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DISCUSSION PAPER: ARCHITECTURE & FINANCING MODELS FOR EFFICIENT COOLING ALONGSIDE THE MONTREAL PROTOCOL

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The contents of this publication are the sole responsibility of the authors and do not necessarily reflect the views of K-CEP.

LIST OF ABBREVIATIONS

AC	Air Conditioning	IRENA	International Renewable Energy Agency
ADB	Asian Development Bank	IS	Investment Services
AfDB	African Development Bank	IsDB	Islamic Development Bank
AIIB	Asian Infrastructure Investment Bank	K-CEP	Kigali Cooling Efficiency Program
APEC	Asia-Pacific Economic Cooperation	LVC	Low-volume Consuming Country
AS	Advisory Services	M&E	Monitoring and Evaluation
CBD	Convention on Biological Diversity	MDB	Multilateral Development Bank
CEM	Clean Energy Ministerial	MEPS	Minimum Energy Performance Standard
CIF	Climate Investment Funds	MIGA	Multilateral Investment Guarantee Agency
CIFF	Children's Investment Fund Foundation	MLF	Multilateral Fund
CTF	Clean Technology Fund	MP	Montreal Protocol
DBSA	Development Bank of Southern Africa	MRV	Monitoring, Reporting, and Verification
DFI	Development Finance Institution	NAMA	Nationally Appropriate Mitigation Action
EE	Energy Efficiency	NDC	Nationally Determined Contributions
EESL	Energy Efficiency Services Limited	NGO	Non-Governmental Organization
EIB	European Investment Bank	ODS	Ozone Depleting Substance
FI	Financial Institution	RACHP	Refrigeration, Air Conditioning, Heat Pump
GCF	Green Climate Fund	REDD+	Reducing Emissions from Deforestation and Forest Degradation
GCP	Global Cooling Prize	REEEP	Renewable Energy and Energy Efficiency Partnership
GEF	Global Environment Facility	SDGs	Sustainable Development Goals
GiZ	Deutsche Gesellschaft für Internationale Zusammenarbeit	TCFD	Task Force on Climate-Related Financial Disclosures
GSEP	Global Superior Energy Performance	TEAP	Technology and Economic Assessment Panel

GWP	Global Warming Potential	TWh	Terawatt Hour
HCFCs	Hydrochlorofluorocarbons	UNCCD	United Nations Convention to Combat Desertification
HFCs	Hydrofluorocarbons	UNDP	United Nations Development Programme
HPMP	HCFC Phase-out Management Plans	UNEP	United Nations Environment Programme
IDB	Inter-American Development Bank	UNFCCC	United Nations Framework Convention on Climate Change
IDFC	International Development Finance Club	UNIDO	United Nations Industrial Development Organization
IEA	International Energy Agency	UN-REDD	United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation
IFC	International Finance Corporation	USAID	United States Agency for International Development
IFC EF	International Finance Corporation Earth Fund	WBG	World Bank Group

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EXECUTIVE SUMMARY

Clean, efficient cooling – thermal comfort achieved while minimizing use of harmful refrigerants and energy – is urgently needed to mitigate climate change, protect public health from the dangers of heat, promote sustainable development, and reap the economic and environmental benefits of reducing energy demand.

The proven institutional machinery of the Montreal Protocol is being put to work phasing down hydrofluorocarbons (HFCs), a critical piece of the puzzle. Cooling efficiency, however, has no equivalent international institution or fund dedicated to it; it is but one of many issues on the agendas of the multilateral climate funds. Cooling efficiency support has therefore been provided mostly in an ad hoc, uncoordinated manner, failing in particular to capitalize on the Montreal Protocol's work phasing out ozone depleting substances (ODSs) from appliances whose energy use is significant.

The Montreal Protocol community has discussed ways to maximize the climate benefits of its chemical transitions for over a decade, including via energy efficiency. Addressing hurdles to energy efficiency in a coordinated fashion, however, introduces hurdles of its own. The World Bank's work with the Global Environment Facility (GEF) and the Multilateral Fund (MLF), for example, to implement co-financed projects to phase out ODSs and increase energy efficiency was met with mixed success. Challenges related to the predictability of energy efficiency funds, mismatches in approach, greater transaction costs, risks associated with blended finance, the need for interinstitutional coordination, and a dearth of political will hindered these and other efforts to fund energy efficiency alongside refrigerant transitions.

A plan for efficient cooling finance can be built from solutions to these known barriers; streamlining operation of any cooperative effort through a variety of approaches is essential. There remains strong stakeholder support for doing so: in 2018, at the 30th Meeting of Parties, parties instructed some of their key bodies to liaise with other climate funds and financial institutions to evaluate the possibility of "mobilizing additional resources and, as appropriate, [setting] up modalities for cooperation" to support energy efficiency alongside the HFC phasedown (Dec. XXX/5 para 7). Other institutions are also taking a closer look at cooling efficiency; the World Bank, for example, launched an initiative to accelerate the uptake of sustainable cooling solutions this year.

This paper reviews the initiatives of the Montreal Protocol and climate finance communities that offer precedents for a cooperative cooling efficiency program. Noting the breadth of institutions potentially involved, it describes four generic institutional arrangements, or models, for collaboration among institutions: an energy efficiency 'sidecar' to the MLF; a dedicated donor facility housed at a multilateral climate fund or development financial institution; a formal mechanism of interinstitutional coordination; and an increase in disparate, ad hoc activities. They are described in brief in the chart on the following page. One or a combination of these models may be deployed to enhance energy efficiency alongside the work of the Montreal Protocol or, to even greater effect, transform multilateral support for cooling efficiency well beyond the interface of cooling efficiency with the Montreal Protocol.

There are several next steps to get an efficient cooling program off the ground: stakeholders should begin engaging to agree the challenges to be addressed and solutions available; funding should be allocated to support development of a plan, including analytical work, consultations, and more; and pilot programs should be developed to provide the evidence base for a major cooling efficiency program. Interested institutions should meanwhile explore near-term opportunities to increase their effectiveness.

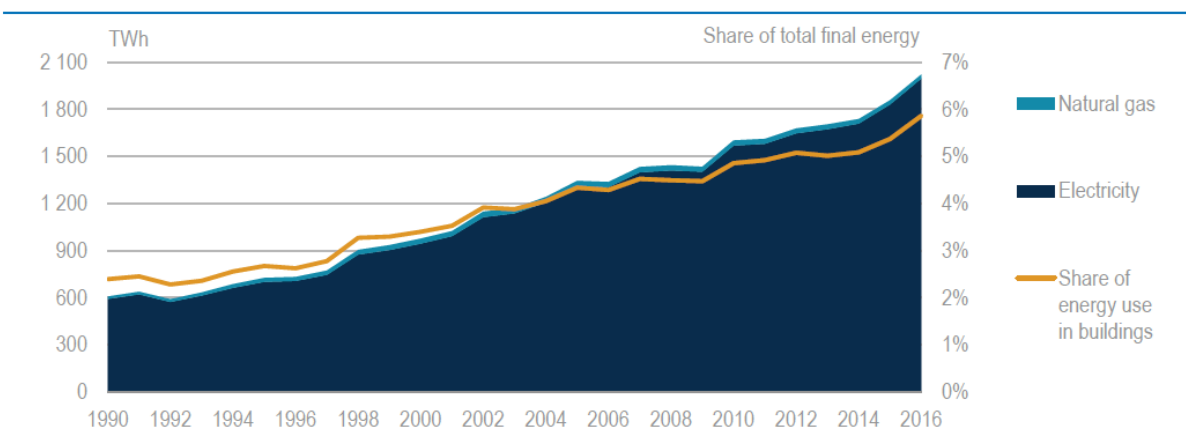
The Four Models

Architectural Model	Description	Strengths	Weaknesses
Sidecar facility	A 'Sidecar' donor trust fund co-located with the Montreal Protocol: donor capital co-located with MLF resources at the MLF secretariat; donor activities funded align closely with Kigali Amendment and MLF mandates.	High functionality and track record of Montreal Protocol and MLF; twinning with existing HPMPs and Kigali implementation grants; efficiency of operationalization building on existing structures and systems.	Political contentiousness within Montreal Protocol and among parties and stakeholders for EE funding; complication of MLF donor mandate under Montreal Protocol; difficulty of determining and applying incremental cost methodologies; not suited to non-grant activities; limited staff and capacity of MLF Secretariat.
Dedicated funding window	Establishment of dedicated funds or financing windows for efficient cooling through existing multilateral finance institutions or donor facilities, e.g. GCF, GEF, UNDP or World Bank.	Flexibility; adaptable to sectors, barriers, opportunities, mechanisms, geographies and markets; can overcome institutional politics and bureaucracy of funding institutions once created and funded.	Politically challenging to align donors and secure senior-level support of host agency; administratively difficult to create and implement effectively; very resource-intensive to create new institutional infrastructure. May be difficult to coordinate with institutions, particularly other than host and donors.
Inter-institutional coordination mechanisms	A mechanism of formal coordination between the MLF and other multilateral climate change entities such as the UNFCCC, GEF, and/or GCF without funding.	Serves to build consensus and institutional collaboration and information sharing; builds trust and communication infrastructure and protocols; may lay groundwork for deeper collaboration.	Slow-moving; does not address funding cycle and project criteria challenges limiting flexibility; does not immediately channel resources to solutions; better track record for information sharing and harmonization of standards and approaches than co-funding; incompatible governance models among some institutions.
Decentralized, disparate donor-supported activities	Most closely resembling the status quo of discrete and disconnected donor initiatives.	Innovation, nimbleness, flexibility, facile engagement with market and other actors (e.g. project developers, financiers, manufacturers).	Lacking in scale and synergy between efforts; difficult to collect and disseminate learnings and best practices; difficulty in harnessing network effects to hasten EE uptake of technology and standards; lack of coordination/ potential to duplicate is paramount; no clear model for lessons learning/sharing of successes.

INTRODUCTION

Communities worldwide depend on cooling for their health and development – both access to it, and its economical and sustainable provision. For cooling to be made efficient, much work remains: technologies and approaches must be identified, policies must be developed, government capacities must be fostered. Important questions remain about how to do these things.

Global cooling demand is booming and in some parts of the world already accounts for more than half of peak demand for electricity. Global energy consumption from cooling has tripled since 1990 to 2,000 TWh annually, and is projected to triple again by 2050.¹



Key message • Energy use for space cooling, almost entirely in the form of electricity, is expanding rapidly in absolute terms and as a share of overall energy use in buildings.

Figure 1. World Energy Consumption for Space Cooling (Source: IEA, 2018)

If current trends continue, cooling alone will make the Paris Agreement goals unattainable. Starting now, large-scale institutional infrastructure of governments, development finance institutions (DFIs), and donor entities needs to be built to meet the challenge of global efficient cooling. Waiting until the solutions for efficient cooling are “ready” will all but guarantee build-out of harmful, last-generation cooling technologies and practices.

The proven institutional machinery of the Montreal Protocol will be put to work phasing down HFCs – one part of the puzzle of making cooling appliances more climate-friendly. Energy efficiency, the other major part, has no such international treaty or institution dedicated to it. Such a home is needed: a host of well-documented market, policy, and capacity shortcomings tend to result in the under-deployment of energy efficiency in economies worldwide. Systemically improving cooling efficiency is a top priority to mitigate climate challenge, promote sustainable communities, improve health, and reap the economic benefits of reducing energy demand. There are several ways to achieve these outcomes leveraging the existing institutions that work in this and adjacent spaces; this paper examines several.

Financial support holds part of the key to unlocking scalable, sustainable solutions for efficient, clean cooling. For emerging cooling markets, access to smart finance and the institutional structures that support it may be the best chance to scale efficient cooling solutions while they’re being developed. The challenge before us is to devise financial and institutional “means” for encouraging these solutions before

we know exactly what they are. Do we seek widely-available, cheap, ultra-efficient room air conditioners? Buildings that don't depend on mechanical cooling? Non-vapor-compression building chilling systems? Well-staffed energy ministries that work to implement myriad country-specific solutions around the globe? Incentives for maintenance that make it more likely that energy efficiency does not degrade over time? Community cooling hubs that provide rural access to energy efficient cooling infrastructure?

Efficient cooling is inherently interdisciplinary. Refrigerants; energy efficiency; electricity pricing; system maintenance; raw materials extraction, reuse, and disposal; buildings and real estate; and architecture and urban design all tend to be the purview of different agencies and interests. Cooling touches many of the Sustainable Development Goals (SDGs), relates to the Montreal Protocol's work replacing ozone depleting chemicals and HFCs, and dramatically impacts the projected electricity consumption of the world's developing countries. The logical entities to be involved in a global efficient cooling program are all the players interested in those wide-ranging topics. At the international level, they include climate funds, multilateral development banks (MDBs), UN agencies, the Montreal Protocol, and nongovernmental initiatives.

Both the sheer scale and the diversity of the cooling challenge calls for global, cross-institutional approaches. Subsets of the challenge can be met by subsets of the community. But without broad coordination, the successes we can hope for diminish to unsatisfying reflections of what they should be. Institutional arrangements should be flexible enough to accommodate the wide range of solutions.

With strong political will, the world's institutions could converge to make efficient cooling the global norm. Doing so would contribute substantially to meeting the goals of the Paris Agreement, the SDGs, and the Kigali Amendment. Coordination among the MLF and climate-related funds is a matter of shared interest – in principle, their objectives are aligned, if not identical. But disparate institutional practices, arrangements, and governances pose significant challenges to rolling out a coherent efficient cooling initiative.

This paper describes opportunities to improve financial support and coordination for efficient cooling. It describes a number of potential architectural models that could address some of the barriers to a scalable institutional approach to promoting efficient cooling. It intends to propel the discussions of a global approach forward by offering options; it does not claim to predict the success or failure of any particular approach. These approaches may be employed specifically to enhance energy efficiency alongside the work of the Montreal Protocol, or may be used to even greater effect to transform multilateral support for cooling energy efficiency well beyond the interface of cooling efficiency with the Montreal Protocol.

BACKGROUND

COOLING EFFICIENCY AND THE MONTREAL PROTOCOL

In October 2016 countries agreed the Kigali Amendment to the Montreal Protocol, a global deal to phase down use and production of HFCs. In the accompanying decisions, cooling energy efficiency made several prominent appearances: first, parties agreed to increase servicing/end user sector funding available to low volume consuming countries for, inter alia, maintaining energy efficiency (Dec. XXVIII/2 para 16); second, parties agreed to request cost guidance associated with maintaining and/or enhancing the energy

efficiency of low- or zero-global warming potential (GWP) replacement technologies and equipment, noting the role of other institutions addressing energy efficiency (Dec. XXVIII/2 para 22); third, in a separate decision, parties called on the Technology and Economic Assessment Panel (TEAP) to review and report on opportunities to improve energy efficiency and solicited party feedback on their experiences (Dec. XXIII/3).

Through 2017 and most of 2018, parties continued discussing energy efficiency vis-à-vis the HFC phasedown. At the 29th Meeting of the Parties, a multipart decision was taken to further TEAP's evaluation of energy efficiency, including a request to, inter alia, provide an overview of activities of other major climate funders and financiers working in the area of energy efficiency (Dec. XXIX/10 para 2). Prior to the 40th Open-Ended Working Group, the Ozone Secretariat held a two-day workshop on cooling energy efficiency, convening global experts, including several from climate funds and MDBs, to share experiences with energy efficiency and views on potential areas of cooperation.

In November 2018, at the 30th Meeting of Parties, parties inter alia “requested the Executive Committee, in dialogue with the Ozone Secretariat, to liaise with other funds and financial institutions to explore mobilizing additional resources and, as appropriate, set up modalities for cooperation, such as co-funding arrangements, to maintain or enhance energy efficiency when phasing down HFCs, acknowledging that activities to assist Parties operating under paragraph 1 of Article 5 in complying with their obligations under the Montreal Protocol would continue to be funded under the Multilateral Fund in accordance with its guidelines and decisions (Dec. XXX/5 para 7).”

Dec. XXX/5/7's core concept, “...mobilizing additional resources and... modalities for cooperation, such as co-funding arrangements” in support of energy efficiency when phasing down HFCs, is the focus of this paper. The paper explores types of institutional structures that may promote the attainment of efficient cooling, organized into four general ways to cooperate among funding sources. We describe some benefits and limitations of each and also discuss financial mechanisms that may be facilitated by certain types of inter-fund collaborations.

The HFC phasedown presents an excellent opportunity to improve the energy efficiency of cooling appliances en masse. The MLF will provide financial support to manufacturing enterprises to redesign products, retool manufacturing lines, and more, to comply with HFC reduction measures. Expanding that effort to simultaneously boost energy efficiency would cut down significantly on the transaction costs of doing so. In addition, providing energy efficiency support would help smaller, domestic manufacturers remain competitive with larger, often multinational companies that have greater resources to devote to energy efficiency research and development. Specific interventions have been identified, such as adding capacity for manufacturers to produce and test variable-speed air conditioners, that would be particularly helpful to the competitiveness of local enterprises.

Energy efficiency, however, is not currently a compliance obligation of the Montreal Protocol. Unless parties agree otherwise, manufacturers will not be eligible to receive support from the MLF to defray their investments in energy efficiency above and beyond what is needed for refrigerant conversion. This limitation has been reiterated by the Montreal Protocol's decisionmaking bodies (see ANNEX 3: THE MULTILATERAL FUND, ENERGY EFFICIENCY, AND ITS RELATIONSHIP TO OTHER FUNDS, for a brief history of the MLF's deliberations related to energy efficiency). The Montreal Protocol is currently carrying out a phaseout of ozone-depleting hydrochlorofluorocarbons (HCFCs) and preparing to implement the Kigali

Amendment HFC phasedown. Absent agreement otherwise, it will be up to other climate and development institutions to encourage the transition to energy efficiency during the HFC phasedown.

INSTITUTIONAL INTEREST IN COOLING EFFICIENCY

Energy efficiency projects worldwide draw billions of dollars in multilateral support. Estimating energy efficiency-related financing flows precisely is challenging and estimates of cooling efficiency are even harder to quantify. But activity appears to be on the rise. The most important institutions interested in the cooling efficiency objectives, inclusive of donors, development agencies, and DFIs, may be broken into the following categories (see List of Abbreviations as needed):

- The MLF Secretariat
- MLF implementing agencies: World Bank, UNEP, UNDP, and UNIDO
- Bilateral donor agencies and governments, including MLF funding contributors
- Key global climate funds: GEF, GCF, and CIFs
- Multilateral development banks: ADB, EIB, EBRD, AfDB, IDB, IsDB, AIIB, etc.
- Philanthropic donors led by the Kigali Cooling Efficiency Program (K-CEP) and the Children's Investment Fund Foundation (CIFF)

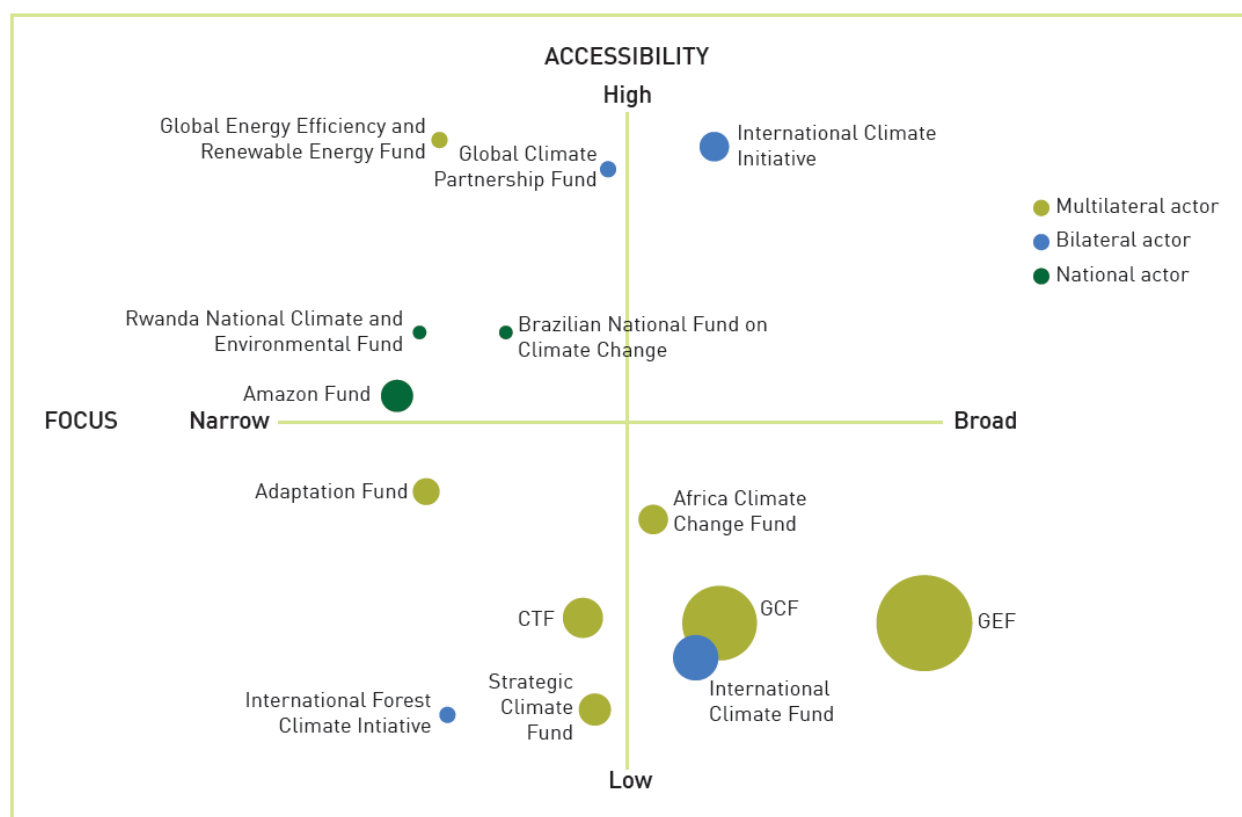


Figure 2. Snapshot of Environmental Donor Funds (GEF, 2017)

Figure 2 reviews the status quo in brief, as does ANNEX 7: KEY FINANCIAL INSTITUTIONS.

There is a range of disparate initiatives and projects in the efficient cooling space, supported by donors such as K-CEP (see Box 1), GiZ, ClIFF, Conservation X Labs, and other philanthropic and bilateral donors, with K-CEP itself representing a large coalition of philanthropies.^{2, 3, 4} The Montreal Protocol MLF has supported a number of discrete small projects that effectively incorporate energy efficiency as pilots, largely outside the scope of its formal compliance mandate regarding obligations on Montreal Protocol parties.^{5,6} The World Bank, the GEF, and the MLF co-financed a cohort of projects to phase out ODSs and increase energy efficiency in building chillers.

A small number of cooling efficiency projects have been advanced or supported by the largest of the multilateral climate change donor funds, the GCF and the GEF. MLF implementing agencies, including the UN Environment OzonAction Secretariat, UNDP, UNIDO and the World Bank, have a wealth of experience with project implementation and in some cases have the ability to provide their own

capital or channel donor resources, though this has happened to date on a limited basis. K-CEP has also assisted in seeding and coordinating such projects. Other than ClIFF’s and K-CEP’s attempts at a comprehensive cooling efficiency strategy and engaging the key stakeholders of the Montreal Protocol community, and the World Bank’s recent series of sustainable cooling forums, these efforts have been largely disjointed and atomized, without coordination and collective strategic planning.

Notwithstanding the lack of a clear institutional framework for efficient cooling, energy efficiency is progressively being incorporated into the practices of entities that operate in the Montreal Protocol space. K-CEP was launched in 2017 as a multi-donor initiative to begin addressing the efficient cooling challenge. Its activities aggregating donor funds, coordinating and supporting the MLF and other multilateral donor entities, and experimenting with approaches intended to catalyze markets,

STATE OF DONOR FUNDING FOR COOLING EFFICIENCY



Figure 3. Barriers to Donor Funding for Efficient Cooling

Box 1: The Kigali Cooling Efficiency Program (K-CEP)

The Kigali Cooling Efficiency Program (K-CEP) works together with the Kigali Amendment to the Montreal Protocol to help developing countries transition to energy-efficient, climate-friendly, and affordable cooling solutions. Formed in March 2017 after a group of foundations and individual donors pledged \$51 million to help increase the energy efficiency of cooling, K-CEP has since allocated approximately \$48 million to projects in 44 countries. K-CEP also provides technical assistance and has since helped multiple developing countries introduce national cooling efficiency plans and National Cooling Plans, with over two dozen more in development.

Source: K-CEP Year 2 Report, Kigali Cooling Efficiency Program (2019).

government action, and development assistance serve as a backdrop for an expansion and formalization of K-CEP's and others' initial efforts in the cooling efficiency arena.

Examples for the type of cooling efficiency initiative sought may be found in a number of large-scale efforts to tackle renewable energy, carbon pricing, deforestation, energy access, and adaptation and resilience. All have enjoyed sustained and concentrated donor support, often centered around dedicated initiatives, multilateral structures, and funding facilities. REDD+ is an initiative comprised of various efforts to reduce emissions from deforestation and forest degradation that have been implemented worldwide. The most well-known are the UN-REDD program, which supports and promotes national REDD+ activities, and the Kyoto Protocol, which brought carbon credits and trading to the forefront. Investment in renewable energy has surged globally in the last decade; as costs have declined, support in both the public and private sector has soared. By contrast, there has been a paucity of large-scale dedicated initiatives to support cooling efficiency; those that do exist have been small and dispersed.

BARRIERS AND OPPORTUNITIES

There are two interrelated sets of barriers to financing cooling efficiency. One set concerns marketplace impediments that hinder the penetration of energy efficiency, both in the cooling space and more broadly. The second set concerns the challenges particular to the donor community and its efforts to overcome the first set of barriers; this paper intends to address these issues by exploring options for donor coordination and enhanced action.

BARRIERS: WHY COOLING EFFICIENCY IS NOT ADDRESSED IN THE MARKETPLACE

Barriers to adoption of cooling efficiency, akin to those for energy efficiency more generally, are well documented. They form the basis of challenges necessary for the donor community, governments, market actors and philanthropy to tackle. Evidence suggests that solutions must be holistic and comprehensive, because addressing any individual barrier is necessary but typically not sufficient to enable and accelerate market uptake of efficient solutions.

- **Market barriers.** Market barriers relate to consumers' unwillingness to voluntarily purchase more efficient cooling appliances and systems that will ultimately lower their life cycle ownership costs. As a consequent, manufacturers are under-incentivized to supply the market with energy efficient products. There are numerous reasons for this, first and foremost consumer sensitivity (particularly for lower- and middle-class households) to purchase price; most efficient air conditioners tend to be more expensive upfront in the absence of regulations and/or financial incentives. Lack of consumer awareness about the benefits of energy efficiency compound this effect unless regulation mandates adequate labeling of appliance energy performance and lifetime energy costs. Needs will vary depending on the size of local markets, climate, and energy costs.

Possible response: a combination of grants for policy reform (e.g. labeling and consumer awareness) and consumer incentives such as rebates.

- **Policy barriers.** Policy barriers originate from the need to address market failures through policy. Appliance performance testing and labeling and minimum energy performance standards (MEPS) are effective tools but require a significant technical policy apparatus to devise and maintain effectively. Building energy conservation codes and performance ratings, the analogous policies for buildings in their entirety, reduce cooling energy demand by imposing requirements on insulation, building materials, fenestration, natural ventilation, and more. Urban design choices, such as greening of spaces, can also significantly cut down cooling demand but require dedicated attention. Public policies can also encourage manufacturers and utility efforts to promote more efficient cooling measures, including procurement for government buildings, but require prioritization by local governments.

Possible response: in emerging markets, DFIs can provide grants and technical assistance for policy design.

- **Lack of domestic coordination between environmental and energy agencies.** On the topic of appliance efficiency, the MLF has traditionally worked with environmental agencies while the GEF and GCF most often work with energy agencies on appliance efficiency. The climate change benefits of improving cooling efficiency may therefore not be given appropriate consideration by the agencies with relevant authority, although this disconnect is being addressed in some countries which have included cooling efficiency in their NDCs. K-CEP has also supported a program to promote coordination between these agencies many countries.⁷ There is also a failure to recognize energy efficiency as a resource for grid planning by power ministries, many of which house national energy efficiency offices.

Possible response: expand efforts to promote inter-agency cooling efficiency coordination and joint project proposals to DFIs and climate funds; socialize energy efficiency as a resource.

- **Capacity barriers.** Several aspects of clean, efficient cooling require ongoing capacity to maintain. Servicing and maintenance of air conditioning and refrigeration systems can improve performance, but many countries lack government mandates and trained personnel to provide adequate post-sale operations & maintenance, particularly with flammable refrigerants. Evaluation, measurement, and verification of energy efficiency measures, as well as market surveillance, are needed to ensure compliance with efficiency standards and building codes. Training of customs officials is also often needed to assure imported equipment complies with domestic requirements.

Possible response: grants for technical assistance/capacity building for (i) government agencies, customs officials and compliance officers; and (ii) training and building technical capacity for post-sale operations and maintenance to help maintain and when necessary rehabilitate equipment.

- **Finance and access-to-finance barriers.** Businesses are seldom interested in or able to secure capital for energy efficiency investments in their buildings and equipment, and banks often will not lend for such projects due to an apparent absence of security. Manufacturers may also be capital-constrained, preventing investment in high efficiency production lines requiring substantial capital outlays and higher per-unit costs that must be carried until unit sale. These barriers are exacerbated by the small size of most cooling efficiency projects, leading to high

transaction costs and barriers to aggregation and securitization. More standard barriers to finance also apply, such as the inability to hedge political and currency risk and lack of access to long-tenor loans.

Possible response: direct financing, guarantees or other risk reduction measures for local lenders, sometimes credit enhancement for targeted energy efficiency loan programs, or other ways to “crowd-in” local banks into the business of financing efficiency investments.

BARRIERS: WHY DONORS STRUGGLE TO OVERCOME BARRIERS TO SUPPORTING COOLING EFFICIENCY

Inter-institutional energy efficiency projects alongside work of the Montreal Protocol have encountered barriers to success. Disparate priorities, funding cycles, application and reporting requirements, technology preferences, and intervention approaches have resulted in poor coordination. Many of these challenges apply to climate change mitigation projects in general, but some appear exacerbated in the case of cooling.⁸

A 2015 World Bank assessment of co-financing climate benefits alongside work of the Montreal Protocol made several significant findings, the details of which remain very relevant, including:

“Challenges arise... with respect to timing, approach, and implementation: No sources of funds were identified that could provide the type of predictable funding that would allow countries to plan on securing funds in accordance with the timeframe of their compliance obligations under the Montreal Protocol. Climate financing traditionally takes a demand-side approach offering incentives to end-users to reduce their energy use, while the Montreal Protocol typically works with equipment manufacturers to replace ODS in production processes. Multisource financing can add to transaction costs and elevate governance and decision risks in interdependent financing operations.”⁹

Achieving cooperation and coordination between climate funds would seem to be a matter of shared interest – in principle, their objectives are aligned if not identical – but in practice runs counter to their institutional arrangements and governance. The result can be significant operational and procedural complexities. The GEF resource allocation system, for example, determines how much of each replenishment goes to each country and focal area, with relatively small amounts for climate change over the four-year replenishment cycle for most recipient countries. Each fund has its own application and review process and the requirements and timetables for processing can vary significantly. The availability of resources and strategic focus of each varies as well; the GCF is focused on replenishment this year, while the GEF is about to begin a process for selecting a new CEO.¹⁰ Both will distract from the effort to formulate a plan to coordinate on efficient cooling.

Further, the GEF and GCF are both constricted by their decision-making processes: the GEF, for example, distributes climate resources according to a rigid ‘STAR’ country allocation system, which limits the size and scope of strategic initiatives and discourages private sector projects. UNDP has twice submitted proposals to link energy efficiency funding to refrigerant replacement, for Indonesia and Mauritius. Neither was approved due to unresolved objections from European Council members as to the choice of

refrigerants. The GCF requires unanimous approval of projects from its board, leading to a lowest common denominator approach to project selection that effectively limits risk-taking and politically sensitive approaches.

Blended finance, i.e. using donor capital for bearing risk in tandem with commercial investors or for providing necessary grant support to enable pipeline development and project execution, can increase the amount of capital directed to efficient cooling. Yet blended finance is often difficult to implement and has proved especially so for energy efficiency, where projects are often small, difficult to aggregate, unfamiliar to investors, hard to monetize, and of low priority for governments, corporations, and investors. There is large potential to use concessional donor capital to spur market investment, but only with concentrated efforts, and usually after other upstream policy and capacity barriers have been addressed. That potential in the cooling efficiency space remains largely untapped.

OPPORTUNITIES

Opportunities in many ways mirror the barriers: finding solutions to them can result in major successes. Targeted efforts can create necessary, but by themselves likely insufficient, conditions for market penetration. The World Bank recently illustrated these conditions, as shown in Figure 4.¹¹ There are discrete elements related to policy, technology, supply chains, market development, and scaling that are substantially enhanced by sequencing and coordination. These necessary elements can be vertically integrated in one initiative, or disseminated horizontally among many support institutions, which in turn need to be coordinated and/or aligned. It should be noted that there may be many important steps in the process prior to technology choice, beginning with needs assessments and other evaluations.

Indicative Taxonomy of approaches

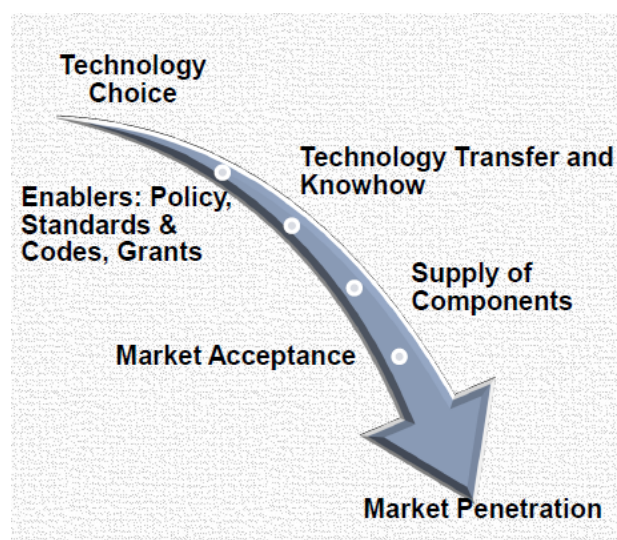


Figure 4. Stages in the Adoption of Cooling Efficiency

TAXONOMY OF COOLING EFFICIENCY SUPPORT ACTIVITIES.

To undertake the opportunities and overcome the barriers described above, there is a range of support mechanisms and responses available to donors. Breaking them down according to an indicative taxonomy can illustrate the type and scale of donor funding required (see

Table 1 below), and can be matched to the institutional capacities and structures best positioned to deliver support.¹² These categories include pilot and demonstration projects, technology development, reduction in consumer prices, manufacturer support, technical assistance and capacity building for policy and implementation, and financing. A more detailed treatment of these categories of support can be found in ANNEX 2:

Table 1. Opportunities for Addressing Barriers

Opportunities	Description
1. Increased resource allocation within key donor institutions and funds	Catalyze donor investment in policy, capacity, and market promotion activities within countries (total dollars relative to investment identified at project initiation) and greater focus and investment in clean cooling among existing climate donor institutions, such as the GEF and GCF.
2. Policy measures to increase consumer demand	Increase consumer demand for energy efficient products and introduce successful business models for efficient cooling technologies.
3. Catalyze commercial and impact investment	Catalyze private-sector investment in efficient cooling and attract the interest of non-climate donors, philanthropists, and policymakers in supporting efficient cooling and cooling access as an enabler of SDGs and national development goals.
4. Promote cross-sectoral linkages with SDG delivery	Increase awareness and engagement in the importance of cooling access for delivery on SDGs and other development initiatives; embedding in urban and building design, management, and maintenance to promote conservation, reduce cooling demand, and improve cooling performance.
5. Improve knowledge management and dissemination	Develop new practical, applied knowledge and learning for dissemination to global markets and policymakers to accelerate the efficient cooling transition (more difficult to quantify, but potentially reflected in publications, evaluations, and other resources on the topic); a closely related benefit could be new methodologies and metrics for energy efficient cooling benefits, both for climate change and for development more broadly, enabling effective project design, selection, implementation, and M&E/monitoring, reporting and verification (MRV) of project results.
6. Improve donor coordination	Engender greater coordination of the climate donor community on efficient cooling, through informal agreements and/or formal coordinating structures and initiatives, including a commitment to efficiency within the Montreal Protocol architecture and a pathway to operationalizing it, including new donor commitments to the MLF and enhanced capacity within the MLF for efficient cooling program and project management.
7. Include cooling in country policy planning	Spur greater inclusion of and commitment to efficient cooling in countries' NDCs and NDC implementation plans.

These categories can be further divided into types of funding – grants and non-grant instruments – and specific instruments targeted to different groups of beneficiaries, including manufacturers, consumers, local finance institutions, and other supporting entities (see Table 2 below). It should be noted that different funding mechanisms and uses would be directed towards different beneficiaries. For example, a facility targeting policy and regulatory barriers would likely supply grants that help public entities to develop and design good regulatory and legal approaches that can address policy barriers but may not directly address the needs of manufacturers to finance and implement the necessary technology upgrades.

Table 2. Donor Funding Support Instruments and Beneficiaries

Type of Funding	Use of Funds	Opportunity Type (based on Table 1)	Recipients			
			Manufacturers	Consumers	Local Financial Institutions	Providers of TA/Capacity building
Grant funding	R&D grants	3, 4	x			
	Policy & regulatory planning, execution	2, 4, 5, 7				x
	Advance market commitments	2, 4, 5, 6	x	x	x	x
	Capital cost buy-downs	3	x			
	Purchase price buydown (rebates, etc.)	2, 3	x	x		
	Interest rate buydown	2, 3	x		x	
	Pilot & demo projects	2, 3, 4	x	x	x	x
	Technical assistance (convening, studies, advisory)	2, 4, 5, 7				x
	Capacity building (trainings & workshops)	4, 5				x
	Procurement support	2, 3, 4		x		x
Non-grant investments	Direct loans for EE AC production & consumption	2, 3	x	x		
	Loan guarantees	1, 3, 6	x			
	Risk sharing/guarantees for FIs	1, 3, 6			x	
	Equity & direct investment (e.g. convertible debt)	3, 6	x		x	

ARCHITECTURAL MODELS FOR MULTILATERAL COLLABORATION ON COOLING EFFICIENCY FINANCE

The opportunities, funding mechanisms, and programmatic approaches listed above address the underlying barriers to adoption of efficiency. The architectural models proposed in this section present options for how the donor community can organize itself to address them and in turn overcome its own barriers to achieving impact. These architectural models are intended as a menu of options for enhancing and accelerating donor coordination and delivering and mobilizing resources where they are most needed to catalyze investments in cooling efficiency. The four models explored here include:

- 1) A ‘sidecar’ donor trust fund co-located with the Montreal Protocol: donor capital co-located with MLF resources at the MLF secretariat, with programmatic activities closely aligned with the Kigali Amendment and MLF mandates;
- 2) A dedicated fund or financing windows for efficient cooling within existing multilateral finance institutions or donor facilities, e.g. GCF, GEF, UNDP or World Bank;
- 3) A mechanism of formal coordination between the Montreal Protocol and other multilateral climate change entities such as the UNFCCC, GEF, and/or GCF without funding;
- 4) Decentralized, disparate donor-supported activities.

These four models are not necessarily mutually exclusive. In fact, Models 1 and 2 reflect arrangements for centralized funding facilities while Models 3 and 4 represent cooperative mechanisms between and amongst donors and funds, which currently disperse funds in a decentralized and dispersed manner. Donors could choose to site

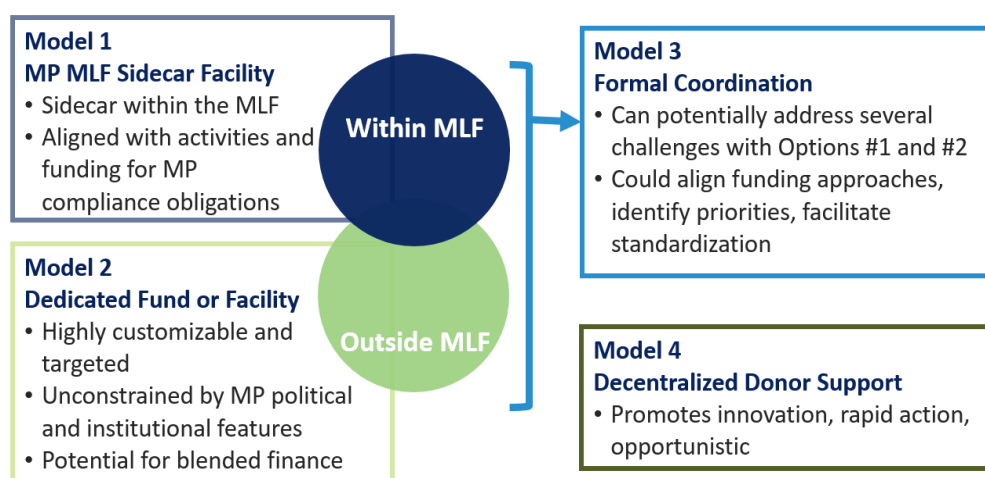


Figure 5. Approaches to Donor Support for Cooling Efficiency

funding for efficient cooling both within an MLF sidecar (Model 1) and in a new dedicated fund or funds (Model 2), and incorporate both formal (Model 3) and informal/limited approaches to coordination (Model 4) amongst themselves and other funders not participating in a dedicated fund. Yet while pursuit of multiple models in parallel has the potential for mutually supporting and synergistic efforts, an unfocused donor landscape that does not collectively prioritize will likely fail to achieve maximum gains. Consequently, there are strategic decisions to be taken about the feasibility, required inputs, opportunity costs, and likely benefits of each approach.

The treatment here of the four models describes their purposes, lays out their strengths and weaknesses, and cites examples of past precedents, experience, and proposals that fit the typology. Opportunities and resource requirements for both near-term, quick wins and longer-term, more ambitious agendas are included to support both fast action and realize the broader global potential for cooling efficiency at scale. These models take as their point of departure the opportunity created by the adoption of the Kigali Amendment and the institutional support of the Montreal Protocol and MLF. As such, the models proceed according to progressively diminishing linkages to the Montreal Protocol and its institutions.

MODEL 1: MONTREAL PROTOCOL MLF 'SIDE CAR' FACILITY

An MLF energy efficiency sidecar facility would be a separate entity within the MLF funded to improve energy efficiency alongside the HFC phasedown. It refers to an arrangement in which donor capital is co-located with MLF resources housed at the MLF Secretariat. A sidecar envisions donor activities funded by donor resources beyond those contributed to the MLF for Montreal Protocol compliance obligations, but that align closely with Montreal Protocol Kigali Amendment and MLF mandates. (For an overview of the Montreal Protocol's recent consideration of funding for efficient cooling and for a dedicated sidecar facility, see ANNEX 3: THE MULTILATERAL FUND, ENERGY EFFICIENCY, AND ITS RELATIONSHIP TO OTHER FUNDS.)

APPROACHES TO DONOR SUPPORT: STRUCTURE OF FINANCE FACILITY

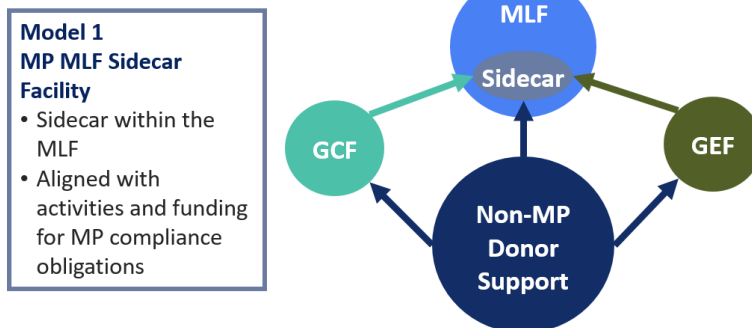


Figure 6. Model 1: MLF Sidecar Facility

The MLF has worked beyond its typical remit on some occasions. It has accommodated at least one fund for a dedicated purpose: the 17-donor, \$27 million 'fast-start' fundraised for activities related to early implementation of the Kigali Amendment.¹³ These funds were placed alongside regularly-replenished MLF funds and their use has been determined by the Executive Committee. The fast-start funds have been used to prepare for implementation of the Montreal Protocol, for example to support ratification of the Kigali Amendment, and thus represent a partial departure from the MLF's traditional focus on compliance.

A sidecar facility would most readily be devised to support activities other than incremental-cost aspects of energy efficiency; defining a methodology to account for incremental costs and benefits would take significant time to produce. These non-incremental-cost aspects would include formulations of national cooling plans, incorporation of cooling efficiency targets into Nationally Determined Contributions, establishment and/or strengthening MEPS, servicing and maintenance guidelines and technical support, preparation of joint efficiency and refrigerant conversion project proposals, and various market enabling and government capacity building activities. The sidecar could also support emerging cooling efficiency technologies and business models with pre-commercial technology development and deployment programs.

An energy efficiency sidecar could also be designed to support incremental cost grants for transitioning production lines to produce more energy efficient cooling appliances. Ideally, these grants would be aligned with HCFC Phase-out Management Plans (HPMPs) or HFC phasedown compliance activities; many of the costs of intervening at manufacturers' facilities are already being born by the MLF to change refrigerants, so the additional cost of making energy efficiency alterations is reduced. A precise methodology would need to be developed to account for baselines, costs, and benefits, or interventions would need to be specific and limited in scope. (see ANNEX 4: CONSIDERATIONS SURROUNDING INCREMENTAL COST GRANTS FOR ENERGY EFFICIENCY)

Sidecar facility details

In general, the energy efficiency sidecar fund should be housed as close as possible to the locus of institutional capacity for program design and implementation. Where possible, the donor funding should enter existing entities, or reside in newly-created funding vehicles such as the GEF Earth Fund expressly designed to minimize bureaucratic and political friction in coordinating with the 'core' institution or institutions (e.g., MLF, UNFCCC, GEF, GCF, etc.).

A new facility, possibly requiring new legal arrangements, could ring-fence new donor funds to emphasize the distinct efficiency mandate of the sidecar and eschew confusion surrounding the scope of eligible MLF funding beyond HPMP and Kigali Amendment compliance activities. The development of autonomous governance and capacity would be particularly important as the scale of the sidecar increases; such a discrete management structure was not created for the fast-start funds. Practically, decision-making authority, policies, and procedures would be delegated to the MLF Executive Committee and Secretariat, much as donors establishing trust funds at the World Bank, UNDP, and other multilateral donor agencies delegate project selection and application of other policies and procedures to the trustees and fiduciaries.

Pre-approving a set of energy efficiency promotion activities would minimize complexity and management burden on the MLF Secretariat. These activities should, where possible, be fully integrated into HPMPs and Kigali Amendment implementation plans, and aligned with the same implementing agency/country/sector pairings already in place for ongoing Montreal Protocol implementation. Should methodologies be readily available and applied, incremental cost grants to more aggressively target energy efficiency benefits could be adopted into HPMP implementation grants to manufacturers for production line conversion, or to recipients in low-volume countries targeting the servicing sector.

The MLF also has a history of pilots and demonstration projects that have incorporated cost elements beyond basic Montreal Protocol compliance (at the time they are conducted, at least), in order to promote the adoption of innovative technologies, maximize benefits, and achieve cost discovery. Building on this experience, the MLF and its Secretariat could absorb more resources and expand existing efforts. MLF has in the past supported pilot projects that yield energy efficiency benefits, though new activities would expand in scope and focus on targeting cooling efficiency. These activities would likely require the development of new management and implementation capabilities and operational procedures within the MLF Secretariat for grant selection and management, and downstream in implementing agencies at the level of project implementation. The MLF Secretariat has already developed many of these capabilities in the process of implementing dedicated technical assistance programs, such as for ratification support of the Kigali Amendment among Article V countries, and for a range of energy-efficiency themed pilots.¹⁴

^{15, 16} The MLF implementing agencies have themselves also developed many of these capabilities, both through the implementation of the MLF pilot projects themselves, as well as through donor-funded initiatives funded by other donors such as the GEF and the HFC Initiative of the Climate and Clean Air Coalition (CCAC).¹⁷ These activities could remain within the MLF or be transferred to the new sidecar facility. Cooling efficiency pilots and demonstrations would help the Executive Committee gain an understanding of the costs of maintaining and/or enhancing energy efficiency during refrigerant transitions, the subject of a request for guidance from the parties (Dec. XXVIII/2 para 22).

In the case of incremental costs for manufacturing production line upgrades beyond the MLF's refrigerant substitution mandate, the sidecar should seek discrete additional money and capacity for project guidance, decision-making, management, governance, and procedures. Committing incremental cost support for energy efficiency should be commensurately matched with obligations upon countries and manufacturers analogous to the Montreal Protocol's ODS phaseout and HFC phasedown compliance obligations. Most likely, this type of intervention would require collaboration with other high-capacity institutions unless limited in scope and cost.

Multilateral donor agencies are well suited for the grant activities outlined in the preceding section. Their activities can extend far beyond the scope of traditional MLF activities and may include appliance rebate programs, research and development, business support services, prize competitions, and more. These agencies include MLF implementers, other high-capacity donor agencies, and institutions such as regional development banks, bilateral donor agencies, and large philanthropies and charities. Most or all of these are GCF accredited entities (AEs) and have well-established project and financial management frameworks, and the requisite technical capabilities. Implementation or funding windows of this nature would likely be housed at a UN agency or the World Bank, or could be jointly hosted. Depending on the degree of coordination envisioned with the UNFCCC, the implementing entities should be well-established in the climate finance and diplomacy firmament in order to integrate effectively with UN diplomatic processes. In particular, the development, implementation and financing of Nationally Determined Contributions is an opportune focal point for multi-institutional coordination around efficient cooling. Strong enabling policies, robust institutional capacity, and established relationships between environment and energy ministries will help grantmaking entities and implementors maximize opportunities.

Trade-offs and Other Considerations

Political support for a sidecar facility by the MLF Executive Committee and the parties to the Montreal Protocol should not be taken for granted; it will need to be cultivated. More often than not, the MLF and its Executive Committee have rejected sidecar-like facilities and other voluntary additional contributions earmarked for non-compliance-related activities. Twice in recent history the MLF has declined voluntary funding related to increasing the climate benefits of its engagements. It lacked consensus to accept 3 million euros from the EU in 2013 and, in 2018, declined to accept US \$2 million from the governments of the UK and Northern Ireland to serve "as a proof of concept, demonstrating how the co-funding approach could be operationalized for future additional funding" and to "provide further information relating to costs for maintaining or enhancing energy efficiency in the refrigeration, air-conditioning and heat-pump sectors when phasing down HFCs."¹⁸

Some of these rejections arose from concerns about expanding the scope of the MLF beyond the core work of implementing the Montreal Protocol. Others have stemmed from procedural issues. Substantive

concerns and disagreements have stymied sidecar efforts before, along with political concerns about governance and priority-setting. Stakeholder engagement and careful planning will be necessary to engage any commitment of MLF institutional resources or adjustment of policies, even if sidecar funding is not provided through the MLF contribution process by the parties.

To help ensure the sidecar’s operational success, outreach would be required, from the MLF and beyond, to generate a sufficient project pipeline. A clearly defined approval process that articulates to project proponents the approval procedures and project evaluation criteria will also be needed. The MLF Secretariat may be able to use its institutional architecture and the policies of existing implementing institutions to operationalize a project approval process, particularly for grant-making activities.

Incremental cost grants in particular may require extensive technical study and political negotiation before standardization and scaling. Developing a methodology to underpin incremental cost grants for energy efficiency would be a complex undertaking, incorporating both the measurement methods and calculation of the various benefits of energy efficiency as well as approaches to determine incremental costs against a baseline scenario (for further consideration of the incremental cost question, which has been tackled by the MLF and the GEF among other institutions, see ANNEX 4: CONSIDERATIONS SURROUNDING INCREMENTAL COST GRANTS FOR ENERGY EFFICIENCY).¹⁹

MODEL 2: ESTABLISHMENT OF DEDICATED FUNDS OR FINANCING WINDOWS FOR EFFICIENT COOLING

A dedicated finance facility for cooling efficiency is a candidate for complementing the MLF’s implementation of the Kigali Amendment to phase down HFCs. The scale of support required to enable efficient cooling solutions globally extends far beyond what MLF, even in expanded form, can reasonably take on. The most likely candidates for hosting a dedicated facility would be existing multilateral climate funds, such as the GCF or GEF; DFIs with cooling expertise, such

as the MLF implementing agencies UNDP, World Bank, UNEP and UNIDO; and/or other MDBs such as the International Finance Corporation (IFC) and the regional development banks (ADB, IDB, AfDB, IsDB, AIIB, et al.).

A dedicated fund has several advantages. It would likely be housed at a MDB or other DFI and would be able to overcome some of the administrative and political hurdles facing the more-established MLF, which has numerous existing mandates, established policies and procedures, and many political stakeholders. It would also be free to engage in a more diverse set of grantmaking and blended finance activities than the

APPROACHES TO DONOR SUPPORT: STRUCTURE OF FINANCE FACILITY

Model 2 Dedicated Fund or Facility

- Highly customizable and targeted
- Unconstrained by MP political and institutional features
- Potential for blended finance

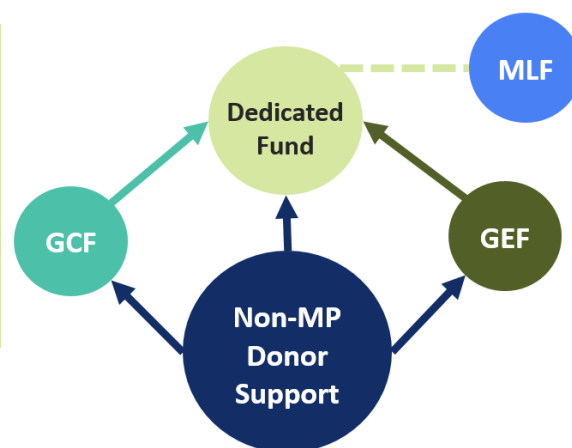


Figure 7. Model 2: Dedicated Fund

MLF, drawing on other institutional capacities and experience and a fresh mandate tailored to the parameters of the efficient cooling issue.

Focus of Dedicated Facilities

The central purpose of a dedicated fund would be to achieve synergies across and attract resources from a broader range of opportunities, programmatic areas, implementers, beneficiaries, and/or funding sources than a sidecar could achieve, allowing it to take on the challenge of cooling efficiency more broadly. Like K-CEP, it would seek a comprehensive approach to the cooling problem, and would have dedicated funding windows or programs that could be designed from scratch to be both strategic and opportunistic. K-CEP's four funding windows – support for cooling efficiency (essentially technical support and training); cooling efficiency policy, standards and programs; finance; and access to cooling – provide a template of sorts for designing a free-standing dedicated fund or collection of funds that address one or more of these critical enabling areas and impact targets.

A dedicated fund would ideally seek financing from multiple sources – or, as in the case of the GCF or GEF, multi-donor funding already consolidated in one institution – to create cohesive and strategic programs that would yield policy, technology, and market breakthroughs necessary for cooling efficiency deployment at scale. Strategic approaches for consideration might include:

- Technology, investment, business model, or policy experimentation to demonstrate proof of concept
- Commitments to addressing critical choke points along the commercialization chain, from R&D and policy readiness to concessional and commercial finance
- National action in critical countries that demonstrate the political will and investment readiness to make rapid progress
- Economy-wide technology transfer and capacity building at scale for demonstrated solutions
- Global platforms hubs for support and exchange

In this manner, a dedicated fund might support development and harmonization of performance policies and standards or the formation and execution of buyers' clubs and other advance market commitments and bulk procurements. Individual programs of the Clean Energy Ministerial (CEM) such as the Global Superior Energy Performance partnership (GSEP) and Super-Efficient Equipment and Appliances Deployment initiative (SEAD), the Global Cooling Prize, or K-CEP's policy and standards finance window are examples of narrow, deep support along these lines.^{20, 21} Targeted advisory services to trouble-shoot policy and commercialization barriers have been deployed through CEM's 21st Century Power Partnership (21CPP) and USAID's Scaling Up Renewable Energy (SURE), supporting such elements grid integration, grid and power sector planning, and auctions.^{22, 23}

Other programs support individual small enterprises, such as the Renewable Energy and Energy Efficiency Partnership (REEEP) or the Private Financing Advisory Network (PFAN).^{24, 25} Yet other programs and forums support the creation of global standards, prizes, knowledge, and advocacy, in the case of Lighting Global, infoDev, the Global Off-Grid Lighting Association (GOGLA), the International Renewable Energy Agency (IRENA), and GSEP.^{26, 27, 28, 29} Another relevant model with very recent commitment of donor support is the World Bank battery storage program, which received endorsement at the June 2019 meeting of the CIF for a combination of \$1 billion in lending, several hundred million dollars of donor

funding for concessional support, and a separate World Bank led public-private partnership on energy storage.³⁰

Another potential approach would be a fund or funding window dedicated to the support of country programs such as national cooling plans, cooling-related elements of NDCs, and other comprehensive national development efforts intersecting with the goals of cooling efficiency and access. Such programs could emulate the country investment plans of the Clean Technology Fund (CTF), which mobilized hundreds of millions of dollars in concessional finance for renewable energy, energy efficiency, and low-emissions transport and waste management in individual emerging market countries, paired with loans from MDBs and commercial investors

and sometimes inclusive of grant support. Other examples of such national, country-level plan-oriented support mechanisms include the NAMA facility (see Box 2), the Low-Emissions Development Strategies (LEDS) Global Partnership, the Partnership for Market Readiness, and the NDC Support Facility.^{31, 32, 33, 34}

Evidence suggests that these dedicated programs and financing facilities tend to work best when they deliver an array of resources ranging from grant support to technical assistance, capacity building, and opportunities for sharing and developing peer learning and best practices.

Because different countries are at different stages of market development for high-efficiency AC manufacturing and consumer adoption (see Figure 4), the dedicated fund's host institution should maintain the flexibility for multiple project types among those described above. However, the scope and selection of project type(s) and degree of flexibility in project and program design imply different operational modalities, and different necessary capacities of the host institution and implementing entities.

Hosting and Funding Considerations

It may not be practicable or desirable to house all of these activities in one central dedicated fund (even if the activities are to be implemented by a range of implementers), for political or practical reasons explored below. In such a circumstance, the pie of efficient cooling support measures could be divided into segments akin to the K-CEP funding windows, each with a dedicated fund housed at an appropriately positioned multilateral institution. Should multiple funds be created, they ideally would be closely aligned and coordinated per the approaches of Model 3 below. Invariably, such intensive interagency coordination would be required to align the activities of the dedicated fund or funds with those of the

Box 2: Nationally Appropriate Mitigation Action (NAMA) Support Projects in Thailand and Colombia

Thailand - Refrigeration and Air Conditioning NAMA

Refrigeration and air conditioning account for approximately 20% of Thai GHG emissions and are forecast to triple by 2030. Beginning in 2016, this EUR 14.7 million project aims to: assist in the sale, production, servicing, and use of green refrigeration and air conditioning; revise local policies and frameworks; and raise awareness on the issue.

Colombia - NAMA for the Domestic Refrigeration Sector

This is a EUR 9 million project that began in 2017. It aims to be a pilot for replication in the rest of Latin America, and supports a ban on HFCs, MEPS in the domestic refrigeration sector, production line conversions and improved product design, replacement program for old and inefficient appliances, and the implementation of a producer responsibility scheme.

Source: NAMA Facility website

MLF. Alternatively, multiple funds could operate more independently of the MLF and of each other, thereby trading the benefits and costs of Model 3 for those of Model 4.

A new dedicated fund or funds would best direct resources to areas for which the MLF itself is less suited to provide technical oversight, management and funding. A grant-specific fund could be housed at an MLF implementing agency with deep experience and expertise in refrigerants and cooling. Non-grant funds could be housed at an MDB with blended finance experience, or a financial institution already established as a GEF implementing agency or GCF accredited entity.

Non-grant activities, i.e. financing, present an opportunity that may find an immediate market. However, achieving sufficient capacity within the finance facility to administer these types of projects will take time and draw on a limited pool of global institutions with expertise across cooling efficiency, blended finance, and financial transactions, and with in-house staff capacity to undertake these investments and manage the resulting portfolio. It is unclear whether these institutions could be paired quickly with the sidecar in the sectors in which the MLF works, although some MDBs are entering into these markets and such a facility could be provided to enhance those efforts. Blended finance functions are best suited for trusteeship and management by a MDB with well-established financial transaction expertise and blended finance experience. As in the case of the GEF Earth Fund at the IFC (see ANNEX 8: THE GEF/IFC EARTH FUND) grants and technical assistance in the form of 'advisory services' could be coupled with financing. Investment activities could either be managed in-house, or outsourced to a fund manager (in the case of private equity funds), to a newly-established financial entity (such as a green bank or revolving loan fund) or to local financial institutions (in the case of corporate lending to local enterprises).

In the absence of the finance facility having the requisite staff to deploy investment capital, non-grant activities could either be housed in a discrete and new unit of a DFI, akin to the World Bank's Carbon Finance Unit; or could be integrated into the organizational structure and investment activities of the host DFI, as in the case of the Earth Fund at the IFC or the implementation of CTF projects by MDB investment officers.

Funding could perhaps be catalyzed by a large climate fund with flexible resources such as the GCF or GEF. Both the GCF and GEF have recently articulated strategies that prioritize technology deployment and energy efficiency (see Box 3), and have the resources and mechanisms available to either create dedicated funding windows or calls for proposals related to key cooling-related challenges in specific regions, markets, or technologies. They also have the potential to support large individual projects that are themselves effectively funding facilities. This approach has been taken by GCF in the case of individual projects such as to the Development Bank of Southern Africa (DBSA) for South Africa's national green bank, the Acumen Resilient Agriculture Fund (ARAF), and others, while the GEF in recent replenishments has funded dedicated private equity funds in developing regions and also created carve-outs for new cross-cutting thematic areas.³⁵

Box 3: Programming for the GCF and GEF Replenishments

In the GCF document on Strategic Programming for the GCF First Replenishment (“GCF strategic programming document”), it is mentioned that one of the focus areas for GCF should be to support the development of environmentally sustainable technologies, technology transfer and collaborative research and development. Two of the areas where GCF sees opportunity to contribute are working with other climate funds to scale and replicate successful investments and accelerating uptake of green investment by mainstream investors, keeping in view GCF’s core value proposition of supporting country-driven transformation through catalytic investment. Further, in the GCF strategic programming document, promoting minimum energy performance in heat pumps and heating and cooling appliances as well as insulation are identified as interventions for creating an enabling environment for paradigm shift in energy efficiency.

Adoption of energy efficient technologies is a stated priority in the GEF-7 programming strategy, adopted in 2018. In pursuit of Article 10 of the Paris Agreement, the GEF identifies “technology innovation with the private sector [as a mechanism to] help create or expand markets for products and services, generating jobs and supporting economic growth. Supportive policies and strategies are fundamental to catalyze innovation and technology transfer for mitigation and enhance private sector investment. Resources from the GEF play a key role in piloting emerging innovative solutions, including technologies, management practices, supportive policies and strategies, and financial tools which foster private sector engagement for technology and innovation.” Further, “accelerating energy efficiency adoption” is identified as one of four “entry points... prioritized to be innovative, align with NDCs, and be complementary to other financial mechanisms.”

Sources: The Green Climate Fund, 2019, and the Global Environment Facility, 2018

It should be noted that large GCF projects to accredited MDBs effectively create the multi-donor facilities in a single large project, such as with the recent GCF-IDB collaboration to support energy efficiency enterprise development in Latin America.³⁶

Another option is for MDBs, which have recently made large commitments to implementing the Paris Agreement and scaling up the share of their investments in climate change solutions, to devote balance sheet resources to address cooling-related challenges and opportunities.³⁷

Yet another approach is for international development institutions, bilateral development agencies, and philanthropies to support new free-standing project, equity, or debt funds. The GEF and GCF examples cited above have recently pursued these strategies, as have large investment-oriented programs such as the UK Government’s CP3 program.³⁸ Revolving loan funds for energy efficiency as well as national enterprise funds, long staples of donor finance dating back to the 1990s, serve as other case studies of free-standing funds established outside existing donor institution architecture. While the lessons learned have sometimes been sobering – shortcomings in design, execution, fiduciary and programmatic oversight can hamstring such funds even when demand for energy efficiency loans and deal flow exist – such funds can be targeted and serve local financing needs in individual countries, while returning profits that sustain long-term operations and localizing capacity for financing and demand for entrepreneurship in targeted areas.

MODEL 3: A MECHANISM OF FORMAL COORDINATION BETWEEN THE MONTREAL PROTOCOL AND OTHER MULTILATERAL CLIMATE CHANGE ENTITIES

Funding facilities, as described in Models 1 and 2, describe the locus, flow, and target use of funds. But in many ways, it is just as important to get the various stakeholders to behave in a concerted manner to enable collective decision-making, rational allocation of resources, division of labor, operational efficiencies, transmission of learning, strategic synchronizing and sequencing of donor activities, etc. These coordination mechanisms are vitally important even should donors successfully organize a dedicated facility, because smaller donor efforts, localized projects and programs, and development

assistance in spheres other than climate change and ozone will invariably persist and intersect with a dedicated fund or funds. A set of coordination practices to complement the institutional architecture of Models 1 and 2, collectively described as Model 3, follows.

Formal coordination among donors has the potential to address several of the challenges of ad hoc investment by various funding institutions. A formal mechanism to support implementing the Kigali Amendment paired with cooling efficiency would bring together the projects of the Montreal Protocol and one or more of the other key climate change institutions such as the the UNFCCC, GEF, and GCF. Formal coordination to align funding approaches, identify funding needs, and apportion components to different donors and implementers will help build commitments and momentum, align funding cycles, identify priorities, develop best practices, facilitate harmonization of standards and methodologies, avoid duplication, and build a community of practitioners. The mechanics of such collaboration share similarities with coordination bodies for government and multilateral organizations, many of which are the same stakeholders for multi-donor trust funds. Consequently, those practices can yield valuable lessons for donor coordination.

Examples of formal collaboration can be found outside the world of climate finance. Several of these initiatives are loosely bound, some are tight, and a few, the most ambitious, strive for permanence. The distinction relates to the extent of alignment of the many aspects of the funds' operation. A number of these models are reviewed in ANNEX 5: CLIMATE DONOR COORDINATION MODALITIES and ANNEX 9: EXISTING EXAMPLES OF INTER-AGENCY COOPERATION. An example of loose and opportunistic coordination is the pooling of funds and technical assistance at the level of large, discrete projects, as in the case of the Energy Efficiency Services Limited (EESL) super-energy efficient air conditioner program. EESL served a single purchasing intermediary of the bulk procurement of 100,000 efficient air conditioning

APPROACHES TO DONOR SUPPORT: MODES OF COOPERATION

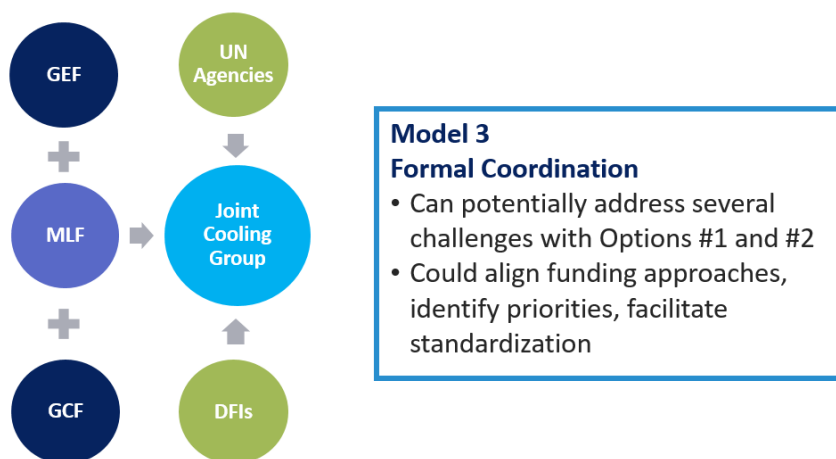


Figure 8. Model 3: Formal Coordination

units in India, with donor support from the World Bank.^{39, 40} Projects of this nature can deliver assistance from many sources through a single implementing entity and can be organized relatively ad hoc.

Another loose coordination model is that of the Joint Liaison Group, linking the three Rio Conventions (UNFCCC, CBD, UNCCD) in a formalized manner but with little by way of binding collective decision-making. The Joint Liaison Group “aims to collect and share information on the work programmes and operations of each convention. The responsibility for organizing and chairing meetings rotates among the secretariats”.⁴¹ While simple in form and modest in ambition, by maintaining a schedule of regular meetings and engagement it has enabled the various Rio environmental treaties to share information, synchronize agendas, and avoid duplication.

Other groups have formed to forge shared terminology and methodologies and serve as a platform for collaboration and problem-solving in climate finance, such as the MDB climate finance tracking group.⁴² This group has tried to harmonize approaches to allow for a common language, apples-to-apples comparisons across institutions, and ultimately joint commitments, as in the case of the MDBs’ joint commitment to scale up climate finance in Katowice in December 2018.⁴³

Some groupings begin with the political and then descend to the technical, a critical pathway for securing senior-level support, essential for rapid action and prioritization. In other words, high-level political forums have created the political impetus and directives for specific agendas and results that then gave rise to action at the technical and project level. Such approaches, for example, have proven critical in the G20 for putting climate change itself on the policy agenda, as well as specific issues such as fossil fuel subsidy reform, subsequently taken up by the Asia-Pacific Economic Cooperation (APEC) Energy Working Group, as well as disclosure of climate risk through the Task Force on Climate-Related Financial Disclosures (TCFD).⁴⁴

More structured approaches to technology and policy development and harmonization of standards are the initiatives of the Clean Energy Ministerial, which involved little donor financing aside from administrative costs, but which secured the buy-in and coordination of policymakers and technologists in energy ministries across 20 of the world’s largest countries. This was achieved through the leadership of minister-level senior officials in numerous large countries, who were committed to an aggressive and well-defined agenda across a range of specific technology areas, as well as the sustained participation of technical experts in their agencies with the specialized skills and jurisdiction to advance policies and projects. In addition to project and technology piloting, best practice and information sharing, and standards harmonization, the CEM helped to birth collective ambition such as Mission Innovation, representing collective national commitments to double R&D investment in energy, as well as performance-based prize competitions for super-efficient appliances. The CEM itself as well as new or existing analogues to it, such as industry-based technology groups at the IPEEC and the IEA, may be effective models to follow.⁴⁵

More ambitious still are the permanent coordinating structures designed to align agendas and create platforms for project selection, resource sharing and planning. The Climate Investment Funds (CIF) and, in particular, the CTF provide an example of a collection of donors and implementing entities that – in collaboration with country partners, MDBs, and private investors – developed country programs, selected projects, and secured co-investment of private investors using blended concessional capital. Such an approach can deliver impressive impact and is likely merited for efficient cooling in larger emerging

markets where efficient technologies are already commercially ready. The CIF secured billions of dollars of investments in new donor facilities that took many years to establish and operationalize (not unlike the GEF and GCF themselves). One might argue that cooling efficiency is worthy of such a commitment, and thus of building such mechanisms into new freestanding donor facilities as discussed in the sections above.

Such high-effort coordination approaches, however, could also be applied to address the various enabling environment barriers stretching across the realms of refrigerant management, climate change, and energy even without new funding structures. With or without new funds or mechanisms, interagency donor coordination is likely required to assemble necessary support across value chains, markets, and geographies (i.e., address multiple barriers to technology adoption). In the domain of cooling and refrigerant management, the OzonAction Secretariat, K-CEP, and increasingly the MLF implementing agencies have been leading efforts to coordinate donors, industry representatives, funders, policymakers, investors, and technical experts.

MODEL 4: DECENTRALIZED, DISPARATE DONOR-SUPPORTED ACTIVITIES

Decentralized activities will always exist, and they serve a critical function by promoting innovation, nimble and experimental action, rapid-response trouble-shooting, and opportunistic delivery of solutions as institutional, technological, political and market environments evolve. Activities on the fringes of the climate and ozone communities, furthermore,

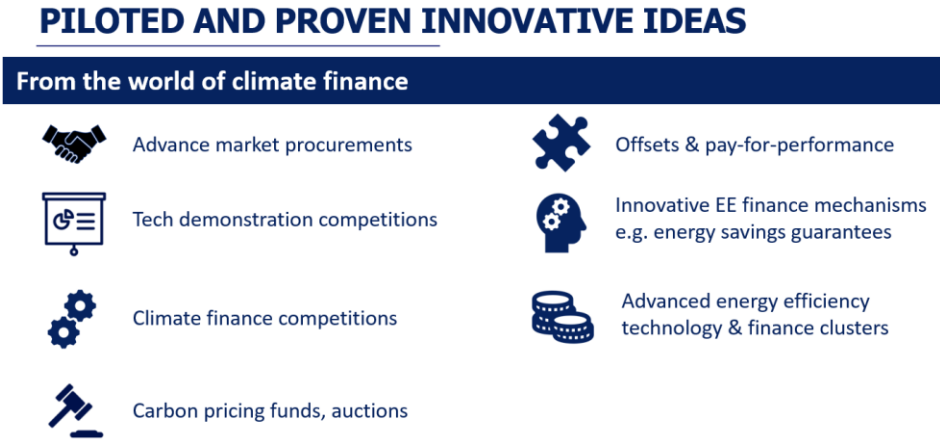


Figure 9. Innovative Ideas for Efficient Cooling

serve an important function in forging partnerships across new geographic and sectoral frontiers that may be peripheral to current donor focal areas. For example, research laboratories, prize competitions, business incubators and accelerators can helpfully innovate new business models, technology, and service delivery mechanisms for future uptake by dedicated funds, while interactions with funding initiatives for health, education, urban planning, and other development imperatives may evolve over time, presenting new opportunities for synergy (see Figure 9).

The GEF itself has funded a number of discrete projects that have helped develop design and implementation experience in the cooling efficiency space (see Figure 10). In many respects, these field projects have played the role of piloting new approaches and in new settings.

These decentralized activities can nonetheless be improved upon. Key political stakeholders can develop action plans that comprehensively address barriers in a bottom-up manner, and can be technology- or geography-specific. Including efficient cooling in NDCs and developing national cooling plans can create frameworks through

GEF SAMPLE PROJECTS

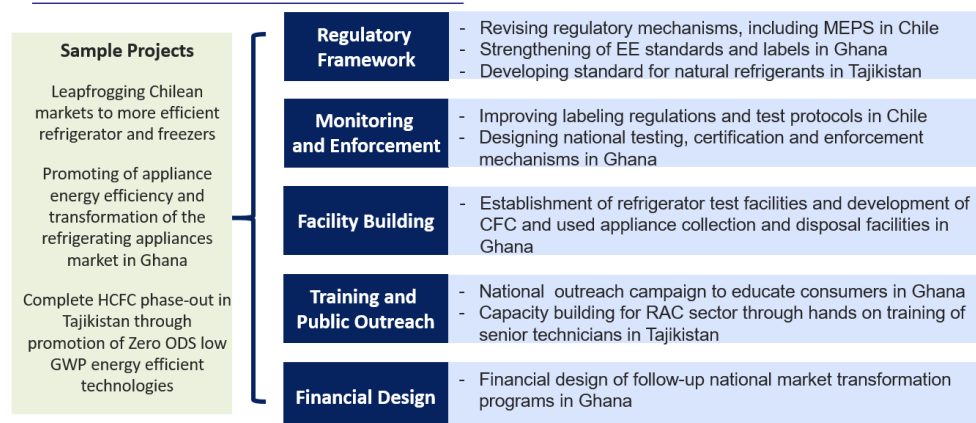


Figure 10. GEF sample projects in efficient cooling

which individual donors can dock into existing national planning processes without risk of duplication and facilitate synergies amongst donors and development agencies.

Donor agencies, MDBs, and DFIs themselves could develop cooling action plans of their own to telegraph to their own staffs, partner organizations, and the efficient cooling and climate finance communities their areas of focus and forthcoming allocation of resources. These processes are now beginning to take shape with new climate change plans from a range of MDBs and the adaptation action plan from the World Bank Group. Why not for cooling? Political forums such as the G-20 or regional organizations such as APEC could develop action plans with the express purpose of orienting bottom-up efforts.

More open-ended forums such as the Global Innovation Lab for Climate Finance, the U.S.' Advanced Research Projects Agency-Energy (ARPA-E), Breakthrough Innovation Ventures, ClimateInvestorOne, and other investor groups, prize competitions and enterprise development mechanisms serve a critical function of identifying entrepreneurial talent, policy innovation, and technological solutions; demonstrating them for proof-of-concept; and bringing them to the attention of larger pools of resources for piloting.^{46, 47, 48, 49} These efforts should focus more aggressively on cooling needs and be intensified, through formal and informal channels of collaboration.

Nevertheless, it should be recognized that decentralized efforts also reflect a status quo that lacks the necessary urgency, focus, and scale, and is the default should more ambitious and centralized efforts fail. Model 4 should be viewed as a complement rather than an alternative to the other models.

Table 3. Summary of Cooling Efficiency Finance Models for Donor Architecture

Architectural Model	Description; Precedents	Type of Funding, Activities Funded	Level/Type of Coordination	Strengths	Weaknesses
Sidecar facility	<p>A ‘Sidecar’ donor trust fund co-located with the Montreal Protocol: donor capital co-located with MLF resources at the MLF secretariat; donor activities funded align closely with Kigali Amendment and MLF mandates.</p> <p><u>Precedents:</u> MLF Kigali fast-start funds; GEF grants for World Bank loans; IFC Earth Fund.</p>	<p>Non-Montreal Protocol compliance activities: Kigali ‘fast-start’ activities; enabling policy, technical support, technical assistance; demonstration and cost-discovery projects for new and incrementally-expensive technologies.</p>	<p>Cofinancing of compliance projects for HPMPs and Kigali implementation; likely very high coordination with MLF and Montreal Protocol, more limited coordination with GCF and GEF; intensive coordination with bilateral or non-state donors to Sidecar fund.</p>	<p>High functionality and track record of Montreal Protocol and MLF; twinning with existing HPMPs and Kigali implementation grants; efficiency of operationalization building on existing structures and systems.</p>	<p>Political contentiousness within Montreal Protocol and among parties and stakeholders regarding covering EE; complication of MLF donor mandate under Montreal Protocol; difficulty of determining and applying incremental cost methodologies; not suited to non-grant activities; limited staff and capacity of MLF Secretariat.</p>
Dedicated funding window	<p>Establishment of dedicated funds or financing windows for efficient cooling through existing multilateral finance institutions or donor facilities, e.g. GCF, GEF, UNDP or World Bank.</p> <p><u>Precedents:</u> GCF RFPs; GEF cross-cutting areas; K-CEP; IFC Earth Fund; NAMA Finance Facility; CIFs; EE revolving loan funds; Global Facility for Disaster Reduction and Recovery; GEF- and GCF-funded regional and sector investment funds.</p>	<p>Full range of grant and non-grant activities.</p>	<p>Highly coordinated policies, procedures, and modalities unique to the institution and its governing constituents and donors.</p>	<p>Flexibility; adaptable to sectors, barriers, opportunities, mechanisms, geographies and markets; can overcome institutional politics and bureaucracy of funding institutions once created and funded.</p>	<p>Politically challenging to align donors and secure senior-level support of host agency; administratively difficult to create and implement effectively; very resource-intensive to create new institutional infrastructure. May be difficult to coordinate with institutions, particularly other than host and donors.</p>

Inter-institutional coordination mechanisms	<p>A mechanism of formal coordination between the MLF and other multilateral climate change entities such as the UNFCCC, GEF, and/or GCF without funding.</p> <p><u>Precedents:</u> CIFs; joint liaison group between UNFCCC, UNCDD and CBD; Clean Energy Ministerial, IPEEC; K-CEP; UNEP OzonAction Secretariat, SEforAll; MDB group on adaptation.</p>	Mostly non-grant activities currently funded via environmental treaty organizations, with some examples of non-grant coordination (e.g. CIFs).	Regular convenings and communication to transmit information, agree on common agendas, protocols, standards, priorities, etc. Platform for mobilizing political will and aligning institutional priorities.	Serves to build consensus and institutional collaboration and information sharing; builds trust and communication infrastructure and protocols; may lay groundwork for deeper collaboration.	Slow-moving; does not address funding cycle and project criteria challenges limiting flexibility; does not immediately channel resources to solutions; better track record for information sharing and harmonization of standards and approaches than co-funding; incompatible governance models among some institutions.
Decentralized, disparate donor-supported activities	<p>Most closely resembling the status quo of discrete and disconnected donor initiatives.</p> <p><u>Examples:</u> Climate & Clean Air Coalition HFC initiative projects; NAMA facility support for Colombia and Thailand national cooling plans; K-CEP support for MLF implementing institution projects.</p>	Full range of grant and non-grant activities.	Ad hoc and decentralized; shifting coalitions and groupings of stakeholders.	Innovation, nimbleness, flexibility, facile engagement with market and other actors (e.g. project developers, financiers, manufacturers).	Lacking in scale and synergy between efforts; difficult to collect and disseminate learnings and best practices; difficulty in harnessing network effects to hasten EE uptake of technology and standards; lack of coordination/ potential to duplicate is paramount; no clear model for lessons learning/sharing of successes.

OPPORTUNITIES AND CONSTRAINTS OF THE VARIOUS APPROACHES

The models discussed in the last section comprise a possible menu for resolving some of the challenges to concerted donor action on cooling efficiency. At a conceptual level, these models sketch out ways donor institutions could align and coordinate to use the range of tools in the development assistance toolkit, from traditional MLF incremental-cost, project-level grants to policy development, pilot projects, and market mechanisms such as blended finance investments and bulk procurement structures. The coordinating structures and independent initiatives are explored as models for broadening efforts, achieving synergies, filling gaps, and pursuing speed and innovation, inclusive of efforts with and without discrete sources of climate finance for beneficiaries. Such coordination to collectively define and describe a set of issues is typically critical for establishing a common vision for action and mobilizing donor funding. The GEF and the GCF themselves vividly illustrate this principle, with the former ultimately arising out of the 1987 Brundtland report on sustainable development and the latter out of the UNFCCC COPs beginning in 1995, with a focus on ‘common but differentiated responsibilities’, and specifically ‘fast-start’ funding commitments from the COP-15 held in Copenhagen in 2009.^{50, 51}

These models are presented as a wide-ranging set of organizing structures reflective of the diversity of operating environments, markets, stakeholders, and barriers to be addressed. As no one fund or initiative could address all the enablers of the cooling revolution, a range of solutions, each tailored to a particular objective and responsive to institutional imperatives and requirements, could be considered.

Institutional imperatives and requirements are particularly important when considering key donor institutions providing critical large-scale grants and investment capital as well as the limited set of institutions with global reach and expertise in the cooling space. These institutions are frequently constrained by funding cycles, earmarking and bureaucratic stove-piping.

Among the key donor entities, aligning with the GEF and GCF, the largest and broadest of international climate change donor funds, is perhaps most important to secure funding, particularly in the middle- to long-term (i.e., 3 to 5 years and beyond). The GEF and the GCF are both in the process of carefully examining their relationship to other climate change donor funds and refining their funding niche, and are attempting to strengthen coordination with each other.^{52,53,54}

The leadership of donor institutions beyond the MLF is important because, among other reasons, the scale of the cooling efficiency opportunity is large and the effort to scale up energy efficiency efforts within the MLF itself or in a sidecar facility based at the MLF will need to compete with core, crescendoing Montreal Protocol engagements, the HCFC phaseout and the beginning of the HFC phasedown. Commitments and catalytic activities of other donors that may encourage such efforts and demonstrate to Montreal Protocol stakeholders that they are not taking on a disproportionate amount of the effort to promote clean, efficient cooling.

The MLF and its implementing institutions are indispensable partners for donor efforts on cooling efficiency, equipped with institutional capacity and experience in the domain of the Montreal Protocol. The operational capacity and programs of the other MDBs will be essential to leverage for energy efficiency and climate change; grant and financial transaction management capacity; policies and procedures; bankable projects; project pipeline development; provision of technical assistance; and engagement with country governments and other implementers and partners in the field.

Inasmuch as efficient cooling and cooling access support broader development agendas, other donors and donor programs, including those in support of the SDGs, will likely emerge over time as important operational and funding partners to embed efficient cooling into development agendas around the world and ensure sustainable funding sources.

Beyond the creation of dedicated funding facilities, there is a range of formal and informal, tight and loose coordination mechanisms that are essential in overcoming inaction, bureaucratic gridlock, discord, and fragmentation. Such coordinating mechanisms can help to iron out issues related to an in-house MLF-based sidecar and free-standing facilities as well as to promote enhanced action and collaboration among disparate institutions.

CONSIDERATIONS AND RECOMMENDATIONS FOR NEXT STEPS

In sum, scaling up efficient cooling may take many forms. There are precedents and examples to draw upon when devising a program and specific past experiences that can guide future improvements. Political will and commitments from country stakeholders and senior leadership of the institutions are necessary ingredients for success. Pledges such as the MDBs' Paris Agreement alignment from December 2018 and Climate Action by Finance Ministers in April 2019 are two good examples (see ANNEX 1: NEW DEVELOPMENTS IN 2018-2019 ON COOLING EFFICIENCY AND CLIMATE FINANCE for more details).^{55, 56} Consensus is emerging that better coordination is needed, both specific to increasing the energy efficiency benefits of implementing the Montreal Protocol but also generally among climate and environment funds.

On the Need for Donor Coordination and Integration with Policy Planning

Resource Mobilization for HCFC Phase-out and Climate Mitigation Co-benefits: A Study Prepared for the Executive Committee of the Multilateral Fund (WB, 2015)

"Generally, bringing together various sources of financing increases transaction costs. Any effort to promote multi-source financing should acknowledge the same and strive to streamline implementation and management procedures of such a blended operation in order to eliminate, or strongly limit, additional project and financial management and reporting requirements and keep transaction costs low.

"Good strategic planning and inter-sectoral coordination at the country level are crucial to ensure that policies are aligned and possibilities to leverage financing are optimized. Parties should be encouraged to ensure that their second phase HCFC Phase-out Management Plans include a broad and strategic overview of on-going and planned investments for climate mitigation and energy efficiency so that the Montreal Protocol interventions can be mainstreamed within these larger on-going programs. The overall domestic climate change and energy policy and regulatory environment, including Nationally Appropriate Mitigation Actions (NAMAs) and Intended Nationally Determined Contributions (INDCs) where relevant, should be providing the framework for the mainstreaming of HCFC phase-out. Linkages should be made with potential new sources of climate finance and greenhouse gas mitigation instruments, including the Green Climate Fund and potentially new carbon market-based instruments which the Partnership for Market Readiness supports. In many countries, this would require strong coordination and collaboration across sectors and ministries, as well as careful consideration of Agencies' comparative advantage."

Future of the Funds: Exploring the Architecture of Multilateral Climate Finance, (WRI, 2017)

"Even without changes to their formal operations, funds could improve their coordination to ensure that they meet countries' diverse needs, minimize duplications and inefficiencies in their portfolios, and simplify access to funding. This would require funds to think strategically and collaboratively about who is best placed to serve different thematic and geographic areas, who should support which activities, and how needs will evolve over time. Funds could improve coordination by having their secretariats and boards engage with each other more closely. At the country level, programming and planning need to be holistic and not limited to a fund-specific portfolio. One possible solution is for countries to identify one ministry or body that serves as the national focal point or authority for all the climate funds. There is also a need for more coordinated readiness support and capacity building than is being provided by the funds and their readiness partners. There may be value in establishing a broader readiness hub or program that addresses overall planning and pipeline needs."

We conclude with a set of recommended next steps to initiate a process of donor coordination by which the Montreal Protocol institutions and other key donors and development financiers can coalesce around a set of cooling efficiency finance priorities and the corresponding structures best suited to achieve those priorities, drawing on the models explored in this paper (see Figure 11).

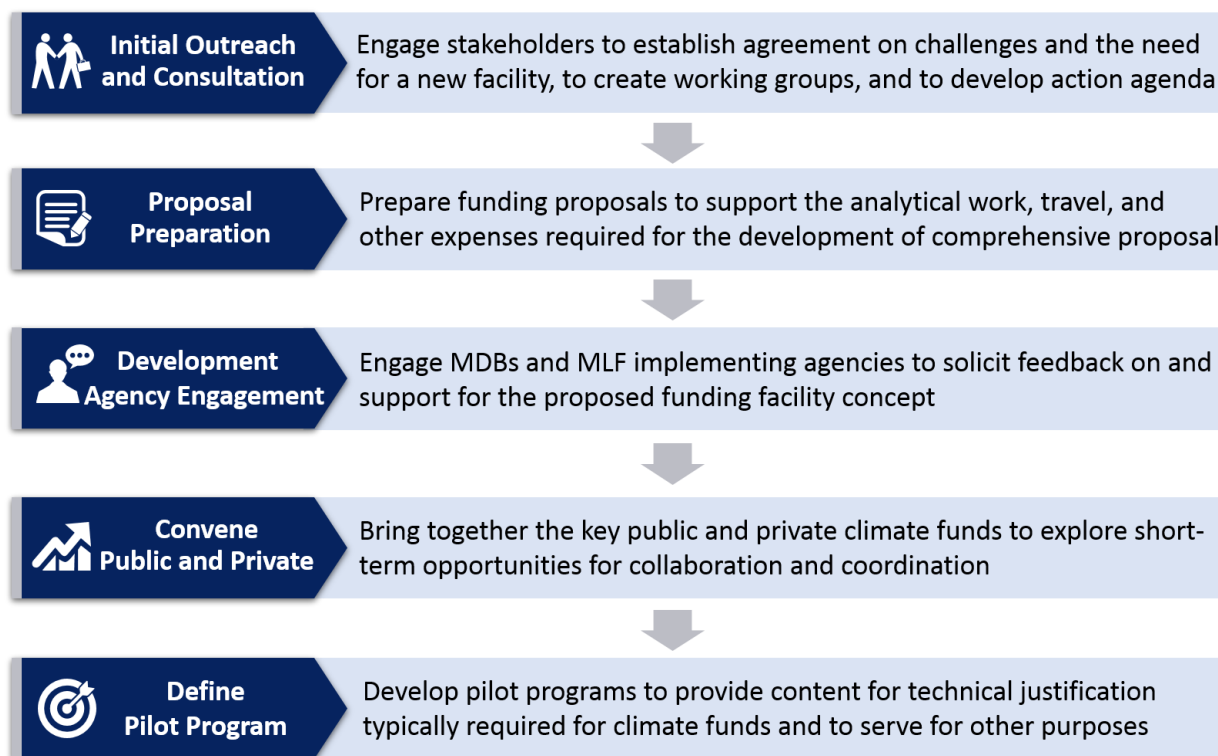


Figure 11. Next Steps towards Coordinating Donors and Aggregating Funding

STEP ONE: Engage in a process of outreach and stakeholder consultation to include representatives of the two conventions (Montreal Protocol and UNFCCC), existing financial mechanisms (MLF, GEF, GCF), climate funds with private support (e.g., Climate Investor One), climate donors, developing countries, the World Bank and other DFIs, major manufacturers, non-governmental organizations (NGOs), and perhaps technical experts (e.g., Lawrence Berkeley National Laboratory, U. Birmingham). The purpose of such a meeting would be to establish agreement on the challenges that exist due to the current lack of donor coordination, the need for a new facility and reference to some relevant precedents, and if possible the creation of a working group to develop more specific proposals and an action agenda. While numerous parties need to be represented, ideally an initial meeting should be small enough to allow informal discussion and operation under Chatham House rules. This step might helpfully be divided into an initial meeting among the key funding mechanisms, MLF implementing agencies, and DFIs to develop an early draft and consider future coordination modalities, followed by a broader stakeholder consultation.

STEP TWO: Emerging from the initial consultation process, a proposal (or multiple proposals) for funding should be prepared to support the analytical work, travel, and related costs for the development of a comprehensive proposal to devise a program with resources and capacity to spearhead a global cooling efficiency program. Committed donors should be approached as partners in this effort and potentially to provide the modest initial support required.

STEP THREE: Engage development agencies – MDBs and MLF implementing agencies (e.g., World Bank Group and UNDP) to solicit feedback on and support for the proposed funding facility concept (or concepts). Experts within these institutions recognize the importance of these issues and the need to expand the scope of their work to a wider range of cooling applications consistent with providing sustainable access to cooling, as well as making cooling more efficient for those who can already afford it. As implementing agencies for the ozone and climate funds, these agencies have established relationships with the relevant ministries in developing countries and expertise in the administration of environmental facilities. However, the cooling issue has not achieved the status necessary for high-level support within these institutions, which need to be fully engaged and to become leaders in defining any new facility.

STEP FOUR: The elaboration of a comprehensive proposal, and the process of obtaining the necessary political support, will necessarily take some. Parallel efforts should be made to bring together the key existing public and private climate funds to explore short-term opportunities for collaboration and coordination.

STEP FIVE: While not a prerequisite for creating a dedicated fund, climate donor funds such as the MLF, GEF, GCF, and K-CEP, could choose to define and launch pilot programs that can serve as models for the full range of activities required in a dedicated fund. (In many respects, K-CEP grants and other disparate projects by various donors are already serving this function, but without an eye towards establishing modalities and practices of a dedicated fund). A pilot stage would also provide content for the technical justification typically required for climate funds – viz., a description of project design, identification of benefits and risks, procedures for tracking and reporting of results, and initial successes that give confidence and momentum to scaling efforts.

ANNEX 1: NEW DEVELOPMENTS IN 2018-2019 ON COOLING EFFICIENCY AND CLIMATE FINANCE

National Cooling Action Plans

India⁵⁷

The Ministry of Environment, Forests and Climate Change (MoEFCC), Government of India, released the India Cooling Action Plan (ICAP) in March 2019. It provides a 20-year outlook on how cooling in India will grow and outlines strategies and actions to promote the sustainability of that process. ICAP's primary goals are: 1) the promotion of cooling as a research priority, 2) reduction of cooling demand across sectors by 20-25% by 2037-38, 3) reduction of refrigerant demand by 25-30% by 2037-38, 4) Reduction of cooling energy requirements by 25-40% by 2037-38, and 5) training and certification of 100,000 servicing sector technicians by 2022-23.

The ICAP was developed with extensive stakeholder input, including government departments, experts, industry representatives, and think tanks. ICAP focuses on seven thematic areas, with multi-stakeholder working groups established for each:

- Space cooling in buildings
- Air conditioning technologies
- Cold chain & refrigeration
- Transport air conditioning
- Refrigeration and air conditioning servicing sector
- Refrigerant demand and indigenous production
- Research and development

For each thematic area, ICAP explored two scenarios (a reference business-as-usual scenario and an intervention scenario) to estimate future cooling demand requirements and determine an optimal plan of action. The plan's proposed recommendations are:

1. Promote development and commercialization of technology pathways, especially technologies that reduce the energy footprint of active cooling
2. Accelerate the implementation of improved building codes and standards, increase MEPS of air conditioning systems, and enhance consumer awareness
3. Public procurement of energy efficient air conditioning systems and service technicians
4. Further government support for low income and economically disadvantaged segments of the population
5. Drive skill building of the cooling service sector
6. Harmonization of policies
7. Create and ecosystem for research and development

Rwanda⁵⁸

In 2018, the UN Environment's United for Efficiency initiative partnered with the Rwandan government to develop the Rwanda Cooling Initiative (R-COOL) to help improve the sustainability of the local cooling

market.⁵⁹ One of the first phases of R-COOL is the development of the Rwanda National Cooling Strategy, which includes mandatory MEPS for air conditioning and refrigeration products and financial mechanisms to encourage the use of energy efficient appliances.

The Coolease scheme, the first financial mechanism of the R-COOL initiative launched in June 2019, enables suppliers and consumers of air conditioning and refrigeration products to transition to the latest technology without an upfront investment.⁶⁰ The scheme is structured around a finance leasing agreement where the collateral is the cooling system.

World Bank Cooling Strategy

In April 2019, the World Bank launched a new program to accelerate the uptake of sustainable cooling solutions. Financed from a US\$3 million grant from K-CEP, the program – named “Efficient and Clean Cooling Program” – focuses on assisting countries in developing market infrastructure, financing mechanisms, and policies and regulations to deploy sustainable cooling, mitigation of urban heat islands, and raising awareness in public and private sector partners.

Morocco Efficient AC Buyers Club

The Morocco Pilot for All-Africa Public & Private Bankers AC Buyers Club launched in 2018, is an organization that buys high quality products in bulk to lower price and streamline distribution and installation. Aside from financing the replacement of air conditioning units within the banks themselves, the Buyers Club could also make the air conditioning units available to customers. This model is attractive as it can be structured as a private organization, is less dependent on government, minimizing red tape, and increasing efficiency. Five coordinated pilots are currently being implemented in Morocco, and there are plans to expand the program to Brazil.⁶¹

Global Cooling Prize (GCP)

Led by the Rocky Mountain Institute, the Global Cooling Prize aims to incentivize the development of a more energy efficient residential cooling system. Studies have shown that conventional solutions and incremental solutions will be insufficient to mitigate the emissions resulting from the imminent boom in energy demand for cooling and air conditioning – demand that will reach an increase of 5X in non-OECD countries. The GCP is an attempt to find a solution with 5X less environmental impact than current air conditioning units, which, if achieved, could prevent up to 100 gigatons of CO₂-equivalent emission by 2050, mitigate up to 0.5°C of warming by 2100, and potentially lead to savings of US\$1.4 trillion of investment in power generation capacity.⁶² Criteria for the prize are numerous, and include: five times less climate impact than current models; no more than twice as expensive when manufactured at scale; consume no more than a specified level of power, etc.⁶³

Efficient Conversation of China AC Manufacturers

China is currently both the world’s largest producer and purchaser of room air conditioners (RACs), producing over 70% of global stock, and domestic sales accounting for over 40% of the global market. It is projected that by 2050, there will be over 1 billion installed RACs in China. The Chinese government has placed a high priority on energy efficiency, spending US\$60 billion on it in 2016 and implementing various incentive plans and policies; however, overall average efficiency of RAC units sold are still mediocre due to consumer preferences pushing production towards low-cost rather than operational efficiencies.⁶⁴

Access to Cooling Issues

A report by SEForAll in July 2018 studied access to cooling and the resulting risks, which include lack of access to cold chains to reduce food loss and to enhance income, or cold storage for safe vaccines and other health services. The report indicated that over 1.1 billion people in countries around the world face cooling access risk, with the top countries being Mozambique, Sudan, China, Indonesia, Nigeria, Brazil, Pakistan, Bangladesh and India.

In order to bridge the financing gap, the report recommended the use of pay-as-you-go (PAYGO) financing, which has seen tremendous success in the off-grid solar market for energy access. However, other sources of funding such as government procurement and donor funds will still be crucial in this effort. Other important initiatives are ones to cool cities (such as through green rooftops and other measures to reduce the urban heat island effect) and cooler agriculture (both in terms of storage and in transportation).

A more recent study by the International Institute of Applied Systems Analysis (IIASA) and the Yale University School of Forestry and Environmental Studies in 2019 showed that up to 4.1 billion people are potentially exposed to dangerous heat stress due to lack of access to cooling. The study noted that energy efficiency alone will not be sufficient, and will require other solutions such as passive building, city design, and innovative cooling technologies to meet this cooling gap.

Link of Cooling Efficiency Plans to NDCs

Pursuant to the Paris Agreement, all parties have the opportunity to submit new or updated NDCs by 2020. In general, there are four main approaches to enhance NDCs: by increasing mitigation ambition, adaptation ambition, improving implementation, or boosting communication. Improving the efficiency of cooling appliances will generally fit into either mitigation or adaptation – reducing energy demand through energy efficiency, or improving the resiliency of cooling systems. Mobilizing finance is an important part of improving implementation; innovative financial products may be essential in the implementation of solutions to the cooling gap other than energy efficiency.

Increasing GCF Commitment to Climate Financing Structures with Potential to Fund Cooling Strategies

In October 2018, the GCF Board launched the Fund's first replenishment. A report on the GCF's Strategic Programming for its replenishment analyzed different scenarios for levels of GCF ambition, recommending a 'pursuit of impact' scenario to raise the GCF's ambition and impact to higher levels.

As part of this analysis, the report highlighted a number of impact areas that optimize alignment between country need and potential – with energy efficiency being one area. Possible outlined approaches include building enabling environments, targeting projects that scale the uptake of energy efficient equipment, and the promotion of innovation in energy efficient technologies, such as cooling.

One of the first projects approved of this nature, the Green Cities Facility, was launched in October 2018, and has an estimated lifespan of 23 years. It aims to assist ten cities with higher than average energy and carbon density, and have various environmental and social issues, in transitioning to a low-carbon development path. The Green Cities Facility will provide concessional finance to boost investments in climate-resilient urban infrastructure such as district heating/cooling, low-carbon buildings, and solid waste management, while at the same time developing private investment in sustainable infrastructure.⁶⁵

December 2018 MDB Climate Finance Commitments

In December 2018, a group of nine MDBs announced a joint framework for aligning their activities with the goals of the Paris Agreement, reinforcing their commitment to combat climate change.

In a joint declaration, the MDBs committed to working together in six key areas considered central to meeting the goals of the Agreement, which aims to limit the increase in global temperatures to well below 2°C, pursuing efforts for 1.5°C. Their joint framework approach to align their activities with the goals of the Paris Agreement includes:

- i. Alignment with mitigation goals
- ii. Adaptation and climate-resilient operations
- iii. Accelerated contribution to the transition through climate finance
- iv. Engagement and policy development support
- v. Reporting
- vi. Align internal activities

The declaration was issued at the start of the 24th Session of the Conference of the Parties (COP24) to the United Nations Framework Convention on Climate Change (UNFCCC) in Katowice, Poland.

MDBs and the International Development Finance Club (IDFC) had already pledged in December 2017 to align financial flows with the objectives of the Paris Agreement.

The nine MDBs are: The African Development Bank Group (AfDB), the Asian Development Bank (ADB), the Asian Infrastructure Investment Bank (AIIB), the European Bank for Reconstruction and Development (EBRD), the European Investment Bank (EIB), the Inter-American Development Bank Group (IDB), the Islamic Development Bank (IsDB), the New Development Bank (NDB), and the World Bank Group (World Bank, IFC, MIGA).

In 2017, the group of MDBs had committed over US\$35 billion in climate finance. This figure grew over 20% to US\$43 billion in 2018, and mobilized an additional US\$68 billion in public and private capital.

April 2019 Council of Finance Ministers for Climate Action

The Coalition of Finance Ministers for Climate Action, first launched in April 2019, is a group of finance ministers from over 20 countries. The coalition's aim is to advocate for climate action through public vectors, such as fiscal policy and public finance. They endorsed a set of six principles ("the Helsinki Principles"):

- i. Aligning policies and practices with Paris Agreement commitments
- ii. Sharing of experiences, expertise, and best practices
- iii. Working towards carbon pricing
- iv. Mainstreaming climate change into macroeconomic policy and fiscal planning and management
- v. Mobilizing private sources of climate finance
- vi. Engaging in the implementation of the NDCs

ANNEX 2: TAXONOMY OF COOLING EFFICIENCY SUPPORT ACTIVITIES

Eligible Activity ⁶⁶	Enabling Mechanism/ Barrier Removed	Illustrative Examples
Pilot & demonstration projects	Demonstrating technical, commercial, and financial proof of concept; Cost discovery; Market confidence through demonstration projects.	<ul style="list-style-type: none"> Complementary grants with the MLF refrigerant transition to enhance EE specifications & performance of pioneering low-GWP refrigerant technology demonstration projects in new geographic and product markets.
Technology development	Accelerating technical and commercial viability of high-efficiency components & appliances.	<ul style="list-style-type: none"> R&D grants for development and manufacture of super-efficient AC components and appliances; Prize competitions.
Consumer price reductions	Reduction in first cost (purchase price) to stimulate market demand; enabling financing of manufacturer production lines & economies of scale.	<ul style="list-style-type: none"> Utilities' AC appliance rebate and demand-side management subsidy programs; Bulk procurement orders (public and private) & buyers' clubs; Advance market commitments; Capital cost and interest rate buy-downs for manufacturers.
Incremental cost grants for production line transitions	Inadequate incentives for manufacturers to invest in production of high-efficiency cooling appliances.	<ul style="list-style-type: none"> Grants to manufacturers for HPMP and Kigali amendment implementation covering incremental costs of production line conversion to appliances with higher efficiency than the baseline; Grants for supporting incremental costs of technical experts/engineering to undertake upgrades/improvements.
Capacity building/technical assistance grants	Inadequate capability to undertake investments needed to upgrade manufacturing facilities; business model enhancements to improve post-sale efficiency performance.	<ul style="list-style-type: none"> Training programs for emerging market in-country technicians/engineers. Train the trainer programs; Curriculum design and other support infrastructure (e.g. on-line certification programs, etc.) Workshops, conferences, forums, and trainings to disseminate best practices, raise awareness of technical, commercial and financial solutions to manufacturers, financiers, large-scale AC buyers, servicing companies, and public policymakers.
Financing	Access to affordable capital for manufacturers (directly or indirectly).	<ul style="list-style-type: none"> Low-interest, long-tenor loans and loan guarantees to a manufacturer to finance an expanded production line retrofit; Credit lines to FIs for targeted lending; Guarantees and/or risk sharing mechanisms to underwrite risks for FIs lending into this market segment (manufacturers).

ANNEX 3: THE MULTILATERAL FUND, ENERGY EFFICIENCY, AND ITS RELATIONSHIP TO OTHER FUNDS

The Montreal Protocol's MLF is one of the world's most successful global funds supporting environmental objectives. It has channeled several billion dollars to developing countries to facilitate compliance with the Montreal Protocol. The MLF employs grants to support a range of activities, the biggest of which typically offset "agreed incremental costs" of manufacturers transitioning from use and production of chemicals subject to Montreal Protocol phaseout to safer substances. The MLF also supports "activities including the closure of ODS production plants and industrial conversion, technical assistance, information dissemination, training and capacity building aimed at phasing out the ODSs used in a broad range of sectors."⁶⁷ The MLF has an Executive Committee comprised of seven developed and seven developing countries.

The MLF's perch at the focus of Montreal Protocol implementation necessitates that it will be closely involved in any approach to increase finance for energy efficiency alongside the HFC phasedown. Indeed, the MLF has considered the role of the Montreal Protocol relating to energy during previous chemical transitions. In 2007, at the 19th Meeting of Parties the parties adopted Decision XIX/6, which called on the Executive Committee to prioritize, *inter alia*, *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* during the HCFC phaseout.

Between 2008 and 2010 the Executive Committee discussed establishing a facility within the MLF to help maximize the climate benefits of the HCFC phaseout. "Because achieving climate benefits is not currently an agreed incremental cost of HCFC phase-out," the MLF Secretariat wrote, "the purpose of the special facility could be to augment funding to cover non-agreed incremental costs associated with climate benefits, as well as other additional environmental benefits, which are not required for compliance with the Montreal Protocol."⁶⁸ At this time, energy efficiency was explicitly understood to be among the key potential climate benefits that could be gained during refrigerant transitions; the other was avoiding uptake of HFCs, now subject to phasedown directly under the Kigali Amendment. A key source of potential funds discussed was the now largely-defunct carbon market established under the UNFCCC.

In 2009, at the 59th Meeting of the Executive Committee, parties raised the issue of eligibility for financial support of measures that would reduce the climate impact of conversion projects, including increasing energy efficiency. Discussions ensued, focusing in practice on a half-dozen project submissions to the MLF that included cost elements that would significantly improve energy efficiency. In 2010, at the 61st meeting, the Executive Committee decided not to revise existing practice to allow cost support for energy efficiency cost elements beyond those required for the refrigerant conversion, so-called unavoidable technology upgrades (Decision 61/44).

Discussions about the facility included reviews of the following: definition of a facility; benefits of establishing a facility compared to soliciting voluntary contributions to the Fund itself; description of what activities would be eligible for assistance from a facility and how they differed from activities currently eligible for MLF assistance; who would contribute to a facility and the role of extra-budgetary contributors within the Executive Committee; the time horizon over which a facility would be active; how a facility would initially be capitalized; how a facility would maintain funding over time; criteria for receiving funding from a facility (such as repayment of money provided by the facility); and the potential role of carbon markets.

In 2011, at its 63rd meeting, the Executive Committee agreed to fund the implementing agencies for several activities to promote resource mobilization for climate co-benefits during the HCFC phaseout,

including preparation of demonstration projects to improve energy efficiency, co-financing for HCFC activities, two pilot applications of co-financing, and a World Bank study on mobilizing resources for climate co-benefits and monetizing carbon credits.⁶⁹

The World Bank study, completed in 2013 and republished in 2015, is the most comprehensive look at mobilizing external support for energy efficiency alongside the Montreal Protocol. Much of it is still relevant. Among many other things, it reflects on a cohort of projects to replace building chillers with more efficient models using alternative refrigerants in Turkey, Thailand, India, Philippines, and Indonesia (canceled) beginning in the 1990s and continuing into the 2010s. The projects were financed by a combination of the MLF, GEF, private enterprises, and by carbon finance. Overall, the experience was mixed: barriers to success included “inability to synchronize the timing of financing approvals, the collapse of the carbon market, the impact of the 2008 financial crisis, competing institutional and implementation arrangements (e.g. dual reporting), namely under the MLF and GEF, and issues regarding the suitability and commercial availability of alternatives.”⁷⁰

The chiller cohort of projects is at front of mind for many in the Montreal Protocol community as a cautionary tale about blending MLF and climate finance. Several external factors affected the success of the program; its shortcomings revealed the challenges of blending finance but were also due to external factors that, if corrected, would not preclude future collaboration from being effective. The history of these projects and the outcomes of the MLF’s resource mobilization efforts should be reviewed, as they largely reflect current discussions about incorporating energy efficiency into the HFC phasedown.

The MLF is actively considering increasing financial support for air conditioning and refrigeration system servicing in low-volume consuming countries (LVCs) in order to increase energy efficiency and accelerate the uptake of lower-GWP refrigerants. The Executive Committee received a direct request from the parties on this matter, Decision XXVIII/2 para 16.

ANNEX 4: CONSIDERATIONS SURROUNDING INCREMENTAL COST GRANTS FOR ENERGY EFFICIENCY

An incremental cost support program for energy efficiency measures would need to devise several methodological approaches. First, a energy efficiency baseline would be needed to benchmark upgrades. For example, a baseline would incorporate upgrades already slated to receive support under, say, the MLF's current standard of "unavoidable technology upgrades" during refrigerant conversions – those upgrades that are inherent in changing refrigerants because, for example, newer compressors compatible with new refrigerants are better-designed and more energy efficient than those incorporated in old designs. Additional financial support should be used for additional gains above the baseline.

Next, there would be need to determine the costs and benefits of cooling appliance energy efficiency. The benefits of energy efficiency are more difficult to characterize than those of reducing fluorinated gas emissions. For example, accounting for the benefits of energy efficiency requires tallying impacts that depend on the frequency and duration of appliance use, temperature conditions at which it is operated, the source of the electricity used to power it (and the associated carbon dioxide and criteria pollutants emissions rates), losses in the local transmission and distribution system, and more. None of these are needed when estimating the benefits of reducing fluorinated gas emissions.

The incremental costs are similarly challenging to estimate by a methodology that can be consistently applied across technologies and geographies. A variety of approaches may be taken to make appliances more energy efficient. Techno-economic analysis of these options is often the purview of experienced agency regulators, national laboratories, academics, and technical contractors. Reproducing this type of analysis in a generalized form for application across developing country manufacturers of cooling appliances is a significant, potentially unwieldy undertaking, and may not have great value if generalized too broadly.

Therefore, due to the methodological and political challenges facing the rapid establishment of incremental cost guidelines for energy efficiency measures, efforts to establish an energy efficiency sidecar at the MLF may be wise to focus on non-incremental cost support activities first. Experimentation with incremental cost support may best be left to a subsequent phase, implementing agencies, or other financial institutions that can be more nimble and flexible in determining project requirements, at least in the near term. A more comprehensive program that includes incremental energy efficiency cost support could best be implemented by a mechanism that can draw on technical expertise and financing of institutions in addition to the MLF.

ANNEX 5: CLIMATE DONOR COORDINATION MODALITIES

Climate Investment Funds (CIF)

Established in 2008, the CIF works exclusively with MDBs to scale up mitigation and adaptation activities around the world. It is funded by 14 donor countries who have contributed over US\$8 billion to date. The funds are held in trust by the World Bank, and then disbursed through the implementing MDBs, ensuring clear due diligence and standards, and fostering cooperation between the various MDBs.

Joint Liaison Group between UNFCCC, UNCDD and CBD

The secretariats of each convention established the Joint Liaison Group to enhance coordination, exchange information, and to analyze opportunities for synergistic projects. As the Joint Liaison Group is an informal forum, there is no official funding, though the responsibility for organizing and chairing meetings rotates among the secretariats.

Clean Energy Ministerial (CEM)

Annual ministerial meetings for collaboration and policy dialogue, public-private engagement, and year-round initiatives are held to facilitate international coordination. Initiatives and shorter duration campaigns are each (co-)led by different countries.

International Partnership for Energy Efficiency Cooperation (IPEEC)

The IPEEC Secretariat coordinates the G20's energy efficiency work, and supports various workstream task groups that are each led by different countries. Its membership is composed of 17 of the G20's economies. The IPEEC Secretariat is governed by the Policy Committee (currently chaired by the European Commission) and the Executive Committee (currently chaired by Canada), and each committee chair is elected every two years by the IPEEC members. The IPEEC works directly with governmental ministries, departments and agencies.

Kigali Cooling Efficiency Program (K-CEP)

K-CEP works in tandem with the Kigali Amendment of the Montreal Protocol to provide a platform for technical assistance, funding, and policy support. It is funded by 17 different individuals and foundations, who have pledged a total of US\$51 million to increase the efficiency of cooling in developing countries.

UNEP OzonAction Secretariat

Since 1991, UNEP has been the implementing agency of the Montreal Protocol. OzonAction, part of UNEP's Law Division, strengthens the capacity of governments, and maintains strong partnerships with implementing agencies, such as the Ozone Secretariat, MLF Secretariat, UNDP, UNIDO, World Bank, bilateral agencies, industry associations, and NGOs. It serves clients in over 140 developing countries around the world, providing compliance assisting services and project support.

Sustainable Energy for All (SE4All)

SE4All is an independent non-profit organization that works with the public and private sector in countries around the world to ensure access to sustainable energy. It is funded by various national agencies and departments from around the world, facilitating collaboration through stakeholder engagement and

provides technical assistance in the form of policy reform, investment promotion, etc. SE4All has a relationship agreement with the United Nations whereby both parties agree to mutually cooperate, coordinate, and communicate.

MDB Climate Finance Tracking Group

Beginning in 2011 with the first Joint Report, the MDBs have jointly developed climate finance tracking methodology. Since then, the MDBs have formalized the coordination of two work streams – one for climate change mitigation (led by the EIB) and one for climate change adaptation (led by the IDB).

ANNEX 6: INSTITUTIONAL REQUIREMENTS FOR GRANT AND NON-GRANT INSTRUMENT FACILITIES

A key decision point for the design and operations of a new facility is whether it will make investments or simply provide grants. How the facility is established, what type of skills and capacity is required in its staff, and its overall operations will vary significantly based on the outcome of this one decision. In general, the implications of this key decision can be delineated as follows:

Grants-only: A “grant-only” facility will be able to fund technical assistance and capacity building activities that can enable investments but will not directly finance those investments. Examples of how this type of grants can be used may include: (i) support for manufactures and industry to implement cooling standards, (ii) support for enterprises/businesses engaged in implementing or servicing improved cooling standards, (iii) training and technical support for after-market service providers, (iv) training of local financial institutions to enable them to finance cooling efficiency projects, and (v) training and technical support for government agencies, including on MEPS development and implementation, efficiency labeling programs, utility rebate programs, and government mandates and procurement.

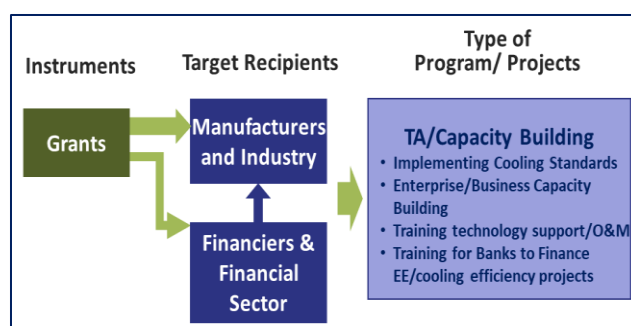


Figure 12. Sidecar Structure with Grants Only

Non-grant Instruments (e.g. debt, guarantees, equity): A facility that provides a broader range of financing options will not be limited to only supporting technical assistance and capacity building programs. Such a facility can both fund the activities identified in a grants-only facility, and may also provide financing which can directly enable investments by manufacturers and industry that meet the Kigali and MLF objectives, including (for example): (i) low-cost financing of tangible upgrades/capital costs for

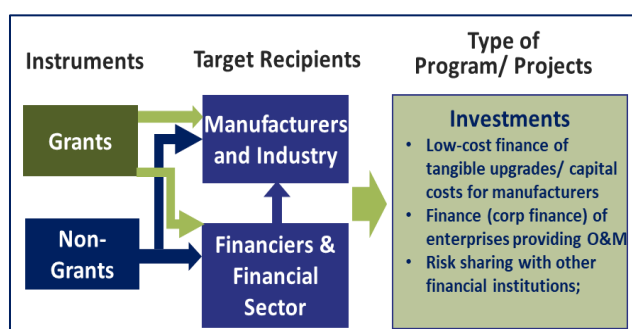


Figure 13. Sidecar Structure with Non-Grant Instruments

manufacturers, (ii) corporate finance for enterprises engaged in technical support for cooling efficiency upgrades, after market service or other technical support to consumers or manufacturers; and (iii) risk sharing with financial institutions to enable/incentivize them to lend directly to manufacturers and enterprises in this sector. The direct implications of this type of product offering is that the operations of the Sidecar will need to have staffing capability in finance, structuring, credit analysis and risk management, in addition to staffing that understands the MLF mandate.

ANNEX 7: KEY FINANCIAL INSTITUTIONS

KEY FINANCE INSTITUTIONS	SNAPSHOT	ACTIVITIES	OPTIONS
GEF	The GEF has provided over US\$18.1 billion in grants and mobilized an additional US\$94.2 billion in financing for more than 4500 projects in 170 countries. By the end of 2015, the GEF had invested in 1,000 climate mitigation projects, including more than 200 EE projects.	The GEF supports capacity development for successful implementation of international environmental conventions. Recent GEF replenishment and GEF Assembly statements on benefits of cross-cutting conventions. "Multi-focal" projects: a unique feature of the GEF.	Blended finance to reduce risk and increase the opportunities for private investors. It also helps rally partners from different sectors around an issue. The GEF is established not only as an innovator, but also as a catalyst.
GCF	The GCF itself uses public investment to stimulate private finance multiplying the effect of its initial financing by opening markets to new investments. The GCF portfolio has 102 projects and programs approved, amounting to US\$5 billion.	GCF has engaged in 5 energy efficiency projects, for example, the energy efficient building retrofits project in Armenia with UNDP.	The GCF implement projects through partnerships with Accredited Entities who submit a project proposal, and responsible for managing the projects. Executing Entities can also do this on behalf of AEs by channeling funds and carrying out the funded activity.
CTF	The US\$5.4 billion CTF is empowering transformation in developing countries by providing resources to scale up low carbon technologies with significant potential for long-term greenhouse gas emissions savings. Over US\$4 billion is approved for implementation in renewable energy, energy efficiency, and clean transport, with the potential to leverage a further US\$47 billion.	Energy efficiency finance programs in Mexico, Colombia, and other countries.	Partnerships with MDBs, which lend at their standard commercial rates, with blended donor funding. Many investments in large-scale energy projects.

World Bank Group and MDBs	World Bank Group (WBG) stated its “support of the amendment by helping countries phase down HFCs and improve EE in air conditioning and refrigeration. WBG aims to invest US\$ 1 billion to promote energy efficiency and resilient buildings in urban areas.	Beyond committing its own financing, the WBG promoted four steps to expand its work in this area: undertake studies to identify where impacts could be the greatest; integrate technical assistance and policy work with concessional financing; deploy new Montreal Protocol financing to help countries; and share knowledge and practices across countries to accelerate action.	Many
GiZ (among other bilateral donors)	GiZ is an implementing agency and it focuses in several areas of cooperation including environment and climate change. One major program is the Proklima sector project, which aims to promote environmentally friendly and energy-efficient cooling technologies worldwide.	GiZ has funded projects in RACHP sectors. For example, production conversion project in India; and alternative refrigerator project in Swaziland.	GiZ works with international programs and countries, including the private sector, to leverage additional resources, following the financial partnership approach. GiZ’s International Climate Initiative (IKI) has a cooling project funding window.

ANNEX 8: THE GEF/IFC EARTH FUND

Program background and design

The IFC Earth Fund (EF) Platform was established as the first platform under the GEF Earth Fund.⁷¹ The primary objective of the Platform was to support private sector projects that would generate global environmental benefits in the area of climate change. It sought to leverage IFC's capacity to draw in private sector investments in fields aligning with the GEF's focal areas. The IFC EF received an initial capitalization of \$40m: \$30m from the GEF Earth Fund and \$10m from IFC. When the overall IFC Earth Fund Platform was approved, IFC received delegated authority from the GEF to approve IFC Earth Fund projects governed by IFC's policies and procedures. This exempted IFC EF projects from the GEF project cycle procedures, increasing flexibility, and speeded up the decision-making process. The Fund became operational in June 2008 and closed in June 2014. IFC and the GEF recognized that market transformation is a long-term process that is unlikely to be achieved through a single project, but rather requires long-term support. Furthermore, both organizations recognized that the private sector plays a central role in driving market change. As a result, the IFC EF was supposed to focus its interventions on creating "lasting change in market behavior by removing identified barriers," such as access to finance, lacking technical capacity or insufficient market knowledge, particularly by focusing on testing and pilot interventions and scale-up interventions:

- 1) Testing and piloting interventions – Support demonstrations that show the ability to mitigate or eliminate the perceived risk associated with new technologies, financial products, and business models.
- 2) Scale-up interventions – Support scale-up initiatives of previously successfully tested technologies, financial products, or business models to encourage widespread adoption.

The IFC EF Platform has four key objectives:

- Minimum of \$30m of projects funded (both IFC EF and private sector) within three years of IFC Earth Fund operations, or minimum of 30% of funds deployed;
- Growth of the IFC Earth Fund Platform beyond initial capitalization of \$40m;
- Replication effect of projects supported under the IFC EF;
- Adequately addressed environmental problems associated with the GEF Strategic Programs and Operational Programs that the IFC EF supports.

IFC EF Platform governance

Within the context of the IFC EF Platform, delegated authority is in place, with IFC responsible for project selection, as well as project management, financial management, monitoring and evaluation as well as other management and support functions, while the GEF has an observer role. The IFC EF program is managed by IFC's Blended Climate Finance (BCF) Unit (formerly the Financial Mechanism Unit, "FinMech"). The BCF Unit focuses on managing the donor relationship as well as ensuring that IFC investment and advisory staff are aware that Earth Fund funds can be accessed, thereby developing a pipeline of projects for IFC EF Platform funding.

The IFC Earth Fund Platform was split between two types of projects – Advisory Services (AS) and Investment Services. IFC's Advisory Services projects support advisory style work such as research,

consulting, capacity building and training for its private and public sector clients. Funding for AS projects is not only monetary but can also be partly in-kind, provided by project partners. AS projects under the IFC EF were intended to help clients overcome market barriers including lack of capacity, lack of information availability as well as high perceived risk and high upfront project costs. Examples include providing technical assistance, such as for companies providing modern lighting services for un-electrified populations, or to promote sustainable energy lending among financial institutions. IFC's Investment Services (IS) projects under the IFC EF provided loans, risk-sharing facilities and equity for cleantech-related projects and services, such as risk-sharing for an energy efficiency/renewable energy credit line and an equity investment into a concentrated solar power installation. In general, IS projects address market barriers related to high perceived risks and/or high upfront costs.

Lessons learned

Based on the review of the available documents and interviews with project actors, some lessons learned have been identified across the IFC EF Platform project portfolio. These reflect one or more projects in each case, as detailed below, and have been considered more broadly applicable to future similar contexts. The lessons learned have been grouped around a few key themes:

- Project development and structuring
- Role and impact of Advisory Services projects
- Dissemination and knowledge sharing
- Good practice for Facilities

It is interesting to note that the majority of lessons learned are related to project development and structuring, highlighting to what extent the project development phases are important to ensure project success. Those projects facing challenges occurred at the implementation stage or in relation to the market context, but could potentially have been identified at the project development and structuring stage.

Project preparation and development

Confirming knowledge related to the current market, regulatory and project context is up to date before launching a project or allocating funds helps ensure its success. A few projects faced difficulties related to market, regulatory or project context, which could potentially have been avoided if the ongoing validity of the project context was challenged and the project adjusted in consequence.

Selecting the right partner and ensuring engagement of relevant stakeholders is crucial to project success. In this context, professional associations can be a meaningful lever for engaging with industry stakeholders. Professional or industry associations help provide credibility and allow access to relevant industry contacts and organizations. Furthermore, their existing outreach activities can be leveraged by the IFC EF Platform in its engagement or awareness-raising activities, leading to more impact.

In some cases, projects faced challenges because the market was not sufficiently mature to support follow-on projects. Certain projects faced challenges due to market conditions, notably an insufficiently mature market.

The Cleantech Innovation Facility faced challenges in identifying eligible projects; this appears to be partly due to innovative cleantech markets not being mature enough in the targeted countries leading to a very

limited pipeline of deals. The lack of maturity in the market combined with deals which were small, high risk, and aligned with environmental goals, led to the identification of very few potential projects. Possibilities for addressing this type of challenge include either broadening project selection criteria or undertaking deeper thematic market assessments and market intelligence before launching such a facility.

The IFC EF was well placed to respond to investment and advisory projects that met its objectives

The ability of the IFC EF Platform to support projects globally in a flexible manner was critical to the development of innovative investments and the successful use of EF Platform funds and the outcomes and impacts that they are generating. Most donors' strategies may focus only on specific countries or regions, which place limits on the abilities to use the funds to their fullest potential. IFC EF's position in investing early in certain areas or technologies helped demonstrate viability and encourage other participants to join the market, as well as giving IFC a leadership role in assisting other donors in understanding market needs. This is notably the case for IHS, in which IFC's early investment led to a follow-on KfW investment and for Lighting Global, in which the Earth Fund's Advisory Services in emerging market technologies such as off-grid solar ensure leadership for IFC in assisting other donors.

Role and impact of Advisory Services projects

Advisory work has a crucial role for building awareness, technical capacity and catalyzing investment from the private sector. In the Green Power for Global Mobile II project, the upfront advisory work funded by IFC EF was crucial for catalyzing investment from the private sector. In the BPI SEF II project, advisory work helped lay the groundwork for the local bank to develop their technical capacity to launch sustainable energy financing and engage with the private sector.

Dissemination and knowledge sharing

There is significant potential of benefiting from dissemination of project results amongst IFC EF Platform projects internally, beyond the scope of project reporting documents, as well as externally; this could benefit both IFC and other actors

- The existence of a knowledge management platform, as well as frequent meetings in the context of the Global Cleaner Production Facility, contributed to the sharing of expertise and knowledge, which was a key project success factor, allowing harmonious development of many regional programs simultaneously. The knowledge transfer across the regions positively impacted the steady improvement of programs in almost all regions.
- For Lighting Global, a common knowledge platform was considered particularly meaningful in the context of global projects to transfer expertise from one IFC team to another when implementing new projects, through training and other dissemination events.

Good practice for financing facilities

In the development of financing facilities, some lessons learned on good practice were identified from the Global Cleaner Production Facility. These include:

- Having a small amount of time set aside for administering project budget and overseeing implementation was helpful.
- Allowing operations officers flexibility in allocating funds among projects under the facility seemed to represent a well-adapted and efficient model.

- A Knowledge Management platform and frequent meetings contributed to sharing of expertise and knowledge, which is useful for the development of simultaneous projects.

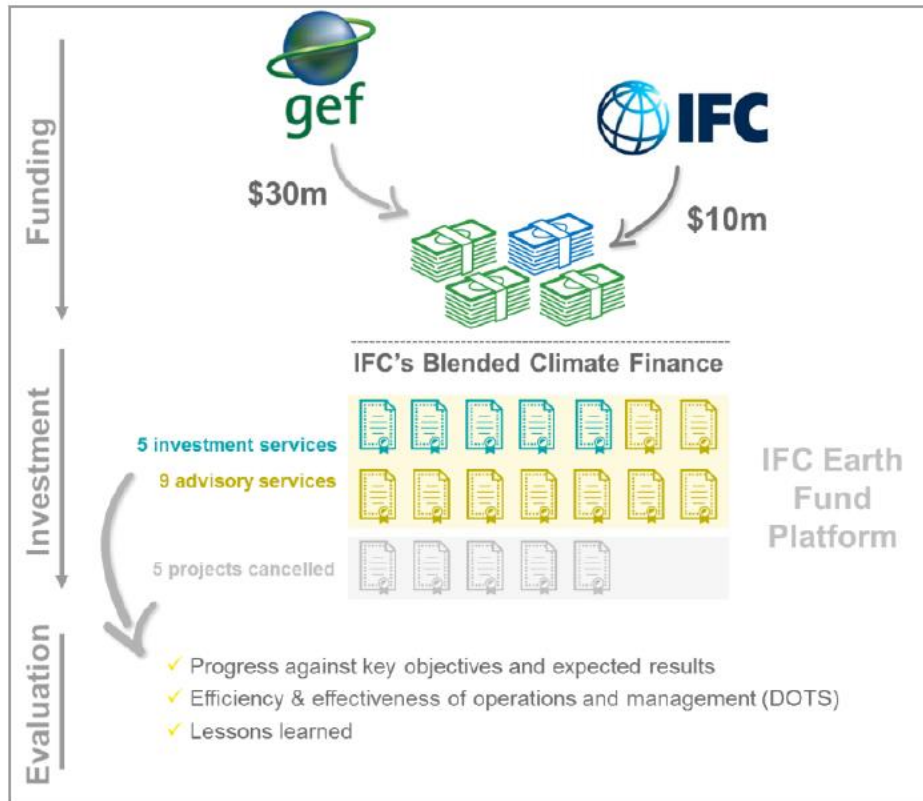


Figure 14: Structure of the IFC EF Platform Source: EY (2016)⁷²

ANNEX 9: EXISTING EXAMPLES OF INTER-AGENCY COOPERATION

Name	Agencies Involved	Purpose	How it works
CIF	14 Donor countries, AfDB, ADB, EBRD, IDB, World Bank	Supports scaling up mitigation and adaptation action in developing and middle-income countries.	Donor countries contribute funds, which are then held in trust by the World Bank. Funds are disbursed to recipient countries through the MDBs.
Joint Liaison Group	UNFCCC, UNCCD, CBD	To enhance coordination between the three conventions in combating desertification, land degradation and drought (DLDD).	An informal forum for the three conventions to exchange information, explore opportunities for synergistic activities, and improve coordination.
CEM	25 countries and the European Commission	To enhance coordination and information sharing between energy ministries around the world to improve energy efficiency, clean energy supply, and clean energy access.	Annual ministerial meetings for collaboration and policy dialogue, public-private engagement, and year-round initiatives to facilitate international coordination.
IPEEC	16 countries and the European Commission	To promote collaboration on energy efficiency.	The IPEEC Secretariat coordinates the G20's energy efficiency work and supports various workstream task groups that are each led by different countries.
K-CEP	17 donors and individuals	To help developing countries transition to energy-efficient and climate-friendly cooling solutions.	Works in tandem with the Kigali Amendment of the Montreal Protocol to provide a platform for technical assistance, funding, and policy support.

Name	Agencies Involved	Purpose	How it works
UNEP OzonAction Secretariat	UNEP	To enable developing countries to meet and sustain their compliance obligations to the Montreal Protocol. Builds capacity in governments and industry to enforce and implement the Protocol.	Maintains strong partnerships with implementing agencies, such as the Ozone Secretariat, MLF Secretariat, UNDP, UNIDO, World Bank, bilateral agencies, industry associations, and NGOs.
SE4All	Various private foundations, national aid agencies, K-CEP, the EU, World Bank	Promotes and supports the development of affordable, reliable, sustainable and modern energy for all.	Works with the public and private sector in countries around the world to ensure access to sustainable energy. Facilitates collaboration through stakeholder engagement and provides technical assistance in the form of policy reform, investment promotion, etc.
MDB Climate Finance Tracking Group	AfDB, ADB, EBRD, EIB, IDB, WBG, IsDB	To take a common approach to tracking and reporting of climate finance.	Formalized coordination of two work streams – one for climate change mitigation (led by the EIB) and one for climate change adaptation (led by the IDB).

¹ Ibid.

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³ "Super-Efficient Air Conditioning & the Phase-down of HFCs." Children's Investment Fund Foundation, 2016, ciff.org/grant-portfolio/super-efficient-air-conditioning/.

⁴ "Conservation X Labs Launches The Global Cooling Prize in India." Conservation X Labs, 2018, conservationxlabs.com/news/2018/11/19/conservation-x-labs-launches-the-global-cooling-prize-in-india.

⁵ "Paper on Information on Relevant Funds and Financial Institutions Mobilizing Resources for Energy Efficiency That May Be Utilized When Phasing down HFCs (Decision 82/83(d))." Executive Committee of the Multilateral Fund, 2019, www.multilateralfund.org/83/English/1/8341.pdf.

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⁸ Amerasinghe, Niranjali, et al. The Future of the Funds: Exploring the Architecture of Multilateral Climate Finance. World Resources Institute, 2017, wriorg.s3.amazonaws.com/s3fs-public/The_Future_of_the_Funds_0.pdf.

⁹ World Bank, 2015. Resource Mobilization for HCFC Phase-out and Climate Mitigation Co-benefits. <https://openknowledge.worldbank.org/bitstream/handle/10986/21978/ResourceMobil0he0multilateral0fund.pdf?sequence=5&isAllowed=y>

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¹³ "Report of the Seventy-Eighth Meeting of the Executive Committee." Executive Committee of the Multilateral Fund, 2017, www.multilateralfund.org/78/English/1/7811.pdf.

¹⁴ "Experiences and Case Studies on Energy Efficiency in the Refrigeration and Air Conditioning Sector." United Nations Development Programme, 2018.

¹⁵ "Past Successes and Future Opportunities: Case Studies from the UNDP Portfolio and Innovative Approaches to Cooling without Warming the Planet." United Nations Development Programme, 2017.

¹⁶ "Protecting the Ozone Layer and Reducing Global Warming Results, Case Studies and Lessons Learned from UNDP's Montreal Protocol Programme." United Nations Development Programme, 2014.

¹⁷ "HFC Initiatives." Climate & Clean Air Coalition, www.ccacoalition.org/en/initiatives/hfc.

¹⁸ "Additional Contribution to the Multilateral Fund by the Government of the United Kingdom of Great Britain and Northern Ireland." Executive Committee of the Multilateral Fund, 2018, www.multilateralfund.org/82/English/1/82Inf.pdf.

¹⁹ The GEF solved this problem by focusing on the costs of "barrier removal" for measures that were expected to be cost saving on a LCC basis. "Cost Effectiveness Analysis in GEF Projects." Global Environment Facility, 2005, www.thegef.org/sites/default/files/council-meeting-documents/C.25.11_Cost_Effectiveness_0_5.pdf.

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²² "21st Century Power Partnership." 21st Century Power Partnership, www.21stcenturypower.org/about.html.

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- ²⁵ Private Financing Advisory Network, pfan.net/about-us/.
- ²⁶ Lighting Global, www.lightingglobal.org/about/.
- ²⁷ InfoDev, www.infodev.org/about.
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