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COOL DEVELOPMENT BANKS: RISING TO THE CHALLENGE OF COOLING A WARMING WORLD

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Summary

Cooling accounted for 17% of global power consumption in 2017, and demand is expected to treble by 2050. Without intervention, direct and indirect GHG emissions from cooling are set to rise 90% by 2050[1]. Beyond the energy sector, cooling is important to labour productivity, human welfare and is integral to a number of critical industries such as healthcare and the food system. Today, cooling is both a contributor to global warming and a means of mitigating its impacts.

The fastest growth in cooling demand will be seen in the developing world, due to rising incomes, urbanisation and increasing temperatures with climate change. Development Financial Institutions (DFIs) will play an important role in the cooling sector as key providers of both technical and financial assistance and as standard setters, with their support having a long-lasting effect. However, in the developing world, cooling, particularly air-conditioning (AC), has often been misperceived as a niche market or a luxury. For over one billion people[2], this 'luxury' is an unmet necessity, both in the face of rising temperatures and for economies to develop. **Sustainable cooling can offer climate co-benefits whilst also facilitating sustainable development, and sits at the nexus of three international commitments** – the Paris Agreement, Sustainable Development Goals and the Kigali Amendment to the Montreal Protocol.

DFIs are starting to recognise this and are looking to integrate cooling into their work beyond the energy sector. Given cooling's importance and potential

[1]IEA & UNEP (2020) **Cooling Emissions and Policy Synthesis Report: Benefits of cooling efficiency and the Kigali Amendment**

[2] Sustainable Energy for All (2020) **2020 Chilling Prospects – Tracking Sustainable Cooling for All**

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impact, faster progress is needed. Mainstreaming cooling in DFI's operations will entail a rapid process of learning by doing and this will be made more efficient by pooling experience and know-how amongst the DFIs as they share common barriers. There are tools and networks that can help them to accelerate this, starting with the consideration of the Kigali Amendment in their policies.

Common barriers to progress include the perception of cooling as being niche; this means it receives limited strategic support from DFIs' leadership and is not systematically measured or tracked. DFIs may not have their own energy efficiency standards, and may use local standards which are highly variable. Environmental assessments of projects may not pick up cooling as an issue. Lastly, DFI finance of cooling projects is impeded by both the small ticket size of individual projects and also because member countries prefer to seek DFI finance for larger, more visible projects and may view air conditioning as a luxury.

There are potential solutions to overcome those barriers.

At the institutional level, placing a greater emphasis on cooling within mainstream priorities and appointing a flag waver could help boost awareness, break down sectoral silos, and map and quantify DFIs' cooling-specific projects and activities with cooling impacts in health, agriculture and cities. DFIs can also utilise existing external resources and share expertise amongst themselves.

Financial and Technical Assistance from DFIs can support better cooling outcomes. Cooling can be better integrated within the country diagnostic and partnership guidelines – where applicable – as well as supporting local financing intermediaries to improve cooling solutions and increase awareness of potential opportunities. Demonstration projects can reduce and manage perceived risk to attract other financial players. Aggregating projects at a regional rather than just national level could create a critical mass and dilute country-specific risks[3].

DFI Engagement at country, devolved and department level is important to highlight the implications of cooling across the wider economy beyond energy, and to emphasize the interaction between cooling and wider efforts at national level such as Nationally Determined Contributions and National Development Plans. COVID-19 poses a challenge but also an opportunity where countries are supported to strengthen their health systems, by investing in a resilient and

[3] One example is the Energy Savings Insurance (ESI) programme developed by the Inter-Amercian Development Bank - IADB (2020) **Energy Savings Insurance**. This provides insurance for projected energy savings in SMEs using local insurers and international reinsurers. In Colombia, this was implemented through a commercial bank and in Mexico, through a public trust.

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responsive cold chain, as well as improving hospital cooling systems. DFIs can support countries to not lose sight of opportunities to build longer term sustainability into short term recovery measures – which will set the tone and outcomes for years to come. Recognising the importance of cooling to food security, health, labour productivity and human welfare is key to not missing this window.

Introduction

Cooling is central to human health and prosperity; it ensures access to nutritious food and safe medicines; it enables productivity and provides protection from extreme heat, ensuring a safe environment for people from all walks of life. However, most cooling is heating up the world[4]. Conventional, mechanical cooling such as air conditioning (AC) uses high global warming potential (GWP)[5] refrigerants, and indirect emissions from fossil fuelled power generation to power cooling appliances contribute to overall greenhouse gas (GHG) emissions.

The International Energy Agency (IEA) forecasts that cooling demand will treble by 2050[6]. This is a function of both rising spending power in hot countries and increasing need in a warming world. Increasing urbanisation and growing urban heat islands will only exacerbate the need for residential and commercial space cooling.

Refrigerants used in conventional cooling technologies – usually fluorinated gases or F-gases[7] – could account for nearly 20%[8] of total GHGs by 2050, as these gases are 1,000 times more potent than CO_2. Phase down of current generation refrigerants under the Kigali Amendment[9] to the Montreal Protocol – and its ratification[10] by national governments – will make an important contribution to limiting global warming, by up to 0.4C by 2100[11].

[4] Carbon Brief (2019) **Why Demand for Cooling Could Make the World Hotter**
[5] Global warming potential is a measure of the relative global warming effects of different gases.. UNEP (2014) **Global Warming Potential (GWP) of Refrigerants**
[6] UNEP & IEA (2019) **Cooling in a Warming World Opportunities for Delivering Efficient and Climate Friendly Cooling for All**
[7] Carbon Brief (2015) **Hydrofluorocarbon Emissions up 54% with Air Conditioning on the Rise**
[8] K-CEP (2020) **Why Cooling**
[9] Carbon Brief (2016) **Why a UN Climate Deal on HFCs Matters**
[10] UN treaties (2020) **Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer**
[11] IEA & UNEP (2020) **Cooling Emissions and Policy Synthesis Report: Benefits of cooling efficiency and the Kigali Amendment**

Global warming also puts at risk countries' capacity for growth, as it is estimated that rising temperatures by 2050 could result in 6% loss of GDP on an annual basis as a consequence of work hours lost due to excessive heat in the worst affected regions of South Asia and West Africa[12]. This also has direct implications for the power sector. In 2017, the cooling output capacity of AC added to the world's grids exceeded the record amount of new solar power installed that year.[13] This poses an energy security risk and helps maintain fossil-fuelled sources of electricity in the system due to increasing peak power demand.

Cooling goes far beyond the energy sector and appliances. It is a key ingredient to achieving the Sustainable Development Goals (SDGs) as action on, and access to, cooling supports all SDGs[14]. Affordable and efficient cooling represents an important component of human welfare, as 699 million people already live in slums in some of the world's hottest cities where access to mechanical cooling is largely non-existent, unreliable, or expensive. Added to this are 318 million people at risk from lack of access to cooling in rural communities[15].

Currently, 50% of post-harvest food is lost in developing economies[16]; this is partly explained by the lack of reliable cold chains and is at risk of worsening in the wake of COVID-19[17]. Labour productivity is affected directly by temperature levels, which in turn can hamper economic growth[18]. The World Health Organisation estimates that, due to broken cold chains, there is a loss of 50% of freeze-dried and 25% of liquid vaccines[19], a failing which could undermine global efforts to combat COVID-19 if vaccines to tackle it are not thermostable.

[12] See ESMAP (nd) **ESMAP Efficient and Clean Cooling Program**

[13] RMI (2018) **Global Cooling Challenge**

[14] Sustainable Energy for All (2018) **Chilling Prospects – Providing Sustainable Cooling for All**

[15] Sustainable Energy for All (2020) **Global Access to Cooling 2020**

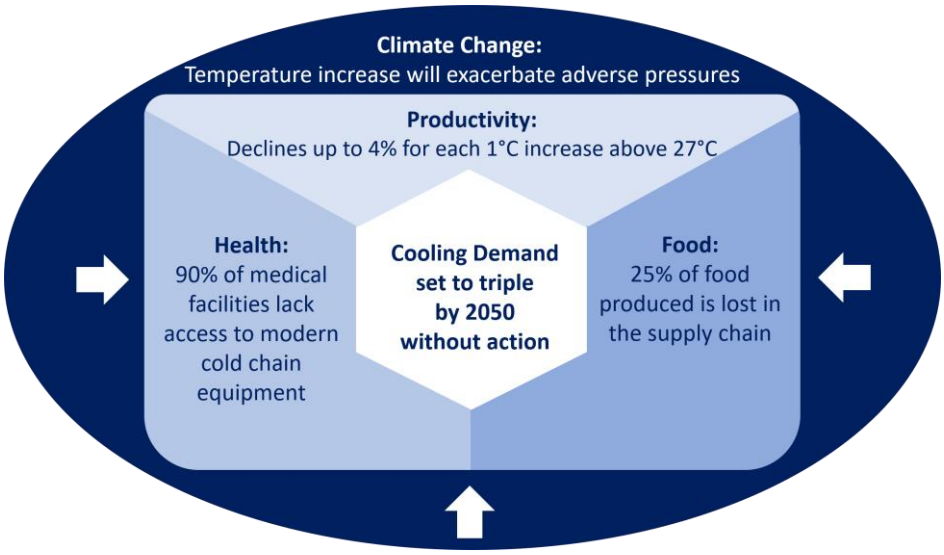
[16] Climate & Clean air Coalition (2018) **Cooling for all – the 18th Sustainable Development Goal**

[17] Current Research in Food Science (2020) **How COVID-19 Changed our Food Systems and Food Security Paradigms.**

[18] Federal Reserve Bank of Richmond (2018) **Temperature and Growth: A Panel Analysis of the United States**

[19] Climate & Clean air Coalition (2018) **Cooling for All – The 18th Sustainable Development Goal**

Figure 1: The impacts of cooling and incomplete cold chains across key sectors



Source: IEA[20], Gavi[21], EPIC[22]

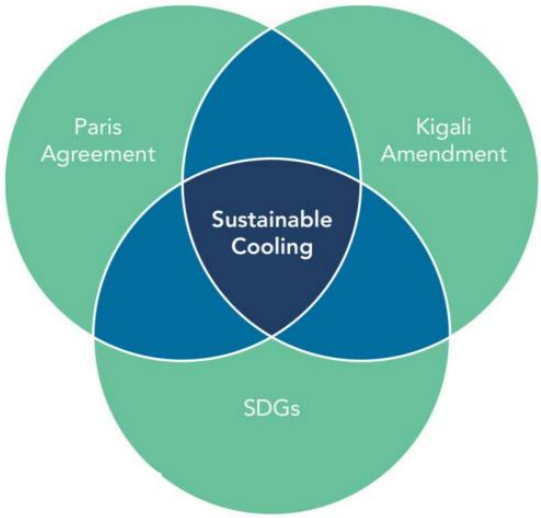
Cooling sits at the nexus of three international commitments – the Paris Agreement, Sustainable Development Goals and the Kigali Amendment to the Montreal Protocol. Getting cooling right offers DFIs the opportunity to contribute to all of these commitments while boosting economic activity, sustainability, and resilience. Doing cooling well will support progress in these major international agreements: the Paris Agreement – addressing climate change; the Kigali Amendment to the Montreal Protocol – reducing F-gases through both refrigerant transition and increased efficiency; and the Sustainable Development Goals – see Figure 2. DFIs as key partners to countries, can play a determining role in supporting them to deliver all three of these commitments.

[20] IEA (2018) **The Future of Cooling**

[21] GAVI (2019) **Cold Chain Equipment Optimisation Platform**

[22] EPIC (2018) **Hot Temperatures Decrease Worker Productivity, Economic Output**

Figure 2: Cooling at the intersection of three key international pledges



Source: IEA 2019[23]

The Kigali Cooling Efficiency Program (K-CEP) was created to support the implementation of the Kigali Amendment to the Montreal Protocol. K-CEP has four 'windows' through which it organizes its activities to meets its objectives. These include: enhancing energy efficieny capacity in developing countries; policies, standards and programs to meet the cooling challenge; leveraging finance for implementation; and widening access to cooling[24]. In addition, the Cool Coalition – which is a global network of actors including governments (both national and city level), industry, civil society, and financial institutions coordinated by the UN Environment Program – has developed a framework for finance actions for DFIs in relation to sustainable cooling[25].

To inform this briefing paper, E3G conducted desk-based research building on previous political economy analysis across key cooling jurisdictions (China, Brazil, Mexico, Indonesia plus others) on sustainable cooling's role in the low-carbon energy transition. E3G carried out interviews with key stakeholders from development financial institutions working on issues related to cooling - such as energy efficiency - from the following institutions: Asian Development Bank, Asian Infrastructure Investment Bank, European Investment Bank, European Bank for Reconstruction and Development, World Bank, International Financial

[23] IEA (2019) **Cooling for All**

[24] K-CEP (2020) **Kigali Cooling Efficiency Program**

[25] Cool Coalition (2020) **The Case for Finance Actions**

Corporation and Green Climate Fund. E3G also approached Japan International Cooperation Agency. Furthermore, key experts in the area were interviewed. Finally, E3G analysed a sample of the projects from the relevant institutions in the OECD database to assess where cooling has been incorporated, although available data was limited.

The purpose of this brief is twofold. Firstly, to highlight the importance of DFIs in supporting the implementation of the Kigali Amendment to the Montreal Protocol – which governs phasedown of high global warming potential (GWP) refrigerant gases – and, secondly, to show the challenges they face in doing so and how these can be overcome.

This research has been funded by the **Children's Investment Fund Foundation** (CIFF) and the grant is overseen by the **Kigali Cooling Efficiency Program (K-CEP)**, a philanthropic program to support the Kigali Amendment of the Montreal Protocol.

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Cooling the world: the role of Development Finance Institutions

Development Finance Institutions (DFIs) promote economic and social development in countries, primarily through financing and technical assistance[26]. DFIs can play a role as investors of first resort, helping to build a pipeline of projects which in the medium-term have significant potential to crowd in private sector capital. DFIs are also instrumental as market makers, they are leaders in setting precedents such as standards that then are implemented and followed across the world. Furthermore, they can support and advise governments on long-term decarbonisation strategies, including the policies and institutional reforms required across the economy. In short, their advice and finance has a long-lasting impact in recipient countries and beyond.

Several DFIs have committed to increasing climate mitigation and adaptation financing. The International Development Finance Club has committed to align with the Paris Agreement[27]. The major Multilateral Development Banks, a subset of DFIs, have also introduced their own framework for Paris Agreement alignment[28]. Delivering on the Kigali Amendment and action on efficient, climate-friendly cooling are necessary to achieve those goals. However, most DFIs have yet to adopt the implications of the Kigali Amendment into their policies.

Analysis by E3G has shown that all major MDBs have a majority shareholding that support greater action on cooling, either through ratification of the Kigali Amendment, or through the development of a National Cooling Action Plan (NCAP)[29] – illustrated in Figure 3.

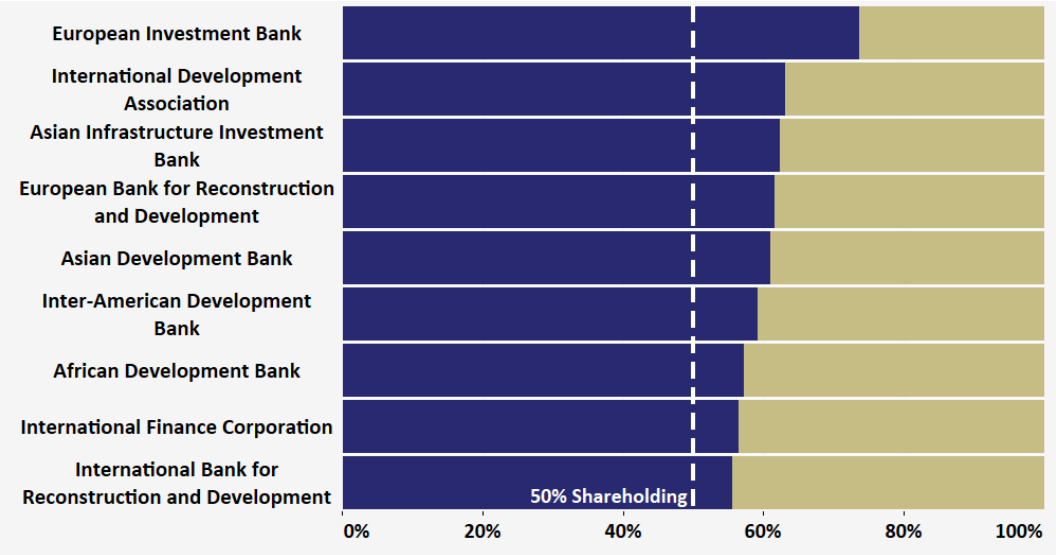
[26] FAS (2020) **Multilateral Development Banks: Overview and Issues for Congress**

[27] IDFC (2018) **IDFC Position Paper: Aligning with the Paris Agreement**

[28] AfDB (2019) **UN Climate Action Summit: High Level MDB Statement**

[29] E3G (2019) **A cooling opportunity for Multilateral Development Banks**

Figure 3: Country shareholding of Multilateral Development Banks that have ratified the Kigali Amendment or have developed/are developing a National Cooling Action Plan

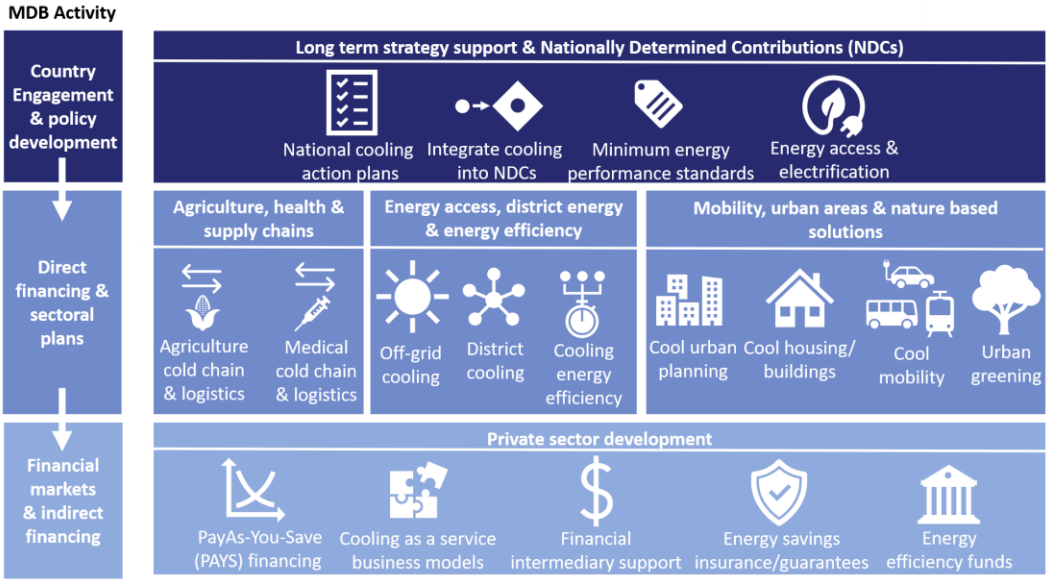


*Source: **Ratification** of Kigali Amendment. List of NCAP's **here** and **here**. Shareholding data from MDB websites.*

The combination of financial and technical assistance across a broad range of sectors means that DFIs are wellplaced to support greater action on sustainable and affordable cooling. An increasing number of countries are developing National Cooling Action Plans[30]. DFIs can support the translation of these plans into investable projects and then help finance their implementation, whilst also providing key policy advice in designing standards and supporting the development of domestic manufacturing and service sectors. When providing funding via financial intermediaries DFIs can ensure that their high standards are also applied. Figure 4 shows that cooling investments extend well beyond the energy sector and intersect with numerous areas of DFI activities. Furthermore, projects often do not just feature one of the areas listed below as cooling touches investments across the different DFI activities.

[30] K-CEP (2019) **Principles for National Cooling Plans**

Figure 4: What mainstreaming could look like: the location of sustainable cooling solutions within a Development Finance Institution's wider technical assistance and lending portfolio



Note: The figure is a non-exhaustive illustration of areas where cooling is an important aspect of MDBs activities.

Cooling also represents an opportunity to align work on supporting countries with their Nationally Determined Contributions (NDCs) and National Cooling Action Plans (NCAPs). E3G analysis illustrated in Figure 5 shows that out of 34 countries that K-CEP has engaged with, only seven had cooling explicitly incorporated into their NDCs. Initiatives such as the World Bank's NDC Support Facility can help to increase this number ahead of COP26 in Glasgow next year.

E3G analysed the NDCs of countries which have engaged with K-CEP to establish where cooling had been referenced or integrated. E3G also reviewed three other areas; demand-side efficiency, buildings and appliance standards or labelling because these are areas which impact cooling. Countries were then split into four categories. This shows that key cooling growth markets such as Indonesia and Brazil have little relevant cooling coverage in their NDCs.

Figure 5: Analysis of cooling integration into NDCs – selected countries that have been the focus of activities supported by the Kigali Cooling Efficiency Program.

> *Dark blue is a clear reference for that area and some form of quantification i.e. through a target or investment/funding amount.*
> *Medium blue is a clear reference to the issue – but without quantification*
> *Lightest blue is no mention.*

NDC cooling integration	Country	Demand-side efficiency	Buildings	Appliance standards or labelling	Cooling
Cooling included	Bangladesh				
	Cuba				
	Morocco				
	Nigeria				
	Palau				
	Uruguay				
	Venezuela				
NDC framework & coverage aligns with well with cooling	Chile				
	China				
	Egypt				
	Ghana				
	Jordan				
	Kenya				
	Lebanon				
	Rwanda				
	South Africa				
	Tunisia				
NDC framework & coverage has some areas that aligns well with cooling	Costa Rica				
	Mexico				
	Brazil				
	Thailand				
	Uganda				
	Viet Nam				
Little cooling relevant coverage	Argentina				
	Colombia				
	Cook Islands				
	Ecuador				
	Guatemala				
	Indonesia				
	Malaysia				
	Panama				
	Philippines				
	Sri Lanka				
	Trinidad & Tobago				

Source: E3G Analysis using Nationally Determined Contributions

COVID-19: a health sector case study

Cold chains in the health sector consist of a network of fridges, cool boxes and sensors that help store and transport heat-sensitive medical supplies such as vaccines[31]. Up to 90% of medical facilities globally lack access to the modern cold chain equipment required. Furthermore, the global healthcare sector is equivalent to 4.4% of net emissions globally[32]. By making hospital cooling 30% more efficient, the overall carbon footprint of the healthcare sector could be reduced by more than 5% whilst lowering operating costs[33].

COVID-19 has made universal access to a vaccine, when ready, essential to managing the disease[34] - an estimated 70% of the world population will need access to the vaccine. The World Bank and the Coalition for Epidemic Preparedness Innovations led the launch of a COVID-19 Vaccine Development Taskforce that is working on how to finance and manufacture vaccines for global access. Up to 50% of vaccines are wasted globally every year, in large part this is attributed to a weak cold chain. It has been estimated that 1bn COVID-19 vaccines could be spoiled - at an estimated non-profit cost of USD 10 per vaccine this would be a loss of approximately USD10bn[35].

As investments in global healthcare systems ramp up, it is vital to ensure the healthcare sector investment is fit to tackle COVID-19 as a marathon, rather than a sprint. Investments should lay the foundation for lasting improvements in healthcare[36].

With their ability to take a longer-term view, MDBs can focus on baking in longer-term considerations around resilience into their healthcare responses. MDBs can, for example, build on the work of the Gavi Alliance which, through the Cold Chain Equipment Optimization Platform, has committed US $250 million to jointly invest with countries to purchase and install superior cold chain equipment[37].

[31] Gavi (nd) **Cold Supply for Hot Demand Transforming the Market for Cold Chain Equipment in the World's Poorest Countries**

[32] Health Care Without Harm (2019) **Health Care Climate Footprint Report**

[33] K-CEP (2018) **Global Climate Impact from Hospital Cooling**

[34] The Lancet (2020) **Ensuring Global Access to COVID-19 Vaccines**

[35] UNEP (2020) **Why Optimized Cold-Chains Could Save A Billion Covid Vaccines**

[36] E3G (2020) **Cooling the Health Sector**

[37] Gavi (2019) **Cold Chain Equipment Optimization Platform**

Most MDBs do not have a mandate to assess cooling needs, and from all the MDBs in this report only the World Bank has committed to ensure the implementation of the Kigali Amendment. Previous analysis of overseas development aid financing for 2014 and 2015 found that only 0.2% of projects went towards cooling focussed projects[38]. This is despite cooling accounting for 17% of the worlds total demand for electricity[39] and the market for cooling equipment exceeding that of solar PV panels[40].

E3G has analysed the OECD climate finance database, which MDBs and several DFIs report projects into. Analysis of the description associated with these projects has enabled some cooling specific components to be identified. The lack of available data on cooling projects means no definitive conclusions can be made – see Annex I.

The explicit approach to cooling varies across institutions

> The World Bank is the only institution with a dedicated programme targeting efficient and climate-friendly cooling. The programme is led by the World Bank's Energy Sector Management Assistance Program (ESMAP)[41] and the World Bank's Climate Change Group; originally supported with a USD 3 million grant from K-CEP to ESMAP. This work has also been focused on mainstreaming cooling within the activities of the World Bank.

> The European Investment Bank highlights cooling as part of its new Energy Policy as a component of energy efficiency gains[42].

> The European Bank for Reconstruction and Development in its Green Economy Transition handbook recognises cooling as a key component for energy efficiency and, more specifically on, air-conditioners and refrigeration, highlights mitigation activity beyond GHG emission and mentions the mitigation arising from non-energy GHG such as reducing refrigerant consumption. EBRD has a green technology catalogue which contains 'best in class' technologies to support delivery of climate finance.

[38] Kigali Cooling Efficiency Program (2017), Internal Study on Public Funding Sources for Climate/Mitigation-focused Cooling.

[39] UNEP & IEA (2020) **Cooling Emissions and Policy Synthesis Report**

[40] The Economist Intelligence Unit (2019) **The Cooling Imperative**

[41] ESMAP (nd) **ESMAP Efficient and Clean Cooling Program**

[42] EIB (2019) **Energy Lending Policy**

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> The Asian Development Bank work on cooling is just emerging[43]. ADB recently published a technical assistance project at the regional level improving energy efficiency in public buildings by deploying efficient, clean, and smart centralized air-conditioning (CAC) systems[44].

> The Asian Infrastructure Investment Bank highlights energy efficiency as one of the "major means to achieve global environmental objectives". Cooling is a component of the energy efficiency projects in some cases[45].

In general, **most of the MDBs are far from mainstreaming cooling into their activities, and the different relevant sectors for example, agriculture, health, urban development,**. Nevertheless, there are incipient efforts, particularly from the World Bank, where efforts have started to increase awareness internally and support the staff to think about cooling in a more strategic manner[46], such as when it comes to developing and delivering the COVID-19 vaccine[47].

What MDBs can do to meet the cooling challenge

Initial findings from the research and interviews with key staff within relevant MDBs amongst other stakeholders show that there are areas where the DFIs could adjust their approach or expand their role to deliver better outcomes.

Below we lay out the common key barriers which impede these institutions from maximising the impact of their projects to simultaneously advance sustainable cooling.

> **Cooling is perceived as niche and a subset of energy efficiency rather than as a cross-cutting issue**. Cooling is typically handled by the energy team within the DFIs, meaning that in other areas such as agriculture, health, or transportation the financial or technical assistance that is being provided does not fully take cooling into account. The World Bank is the only MDB out of the four implementing agencies of the Multilateral Fund for the implementation of the Montreal Protocol[48]. However, mainstreaming efforts are still underway.

> **Impetus for mainstreaming cooling within MDBs is reduced as there is limited strategic support from MDB leadership** for improving cooling with

[43] According to ADB's staff
[44] ADB (2020) **Regional Support to Build Disease Resilient and Energy Efficient Centralized Air-conditioning systems**
[45] According to AIIB's staff.
[46] According to WB's staff.
[47] WB (2020) **What Would it Take to Deploy COVID-19 Vaccines Through Sustainable Cold Chains?**
[48] UNEP (nd) **About Montreal Protocol**

the exception of the World Bank Group which has the Efficient and Clean Cooling Program[49]. Although MDBs' member countries are signatories to the Kigali Amendment, with a majority having ratified it, the MDBs themselves are not and therefore have yet to place cooling on the same footing as other international commitments which they have made. MDBs should consider committing and operationalising alignment with the Kigali Amendment in the same way as they are doing with the Paris Agreement.

> **MDBs at present do not measure or track cooling** within wider investments which means that gauging improvements is challenging. This also inhibits institutional understanding of the scale of their cooling-related activities.

> This is also reflected in the project cycle, where **environmental and social assessments may not pick up cooling as an issue, and energy efficiency seems to be dominant – even though cooling affects workers' health and productivity.** Cooling may emerge as an issue later in the project assessment but once a project has been structured by the principal investment officer and presented to the board it is challenging to make substantial changes.

> In many cases, separate consideration of cooling may mean **the ticket size of projects is not sufficient for MDBs to invest.** The aggregation of projects tends to be a challenge in some cases where at least USD 100 million would be needed to make the investment impactful. However, this lack of aggregation impetus could also be symptomatic of the low priority this issue is given. Another way to overcome this is by integrating cooling into projects with larger ticket size e.g. a new hospital; and to build awareness within the project cycle of the effectiveness that can be accrued through the use of sustainable cooling over conventional methods.

> **Demand from member countries for MDB support of cooling projects is limited**, as countries prioritise larger, more visible projects and there is a lack of awareness of the cooling challenge. Additionally, the fact that air conditioning, for example, is often perceived as a luxury deters public investments.

> The **lack of rigorous local standards for cooling** means that integrating such standards into MDB projects requires significant external assistance and coordination with donor countries and other funders. Information on the efficiency of cooling systems might not be available at a local level, whilst the availability and quality of energy audits is limited as is access to efficient, low GWP cooling solutions.

[49] See WB (2019) **New Program to Scale Up Efficient, Clean Cooling in Developing Countries**

> Furthermore, **some MDBs have yet to develop their own energy efficiency standards**, relying instead on local standards which vary widely. These local standards may not consider the potential efficiency gains from more stringent standards. It is as yet unclear how an energy efficiency first principle will be operationalized within the MDBs. The European Investment Bank has recognised the energy efficiency first principle across its energy investments[50]. The ADB has referenced energy efficiency as a priority in its climate strategy and covers transport, buildings, and industry sectors[51]. However, there were no demand side energy efficiency investments in 2017 and 2018 suggesting it is not applied in practice. The IFC has sectoral energy efficiency standards but is unclear if there is an overarching energy efficiency approach.

To summarise, cooling is an emerging issue for many of the MDBs, which means that they have yet to assess all the available resources to support them. Internal procedures may be delaying the opportunity to tap into pools of expertise - such as the Cool Coalition -, while a lack of strategic impetus is limiting MDB appetite to address and overcome some of the structural barriers within the sector.

There are several potential solutions to overcome those challenges, including within the MDBs themselves, to the financial and technical assistance they provide and also to the engagement with member countries.

At the institutional level

> **Break through sectoral silos by increasing awareness within the institution.** Assign a flag waver internally to chair a cross-cutting working group bringing together key sectors whilst ensuring investment officers are engaged, and that the profile of cooling is raised to the top-levels of management through for instance action during annual meetings. This is important to recast cooling as an opportunity for MDBs, rather than a cost. It will not be sufficient to have cooling as part of the policy and strategy within the MDBs if there are insufficient efforts to build a pipeline of potential projects on cooling, or that incorporate cooling, for MDBs to finance.

> **Map and quantify existing activities, including current project pipelines, to understand which sectors are most exposed to cooling and where there are potential areas for improvement**. This could form part of the first exercise of the cross-cutting working group. There is evidence that an internal tracking

[50] EIB (2019) **EIB Energy Lending Policy**
[51] ADB (2017) **Climate Change Operational Framework**

system could identify the opportunities and understand those missed[52]. This could then be the basis for DFIs to design projects with cooling at its core.

> **Tap into existing external resources and wider networks** such as the Cool Coalition to build an understanding of current best practices and technical standards required to meet the cooling challenge. However, there are several initiatives around cooling that could be helpful to raise awareness and support teams to develop their skills and knowledge when it comes to the cooling sector. For example, EBRD has a green technology catalogue which contains 'best in class' technologies to support delivery of climate finance.

> **Consider setting up a temporary joint MDB working group** to share best practice on approaches to sustainable and efficient cooling.

Financial and Technical Assistance

> **Include cooling in the country diagnostic and in partnership guidelines** – where applicable and potentially supported by cooling needs-based assessment methodologies[53] – are one of the most effective entry points. These documents serve as the jumping off point for MDB activities in a country and highlighting cooling will help build a potential pipeline of projects that encompass cooling in the different sectors.

> **Provide training and support to financial intermediaries** – MDBs experience in energy efficiency financial support to countries via the local banking system could be a starting point to introduce a stronger focus on cooling. More specifically build on the work done for example by the IFC on green buildings, and the work by EBRD on the list of best technologies to use. This could help financial intermediaries to understand the market, and work as a short-cut and incentive for staff.

> **Alongside mainstreaming, project aggregation, even at a regional rather than just at a national level, could create critical mass.** MDBs could develop this with industry partners such as equipment suppliers or customers like hotel chains or shopping malls. This could be complemented by energy saving guarantees to incentivise customers and amortise the up-front costs, such as the Energy Savings Insurance (ESI) programme at the Inter-Amercian Development Bank[54].

[52] Sustainable Energy for All (2020) **Financing Access to Cooling Solutions**
[53] See Sustainable Energy for All (2020) **'Cooling for All': Needs-Based Assessment**
[54] IADB (2020) **Energy Savings Insurance**

> In many countries perceived risks are high and the market might be very concentrated. **By undertaking demonstration projects MDBs can attract other financial and industry players to undertake cooling projects.** Accompanying this with good communication plans can maximise the impact and crowd in third party players.

Engagement at the country level

> **Engage with member countries across different levels and departments of government** to raise awareness and highlight the importance of cooling and the opportunities it offers at a country level. Cooling is not only relevant for energy efficiency gains. It can also translate into increasing productivity, health benefits, improved logistics and social justice through access to cooling for at risk communities. There is a need for expressing cooling benefits beyond energy savings. NCAPs could be a starting point but should not limit the scope of cooling opportunities.

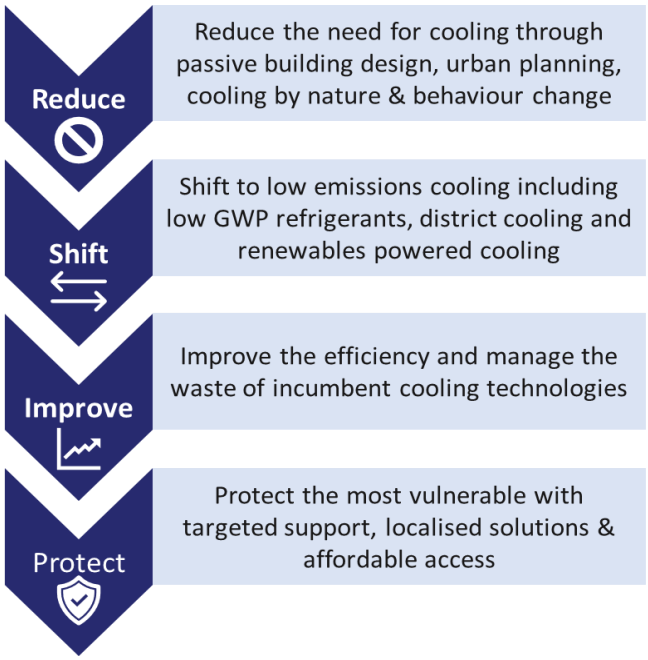
> **Support countries to embed long term benefits into the short-term responses via the current spending and COVID-19 recovery packages.** Countries will require support to look at the opportunities and not lose sight of the long-term commitments. In the short term, DFIs can support countries in the preparedness of their health system cold chain; making them aware of the benefits of supporting labour intensive cool retrofits and passive technologies which could create jobs and reduce indoor temperatures and cooling needs at a low marginal cost – this could be as part of demand stimulus efforts. Additionally, DFIs can support countries in designing incentives to encourage uptake of more efficient appliances and technologies at both retail and wholesale, this in turn unlocks operating capital for other expenditures[55]. DFIs could make countries aware of the recently created K-CEP NDC Facility for Efficient, Climate-friendly Cooling which can provide technical assistance (TA) to improve access to and the efficiency of cooling in developing countries[56].

> **Highlight the interaction between cooling and wider efforts at a national level such as NDCs, but also National Development Plans.** Countries are facing new challenges; for example, in Vietnam in 2019 farmers had to work overnight due to high temperatures. In cases where countries have NCAP, MDBs could engage to demonstrate how climate change can affect their productivity and also health conditions within the work environment.

[55] E3G & KCEP (2020) **Building Back Better: How Climate-Friendly Cooling can Support a Clean, Resilient Covid-19 Recovery**
[56] K-CEP (2020). **The NDC Support Facility for Efficient, Climate-Friendly Cooling**

MDBs should adopt a joined-up strategy on cooling. A good example can be taken from the transportation sector, where some MDBs have successfully adopted the Avoid-Shift-Improve approach to guide transportation investments. In the case of cooling, the Cool Coalition has designed a multi-pronged approach – focused on Reduce-Shift-Improve-Protect – illustrated in Figure 6.

Figure 6: Cool Coalition has designed a multi-pronged approach to cooling



Source: Adapted from The Economist Intelligence Unit

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Conclusion and next steps

Cooling is a necessity for human welfare as well as a key component of health, food security and labour productivity. In a narrower, immediate sense, cooling will play a key role in delivering a COVID-19 vaccine. More broadly, getting cooling right – both by being efficient and climate-friendly – can reduce greenhouse gases as well as improving people's lives whilst supporting countries in achieving three key international commitments: Sustainable Development Goals, Kigali Amendment to the Monreal Protocol, and the Paris Agreement.

DFIs, as standard setters and providers of countercyclical support can play a key role in improving sustainable cooling outcomes. This is important in the context of financing the COVID-19 recovery, where DFIs are integral to efforts around building back better, particularly in developing economies where they are key providers of finance. In the immediate term, efforts to integrate cooling into current investment in the health sector could support country preparedness for when the vaccine becomes available. In the medium term, country recovery packages will shape the economic and development landscape for decades to come. Efficient and climate-friendly cooling is also an adaptation measure which could help reduce and offset the impacts of a warming world. Ensuring that this spending is used to shift economies into a longer term trajectory to facilitate decarbonisation and increase resilience that could result in sustainable development is crucial, and DFIs' 'know-how' should play an important role in delivering this.

All in all, today, cooling is an emerging issue for many of the DFIs which represents an opportunity against the backdrop of COVID-19 and recovery packages. However, cooling's importance means that DFIs should work together and tap external resources to accelerate internal learning and external results to maximise the impacts of their financing and technical expertise.

To support this E3G will host a roundtable with relevant stakeholders including some MDBs to work together and discuss how best to overcome the challenges in the current environment, as well as identify opportunities for short-term improvements and longer-term strategic priorities[57].

[57] Some of which are highlighted in Annex II.

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ANNEX I – selected cooling-specific DFI projects

One defining feature is that each of the following projects are focused on improving the efficiency of 'active' or mechanical cooling solutions. This refers to systems which require energy to address cooling demand, rather than 'passive' cooling solutions which are techniques used to dissipate heat using natural convection, for example in architectural design.

Sector	DFI	Project Summary
Agriculture/fisheries cold chain & storage	IBRD	- Sustainable Coastal Resource Development Project, where cold storage for fish was one component[58].
	ADB	- Loans which were channelled through financial institutions to lend to horticulture farmers for fixed asset investments, including cold storage[59]
	ADB	- Loans for improving cold chain logistics in Tianjin [60] [61].
	IADB	- Loan to Chilean fruit company to carry out energy audits in cold storage facilities and a pre-feasibility study for solar cooling technology[62]. Previous loans had been provided to build the cold storage facilities.
	IBRD	- Loan for promoting the development of Micro, Small and Medium Enterprises (MSMEs) and relevant value chain actors in the agriculture, tourism and associated sectors in Comoros with a target of 10 Operational cold-storage, dry storage and warehouse facilities by 2024 and a 25% increase in the volume of chilled milk collected and transported to market[63] - A project to improve rural livelihoods and food security in Mongolia where the existence and use of cold chain for livestock vaccines and sample transportation was a component of the project[64]

[58] WB (1998) **Sustainable Coastal Resource Development Project**
[59] ADB (nd) **Uzbekistan: Horticulture Value Chain Development Project**
[60] ADB (2012) **ADB Supports Cold Chain Logistics Hub to Improve Food Safety in the PRC**
[61] ADB (2013) **China, People's Republic of: Tianjin Cold Chain Logistics Facility Development Project**
[62] IADB (2011) **Renewable energy to power irrigation in the Atacama desert**
[63] WB (2019) **Integrated Development and Competitiveness Project**
[64] WB (2013) **Mongolia Livestock and Agricultural Marketing Project**

Sector	DFI	Project Summary
	IFC	- A project to develop a greenfield fruit orchard in Kazakhstan along with its corresponding supply chain which includes installing cold rooms, and deep-freezing tunnels[65] - A project to establish an independent grain handling and storage plant in Kenya where one component was temperature-controlled silos for grains[66].
Energy efficiency and cool urban planning	ADB	- Technical Assistance in Ningbo, China. This involved analysing which highly efficient cooling technologies could be used, the potential for a Super EPC model for the whole city and also whether business models such as cooling as a service could be deployed[67]. The ADB has also provided financing for a district cooling plant as part of a broader development[68]. - A knowledge and technical assistance project deploying efficient, clean, and smart centralised air-conditioning systsems to support developing member countries to improve energy efficiency, mitigate virus transmission risks, whilst ensuring safe working conditions in public buildings[69].
	EBRD	- A loan for the establishment of Jordan's first district cooling and heating plant. The Project was estimated to contribute an annual savings of 40,450 MWh of electricity and heat, reducing the annual CO2 emissions by 13,700 tons[70].

[65] IFC (2019) **Phoenix KZ**
[66] IFC (2000) **AEF Lesiolo Grain Handlers Limited**
[67] ADB (2018) **People's Republic of China: Developing a Climate Friendly Cooling Sector through Market and Financing Innovation**
[68] ADB (nd) **Initial Poverty and Social Analysis**
[69] ADB (2020) **Regional Support to Build Disease Resilient and Energy Efficient Centralized Air-conditioning Systems**
[70] EBRD (2014) **Abdali District Heating and Cooling**

Sector	DFI	Project Summary
	EIB	- Financing the rehabilitation of district heating and cooling networks in various cities in France, including the optimisation of heat/cooling generation facilities to be implemented over the period 2020-2024[71] - A loan to enable beneficiaries in Greece to invest in activities related to building retrofitting which includes the replacement of obsolete heating and cooling equipment[72] - A project to finance new energy efficient infrastructure (cooling system, electrical supply, PV) for existing and new cellular towers across Lebanon[73] and Guinea[74] - The construction of a nitrogen plant in Zuidbroek in the Netherlands with integral project components consisting of compressing and cooling units[75] - A loan to finance small-scale investments targeting energy efficiency measures mainly undertaken by private sector entities in France which includes energy efficient heating and cooling[76] - A loan to finance urban heat and cold generation with ground source, geothermal and solar heat pump systems in the cities of Weifang and Changyi in the Shandong Province, China[77]
	IFC	- An R&D project to improve the promoters (Danfoss) performance of its products and equipment in the field of refrigeration and air conditioning, power electronics, heating solutions, commercial compressors and district heating/cooling[78]

[71] EIB (2020) **Engie Solutions DHC Networks**
[72] EIB (2020) **Energy Efficiency in Public Venues**
[73] EIB (2020) **Energy Efficiency Telecom Lebanon**
[74] EIB (2020) **Energy Efficiency Telecom Guinea**
[75] EIB (2019) **Gasunie Nitrogen Plant**
[76] EIB (2015) **Credit Cooperatif Energy Efficiency FL - PF4EE**
[77] EIB (2014) **CCCFL II - Shandong Heat and Cold Generation**
[78] EIB (2015) **DANFOSS RDI**

ANNEX II – Cooling Specific Approaches

MDB	Sustainable Cooling
WBG	The Efficient and Clean Cooling Program[79] sits under the Energy Sector Management Assistance program (ESMAP). It provides technical assistance to include efficient and clean cooling across the World Bank Groups new investment projects and to mobilise further financing. The program looks to facilitate countries in the development of market infrastructure, financing mechanisms, and policies and regulations that can enable the uptake of sustainable cooling at scale. The program focuses on air conditioning, refrigeration and cold chain, cool surfaces such as reflective roofs, walls and pavements, and mitigation of urban heat island effects. It also focuses on partnerships to raise awareness around efficient, clean cooling opportunities in emerging markets. IFC's TechEmerge Sustainable Cooling in Latin-American Cities Program[80] match makes global companies with companies and municipalities in Mexico and Colombia to drive sustainable innovation through piloting new climate-smart and energy efficient cooling.
EIB	The Energy Lending Policy[81], the bank identifies significant investment in energy efficiency including cooling as a component of the energy transformation. It notes SMEs in the cooling and heating sector as an important domain in which to target energy efficiency. The policy document sets out technical and economic assessment criteria specific to heating and cooling generation.
EBRD	The Green Economy Transition (GET) Guide[82] recognises cooling as a component in energy transition and lists the positive mitigation actions related to cooling. The EBRD's Technology Selector[83] is an online tool to accelerate the delivery of climate finance. It identifies best-in-class climate technologies which specifically includes efficient cooling solutions. The tool supports a joint GCF-EBRD programme to deliver US$ 1.3 billion of climate finance to 10 countries.

[79] ESMAP (nd) **Efficient and Clean Cooling Program**
[80] IFC (2020) **Sustainable Cooling – Latin American Cities**
[81] EIB (2019) **Energy Lending Policy**
[82] EBRD (2018) **Implementing the EBRD Green Economy Transition – Technical Guide for Consultants**
[83] EBRD GEFF (nd) **Technology Selector**

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About E3G

E3G is an independent, non-profit European organisation operating in the public interest to accelerate the global transition to a climate-safe world. E3G builds cross-sectoral coalitions to achieve carefully defined outcomes, chosen for their capacity to leverage change. E3G works closely with like-minded partners in government, politics, business, civil society, science, the media, public interest foundations and elsewhere.

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