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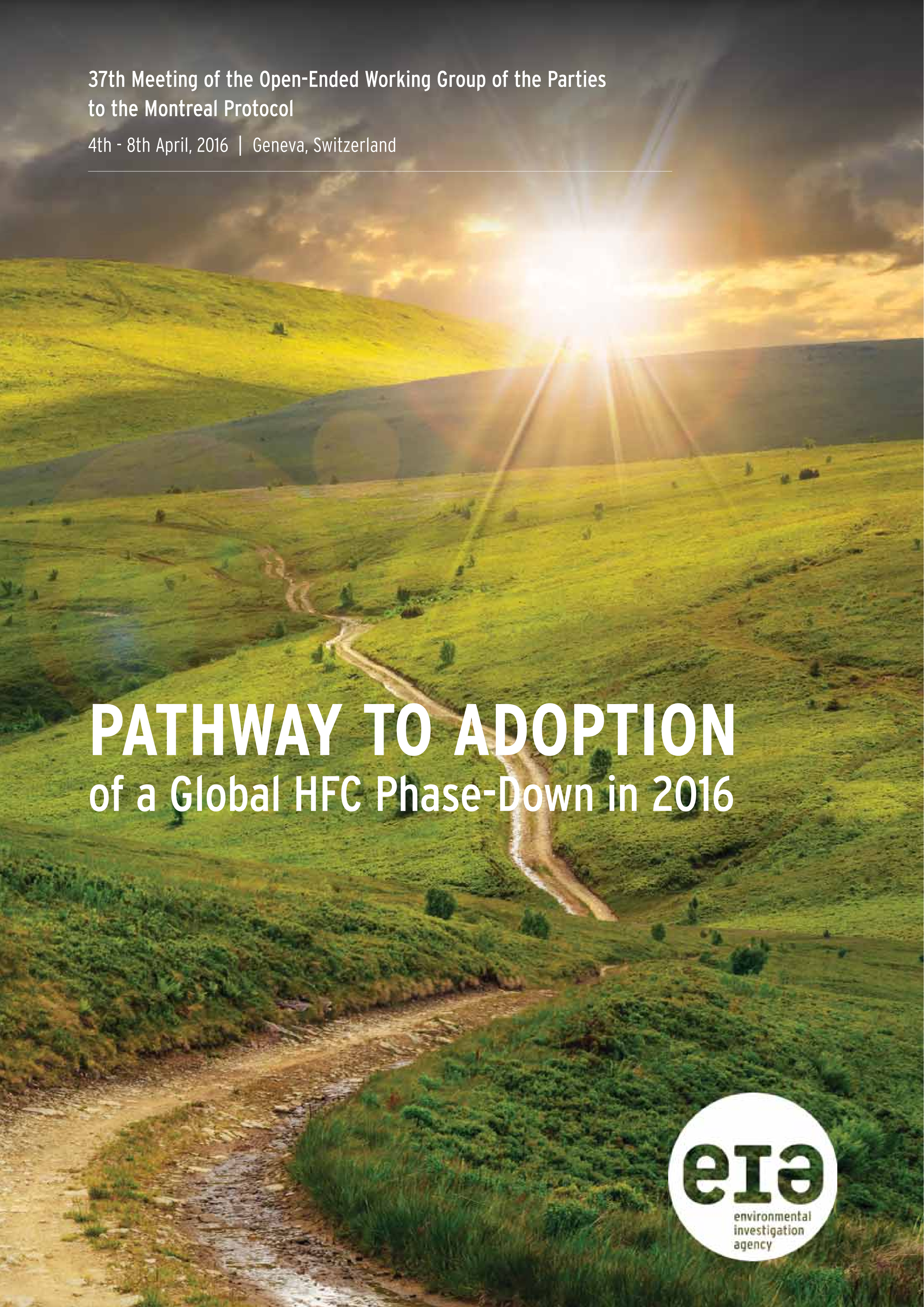

PATHWAY TO ADOPTION
of a Global HFC Phase-Down in 2016

eia
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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CLOSING THE GIGATONNE GAP

2015 was the hottest year on record and 2016 is expected to be even warmer. Fifteen of the sixteen hottest years since records began have occurred since 2001,[1] and January and February 2016 have already set new records.[2] In December 2015 at the 21st Conference of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC), 195 countries agreed to limit warming this century to well below 2°C and drive efforts to limit the temperature increase even further to 1.5°C in order to prevent the worst impacts of climate change.[3]

According to UNEP's Emissions Gap Report, full implementation of existing mitigation pledges under the UNFCCC, through Intended Nationally Determined Contributions (INDCs), at best ensures emission levels in 2030 that will see global average temperature increases in the range of 3 to 4°C by 2100.[4] The emissions gap between full implementation of unconditional INDCs and the least-cost emission level for a pathway to stay below 2°C, is estimated to be 14 $GtCO_2e$ in 2030.[5] For the desired 1.5°C scenario the gap is even wider, more than 17 $GtCO_2e$.

Early and enhanced action on non-CO_2 gases, including rapid action to address hydrofluorocarbons (HFCs), is critical to closing this gap, and avoiding disastrous climate tipping points which are projected to occur even for warming levels below 2°C.[6]

Phasing down and eventually phasing out HFCs is the most cost-effective, short-term and fast-action strategy for reducing GHG emissions. A global phase-down of HFCs under the Montreal Protocol could avoid 1.1–1.7 $GtCO_2e$ of GHG emissions per year by 2030[7] with cumulative emission reductions of nearly 100 $GtCO_2e$ by 2050.[8] Additional substantial emission reductions are feasible through the prioritisation of energy-efficient technologies in the refrigeration and air conditioning sector. The November 2015 TEAP report estimated that under the more cost-effective fast-action scenario, the phase-down of HFCs could occur for a reasonable cost of $2.5 billion.

EIA urges Parties to address the challenges identified in the mandate for a contact group on HFCs in a comprehensive way that will allow for the adoption of the most ambitious HFC amendment possible in 2016. Non-Article 5 (Non-A5) Parties, many of which have already implemented HFC regulations, must lead the way with an early-action scenario akin to the TEAP MIT-3 scenario. Article 5 (A5) Parties should agree to control measures that will incentivise actions to avoid transitions from HCFCs to HFCs, for example an early freeze in HFC consumption and production.

The Paris Outcome was a turning point for global action to limit climate change below dangerous levels. The Parties to the Montreal Protocol can take the first concrete steps to build on this success through a 2016 agreement to rapidly phase-down HFCs.

COVER IMAGE:
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NATIONAL ACTIONS TO CONTROL HFCs

Countries are already taking steps to curb HFC consumption and emissions under a range of different legal frameworks and policy mechanisms. Some of these actions, such as the European Union's F-Gas Regulation, are based on comprehensive legislation drafted specifically for controlling HFC emissions. Several other countries have initiated regulations that achieve HFC reductions through one or a combination of the following types of domestic actions:

1. **A Phase-down** in the total amount of HFCs that may be produced and consumed, measured by total volume or CO_2 equivalent, and progressively reduced over time.

   Example:
   The EU F-Gas Regulation establishes an HFC consumption phase-down schedule reaching 79% reduction CO_2e in 2030 on 2009-2012 base levels.[9] The Australian Government is considering options for introduction of new regulations to potentially include a phase-down of HFCs by up to 85% in 2036.[10]

2. **Prohibitions or bans** on the use of HFCs in certain sectors or applications, starting with bans on the use of HFCs in new equipment, typically for all HFCs or for HFCs above a certain GWP threshold.

   Example:
   The EU F-Gas Regulation imposes prohibitions on placing on the market of many types of new equipment containing HFCs above a GWP threshold (e.g. foams, refrigeration and air conditioning equipment).[11] The United States Significant New Alternatives Policy (SNAP) program places prohibitions on some of the highest-GWP HFCs in some equipment, for example in 2015 the EPA passed a rule which prohibits the use of HFC-134a in passenger cars beginning with 2021 models as well as HFC-404A and HFC-507A in many retail food refrigeration uses, including supermarket systems, condensing units, stand-alone commercial refrigeration units and vending machines as of January 2017. The rule also prohibits HFC-407C in new stand-alone commercial refrigeration units and vending machines taking effect in 2019 and 2020.[12]

3. **Market incentives** for manufacturers or end users to transition away from HFCs. These may take the form of discouraging the use of HFCs either through environmental taxes or providing fiscal incentives to reward adoption of low-GWP technologies.

   Example:
   The Australian Ozone Protection and Synthetic Greenhouse Gas Management (OPSGGM) Act includes a levy on imports of HFCs of $165 per tonne.[13] The Japanese Revised F-Gas Law provides fiscal incentives for low-GWP alternatives, including a JPY 6 billion subsidy for adoption of natural refrigerant technology.[14]

4. **Mandatory licensing and reporting** of production, imports and exports of HFCs.

   Example:
   All importers are required to obtain a license and seek approval to import HFCs in Colombia. Other countries include Macedonia, Montenegro, Serbia and Australia.[15]

5. **Refrigerant management** provisions including bans on the venting or release of HFCs, periodic leak inspections or automatic leak detection devices in equipment, and requirements for HFCs to be recovered and recycled or reclaimed, or destroyed from systems during servicing or at end of life.

   Example:
   The Canadian Federal Environmental Code of Practice for the Elimination of Fluorocarbon Emissions includes refrigerant management rules that prohibit the release of HFCs.[16]

6. **Management of HFC-23 by-product** emissions by requiring destruction, chemical conversion or capture of HFC-23 produced as a by-product (of HCFC-22 production or other fluorinated gas production). Governments that import HCFC-22 or other chemicals that involve HFC-23 by-product can require proof of HFC-23 destruction before approving imports.

   Example:
   The Chinese government has committed to funding up to 40% of the equipment costs for HFC-23 destruction projects.[17]

"Countries are already taking steps to curb HFC consumption and emissions under a range of different legal frameworks and policy mechanisms."

SIGNIFICANT OPPORTUNITY FOR A5 COUNTRIES TO LEAPFROG HFCs

As A5 Parties are phasing-out HCFCs with assistance from the Multilateral Fund (MLF) of the Montreal Protocol, there is a time-limited opportunity to "leapfrog" dead-end HFC technologies and undertake a one-time transition from HCFCs to low-GWP alternative technologies with GWPs below 150, for example using natural refrigerants and not-in-kind technologies.

In *Decision XXVII/4 Task Force Report: Further Information on Alternatives to Ozone-Depleting Substances*, the Technology and Economic Assessment Panel (TEAP) analysed two scenarios that underscore the significant environmental benefits of leapfrogging.[18] Under the MIT-3 scenario, A5 Parties would begin the transition in 2020 to low-GWP technologies, defined as those with GWP $\leq$300.[19] Under the MIT-5 scenario, this transition is delayed 5 years, starting in 2025 instead.[20] The difference between the MIT-3 and MIT-5 scenarios for A5 Parties, in terms of aggregate HFC demand reductions during 2020-2040 period, is over 8.4 $GtCO_2e$.[21]

The financial benefits of leapfrogging are also significant. During the 2020-2030 period alone, TEAP has calculated the difference between the MIT-3 and MIT-5 scenarios as approximately $1.2 billion.[22] This figure does not account for the financial benefits from avoiding a double transition in the post-2030 period to very low-GWP alternatives, which would be required under either scenario in order to prevent emissions from increasing due to growth in the cooling sector of A5 countries.[23] Parties should work together to make smart transitions now, capturing these environmental and financial benefits by leapfrogging HFCs to the greatest extent possible in their Stage 2 HPMPs and agreeing to an ambitious HFC amendment.

BELOW:
Split air-conditioner condensing units, Shanghai.

GEARING UP THE MLF TO FINANCE THE HFC PHASE-DOWN

At the 36th Open-ended Working Group meeting, Parties finalised the mandate for a contact group on the feasibility and ways of managing HFCs, identifying a number of challenges, and agreed to: Maintain the MLF as the financial mechanism, and to agree that additional financial resources will be provided by Non-A5 Parties to offset costs arising out of HFC management for A5 Parties if obligations are agreed to. In this regard, key elements for financial support from the MLF for A5 Parties will be developed by the contact group to provide guidance to the Executive Committee (ExCom) of the MLF, taking into account the concerns of parties. Progress was made at the 27th Meeting of the Parties (MoP) on a number of issues, for example the eligibility of second and third stage conversions for funding. However additional work is needed to develop guidance to the ExCom on a number of other issues, including *inter alia* enabling activities, the determination and calculation of incremental costs, cost-effectiveness thresholds and energy efficiency.[24] The directions and guidance to the ExCom are fundamental to the successful implementation of any HFC agreement, and are equally important to both A5 and Non-A5 Parties. In particular, it is possible that revised guidance to ExCom will have implications for the way that TEAP calculates manufacturing and servicing costs in order to give an estimated cost of any phase-down scenario.

In April 2015, EIA and the Centre for Science and Environment (CSE) held a workshop in Bangkok to examine how to maximise the climate benefits of the MLF, both within its current efforts to phase-out HCFCs and in the future event of an HFC phase-down. The workshop was attended by current and former A5 and Non-A5 participants from the Montreal Protocol, along with financial, technical and legal experts. The following points received broad agreement from participants:

1) An HFC phase-down amendment offers the greatest opportunity for innovations to the financial mechanism in order to optimise the climate benefits of the Montreal Protocol;

2) Under an HFC phase-down, it will be particularly critical to incentivise high energy efficiency of low-GWP alternatives;

3) There is a need to re-examine "cost-effectiveness" in order to effectively respond to Decisions XIX/6 and XXI/9 for HCFC phase-out plans and to take into account GWP and energy efficiency in case of an HFC phase-down;

4) There may be some steps that the MLF could take now to increase the climate benefits of the HCFC phase-out, including giving more consideration to energy efficiency and further promoting low-GWP alternatives;

5) Low-volume consuming countries (LVCs) require additional financial incentives to ensure availability and uptake of climate-friendly technologies and to maximise climate benefits in the servicing sector;

6) MLF could play the role of a knowledge leader to other regimes and organisations working on the refrigeration and air conditioning (RAC) sector.[25] Although the overarching driver of MLF decisions is the level of funding available, Parties also need to agree on a broad set of principles that will ensure that sustainable climate-friendly (low-GWP and energy-efficient) technologies are subject to sufficient financial incentives to ensure their uptake and availability to all A5 Parties on an equitable basis.

Incremental Costs

The general principles and the list of indicative incremental costs will need to be amended to ensure adequate funding to meet the challenge of the HFC phase-down. Parties should examine the concept of *full* incremental costs, which ensures that incremental costs funded for a project are not reduced as a result of any additional domestic benefits that a project with global environmental benefits might yield in comparison with the baseline activity.

For example, technology upgrades that result in concrete energy efficiency gains are not currently considered as eligible incremental costs, however technology improvements will be critical to maximizing the efficiency, safety and ultimately the viability of many low-GWP solutions to HFCs, particularly in high ambient temperature conditions.

Further, consideration should also be given to not-in-kind transitions such as district cooling and heating projects and reversible heat pumps providing heating and cooling which can yield significant energy efficiency benefits. Solar technologies and evaporative cooling likewise offer significant benefits and should be covered by the financial mechanism.

Cost-effectiveness

The cost-effectiveness threshold has become the primary parameter used by the ExCom to review investment projects for funding. Parties will need to consider a broader approach which allows A5 Parties "*flexibility to prioritise HFCs, define sectors, select technologies/alternatives, elaborate and implement their strategies to meet agreed HFC obligations, based on their specific needs and national circumstances…*," as outlined in Annex II to the Dubai Pathway.

In EIA's view, cost-effectiveness should be only one of several parameters by which investment projects are considered. Other parameters that could be considered include:

- The existence of additional climate benefit through energy efficiency gains or replicability;
- Commitments over and above agreed control measures;
- Linkages between the HCFC and HFC control measures which avoid a double transition;
- Elements that assist capacity building in LVC countries to tackle issues including *inter alia* disposal of ODS and HFCs and illegal trade;
- Elements that contribute to sustainable development; for example, projects should ensure that A5 Parties are protected from long-term higher incremental operating costs for alternative refrigerants.

Cost-effectiveness should also take a long-term view on the need to avoid a fourth-generation phase-out of so-called medium-GWP HFC chemicals and blends in the post-2030 period. Given their lower scales of production, many HFC-free technologies have higher upfront capital costs than some lower-GWP fluorinated drop-in solutions. However, given the need to ultimately

"Under an HFC phase-down, it will be critical to incentivise high energy efficiency of low-GWP alternatives."

RIGHT:
Air conditioner using hydrocarbon as refrigerant.

transition to zero- or very low-GWP technologies, the cost of a double transition should be considered when reviewing higher capital costs for truly low-GWP solutions.

Energy Efficiency

Energy savings should not be considered an incremental operating cost saving, as is currently the case under the guidelines for financing investment projects in the HCFC phase-out management plans. Applying best available technologies to maximise energy efficiency could double the climate benefit of the HFC phase-down,[26] and provide sustainable technology transfer, and Parties need to consider concrete measures to achieve this through the existing financial mechanism. As stated earlier, technology upgrades that improve energy efficiency at a reasonable cost should be considered eligible for funding.

Currently under the HCFC phase-out, 25% additional funding over the agreed cost-effectiveness thresholds is available for investment projects that prioritise low-GWP transitions. This climate incentive, however, has only been available to manufacturing countries, not to other countries such as LVCs that use HCFCs only to service equipment. A similar percentage incentive could be considered to promote energy efficiency in HFC phase-down projects, however EIA urges Parties to ensure it is equally applied to all Parties, not just manufacturing countries.

Enabling Activities

Additional funding will need to be provided for enabling activities that allow for early and smart transitions to zero- and very low-GWP refrigerants, including support for developing industry standards for flammable refrigerants. This includes establishment of certification and training programs on their safe handling and use as well as capacity building to ensure the availability of refrigerant-grade hydrocarbons, for example, and components to convert existing equipment along with related programmes that ensure their accessibility in A5 Parties.

Institutional strengthening is the backbone to successful implementation of Montreal Protocol control measures. The implementation of the accelerated HCFC phase-out is currently threatened by increasing illegal trade in HCFCs and counterfeit chemicals. With additional control measures based on CO_2-equivalence, and the ever-expanding list of HFC chemicals and blends, Parties will face new challenges to ensure compliance with any HFC phase-down schedule, which will require additional investment in institutional strengthening.

HFC Banks

Millions of units of HFC refrigeration and air conditioning equipment have already been sold in A5 countries. For LVCs and other countries that do not manufacture HFC-containing equipment, the best way to reduce their use of HFCs is to convert this equipment, where possible, to use low-GWP, non-fluorinated refrigerants. By focusing on consumption and production, the Montreal Protocol in the past has done little to address existing banks of ODS or incentivise their controlled destruction. The amendment is an opportunity to establish a plan for control, capture and disposal of banks in order to maximise the climate benefit of the amendment.

LIMITING TRANSITIONS TO MEDIUM-GWP HFCS OR BLENDS OF HFCS

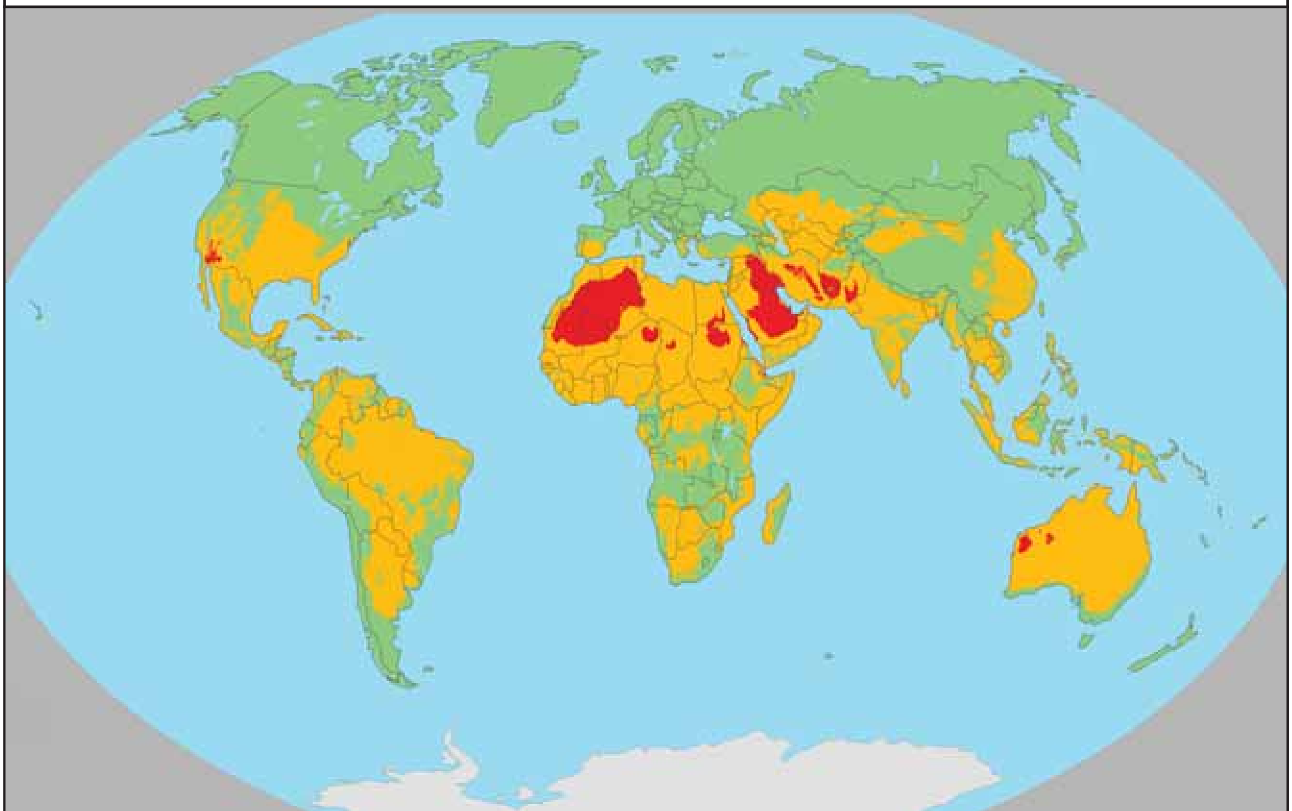
In order to ensure a cost-effective HFC phase-down and avoid a double transition, countries and end-users should avoid, wherever possible, transitioning to medium-GWP HFCs (e.g. HFC-32) or refrigerant blends that combine high- or medium-GWP HFCs with lower-GWP and unsaturated HFCs (HFOs). These chemicals have GWPs ranging from around 600 to 2500, however their climate impact is underplayed by the use of the standard 100-year GWP as most HFCs have atmospheric lifetimes dramatically less than 100 years. The most commonly used HFCs have an average 100-year GWP of 2,363, but a 20-year average GWP of 4,582.[27] Given the average life-time of HFCs is approximately 15 years,[28] the 20-year GWP is a better reflection of their actual impact on the climate and potential tipping points.

Low-GWP alternatives with negligible climate impacts, such as natural refrigerants, are already technically feasible and commercially available in most sectors.[29] Additionally, test results suggest that many of these low-GWP alternatives provide better energy efficiency, including under high ambient conditions.[30] It is in the best interest of all Parties to limit, to the maximum extent possible, the introduction of HFC chemicals and blends that will be obsolete soon after introduction.

LOW-GWP SOLUTIONS FOR HIGH AMBIENT CLIMATES

A broad range of low-GWP solutions exist to replace HFCs in most applications, however high ambient temperature conditions pose an additional challenge for refrigerant performance. This has become a particular issue for the transition away from HCFC-22 in air conditioning, as HFC replacements, including the primary replacement chemical HFC-410A, have significantly declining efficiency at higher temperatures, particularly above 40°C.[31] Fortunately, low-GWP alternatives such as hydrocarbons and ammonia have thermodynamic properties that outperform HFCs at high ambient temperatures.[32] For others, such as carbon dioxide, equipment redesign and efficiency enhancing technologies is increasing their performance in ever-warmer climates, offering a promising complement to the alternatives already available.

FIGURE 1. AVERAGE HIGH TEMPERATURES FOR THE HOTTEST MONTH IN EACH HEMISPHERE (°C)



The map is a merged representation of average high temperatures (1950-2000) in January in the Southern Hemisphere and July in the Northern Hemisphere, the hottest months of the year in each hemisphere. Given current technologies, the green areas on the map represent climate conditions optimal for efficient operation of transcritical CO_2 systems, orange represents areas that transcritical CO_2 systems should be paired with energy efficiency enhancing technologies (boosters, parallel compressors, etc.), and the red areas represent regions where other low-GWP refrigerants are recommended or where CO_2 may be used as a secondary refrigerant.[33]

KEY:

- <30C
- 30-40C
- >40C

"In the group of five alternative refrigerants to HCFC-22, propane was the only alternative that showed an improvement in energy efficiency from the HCFC-22 baseline when tested at medium and high ambient temperatures..."

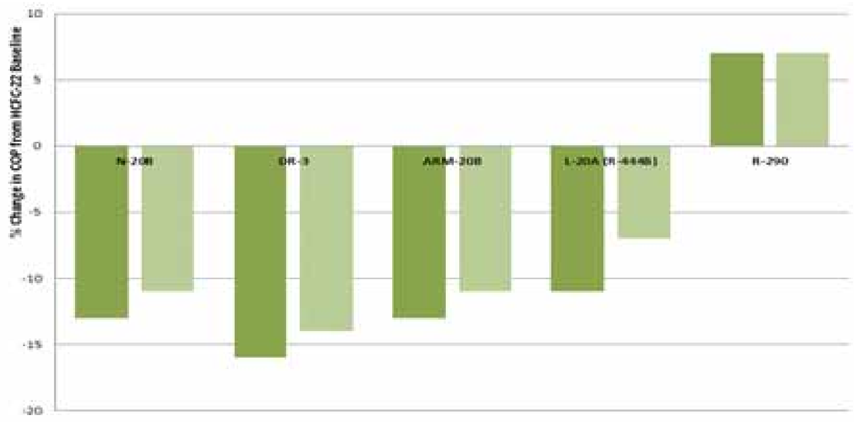
Hydrocarbons Outperform Mid-range GWP HFC Blends

While both HFC-410A and HFC-32 have been shown to have lower efficiency compared to HCFC-22 under high temperatures[34] low-GWP hydrocarbons and ammonia have higher critical temperatures that make them well-suited to high ambient temperature conditions. The recent high ambient test results published by the Oak Ridge National Laboratories (ORNL) show propane out-performing the energy efficiency of the new synthetic HFC blends in mini-split air conditioners.[35] In the group of five alternative refrigerants to HCFC-22, propane was the *only* alternative that showed an improvement in energy efficiency from the HCFC-22 baseline when tested at medium and high ambient temperatures of 27.8°C, 35°C, 52°C, and 55°C.[36] The study showed that at 35°C, propane had a 7% increase in Coefficient of Performance (COP), while the other alternatives tested (HFC blends with GWPs ranging from 146 to 904) all showed declines in COP between -11% and -13%. These results were similar at the higher temperature conditions, where again propane showed efficiency gains compared with declining performance of other alternatives.

Enhanced Technologies Raising the Efficiency Ceiling for CO_2 Up to 38°C and Above

Carbon dioxide (CO_2) has historically been constrained by its low critical temperature, which causes deteriorating performance at higher temperatures. New enhancements to transcritical CO_2 booster refrigeration systems including parallel compression, adiabatic condensation, and injection technologies are raising the temperature ceiling for energy efficient transcritical CO_2 refrigeration equipment.[37] Supermarkets using transcritical CO_2 in warm climates in Indonesia,[38] Spain,[39] Turkey,[40] and the southern United States[41] are demonstrating that enhanced transcritical CO_2 booster systems can significantly outperform their HFC-404A predecessors at temperatures up to 38°C.[42] The energy consumption of a CO_2 transcritical system can outperform a HFC-404A system by 22% at 32°C when using parallel compression paired with liquid and gas ejection.

FIGURE 2. TEST RESULTS FROM OAK RIDGE NATIONAL LABORATORIES ALTERNATIVE REFRIGERANT EVALUATION FOR HIGH AMBIENT TEMPERATURE ENVIRONMENTS; R-22 ALTERNATIVES IN MINI-SPLIT AIR CONDITIONERS



Oak Ridge National Laboratories (ORNL), Alternative Refrigerant Evaluation for High Ambient-Temperature Environments: R-22 and R-410A Alternatives for Min-Split Air Conditioners, October 2015. See Table ES.3 and Table ES.4. Available at: http://www.osti.gov/scitech/

TABLE 1: ENERGY SAVINGS OF ENHANCED TRANSCRITICAL CO_2 TECHNOLOGIES AT 32°C (DANFOSS)[43]

SYSTEM	ENERGY vs. 404A	COMPRESSOR SAVING vs. BOOSTER
Booster	-11%	0%
Parallel compression	7%	15%
Gas ejector	10%	18%
Liquid and gas ejector	22%	27%

ADOPTING SMART STANDARDS FOR LOW-GWP TECHNOLOGIES

Industry standards for refrigeration, air conditioning and other uses of HFCs are critical to the roll-out of low-GWP, energy efficient HFC-free alternatives, which have been developed and proven for almost every refrigeration and air conditioning application. Standards are important for setting technical specifications and criteria that ensure that appropriate levels of quality and safety are met, and that countries and companies can compete on equal terms.[44] However, many standards for using low-GWP refrigerants are overly restrictive, based on outdated data and unsupported assumptions that do not take into account advances in technologies, modern safety devices and the use of clear warning labels.[45] These outdated standards create market barriers, favouring fluorinated gases over natural low-GWP alternative refrigerants such as hydrocarbons, carbon dioxide and ammonia, which limit their market penetration.

Industry standards, developed primarily by industry experts, but with mechanisms that allow for broader participation and oversight, set the rules for practically every safety and quality aspect of designing, testing and installing any product sold. This includes what kind and how much refrigerant can be used in a refrigeration or air conditioning system. If a standard imposes requirements that are too restrictive for certain refrigerants, equipment using those refrigerants can be prohibited from entering the market, or prohibited from being produced cost-effectively, even if governmental regulations incentivise and/or allow that equipment to be used on the market.

For example, more than 700 million hydrocarbon domestic refrigerators have been sold around the world,[46] but hydrocarbon technology has yet to enter the U.S. market due primarily to an outdated standard recognised in the United States, Underwriters Laboratory (UL) 250. This standard allows only 57 grams of hydrocarbon refrigerant compared to the globally recognized international standard set by the International Electrotechnical Commission (IEC), which allows 150 grams. 57 grams is an insufficient amount of refrigerant to design an efficient, cost-effective refrigerator, thus majority of refrigerators in the U.S. are forced to use HFCs. Overly restrictive standards present significant operability, energy efficiency, and cost-effectiveness issues for low-GWP technology and equipment.

There is a need for more research demonstrating safe operation of various low-GWP refrigerants, as well as a need for wider representation of stakeholders (government, NGO, technical experts

TABLE 2: SUMMARY TABLE OF RELEVANT INTERNATIONAL STANDARDS-MAKING ORGANISATIONS

STANDARD	TECHNICAL COMMITTEE	AREA COVERED
International Electrotechnical Commission (IEC)		
IEC 60335-2-40	IEC SC 61D WG9 WG16	AC - Appliances for air conditioning for household and similar purposes Amendment for A2L refrigerants Amendment for A2 and A3 refrigerants
IEC 60335-2-24	IEC SC 61C	Domestic refrigerators
IEC 60335-2-89	IEC SC 61C WG4	Commercial Refrigeration Amendment for flammable refrigerants
International Organization for Standardization (ISO)		
ISO 5149	ISO TC86 SC1 WG1	Refrigeration & AC – safety Revision of ISO 5149

"Smarter standards will open the market to new alternatives that will allow countries to accelerate their transitions to low-GWP technologies and bring down costs by allowing economies of scale to develop."

and representatives of companies manufacturing or using low-GWP technologies) on selected standards panels and committees, to balance the industry representatives from companies that make or use HFCs, in order to ensure oversight of timely actions and fair and competitive standards.

In addition to international standards, there are standard-setting bodies at national and regional levels in most countries, such as Underwriters Laboratory, European Committee for Standardization, the Bureau of Indian Standards, Standardization Administration of China and others.[47] While it is important that governmental representatives join international and national standards panels and committees, they can also play a critical role in making funds available for research and testing of low-GWP technologies.

Smart standards for low-GWP technologies should:

- Be based on the most current research, technologies, data, and testing of low-GWP equipment;
- Take into account modern safety technologies for mitigating flammability risks such as automatic shut-off valves, leak detectors, ventilation, and use of warning labels;
- Make every effort to harmonise with other globally recognised standards that allow for broader market penetration of low-GWP technologies while also levelling the playing field for the natural refrigerant market.

Smarter standards will open the market to new alternatives that will allow countries to accelerate their transitions to low-GWP technologies and bring down costs by allowing economies of scale to develop. Without these changes, meeting the schedule for any phase-down of HFCs will be exceedingly difficult.

BELOW:
Climate-affected internally displaced persons board a boat to travel to Dhaka, Bangladesh.

CONCLUSIONS & RECOMMENDATIONS

With the Dubai Pathway now in motion, discussions at the 37th OEWG in Geneva must lay the groundwork for adopting an ambitious HFC amendment in 2016. Existing and planned national actions to mitigate HFCs already demonstrate the feasibility and ways of enacting comprehensive legislation to phase-down HFCs. As Parties discuss and resolve the remaining challenges, EIA urges Parties to agree to concrete and comprehensive measures that will allow for the adoption of the most ambitious HFC amendment, one that is characterised by early action and a comprehensive financial mechanism to maximise climate benefits.

- Non-A5 countries should adopt a phase-down schedule in line with the TEAP MIT-3, while A5 countries must aim to initiate an ambitious and early freeze in HFC consumption, in line with closing the emissions gap.

- As a priority, Parties should develop guidance to the ExCom on a broad set of principles that will ensure that sustainable climate-friendly (low-GWP and energy efficient) technologies are subject to sufficient financial incentives to ensure their uptake and are available to all A5 Parties on an equitable basis.

- All Parties should develop domestic led actions to reduce HFC consumption through the development of comprehensive national policies.

- A5 Parties should maximize the climate and economic benefit of the HCFC phase-out by leapfrogging HFCs and transitioning directly to low-GWP technologies, wherever possible.

- Parties should avoid transitions to medium-GWP HFCs or HFC blends containing medium- or high-GWP HFCs.

- Parties should establish a plan for control, capture and disposal of banks in order to maximise the mitigation of emissions of HFCs.

- Parties should increase participation in standards development and empower the TEAP to undertake research and actions on standards in order to allow for broad market penetration of safe low-GWP technologies.

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