

FINANCING ACCESS TO COOLING SOLUTIONS

KNOWLEDGE BRIEF

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INTRODUCTION AND OVERVIEW

Financing for access to cooling solutions is a significant challenge. The diversity of cooling access needs—from those of large wealthy companies to those of poor rural populations; from large buildings to urban slums to rural huts; from human comfort to cold chains for food and vaccines—requires a range of financial products, instruments, and approaches to deliver specific solutions. Mapping finance needs and market gaps can enable the identification and improve the ability to overcome the barriers for financial flow necessary to increase access to cooling. Some of these financing barriers can be surmounted with modest risk mitigants to attract private capital while others will require substantial subsidies and still others can only be addressed fully by grants. Similarly, potential sources of funding will vary according to the likelihood of commercial returns, the local investment climate, the scale of investment and other factors. In some situations,

commercial financing will be available. However, for projects requiring challenging or innovative solutions, such as for those that can meet the needs of poor rural populations, some commercial strategies such as bulk procurement to lower costs may be feasible, but in many cases public or grant funding may still be required.

The Kigali Cooling Efficiency Program (K-CEP) has given a major boost to the recognition of financing needs for access to cooling but this recognition remains limited given that financing needs continue to be poorly defined and tracked globally. Numerous recent initiatives offer some promise going forward, among them prizes from the Rocky Mountain Institute, Engineers Without Borders CLASP's Global LEAP Program, and the Million Cool Roofs Challenge, as well as innovative business models like the expansion of Cooling as a Service (CaaS).

ACCESS TO COOLING FINANCE CHALLENGES

Challenge 1: The diversity and complexity of cooling needs

Needs concerning human comfort and safety; food, nutrition security and agriculture; and health services are part of the challenge in identifying financing solutions.

Human comfort and safety

Efficient and affordable cooling for the poor is a large and complex financing challenge. For the growing number of families marginally able to afford a cooling device—a fan or an air conditioner—the initial cost of the device is a major consideration and often means buying the least energy-efficient, most carbon-intensive product on the market and using it for limited periods during the hottest times of the day. Sustainable Energy for All's (SEforALL) *Chilling Prospects* series of reports estimates that more than 2 billion people fall within this category, a group that could cause a dramatic increase in energy consumption and associated GHG emissions due to its high cooling needs.¹ As incomes rise and temperatures increase, this segment of the population is likely to grow steadily in the coming years. Finding ways to make more efficient and climate-friendly systems with low upfront costs widely available is a major challenge and must be considered in the context of subsidies that may

exacerbate the issue. Evolving solutions include raising consumer awareness, providing more informative product labels, and policy reforms that promote innovative approaches to consumer financing that provide incentives for more efficient cooling technologies.²

In cities, urban design and planning for heat extremes are key issues in the construction of both buildings and public spaces. Technical assistance from international organizations, including NGOs, has provided an important foundation for such efforts along with support for sharing learning and experience among city leaders. The issue is urgent. By 2030, the proportion of residents living in urban areas is expected to grow to 40 percent of India's population, 55 percent of that of Southeast Asia, and to nearly half the population of Sub-Saharan Africa.³ Preventing dangerous lock-in effects from the growth of unsustainable building expansion is vital in the short term. Urban planning must promote sustainable cooling, including passive cooling and nature-based solutions.

Food, nutrition security and agriculture

Supporting cold chains that both improve agricultural incomes and enable healthier diets remains a complex challenge. Fostering the development of sustainable cold chain technologies is criti-

¹ SEforALL (2019). *Chilling Prospects: Tracking Sustainable Access to Cooling for All 2019*.

² Eli, A. et al. (2019). Discussion paper: Architecture and financial models for efficient cooling alongside the Montreal Protocol.

³ United Nations Population Division, Department of Economic and Social Affairs (2018). *World Urbanization Prospects: The 2018 Revision* (2018).

cal to their successful delivery, but it is difficult to identify the appropriate financial instruments to enable access to funding for the deployment of the right technical solutions. This is because low agricultural incomes and the low density of rural populations likely necessitate grants or highly concessional finance to stimulate market development, possibly facilitated by innovative methods to aggregate demand (see reference to Cooling Hubs below). At the same time, it is important to create a sustainable market for innovative technologies that reduce reliance on this type of funding and helps the market as a whole transition to being commercially sustainable. In developing these strategies, a key concern is that smallholder farmers see an equitable financial return.

Health services

Few finance solutions address the health-care sector and cold chain, which is a combination of the delivery of vaccines and other temperature-sensitive medical products, and the functioning of health-care infrastructure facilities to deliver medical care. According to the public-private global health partnership Gavi, the Vaccine Alliance, innovative technology is key to extending the cold chain to ensure lifesaving vaccines reach remote off-grid communities. However, in poorer countries where markets and delivery mechanisms for new technologies rarely exist, government and health partners must use their limited resources to purchase and maintain cold chain equipment.⁴

As health-care products and services are primarily public goods, funding the health sector cold chain will continue to be a public need that requires highly concessional finance. This public investment is essential to foster a viable market and to deliver enhanced access to sustainable cooling in high-impact countries. To justify domestic and

donor funding, such programs need to be shown to be efficient and effective, sometimes achieved through public-private partnerships.

Challenge 2: The diversity and complexity of funding

A wide range of financial tools will be needed to fund the diversity of solutions.

Not every type of finance or funding mechanism will be of relevance or suitable for all cooling solutions. Access to cooling raises diverse challenges specific to different areas of need, populations and governments, all of which in turn require targeted financial instruments. In addition, these must be carefully matched with the intended type of financing party and expected beneficiaries. As mentioned above, a diverse set of financing sources will be needed. Private sources dominate overall but are typically highly risk averse, while public and philanthropic sources with greater risk tolerance are much more limited.

There is a range of commercial financial instruments, including loans, equity investments and risk mitigants. Each of these can vary with the stage of a project or enterprise; for example, early stage equity investments are typically perceived as higher risk and are therefore made with expectations of greater compensation than loans for completed projects with established revenues. There are also typically economies of scale associated with financing, such that smaller projects should be reviewed with less scrutiny (for example by adopting a credit scorecard approach) or aggregated to reduce transaction costs while avoiding unsustainable default rates.

Delivering access to sustainable cooling has clear climate change mitigation benefits in terms of greater energy efficiency and lower greenhouse gas emissions. But it exists at a

⁴ GAVI (2018). Cold supply for hot demand. Available at: <https://www.gavi.org/vaccineswork/cold-supply-hot-demand>

nexus between mitigation and adaptation and is receiving greater attention due to the increasing emphasis on financing adaptation to climate change. The Green Climate Fund (GCF), for example, calls for half its funding to be dedicated to adaptation, with half of that funding going to Sub-Saharan Africa, less developed countries (LDCs), and small island developing states (SIDs) where access to cooling is a key resilience measure. Considering the increased prioritization, it is important to address the access to cooling dimensions of commonly understood gaps or barriers to finance. According to the UN Environment Programme Finance Initiative (UNEP FI), barriers to investing in climate change adaptation can be categorized under six groupings: financial barriers, information barriers, institutional barriers, political and regulatory barriers, technological barriers, and socio-cultural barriers.⁵ Table 1 shows these financial obstacles and how they both prevent socially optimal investments from being commercially attractive and limit scaling up of cooling solutions.

Challenge 3: The diversity and complexity of the financial sector

The financial sector is locally specific where risk-averse private sources dominate, while public and philanthropic sources with greater risk tolerance are much more limited.

The financing challenge for access to cooling is to create strategies that attract capital to these very diverse needs and locations. At a global scale, there is sufficient capital for long-term investments – more than USD 200 trillion according to a recent OECD report, primarily held by pension funds, insurance companies, and sover-

ign wealth funds, but also investment funds and commercial banks.⁶ However, much of this wealth is conservatively managed to generate returns and a relatively small share (although increasing) goes to emerging markets where need is highest. The nascent nature of the issue as well as the diversity of cooling needs, particularly those where business models have not yet been proven to return profits, are barriers to attracting this type of capital. Tracking of investments in the categories relevant to access to cooling is also currently very poor, as discussed below.

The diversity of needs is matched by a correspondingly diverse set of financial instruments and sources:

An obvious challenge is the diversity of the financial sector and its priorities in different contexts. National treasuries, banks, pension funds, insurers and reinsurers, development financiers, ratings agencies and regulators all have a role to play, and these roles will be different in developed and developing countries. The good news is that these actors are increasingly interested in and engaged with climate change. (UNEP and IEA 2020)

Philanthropic initiatives, while of lesser amounts, also provide critical grant funding that has considerable relevance for access to cooling. In September 2018, 29 philanthropists pledged USD 4 billion over the following five years to combat climate change – the largest-ever philanthropic investment focused on climate change mitigation.⁷ In addition to K-CEP, for example, the Rockefeller

⁵ UNEP Finance Initiative (2016). Demystifying adaptation finance for the private sector. Available at: <https://www.unepfi.org/wordpress/wp-content/uploads/2016/11/DEMYSITIFYING-ADAPTATION-FINANCE-FOR-THE-PRIVATE-SECTOR-AW-FULL-REPORT.pdf>

⁶ OECD-GIZ (Convergence Blended Finance Task Force) (2018). Available at: <http://www.oecd.org/water/OECD-GIZ-Background-document-Who-is-the-Private-Sector.pdf>

⁷ Philanthropic Community Announces \$4 Billion Commitment to Combat Climate Change, William and Flora Hewlett Foundation, September 14, 2018. Available at: <https://hewlett.org/newsroom/philanthropic-community-announces-4-billion-commitment-to-combat-climate-change/>

Table 1

Gaps and barriers to adaptation finance for access to cooling (adapted from UNEP FI (2016): Demystifying adaptation finance by the private sector)

| | Financial | Information | Institutional | Political and Regulatory | Technological | Social and Cultural |
|------------------------------------|--|---|---|---|--|---|
| Description of Gap and Barrier | <ul style="list-style-type: none"> Lack of financial resources, budget constraints or lack of access to credit Lack of, or limited access to, tools to assess risks and opportunities related to the implementation of adaptation projects | <ul style="list-style-type: none"> Lack of overview and understanding of the cooling needs and disaggregated data specific to a geography or market sector | <ul style="list-style-type: none"> General shortcomings in institutional arrangements and governance, in the public and/ or private space | <ul style="list-style-type: none"> Adverse effects of policy and regulation on business motivations for adaptation investing | <ul style="list-style-type: none"> Lacking availability of, or access to, advanced technologies, tools and structures | <ul style="list-style-type: none"> Social and cultural processes that govern how people and other stakeholders react to climate variability and change |
| Example of Gap and Barriers | <ul style="list-style-type: none"> Rural poor and slum dwellers perceived as high-risk investment due to lack of adequate collateral Lack of sufficient data on economic returns of low-tech solutions such as white roofs/urban greenery, as well as in agricultural and medical cold chains Lack of access to affordable capital for manufacturers (directly or indirectly) | <ul style="list-style-type: none"> Lack of awareness of the importance of access to cooling, to create interest and enable financing flows to cooling sector Lack of quality data | <ul style="list-style-type: none"> Lack of cooperation and coordination between climate funds Lack of coordination between ministries, agencies and levels of government | <ul style="list-style-type: none"> Low or subsidized electricity prices that limit incentives to acquire energy-efficient cooling devices Limited verification of compliance to MEPS for ACs and refrigeration Lack of building energy efficiency codes or poor enforcement of these codes | <ul style="list-style-type: none"> Limited funding into RD&D for affordable and efficient cooling appliances that are appropriate for the market | <ul style="list-style-type: none"> In certain regions, increased energy demand to maintain unnecessary low indoor temperature |
| Potential Financiers to cover Gaps | <ul style="list-style-type: none"> International finance institutions, including development finance institutions Commercial banks, philanthropic foundations | <ul style="list-style-type: none"> Intergovernmental organizations, Multilateral development banks CSOs | <ul style="list-style-type: none"> Multilateral climate funds, governments, commercial investors, trade promotion agencies, climate investment funds | <ul style="list-style-type: none"> National governments | <ul style="list-style-type: none"> Entrepreneurs, SMEs, commercial banks, Angel/ impact investors, Multinationals/ corporates Public RD&D | <ul style="list-style-type: none"> National governments Cities CSOs |
| Examples of Measures | <ul style="list-style-type: none"> Servitization, pay-as-you-go, or pay-as-you-store Financing for solar-powered refrigeration Guarantees and/or risk sharing mechanisms to underwrite risks for FIs lending to manufacturers | <ul style="list-style-type: none"> Undertaking a Cooling Needs Assessment | <ul style="list-style-type: none"> Multi-sectoral approach Strategic timing of technical assistance Support for systemic change, and successful facilitation of co-finance | <ul style="list-style-type: none"> Utilities' AC appliance rebate and demand-side management subsidy programs | <ul style="list-style-type: none"> Low up-front cost technologies accelerating technical and commercial viability of high-efficiency components & appliances | <ul style="list-style-type: none"> Passive cooling measures in buildings Public cooling centers, heat alert functions, support to health sector to prevent and treat heatstroke Awareness-raising of measures to take during extreme heat. |

Table 2**Typology of financiers**

| Type of financiers | |
|--------------------------------------|---|
| Public | Private |
| • International finance institutions | • Philanthropic foundations |
| • international organizations | • Trade promotion agencies |
| • ODA agencies | • Commercial investors |
| • Domestic governments | • Angel/impact investors |
| • Public (development) banks | • Commercial banks |
| • Export credit agencies | • Multinationals/corporates |
| | • Pension funds/insurance companies |
| | • Small and medium-sized enterprise (SME) entrepreneurs |
| | • Social impact funds |

Foundation recently announced a grant of USD 42 million for resilience efforts around the globe⁸ and an initial commitment of USD 8 million for resilience efforts in an international network of cities, including support for resilience officers.⁹ Because of their willingness to support innovative activities with at least initially higher risks and limited expectation of return, these commitments are particularly valuable.

Factors such as the stability of local currencies and the creditworthiness of national financial institutions can also be critical factors in the availability of finance. A substantial share of climate finance is from sources within countries as shown in the Climate Policy Initiative (CPI) *Landscape of Climate Finance 2018 Update*:

The vast majority of climate finance continues to be spent domestically. 81 percent of climate finance was spent domestically during 2015/2016. The private sector provided 63 percent of this spending, while the public sector provided 37 percent. Of the USD 87 billion in international flows, most was sourced from the OECD (USD 73 billion), but spent in non-OECD countries (USD 56 billion).

In many developing countries, the investment climate is perceived as high risk. This is often due to political unrest but can also be attributed to corruption and weak enforcement of contracts among other barriers to doing business. These factors can have a major impact on the availability and the cost of finance. Political unrest can to a point be mitigated via political risk insurance products from the small number of institutions that offer it, although this adds to the cost of doing business. In addition, capital markets in developing countries are also less advanced, which means limited financial innovation of the sort needed to address financing needs for cooling.¹⁰

⁸ Rockefeller Foundation Awards \$42 Million for New Climate Efforts, *Philanthropy News Digest*, April 3, 2019. Available at: <https://philanthropynewsdigest.org/news/rockefeller-foundation-awards-42-million-for-new-climate-efforts>

⁹ The Rockefeller Foundation Launches New Climate and Resilience Initiative; Commits to an Initial \$8 Million to Continue Supporting Global Network of Cities and Chief Resilience Officers, The Rockefeller Foundation, July 8, 2019. Available at: <https://www.prnewswire.com/news-releases/the-rockefeller-foundation-launches-new-climate-and-resilience-initiative-commits-an-initial-8-million-to-continue-supporting-global-network-of-cities-and-chief-resilience-officers-300880528.html>

¹⁰ For a comprehensive review of perceived global corruption, please see: *Corruption perceptions Index: 2019, Transparency International*. Available at: <https://www.transparency.org/cpi2019>

Table 3**World Bank *Doing Business* ranking, 2020**

| Critical countries | <i>Doing Business</i> ranking, 2020 |
|--------------------|-------------------------------------|
| China | 31 st |
| India | 63 rd |
| Indonesia | 73 rd |
| Pakistan | 108 th |
| Brazil | 124 th |
| Nigeria | 131 st |
| Mozambique | 138 th |
| Bangladesh | 168 th |
| Sudan | 171 st |

Many climate-vulnerable countries with high access to cooling gaps rank poorly in the World Bank's ranking of 190 countries according to the attractiveness of *doing business*.¹¹ Table 3 shows the *Doing business* ranking for the *critical nine* countries, which rank highest by population at risk due to lack of access to cooling.

The global economy requires around USD 90 trillion of investment in infrastructure (e.g. buildings, transport, energy) between 2015 and 2030 to support economic growth and the broader development agenda. In advanced economies, many aging infrastructure networks for water, energy and transport need to be replaced or upgraded. In emerging and developing economies, most of the infrastructure required to meet development goals is still to be built, particularly in urban settings. This provides governments with an opportunity to develop innovative financing strategies to address their infrastructure investment needs by diversifying their financial sources and instruments. This can be done, for example, by supporting the use of green or sustainabili-

ty-related instruments in order to attract Environmental Social Governance (ESG) or impact-oriented investors.

Challenge 4: The ability to track data and evidence

Measurement and evaluation of pre- and post-intervention can support better decisions.

What gets measured gets managed. It is only when the International Finance Corporation (IFC) made a public commitment to grow its renewable energy (RE) and energy efficiency (EE) activities that a tracking system was put in place. It is only when such investments began to be tracked and targets set that staff realized that there were several climate-related opportunities in the business that could, with a little extra effort, be secured. (IFC, *Leverage in IFC's Climate Related Investments*, 2013)

¹¹ *Doing Business 2020 – Sustaining the pace of reforms*, World Bank Group, October 24, 2019. Available at <https://www.worldbank.org/en/news/feature/2019/10/24/doing-business-2020-sustaining-the-pace-of-reforms>

A formal tracking effort to understand access to cooling finance remains a key need for the community in order to establish a comprehensive baseline for investment, understand the trends and gaps, and to redirect efforts where further effort is required. Tracking also helps enable target setting and benchmarking that can allow implementation organizations to realize new opportunities.

Tracking has been effectively deployed by other organizations in the energy space. The International Energy Agency (IEA), for example, tracks annual investment in energy efficiency across key sectors that include buildings, transport, and industry among others. In *Energy Efficiency 2019*, the IEA found that investment had improved only modestly, from USD 236 billion to USD 240 billion, and noted that investment must at least double by 2025 to unlock the full potential of energy efficiency. Similarly, the International Renewable Energy Agency (IRENA) and REN21, among others, track the volume of finance in renewable energy globally.

Together with the Climate Policy Initiative, SEforALL tracks investment for electricity access and clean cooking, and has found clearly in recent years that the finance is falling short of what is necessary to deliver universal access to energy. Tracking electricity access can help form initial conclusions about access to cooling, notably as electricity enables cooling with fans and air conditioners. For example, SEforALL's *Energizing Finance: Understanding the Landscape 2019* report found that that finance commitments for off-grid electricity solutions, including mini-grids and stand-alone systems, stood at USD 430 million in 2017 across SEforALL's 20 identified high-impact countries with large electricity access gaps, a marginal increase of only 12 percent compared to the annual average in 2015-16. The same report also tracks financing for energy efficiency that would enable energy access, and in 2019 found that energy efficiency accounted for USD 740 million of the finance commitments tracked for electricity access in

2017, a significant increase from USD 260 million in 2015-16. Notably, energy efficiency finance includes demand reduction measures, which can also be viewed as enablers of access to cooling.

While useful, a comprehensive methodology to track access to cooling finance must go beyond proxies related to access to energy. These estimates, for example, do not typically capture investments in passive building design in hot climates or efforts made to ensure cold chains for agriculture and medicine. As identified in *Energizing Finance: Understanding the Landscape 2019*, for the energy access sector, there are significant data gaps for private sector investment in energy efficiency, with cooling an even more narrow subset of such finance.

A substantive methodology to track access to cooling finance would therefore recognize that cooling finance exists as a subset of finance for access to energy, renewable energy, energy efficiency, and non-energy investment across the spectrum of cooling needs. Fundamentally the methodology would enable an understanding of the types of investment made, the sectors in which they are applied, and the outcomes targeted, including reducing the demand for electrical cooling. The Cooling for All Needs Assessment, part of SEforALL's *Chilling Prospects: Tracking Sustainable Cooling for All 2019* report, provides an indicative basis for how such investment could be categorized.

Next steps in such an effort should include a survey of finance that supports access to cooling and a corresponding effort to track overseas development assistance (ODA), the development of a framework to allow for private sector self-reporting, and tracking access to cooling-related activities and investment in the context of a larger effort to evaluate progress, share lessons learned, and identify gaps in specific sectors and geographies. This effort could be accomplished most efficiently if a partnership can be established with organiz-

Table 4

Examples of access to cooling finance, by solution and need

| | Human Comfort and Safety | Food, Agriculture, and Nutrition Security | Health Services |
|-------------------------------------|--|---|--|
| Passive or non-electrical solutions | Subsidies or grants for cool roofs installed at educational facilities | Pay-as-you-store cold storage utilizing evaporative cooling | Hospital retrofits to maximize energy savings with external shading, green roofs, and blinds |
| Energy-related solutions | Incentives for energy efficient fans Cooling as a Service (CaaS) | Community cooling hubs for agricultural producers | Mini-grid or off-grid generation investments to power rural clinics |

ations already tracking developments for specific sectors, for example the WHO for health-related investments and the Global Cool Cities Alliance for urban cooling programs.

A collaborative knowledge portal along these lines was included in the recent World Bank announcement of an initiative to accelerate the adoption of battery storage technology.¹²

¹² The Energy Storage Partnership (ESP) is comprised of diverse international members including governments, research institutions, and MDBs. The partnership was conceived with the rationale that: “to open new markets for energy storage in developing countries, several barriers will need to be addressed: the lack of knowledge about and exposure to new technologies and their applications; regulatory and policy environments that are unable to guarantee cost recovery; and procurement practices that are not yet adapted to energy storage investments. An international approach to research and development, knowledge-sharing, training, and capacity building has been identified as an important way to encourage the uptake of energy storage technologies in developing countries and ultimately enable more integration of variable renewable energy. By connecting stakeholders and sharing experiences in deploying energy storage, the ESP will help bring new technological and regulatory solutions to developing countries, as well as help develop new business models that leverage the full range of services that storage can provide.” <https://esmap.org/webpage/energy-storage-partnership-esp-factsheet>

OPPORTUNITIES IN FINANCE FOR ACCESS TO COOLING

Opportunity 1: Consideration of access to cooling by climate funds

SEforALL's *Chilling Prospects: Tracking Sustainable Cooling for All 2019* report described some of the challenges associated with obtaining funds for access to cooling from multilateral climate funds. To date climate finance for access to cooling has been very limited, with the exception of a few initiatives promoting more efficient appliances and more efficient buildings. There are some indications that awareness of the importance of cooling issues within these funds may be increasing, particularly within the Montreal Protocol community as discussed more specifically below. The GCF, for example, proposed strategic priorities as background for replenishment negotiations in 2019 that include funding innovative technologies for energy efficiency, including refrigeration and cooling, and support to embed urban greening and resilience actions into national adaptation plans.¹³ A GCF project concept for Costa Rica, Ghana and Indonesia submitted by GIZ is framed around green cooling and accelerating the transition to climate-friendly and energy-efficient air conditioning.¹⁴ In support of

a request for USD 87.4 million in grant funding, the concept states:

"Only the GCF can holistically address direct (refrigerant) and indirect (electricity) emissions in a 'joined up' approach at scale. Most NDCs cover all six Kyoto gases, including HFCs, in their scope, and energy efficiency is mentioned in the vast majority (143) of NDCs. Yet very few NDCs 'join the dots' between HFC abatement and energy efficiency. The GCF can play a key role in this regard."

The Pilot Program for Climate Resilience (PPCR), one of the Climate Investment Funds with commitments of over USD 1 billion for adaptation efforts in 28 countries, has been a significant source of financing although its future is unclear.¹⁵

The commitment to increase the share of climate finance targeted at measures to reduce the vulnerability of developing countries to climate change adaptation may also benefit some access to cooling measures. While mitigation has had the lion's share of climate funding, the GCF now has a policy that its funding for adaptation be equal and has recently approved large commitments of financial support for use as technic-

13 Strategic Programming for the Green Climate Fund First Replenishment, Green Climate Fund (2019). Available at: https://www.greenclimate.fund/documents/20182/1429983/RC1-2_Strategic+programming_version2_consultation+meeting_oslo_20190321.pdf/0caf3e45-be5a-7b86-01d6-c3008fe25424 (Accessed: March 21, 2019)

14 Green Cooling – Accelerating the Transition to Climate-friendly and Energy Efficient Air Conditioning, Green Climate Fund Concept Note, March 7, 2019. Available at: https://www.greenclimate.fund/documents/20182/893456/21670_-_Green_Cooling__Accelerating_the_transition_to_climate-friendly_and_energy-efficient_air_conditioning.pdf/acae1d22-b2b8-e223-429c-5b0adce73c2c

15 Bird N., Y. Cao, and A. Quevedo, "Transformational Change in the Climate Investment Funds: a Synthesis of the Evidence (ODI 2019), p. 31, <https://www.odi.org/sites/odi.org.uk/files/resource-documents/12587.pdf>. ("PPCR has significantly contributed to achieving transformational change through the scaling of funding available for climate-resilient investments. For every dollar invested by the PPCR an additional two dollars have been raised by the MDBs, national governments and other co-financing partners. This has helped bring about climate-resilient action at scale.")

al assistance (grants) and risk mitigants for loans and investments that address both mitigation and adaptation needs.¹⁶ Common elements of these programs include ambitious financial targets, often multiple potential country recipients, and delegation of significant administrative discretion to an experienced financial intermediary that has incurred risk. A program along these lines defined around cooling needs is worthy of consideration as it could afford the combination of flexibility, centralized management, diverse market application, and relatively long-term approach needed.

The GCF also has a policy that half its adaptation funding goes to Sub-Saharan Africa, less developed countries (LDCs), and small island developing states (SIDs), which includes two of the populations with the largest access to cooling gaps – Bangladesh and Nigeria. Among access to cooling measures, cold chains for agriculture and medicines and cooler cities could qualify for adaptation funding. Such measures can sometimes qualify as both mitigation (reducing GHG emissions) and adaptation. For example, a proposed GCF project to enhance the resilience of fishing communities in The Gambia using cold rooms with solar-powered equipment cites both reduced vulnerability to sea level rise (adaptation) and reduced greenhouse gas emissions (mitigation).¹⁷ The Global Environment Facility (GEF) has also been a significant source of funding for climate adaptation projects.¹⁸ In December 2019, the GEF announced nine winners of its challenge program for adaptation innovation, which will provide nine winners with between USD 500,000

and USD 2 million in seed funding.¹⁹ Several winners had concepts that may be supportive of access to cooling.²⁰ Both the GCF Green Cities Facility and the GEF Sustainable Cities Impact Program offer concessional support for cities to pursue sustainable urban planning, energy efficiency in buildings, and utilization of green space and infrastructure.²¹ Other adaptation climate funds that could include access to cooling funding include the Adaptation Fund (AF), also administered by the GEF.²²

Opportunity 2: Coordination of funding for refrigerant replacement and for improving energy efficiency

Achieving cooperation and coordination between climate funds would seem to be a matter of shared interest. However, while in principle, their objectives are aligned if not identical, in practice they often run 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, highlighting the need to coordinate on efficient

16 Reference to Climate One and other GCF approved facilities with administration by financial institutions.

17 Climate Resilient Fishery for Livelihood Improvement, Green Climate Fund Concept Note, Feb 1, 2018 (2018). Available at: <https://www.greenclimate.fund/documents/20182/893456/19130 - Climate Resilient Fishery Initiative for Livelihood Improvement.pdf/269fab05-1eee-5b11-0e3e-11b8594d5c76>

18 "The GEF supports climate adaptation efforts mainly through the LDCF [Least Developed Countries Fund] and SCCF [Special Climate Change Fund]. Since their inception in 2001, the GEF has provided over \$1.5 billion in grant financing and mobilized more than \$7 billion from other sources for 330 adaptation projects in 130 countries."

19 Winners of the GEF Challenge Program for Adaptation Innovation announced, Global Environmental Facility, December 10, 2019. Available: <https://www.thegef.org/news/winners-gef-challenge-program-adaptation-innovation-announced>

20 For example, the Climate Technology Centre & Network provides tailored technology assistance in support of NDCs and promises to help mid-size cities access innovative financing for climate adaptation technologies. See: <https://www.thegef.org/news/winners-gef-challenge-program-adaptation-innovation-announced>

21 Global Environment Facility, Sustainable Cities. Available: https://www.thegef.org/topics/sustainable-cities_and_Green_Climate_Fund_Green_Cities_Facility. Available: <https://www.greenclimate.fund/project/fp086>

22 General information about the Adaptation Fund is available at the Fund website, see: <https://www.adaptation-fund.org/>. Since becoming operational in 2007, the AF has allocated \$720 million for projects in developing countries.

cooling.²³ The Climate Investment Platform, announced at the 2019 Global Climate Action Summit, is one initiative seeking to declutter and streamline general climate finance support to developing countries.

One of the major challenges for using climate financing for policies and programs to improve cooling efficiency has been the lack of coordination between the source of funds for refrigerant replacement, the Multilateral Fund for the Implementation of the Montreal Protocol (MLF), and the multilateral climate funds that support improving the energy efficiency of appliances. The need for coordination became an issue after the adoption of the Kigali Amendment to the Montreal Protocol, where countries agreed to substantial reductions in the use of HFCs, chemicals widely used as substitutes for ozone-depleting chemicals in refrigeration and air conditioning equipment, but which are powerful greenhouse gases. The MLF supports developing country reduction/replacement of substances regulated under the Montreal Protocol (MP), but while energy efficiency issues are included in the Kigali Amendment, the MLF has not yet reached agreement on how to consider finance that supports energy efficiency. This is a problem—or at least a lost opportunity—in that the energy used for refrigeration and air conditioning equipment can, over the life of the system, generate greater greenhouse gas emissions than the reduction from HFC replacement.²⁴

Further, the GEF and GCF are both constricted by their decision-making processes: the GEF, for example, distributes climate resources according to a rigid System for Transparent Allocation of Resources (STAR)²⁵ that 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 funding facilities from its board, which effectively limits risk-taking and politically sensitive approaches.

Opportunity 3: Recognition that blended finance can increase the impact of public funds

There is increasing recognition that donor and other public funds will not be enough to address climate-related needs and that consequently private resources must also be engaged more effectively for those cooling needs to be met in the context of commercial markets. Initiatives bringing together public, private, and philanthropic sources to help achieve the SDGs include the Blended Finance Task Force²⁶ and Convergence.²⁷ These and related efforts have led to a growing focus on the leverage achieved through the use of public funds. Convergence, for example, notes that: “By using catalytic capital from public or philanthropic sources to scale-up private sector investment in developing countries, blended finance has the potential to result in

23 Andrew Eil, Alan Miller, Alexander Hillbrand, and Sheldon Cheng, “Discussion Paper: Architecture & Financing Models For Efficient Cooling Alongside The Montreal Protocol (July 2019), <https://www.k-cep.org/wp-content/uploads/2019/07/NRDC-CFA-2019-Architecture-Financing-Models-for-Efficient-Cooling-alongside-the-Montreal-Protocol.pdf>. The NRDC/CFA paper outlines solutions in the form of four generic institutional arrangements for collaboration among institutions, two based on creation of new dedicated funds and two more modest initiatives based on greater coordination among existing programs and institutions.

24 IEA, The Future of Cooling (2018). Improvements in the efficiency

of AC equipment reduce GHG emissions in several ways. First, by reducing demand for power generated using fossil fuels. Second, by reducing peak demand, which is dominated by AC in many countries and typically supplied at the lowest system efficiency and therefore greatest emissions. And third, by reducing total system requirements enabling a greater proportion of total demand to be met from wind, solar, and other non-fossil sources of energy.

25 Ibid.

26 For more information please see: Blended Finance Task Force. Available at: <https://www.blendedfinance.earth/>

27 For more information please see: Convergence. Available at: <https://www.convergence.finance/about>

as much as a ten-fold increase in investment.” Blended finance has already mobilized over USD 140 billion. The increasing interest among commercial banks in emerging market opportunities was reflected in the recent announcement by JP Morgan Chase that it will create its own development finance institution.²⁸

Some climate projects supporting energy efficient appliances with commercial technologies and cost savings over time have proven attractive for blended finance,²⁹ but achieving similar leverage for access to cooling measures remains a challenge given the diversity of projects needed to increase access to cooling that may not deliver cash flow and commercial returns. While a promising source of additional investment in climate-related projects and programs, the relevance of blended finance for access to cooling may be limited by the reality that *blended finance*—and other innovative financing mechanisms that attract institutional investors—can only be deployed for activities that can produce cash flows over time in order to repay investors an acceptable return that is comparable, or at a premium, to alternative investment opportunities.³⁰

A related opportunity is the potential to attract impact fund investors to participate in cooling projects. This category of investors actively seeks investments with the potential to create significant, positive societal impact.³¹ While they are a relatively small share of the financial community, impact investors collectively manage billions of dollars and some are active in areas linked to cooling, such as sustainable agriculture and clean energy.

28 “JP Morgan Launches Development Finance Institution,” Bloomberg Business Wire, Jan. 21, 2020. Available: <https://www.bloomberg.com/press-releases/2020-01-21/j-p-morgan-launches-development-finance-institution>

29 See, e.g., a GCF project promoting energy efficient equipment in El Salvador through an insurance scheme developed by the IDB, <https://www.greenclimate.fund/projects/fp009>

30 Who Is the Private Sector: Key Considerations for Mobilizing Institutional Capital Through Blended Finance, OECD-GIZ Working Paper, January 2018 p.7. Available at: <http://www.oecd.org/water/OECD-GIZ-Background-document-Who-is-the-Private-Sector.pdf>

31 The Top 5 Impact Investing Firms, Investopedia, January 8, 2020. Available: <https://www.investopedia.com/articles/active-trading/090115/top-5-impact-investing-firms.asp>

Blended finance commonly refers to the use of concessional development capital from public and philanthropic sources to create more attractive investment opportunities for the private sector that contribute to the global goals in developing countries.

The Organisation for Economic Co-operation and Development (OECD) recently established a broad definition for blended finance as “the strategic use of development finance for the mobilization of additional commercial finance towards the SDGs in developing countries.”³²

The key financial objective of blended finance is to deploy concessional development capital (from public and/or philanthropic institutions) to create investment opportunities in developing countries that have an acceptable risk-adjusted return for institutional investors. Concessional development capital is typically provided by public funders such as development agencies, as well as philanthropic institutions like foundations.

Development finance institutions (DFIs), while public, often invest with a commercial mandate, but may deploy concessional funding on behalf of development agencies, provide credit enhancement or other risk participation, or play an important asset origination and arranging role. In blended finance transactions, all parties achieve their unique objectives.

32 OECD DAC Blended Finance Principles for Unlocking Commercial Finance for the Sustainable Development Goals, January 2018. Available at: <https://www.oecd.org/dac/financing-sustainable-development/development-finance-topics/OECD-Blended-Finance-Principles.pdf>

Opportunity 4: Technical assistance and improving the environment for investment

Technical assistance, usually provided in the form of grants, can make a valuable contribution to the enabling environment for investment. For example, while the International Finance Corporation (IFC) primarily operates by financing commercial projects in developing countries, technical assistance or *advisory services* are often provided to facilitate investments in four areas: (1) access to finance, (2) climate investment, (3) sustainable business, and (4) public-private partnerships. For example, an audit for a sugar company led to a loan for a cleaner production project, while training of bank lending officers was part of a project enabling commercial banks to make energy efficiency loans (IFC 2013). The initial cost of the grant—or concessional finance—was thus more than repaid in financial and environmental terms by the creation of a sustainable commercial venture.

In evaluating the full costs and benefits of grants and subsidies for access to cooling, it is important to consider the indirect benefits as well as the direct ones. For example, helping low-income consumers purchase more efficient cooling equipment has the potential to more than *double* the climate benefits of the Kigali Amendment, with the combined potential to avoid the equivalent of up to 260 billion tons of carbon dioxide by 2050. This will save nearly USD 3 trillion dollars in energy generation and transmission costs, in addition to reducing consumers' monthly electricity bills, while also protecting public health and agriculture productivity by reducing air pollution. (UNEP and IEA 2020)

Opportunity 5: National cooling action plans

The effort to address the cooling issue is in its nascency and many of the financing barriers and gaps have yet to be identified and addressed.

There is a need to map the full scope of cooling demand and conduct a needs assessment for access to sustainable cooling that will allow for aggregated financial, policy and technology responses. This will also allow actors to clarify financing needs by country and sector. Identifying the financial beneficiaries and mechanisms suitable for access to cooling finance has been an issue since the Kigali Amendment to the Montreal Protocol came into force. One of the most promising approaches to creating this country-level baseline is the preparation of national cooling action plans.

Catalyzed by the Kigali Cooling Efficiency Program, 26 governments are now at varying stages of preparing national cooling action plans or an equivalent set of measures, in part to comply with the Kigali Amendment to the Montreal Protocol. The development of these plans along with their implementation phases are key opportunities for preparatory and opportunity-mapping activities related to financing access to cooling solutions. Such plans serve to highlight nationally specific issues and priorities although the diverse range of public agencies relevant to cooling needs means that implementation of recommended actions may be a challenge.³³ To overcome this, governments will need to coordinate across ministries and stakeholders in order to apply for centralized financing, and consider measures that deliver on energy sector needs and the SDGs. National cooling action plans also offer an opportunity to enhance Nationally Determined Contributions (NDCs) and climate plans in support of the Paris Agreement and potentially linked to financing.

To be fit for the purpose of delivering or enabling investment that supports the most vulnerable, national cooling action plans must be

³³ For example, the India cooling action plan was led by a group under the Environment Ministry but included an advisory group with wider representation. Many of its recommendations require leadership by other ministries. [Any update on status of the India plan?]

comprehensive in scope and address cooling needs. SEforALL's Cooling for All Needs Assessment and accompanying guidance for national cooling plans can assist governments in understanding the full scope of cooling demand and enable the aggregation of policy, technology and financial tools to address the full scope of cooling needs across human comfort and safety, food, nutrition and agriculture, and health services. A Cool Coalition working group will also aim to provide further guidance to countries on how to integrate a needs-driven approach with typical market-based methods. Such an approach can inform finance by identifying what is achievable with private investment and blended finance and what is only achievable through public support. It can also create a foundation for financing strategies that complement investment plans (where investment plans will indicate what the investment needs are, financing strategies will indicate what type of financing is needed). Opportunities for this type of support include, but are not limited to: the GCF Readiness and Preparatory Support Program; World Bank technical assistance through the Energy Sector Management Assistance Program (ESMAP); and for implementation of specific initiatives linked to NDC commitments, the Kigali Cooling Efficiency Program's new NDC Support Facility.

Opportunity 6: Linking access to cooling to the NDCs and NAPs

Two documents—Nationally Determined Contributions (NDCs) and National Adaptation Plans (NAPs)—prepared under processes created by the UNFCCC also can be used to facilitate finance for access to cooling. NDCs are the formal reporting requirement adopted as part of the 2015 Paris Agreement as the mechanism for countries to report their climate commitments. While much of the focus has been on the level of GHG reduction promised in the NDCs, many also

include adaptation elements as well as a focus on finance.³⁴ The high level and broad scope of such reports has so far meant few NDCs have addressed access to cooling. An initiative of the German Environment Ministry entitled *Cool Contributions fighting Climate Change* is working with six countries to include climate-friendly cooling in NDCs.³⁵ The World Bank has also identified technical assistance for NDCs as an avenue for promoting sustainable cooling, as noted above. K-CEP has also recently launched the NDC Support Facility for Efficient, Climate-Friendly Cooling, which will provide grant funding to support governments interested in including cooling in their 2020 NDC update.

The climate convention created the process of NAPs in 2010 with a primary focus on least developed countries but open to other developing countries as well, with the intent to identify priority adaptation needs, projects and programs. As of November 2018, only 11 developing countries had produced a completed NAP but 91 had launched the process.³⁶ More technical support and funding is being provided through the GEF and GCF. A recent report by the NAP Global Network formed to provide technical support for NAP preparation focuses on how the process can be used to engage

34 Aligning Climate Finance to the Effective Implementation of NDCs and to LTSs: Input Document for the G20 Climate Sustainability Working Group, UN Environment, (2018). Available at: http://unepinquiry.org/wp-content/uploads/2018/10/Aligning_Climate_Finance_to_the_effective_implementation_of_NDCs_and_to_LTSs.pdf; Funding Knowledge Resources That Support Climate Action, NDC Partnership. Available at: <http://ndcpartnership.org/news/funding-knowledge-resources-support-climate-action>

35 Cool Contributions Fighting Climate Change (C4), GIZ. Accessed March 17, 2020 at: <https://www.giz.de/en/worldwide/69156.html>; see also: Cool Contributions Fighting Climate Change (C4): For a Cool and Green Island. Available at: https://www.giz.de/en/downloads/C4_Grenada_FS_en_June%202018_.pdf

36 Aligning Climate Finance to the Effective Implementation of NDCs and to LTSs: Input Document for the G20 Climate Sustainability Working Group, UN Environment, (2018). Available at: http://unepinquiry.org/wp-content/uploads/2018/10/Aligning_Climate_Finance_to_the_effective_implementation_of_NDCs_and_to_LTSs.pdf <https://unfccc.int/sites/default/files/resource/Progress%20in%20the%20process%20to%20formulate%20and%20implement%20NAPs.pdf>. The report highlights the importance of measures to enable and “crowd-in” private investment (“One cannot help but stress the centrality of catalyzing private financial flows through proper alignment of public capital. Private capital will be the main engine that can drive climate-smart infrastructure needed for a carbon-neutral world.” p. 24)

the private sector.³⁷ The report goes into some detail on instruments and strategies for working with the private sector to mobilize greater investment in adaptation.

Opportunity 7: Bulk procurement of sustainable cooling solutions

Scale is a key issue with respect to the cost and efficiency of finance. Small, dispersed transactions are typically more costly to process, and the challenge becomes still greater if purchasers are low income and lack creditworthiness. A recent, innovative approach to the challenge to promoting cold chains for rural farmers is the concept of community cooling hubs.³⁸ The goal is to aggregate demands and generate revenue flows to support a range of rural needs, including health services, product sorting and food storage.

A public program in India and a privately developed program in Morocco are achieving reductions

in the cost for more efficient air conditioners through aggregating demand and buying in bulk. In India, a joint venture company of the Ministry of Power and Public Service Undertakings (PSUs), used USD 68 million in public resources for a competitive procurement of 100,000 room air conditioners at efficiencies better than had generally been available. The company was subsequently awarded USD 300 million in World Bank financing to scale up and expand the program to include ceiling fans.³⁹ In Morocco, an air conditioners buyers club is being championed by the Institute for Governance and Sustainable Development (IGSD), the BMCE Bank of Africa and the Moroccan Energy Efficiency Agency to leapfrog to high-efficiency units through the matching of technology suppliers and buyers.

Further efforts to bulk purchase other access to cooling solutions—such as shading, cool roofs, nature-based solutions, fans and efficient climate-friendly cooling—will be essential for accelerating the development of sustainable markets at scale.

37 Engaging the Private Sector in National Adaptation Planning Processes, IISD, NAP Global Network, and GIZ. (2019). Available at: <http://napglobalnetwork.org/wp-content/uploads/2019/04/napgn-en-2019-engaging-the-private-sector-in-national-adaptation-planning-processes.pdf>

38 Birmingham hub solution offers cooling hope to Indian farming communities, University of Birmingham, June 2019. Available at: <https://www.birmingham.ac.uk/news/latest/2019/06/cooling-hope-for-India.aspx>

39 Project Signing: Government of India, EESL and World Bank Sign \$300 Million Agreement to Scale Up India's Energy Efficiency Program, World Bank Group, August 28, 2018. Available at: <https://www.worldbank.org/en/news/press-release/2018/08/28/agreement-scale-up-indias-energy-efficiency-program>

CONCLUSION: TOO LITTLE FINANCIAL ACTION SO FAR, BUT SOME PROMISING DEVELOPMENTS

While this knowledge brief has discussed challenges to and opportunities for accelerating catalytic finance towards action to cooling, it is important to note that there have recently been promising developments. The World Bank's technical assistance program to accelerate sustainable cooling solutions and the GCF's inclusion of cooling in its strategic prioritization are two examples that could unlock significant new finance to address the challenge. The healthy USD 540 million replenishment of the Multilateral Fund for the period of 2018-2020 is an important recognition of the growing nature of the challenge. In addition, the Biarritz Pledge recognized that action on cooling can be a significant short-term means of avoiding up to 0.4 degrees centigrade of warming by 2100.

A number of initiatives are working to ensure that growing political momentum translates to long-term impact. This includes the increasing number of national cooling action plans building on K-CEP's work in over 25 countries, as well as K-CEP's new NDC Support Facility aiming to support governments that include cooling in their 2020 NDC updates. Prizes, including the Rocky Mountain Institute's Global Cooling Prize, the CLASP Global LEAP Awards and accompanying finance facility for early-stage appliance markets, Engineers Without Borders Chill Challenge, the Ashden Cool Cities Award, and the Million Cool Roofs Challenge have shown to be a catalytic form of finance to incentivize innovation and

market. Manufacturers of air conditioning equipment are also increasingly focused on improving efficiency as a key to their future share of a very competitive market.⁴⁰

But there are significant gaps, notably in the agricultural and health sectors and how access to cooling is considered in terms of heat stress planning and finance for passive building and urban design. Moreover, while the health community has a dedicated constituency, further effort is needed to bridge health cold chain and electrification efforts with the climate-finance community. There is also a serious risk that near-term financing favors higher income markets with well-established business models, whereas access to cooling gaps are acute in low-income markets and are likely best served with solutions that are only currently evolving.⁴¹

⁴⁰ "The global air conditioner (AC) market is highly competitive with a high influx of global, regional, and local players...To maintain a competitive edge with other players, the global players are focusing on developing innovative products and increasing their product portfolio by making considerable investments in R&D." *Global Air Conditioner Industry Study, 2019-2024 - Energy Efficiency & Reduction in GHG Emissions Spells Market Opportunity*, PR Newswire, Nov. 22, 2019. Available: <https://www.prnewswire.com/news-releases/global-air-conditioner-industry-study-2019-2024---energy-efficiency--reduction-in-ghg-emissions-spells-market-opportunity-300962341.html>

⁴¹ A good example is the concept of fee for service, business models that address the first cost barrier by charging customers only for the lighting or energy used. This approach has been used with some success to promote use of solar energy among poor consumers in rural areas. K. Cleary and K. Palmer, "Energy as a Service: A Business Model for Expanding Deployment of Low Carbon Technologies" (Resources for the Future Issue Brief, Dec. 18, 2019). Available: <https://www.rff.org/publications/issue-briefs/energy-service-business-model-expanding-deployment-low-carbon-technologies/>

RECOMMENDATIONS: THE NEXT STEPS FOR FINANCING ACCESS TO SUSTAINABLE COOLING

Recommendation 1: Track, report and share experiences

Development and climate finance are still in nascent stages of recognizing and addressing the need for access to cooling. Because of this there is an urgent need for tracking, reporting, and the sharing of experiences – ideally in a partnership that brings relevant parties together to define access to cooling finance, including its relationship to energy access. The energy access challenge has shown that tracking and benchmarking regularly in coordination at an early stage can have important long-term results, though access to cooling is arguably even more diverse and complex. At a minimum there must be a definitive assessment of relevant public and private funding, based on an agreed methodology for what constitutes an access to cooling investment.

Recommendation 2: Link national cooling action plans to SDGs and NDCs

The focus on air conditioning, and to a lesser extent refrigeration, in response to the Kigali Amendment is promising, as is the recognition of the link to long-term climate change goals. But there is still a long way to go. Countries with vulnerable groups without access to cooling should be developing national cooling action plans that link to the SDGs and support the NDCs to iden-

tify opportunities for finance with more focus on accelerating new technologies and developing schemes that reduce first costs for the end user, to achieve adoption as rapidly as possible. For countries that have developed a national cooling action plan, there may be a need to use a subsequent strengthening or implementation phase to realize better linkages to the SDGs and continued efforts to create a stronger link between with the NDC.

Recommendation 3: Continuing success of the Kigali Cooling Efficiency Program (K-CEP)

The philanthropic Kigali Cooling Efficiency Program (K-CEP) has delivered catalytic finance across its delivery windows with relatively limited resources, resulting in broader energy efficiency policy coverage, over 25 national cooling plans in process, and institutional strengthening that likely would not have occurred without its funding between 2017 and 2020. With many initiatives still in nascent stages and a need to show how technical and financial innovation can be delivered at scale, it is important that the K-CEP be continued through 2025 and, if possible, expanded through the addition of bilateral and multilateral donor funding. In addition, the K-CEP NDC Support Facility could provide a basis for further NDC enhancements at the 2025 COP when the next iteration of enhanced NDCs is due.

Recommendation 4: Build evidence of the benefits of agriculture cold chain

The issue of cold chains for rural agriculture has not received nearly the attention it should given the strong linkages to the SDGs and economic benefits. A lack of data on cold chain breakdowns and an uneven understanding of supply-side economics for smallholder farmers remain barriers to market development, areas where relatively modest finance for technical assistance and project preparation could make a valuable contribution.

Recommendation 5: Build evidence of the benefits of health services cold chain

Health issues have a small dedicated constituency that could be linked more effectively to the larger challenge of delivering access to cooling. This could include participation of the

health sector in community cooling hubs and technology challenge prizes. The sector could also channel finance through its procurement power and incentives to ensure innovative, energy-efficient cooling technologies such as solar direct-drive vaccine refrigerators are available and affordable for health facilities in low-income countries, where electricity is likely intermittent.

Recommendation 6: Coordinate refrigerant phasedown and efficiency improvement funding

Financing for the HFC phasedown and energy efficiency improvements will be more effective when coordinated. Development agencies and financing institutions have an important role to play by advancing financial solutions and facilities that bridge the divide. Timing is critical. Without quick action we may not be able to fully realize the climate benefits of the HFC phasedown and deliver access to cooling.⁴²

⁴² For a recent detailed review of the urgency and importance of the HFC phasedown as a contribution to meeting the Paris climate goals, see G. Dreyfuss et al, *Assessment of climate and development benefits of efficient and climate-friendly cooling* (2020), <https://www.ccacoalition.org/en/resources/assessment-climate-and-development-benefits-efficient-and-climate-friendly-cooling>