steward.

"In the early stages of the program, the consumer was less strongly in mind," says Gerrard, "But it has become clear to us that consumers are demanding more from our products than just quality and value, they are also looking for companies that are aware of their impact on society and the environment."

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Ineos Fluor email: KleaUSwebmail@ineosfluor.com

April 2008

Press Coverage on the Technical Seminar at the China Refrigeration Expo, Shanghai

China Appliance, one of the most influential appliance magazines in China,
China CCM.com (China Commodity Marketplace website), the biggest industrial information exchange platform,
Canwest News Service, a national news agency with correspondents in Canada, Europe, Asia and the United States and part of the Canadian newspaper chain owned by Canwest,
China Construction Heating & Refrigeration, the magazine published by the Information Centre of Ministry of Construction, China,
China Appliance Technology Magazine, and
Shanghai Science and Technology Newspaper.

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