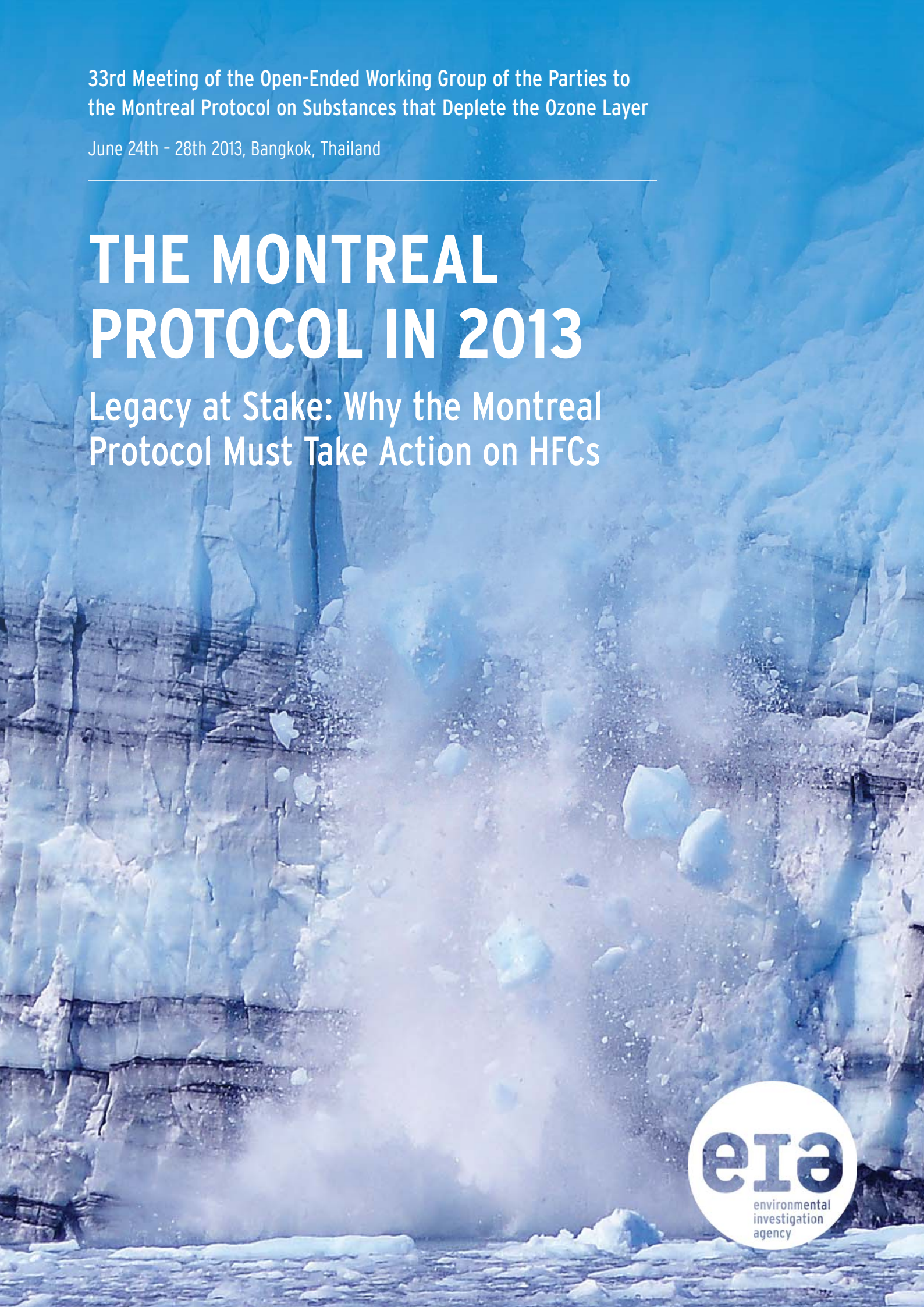
33rd Meeting of the Open-Ended Working Group of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer

June 24th – 28th 2013, Bangkok, Thailand

THE MONTREAL PROTOCOL IN 2013

Legacy at Stake: Why the Montreal Protocol Must Take Action on HFCs



environmental investigation agency

ABOUT EIA

EIA is an independent campaigning organisation committed to bringing about change that protects the natural world from environmental crime and abuse. As part of our work, we have undertaken groundbreaking investigations into the illegal trade in ozone depleting substances (ODS) and have been closely involved in the international ozone and climate negotiations for well over a decade.

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Gothab Glacial Flow, Greenland

A LEGACY AT STAKE

This year, the planet passed a dangerous milestone when atmospheric levels of carbon dioxide exceeded 400 parts per million,[1] prompting the scientific community to advocate renewed vigour in efforts to combat climate change, and the UNFCCC's Executive Secretary to call for a "policy response which truly rises to the challenge".[2]

Analysis has shown that there is a gap of 8-13 gigatonnes of CO_2-equivalent emissions ($GtCO_2e$) between the reductions required to limit global temperature rise to 2°C by 2020 and countries' current pledges under the Climate Convention.[3] As many of us are experiencing first hand, when the global temperature rises, the incidence of extreme weather events and other climate change impacts also increases, usually with dramatic results.

This reality presents us with a stark choice: we can either take drastic action now to rein in our greenhouse gas emissions or face a future of massive and escalating disruption to the planetary ecosystem. Against this backdrop, hydrofluorocarbon (HFC) emissions continue to rise at a rate of 10-15% per year.[4]

And yet in 2013, we have a unique window of opportunity to solve a big piece of the climate puzzle. The recent landmark agreement by the US and China to work together "using the expertise and institutions of the Montreal Protocol to phase down the production and consumption of HFCs" sends an important signal, as do ongoing discussions under the UNFCCC. In Europe, the review of the F-gas Regulation is expected to transform the domestic market, creating new commercial opportunities for the providers of alternatives to HFCs everywhere. Voluntary initiatives undertaken in the commercial refrigeration sector also demonstrate the business case for switching away from HFCs.

If we take the right decisions now, we could be on the cusp of the most significant climate protection step to date. Unfortunately, the draft report by the TEAP providing Additional Information on Alternatives to Ozone Depleting Substances (ODS) misses major aspects of this potential. The increasing availability of low-GWP alternatives to HCFCs and HFCs has made it feasible to now convert entire sectors (e.g., foams, mobile air conditioning, domestic, commercial and industrial refrigeration) to low-GWP compounds and technologies.[5] In reality, there are no longer any technical reasons for Parties to delay

action to control HFCs; the final version of the TEAP report must make that very clear.

As ever, adequate funding will play a pivotal role in ensuring that outcomes match ambition. This applies as much to efforts enabling countries to leapfrog HFCs as it does to the outstanding problem posed by the accumulation of ODS and HFCs in banks. Indeed, continued faith in the Montreal Protocol "model" hinges on the provision of sufficient funding to accomplish its objectives. Without a strong and rapid international response to this crisis-in-the-making, there is a very real possibility that our atmosphere will reach a point of no return. EIA calls on all Parties to work expeditiously to ensure the Montreal Protocol lives up to its legacy as the most effective global environmental treaty and rids the world of fluorinated super greenhouse gases, including HFCs.

THE AMENDMENT PROPOSALS

HFC emissions are predicted to reach between 5.5 and 8.8 $GtCO_2e$ by 2050 under a business-as-usual scenario, but countries have an opportunity to act now to begin phasing out these super greenhouse gases.[6] Proposals to amend the Montreal Protocol to regulate the production and use of HFCs have been tabled every year since 2009 by Micronesia, and by Canada, Mexico and the United States. Enacting an HFC phase-down on the basis of these proposals is the most significant, immediate and cost effective prospect for combating climate change currently available.

Despite the fact that there has been no formal discussion of the Amendments to date, nations around the world have recognised the importance of phasing down HFCs. Earlier this month the United States and China released a landmark statement pledging to discuss HFCs under the Montreal Protocol:

"*Regarding HFCs, the United States and China agreed to work together and with other countries through multilateral approaches that include using the expertise and institutions of the Montreal Protocol to phase down the production and consumption of HFCs, while continuing to include HFCs within the scope of UNFCCC and its Kyoto Protocol provisions for accounting and reporting of emissions.*"[7]

Additionally, at last year's Rio+20 summit, Parties signed a declaration, which stated:

"*We recognize that the phase-out of ozone depleting substances (ODS) is resulting in a rapid increase in the use and release of high global warming potential hydrofluorocarbons (HFCs) to the environment. We support a gradual phase-down in the consumption and production of HFCs.*"[8]

Nonetheless, and despite the fact that global HFC emissions are expected to rise to 9%-19% of CO_2 emissions by 2050,[9] countries have so far failed to take any meaningful international action on HFCs.

Recent developments indicate that the situation may be evolving. At UNFCCC negotiations, Parties have been discussing regulating HFCs under the Montreal Protocol as part of Workstream 2 of the Ad-Hoc Working Group on the Durban Platform for Enhanced Action (ADP-2), which is focusing on ways of enhancing pre-2020 mitigation ambition. As part of the work being carried out under ADP-2, the UNFCCC Secretariat has produced a technical paper which sets out initiatives and actions to enhance mitigation ambition.[10] Phasing down HFCs under the Montreal Protocol is one of the main actions identified as a means of reducing the gigatonne gap.

While the Amendment proposals set out slightly different timelines and baselines, both achieve essentially the same level

BELOW:
In June this year, US President Barack Obama and Chinese President Xi Jinping agreed that their two countries would work together to phase down the production and consumption of HFCs.

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"Parties should convene a formal Contact Group to negotiate the terms and conditions of an HFC Amendment."

and quantity of emissions reductions by 2050. They also call for a combined HCFC and HFC baseline in recognition of their similar and largely interchangeable nature, and as a means of allowing Parties more flexibility in meeting reduction levels.[11] Additionally, the Amendments address HFC-23 by-product destruction that is not currently covered by the CDM. They make it clear that the emissions reductions achieved through a phase-down of HFCs would remain in the Kyoto Protocol "basket" of gases.[12]

The need for early action to curtail HFC emissions is critical, particularly in Article 5 countries where soaring demand for refrigeration and air-conditioning has the potential to trigger a huge rise in HFC consumption. Passing an amendment to the Montreal Protocol now to phase out HFCs reduces the likelihood of developing countries transitioning to unsustainable, high-GWP replacements for ODS that will be more costly and difficult to mitigate in the future.

RECOMMENDATION:

- At this meeting, Parties should convene a formal Contact Group to negotiate the terms and conditions of an HFC Amendment, with a view to agreement at the 25th Meeting of the Parties in October 2013

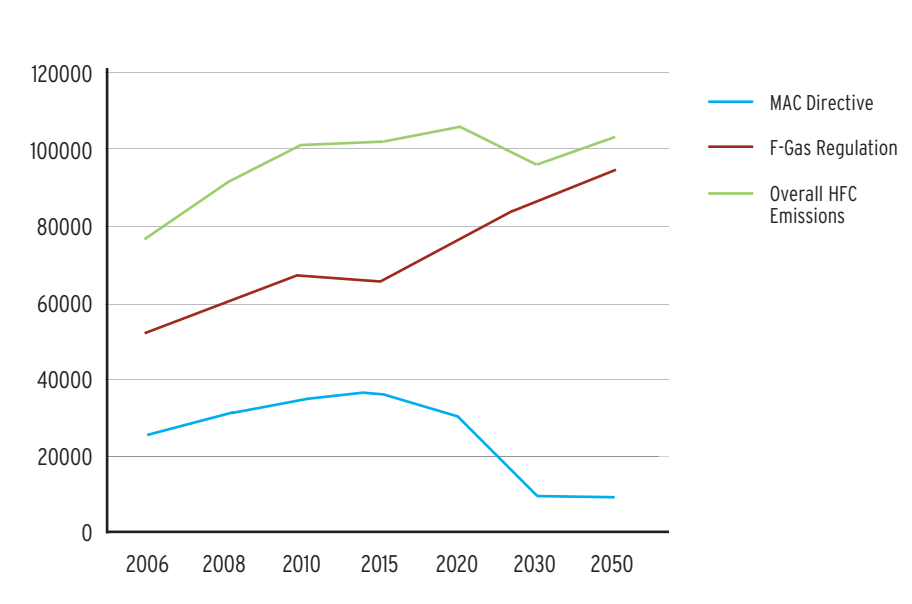
EU CONSIDERS HFC PHASE-DOWN AND BANS

As a result of its early action on HCFCs,[13] the EU saw a sizeable increase in HFC emissions beginning in the early 2000s. This led to the adoption of the EU Regulation on Certain Fluorinated Gases[14] (commonly referred to as the F-gas Regulation), which sought to rein in emissions from stationary refrigeration and air-conditioning equipment through a combined focus on containment and recovery of these gases. Additionally, the MAC Directive banned the use of HFCs over a GWP of 150 in passenger cars, starting in 2011 for new types of cars and in 2017 for all new vehicles.[15]

A review conducted on behalf of the European Commission in 2011 highlighted the significant shortcomings of the containment and recovery approach, showing that that the F-gas Regulation had failed to deliver adequate reductions in emissions of HFCs, and that it would continue to fail unless it was comprehensively revised.[16]

The study found that in the best case scenario of full implementation of the Regulation and the MAC Directive, EU F-gas emissions would only stabilise at around the current level of 110 $MtCO_2e$, an increase of 20% from 2006 when the legislation was adopted.

FIGURE 1: IMPACT OF F-GAS REGULATION AND MAC DIRECTIVE ON HFC EMISSIONS IN THE EUROPEAN UNION IN 2006-2050 (Kt CO_2e)*



* See Öko-Recherche Study, p. 159 (derived from Table 5-2 with-measures (WM) scenario with the MAC Directive comprising the "Mobile A/C" sector and the F-Gas Regulation comprising all other sectors minus "SF6 users" and "PFC and Haloprod," which are assumed to include non-HFC emissions or those associated with halocarbon production, namely HFC-23).

© Torea Jade

ABOVE:
Natural Refrigeration.

In fact, considering only the F-gas Regulation, the future emission scenarios showed an 82% increase in HFC emissions from stationary equipment by 2050, more than offsetting all the emissions cuts being delivered through the bans in the MAC Directive.[17]

Faced with these facts, the European Commission published a proposal for a revised EU F-gas Regulation in November 2012.[18] This contained a range of measures to reduce emissions of HFCs, including a cap and phase down of 79 per cent by 2030, and bans on the use of HFCs in hermetically sealed domestic and commercial refrigeration and air-conditioning systems.

The proposal, which omitted a number of key measures,[19] has since been strengthened by the European Parliament, which on 19th June 2013 voted to ban most sources of HFCs in new equipment by 2020,[20] a measure which multiple studies have shown to be possible.[21] The Regulation remains in the hands of the European Parliament and Member States, with agreement on the final text expected in early 2014.

Once adopted, the effects of the Regulation are likely to be felt well beyond the borders of the European Union as it will create EU demand for alternative technologies, spurring innovation and economies of scale in other markets. This will in turn reduce the cost of a global phase-out of HFCs as well as providing impetus for an international agreement on reducing HFC emissions.

DECISION XXIV/7 TASK FORCE REPORT ON ADDITIONAL INFORMATION ON ALTERNATIVES TO ODS

Decision XXIV/7 of the Twenty-fourth Meeting of the Parties requested the Technology and Economic Assessment Panel (TEAP) to prepare a draft report on alternative refrigerants and technologies for consideration at OEWG 33, leading to a final report at MOP 25. The TEAP was requested to describe "all available alternatives to ozone-depleting substances that are commercially available, technically proven, environmentally-sound, taking into account their efficacy, health, safety and environmental characteristics, cost-effectiveness, and their use including in high ambient temperatures and high urban density cities" as an update to information provided in previous reports.

EIA has studied the draft submitted by the TEAP in May[22] and finds it unsatisfactory in several respects. While we fully acknowledge the limited time available and the fact that the report is not yet final, we are concerned at the failure to include concrete data and case studies in support of some of the assumptions. In particular, the section on commercial refrigeration paints a completely erroneous picture of recent developments in the sector, creating the impression that there is only a limited range of options available to end-users seeking to replace ODS in retail

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ABOVE:
Domestic refrigeration.

TOP:
Commercial refrigeration.

equipment. EIA has therefore compiled supplementary information on each of the major sectors addressed in the report (domestic and commercial refrigeration, air conditioning, foams and solvents) based on our own research.

Domestic Refrigeration

As the draft Task Force report notes, HC-600a (isobutane) is the "ideal refrigerant" for domestic refrigeration units given its higher energy efficiency and reduced noise levels compared with HFC-134a. Over the past two decades, and in the wake of a groundbreaking initiative pioneered by Greenpeace,[23] there has been a rapid and highly successful conversion of 50% of the global domestic refrigeration sector, with most of the remainder running on HFC-134a. The US EPA's decision to approve HC-600a, HC-290 (propane) and the HC-441A blend (ethane, propane, butane and isobutane) as acceptable hydrocarbon alternatives in household and small commercial refrigerators and freezers in December 2011,[24] opens the US market to hydrocarbon refrigeration and freezers, but a specified charge size equivalent to half that employed in the rest of the world will unfortunately prevent a massive conversion to hydrocarbons in the US. This outdated charge size standard must be revised, as universal adoption of hydrocarbon refrigerants in this sector would yield significant climate benefits.[25]

In light of the increasing prevalence of hydrocarbons in domestic refrigeration, there is no justification for the assertion on page 25 of the Task Force report that "Since HFC-134a is well established, it is evident that there are no significant barriers to its use. It is likely that HFC-134a will continue to be a dominant option in domestic refrigeration appliances for a number of years."[26] The TEAP should acknowledge that with the unquestionable availability and efficiency of low-GWP alternatives, the high GWP of HFC-134a (1,034) is a barrier to its continued use as an alternative to ODS in domestic refrigeration.

Commercial Refrigeration

The Task Force report's chapter on commercial refrigeration similarly fails to demonstrate the full range of alternatives that are already available in the sector. This is unfortunate given the leading role the retail sector has played in pioneering HFC-free refrigeration, notably in Europe but also elsewhere in the world.

Over the past five years, EIA has documented impressive progress in supermarkets' efforts to move away from using HFCs in all types of equipment, from small stand-alone fridges to large centralised systems. In addition, multiple studies have identified numerous technically feasible, safe and energy efficient alternatives already in use.[27] The alternatives vary for each application, but mostly consist of natural refrigerants such as isobutane, propane, carbon dioxide and ammonia whose benefits are being proven in every region of the world.[28]

Historically, about one-quarter of supermarkets' carbon footprint has come from the cooling gases used in their refrigeration systems. However, a group of forward-thinking companies within the Consumer Goods Forum have spearheaded a change of direction in the industry, leading to a sector-wide move away from HFCs. Across Europe, and increasingly in other regions around the world the retail sector is switching to CO_2, hydrocarbons and ammonia – which have been proven to work efficiently across a range of climatic conditions. Concerns about the flammability of hydrocarbons have been dealt with by ensuring that charge sizes are kept low, or by using them in cascade systems, and by taking appropriate safety precautions. Ammonia is increasingly being used in cascade systems with CO_2, water and glycol so that it does not have to enter the occupied space. In the case of CO_2, where the primary concern has been energy efficiency, there has been a major focus on system design, allowing supermarkets to at the very least 'break

even' (from an energy consumption perspective) and often reduce energy use by a significant amount.

Since 2009, EIA has produced an annual report ("Chilling Facts") on supermarket refrigeration detailing retailers' efforts to reduce the climate impact of their refrigeration and cooling systems.[29] The following section provides some early examples taken from this year's survey, which will be published in full in September 2013.

Switzerland has enacted measures banning HFCs in most sectors, including commercial refrigeration.[30] As a result, Swiss retailers are swiftly replacing HFC-based equipment with systems running on alternative refrigerants. All newly built and refurbished **Coop Schweiz** stores use CO_2 systems for cooling and a quarter of their stores are already running on this technology, reducing their energy needs by about 30% (see Figure 2). They report no loss in efficiency on warmer days and plan to have all their retail stores equipped with 100% CO_2 by 2023. Their new distribution centres will rely upon ammonia, rather than HFCs.

Marks & Spencer (UK) are also making progress on their commitment to operate entirely without HFCs by 2030. Since 2010 all new builds are installed with CO_2 refrigeration systems, amounting to 10% of their 740 UK and Republic of Ireland stores so far. They are trialling further HFC-free systems for their stores and transport fleet.

Tesco (UK) is committed to CO_2 systems in all new super-stores and 'extra' stores. In June 2013, CEO Philip Clarke announced that the Group would double the number of these systems in the UK this year.[31] On average, Tesco has found that across Europe their HFC-free systems use 5% less energy than HFC systems.

HFC-free technologies are being successfully developed and trialled by many other retailers and manufacturers across the world. **Coca-Cola** report[32] that their CO_2 systems are more energy efficient than HFC ones, even when operating in 40°C ambient temperatures, and as of 2015 100% of their new vending machines and coolers will be HFC-free.[33] Similarly, Japanese retailer **AEON** reports energy savings in all its HFC-free stores, which use CO_2 transcritical refrigeration, regardless of climate.[34]

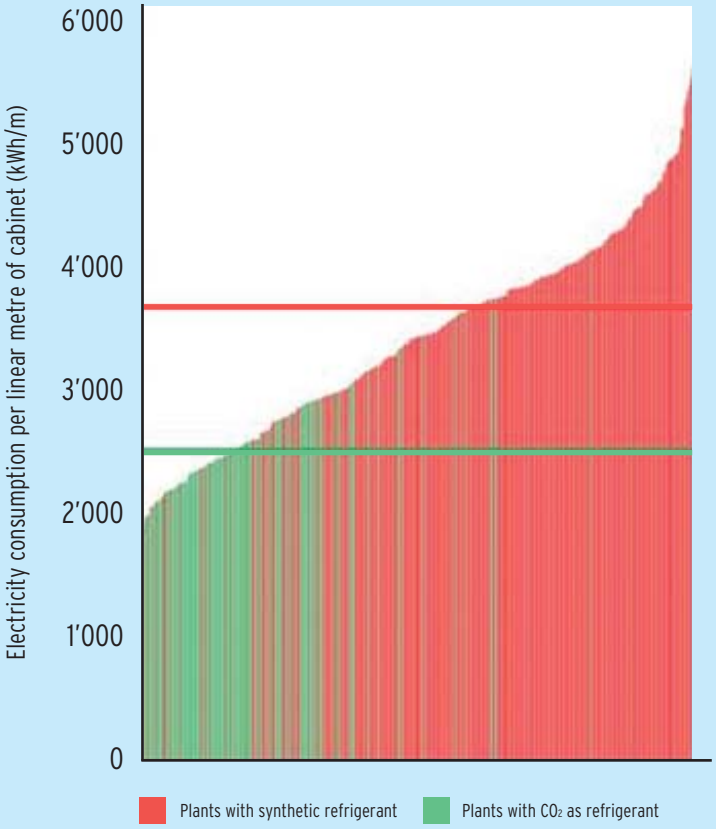
In 2011, **Carrefour** (France) estimated refrigerant leakage accounted for over 40% of its carbon footprint. Since then, they have begun installing HFC-free systems in a number of stores, including the first CO_2 transcritical system in Turkey which offers significant economic benefits through reduced energy bills and a reduction in the cost of refrigerants.[35] This year an additional 30 new stores in Europe will run entirely on CO_2.

In 2010, the Consumer Goods Forum declared plans to begin phasing out HFC refrigerants as of 2015 and replace them with HFC-free refrigerants where legally allowed and available for new purchases of point-of-sale units and large refrigeration installations. With over 650 members from retail, manufacturing and service providers across 70 countries a commitment of this scale will have a global effect on the proliferation of HFC-free technology

The TEAP Task Force report notes that "Choosing hydrocarbons usually requires a "policy" decision of the commercial chain management". While that may have been true several years ago, the

FIGURE 2: ENERGY EFFICIENCY COMPARISON OF HFC REFRIGERANTS VERSUS CO_2 SYSTEMS IN COOP SCHWEIZ STORES, EXHIBITING AN AVERAGE ENERGY SAVING FOR CO_2 SYSTEMS OF ABOUT 30%.

Source: Coop Schweiz



"Companies in several large emerging economies are investing heavily in HC-290 technology as an alternative in the air conditioning sector."

commercial refrigeration landscape looks very different today, with retailers branching out into alternative refrigerants for economic reasons. Today there is a clear business case for moving away from ODS and HFC-based refrigerants.

Air conditioning

The air-conditioning section of the Task Force report is far more detailed than the chapter on refrigeration, with a focus on HC-290 as a good replacement for various applications, both in terms of costs and energy efficiency.[36]

Companies in several large emerging economies are investing heavily in HC-290 technology as an alternative in the air conditioning sector. For example, China has committed to converting some 18 production lines from HCFC-22 to HC-290 by 2015.[37] Based on this initiative, supported by UNIDO and GIZ, the Deputy Manager at China's Ministry of Environmental Protection (MEP/FECO) in Beijing recently stated that "[HC-]290 will eventually be used in 70% of RAC production (annual capacity of 5 million HC AC units)."[38]

In India, Godrej, one of the largest suppliers of home appliances in the country, has launched the Godrej EON Green Balance range of 5-star air conditioners, which not only exceed the energy saving rating specified by the Bureau of Energy Efficiency (BEE) for 2012 but also surpass the ratings specified for 2014 standards.[39] Godrej reports that the new product saves 23% more energy than other 5-star products currently on the market. One production line will produce approximately 180,000 units per year. This will lead to combined direct and indirect emissions savings of approximately 1 million tonnes CO_2e (based on a product lifetime of 10 years).[40]

Mexico has also seen a voluntary move towards the use of hydrocarbons in the air conditioning sector, based on energy efficiency gains.[41]

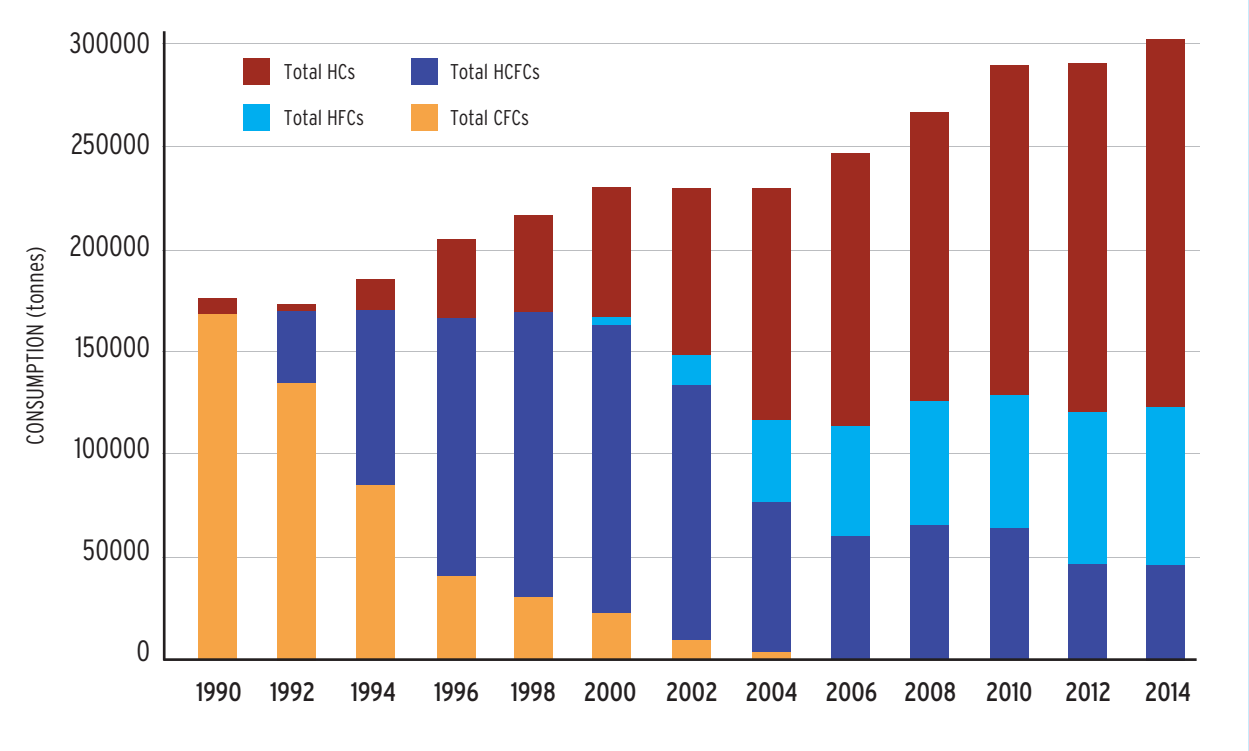
Foams

Global HFC consumption in the building/construction foams sector accounted for approximately 38 $MtCO_2e$ in 2010, with 98% of the consumption attributed to developed countries.[42]

A variety of climate-friendly alternatives to HCFCs and HFCs exist for use in the foams sector. For production of XPS board, hydrocarbon alternatives already comprise more than half of the global market, while CO_2 is also being used. Similarly, for PU rigid foams,

FIGURE 3: GLOBAL TRENDS IN BLOWING AGENT CONSUMPTION 1994-2014

Source: TEAP Task Force Report, p.53



hydrocarbons are being used to produce panels, boardstock, block, and pipe-in-pipe foam. Methyl Formate is also starting to acquire significant market share.[43]

Figure 3 displays the high market penetration of hydrocarbon foams over the last decade. The optimisation of these technologies has resulted in improvements in thermal performance and has been proven effective in meeting even the strictest energy efficiency requirements for foams.

While developing countries have been addressing the use of HCFC-141b in foams as a priority under the accelerated HCFC phase-out, and are predominantly transitioning to HFC-free alternatives, North American countries still primarily use HFCs.

With developed country HPMPs now well into their final phase, it is clear that Article 2 countries have made significant conversion to HFC technologies in sectors where Article 5 Parties are routinely converting to low-GWP alternatives. Article 2 countries need to take regulatory action to convert these industries as soon as possible, given the availability of alternatives and the extremely low recovery rate for HFCs in foams at end-of-life.

Solvents

More than 90% of ODS solvents have been reduced already through switching to alternatives and substitution with not-in-kind technologies, and solvents now account for only 0.17% of global production of HFCs.[44]

Solvents are primarily used in three industrial processes: metals cleaning, electronics cleaning and precision cleaning. A wide range of alternative solvents and technologies developed since the 1980s, are available to replace HCFCs. These include not-in-kind technologies such as aqueous cleaning, semi-aqueous cleaning, hydrocarbon and alcoholic solvents, and in-kind solvents such as chlorinated solvents, a brominated solvent, and fluorinated solvents (HFEs). As with CFCs and HCFCs, no single alternative will be able to replace HFCs in all applications.

Overall, the TEAP report gives a good assessment of the alternatives available in the solvents sector, but the heavy influence of Task Force members from the fluorinated gas industry is evident from the second paragraph where it is stated that "fluorochemical HFOs (hydrofluoroolefins) with zero ODP and HCFOs (hydrochlorofluoroolefins) with negligibly small ODP **are said to be under development**. […] they may replace HCFCs totally in the future." Why expensive HFOs and HCFOs are well positioned to gain an advantage over low-cost and well established alternatives is not explained.

Fire Suppression

Fire suppression accounts for only approximately 1% of global HFC production. Commercially available, technically proven alternatives to ODS for fire protection have been developed and include: halocarbon agents, e.g. a fluoroketone (FK); inert gases, e.g. nitrogen and argon and their blends; carbon dioxide; water mist technologies; inert gas generators; fine solid particles (powders); dry chemicals; aqueous film-forming foam; and HFCs.[45]

As in other sectors, no one fire suppressant is suitable for all requirements, but there are non-ODS, HFC-free alternatives for all uses, which could reduce most if not all use of HFCs in fire suppression.

TIME TO REASSESS EMISSIONS FROM FEEDSTOCK

A number of ODS serve as chemical building blocks for the manufacture of other chemicals. The majority of ODS feedstock is used for the production of three groups of chemicals: other ODS (e.g. HCFCs, CFCs), HFCs and fluoropolymers.[46] When the Montreal Protocol was created, Parties generally believed that feedstock was entirely converted to other chemicals and did not emit ODS to the atmosphere. Article 1 of the MP therefore created an exemption for ODS that are entirely used as feedstock in the manufacture of other chemicals.[47] As a result, ODS feedstock is not subject to the Montreal Protocol's phase-out schedules.

Reported feedstock production rose from 823,787 to 1,111,308 metric tonnes per year between 2007 and 2011. Production rose by 8% in Article 2 countries during the same period, while the increase in Article 5 countries was 135%.[48]

CTOC has determined that feedstock emissions may be as low as 0.1% in highly automated tight facilities with proper procedures, or up to 5% in smaller and less-tight batch processes that have less concern for operational

ABOVE:
CO_2 Fire Extinguisher.

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excellence.[49] If emission factors ranging from 0.1% to 5% are applied to ODS feedstock production in 2011 (reported at 1,111,308 metric tonnes), emissions from feedstock are in the range of between 1,110 - 55,565 metric tonnes per year. This is equivalent to approximately 435 - 21,765 ODP-tonnes, and 2.8 - 139.6 million tonnes CO_2e in 2011.[50]

However, this figure does not include the intentional venting of HFC-23 in connection with the use of HCFC-22 as feedstock. Global HFC-23 emissions from the non-CDM plants are approximately 10,000 metric tonnes per year, which is equivalent to 148 million tonnes CO_2e.[51] Given the projected growth in HCFC-22 feedstock production, annual emissions of HFC-23 from HCFC-22 feedstock production alone are projected to exceed 23,000 metric tonnes by 2035. This would be more than 340 million tonnes CO_2e per year.[52]

It should also be noted that continued ODS production for feedstock contributes to the risk of illegal trade and the danger that ODS may be diverted to unauthorised uses.

FUNDING CLIMATE BENEFITS THROUGH THE MLF

Decision XIX/6 encourages Parties to promote the selection of alternatives to HCFCs which minimize environmental impacts, in particular impacts on climate. It also requests that the Executive Committee of the Multilateral Fund (MLF), develop and apply funding criteria for the accelerated phase-out of HCFCs, give priority to substitutes and alternatives that minimize other impacts on the environment, including on the climate, taking into account global warming potential, energy use and other relevant factors. Decision XXI/9(7) requested the ExCom to consider providing supplementary funding and/or incentives for additional climate benefits where appropriate.

The vast majority of MLF-funded transitions to HFCs in the first stage of the accelerated HCFC phase-out occurred due to the fact that available low-GWP conversions were not "cost-effective" on an ODP basis, particularly for small and medium sized enterprises (SMEs). The MLF financed a limited number of pilot projects but, due to funding limitations, decided that no additional funding would be made available to demonstrate the effectiveness of low-GWP alternatives in high ambient Article 5 countries or for demonstration and pilot projects in the air-conditioning and refrigeration sectors. As these sectors account for approximately 68% of HCFC consumption, ensuring cost-effective viable alternatives is critical to achieving the promised climate savings of the HCFC phase-out.

In addition, other than conducting studies, the Montreal Protocol has failed to take any substantive action to destroy CFCs, halons, and other banned ODS, which will continue to accumulate in banks as the HCFC phase-out progresses. When the quantity of ODS contained in banks was originally evaluated, it was estimated to be 21 $GtCO_2e$, but by the Twentieth Meeting of the Parties, the estimate had been reduced to 16-17 $GtCO_2e$. Despite Decisions XX/6 and XXI/2 calling for strong action to address ODS banks and to identify financing for the destruction of stored ODS, emissions from banks continue virtually unabated.

The window of opportunity for avoiding unnecessary conversion to HFCs during the HCFC phase-out and for eliminating used HCFCs through the destruction of ODS Banks is rapidly disappearing. In addition to this, the cost of the HCFC phase-out is rising fast as industries in both Article 2 and Article 5 countries transition to HFCs, against a backdrop of increasing demand for refrigeration and air conditioning in emerging economies.

In 2012, Switzerland proposed to set up a fund to maximise the climate benefits of the HCFC phase-out. The discussion was fruitful, but no decision was reached.

RECOMMENDATION:

- Parties should pass a decision encouraging all Parties to make voluntary contributions to the MLF to:

1. Maximise the transitions to environmentally friendly alternatives and capture additional benefits;
2. Demonstrate the effectiveness of low-GWP alternatives, particularly in high ambient temperatures;
3. Conduct projects to collect and destroy Banks of ODS.

The decision should make clear that any contributions may not be counted against a party's general obligation to fund the Replenishment to phase-out HCFCs.

A COMPREHENSIVE EVALUATION IS REQUIRED FOR THE 2015–2017 REPLENISHMENT

The ExCom's April 2013 decision to provide China with up to US$385 million for the elimination of its industrial production of HCFCs by the year 2030 will substantially change the replenishment discussions.[53]

According to the terms of the agreement, China will close and dismantle its production lines which produce HCFCs for emissive uses, and ensure that they do not switch to producing HCFCs for feedstock. China will also make its best efforts to manage HCFC production and HFC-23 by-product emissions so as to minimize all associated climate impacts.

The Replenishment has played a pivotal role in making the Montreal Protocol the world's most successful environmental treaty. A comprehensive TEAP assessment of projected expenditure will be critical to ensure that Parties continue to have faith in the Replenishment process.

RECOMMENDATION:

In order to properly plan for the 2015-2017 Replenishment, Parties need to request that the TEAP evaluate:

- How much it will cost to sufficiently fund the accelerated HCFC Phase-out;
- Whether the 25% climate incentive is sufficient to maximise transitions to low-GWP alternatives, particularly in low volume consuming countries and in SMEs;
- What it would cost to fund additional demonstration and pilot projects for alternatives in the refrigeration and air conditioning sectors;
- What it would cost to fully fund activities that are not required for compliance that have been approved or proposed but repeatedly deferred over the past few years due to financial constraints and;
- What it will cost to phase down HFCs and whether a combined HCFC and HFC phase-out/down would be cheaper and less disruptive to Article 5 Parties and their industries.

"The Replenishment has played a pivotal role in making the Montreal Protocol the world's most successful environmental treaty."

BELOW:
The effects of climate change are being felt all over the world. Here, a lake in Australia has dried up entirely because of drought, making the "No Swimming" sign redundant.

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