Working with





Clean Cooling Collaborative Finance case studies

March 2022

Executive Summary

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1. Executive summary



Executive summary

- Cooling efficiency finance is a big opportunity; the cooling market is <u>already worth \$135 billion/year</u> and is growing fast.
- Financing cooling efficiency is also a big challenge as there are relatively few examples of financing mechanisms that demonstrate how to support efficient, climate-friendly cooling.
- We need to **mobilize finance at speed and scale to achieve efficient, climate friendly cooling for all**. This requires demonstrations across a range of geographies, applications, and financing mechanisms, as well as disseminating lessons learned to raise awareness of opportunities and mobilizing capital from new investors.
- Despite Covid-19 challenges, the Clean Cooling Collaborative (CCC) finance grantees have achieved exceptional results including:
 - Catalyzing over \$600 million in finance, informed by \$10 million of grants provided;
 - Influencing institutional change across multilateral and regional development banks, commercial banks and corporates; and,
 - Introducing a range of **new capital providers** and projects to the cooling sector.
- We have also played a catalytic role by deploying capital to build on new policies and standards; supporting the development of supply chains; raising awareness of cooling finance opportunities; and addressing barriers to large scale deployment.



Executive summary (continued)

Our finance support has been a **lab for action at scale**. Key lessons learned include:

- 1. **Project pipeline:** Developing a pipeline of investible projects and providing technical assistance for project preparation are critical success factors to scaling up finance and bringing in new investors.
- **2. Awareness:** We still need to raise awareness of the need to deliver cooling more sustainably and unlock commercial debt from the finance sector for companies looking to supply sustainable cooling solutions.
- **3. Demonstrations and data:** First-of-a-kind projects may take longer but are key to promoting cooling efficiency in new geographies. More data and demonstrations are required and there are opportunities to develop standard contractual toolkits on sustainable financing.
- 4. Risk perception: Efficient, climate-friendly cooling projects are innovative and carry a risk premium, particularly for upfront costs. There are relatively few risk-mitigation mechanisms, which remains a gap in the finance landscape for cooling projects.
- **5. Covid-19:** Covid-19 had a significant impact on the ability to access sites; on customer ability and willingness to pay; and on the speed of decision making. While challenging, this also caused our finance grantees to develop new strategies; increased demand for reliable and sustainable cold chains; and highlighted the relevance and importance of cooling to help efforts to build back better.

These lessons learned highlight areas where there are opportunities for further support to continue to catalyze finance at the speed and scale necessary to accelerate the deployment of sustainable cooling solutions.



2. Portfolio introduction and outcomes





Introduction

- We have piloted innovative approaches to unlocking finance for efficient, climate-friendly cooling.
- We provided targeted technical assistance grants to inform and influence the capital needed to integrate energy efficiency improvements with the transition away from fluorinated gases (Fgases).
- These grants cover a range of implementers across a broad spread of developing countries and employ different financing approaches.
- These grants have mobilized finance from a range of capital providers.
- Demonstrating innovative approaches and disseminating lessons learned is central to catalyzing capital at scale and speed.
- This overview summarizes core findings, challenges, and lessons learned from our finance support between 2018 and 2021.





Support covers a broad range of countries

Funds directly catalyzed by CCC Project preparation or exploratory work undertaken as a result of CCC funds



Support covers a broad range of applications

- We have supported projects across a broad range of applications and sectors.
- Support ranges from domestic appliance financing of residential air conditioning and refrigerators, through to cooling in commercial and industrial buildings.
- We have also supported integrated and passive cooling solutions including cold chains and cool roofs.
- Many projects have developed financing approaches for multiple cooling applications and sectors.





Introduction to the grantees – private finance

The MGM Innova Group provides integrated environmental, financial, and technical solutions that contribute to sustainable energy management as well as climate change mitigation and adaptation. MGM Innova's CCC-supported program involves identification, structuring, investment support, monitoring, and reporting on energy efficient, low global warming potential (GWP) and non-F-gas cooling projects across several sectors focusing on countries in Latin America and Caribbean. The capital builds on the foundations established in the MGM Sustainable Energy Fund LP (MSEF) and is provided by MGM Innova's MSEFII fund.

OSDCL

Sustainable Development Capital LLP (SDCL) is a UK-based institutional investment management firm that specializes in efficient and decentralized energy solutions for clients in industrial, commercial, and real estate sectors. This is typically in partnership with market-leading equipment manufacturers and specialist energy services companies. The CCC grant has supported SDCL to deliver Investment Grade Audits to clients across Asia, demonstrating the benefits of deploying efficient, climate-friendly cooling technologies. SDCL has focused on promoting the importance of the "Cooling Imperative" across corporates, lenders (national, international, and multilateral), and institutional investors. SDCL has worked with corporates and key market players across Asia to build a pipeline (400 + projects) in cooling efficiency projects.



Introduction to the grantees – development



The World Bank Group (WBG) launched a new *Efficient Clean Cooling Program* in 2019 to accelerate the uptake of sustainable cooling solutions, including space cooling, refrigeration, and cold chains across sectors such as health, agriculture, fisheries, buildings, and transportation. This program is led by the World Bank's Energy Sector Management Assistance Program (ESMAP) and has become a key program in ESMAP's Business Plan for FY21-24. CCC's seed funding has kick-started a new cooling business line and catalyzed finance by leveraging the World Bank's balance sheet. Since the onset of the Covid-19 pandemic, a particular focus has been to contribute to the World Bank's Covid-19 response efforts and the rollout of vaccines by supporting the deployment of reliable and climate-friendly vaccine cold chains and strengthening and enhancing the sustainability of client countries' health systems. This program provides grants for technical assistance and in-kind technical support for the design and inclusion of efficient, clean cooling in relevant WBG operations and investments as well as policy dialogues, awareness raising, partnership development, and mobilization of concessional financing.

Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH



ASIAN INFRASTRUCTURE INVESTMENT BANK The German International Development Agency (GIZ) received a grant to explore options to support sustainable public procurement for cooling efficiency in public buildings in Bangladesh. The Asian Infrastructure Investment Bank (AIIB) was an implementing partner with an interest in the project results as a basis for large scale energy efficiency investments in Bangladesh. Public buildings in Bangladesh are responsible for a significant share of the national energy consumption and related greenhouse gas emissions. This project aimed to determine the potential for improving energy efficiency and securing government buy-in. GIZ undertook an inventory of existing public buildings in Bangladesh and conducted energy audits in selected public buildings to help determine the potential investment required, energy savings, and recommendations for action in order to inform potential lending at scale from AIIB.



Introduction to the grantees – private banks and international organisations





 新華大学 Tsinghua University

environment programme



The Natural Resources Defense Fund (NRDC) received a CCC grant to work with implementing partners China Industrial Bank (CIB), a commercial bank, and Tsinghua University, to support the development of specialized CIB credit lines for efficient, climate-friendly cooling. The program has promoted the establishment of cooling efficiency business lines focusing on privately owned commercial buildings, and cold storage and logistics industries in China. As part of the project, CIB has worked with policy makers and industry associations to raise the awareness of opportunities to finance efficient, climate-friendly cooling.

The UN Environment Programme (UNEP) is a leading global voice on the environment. UNEP has utilized CCC funding to catalyze and scale-up three cooling projects:

→ Investment in low-GWP refrigerant and energy-efficient **district cooling systems in Egypt** through the mobilization of local and national authorities to attract finance for the development of a deep-sea district cooling project in the new city of El-Alamein;

→ ECOWAS Refrigerators and Air Conditioners (**ECOFRIDGES**) by UNEP's United for Efficiency (U4E) and the Basel Agency for Sustainable Energy (BASE) accelerates the transition to efficient and low-GWP cooling solutions in Ghana and Senegal through innovative on-bill and on-wage financial mechanisms; and → The Rwanda Cooling Finance Initiative (**R-COOL FI**) by U4E and BASE, like ECOFRIDGES, is developing a new on-wage financing mechanism to foster widespread adoption of efficient and low-GWP domestic refrigerators and room air conditioners.



Support to a range of finance types across cooling sectors and regions

Estimated funding mobilized from CCC's finance window, support by type of finance, cooling application, and geography (USD millions)



This summary visualization includes a number of assumptions and uncertainties given the timeframe for finance projects to move through the project development cycle. Funding numbers include projects started within the duration of the CCC grant (2018-2021) in addition to firm investment commitments, so are a mix of actual and projected investments.





CCC has catalyzed action and assisted with the implementation of projects showcasing the ability to mobilize funding for efficient, climate-friendly cooling.

Private finance opportunities in Asia

SDCL has raised awareness of the cooling imperative with corporates, public bodies, and private investors across Asia. By developing a significant pipeline, they have identified new market players, showed that attractive cooling finance opportunities exist for private investors in Asia, and highlighted the urgent need to address end-of-life hydrofluorocarbon (HFC) waste management problem across Asia. "The CCC grant promoted cooling and energy efficiency projects, HFC waste management initiatives, and the "Cooling as a Service" delivery model across Asia – by framing the issue within the Kigali Amendment, stakeholders were incentivized to be a part of a global initiative." Jim Maguire, Partner, SDCL

Pioneering procurement practices

GIZ has identified and quantified cooling finance opportunities in public buildings in Bangladesh and enabled AIIB to progress its first ever energy efficiency project. Political willingness to move to sustainable procurement is growing and country examples are vital to drive up standards globally. This work has helped Bangladesh and neighboring countries to green their procurement processes. "The energy audits carried out in various public buildings revealed significant energy saving potential, with cooling at the forefront. The results have laid the groundwork for the planned AIIB project to scale energy efficiency finance and promote comprehensively executed green public procurement, generating sustained cost and greenhouse gas emission reductions."

Philipp Munzinger, Project Director, GIZ





Innovative product financing in Africa

To date, there has been limited willingness to import efficient, climate-friendly cooling equipment with higher upfront costs in Africa. The launch of UNEP and BASE's on-wage and on-bill schemes in Ghana and Senegal have spurred demand thanks to low-interest loans, quality controls, collaboration with leading banks and vendors, and robust awareness raising. Lessons learned are also being applied in Rwanda and can be replicated elsewhere. "ECOFRIDGES is enabling the introduction of more efficient and climate-friendly cooling appliances than any previously offered in these markets. It is market-based, leveraging the expertise and networks of local banks and vendors to succeed, so it can thrive well beyond this project, fostering a switch to sustainable new products and recycling of old ones."

Brian Holuj, Program Management Officer, UNEP U4E

Demonstrating district cooling solutions

UNEP's project preparation support in Egypt will allow a deepsea district cooling system to be demonstrated for the first time in the region. While the technology is well-known in North America and Europe, regional examples are vital to prove the technical and economical feasibility and drive demand for more efficient, climate-friendly solutions. There is significant potential to expand this approach across the developing world. "District cooling is one of the most efficient solutions for dense urban areas to phase-down HFC emissions, but it is still unknown in many countries of the MENA region. This project has raised awareness and mobilized key stakeholders to unlock investment in the first deep-sea district cooling project in Egypt, opening the door to scaling-up the technology in the region."

Celia Martinez Juez, Coordinator Latin America and Africa, District Energy in Cities Initiative, UNEP





Influencing global institutional change

CCC support enabled the World Bank's ESMAP to establish a new program that is supporting across the World Bank's Global Practices and the International Finance Corporation (IFC) to incorporate financing for efficient, climate-friendly cooling in projects spanning a range of developing countries and has catalyzed efforts to mobilize additional financing at scale for cooling. "CCC support has been instrumental to establishing ESMAP's Efficient Clean Cooling Program which is helping develop a cooling business line at the World Bank and promoting access to clean cooling solutions in over 20 countries. CCC's support also made possible the ESMAP-led World Bank mobilization of over \$150 million from the Green Climate Fund to support a multi-country Cooling Facility which will provide funding to nine countries for sustainable cooling investments in key sectors."

Martina Bosi, Senior Energy Specialist, ESMAP, World Bank

Private finance in Latin America

CCC funds have enabled the transition towards low- or zero-GWP refrigerants and energy-efficient cooling equipment to become a focus area of the second MSEF. Investment in countries including Mexico and Colombia and learnings from the projects will be the first of a kind in the region. "CCC supported the implementation of a pioneering cooling efficiency leasing program in a chain of minimarkets in Colombia and Panamá (over 500 stores). The success of the program has allowed MSEF II to replicate it in other investments in the food tech and ghost kitchens businesses in Colombia, Mexico, and Brazil."

Alfredo Nicastro, SVP Operations, MGM Innova





Financing opportunities in China

CIB has developed a pipeline of projects ranging from space cooling to cold chains. As this portfolio develops, this will provide valuable reference cases for financing efficient, climatefriendly cooling projects in China, a key priority for addressing cooling emissions globally. "What CCC offered is more than grants, but also an opportunity for commercial financial institutions like CIB to play their part in supporting the transition towards a climatefriendly cooling industry. By working with CCC and other implementing partners, CIB's capacity in serving financing demand for efficient, clean cooling has been enhanced. CIB also sees great potential in promoting knowledge products to other stakeholders and therefore unlocking additional funding for cooling."

Francis Chen, Senior Manager, Green Finance, China Industrial Bank





We have raised awareness and catalyzed action and collaboration across cooling stakeholder groups





3. Case studies



Introduction to case studies

CCC has funded six organizations to work on different financing mechanisms under its finance window and supported multiple grantees under other CCC windows to prepare projects for finance. Work has ranged from capacity building within financial institutions and governments, to preparing projects for investment to full-scale deployment. The nature of the work has meant some projects have utilized multiple funding mechanisms.

To bring meaningful lessons to the wider market, this report aggregates findings by funding mechanism rather than focusing on the outcomes and insights from individual grantees. Similarly, we focus on the overall scheme rather than the administrative and process steps that are required to implement these financing mechanisms. This distils the key elements and provides an overall conceptual framework rather than providing exhaustive methods for how the financing can work.

The following section focuses on the four key finance mechanisms supported by CCC. For each mechanism, we provide an overview of the mechanism, a diagram to describe how it works, and a summary of the key design features of each scheme based on the framework set out in Figure 1 (next slide).

The four finance mechanisms are:

- 1. On-bill/on-wage finance
- 2. Public procurement
- 3. Bank finance (development bank and private bank)
- 4. Cooling-as-a-Service (CaaS) / Energy Service Companies (ESCO)



Framework for cooling efficiency financing case studies

There are six key aspects to consider in the design of any successful efficient, climate-friendly cooling finance scheme as summarized below in *Figure 1*.

Figure 1: Framework for analysing cooling finance mechanisms



- 1. Definition of the target market is clear and well understood.
- 2. Fundamental drivers for action (e.g., policy) are in place, and if not, efforts are made to strengthen them.
- 3. The supply chain to deliver greater cooling efficiency is mapped, and if needed, action is taken to fill in any gaps or build its capacity.
- 4. Barriers across the cooling efficiency supply chain are analyzed comprehensively and prioritized.
- 5. Programs are developed that target barriers systematically, with both financial and technical solutions implemented.
- 6. Steps are taken so that once public or philanthropic support ends, the supply of, and demand for, finance continues where needed to support cooling efficiency.



Portfolio overview by financing mechanism

Financing mechanism	CCC finance grantees							
	GIZ	UNEP	WBG	SDCL	MGM Innova	CIB		
Project preparation facility	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		
Procurement	\checkmark	\checkmark	\checkmark					

Leasing				~	
Credit line		\checkmark			\checkmark
On-bill / on-wage financing	\checkmark				
Rebates, incentives, or subsidies	~				
CaaS / ESCOs			\checkmark	\checkmark	

- CCC's finance grants have provided technical assistance to a broad range of initiatives to explore, catalyze, and scale-up investment from public and private sources to showcase how projects can lead to faster implementation of efficient, climatefriendly cooling.
- Projects were intentionally chosen to develop a portfolio from early-stage work (project preparation/ procurement) to various investment mechanisms.
- For more information on other finance mechanisms not covered by the CCC grant, please see previously published cooling efficiency finance case studies.



3.1 On-bill and on-wage financing



On-bill financing overview

Summary	Leverage existing billing	Observations	• Ke	ey components of the mechanism include on-bill loan repayments, vendor
	arrangements to finance new product		re	bate, and take-back scheme/recycling.
	purchases by consumers, with		• R	ole and motivation of vendors is crucial to providing rebate that enables
	energy savings offsetting much of		0%	% or low interest rate loans from the bank(s).
	these added costs during the		• Co	ollection/recycling of old products needs to be incentivized.
	repayment period.		• Te	echnical capacity of the utility and the strength of their relationship
Goals	Address the key barrier of high		wi	ith government are critical to on-bill financing and typically require
	upfront capital costs (and high		te	echnical assistance early on to address.
	consumer credit interest rates) and		• Th	he financial health of the utility can be a barrier as utility balance sheets
	perceived technology risk.		ar	nd the electricity grid may be under strain, with a focus on adding supply
Financing	Customer applies for a loan		ra	ather than energy efficiency.
	through a commercial bank and		• Th	here is a potential trade-off between customer risk profile and size of
	agrees instalment amount.		th	ne market needed for viability – both are usually higher for on-bill than
	Bank pays vendor (which provides		or	n-wage financing.
	equipment to customer) and is		• Er	ngagement of utilities in the national energy strategy is important –
	reimbursed via repayments from		рс	otentially easier to deliver on-bill with publicly owned utilities in developing
	customer.		CC	ountries.
	• Utility plays a transactional role for		• Pr	roduct eligibility criteria must be robust and enforced, preferably based
	the bank providing billing		or	n proven examples (e.g., U4E model regulations) and linked to the local
	infrastructure and pre-paid		lal	beling scheme (if it exists).
	payment collection.		• CI	ustomer eligibility criteria can include a minimum credit score using a
			cr	redit scoring formula.





Example schematic of how on-bill financing mechanisms can work



Replicated and simplified from UNEP and BASE



On-wage financing overview

Summary	Offering flexible and simple repayment terms for sustainable energy products using salary deductions to pay back the upfront cost of the equipment over time.	Observations	 Key components of the mechanism include on-wage loan repayments, vendor rebate, and take-back scheme/ recycling. On-wage financing may be preferred to on-bill financing for program feasibility as salaried employees have lower risk profiles, which may be important in geographies with low electrification rates as well as high blackout and bill default rates.
Goals	Address the key barrier of higher upfront capital costs (and high consumer credit interest rates) for end customers.		• Cost recovery is critical : rebate rate enables banks to provide 0% or low interest loans, support the cost of equipment recycling, and provide technical assistance to the lead agency to encourage government ownership.
Financing	 Financing provided by commercial banks. As permanent employees are lower risk, partner banks can offer credit to customers on competitive conditions (0% or low interest rates) pay off the cost of the cooling appliance to the partner vendors over time. Partner vendors negotiate a rebate to enable competitive credit and equipment recycling. 		 Collection/ recycling of old products must be incentivized. Securing a small number of large-sized salaried cohorts (e.g., teacher's union) enables initial scale-up. Product eligibility criteria must be robust and enforced, preferably based on proven examples (e.g., U4E model regulations) and linked to the local labeling scheme (if it exists). Customer eligibility criteria: salaried employees.





Example schematic of how on-wage financing mechanisms can work



- Financial institutions in repayment agreements with profiled employers.
- Financial institutions in finance agreements with participating vendors.









- 1. Electricity grid-connected households and small enterprises (on-bill) and eligible salaried employees (on-wage) to access affordable efficient refrigerators and air conditioning systems.
- 2. Development policy agreements, minimum energy performance standards(MEPS) and labels, and opportunities to address energy security and economic competitiveness considerations.
- 3. Increase capacity of technology manufacturers, authorised waste management companies and financial institutions; raise customer awareness; and enhance financial health and engagement of utility and energy efficiency agencies.
- 4. Higher upfront cost and lack of familiarity and availability of efficient cooling equipment; lack of compelling business cases to engage financial institutions; lack of robust monitoring; and identifying low-risk customers.
- 5. Relationship building between financial institutions and employee companies; technical assistance for manufacturers and rebates; awareness raising; and time for importing products that meet the eligibility criteria.
- 6. Competition between vendors and between banks; pipeline of investible projects; monitoring of green loans and efficient product sales; promotion of market-based scheme; increase availability of efficient equipment and enhance demand through consumer engagement; and provide a common set of contractual terms and monitor compliance.



3.2 Green public procurement



Green public procurement of equipment and appliances

S	Summary	Mobilize local and national authorities to finance and procure efficient, climate-friendly cooling equipment.	Observations	 Green procurement follows the same process as conventional procurement but includes environmental criteria throughout the preparatory, specification, and tender stages based on equipment standards and regulations. Criteria can be determined by procurement team and can include
C	Boals	Procure equipment that meets high environmental and efficiency standards and enable spillover effects to the private sector, stimulating the adoption of efficient, climate-friendly equipment.		 criteria regarding high energy efficiency, ultra low-GWP refrigerants, professional installation and maintenance, etc. There is often a conflict between purchase price being the predominant criteria for public procurement and the need for more efficient equipment with lower through life cost. Regulatory/structural change and political will to move to more efficient equipment requires a change in mindset as investing in
F	inancing	 Financing provided by public finance or development finance institution. Equipment provider responds to procurement tender and meets energy- efficient, climate-friendly cooling criteria. Public body invests in selected project/equipment. 		energy-efficient appliances today to generate public budget savings over time is not the traditional approach in public procurement.

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Overview of key steps for green public procurement of equipment

GUIDING STEPS

SUPPORT

OPTIONS

Assess the saving potential and prepare action plan

- Analyze the existing building and appliance performance in comparison to best available technologies.
- Derive efficiency measures in a sustainable procurement action plan.

 Energy audits and greenhouse gas inventories of public buildings/sector.

 Draft sustainable public procurement action plan. Secure commitment and set green public procurement target

- Present technology options and saving potential to decisionmakers.
- Seek commitment for procurement target and consequent changes in procurement regulations and procedures.

Provision of grant/loan

cost for sustainable

Assist in bundling order

incremental investment

finance to cover

products.

for larger bulk procurements and guaranteed volumes to reduce incremental costs. Revise procurement regulations and procedures

IMPLEMENTATION

 Ensure that revised regulations and procedures consider sustainable procurement methods. i.e., life cycle cost analysis (LCCA) or total equivalent warming impact (TEWI).

Build capacity of procurement officers and building managers on revised procurement regulations and procedures.

Training

 Assist in developing sustainable public procurement guidelines.

 Assist in developing training materials.

 Implementation of training programs.

Replicated from GIZ



Green public procurement (cooling equipment): key design features



- 1. Publicly owned buildings.
- 2. Environmental and economic savings highlighted from country level MEPS and cooling action plan.
- 3. Increase capacity of technology manufacturers and raise retailer and customer awareness to ensure take-up.
- 4. Lack of financial incentives to overcome higher initial upfront costs (public customers rarely consider life-cycle costs); end-users unaware of the environmental and economic benefits; and lack of labeling and regulation for climate-friendly equipment.
- 5. Public procurement climate-friendly targets with more ambitious energy performance standards and labeling framework. Toolkits for best practice.
- 6. Public bodies to champion climate-friendly cooling equipment and revise public procurement regulations and procedures to improve the local supply chain.

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District cooling procurement - overview

Summary	Mobilize local and national authorities to attract finance for the development of a local district cooling network.	Observations	 Activities include project mapping, feasibility, and design stages in pre- procurement phase to identify energy-efficient and ultra low-GWP refrigerant district cooling systems. Criteria determined by procurement team – can include criteria regarding high energy efficiency, ultra low-GWP refrigerants,
Goals	Integrate identification, design, and structuring of procurement phases within national authorities to raise project profile of district cooling.		 professional installation and maintenance, etc. There needs to be a coordinated approach to planning especially where projects require green field and urban planning permission. Developing countries often lack the local engineering and procurement expertise, which results in the need for substantial technical assistance and financial support to be able to develop and de-risk these projects to the point where large-scale finance can carry
Financing	Typically, large scale finance given size of district cooling projects provided by national and international financial institutions with support from local and international utilities.		out due diligence and commit to the project.



Green public procurement (district cooling) – key design features



- 1. Network of buildings within city perimeters that have appropriate cooling density.
- 2. Environmental and economic considerations and targets including national energy and building strategies, country level cooling action plans and other national policies.

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COLLABORATIVE

- 3. Increased capacity of manufacturers and project developers required to progress project from concept to investment readiness; city planners require awareness to support district cooling rather than leave to individual equipment purchases.
- 4. Lack of capacity of local authorities to identify and integrate criteria for selecting low-GWP refrigerant district cooling systems into their procurement processes; limited coordination between different state departments; and high up-front costs.
- 5. Establishing an institutional framework to effectively coordinate communication and promote opportunities to international investors to fill the possible local skills gaps.
- 6. Demonstrating successful case studies from similar countries, sharing lessons learned, and developing toolkits to support replication.



3.3 Bank finance



Development bank finance - overview

Summary	Provision of capital by a development bank to their government client partners.	Observations	 Activities include building partnerships with national development banks to build steady credit lines and developing support mechanisms and eligibility varies depending on the nature of the financing. Requires technical assistance throughout supply chain – lack of lending is not always due to lack of available capital but, for example
Goals	Catalyze investment to fund energy efficiency projects.		 a limited pipeline of investible projects (or perception that the pipeline of these projects is limited). On-lending often requires a well-established, stable financial sector with relationships with the target market and across the supply chain. Cooling might not yet constitute an independent financing activity in many countries, highlighting the importance of providing credit lines.
Financing	 Financing provided by multi-lateral/ regional/ national development bank. Credit provided by development bank is typically provided at a low interest rate and/or longer tenor to partner governments. Development bank finance delivered through a range of financing mechanisms (e.g., public procurement, credit lines, etc.). 		 for a higher-level industry sector on the lender side as well as integrating cooling into other projects (e.g., agriculture cold chains, rural healthcare, distributed off-grid energy systems, etc.) on the borrower side. A repayment guarantee mechanism can be important to reduce risk and change perceptions of risk and priorities, especially for first-of-a-kind projects in new geographies.

Example overview of development bank finance



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Development bank finance example – key design features



1. Project dependent, ranges from cooling equipment for buildings and industry through to agriculture focused cold chains and passive cooling in city developments.

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- 2. Environmental and economic considerations and targets including national energy and building strategies, country level cooling action plans, and other national policies.
- 3. Increased capacity of technology manufacturers to make affordable, efficient cooling equipment; awareness for retailers and end-customers to ensure take-up and city planners to support passive cooling.
- 4. Financial institutions lacking liquidity and/or inclination to invest in energy efficiency projects; on-lending requires a strong, stable banking sector with relationships in the target market and across the supply chain.
- 5. Technical assistance throughout the supply chain to ensure that the project credit is well managed and reimbursed accordingly.
- 6. Demonstrating successful case studies from similar countries, share lessons learned, and develop toolkits for others to replicate.



Private bank finance - overview

Summary	Provision of financing by a commercial bank to private end users for investing in cooling efficiency projects.	Observations	• While the details of private bank finance are different to development bank finance, there are similarities in the mechanism and observations noted in the development bank finance summary, including:
Goals	Catalyze investment to fund energy efficiency projects.		 The importance of technical assistance throughout the supply chain. The benefits of existing relationships with the target market and supply chain. The value of providing finance as part of other sector/project activity. Repayment guarantee mechanisms helping to reduce risk, especially for first-of-a-kind projects in new geographies.
Financing	 Finance provided by commercial banks sometimes with support of concessional finance. Credit provided by private banks typically provided at commercial rates. Private bank finance delivered through a range of financing mechanisms (e.g., credit lines, leasing, working capital facilities, etc.). 		 Commercial banks may have different risk perceptions and risk tolerance than development banks and can be more risk averse when assessing projects and deciding whether they want to lend to a sector given other established financing activities. Guarantees and collateral requirements may create a barrier for commercial bank lending to private end users.



Mechanisms for private bank financing include term loans, working capital facilities, revolving loans, and project/corporate/consumer loans. Additional examples on how cooling finance can operate for energy efficiency in the private sector can be found in the <u>cooling efficiency finance case studies</u>.



Private bank finance – key design features



- 1. Project dependent, ranges from cooling equipment for buildings and industry through to agriculture focused cold chains and passive cooling in city developments.
- 2. Return on investment opportunities from cooling finance; national energy and building strategies; country level cooling action plans and other national policies.
- 3. Increased capacity of technology manufacturers to make affordable efficient cooling equipment available; awareness for retailers and end-customers to ensure take-up.
- 4. High perceived risk; lack of awareness and understanding of the financing opportunities; lack of knowledge of suppliers.
- 5. Technical assistance throughout the supply chain to ensure that project credit is well managed and reimbursed.
- 6. Sharing successful case studies and lessons learned to help expand the market and bring in new investors



3.4 Cooling-as-a-Service (CaaS) / Energy Service Company (ESCO)



CaaS and ESCO – overview

Summary	ESCOs: Companies that provide energy savings solutions to	Observations	• ESCO model is best suited to sectors with large
	customers that pay for themselves (and provide a return to the ESCO) through the savings on energy bills they generate. The ESCO typically guarantees the performance of energy-efficient solutions and may or may not provide customers directly with finance for the investment. CaaS: A disruptive business for end-users to access clean cooling on		and consistent energy bills – for example: municipalities, universities, schools, hospitals, and large energy intensive industries, while SME markets with relatively smaller, less predictable energy bills are less suitable for ESCOs.
Goals	a pay-per-unit basis. Ownership of the system stays with the technology provider or the ESCO who cover operational costs and are incentivized to deploy the most efficient solutions. Offer energy saving solutions for cooling systems in buildings.		• ESCOs often lack their own collateral, preventing them from accessing debt financing for growth and the unfamiliarity and complexity of their business model to end-customers can also limit take-up.
Financing	 Financing provided by International Financial Institutions (IFIs), commercial banks, or investment funds. In a guaranteed savings model, the ESCO ensures the energy saving performance of the project but is not responsible for arranging the financing or taking on the associated credit risk. In a shared savings model, the ESCO is responsible for both the performance risk and the credit risk of the project. CaaS involves a series of ongoing payments for cooling services provided and helps overcome the upfront capital costs of cooling equipment to unlock clean cooling projects. CaaS and Energy Services Agreements combined as Energy and Cooling Services Agreements provide a fully funded solution that can be implemented by an ESCO backstopped by performance guarantees. 		 CaaS and ESCOs offer the potential to address small and higher upfront capital barriers and help to align incentives for more efficient equipment between cooling suppliers and end users and incentivizes a circular economy approach. For example, small off-grid cold rooms for agricultural use and large cooling plants for commercial and industrial use. Financing CaaS through private investment funds typically minimizes guarantee/collateral requirements. A risk reducing mechanism can help to attract private investment, but existing contracts and structures are not necessarily transferable across geographies.





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CaaS

Financial structure 2: Sale and leaseback



Replicated and modified from BASE



CaaS/ESCO – key design features



- 1. Commercial and industrial facility owners, municipalities, schools, hospitals, universities, and more remote cooling applications (e.g., cold rooms for agriculture or vaccine storage).
- 2. Avoids the need for large outlay of capital expenditure to get energy efficient solutions and the technical know-how to operate these systems, and transfers O&M burden from end-user to CaaS/ESCO provider.
- Increased capacity of technology manufacturers/ project developers to make efficient equipment available at affordable cost; end-customers awareness to ensure take-up; focus on use of low-GWP refrigerants; service providers to ensure equipment can easily be serviced by qualified local providers.
- 4. Lack of familiarity and trust from end-users and investors in energy savings; access to commercial debt and change in user approach; variability of the system load due to variable occupation/production output to guarantee investors funds.
- 5. Technology providers energy cost savings are either not included as part of the end customer agreement or guaranteed by the provider; mixed payment structure including a variable based on consumption and a fixed payment to guarantee return on investment.
- 6. Performance guarantees and ongoing operations and maintenance services; dissemination of case studies to catalyze replication.



4. Key challenges and lessons learned



Summary of key challenges

This section summarizes five key challenges and lessons learned that have emerged from the work delivered by CCC's finance grantees. These challenges and lessons learned are presented here to enable stakeholders across the cooling ecosystem to move further and faster in scaling up finance for efficient, climate-friendly cooling:

- **1. Project pipeline** Developing a pipeline of investible projects and providing technical assistance for project preparation are critical success factors in scaling up finance for efficient, climate-friendly cooling and bringing new investors into these opportunities.
- 2. Awareness While CCC has helped to raise awareness of the benefits of transitioning to efficient, climate-friendly cooling across a range of stakeholder groups, there is still a lot of work to do to raise awareness of the imperative to deliver cooling more sustainably, and to unlock commercial debt from the banking sector for the technology providers or ESCOs looking to deploy sustainable cooling solutions.
- 3. Demonstrations and data First-of-a-kind projects may take longer but are key to promoting energy efficiency in new geographies. More data and demonstrations are required and there are opportunities for the development of standard contractual toolkits around sustainable financing.
- **4. Risk perception** Efficient, climate-friendly cooling projects are innovative and carry a risk premium, particularly regarding upfront costs. Further demonstrations are needed to scale up finance to these projects. There are also relatively few risk-mitigation mechanisms, which remains a gap in the finance landscape for cooling projects.
- **5. Covid-19** Covid-19 had a significant impact on the ability to access sites; on customer ability and willingness to pay; and on the speed of decision making, which has caused grantees to develop new strategies to manage these challenges. Covid-19 increased demand for reliable and sustainable cold chains to address the pandemic and highlighted the relevance and importance of cooling to help build back better efforts.

Key challenges and lessons learned: Project pipeline



Developing a pipeline of investible projects and providing technical assistance for project preparation are critical success factors in scaling up finance for efficient, climate-friendly cooling and bringing new investors into these opportunities.

Key challenges relating to project pipeline include:

- Lack of experience: It is challenging to work in regions that are inexperienced in implementing cooling projects, as a level of technical knowledge is required alongside relationship building and knowledge sharing across the supply chain including with financial institutions and governments.
- Lack of funding: Financiers are often constrained in their ability to support the additional project preparation needed to design higher efficiency solutions.
- Lack of technical assistance: Public agencies and institutions often need a significant amount of technical assistance, especially when there are no similar projects that can serve as examples.
- Lack of data: It can be particularly hard to access data needed to develop pipelines including information on potential energy savings required to make investment decisions. To invest, IFIs need strong business cases, completed prefeasibilities, and a clear procurement strategy all of which require technical capacity.

Key lessons learned include:

- **Technical assistance:** Foundational work including awareness raising through 'lunch and learns', workshops, toolkits, etc. within the supply chain are critical in new markets. Project preparation is particularly important in scaling up sustainable public procurement. Technical assistance to local authorities for feasibility studies and business modelling has been helpful.
- **Project preparation:** Adequate time should be given to project preparation, which will likely be 2-3 years at a minimum in the design of national schemes. Funding for this project preparation is critical to building the pipeline that enables cooling efficiency finance to flow at scale.
- **Technical experts:** Access to the right expertise is important to accompany access to financing, given knowledge gaps. More needs to be done to build the capacity of local engineering and procurement teams in order to get projects ready for investment.
- **Growing an alliance:** A strong alliance is an effective and reliable tool to bring actors and influencers in the industry together to collaborate and scale opportunities (the CaaS Alliance is a successful example).

Key challenges and lessons learned: Awareness raising and communications

While CCC has helped to raise awareness of the benefits of transitioning to efficient, climate-friendly cooling across a range of stakeholder groups, there is a lot of work still to do to raise awareness of the imperative to deliver cooling more sustainably and catalyze finance at scale.

Key challenges relating to project pipeline include:

- Within financial institutions, **engagement and buy-in from senior management** is necessary to drive the different teams to work together and catalyze finance. However, it can be time consuming to find the right contacts and build interest in the business case. For corporates, competing silos (e.g., finance, facilities management, sustainability) complicate decisionmaking.
- While the greenhouse gas emissions saving potential of efficient, climate-friendly cooling is becoming better known, it can be **difficult to demonstrate the financial benefits** without local case studies or adequate data to support the business case.
- There is still a need to raise awareness of the links between cooling and other key action areas (e.g., clean energy transition, agriculture and food resilience through cold chains, Sustainable Development Goals, etc.) to help mobilize funders interested in these themes.

Key lessons learned include:

• Engagement with senior management has been shown to bring reforms to risk assessment frameworks and influence committee decision makers.

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- **Support from IFIs** is a crucial enabler to bringing private money into the sustainable cooling sector.
- Governments can further support the efficient, climate-friendly cooling ecosystem by linking ambitious, voluntary financial mechanisms to mandatory MEPS/product performance ladders, labels, and compliance.
- Cooling sector stakeholders still need to build links with other relevant communities where cooling is both having significant impacts and can provide solutions to help address these challenges (e.g., energy system flexibility).

Key challenges and lessons learned: Demonstrations and data



Key challenges relating to project pipeline include:

- Lack of similar projects make investment decisions more difficult and extend the time horizons for decision making.
- Projects should **not try to solve everything at once** (i.e., new geography, new mechanism, new sector, new stakeholders) and instead look to combine innovative elements with progress or building blocks that already exist. For example, an innovative deep-sea district cooling project in Egypt was combined with an established cooling finance structure to increase the likelihood of, and accelerate the time to, project approval.
- Lack of data regarding the **potential energy saving opportunities is a key barrier** for green public procurement (e.g., in public buildings).
- A lack of a consistent green building certification platform that is recognized by global lenders.

Key lessons learned include:

• **Flexibility** to adapt the implementation method based on new market knowledge or changing conditions to get first-of-a-kind cooling projects started is key.

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- Identifying expert organizations and **working with partners** makes the process smoother and enables greater knowledge sharing.
- The more projects that we can point to as **case studies**, the easier it is for financial institutions to invest in new projects as it helps to reduce risk perception.
- Promoting **healthy competition** between organizations, equipment suppliers, etc. can help to spur first-of-a-kind projects and create critical momentum around a demonstration project/program.
- Standardizing contractual toolkits for sustainable financing and capacity building activities means it is easier to replicate projects elsewhere. Offering alternative payment structures (e.g., a combination of variable and fixed components) can help to accelerate the deployment of CaaS/ESCO projects.

Key challenges and lessons learned: Risk perception and mitigation

Efficient, climate-friendly cooling projects are innovative and carry a risk premium, particularly regarding upfront costs and new technologies where these are used. Further demonstrations are needed to scale up finance to these projects. There are also relatively few risk-mitigation mechanisms which remains a gap in the cooling finance landscape.

Key challenges relating to project pipeline include:

- Local banks' **risk perception and credit assessments** require significant development alongside introduction of risk reducing financial mechanisms.
- Guarantee mechanisms can be effective for incentivizing lenders in markets where energy efficiency is new. However, our experience has demonstrated that there are not many guarantee mechanisms available for cooling efficiency finance and practical challenges to implementation still exist.
- While on-bill financing is a proven mechanisms in Europe and the US, many developing countries struggle with power blackouts/brownouts and strained utility balance sheets which make on-bill finance more challenging to deploy successfully.

Key lessons learned include:

• Careful design of guarantee mechanisms is needed to ensure that the risk coverage is sufficient, and requirements are not too onerous.

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- More work is needed to build capacity and onboard more banks in new markets and this can be supported by concessional terms facilitated by donors to prove the concept and assist those implementing projects for the first time.
- On-bill financing can have a **higher risk profile but provide a larger client base.** More work is needed to ensure there are adequate ways to track who has paid their utility bills for this mechanism to work effectively.
- **On-wage financing** can be easier than on-bill financing to start proving the concept and get people used to it, which shows promise in scaling up cooling equipment finance.
- Standardized contracts and models for ESCOs/CaaS will be beneficial in replicating projects, and alternative payment structures (combination of variable and fixed components) can help minimize the risk of not recovering the investment.

Key challenges and lessons learned: Impact of Covid-19

The impact of Covid-19 has caused financial constraints **impacting the willingness and ability to invest** in efficient, climate-friendly cooling. Despite limitations to travel, CCC supported projects have implemented a range of adaptations including moving to **virtual building audits**, **developing hybrid investment strategies**, and switching country and customer focus. Covid-19 presented a huge demand for reliable and sustainable cold chains to address the pandemic and highlighted the relevance and importance of cooling to help build back better efforts.

Key challenges relating to project pipeline include:

- Nearly all travel was slowed or stopped causing a negative impact on business activity and causing **project delays** for all our grantees. For example, in Asia SDCL were unable to carry out all their planned investment grade audits and this had a knock-on effect with no project financing completed in 2020.
- There have been some challenges in ensuring financing is secured for projects with priorities shifting to prioritize pandemic response. However, successes include ESMAP securing significant additional support for cold chain investments in the health sector
- Restrictions on travel have also affected project implementation due to limitations on in-person visits. For example, GIZ faced limited access to onsite energy data in several public buildings in Bangladesh.
- Many facilities operated at limited capacity or closed affecting the financial performance of projects due to lack of payment from end-users.

Key lessons learned include:

- Covid-19 highlighted the importance of cooling to **help build back better** and government priorities including economic development and jobs (e.g., cold chains for food security).
- In response to the pandemic, it has been important to emphasize the need for cooling in health facilities and the cost savings of efficient, climate-friendly cooling systems. Demand is growing as customers seek ways to reduce operational expenditure.
- Some projects were able to switch focus to less affected sectors or where there is an even stronger case for action e.g., pivoting from hospitality to food. New strategies were also developed e.g., combining rooftop solar and cooling efficiency.
- Demand for cooling related technical assistance is growing from investment operations, which other organizations can learn from and for insurance and guarantee mechanisms.
- Opportunities have arisen to switch to **virtual working practices** including the use of online audits.





Conclusions

This finance support has uncovered opportunities to act on these lessons learned to move at speed and scale on sustainable cooling solutions. Key opportunities relevant to a range of stakeholders include:

- 1. **Project pipeline:** Providing support for project preparation to develop pipelines of investible projects is critical to scaling up finance for efficient, climate friendly cooling and bring in new investors.
- 2. Awareness: Raising awareness of why cooling matters and how to transition to sustainable cooling solutions is essential to accelerating progress and unlocking large scale finance from a wider range of financial institutions for sustainable cooling solutions.
- **3. Demonstrations and data:** Support for demonstration projects and sharing key insights from these projects are key to promoting efficient, climate friendly cooling solutions in new geographies, applications, and sectors.
- 4. Risk perception: There are relatively few risk-mitigation finance mechanisms for sustainable cooling. More support is needed to establish risk mitigation mechanisms to address risk perceptions with a range of sustainable cooling projects.
- 5. Innovative approaches: Covid-19 challenges led to the development of new implementation strategies, increased demand for reliable and sustainable cold chains, and highlighted the relevance and importance of cooling to help efforts to build back better. Support is needed to help catalyze further progress on innovative financing and business models.

CCC continues to explore opportunities to work with a range of stakeholders to drive action on efficient, climate friendly cooling and welcomes feedback on this work.



5. Sources and further reading



Clean Cooling Collaborative, Cooling efficiency finance case studies, 2018: https://www.cleancoolingcollaborative.org/wp-content/uploads/2018/04/Cooling-efficiency-financing-casestudies.pdf

CaaS Initiative: <u>https://energy-base.org/projects/cooling-as-a-service-initiative/</u> and <u>www.caas-initiative.org</u>

BASE, Green on-wage financing knowledge brief, 2020: <u>https://energy-base.org/app/uploads/2020/11/Knowledge-Brief-Green-On-wage.pdf</u>

Economic Intelligence Unit, *The Cooling Imperative*, 2019: <u>https://www.eiu.com/n/the-cooling-imperative/</u>

ECOFRIDGES: https://united4efficiency.org/country-regional-activities/ghana-senegal/

U4E reports (e.g., policy guides, country savings assessments) and tools (e.g., model regulations: <u>https://united4efficiency.org/resources</u>

A wide range of knowledge briefs, reports, and insights are available from the Clean Cooling Collaborative <u>website</u>.