



# Coordinating finance for sustainable refrigeration and air conditioning

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## GLOSSARY

AC	Air Conditioner	MEPS	Minimum Energy Performance Standards
BAU	Business-As-Usual	MLF	Multilateral Fund
BMU	German Federal Ministry for Environment, Nature Conservation and Nuclear Safety	MOP	Meetings of Parties
CFC	Chlorofluorocarbon	MP	Montreal Protocol
CO <sub>2</sub>	Carbon Dioxide	MRV	Measurement, reporting and verification
COP	Conference of the Parties	NAMAs	Nationally Appropriate Mitigation Actions
EU	European Union	NC	National Communications
Excom	Executive Committee of the MLF	NDC	Nationally Determined Contributions
F-gas	Fluorinated greenhouse gas	NGOs	Non-governmental Organizations
GCF	Green Climate Fund	NOUs	National Ozone Units
GCI	Green Cooling Initiative (of GIZ)	ODA	Official Development Assistance
GEF	Global Environment Facility	ODP	Ozone Depleting Potential
GHG	Greenhouse Gases	ODS	Ozone Depleting Substances
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit	PSF	Private Sector Facility
Gt	Gigatons	R&D	Research & Development
GWP	Global Warming Potential	RAC	Refrigeration & Air conditioning
HC	Hydrocarbon	RAC&F	Refrigeration, Air conditioning & Foam
HCFC	Hydrochlorofluorocarbon	SDGs	Sustainable Development Goals
HEAT	Habitat, Energy Application & Technology	t	Ton
HFC	Hydrofluorocarbon (saturated)	TEAP	Technology and Economic Assessment Panel
HPMP	Hydrochlorofluorocarbon Phase out Management Plan	UN	United Nations
IEC	International Electrotechnical Commission	UNEP	United Nations Environment Programme (now named UN Environment)
INDC	Intended Nationally Determined Contribution	UNFCCC	United Nations Framework Convention on Climate Change
kg	Kilogram	USD	US-Dollar
LDC	Least Developed Countries		



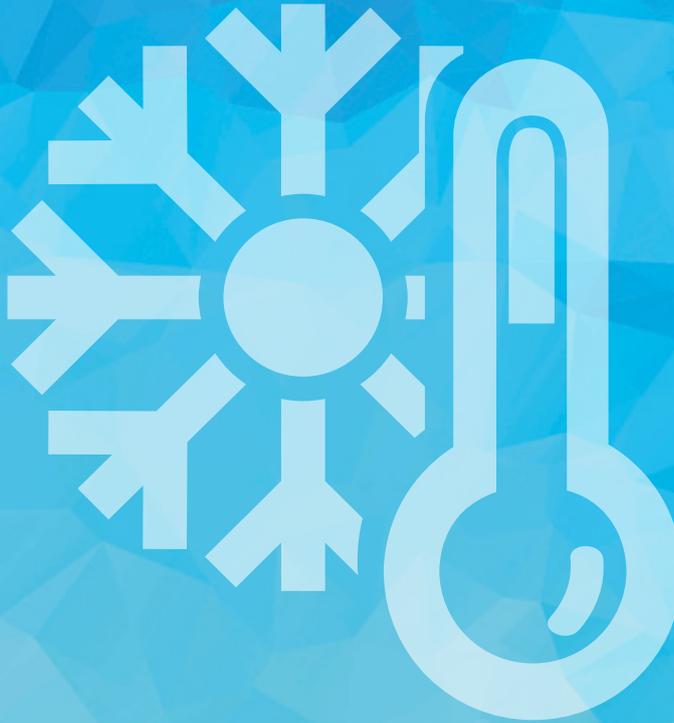
## INTRODUCTION

One of the challenges to achieve successful low-carbon transformation in line with the climate goals set out in the Paris Agreement is the provision and effective deployment of finance to enable widespread uptake of low-carbon technologies. The refrigeration and air conditioning (RAC) sector faces a particular challenge in the implementation of effective finance strategies given its cross-sectoral nature – extending from manufacturing of gases and appliances to energy end-use in buildings – and hence the different institutional responsibilities as well as policy and compliance regimes that affect the sector.

Against this backdrop, the paper focusses on questions related to the financing of the low-carbon transition of the RAC sector. The objective of the paper is to provide an overview of the current (climate) finance situation in the sector including a discussion of the different available sources of finance for ambitious reductions of direct and indirect emissions, and roles of different actors in this regard. This is meant as a starting point for the development of further guidance and recommendations on the elaboration of integrated finance strategies to enable countries, in particular developing countries, to achieve the low-carbon transition.

The paper starts with a brief overview of the RAC sector and its role in the climate context. It continues with a summary of the status quo of different finance options in the sector, differentiating between direct (HFC) and indirect (CO<sub>2</sub>) emission reductions. Subsequently, typical barriers and the role of different actors to provide finance and support are outlined. The ensuing part of the paper takes a more detailed look at the availability of finance for different mitigation activities, with a view to identifying access options to finance sources within the scope of a comprehensive and coherent RAC sector strategy.

# 2



## UNDERSTANDING THE RAC SECTOR IN THE CLIMATE CONTEXT

### 2.1 Relevance of the RAC sector for climate change

Ozone depleting substances (ODS) used in refrigeration and air conditioning, most importantly chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs), are controlled substances under the international regime on the ozone layer, the Montreal Protocol. The recent Kigali Amendment to the Montreal Protocol sets targets for the phase down of ODS-alternatives with a high global warming potential (GWP), namely hydrofluorocarbons (HFCs), over the next three decades. However, while the Kigali Amendment puts in place control measures for the production and consumption of HFCs, it focuses mainly on direct HFC emission reductions, but does not address energy use related CO<sub>2</sub> emissions (indirect emissions) in a comprehensive manner, which are equally crucial to achieve long-term low-carbon development in the RAC sector as mandated under the Paris Agreement.

The RAC sector is a key contributor to global greenhouse gas emissions resulting from emissions associated with the use of refrigerants as well as with the use of electricity for appliances. In developing countries, the combined emissions from the RAC sector amount to an estimated 2.7 gigatons (GtCO<sub>2</sub>eq) or 10.5% of their total emissions (CAIT, 2012). This equals, for example, emissions of the transport sector in these countries. From the total direct and indirect emissions in developing countries, more than two thirds come from air-conditioning.

Already a main source of GHG emissions today, the sector's impact is expected to grow significantly under business as usual scenarios. The IEA identified the RAC sector as one of the fastest growing energy consuming sectors in developing countries, with an estimated growth rate of 7% per annum until 2050 (IEA, 2016). Global equipment sales in the RAC sector are estimated to increase to USD 130–160 billion in 2017, about half of which in developing countries. While developed countries register growth rates of 0 to 4% per annum, markets in developing countries grow, on average, in the range of 7 and 15%. In 2030, 80% of the RAC market is estimated to be located in developing countries (Vardanian, 2016). In view of the fast growth rates of the RAC market in many developing countries, immediate policy review and reforms are indispensable to keep emissions from the sector under control.

The share of emissions in the RAC sector varies from country to country, making it difficult to assess the potentials and costs of investments in the sector at a global level, for example in the context of Nationally Determined Contributions (NDCs). In general, the sector offers many cost-effective mitigation options. Especially investments into energy efficiency present an opportunity to cost-effectively reduce emissions from the RAC sector and drive sustainable sector transformation. At the same time, this potential is not fully realised. In many (developing) countries mitigation related investments in the energy sector target the supply side, while the potential for demand side efficiency improvements remains largely untapped. This indicates that there is a general lack of conducive policies to effectively remove barriers to investments in energy efficiency at a national and sector level and actively drive low carbon transition in the RAC sector.

## 2.2 Implications of the Paris Agreement for the RAC sector

In 2015, the adoption of the Paris Agreement marked a political turning point towards the decarbonisation of the global economy. To date, 196 of 197 countries have signed, from which 179 have also ratified the Paris Agreement, committing themselves to the global goal of limiting global warming to “well below” 2°C, aiming at 1.5°C. In order to reach this goal, all countries need to pursue net-zero greenhouse gas emissions in the second half of the century, with CO<sub>2</sub> emissions to be phased out first and well before 2050. For the RAC sector, this implies a need to significantly reduce indirect emissions, for example through improved cooling systems in new buildings and higher energy efficiency in appliances.

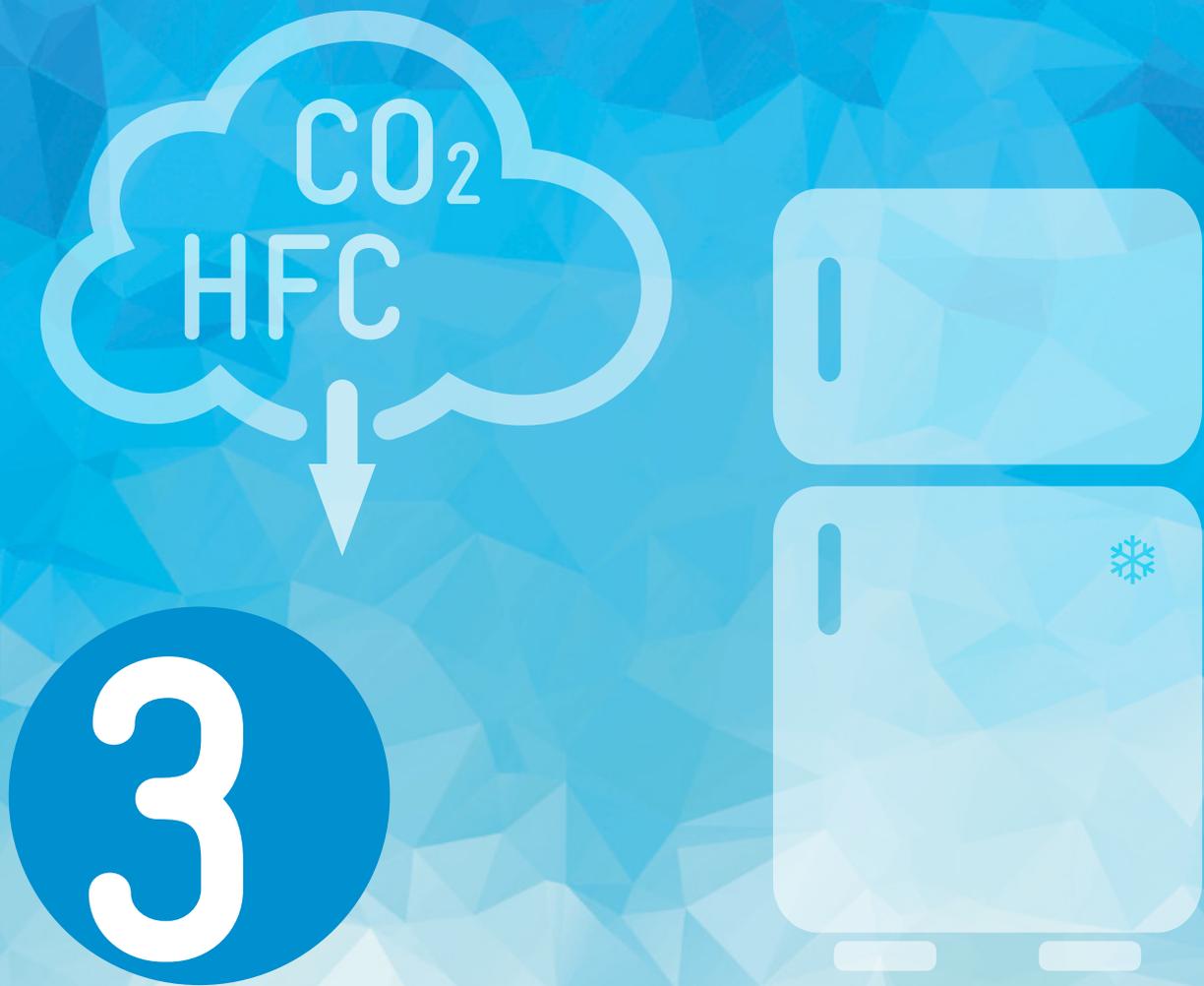
At the heart of the Paris Agreement is the ambition mechanism which requires countries to set progressively ambitious mitigation targets every five years in the form of successive NDCs. When looking at the first round of NDCs submitted in 2015 from a RAC sector perspective, it is encouraging that most NDCs cover all six Kyoto-gases, including HFCs, in their greenhouse gas basket. 83 out of the 197 NDCs explicitly mention HFCs. Similarly, energy efficiency is mentioned in 143 of 197 NDCs albeit in broad terms. Yet, very few NDCs outline specific HFC or energy efficiency sub-targets for the RAC sector as a way to achieve their overall NDC target. Exceptions are Ghana, Jordan, and Vietnam, who have explicitly included RAC sector mitigation in their NDC.

Hence, one challenge that results from the Paris Agreement is for countries to integrate actual RAC sector potentials in their NDCs in order to support the achievement of sub-targets and promote ambition raising. A second challenge is to develop respective implementation plans and secure the necessary funding from national and international sources, based on robust estimation of costs and investment needs in the RAC sector. Many NDCs (in particular those presented by developing countries) outline finance and support needs, either presented as total finance needs or related specifically to mitigation or adaptation targets. However, the level of detail provided on specific needs is very limited and only few NDCs present detailed and transparent financial needs assessments at a

sector- or sub-sector level. At the same time, it is important to note that the purpose of the NDCs is to communicate mitigation targets in the context of the required global level of ambition. More detailed approaches and information on how such targets are implemented need to be developed under specific sector strategies and plans.

In order to face the challenge of scaling up countries' NDCs and develop concrete implementation plans to achieve them, it is important to translate national level targets into sector- and sub-sector level targets. Enhanced coordination of low-carbon transition at the sector level can multiply the benefits of climate finance and implicitly address important barriers such as market distortion, competitive effects as well as deficient supply and demand structures in an effective manner.





## FINANCING LOW-CARBON DEVELOPMENT IN THE RAC SECTOR

To promote low-carbon development in the RAC sector, capital investments are needed to facilitate the development, manufacturing, distribution and deployment of low-carbon cooling technologies. This covers both the supply side (development and manufacturing) as well as the demand side (deployment of refrigeration equipment and appliances) across a wide range of industries and end users in different countries.

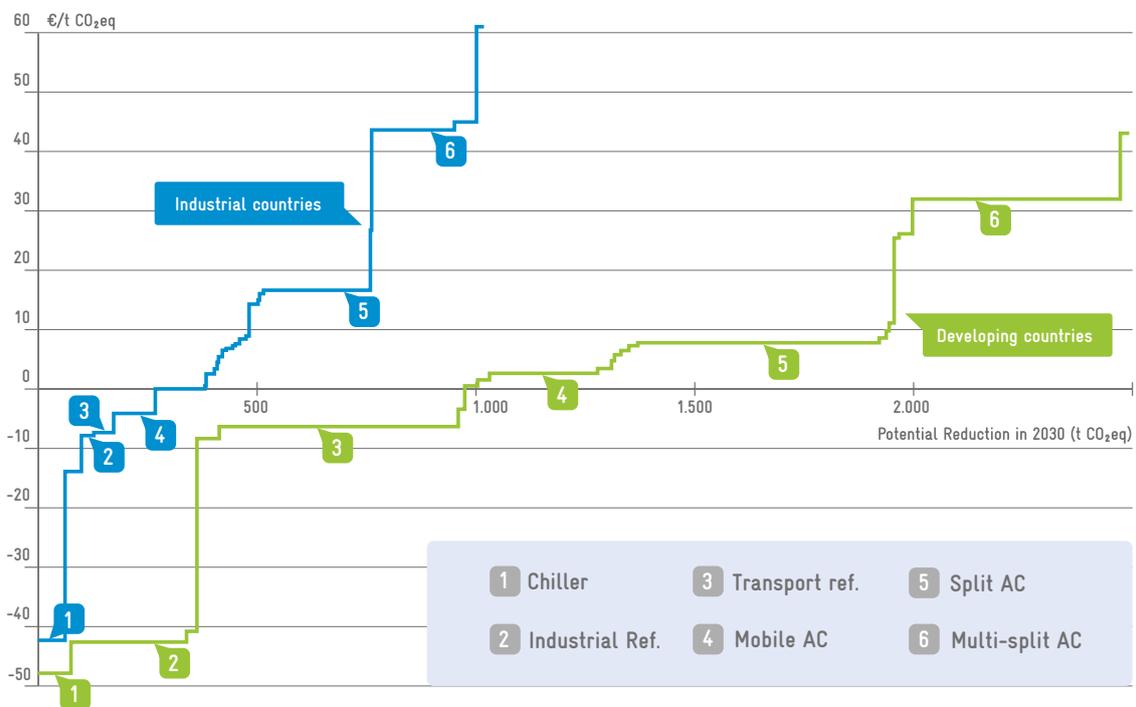
Low-carbon development in the RAC sector must address two aspects: a replacement of high GWP refrigerants with low GWP refrigerants in cooling technology (targeting direct HFC emissions), as well as significant improvements in the energy efficiency of appliances (targeting indirect CO<sub>2</sub> emissions). While the phase-down of HFC production and consumption is mandated under the Kigali Amendment to the Montreal Protocol and falls within the remit of the Multilateral Fund (MLF), less clarity exists about the available sources of funding for energy efficiency measures in developing countries.

The following sections provide an overview of the funds and options that exist to finance either direct or indirect emission reductions in the RAC sector.

### 3.1 Financing direct emission reductions in the RAC sector

The phase-down of HFCs which is mandated under the Montreal Protocol is one of the most cost-effective GHG mitigation options available today. **Figure 1** illustrates the marginal abatement cost curve which presents the relative economic costs of different mitigation technologies, considering both refrigerant transition and energy efficiency. There are several technology options with negative costs – option 1 to 4 in developed countries and option 1 to 3 in developing countries – and adopting them would actually help these countries save money.

**Figure 1: Marginal abatement cost curve in the RAC&F sector**  
(HEAT GmbH, adopted from Schwarz et al. 2011: Preparation study for European Commission)



The replacement of controlled refrigerants with low-GWP alternatives (e.g. natural refrigerants) is supported through the Multilateral Fund for the implementation of the Montreal Protocol (MLF). The MLF enables the compliance of developing countries with the Montreal Protocol targets, supporting, for example, investments in the manufacturing industry and/ or capacity building in the after-sales sector as well as in national institutions that support the phase-down.

The MLF provides funds to developing countries with eligible consumption of controlled substances. The funding amount is evaluated based on incremental investment cost calculations and includes, to some extent, associated non-investment costs such as transaction costs. Co-benefits, such as technology up-grades, are not mandatory and only considered on a case-by-case basis, e.g. in the case of a demonstration effect. RAC manufacturers or end-users of substances other than HFCs are not eligible for funding from the MLF. Financial and technical assistance by the MLF is generally provided in the form of grants and is delivered primarily through four international implementing agencies, UNEP, UNDP, UNIDO and World Bank; as well as a number of so called bilateral agencies, implementing the bilateral contribution of a party to the MLF.<sup>1</sup>

<sup>1</sup> According to No 7 of Decision II/8 bilateral co-operation may, up to 20 per cent, be considered as contribution of a party to the MLF. GIZ is the largest bilateral agency and implements the German bilateral contribution financed by the German Federal Ministry for Economic Cooperation and Development.

The MLF has a clear mandate to finance HCFC phase-out and HFC phase-down but also includes funding for countries to avoid transitioning to HFCs by leapfrogging directly to low-GWP alternatives. At the same time, it aims to avoid negative impacts on energy efficiency in the transition to low- or zero-GWP alternatives. Experiences with the HCFC phase-out process have shown that the technology change has often resulted in substantial energy efficiency gains of new products and improved services. These synergies could be further optimised in future funding cycles, without diluting the current mandate of the MLF which clearly prioritises the support for compliance with HCFC phase-out and HFC phase-down.<sup>2</sup> In addition to that, the MLF will also include funding for countries to avoid transitioning to HFCs by leapfrogging directly to low-GWP alternatives.

In November 2017, Parties to the Montreal Protocol agreed on the 10<sup>th</sup> replenishment for the MLF for the period 2018–2020. Parties decided that developing countries will receive USD 540 million through the MLF, mainly to continue work on HCFC phase-out through the implementation of HCFC Phase-out Management Plans (HPMPs). The MLF's governing Executive Committee (ExCom) agreed that in addition to HCFC phase-out activities, the MLF will also fund a list of initial **enabling activities** to support the preparation for the implementation of HFC phase-down activities, including support of country actions for early Kigali Amendment ratification, work on institutional arrangements, and data reporting on HFC production and consumption.

In addition, the ExCom agreed to fund a limited number of **HFC phase-down investment projects** that will help the MLF to determine typical costs of HFC conversions and support the development of future cost and funding guidelines for HFC phase-down activities. Finally, limited resources will be made available for the preparation of **HFC-23 demonstration projects**, disclosing cost-effective ways to destroy HFC-23. These pilot-type projects provide opportunities for early action on HFC phase-down with financial support from the Montreal Protocol (UNEP and ExCom 2017).

While the bulk of the funding for the 2018–2020 replenishment period will be spent on HCFC phase-out activities, the MLF is also expecting to receive additional voluntary contributions from a group of donor countries, which pledged a total of up to USD 27 million in order to finance the above mentioned HFC-related measures.

The three ExCom decisions that make resources available for enabling activities, HFC investment projects, and HFC-23 demonstration projects present a first step towards implementing the Kigali Amendment.

In order to fully achieve the Kigali Amendment's targets, it is important that additional resources are made available at both domestic and international levels to allow developing countries to leapfrog from HCFC-using equipment to low-GWP alternatives and prepare the grounds for a fast phase-down of HFCs in the future. Care must be taken that in particular international funds are additional, i.e. they must not replace national public or equivalent structural expenditure in a country.

While the cost guidelines for HFC phase-down are still under development, the Meeting of the Parties to the Montreal Protocol (MOP) submitted a framework for identification of general funding principles to the MLF, including mandatory and optional funding topics and activities. The framework also provides information as to which activities are not likely to be eligible for MLF funding (Table 1).

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<sup>2</sup> For example, HCFC funding for the servicing sector is increasingly used to prepare and establish back-up infrastructure for the introduction of natural refrigerants. In addition, in countries with conversions in the manufacturing subsectors, governments could motivate manufacturers to adopt more energy efficient designs. This could be flanked, for example, with introducing specifically related minimum performance standards or consumer awareness campaigns.

Table 1: Overview of eligibility for funding under the MLF<sup>3</sup>

Selected activities that are eligible for MLF funding, if required for compliance with the HFC phase down	Selected activities that are not directly required for compliance, but funded on a case by case basis	Selected activities that are not required for compliance and generally not eligible for funding
<ul style="list-style-type: none"> <li>• HFC manufacturing conversion</li> <li>• Compensation for HFC production shut down</li> <li>• Capacity building and training programmes for manufacturing and servicing for replacement of HFC-equipment and products</li> <li>• Training of customs to control import and exports</li> <li>• Development of preparatory surveys and projects</li> <li>• Development of national management plans for controlled substances</li> <li>• Institutional strengthening</li> <li>• Management strategy for disposal of controlled substances</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstration of HFC replacements in the end-user sector</li> <li>• In cases where HFC conversion would result in lower energy efficiency: additional, cost-effective measures to keep the same or slightly better efficiency level</li> <li>• Development of national management strategies for disposal and destruction of HFCs</li> </ul>	<ul style="list-style-type: none"> <li>• Energy efficiency, if not essential for HFC conversion</li> <li>• Costs of disposal or destruction of HFCs</li> <li>• Sector inventories on energy consumption and related emissions</li> <li>• Development on building codes and minimum energy performance standards</li> <li>• Institution building for managing energy efficiency in buildings and the appliance sector</li> </ul>

For those activities that are not eligible for funding under the MLF it is important to identify additional funding sources. For example, each product conversion incurs significant hidden costs for the private sector. An integrated approach, including compliance with the Kigali Amendment and promoting energy efficiency at the same time will significantly improve efficiency and reduce implementation costs for the private sector.

### 3.2 Financing indirect emission reductions in the RAC sector (energy efficiency)

Compared to the HFC phase-down, the implementation of energy efficiency measures is far more complex. Energy efficiency improvements can be considered at different stages of the refrigeration supply chain, from the manufacturing of equipment to the end-use of refrigeration appliances, e.g. in buildings or industries. This involves a large number of different stakeholders as well as different institutional mandates. The most significant reduction potential lies at the end-use level including industrial and commercial entities as well as private households.

The demand for energy efficient equipment depends on specific national circumstances, such as national legislation, climatic factors, cultural and behavioural aspects as well as incentive structures at the demand and supply side. Cost and affordability remain a determinant of energy use patterns. Various effects can have significant impact. In the case of rebound effects, for example, the absence of stringent use restrictions leads to a situation in which energy cost reductions through enhanced efficiency or subsidies (e.g. lower tariffs) result in higher energy consumption overall.

<sup>3</sup> Decision XXVIII/2: Decision related to the amendment phasing down hydrofluorocarbons, in specific Guidance to the Executive Committee of the Multilateral Fund with respect to the consumption, production and servicing sectors, Reports of the 78<sup>th</sup> to 80<sup>th</sup> Excom.

If well applied, energy efficiency measures generally show various benefits: climate mitigation scenarios with high levels of energy efficiency often lower the total costs at the micro and macro level (IEA 2016). Also, investments in efficient equipment and technologies typically have short payback times and it could be assumed that there is a strong private sector interest in financing energy efficiency measures. Therefore, most countries acknowledge, in general, the relevance of energy efficiency for achieving their individual mitigation objectives. However, despite the cost effectiveness, the full energy efficiency potential in the RAC sector is often not realised. This points to a range of barriers including institutional, knowledge, information as well as financial barriers that may prevent energy efficiency measures from being implemented. These barriers can be addressed, for example, through improved data, policies and regulations as well as targeted incentive schemes.

Currently, there is a range of different funding sources available for energy efficiency. Most development banks provide specific credit lines for such activities. Dedicated climate finance – including for example the Green Climate Fund – is also a potential source of funding for energy efficiency measures. However, such energy efficiency funding is not targeted specifically to the RAC sector as compared to funding under the MLF. The available information is much more scattered and hence it is more difficult for policy makers to develop coherent and comprehensive investment and finance strategies that target specifically indirect emission reductions in the RAC sector.





## RECOGNISING BARRIERS AND THE ROLE OF DIFFERENT ACTORS TO PROVIDE FINANCE AND SUPPORT

Financing low-carbon development in the RAC sector can be adversely affected by a number of barriers that require dedicated engagement of different actors and stakeholders at the national and international level. Key segments involved include the national government, international (public) support providers and the private sector. Their fields of activity overlap partially and it is important that their strategies are based on an integrated approach in order to make their support mutually compatible in the long term, and ensure additionality of the funds provided. The following section briefly outlines the main barriers encountered for investments in the RAC sector and the role of public and private actors to effectively address them.

### 4.1 Understanding barriers to finance low-carbon development

In order to define the role of domestic and international public and private finance to support the transformation of the RAC sector, it is essential to understand specific barriers to change in the sector. Typically, barriers to change – involving both the replacement of refrigerants as well as enhanced energy efficiency at different levels of the supply chain – are diverse. Financial support and instruments can only address certain barriers and can only be effective if embedded in a broader set of interventions which addresses the identified barriers comprehensively. Creating the right enabling environment from a policy, governance and incentives perspective is critical to drive investments into climate friendly solutions in the RAC sector.

Barriers can be categorised into four different groups which are briefly outlined in the following:

- **Regulatory & policy barriers** – which relate to a lack of a stringent policy framework which provides a stable investment environment and long-term certainty to potential investors in green cooling solutions and technologies. This may include, for example, weak technical and energy efficiency standards or competing or misplaced incentives
- **Institutional & information barriers** – which may involve a lack of coordination between key institutional and private sector actors, a lack of knowledge and data on mitigation options, potentials and technology choices, as well as lack of capacities in key institutions including for example, the banking sector
- **Economic & financial** barriers are typically cited as key. These can relate to access to capital markets and commercial finance, high transaction costs given typically small project values, distorting fiscal policies or more general risk perception of new and innovative technologies
- **Technology & market** – relate to structural barriers such as “split incentives” in the building sector, referring to a situation in which those responsible for paying energy bills (e.g. tenant) are not identical with those making investment decisions (e.g. building owner); as well as to availability of technologies and inertia of incumbents in the market

As described above, the composition of barriers varies from country to country and requires a detailed analysis of the situation encountered in a country-sector context.

## 4.2 The role of the public sector / national budgets

Public sector finance plays a key role in addressing several of the above-mentioned barriers and in creating an attractive framework for other actors and sources to step in.

A central function of the public sector is to create an enabling environment which mobilises investments and finance from the private sector towards national and sectoral priorities. Given the key relevance of energy efficiency measures for the achievement of countries’ climate targets and considering that energy efficiency improvements are not mandated under the Montreal Protocol and its Kigali Amendment (and therefore not explicitly funded under the MLF), national governments play a central role in building up supportive frameworks for energy efficiency investments in the RAC sector and its sub-sectors.

Potential areas for domestic public sector support include:

- Optimisation of the regulatory and policy framework, for example through the adoption (and regular updating) of mandatory Minimum Energy Performance Standards (MEPS) and labels across a wide spectrum of appliances and equipment;
- Strengthening of national institutions, e.g. through targeted capacity building, to ensure effective enforcement of laws and regulations and monitoring of fiscal and financial policies;
- Creation of a national framework for cooperation and dialogue between public and private sector actors on investment opportunities and risk mitigation options;
- Creation of financial incentives, such as endorsement schemes, deposit systems or rebate programmes, to encourage private sector engagement (manufacturers, investors and end users as well as banks) and facilitate full market penetration of energy efficient cooling technologies and low-GWP refrigerants;
- With a favourable policy environment and competent institutions, more private sector finance and international support can be attracted and channelled into energy efficiency related priorities.

Financial instruments can play an important role to address or remove the identified barriers to investment in energy efficient and climate friendly refrigeration but need to be embedded in a broader set of interventions, including regulation, targeted capacity building and information campaigns. **Table 2** shows potential measures and instruments that may be initiated and applied by the government to address different types of barriers. International (public) financial support can play an important role to complement private sector investments and scarce national public budgets in developing countries to help the implementation of such measures.

**Table 2: Overview of barriers and possible interventions**

Type of barrier	Role and type of finance instruments/intervention	Role of non-financial instruments/interventions
Regulatory & policy	Bonus or penalty schemes Tax breaks (incentives) and subsidy reform (removal of disincentives)	Integrated policy planning Normative frameworks including regulations/standards Build up monitoring and enforcement capacities
Institutional & information	Increased public budget to create institutional capacities	Demonstration projects Capacity building/training Institutional framework and cooperation platforms Testing facilities for products
Financial	Subsidised loans/dedicated credit lines Guarantees/risk sharing facilities Grant schemes PPP co investment schemes	Project bundling Improved statistics on RAC use, sale, prediction and monitoring of proposed market changes Sharing market information on prices and efficiency
Market & technology	Tax breaks (incentives) and subsidy reform (removal of incentives) Subsidised loans/dedicated credit lines to cover high upfront investment costs	Training & qualification to build local capacities Market reform, R&D Conversion of manufacturers

### 4.3 The role of international public finance and support providers

International public finance sources, including multilateral and bilateral development banks and climate funds, also play an important role in the context of financing RAC sector transformation. For instance, World Bank Group energy financing, including IBRD, IDA, IFC and MIGA guarantees, has exceeded USD 49 billion of funding since 2010, of which over USD 21 billion was used for energy efficiency and renewable energy projects.<sup>4</sup>

<sup>4</sup> See: <http://www.worldbank.org/en/topic/energy/projects> (accessed: 03.09.2018).

**Potential areas for international public support providers include:**

- “Bridging the gap” through the provision of upfront financing as well as technical support and capacity building, where domestic budgets are not capable of leveraging the required private sector capital;
- Targeted energy efficiency measures in the RAC sector as part of larger energy efficiency programmes (e.g. KfW or AfD provide loans and grants for energy efficiency mainly in the industry and building sectors).

Several bi- and multilateral climate funds and banks directly target private sector engagement. For example, the Private Sector Facility of the GCF, IFC and some bilateral institutions like KfW engage in both the provision of funds to the private sector in order to activate capital, and the allocation of funds raised by the private sector to where it is needed. The Kigali Cooling Efficiency Programme (K-CEP) is also aiming to bundle and leverage relevant private sector investments in developing countries.

In general, there is some potential to further streamline the funding activities of all international finance institutions (including the MLF and climate focused institutions) in order to support a more integrated approach towards financing both ozone and climate benefits (i.e., HCFC phase-out, HFC phase-down, energy efficiency and CO<sub>2</sub> emission reduction).

It is important to highlight that both bilateral and multilateral institutions can only provide finance to countries that have the appropriate infrastructure in place to absorb and manage the funds, including mature financial markets and a conducive policy environment. As this is lacking in many developing countries, financial support must always be accompanied by the establishment of a supportive policy and regulatory framework as well as capacity building and knowledge transfer.

#### 4.4 The role of private sector finance

Given the scarcity of public funds, public sector finance is important but cannot be expected to provide the lion's share of required investments in the RAC sector. Dedicated private sector investment is essential to reach a certain degree of market suitability. Both the market for low-GWP refrigerant alternatives as well as the energy efficiency market must be sufficiently mature in order to drive the transformation process at the required speed. Private sector engagement is relevant and appropriate since most energy efficiency investments are cost effective and present short payback periods for the investor.

**Potential areas for private sector support include:**

- Scaling up and sustaining (public) climate and energy investments, both in the supply (manufacturing) and the demand (investor, end user) sector, by filling the enormous funding gap that exists in almost all sectors that are transforming towards low carbon development;
- Supporting (public) project development, commercial financing, and the development and promotion of innovative finance mechanisms (e.g. climate bonds);
- Co-financing large-scale energy infrastructure projects with public interest in the form of public private partnerships (PPPs), involving dedicated credit lines, risk-sharing facilities or Energy Saving Performance Contracts that target specific energy efficiency market barriers;
- Getting involved through project or sector related mechanisms such as the Clean Development Mechanism (CDM), Joint Implementation (JI) or Nationally Appropriate Mitigation Actions (NAMAs).



Carbon finance in general and market mechanisms such as the CDM in particular can provide an additional tool to drive transformation in the RAC sector by helping to unlock private investments at scale. In the context of the CDM, however, only 12% of the expected share of credits up to 2020 come from energy efficiency projects. Of these, most focus on supply side energy efficiency (i.e. in generation, transmission and distribution), while demand side projects only represent 2% of total expected credits. Even though carbon finance and the CDM would seem to be well suited for (traditionally) cost-effective energy efficiency projects, there are several challenges, such as high transaction costs, small project sizes, stringent monitoring needs and additionality requirements. To some extent, Programmes of Activities (PoAs) have facilitated the development of demand side energy projects by offering the flexibility to package many small-scale project activities into one large programme, with the possibility to add projects over time. The CDM experience illustrates that funding instruments must be structured in a way to overcome some of the particular barriers to investments into demand side energy efficiency in order to reach the full potential of private sector finance (OECD/IEA 2012).





# 5

## PREPARING ACCESS STRATEGIES TO FINANCE AND SUPPORT

Considering the fact that direct and indirect emissions from the RAC sector will continue to grow rapidly over the coming years, it is important that countries develop integrated investment strategies for the sector that adequately combine and/ or complement support activities to reduce HFC emissions with effective energy efficiency measures. It is furthermore essential that within an integrated RAC sector strategy different funding sources and actors (domestic and international) are identified that can match the diverse financing needs according to their mandates. The following section outlines potential steps in the preparation of access strategies to finance and support from different sources for low-carbon development in the RAC sector. This includes the definition of sectoral targets and their implication for funding needs, the identification of available domestic and international finance sources, the understanding of options that exist to access these sources, and an overview of international funds where needed to complement domestic budgets in an effort to drive effective transition in the RAC sector.

## 5.1 DEFINING TARGETS

From the 197 NDCs submitted to date, many include unconditional as well as conditional targets. Unconditional targets typically include activities that are economically feasible under local circumstances and likely to be nationally funded, while the achievement of conditional targets depends on international support. Activities that are funded from national sources are generally easier to be implemented and can start with almost immediate effect. National funding is viable where incremental costs of climate friendly investments can be balanced by equal or higher national cost benefits of the project. On the other hand, support by international funding sources is sought in cases where incremental costs of action cannot be balanced by sufficient national revenues.

**Ambitious mitigation targets, involving significant incremental costs, are typically conditional on international support. In the context of the RAC sector, this could include:**

- progress on global HFC phase-down and conversion of industries;
- training and certification of servicing with HFC alternatives;
- early retirement and exchange programs for inefficient RAC appliances;
- promotion of large scale investments in energy savings beyond actual economic feasibility;
- promotion of extensive investments in the use of renewables for RAC;
- adaption of RAC investment to (future) renewable supply infrastructures including thermal storage;
- internalisation of external costs of fossil based supplies in the national economy.

**Mitigation targets that involve significant additional co-benefits in the RAC sector are more likely to be unconditional and hence funded from domestic budgets, this could include for example:**

- improvements in the food chain (e.g. in India, China, Brazil etc.);
- reduction of costs of local energy supply and consumption;
- optimisation of co-benefits of reinvestments such as capacity or long-term risks;
- reduction of trade deficits and dependencies on imports;
- strengthening of local services, industries, production and productivity;
- initiation of necessary fiscal reforms on taxes, levies, subsidies;
- improvement of local capacities, productivity and quality of services and products;
- integration of RAC technology in renewable energy supply schemes;
- NDC management, implementation of low emission development strategies in the RAC sector (LEDS).

Against this backdrop, developing a finance strategy for the RAC sector requires the definition of sub-sector targets that align well with the overall NDC targets, and the identification of respective mitigation activities to achieve these targets. In this undertaking, it is useful to make transparent which activities are likely to be funded through domestic budgets and which, on the other hand, require international support.

## 5.2 IDENTIFYING AVAILABLE FINANCE SOURCES

When developing a RAC sector finance strategy, the mapping of existing finance sources at the domestic and international level that support direct and/ or indirect emission reductions can help matching identified needs with readily available resources, and uncover gaps that need to be filled using alternative or new finance sources.

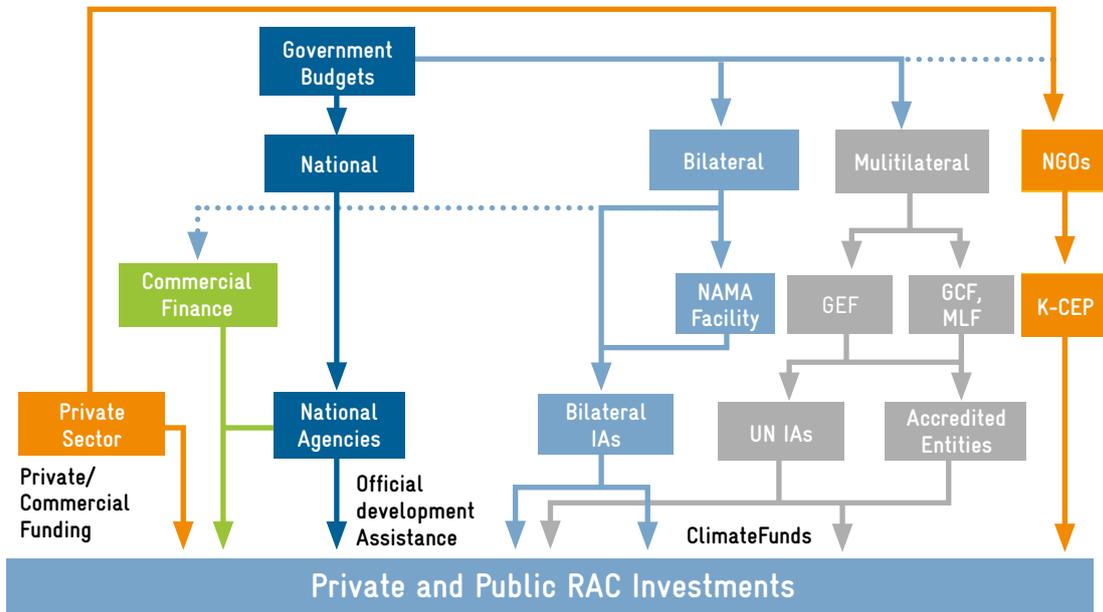
Based on the Kigali Amendment, **HFC reduction measures** in the RAC sector will in principle be funded as a compliance activity through the MLF, corresponding with their specific phase down targets from 2024, or respectively 2028 onwards. Early funding will be utilised by the MLF for enabling activities for countries to develop strategic preparatory activities for HFC phase down. In the light of this, the fast growth of the cooling demand requires an early strategy for managing the introduction of energy efficiencies.

A framework for implementation will be developed in the form of a national phase-down management plan for HFCs latest from 2020 onwards. This plan is open to include additional activities that are co-funded through other sources than the MLF. Following the time lag between now and the implementation of the HFC phase down, it is imperative that countries start early with the preparation and enacting of energy efficiency policies, regulation and incentive schemes in order to facilitate maximum synergies between HFC phase down activities and requirements for efficient design of products and equipments. In this respect, the external funding from outside the MLF is needed for initiation and facilitation of an energy efficient RAC sector transformation.

Depending on the scope of activities planned in the RAC sector and the range of financing instruments available in a country, it is advisable to complement compliance under the MLF with other local mitigation activities, including NAMAs or other internationally supported or domestic initiatives. For example, the RAC NAMA is a more wholistic concept than the MLF compliance mechanism and allows for the inclusion of other aspects, such as broad policy development for appliance efficiency. Figure 3 provides an overview of selected funding sources in the public and private sphere that traditionally support RAC sector investments or have the potential to do so in the future.



Figure 2: Overview of selected funding sources for RAC sector investments (HEAT, GmbH)



Therefore, a combination of measures of the MLF with a RAC sector NAMA is a possible way forward to effectively address emissions and maximise national co-benefits in the future. Apart from advancing HFC phase-down, a NAMA offers the opportunity to combine activities also with other **sector programmes**, such as:

- demand side management, such as appliance energy efficiency programmes;
- green buildings, green cities or green economy;
- energy use in the commercial sector;
- energy sector transformation;
- sustainable supply schemes;
- securing food and medical supply schemes;
- industrial process optimisation;
- co- or trigeneration of heat/cold;
- renewable energy storage.

It is important to note that substantial funding for HFC phase-down under the MLF will be provided only after 2020 and more intensively after 2024, in a stepwise process with some initial enabling projects between 2018 and 2020. Similarly, the GCF is still in a very initial stage of its operation and there is limited experience with the evaluation of its funding criteria and effectiveness.

### 5.3 UNDERSTANDING OPTIONS TO ACCESS FINANCE SOURCES

A financing strategy for the RAC sector needs to carefully assess and evaluate existing funding approaches and roles of the financing infrastructure. This section provides an overview on major elements that have been derived from various funding sources and activities in the RAC sector, including the role of government budgets, commercial banks, private and public investors. In addition, the applicability of financing instruments, such as conditional loans, revolving funds, grants, insurances or pooled purchases are reviewed in the context of the international finance sources and the specific compliance requirements for beneficiaries.

### 5.3.1 Issues to be considered when developing a funding proposal

In the context of the NDC process, RAC sector mitigation projects and programmes preferably address HFCs and energy efficiency of appliances, equipment and installations in an integrated manner<sup>5</sup>.

**The integration with NDCs requires the collection of information and data in the preparation of strategies and related funding proposals, in order to illustrate the full extent of sustainable low-carbon development in the RAC sector, including, among others:**

- the type and targets of proposed mitigation action;
  - whether activities are single standing, at subsector or sector level<sup>6</sup>
  - the projected mitigation levels and cost effectiveness (\$/tCO<sub>2</sub>) – the relation of both is illustrated by the marginal abatement cost curve (MACC) of a project
- the targeted co-benefits; any additional social or economic development meeting potential eligibility criteria of the financing sources<sup>7</sup> and the intention to combine or integrate mitigation with other objectives;
  - the extent to which projects strengthen the local economy in terms of capacity/skill building, manufacturing, trade balances (effects on export/import) and reduction of dependencies, facilitation of emission trading
  - how proposed activities leverage the quality of products/services and enhance competitiveness/business resilience of local manufacturers/service providers
- demonstration of how the activity is embedded in the national and sectoral policy context (including the NDC);
- the extent to which supportive policy reforms and rationalisation of regulations and incentives are implemented and benefit national development and mitigation;
- how concerns of investors are addressed, in terms of incremental costs, rate of return, opportunity and capital costs, equity needs and consequences for consumer prices;
- compatibility with the policies of financial sources, if full or co-funding is required, if ODA capable, eligibility of funds to meet environmental compliance of related agreements;
- the administration of funds, options for commercial finance, cost effectiveness in terms of functional output, need for grants, revolving funds, loans, guarantees securities;
- MRV capability, which is not only NDC relevant but may depend on the financial sources requirements (e.g. emission vs. consumption reporting).

A combination of the above aspects can be used to guide the development of a funding proposal and the identification of appropriate sources of finance. The listed aspects aim further to provide some basic orientation for the development of proposals that combine multiple funding sources, including public and private sector funding. However, it needs to be noted that financial mechanisms are constantly changing, with governing bodies and board members regularly modifying their policies. Therefore, these mechanisms must be understood as moving targets and any recommendation given has to be carefully considered and reconfirmed with the organisation concerned.

<sup>5</sup> HFC mitigation in a wider context also includes the mitigation of HFCs in other sectors, such as foams, fire protection, aerosols, HFC production and HFC by-product emissions (HFC-23), which are also funded under the MLF. HFCs are also linked to the mitigation of other high-GWP F-gases (non-HFC). Energy efficiency in a wider context is generally linked to building efficiency, including passive energy saving measures.

<sup>6</sup> Demonstration or large-scale projects, such as cooling of a large industrial or commercial complex (e.g. airports) are typically single standing projects. Sector approaches have certain advantages and are preferred to ensure larger scale of economies and to avoid market distortion, e.g. when all manufacturers or importers compete for a specific quality product or service. This will also help minimizing other negative effects such as dislocation or rebound effects that happens when incentive structures stimulate excess demand beyond business-as-usual. The MLF is a good example for illustrating the need for sector based financing. During its early times, the MLF used the project-by-project approach, which led to a steady increase of the consumption of controlled substances, partly because of a dislocation and increase of already funded productions. After the change to a sector funding approach, a rapid reduction of controlled substances was experienced.

<sup>7</sup> e.g. leveraging food security and incomes, creating jobs, local employment, capacity/skills developed, technical assistance, consumer benefits.

### 5.3.2 Typical funding criteria of major national and international finance sources

The potential criteria for selecting project proposals to be funded are divided into three major categories, in line with national and international practices in financing RAC sector action:

- **Type and target** of mitigation action;
- the targeted national **benefits, including three sub-sections: national development benefits, policy support, technology and market transformation;**
- choice of **financing instruments.**

The following analysis differentiates between relevant national finance sources, such as private sector equity, commercial banks finance and domestic public budgets, as well as relevant international finance sources. Funding streams are roughly divided into private investments, ODA or specific climate funds. The latter includes bilateral funding of state and non-state actors (such as the philanthropic fund K-CEP), while GEF, GCF, and MLF are typically implemented through their accredited entities, first and foremost the various development banks, the UN agencies and under the GCF to some extent also bilateral agencies or other non-state entities.

For a better overview, tables 3 to 7 below illustrate which activities in the three categories are likely to be funded through which finance source and can thereby help to select the most appropriate funding source for a specific project.

#### Reading the tables 3 to 7 below

The traffic light colours refer to the degree of relevance of finance in relation to the various demands: ● highly relevant, ● Medium, ● Low, ● Not relevant.

**Please Note:** The evaluation of the overall ranking, marked with golden stars (★) in the top row of each of the five sub tables only includes ratings that are relevant (excluding criteria marked with black traffic lights).

In order to understand the overall rating, it is important to review all criteria in the table that has been included as relevant under a specific financing source. Finance sources are divided into:

#### National finance:

- Private sector (Private)
- Public domestic budgets (Domestic)
- Commercial financing (Commercial)

#### ODA finance:

- Bilateral development cooperations (Bilateral)

#### Climate Finance:

- the German/UK/Danish/EU NAMA Facility & other bilateral NAMA initiatives (Nama Facilities) and international NGOs
- Global Environment Facility (GEF)
- Green Climate Fund (GCF)
- Multilateral Fund of the Montreal Protocol (MLF)

**Type and target of mitigation action**

The first table provides an overview of the specific relevance of the mitigation type and target to financing sources. For HFC mitigation this is relatively clear as the MLF has an exclusive role here. In the case of other F-gases and their disposal, the GEF and bilateral funds have supported investments in the past, while the MLF contributes only marginally to the institutional management of waste HFCs. With regard to buildings and energy efficiency, the bi- or multilateral development banks that are accredited to the GCF could be a feasible option in conjunction with private sector participation. In case the proposed activities require complex MRV systems, the GCF will potentially provide support. Private sector participation is generally stronger in the field of buildings and energy efficiency. Compliance related funding needs are addressed by financial mechanisms of the relevant Multilateral Environmental Agreements (MEAs). The total reduction and/or its specific cost effectiveness of an activity is often an important criterion for accessing some of the climate funds.

**Table 3: Type and target of mitigation action**

Financing Sources	National Finance			ODA	Climate Finance			
	Private	Domestic	Commercial	Bilateral	NAMA Facilites	GEF	GCF	MLF
<b>Financing mitigation</b>	★★	★★★★	★★	★★	★★★★	★★	★★★★	★★
HFC mitigation	●	●	●	●	●	●	●	●
Other F-gases (non HFC) & Disposal	●	●	●	●	●	●	●	●
Energy efficiency	●	●	●	●	●	●	●	●
Building efficiency	●	●	●	●	●	●	●	●
MEA Compliance requirements	●	●	●	●	●	●	●	●
Supporting MRV capability	●	●	●	●	●	●	●	●

**Integrating national development with climate action**

If the mitigation activities benefit also development objectives, ODA funding such as bilateral co-operation could be an important source. The extent to which climate action integrates sustainable development benefits is partly determining the choice of the financial mechanisms. Some climate funds could be stronger linked to environmental compliance than others. Among the climate funds, bilateral funding institutions and the GEF are more likely open to include funding for co-benefits, such as elements of the green economy.

In cases where high consumer benefits are expected for example in the case of energy efficiency, national institutions such as commercial banks or domestic private and public funders are a likely funding source. Where co-benefits associated with the RAC sector include food security (cold chain), education, skill development, employment, formalization of informal jobs or an increase of local manufacturing capacity, national institutions at the government, provincial or municipal levels are likely to show interest.

It is interesting to note that, even if there is no measurable mitigation impact, technical assistance and capacity building is sometimes also supported by dedicated climate funds.

Table 4: Integrating national development with climate action

	National Finance			ODA	Climate Finance			
Financing Sources	Private	Domestic	Commercial	ODA	NAMA Facilites	GEF	GCF	MLF
Financing Co-Benefits	★★	★★★	★	★★★★	★★★★	★★	★★★	★★
ODA capability	●	●	●	●	●	●	●	●
Co-Benefits/ Integrated Action	●	●	●	●	●	●	●	●
Consumer benefits	●	●	●	●	●	●	●	●
Food security/ health	●	●	●	●	●	●	●	●
Education/capacity building	●	●	●	●	●	●	●	●
Job creation/local employment	●	●	●	●	●	●	●	●
Informal sector integration	●	●	●	●	●	●	●	●
Increase local manufacturing	●	●	●	●	●	●	●	●

### Financing policy measures

The financing of policy measures typically depends on the availability of domestic budgets. Additional support is generally provided where enhanced policy implementation leads to early mitigation action, justifying additional funds, e.g. as in the case of rapid ratification of multilateral environmental agreements.

While the MLF supports the regulation of consumption and production of controlled HFCs, other financing institutions such as GEF or the Nama Facility enable legislative action and incentive systems for energy conservation. Apart from national budgets, integrating NDC processes may be relevant to GCF funding, but may also attract NAMA finance and to some extent ODA funding.

Overall, bilateral climate initiatives offer the most flexible approach for co-financial support to national policy setting, while the GCF and MLF have a stronger focus on climate policy. For example, the MLF finances specific schemes for nationally certified codes of RAC servicing practices.

In general, co-financing is often catalytic to funding agreements, e.g. where it motivates national actors or banks to contribute funds. Commercial finance is relevant to implement green public procurements.

Table 5: Financing policy measures

Financing Sources	National Finance			ODA	Climate Finance			
	Private	Domestic	Commercial	Bilateral	NAMA Facilites	GEF	GCF	MLF
Financing Policy action	–	★★★★	★	★★★	★★★	★★	★★	★★★★
Sector wide approach	●	●	●	●	●	●	●	●
NDC Process support/capacity Building	●	●	●	●	●	●	●	●
Policy reforms & rationalisation	●	●	●	●	●	●	●	●
Standard and Norms development	●	●	●	●	●	●	●	●
Public Procurement	●	●	●	●	●	●	●	●
Trade balance/dependencies	●	●	●	●	●	●	●	●
Green growth strategies	●	●	●	●	●	●	●	●

### Technology and market transition

Technology and market transition is typically at the core of any mitigation activity. Investments in production and manufacturing are essential for greening of the sector. Ideally, new products entail a number of new benefits for both environment and society, especially for consumers. This is a likely scenario in the RAC sector and many of the technical alternatives are in fact more efficient, durable, functional, competitive in pricing and with lower running costs than their predecessors.

Quality in the RAC sector comes at a cost and requires back-up infrastructure of services that do not yet exist in many countries. A lack of technical assistance and skills development has often led to failure of investment programmes in the past. Banking institutions often fail to understand the complexities of applying alternatives under local circumstances. Under the MLF, this has been a long learning process and over time the fund has gradually increased its support for building capacities and infrastructure. Typically, bilateral institutions with extensive experiences in technology cooperation are very well suited to assist such transitions.

The private sector has a crucial role in establishing the local infrastructure and supplies for climate friendly quality products and multinational manufacturers can be crucial to create enabling environments for local supplies and capacities. Financing of industrial conversions complies more easily with the business model of multilateral funds, such as the GCF, GEF and MLF. Qualitative measures targeting improved skills, business planning and product strategies, technical assistance and engineering are typically financed through institutions with a focus on ODA.

Table 6: Technology and Market transition

Financing Sources	National Finance			ODA	Climate Finance			
	Private	Domestic	Commercial	Bilateral	NAMA Facilites	GEF	GCF	MLF
Market & technology transitions	★★★	★★	★★	★★★	★★★★	★★	★★	★★
Leverage of quality products/services	●	●	●	●	●	●	●	●
Price reductions	●	●	●	●	●	●	●	●
Competitiveness/business resilience	●	●	●	●	●	●	●	●
Capacity/skills development	●	●	●	●	●	●	●	●
Technical assistance Engineering	●	●	●	●	●	●	●	●
Materials Production/Refinement	●	●	●	●	●	●	●	●
Manufacturing conversion/qualification	●	●	●	●	●	●	●	●
Procurement support	●	●	●	●	●	●	●	●

### Financial instruments

In the last table, potential funding sources are evaluated according to their ability to deliver certain instruments to effectively channel and deliver financial support.

Grant funding is specifically required in situations where opportunity costs or incremental costs of technology transfer are high. Banks operating under the GCF are well experienced to deal with this. Few of the organisations limit the overall access to funding on country or sector basis.

The administration of smaller funds is often a problem and some finance instruments are better suited than others. Some institutions are open to manage risks of high capital costs or equity requirements, while others may prefer to work through local banks. The same can be said for grants, loans and guarantees, which often are very specific to the funding institution. Therefore, the selected type of financing instrument has often an influence on the choice and source of funding.

Table 7: Financial Instrument

	National Finance			ODA	Climate Finance			
Financing Sources	Private	Domestic	Commercial	Bilateral	NAMA Facilites	GEF	GCF	MLF
Finance Modalities	★	★★	★★★	★★	★★	★★	★★★	★★★★
Adress opprtunity-costs	●	●	●	●	●	●	●	●
Incremental costs compensation	●	●	●	●	●	●	●	●
Agreed country or reduction mitigation	●	●	●	●	●	●	●	●
Capital costs: local vs. international	●	●	●	●	●	●	●	●
Equity requirement	●	●	●	●	●	●	●	●
Administration of small funds	●	●	●	●	●	●	●	●
Support for local commercial finance	●	●	●	●	●	●	●	●
Grant requirements	●	●	●	●	●	●	●	●
Soft Loans, Guarantees etc.	●	●	●	●	●	●	●	●

## 5.4 SELECTED EXAMPLES OF INTERNATIONAL FUNDS

While the previous chapter evaluated criteria on a more general level, the following chapter will describe funding criteria and focus on four main international funds. It can be used to identify potential complementarities and options for combined funding.

The GEF, GCF, NAMA Facility and MLF all work essentially towards similar environmental objectives, however, in terms of funding approaches there are substantial differences. GEF, GCF and NAMA Facility support the incorporation of development aspects and co-benefits to a varying degree, whereas the MLF focuses almost exclusively on support for compliance.

Table 8: Focus of relevant funds

	GEF	GCF	MLF	NAMA Facility
<b>Environmental Focus</b>	FCCC, Biodiv, Desert, etc.	FCCC	MP	FCCC
Required compliance mechanism		(+)	+++	
Assigns entitled country budgets	++		+++	
Works on agreed reductions principle	+	++	+++	++
Funding of Co-Benefits	+++	++		++
<b>Mitigation aspects</b>				
HFC use	+	+	+++	++
Energy efficiency applications	+	++	+	+++
Building efficiency	+++	+++		+++
<b>Policy action</b>				
Chemicals Policies	+	+	+++	+
Energy Policies	+++	+++		+++
Institutional capacity building	++	+	+++	++
Integration NDC Process	+++	+++		+++
Development, Public procurement	+++	+		++
Technical Standards and Norms	+++	++	+++	+++
<b>Development, Market &amp; Technology</b>				
Materials Prod./Refinement industries			+	
Manufacturing conversion/qualification	++	+	+++	++
Servicing sector qualification	+	+	+++	++
Operator/End User conversion/qualification	+++	+++	(+)	+++
Recycling/Disposal conversion/qualification	+		+	+
Engineering	++	+	+++	++
Technical assistance	++	+	+++	++
Sector wide Management	+	+	+++	++
<b>Financial Instruments</b>				
Grants	++	++	+++	++
Loans, Guarantees, etc.	++	+++		+++
Finance sector support	++	+++		+++
Market instruments	++	+++	+	+++
Financial Capacity Building	++	+	+++	++
Procurement	+	+	+++	++



# 6

## CONCLUSIONS

- ❖ **The RAC sector is a rapidly growing sector that offers highly cost-effective mitigation potentials.** Nevertheless, these mitigation potentials remain largely untapped. As countries prepare to implement their NDCs and meet individual targets, it is important to stress the relevance of the RAC sector for overall NDC achievement and promote ambitious, sectoral mitigation action in the national and international climate discourse.
- ❖ **The RAC sector falls within the scope of two international regimes, the ozone and the climate regime.** With a view to financing sustainable RAC sector transformation, finance flows from different national and international actors and budgets that seek to implement these two regimes must be aligned and integrated in order to exploit the full mitigation potential that exists in the RAC sector and its subsectors.
- ❖ **The Kigali Amendment to the Montreal Protocol is a first step towards the integration of the two regimes at the global level.** While it extends the mandate of the MLF to finance the phase-down of HFCs alongside the phase-out of HCFCs from 2020 onwards, financial support primarily addresses production and consumption of those substances and thus direct HFC emissions in the RAC sector. For substantial mitigation of indirect emissions from energy use, the sector-wide approach of the MLF could be adopted by other funding mechanisms interested in collaborating in the field of energy efficiency. The integration and coordination of national and international finance flows offers outstanding synergetic benefits to effectively cover HCFC phase-out, HFC phase-down, energy efficiency and CO<sub>2</sub> reduction for a sustainable, long-term transformation in the RAC sector at large. As such, it could be a precedence for the implementation of the 1,5° target in other sectors as well.

- ◉ **A comprehensive finance strategy should be based on careful analysis of local barriers, needs and costs, to identify appropriate instruments to enable mitigation action in the RAC sector.** While international support is key to helping developing countries leverage the full potential of RAC sector mitigation, enhanced action must, first of all, take place at the domestic level. Financial support from national and international budgets can only help overcoming specific barriers, and it is of key importance that finance is embedded in a broader set of policy interventions that address the identified barriers more comprehensively.
- ◉ **A RAC sector finance strategy on country level should outline a clear breakdown of action, impact and contributions to be made by national budgets, international support and the private sector.** The primary role of the national public sector is to create an enabling environment which supports the mobilisation of mitigation action and related investments and finance from other sources, specifically the private sector. With a view to the level and range of investments required for energy efficiency measures, and the marginal contribution for energy efficiency from the MLF, it is particularly important that governments build up supportive frameworks to complement additional efforts and funds for energy efficiency improvements.
- ◉ **Private sector engagement is key for long-term, low-carbon development in all sectors, including the RAC sector.** Once barriers for private sector investments have been lifted, private finance has the potential to significantly scale up and sustain the required investments, e.g. in the form of project development, commercial financing, public-private co-financing or engagement in project or sector related market mechanisms.
- ◉ **The inclusion of development issues in RAC sector financing is an incentive for national stakeholder engagement and produces multiple benefits.** Strategies may also address local issues such as food and job security, cost reductions for imports, energy and services, improved productivity, availability and quality of services and products, support of NDC management and initiation of related legal reforms.
- ◉ **Enhanced coordination of finance flows under the ozone and the climate regime, including funding under the MLF, GCF, GEF, NAMA Facility and development banks, can increase effectiveness of international mitigation efforts in the RAC sector.** Many multilateral and bilateral development banks and funds have a broad project portfolio, including energy efficiency and renewable energy projects that could be strategically aligned with other efforts in the RAC sector to integrate financing of ozone and climate benefits. This needs political support of the bi- and multilateral stakeholders involved, as well as coordinated action of donors and beneficiaries throughout the various technical and financial working groups of relevant financing mechanisms. This could be effectively supported through shared dialogue platforms that help to facilitate a regular exchange of information on funding activities between different finance mechanisms and help identifying gaps and potential for further synergies.

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## ANNEX

## Overview: Main funds and sources of further information

Finance Institutions	Sources of information
UK/ Germany/DK/EU NAMA Facility	<a href="http://www.nama-facility.org">http://www.nama-facility.org</a>
Global Environment Facility	<a href="http://www.gef.org">http://www.gef.org</a>
Germany (ICI)	<a href="https://www.international-climate-initiative.com">https://www.international-climate-initiative.com</a>
UK (ICF)	<a href="https://www.gov.uk/government/publications/international-climate-fund">https://www.gov.uk/government/publications/international-climate-fund</a>
Denmark (Global Climate Partnership, GCPF)	<a href="https://www.gcpf.lu">https://www.gcpf.lu</a>
European Union and European Commission (GEEREF, LAIF, AIF)	<a href="http://geeref.com/">http://geeref.com/</a> <a href="http://ec.europa.eu/europeaid/policies/innovative-financial-instruments-blending/blending-operations_en">http://ec.europa.eu/europeaid/policies/innovative-financial-instruments-blending/blending-operations_en</a>
Australia	<a href="http://dfat.gov.au/aid/topics/investment-priorities/building-resilience/Pages/building-resilience.aspx">http://dfat.gov.au/aid/topics/investment-priorities/building-resilience/Pages/building-resilience.aspx</a>
France (AFD, FFEM)	<a href="http://www.afd.fr/home/projets_afd/changement_climatique">http://www.afd.fr/home/projets_afd/changement_climatique</a>
NEFCO (NCF, NPI)	<a href="https://www.nefco.org/">https://www.nefco.org/</a>
Green Climate Fund	<a href="http://www.greenclimate.fund/">http://www.greenclimate.fund/</a>
Multilateral fund of the Montreal Protocol	<a href="http://www.multilateralfund.org/default.aspx">http://www.multilateralfund.org/default.aspx</a>
Kigali Cooling Efficiency Program	<a href="https://www.k-cep.org">https://www.k-cep.org</a>
African Development Bank (AfDB)	<a href="http://www.afdb.org/en/topics-and-sectors/sectors/climate-change">http://www.afdb.org/en/topics-and-sectors/sectors/climate-change</a>
Asian Development Bank	<a href="http://www.adb.org/">http://www.adb.org/</a>
Clean Energy Program	<a href="https://www.adb.org/sectors/energy/programs/clean-energy-program">https://www.adb.org/sectors/energy/programs/clean-energy-program</a>
Energy for All Initiative	<a href="http://www.adb.org/site/funds/funds/clean-energy-financing-partnership-facility">http://www.adb.org/site/funds/funds/clean-energy-financing-partnership-facility</a>
Poverty and Environment Program Caribbean Development Bank	<a href="http://www.caribank.org/programmes/sdfu/disastersclimate-change">http://www.caribank.org/programmes/sdfu/disastersclimate-change</a>
Disaster Risk Management and Climate Change Central American Bank of Economic Integration	<a href="http://www.bcie.org">http://www.bcie.org</a>
European Investment Bank (EIB) Climate Action	<a href="http://www.eib.org/projects/priorities/climate-action/index.htm">http://www.eib.org/projects/priorities/climate-action/index.htm</a>

Finance Institutions	Sources of information
Inter-American Development Bank	<a href="https://www.iadb.org/en">https://www.iadb.org/en</a>
Islamic Development Bank (IDB)	<a href="http://www.isdb.org">http://www.isdb.org</a>
International Bank for Reconstruction and Development (The World Bank)	<a href="http://www.worldbank.org/en/topic/climatechangeClimate">http://www.worldbank.org/en/topic/climatechangeClimate</a>
Projects and Operations	<a href="http://www.worldbank.org/projects">http://www.worldbank.org/projects</a>
Carbon Funds and Facilities	<a href="http://www.worldbank.org/en/topic/climatechange/brief/world-bank-carbon-funds-facilities">http://www.worldbank.org/en/topic/climatechange/brief/world-bank-carbon-funds-facilities</a>
CleanTechnologies	<a href="http://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/cb_home/cleantech_investment_areas">http://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/cb_home/cleantech_investment_areas</a>

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