International Climate Initiative 2019

Programme proposal

to the

Federal Ministry for the Environment, Nature Conservation, and Nuclear Safety (BMU)

COOL ME - Scaling up sustainable COOLing in the Middle East

submitted by

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Place, date	Legally binding signature Daniel Becker, Director

1 Brief description

1.1 Structured brief description	MENA countries face a range of energy challenges against the visible effects of climate change due to rapidly growing urbanisation, and heavily strained energy infrastructure. In the region, cooling constitutes a major source of energy consumption and it is expected to grow further. The COOL_ME programme promotes accelerated technological change in cooling demand reduction, and early implementation of the Kigali Amendment and Paris Agreement in Egypt, Jordan, Lebanon and Turkey. Our approach is based on four pillars: • Reducing cooling demand; • Supporting the phase-down of hydrofluorocarbons (HFCs); • Replacing and safely disposing inefficient cooling appliances and refrigerants; • Improving cooling appliance operation, training, and awareness. Long-term effects will be ensured by clear programme governance and strong participation of the local partners in each country. Our consortia and extended network will use findings of replicable demonstration projects to disseminate knowledge.

2 Programme concept

2.1 Starting situation and challenges

With energy demand expected to increase 50% by 2040[1], MENA countries face a range of challenges in the face of climate change. The region's energy challenges also include rapidly growing populations, urbanisation, and heavily strained energy infrastructure. Cooling represents a major source of energy consumption in the region – typically more than 50% in air conditioning-equipped households. The use of cooling is expected to grow further since, with an improved standard of living, more households are using air conditioning (AC) systems that are often operated and inefficient. Furthermore, inevitable impact of climate change is expected in this vulnerable region with rising average temperatures by 2°C by 2050 coupled with increased humidity, need for intensive cooling.

The COOL_ME programme activities will be conducted in Egypt, Jordan, Lebanon, and Turkey. All Partner countries experience fast-growing demand for cooling, increasing overall final energy consumption, and structural energy sector challenges.

There is high potential to improve energy efficiency and boost the utilisation of natural refrigerants in cooling and refrigeration, particularly in the building sector. However, gaps in the regulatory framework, technical capacity, and financing models as well as the lack of direct cost-savings by use of natural refrigerants affecting end user willingness towards these technologies prevents actions from moving forward. Therefore COOL_ME focuses on accelerating uptake of sustainable cooling in COOL_ME partner countries. Within the scope of COOL_ME, sustainable space cooling and refrigeration systems means residential AC and commercial air-conditioning and refrigeration (RAC) focusing on solutions with natural refrigerants (hydrocarbonates like Propane (R290) or Isobutane (R600a), Carbon dioxide (CO_2), -R-744, Ammonia (NH3)-R-717, Water -R-718, Air-R-729, , and not-in-kind alternatives, cooling technologies without compression and decompression process and which therefore do not require refrigerants that also maintain high energy efficiency requirements and preferably make use of renewable energy (e.g. solar cooling, district cooling). Despite their low global warming potential (GWP), Hydrofluoroolefin refrigerants (HFO) are excluded from the project scope due to their potential adverse effects on environment and human health.

2.1.1 Starting situation in the target region/ target countries	This section describes the framework conditions and eventual barriers to achieving the programme goal and its impacts. **<u>Turkey</u>** The Government of Turkey established regulations to support the phaseout of ozone-depleting substances (ODS). The phaseout includes harmonising customs codes for ODS and ODS blends with those of the EU and limiting HCFC imports to servicing purposes and the manufacturing of domestic AC to be exported to Article 5 countries. In January 2018, Turkey created a fluorinated-gases (F-gases) regulation. In the buildings, appliances, and equipment sectors, Turkey coordinated its energy efficiency regulations, standards, and labels with those in the EU framework. Turkey needs to ensure minimum energy performance standards (MEPS) and label-

[1] British Petroleum. BP Energy Outlook 2018; Report; British Petroleum: London, UK, 2018.

	ling policies are updated in line with future revisions of the EU Eco-design framework. The preparatory phase identified that ensuring EU alignment of current MEPS relevant to RACs is essential in Turkey. Turkey's 2018 National Energy Efficiency Action Plan (NEEAP) refers to cooling in Goal B6, to "increase energy savings and use of renewable energy for heating and cooling by switching to central and district heating systems in mass housing complexes and large settlement units." The Ministry of Environment has a strong dialogue with the industry and challenges are expected to the update of regulation and monitoring enforcement activities. During the preparatory phase, the Ministry of Environment and Urban Planning mentioned their acknowledgement of the COOL_ME programme and agreed that additional complementary actions are needed to fully comply with requirements under the Kigali Amendment. A lack of specific targets for cooling demand reduction in NDC and lack of a national cooling strategy also hinder the cooling sector's transformation to an efficient, sustainable pathway. Turkish financing institutes – in particular, commercial banks and leasing companies – have an established track record and products that target energy efficiency investment. However, financing for sustainable cooling and refrigeration applications is niche. While cooling investments have taken their share of financing as a part of an energy efficiency investment project, they are generally not classified separately under that title. Heating, Ventilation and Air conditioning (HVAC) investments that are covered as a part of a whole package under energy efficiency project also seem to focus on the reduction in energy consumption rather than on the reduction of HFC gases or installation of natural refrigerant-run systems. Turkey is an important, emerging actor for the EU and Middle East HVAC markets. Low-GWP alternatives are already used by manufacturers, mainly for the units that are exported to the EU where the demand for low-GWP alternatives has been triggered by the EU F-gas regulation. The market uptake of low-GWP alternatives in the domestic market is slow. There is a need for practical trainings on natural refrigerants (including flammable refrigerants, high pressure) for service technicians. In Turkey, three demonstration projects for alternatives to HFCs were funded by the MLF and implemented by United Nations Industrial Development Organization (UNIDO) in 2019. They include one propane chiller, one ammonia refrigeration system, and one chiller with hydrofluoro-olefin (HFO) refrigerants. The energy efficiency and performance monitoring of these systems has only been conducted for several months (starting at the end of 2019). Requirements based on relevant EU legislation for RAC technician trainings are being adopted and curricula are being updated accordingly. Vocational training facilities within the country planned to be equipped with tools for trainings on flammable refrigerants under the current HPMP (UNIDO). Training materials for technicians were developed and two train-the-trainer workshops for RAC technicians based on EU requirements were performed under the EU F-gas project in 2018-2019. For policymakers, several workshops on the Kigali Amendment and the EU F-gas regulation were held within the Kigali Amendment enabling activities project (MLF-funded) and the EU F-gas project. Although the contents of these trainings included information on alternatives to F-gases, most trainings currently offered by industry associations relate mainly to ODS or HFC-based equipment. Trainings relating to F-gas free alternatives are uncommon and largely theoretical. The limited content and theoretical approach mean that there are few opportunities for service technicians to gain practical experience on systems and installations that contain natural refrigerants or other low-GWP alternatives (including flammable refrigerants, high pressure). As a result of the activities under the second tranche of HPMP of Turkey on the enforcement of the new technician certification system, a total of 25 state-owned vocational schools have trained an average of 400 technicians per year within the framework of the certification scheme. Each centre is receiving a kit that contains recovery units and tools for training purposes. Mandatory certification for handling HFCs is the main focus with the current requirements for HCFCs. End user awareness and acceptance of natural refrigerants is low, which is considered a major obstacle for uptake of the technologies. Major drivers of decision-making include trust in the technology and cost of equipment.

	Jordan Jordan ratified the Kigali Amendment on October 16, 2019[2] and was the first Middle Eastern country to do so. The National Ozone Unit (NOU) at the Ministry of Environment (MoEnv) is responsible for implementing the Montreal Protocol in Jordan. During COOL_ME preparatory phase meetings, the MoEnv confirmed that Jordan will take the necessary steps to prepare for its international commitments. While the MoEnv informed national stakeholders from politics, industry, and associations about the Kigali Amendment and its future implications, no national legislation addressing HFCs in the implementation of the Kigali Amendment is in place. The MoEnv and other stakeholders consider an HFC or fluorinated gas (F-gas) legislation a necessity to implementing international commitments. To reach NEEAP's energy efficiency targets, policy modules that address cooling appliances in the residential sector and the use of renewable energy have been enforced. Jordan's nationally determined contributions (NDCs) have not included the cooling sector up to this point. COOL_ME will focus on supporting the development of a legislative framework to implement the Kigali Amendment and assisting the development of a licensing system where certification schemes for quota monitoring of imported cooling equipment are applied. Jordan has MEPS under development. In Jordan, the focus will be on assisting the Jordan Standard and Metrological Organization in updating national MEPS for RAC using natural refrigerants. MENA's economic and political instability has generally led to a risk-averted market situation in Jordan: higher initial implementation costs for efficient HFC-free technologies increase the (perceived) investment risk despite proven long-term savings compared to standard systems. This is similar for technology providers and end users. Technology providers, retailers, and other investors lack suitable financing mechanisms because most banks have little experience in and awareness of energy efficiency and need assistance with risk analysis and mitigation to achieve bankability. The lack of suitable financing mechanisms is paired with a lack of expertise to develop business models for energy-efficient cooling projects. A demonstration project was conducted in a public supermarket in Jordan using a CO_2-based refrigeration system. The installation is much more efficient compared to the old R22 system but has low replicability. NOU and UNIDO's (under scope of MLF) ongoing efforts include a set of training and capacity building activities that aim to reduce the use of HCFC-22. Examples of the proposed activities including training for inter alia customs officers, metrological and standard organisation, updating and developing training courses for technicians and vocational schools, and developing certification regulations for the service sector. The trainings do not include all details on natural refrigerants; however, these efforts create an initial training capacity structure that COOL_ME can build upon. Other potential action points identified within COOL_ME trainings include the lack of technical knowledge on the relationship between energy efficiency and the use of refrigerants and the technical regulations related to the energy performance of RAC equipment. Within ongoing efforts by NOU and UNIDO (under the scope of MLF), a set of training and capacity building activities were proposed to reduce the use of HCFC-22. VET addressing activities include updating and developing training courses for technicians and vocational schools. A major obstacle to the uptake of sustainable cooling is the limited awareness of energy-efficient cooling benefits, which can compensate initial high investment costs and low acceptance of natural refrigerants. Contributing to this lack of awareness is the limited number of examples that prove the feasibility of sustainable cooling solutions. There is also a lack of clarity on safety aspects. **Lebanon** The Lebanese Government ratified the Kigali Amendment to reduce HFCs consumption on February 5, 2020. Two parallel projects for accelerating sustainable cooling are underway: • Lebanon is preparing a national cooling plan and minimum energy performance standards (MEPS) for cooling systems in the framework of the Kigali Cooling Efficiency Programme funding programme.

[2] https://www.coolingpost.com/world-news/jordan-is-first-middle-east-country-to-ratify-kigali/

	• Lebanon is establishing the first HVAC testing facility in Lebanon under the framework of the national heat pump project financed by the Italian Ministry for the Environment, Land and Sea. Cooling is not yet included in Lebanon's NDC and the NEEAP. There is no F-gas/HFC regulation in place, and so an HFC reporting procedure is not set up. The building code lacks requirements for the energy efficiency of cooling systems. Coordination can be strengthened among institutions that work on energy efficiency, climate change, and F-gases. Limited awareness of the benefits of cooling systems using natural refrigerants and low acceptance of natural refrigerants from the industry and end users are major barriers for greater implementation of sustainable cooling technologies. The Lebanese standards institution, LIBNOR, will update their cooling standards for domestic AC (RAC) sectors to include natural refrigerants. Under the K-CEP financed programme, LIBNOR is expected to publish those standards in 2020. As part of the NOU/UNDP activities, a train-the-trainers programme and a certification programme was created to address issues related to the use of flammable refrigerants. Private technical education institutions include the C.I.T. (a Higher Technical Institute) and the Al Kafaat University (AKU), which offer courses in AC. Currently, there is no plan established to train service technicians and installers of RAC equipment. No certification programmes for service technicians exist in Lebanon. Knowledge gaps in training for service technicians, suppliers and installers appear to exist in the countries' RAC sector, particularly with respect to the handling of natural refrigerants. The lack of knowledge on handling and servicing of natural refrigerants hinders the successful long-term penetration of such technologies into the market. This is vitally important for technicians so that they will be able to service & maintain equipment using flammable refrigerants. For example, in Lebanon, frequent electricity cuts cause reduced lifetimes of RAC equipment. Due to a lack of technical skills on the handling of flammable refrigerants, existing equipment appears to be often converted from natural refrigerants back to high GWP HFC technology (e.g. R600a domestic refrigerators being converted to R134a). As part of NOU and UNDP activities, five to six public vocational schools are working to strengthen their knowledge on the use and handling of flammable refrigerants. In Beirut, the public vocational school just opened a RAC training centre, which was established with support of UNIDO. Political instability and the macroeconomic situation have considerably slowed lending activities. The high market interest rates and the slowing growth of the real estate sector have a significant impact on the business case of technologies in COOL_ME. **<u>Egypt</u>** Egypt is committed to the Montreal Protocol and to implementing the relevant Programmes of the National Environmental Action Plan. The country is in the process of ratification Kigali amendment, currently the documents are under review from the Ministry of Foreign Affairs. National Ozone Unit and the Egyptian Organization for Standardization and Quality have a collaboration protocol for the development and update of 19 new standards for the safety of freons/refrigerants. An enforcement plan is needed for the existing and newly developed standards and codes. Egypt has a large cooling equipment manufacturing sector dominated by local manufacturers. Refrigerants are currently imported. Egypt commonly use HCFC-22 for refrigeration and HVAC. Some local manufacturers of HVAC and refrigeration systems start shifting from HCFC-22 to R-410A. Although technical capacities exist, in the current market, efficient compressors for HVAC and refrigeration systems are imported while local manufacturers manufacture less efficient compressors for fridge and local HVAC units. While refrigeration technologies, refrigerators, deep freezers, cold rooms, water dispensers are matured and dominated by local industry and there is a high opportunity to upgrade product quality and increase knowledge on energy efficiency and natural refrigerants There is no F-gas/HFC regulation in place, and so a HFC reporting procedure is not set up. According to NOU, Egypt has not started yet the development of a National

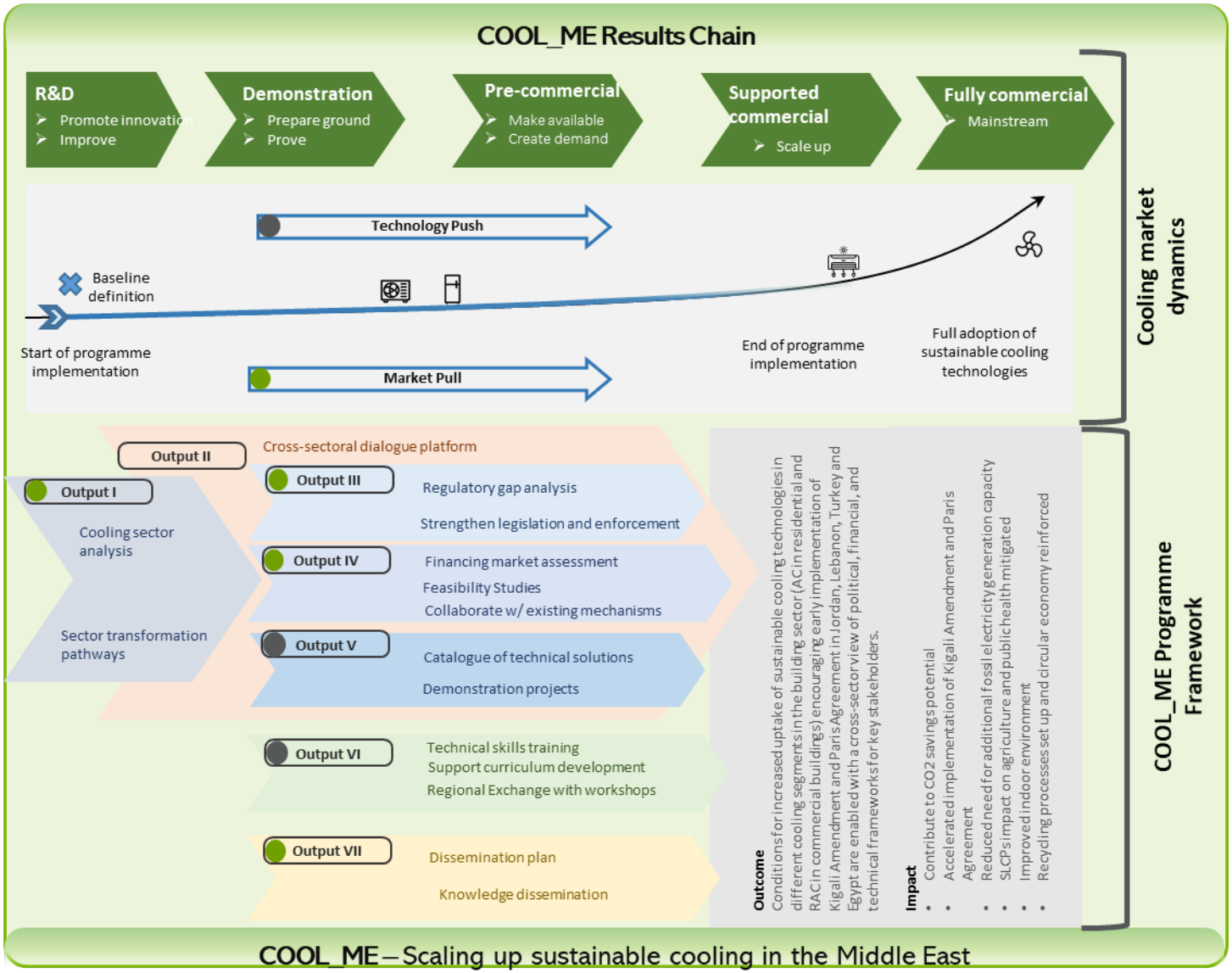
	Cooling Strategy. There are no specific targets for cooling demand reduction in Intended nationally determined contributions (INDC) but mitigation actions can have direct application in the cooling sector. Training programmes offered by different entities were identified for the codes, standards, and technicalities. However, these programmes require updates to focus on sustainable cooling technologies and natural refrigerants that target the previously specified stakeholders. Training installers and technicians is lacking, and focus needed on the safety measures for the installation and maintenance of new equipment (flammable refrigerants). A mandatory certification system is not in place for relevant stakeholders that are involved in handling the refrigerants to avoid purging of any harmful refrigerants into the atmosphere. The country has opened the first three of eight technological universities (to fill the gap between academic universities and technical schools by providing mid-range capacities and experts). In addition, the Center of Excellence for Energy, Ain Shams University with Massachusetts Institute of Technology (MIT) is working on project to develop energy programmes (undergraduate, postgraduate, and tailored continuous education modules). Some financial development projects are at their early stages of implementation aiming to construct a sustainable financing mechanism for EE measures in residential and commercial buildings within the upcoming two or three years. Appetite for financing sustainable cooling technologies for the residential and commercial sectors is not the same as financing EE measures for the industrial sectors which is seen in many banks in Egypt. The green banking methodologies are currently adopted in many areas around the world and they are anticipated to be effectively implemented in Egypt very soon especially with the rapid increase of electric tariffs and the removal of subsidies. Financing schemes for sustainable cooling should be equipped with tools to assess the applicability of technologies in the Egyptian market, minimum energy performance metrics, and the anticipated savings associated with these technologies. There are many technology providers, manufacturers, and suppliers in Egypt that could provide a wide range of sustainable cooling technologies; however, there are no obligatory codes in Egypt that could enforce the use of sustainable cooling technologies in the residential and the commercial building sectors. Availability of these tools and the lack of any enforcement are the main gaps facing the finance of sustainable cooling technologies. In Egypt, K-CEP is a strongly related programme that supports the acceleration of the ratification to Kigali and focuses on creating co-benefits and conducting research in the field rather than carrying out implementation projects. COOL_ME will build up on K-CEP learnings about the potentials in Egypt.
2.1.2 Programme integration into strategies of the target country	COOL_ME activities will be closely linked to the policy goals, strategies, plans and programmes in the partner country as well as to international processes. The project will contribute to following policy, institutional changes. It contributes to SDGs: 7, 8, 9, 11, 12, 13, 17. Policy and legal framework: • Accelerate NDC commitments: NDCs of Turkey, Lebanon, and Egypt do not have specific targets or actions related to cooling demand reduction or refrigeration and air conditioning (RAC) sector. In Jordan's NDC, expanding the use of solar cooling in commercial and industrial facilities is included as a sectoral action under the energy sector. However, all COOL_ME partner countries indicated that they are willing to engage in voluntary actions ahead of the Kigali Amendment's schedules and accelerate their NDC commitments. COOL_ME will create country frameworks through its recommended actions to translate the Kigali Amendment into countries' conditions. • Develop or improve regulation and enforcement: Efforts are ongoing in all Partner countries to develop national regulations on energy-efficient cooling. In Jordan, Lebanon, and Egypt, there is no national legislation in place yet for the implementation of the Kigali Amendment that addresses HFCs. As a candidate country of the EU, Turkey aims to achieve full harmonisation with the EU acquis. On 4 January 2018, Turkey created a national F-gas regulation that is in line with core aspects of the previous EU F-gas regulation 842/2006.

	COOL_ME will support partner countries in policy activities relating to existing regulatory frameworks for the development, uptake, and mainstreaming phases of sustainable cooling technologies. COOL_ME programme activities described under Output III aim to use the policy stimulus (aligned with Outputs IV and V), and to help develop policy interventions to contribute to the early implementation of the Kigali Amendment. Partner countries also develop their application by setting enforcement and monitoring plans with a flexible adaptive management approach. • Multilateral funding (MLF): All COOL_ME partner countries, Egypt, Jordan, Lebanon, Turkey, ratified the Montreal Protocol and are at different stages of implementation according to their obligations. Under the Montreal Protocol, each country is operating under Article 5, which means they are regarded as developing countries. With this designation, the countries are required to comply with the HFC phasedown schedule for A5 countries (group 1). Jordan was the first country to ratify the Kigali Amendment (October 2019), followed by Lebanon (February 2020), while Egypt and Turkey are expected to ratify it soon. Countries that ratify the Kigali Amendment are eligible for MLF for a national strategy for HFC phasedown. Country NOUs are central to planning their activities within the MLF scope. The final set of activities will be selected by the COOL_ME project team in close alignment with the NOU and will consider the countries' HCFC phaseout management plans (HPMPs) during the advisory committee meetings (explained in Output II). The COOL_ME project team will also consider the most recent developments, priorities, and synergies (between COOL_ME and HPMP schedules) in each country. Finance: • Easy access to financing for sustainable RAC: An important recommendation for action is access to financing options for investments in sustainable cooling. Funding mechanisms such as Jordan Renewable Energy & Energy Efficiency Fund (JREEEF), "National Energy Efficiency and Renewable Energy Action (NEEREA), and Lebanon Energy Efficiency and Renewable Energy Financing Facility (LEEREF) in Jordan, Lebanon, and Egypt are already making attractive offers. However, access to these funding instruments is difficult for many applicants, especially private applicants. In all Partner countries, financing for sustainable cooling and refrigeration applications is niche in the scope of commercial banks, with a complete lack of application on reduction of HFC gases and/or installation of natural refrigerant-run systems. COOL_ME (Output IV) activities will build on the success of banking sector to tackle renewable energy and energy efficiency investments and emphasise holistic approaches to incorporating sustainable cooling technologies (e.g., combining renewable energy, energy efficiency, and sustainable cooling in a comprehensive solution). The work would then focus on integrating these new sustainable cooling technologies and supporting financial products attuned to the nuances of these technologies with existing financing schemes or designing new ones to augment expected impacts.
2.2 Programme goals and results	
2.2.1 Target group	In this section we explain the stakeholder groups and institutions that will benefit from COOL_ME programme. Local and regional authorities competent with respect to energy and climate policies will contribute to policy studies and be engaged through awareness activities conveying the main recommendations emerging from the project. Industry and finance stakeholders will be sensitised on the innovative technological solutions promoted by the project, and on the related market opportunities. They will be provided with detailed information concerning the outcome of the demonstration studies, with training opportunities and tailored support aimed at fostering their inclusion in the supply chain of sustainable cooling and refrigeration technologies. Consumers and end users and energy specialists will be engaged through specific dissemination activities. Across target groups, COOL_ME will facilitate the creation of a coherent framework for an integrated cooling transition and dissemination among industry, experts and civil society. • **National/ regional/ /local governments** will be supported in implementing and updating NDCs, in defining roadmaps and regulatory measures for sustainable cooling – combining efficiency with HFC phaseout and an increased use of renewable energy in cooling – and in establishing lasting partnerships. Representatives of this group are for example ministries, na-

	tional ozone unit under the environmental ministry, customs authority, municipalities and local authorities. They are collaborators for output II, V; beneficiary from output I, III, VI. • **Consumers and general public (private & commercial)** will benefit from cost-savings & comfort improvements by the enforced implementation of active and passive measures to reduce the energy demand of cooling. Furthermore, cooling appliances will be more affordable for a larger part or the society due to decreased cost of operation. Representatives of this group are for example project developers, equipment operators (supermarket and retail chains), households and other end users. They are beneficiary from the whole programme via output VII. • **Local installers and planners** will be trained on alternative and sustainable cooling technologies. In countries market maturity of sustainable cooling will evolve and via COOL_ME activities new business models will be offered. Representatives of this group are for example HVAC engineers, architects, project developers, installers and service technicians. They are collaborators for output I, II, V, beneficiaries from output V, VI and VII. • **Industry / suppliers & recycling** are key stakeholders in this project, will benefit from early mover advantages and opportunities to shape frameworks for efficient/sustainable cooling. Their commitment is needed to set up a realistic roadmap and reform necessary partnerships. Representatives of this group are for example industry associations and manufacturers of RAC equipment, technology suppliers (distributors and vendors). They are collaborators for output I, II, V, beneficiaries from output V, IV, VI and VII**.** • **Utilities** will be assisted in the exploration of opportunities for new business models (e.g. contracting). Representatives of this group are for example district cooling companies. They are collaborators for output II, beneficiaries from output IV, V, VI and VII**.** • **Financial institutes and investors** will be supported to develop new business cases and financing models by defining financial schemes and incentives for the previously mentioned target groups. Furthermore, the program intends to facilitate knowledge sharing and capacity building among this group. Representatives of this group are for example national and international banks, multilateral financial institutions, regional development finance Institutions, associations of financial institutions. They are collaborators for output II, output IV, beneficiaries from output IV, V, VI and VII**.** • **Research and academia** will be supported to stay up-to-date by providing assistance in developing material, customised training and curriculum material. Representatives of this group are for example universities and vocational schools. They will be provided with new curricula on sustainable cooling to train the next generation of technicians and engineers, ensuring a multiplier effect. They are collaborators for output I, II, beneficiaries from output V, VI and VII**.** Gender aspects will be addressed throughout the programme in close cooperation with relevant stakeholders mentioned above. During the preparatory phase contacts have been established to the Friedrich-Ebert Stiftung in Lebanon which already works in the field of gender equality to discuss cooperation during the programme.
2.2.2. Impacts (long-term results)	COOL_ME programme will promote climate change mitigation through combined efforts in energy efficiency improvements and the transition to sustainable cooling systems that impact related direct and indirect greenhouse gas (GHG) emissions. Setting energy efficiency standards and labels, combined with suitable enforcement, can significantly reduce energy consumption. Early preparation for the implementation of the Kigali Amendment has been combined with NDC implementation and is ratcheting up. Increased cooling efficiency can reduce peak load and reduce need for additional (high emission factor) energy generation capacity. Specifically, long-term results of COOL_ME programme implementation include the following: • The implementation of the actions under Output III and Output VI (in aggregate) would strengthen partner countries' institutional capacity to monitor,

	regulate, and control the RAC market and lead to accelerated implementation of Kigali Amendment. By building a reporting system, the national authorities will be able to estimate the impact of the Output III and Output VI actions as regulation is enforced. The improved regulatory system will gain transparency, which will increase the international community's confidence in the ability of partner countries to meet the reduction targets and hence in turn increase financial aid. • Implementing the financing stream actions (output IV) would have an aggregated impact that leads to higher volumes of loan disbursements and portfolio allocations focused on or inclusive of sustainable cooling components. There would be capacity built among stakeholders via trainings as well as raised awareness. This would imply a stronger uptake of sustainable cooling technologies by a variety of sectors and customer segments, leading to a reduction in energy intensity (for these customers), reduction in GHG compared to the baseline, and reduction in harmful refrigerants. A full market and product segmentation are needed (via portfolio screening of participating banks and detailed market analysis) to arrive at useful and reliable estimates of volumes and quantifiable impacts. • Demonstrating that sustainable cooling systems are safe to use and have economic, social and environmental benefits is a critical path while updating the MEPS standards for RAC or assisting the procurement of public buildings designed with HFC-free cooling systems. By conducting energy audits and monitoring within COOL_ME programme to verify the energy savings of the demonstrated systems and equipment, investors will gain confidence in the applicability and scaleability of these new technologies, which in turn will prompt banks to update their financial offerings. Building up a catalogue of state-of-the-art solutions will raise public awareness on energy-efficient and sustainable cooling systems. • The impact from implementation of the capacity building actions (in the aggregate) would strengthen the technical and knowledge capacity in country to research, innovate, market and deploy sustainable cooling systems and increase in turn market demand for those solutions. As result of combined effect of all activities following impacts are expected: • Contribution to CO2 savings potential • Reduced need for additional fossil electricity generation capacity • Strengthened energy security • SLCPs impact on agriculture and public health mitigated • Improved indoor environment • Recycling processes set up and circular economy reinforced Furthermore, the following are likely reactions on the supply-side: • increased level of innovation within the companies affected directly by the increase in demand for sustainable cooling equipment; • knock-on effects in diffusion of sustainable products to other markets (both geographical and sector-wise); • as market conditions changes it might attract manufacturers from other markets or sectors bringing in new technologies or innovative concepts
2.2.3 Outline of the results chain underlying the programme proposal	The aim of the COOL_ME programme is to increase sustainable cooling technologies in different cooling segments of the building sector (AC in residential and RAC in commercial buildings). This encourages early implementation of the Kigali Amendment and Paris Agreement in the MENA countries of Egypt, Jordan, Lebanon, and Turkey. The market penetration rate of sustainable cooling technologies is low. Development of technologies is a path dependent process, influenced by the regulatory and market boundary conditions that technology development takes place. These conditions can be favoured towards sustainable solutions by market pull instruments (such as policy instruments, financial schemes) and technology push instruments

	(such as show casing new technologies in markets where they have particular advantage) which work to achieve their objective by increasing demand for sustainable cooling products. COOL_ME applies a combination of activities that utilises both market pull and technology push mechanisms and further supports market transformation with awareness raising and technical trainings. In order to enable a cooling market transformation towards sustainable cooling technologies, we will provide a thorough understanding of the status quo and potential future developments of the cooling market via output I, by developing a cooling sector baseline and pathway study. The pathway study provides important information to the project team and political partners on the future market development to assess demands and potentials in the partner countries. Output II creates a platform for cross-sectoral dialogue between national actors. This activity will build ownership to support long-term impact. The programme is based on an integrative approach with three outputs enabling market pull and technology push mechanisms with the aim of increased uptake of sustainable cooling and the early implementation of the Kigali Amendment: • Output III will contribute to developing policy interventions and supportive elements, create the regulatory environment that requires reduced cooling demand, energy efficiency, and sustainable technologies that supporting the phasedown of HFCs and focus on natural refrigerants; • Output IV will contribute to improving financial mechanisms and funding structures to boost the cooling market transition; • Output V will support scaling up the commercial deployment and dissemination of existing and emerging technologies with natural refrigerants in RAC that would otherwise not be exploited due to the use of conventional equipment and a limited understanding of the field. The programme will empower actors to coordinate and implement political, technical, and financial frameworks with an integrated approach. The project's activities and associated information platform are designed to create lasting institutional capacity for awareness raising, capacity building, knowledge exchange, networking of sector actors and the development of a public and private infrastructure to enable catalytic change within the RAC sector in a manner that supports the continuous commitment and market transformation to support long-term emission reduction goals. Sufficient capacities and human resources are key for a successful transformation with long-term impact of RAC market. Therefore, through output VI we will provide resources for capacity development (technical training and support of curriculum development), reinforcing national efforts to extend and retain them. Within Output VII the programme will support transformational change across the whole cooling value chain and establish natural refrigerants as an accepted alternative to other mainstream products. Output VII enables large-scale knowledge sharing and results of the project activities to a wider audience. The duration and regional coverage of the COOL_ME project provides the chance to initiate a regional approach and exchange for interested countries facilitating scaling up. Specifically, reaching out and working with regional/international financing institutes, knowledge dissemination via regional case studies and regional conferences will further accelerate the transition to sustainable RAC technologies through regional and international cooperation. Please see COOL_ME slide deck, submitted with this proposal for the detail of outline of outputs and work packages.


COOL_ME Results Chain
R&D
Promote innovation
Improve
Demonstration
Prepare ground
Prove
Pre-commercial
Make available
Create demand
Supported commercial
Scale up
Fully commercial
Mainstream
Technology Push
Baseline definition
Start of programme implementation
End of programme implementation
Full adoption of sustainable cooling technologies
Market Pull
Cooling market dynamics
Output II
Cross-sectoral dialogue platform
Output I
Cooling sector analysis
Sector transformation pathways
Output III
Regulatory gap analysis
Strengthen legislation and enforcement
Output IV
Financing market assessment
Feasibility Studies
Collaborate w/ existing mechanisms
Output V
Catalogue of technical solutions
Demonstration projects
Output VI
Technical skills training
Support curriculum development
Regional Exchange with workshops
Output VII
Dissemination plan
Knowledge dissemination
Outcome
Conditions for increased uptake of sustainable cooling technologies in different cooling segments in the building sector (AC in residential and RAC in commercial buildings) encouraging early implementation of Kigali Amendment and Paris Agreement in Jordan, Lebanon, Turkey and Egypt are enabled with a cross-sector view of political, financial, and technical frameworks for key stakeholders.
Impact
Contribute to CO2 savings potential
Accelerated implementation of Kigali Amendment and Paris Agreement
Reduced need for additional fossil electricity generation capacity
SLCPs impact on agriculture and public health mitigated
Improved indoor environment
Recycling processes set up and circular economy reinforced
COOL_ME Programme Framework
COOL_ME – Scaling up sustainable cooling in the Middle East

2.2.4 Outcome (overarching programme goal) including indicators

Outcome:

Conditions for increased uptake of sustainable cooling technologies in different cooling segments in the building sector (AC in residential and RAC in commercial buildings) encouraging early implementation of Kigali Amendment and Paris Agreement in Jordan, Lebanon, Turkey and Egypt are enabled.

Indicators for the outcome:

Outcome indicator 0.1: Project results/recommendations have supported early implementation measures of the Kigali Amendment and/or increased uptake of sustainable cooling technologies in the building sector.

Unit	Baseline (start of programme)	Target value and planned date of attainment:
Supported implementation measures	0	A total of 6 significant measures with a causal relation to the project by the end of the project

Means of verification:

- 12 monitoring reports in total (three reports per country) have been developed in August 2022, August 2024 and August 2026; each up to 5 pages.

Outcome indicator 0.2: Banks in the partner countries have recognized the business potential and the environmental benefits of sustainable cooling technologies and included them in their official lists of eligible green investments.

Unit	Baseline (start of programme)	Target value and planned date of attainment:
Eligible listed sustainable cooling technologies	0 - Sustainable cooling technologies are not currently included in the eligible lists of banks with green financial products	At least 4 in total (at least one bank per country includes at least one sustainable cooling technology) by the end of the project.

Means of verification:

- Copies of partner banks' eligible green technology investment lists dated within the first 12 months of the project and copies of respective revised lists dated before the end of the project.
- A report (chapter) that describes the causal relation of the amended lists to the project.

Outcome indicator 0.3: Evaluation of know-how increase of sustainable cooling (political, financial and technical) carried out for the different stakeholder groups.

	Unit Evaluation	Baseline (start of programme) 0	Target value and planned date of attainment: Three evaluations e.g. online carried out during the programme period, first quarter of 2021, 2024, 2026.
	Means of verification: • Feedback of at least 50 participants per evaluation • An evaluation report will be prepared		
2.2.5 Outputs (specific programme goals) including indicators and work packages (activities)	Outputs including indicators and work packages (activities) are presented in following pages.		

OUTPUT I: National cooling sector baselines and pathways are developed and published

In the partner countries – Turkey, Jordan, Lebanon, and Egypt – detailed cooling market studies that focus on natural refrigerants are unavailable or very limited. Output I's objective is to provide a consistent cooling market baseline and sector specific transition pathway studies. The baselines and transition pathway studies will create a thorough understanding of the status quo and detail future developments of the cooling market in each of the target countries. The baselines and transition pathway studies will also lay the basis of the activities of subsequent outputs, namely:

- Establish a cross-sector dialogue platform with the aim to strengthen the dialogue between stakeholder groups in the country (Output II)
- Develop national policy suggestions (Output III)
- Support the financial sector in the design of financial products and credit lines (Output IV)
- Improve technical knowledge and accelerate the uptake of sustainable cooling technologies (Output V).
- **<u>Indicators for output I:</u>**

Indicator I.1: A **baseline study** presenting the current situation of relevant policies, support schemes, technologies for air-conditioning in residential buildings and refrigeration and air conditioning in commercial buildings, and current ways of waste disposal in the four partner countries is prepared, shared with key stakeholders and discussed and validated through the Advisory Committee.		
Unit Report	Baseline (start of programme) Limited number of reports available (from MLF KCEP, …), not providing all information required for establishing baseline. Overview is available to a certain extend in preparatory phase reports.	Target value and planned date of attainment: Four reports (one per country) available for download by June 2021.
Means of verification: • Four baseline reports in MS Word and pdf format; each report around 10 pages. • Advisory Committee meeting minutes that confirm the validation.		

Indicator I.2		
A **country-specific cooling sector pathway report** for the cooling market transition (containing pathways of the cooling sector showing the potential for reducing direct and indirect GHG emissions from residential AC and commercial RAC applications) in the partner countries is prepared and shared with key stakeholders and discussed and validated through the Advisory Committee.		
Unit Report	Baseline (start of programme) Limited number of national plans exist.	Target value and planned date of attainment: Four reports (one per country) available for download by December 2021.
Means of verification: • Four reports in MS Word and pdf format; each report around 10 pages. • Advisory Committee meeting minutes that confirm the validation.		

Work package I.1: Develop cooling sector baseline study

To transform the cooling market, understanding the current situation in partner countries is essential. There is limited available information[3] and it is insufficient for providing what is required to establish a consistent baseline. While limited, this information will provide the basis of the initial data collection. The study builds on the preparatory phase findings, extend on the RAC market situation and will update them with most recent developments.

The baseline study focuses at the market and the market potential for technologies from a purely market perspective. The objective is to gather information related to the current situation in partner countries to develop a baseline for work packages within Outputs III, IV, and V. Depending on the type of data, different approaches will be used to collect the required information.

Work package I.2: Develop sector pathways for the transition of the cooling market

Lead: Guidehouse

Using the analysis of work package I.1 the project team will identify and specify technical alternatives towards a more sustainable future development of the residential AC and commercial RAC sector. By combining the current situation with the potential alternatives for the transition, the team will develop a set of potential cooling sector pathways.

The initial pathways will be developed based on the baseline and findings of interactions with relevant governmental organisations and private actors, synthesis of available existing market reports, and derived trends based on available data.

The country sector transition pathways will create a business as usual scenario and three to five different scenarios that represent various ambition levels for market transformation. The scenarios will be defined at the start of the programme implementation and consider the most up-to-date situation on a policy and market level. The objective is to provide a consistent basis of current and future quantities (e.g., number of AC and refrigeration systems, number and type of buildings and cooling applications) relevant for all subsequent work packages (e.g., potential for reducing the F-gas in current building/equipment stock). Scenarios can be used under NDC updates to estimate the total investments and potential financial support, which will be a high-level estimate of total required capital and an estimate of investment potential.

The country sector transition pathways include building stock model until 2050 and comparison with the baseline (=business as usual (BAU)) scenario based on the following elements (derived from work package I.1):

- Uptake of residential AC market (number of systems)
- Increase of commercial buildings and associated RAC appliances (number of systems)
- Energy-efficient RAC systems with natural refrigerants
- Alternative refrigerants applicable for the different applications
- Associated costs (investment and life cycle costs)

The results will be discussed with industry stakeholders and the outcomes of these discussions will fine-tune the initial cooling transition pathways later in the project based on the findings of the detailed analysis carried

[3] For example, HCFC Phase-out Management Plan (HPMP) reports, KCEP reports, ODS alternatives survey reports, and BSRIA reports for Turkey and Egypt.

out in work package III.1, in work package IV.1, and in work package V.1. The sector transition pathways information on the future market development can be used to assess future demands and potentials by national authorities. For the preparation of this proposal, the initial assessment carried out on measures that will be focus of COOL_ME programme indicates GHG emission reduction of 10 million tonne CO_2e can be enabled in partner countries until 2030. The potential is evaluated using the IEA Energy Balance forecast for each country assuming:

a- A constant share of electricity demand in residential and cooling buildings for cooling until 2030
b- A constant power generation emission factor in each country until 2030
c- A market penetration of HFC-free cooling technologies of 2% by 2025 and 10% by 2030
d- Cooling energy consumption reduction of 30% compared to BAU.

Co-benefits such as improved grid stability or reduced dependence on chemicals imports, can be considered to give these documents political leverage and create political attention.

OUTPUT II: An inclusive and sustainable dialogue platform among different stakeholder groups in the cooling sector is established

Output II's objective is to provide a structured, organised platform that unifies stakeholders (listed in section 4.2.1) from the three workstreams of the programme: policy, finance, and technology[4] " The members of the platform will be regularly informed about the upcoming topics, decisions and events of COOL_ME programme and will be asked to provide their feedback on current trends and potentials in the RAC sector.

The cross-sectoral dialogue platform will be composed of two main components; (i) the country advisory committee and (ii) specific working groups. This structure will ensure that the platform is initiated by the programme but that ownership is developed by the parties involved. Given the timescale of the programme it is aimed for that the relations build are robust enough that they become institutional and will be continued after the project finishes. The working principles will be settled during the programme by establishing clear communication lines, structured agendas and regular meetings with recorded outcomes, so that the operation of the dialogue platform can easily be sustained beyond the programme timeframe.

- **<u>Indicators for output II:</u>**

Indicator II.1: A platform for cross-sectoral stakeholder dialogue is established on national level with relevant representatives from key institutions that will take action in favor of accelerated uptake of sustainable cooling technologies within the fields of action of their respective organization or industry.		
Unit Dialogue platforms/ feedback from participants	Baseline (start of programme) 0	Target value and planned date of attainment: One cross sectoral dialogue platform per country with up to 30 high-level representatives from key institutions is established by December 2021 that is composed of; a) one advisory committee per country with up to 15 members from at least 5 institutions by December 2021. b) three working groups (policy, financing, technical) set up per country by December 2021. c) feedback from the participants on the actions they have taken

[4] Local ownership might also be conveyed through the name of the platform, consortium is open for the flexibility and suggestions from national stakeholders concerning the name of the platform.

Means of verification:

- A list of participants and constituent documents for the advisory committee and three working groups in each country including name of organisation, position of the representative and their confirmation of participation.
- Minutes from working group meetings (or similar formats) that capture the feedback form the participants on the actions they have taken. The information comes from participants who report on their actions. The level of ambition of the activities will likely vary.
- A power point presentation (slides) of participant's activities that have yielded effective results.

Work package II.1: Establish COOL_ME cross-sector platform advisory committee

Lead: Guidehouse

Immediately following the kick-off of COOL_ME in each partner country, we will create the COOL_ME Advisory Committee. In each country, the advisory committee should include the following: Political partners from different ministries, industry, technology suppliers, projects related to the RAC sector that are implemented in the country, representatives of training institutions and universities. The committee's role includes the following:

- Act as a formal point of contact between the COOL_ME programme and ensure COOL_ME results are fed back into and anchored in the stakeholder landscape
- Support the steady programme implementation by providing the long-term perspective
- Inform about changes in national priorities in the three workstreams

Major developments, such as the national pathways developed in output I at the early stages of the programme, and policy suggestions developed in activities under Output III will be consulted at dialogue plaform via the advisory committees and by reaching out to a broader group of stakeholders via the working groups (work package II.2). The members of the advisory committee will act as multipliers for COOL_ME's aims by communicating programmes vision to larger audience within their sector.

The advisory committee will be established during the kick-off meeting. We will organise annual in person meetings. We will use agile methods to ensure proactive stakeholder involvement and ownership. We will use formal (written) and informal (face-to-face) communication channels. The partners/stakeholders' continuous involvement will be maintained by annual meeting and by email updates regarding ongoing activities. These updates will ensure that COOL_ME does not operate in isolation and that it closely intertwined with relevant stakeholder groups.

We will check the advisory committee's composition examining the objectives and execution in terms of established relations in the country. COOL_ME will closely align and strengthen ongoing coordination efforts. In Lebanon, for example, the suggested advisory committee will cooperate with the steering committee established in the K-CEP National Cooling Plan project to ensure continuous ownership. In Turkey, we will use the strong connection between public sector (MoEnv) and NOU and the industry (RAC manufacturers and industry associations) established during development of F-gas regulation in the country. In Egypt, Egyptian Environmental Affairs Agency (EEAA), the executive arm of the Ministry of Environment heads several committees such as the Ozone standing committee formed of multiple Ministries as well as heading the working group that is established for carrying out the project of "Reviewing and Updating policies, regulations and legislations related to the imports and control over ODS under the umbrella of Montreal Protocol".

Work package II.2: Designing and implementing working groups

Lead: Guidehouse

The aim of this work package is to obtain feedback from stakeholders on political, economic, technical and practical implications in relation to the COOL_ME aims and to utilise the vast amount of information and knowledge that stakeholders hold to find workable, efficient and sustainable solutions.

Three working groups will be established in each country to align with the three workstreams of the COOL_ME programme and will meet at least twice a year. Working group activities will be led by the national partners, IDG, NERC, LCEC, and UNDP. International subject matter experts in the project team will collaborate with national partners and will proactively contribute to establish and implement partnership and working groups. RCREEE will accompany the working group meetings, ensuring regional sharing of experiences and knowledge.

We expect in the first year working groups will focus on activities within the stakeholder group and then built on and extend their discussions into cross-cutting topics and synergies in exchange with other working groups. The working groups have different responsibilities depending on the workstream, as follows:

- **Policy stream working group:** Led by COOL_ME's national partner in each country and facilitated by Guidehouse with primary support from Öko-Recherche. The working groups will involve participants from the NOUs/Ministries for the Environment and other concerned ministries (e.g. Ministry of Energy, Ministry of Industry and Technology), competent authorities (e.g. for labelling and standardisation), municipalities/local authorities, custom authorities and experts from research institutes and other organisations.

  The policy working group activities will allow for a more detailed understanding of the current situation regarding national and international legislation.

- **Financing stream working group:** The financing stream working group will involve participant from the representatives from international financing institutes (IFIs), representatives from financing schemes, banks, potentially other capital market representatives.

  The financing stream working groups' activities will include identifying the challenges, risks, and best practices for the development, deployment, and management of sustainable cooling technology investments in the financial services industry.

- **Technology and markets stream working group:** Facilitated by ILK, the technology and markets stream working group receives support from UNDP. The working group will involve participants from the manufacturers of cooling products and equipment an RAC sector associations, service technicians, installers, distributors, project developers, architects and engineers, public and private universities and research institutes.

  This working group will facilitate active engagement of the private sector that is critical to the transformation of the market for sustainable RAC technologies.

OUTPUT III: The partner countries have been enabled to adopt, adjust and implement effective sustainable cooling regulation for early action on the Kigali Amendment

Policy and regulation are powerful stimuli to further new technology innovation and uptake. Output III aims to use the policy stimulus, aligned with the Output IV and V to contribute to the development of policy interventions to aid early implementation on Kigali Amendment, and sustain their application by setting enforcement and monitoring plans.

The main actors relevant for this Output are public sector- and international agencies involved in the Montreal Protocol and Kigali Amendment implementation in the partner countries (e.g., UNDP, UNIDO, GIZ Proklima). National/regional/local governments will be supported in implementing/updating building regulations, NDCs & national action plans, in defining regulatory measures including their enforcement for sustainable cooling, in making use of combining efficiency with HFC phase-down and increased use of RE in cooling, and in establishing lasting partnerships with key stakeholders.

Besides regulatory gap analysis and respective policy recommendations, different types of documents will be produced. This may include meeting minutes, protocols and reports with different target audiences and purposes. Since these documents may contain confidential commercial or otherwise sensitive information, the restriction of selected documents to the COOL_ME consortium remains within the discretion of the COOL_ME consortium.

- **<u>Indicators for output III:</u>**

Indicator III.1: A **regulatory gap analysis** presenting the current situation of relevant policies, analysis of regulatory status quo and gaps in the four target countries is prepared and shared with key stakeholders.		
Unit Study report	Baseline (start of programme) No in-depth regulatory analysis exists	Target value and planned date of attainment: Four regulatory gap analysis reports (one for each country) have been developed by December 2021.
Means of verification: • Four regulatory gap analysis in MS Word and PDF format; each around 10 pages		

Indicator III.2: Recommendations for policy development or policy implementation have been developed, shared and discussed by key stakeholders.		
Unit Policy recommendations	Baseline (start of programme) 0 (zero documents)	Target value and planned date of attainment: At least 3 recommendations per country by December 2024 (The exact number depends on the menu options selected and does not have to be equal among countries.)
Means of verification: • Copies of the recommendations as conveyed to the partners in written form (PDF or Word). • Records of discussions with partners that verify their interest and adoption of the recommendations, e.g. from the dialogue platforms under Output II		

Work package III.1: Conduct a regulatory gap analysis to map regulatory status quo and identify gaps

Lead: Guidehouse

A particular challenge regarding the promotion of efficient and sustainable cooling in the MENA region is the late start of the HFC reduction obligations for A5 (developing) countries, reducing the urgency in these countries from taking immediate action under the Kigali Amendment to the Montreal Protocol. We will conduct a detailed legislative gap analysis in close coordination with the respective governments reconfirming their needs expressed in the preparatory phase. It will include a detailed comparative analysis of existing relevant national legislations and international requirements under the Kigali Amendment to point out regulatory gaps. F-gas and energy efficiency regulations in place in other countries or regions will also be used as references. The legislative gap analysis will reveal the need for regulatory action and inform the government. It will also be used to provide the basis for decisions on policy support to be provided through work package III.2. Particular emphasis will be placed on the project work funded by the Multilateral Fund of the Montreal Protocol in order to avoid overlaps with these activities. Relevant contacts to implementing agencies were established during the preparatory phase.

The legislative gap analyses will be made available for discussion to NOUs at the environmental ministries. Based on the identified gaps and priorities we will summarise findings and recommendations in COOL_ME recommended actions towards the implementation of the Kigali Amendment. Due to the differences in current legislative positions the priority areas for the gap analysis and focus for each partner country will be different. For example, in Turkey the focus will be on the need for enhancement of current F-gas regulation and additional supporting legislation (bylaws on waste and energy policies). In Jordan comparative analysis of international requirements under the Kigali Amendment and Jordan's present national legislation addressing RAC products and equipment will be the priority. In Lebanon and Egypt, we will focus on conducting a comparative analysis of international requirements under the Kigali Amendment and countries' present national legislation addressing RAC products and equipment.

Work package III.2. Identify and implement policy support using a menu approach and develop recommendations

The aim of this task is to support the partner countries in policy activities in relation to existing regulatory frameworks for the development, uptake, and mainstreaming phases of sustainable cooling technologies. These efforts will be strengthened by Outputs VI and VII activities (e.g. technical trainings, awareness and information campaign needs for emission reductions and use of natural alternatives).

Policy design and implementation are influenced by many factors (such as political priorities) and require regular adjustments. To support these processes effectively the project team has identified a menu of options in line with the needs and demand from COOL_ME partner countries, identified during the scoping mission. Together with the partner countries a selection from the policy menu options will be made for each country and does not have to be equal among countries.

We will implement a flexible approach that allows adaptive management of the programme to ensure that there is no lock-in effect because of a pre-agreed upon project outline. We follow steps below to implement the menu approach in most effective way. A selection which options from the menu will be applied in the partner country will first be made during the project kick-off together with country government, considering the results of legislative gap analysis and the programme scope and ongoing country activities to avoid overlaps (e.g., with other funding mechanisms such as MLF). The result is a project work plan for the full project duration in close alignment with the country governments. Based on this, we will make a yearly work plan. At the end of each year we will evaluate the work plan and design a work plan for the next year considering the overall project plan. Changes to the overall plan can only be made with good reasoning and need to be agreed upon by the COOL_ME programme. Continuous alignment between NOUs and COOL_ME team will prevent frequent shift of interest in the country.

The policy menu covers technical assistance on the following topics (the areas identified as priority during preparatory phase, but it is not exclusive). The policy support can address short-term barriers related to policy design and implementation. This can take the form of strategic and operational advice to concerned ministries and competent authorities and will be considered in the annual work plan and reported as part of the policy menu.

a) Strengthening action on HFCs in NDCs
b) F-gas regulation
c) MEPS and building codes
d) National certification scheme for RAC technicians
e) End-of-life management and extended producer responsibility (EPR) approach
f) Strengthening enforcement of legislation for sustainable cooling

The current legislative situation in each country regarding the menu options is outlined in section 4.1.1.

This output supports key stakeholders, such as NOUs and relevant ministries. In the following sections we provide further details on the menu of options.

a) Strengthening action on HFCs in NDCs

Actions to mitigate HFCs and to support sustainable cooling technologies were underrepresented in the partner country NDCs. There is significant opportunity to strengthen their NDCs in this regard. Under this menu option partner countries will be supported for identifying options for reducing HFCs and cooling demand that can be incorporated in NDCs to support the achievement of global climate goals and national development objectives. Examples of policy support can be as follows;

- Support mitigation target setting and identify best suiting options.
- Support actions that could lead to a commitment to exceed currently associated Kigali phase-down schedule.
- Support actions on policy development to introduce a policy that all new high-efficiency cooling equipment must use an HFC alternative.

b) F-gas regulation (F-gas emissions, licensing, labelling, reporting):

Under this menu option partner countries will be supported, where deemed necessary, in the design of national F-gas policies in line with the Kigali Amendment and possibly in building on the established ODS legislation. The EU F-gas regulation and national policies from other countries will serve as examples but will be adjusted to national circumstances and policies already in place, for example, regarding the phaseout of ODS. National policies will need to include the following:

- Reporting on F-gases, especially HFCs, as a condition for successful implementation of the Kigali Amendment
- Licensing regarding HFC imports and exports, including equipment
- Labelling HFC containers and equipment and products containing HFCs
- Reducing F-gas emissions through containment measures, recovery of refrigerants during repair, maintenance, and at end-of equipment life, as well as proper treatment of the recovered refrigerant (reclamation or destruction in approved facilities)
- The phasedown scheme under the Kigali Amendment and possibly more ambitious national targets that can be reached through additional national measures, e.g., bans, taxes, funding schemes
- Any voluntary industry action supporting the Kigali Amendment

c) MEPS and building codes:

Regularly reviewing and strengthening MEPS is critical, as is ensuring that regulations do not impose barriers on innovation. Where necessary, Technical assistance will be provided to national governments in updating MEPS for RAC equipment, specifically considering equipment that uses natural refrigerants.
Under this menu option we will provide technical assistance on the refinement and development of the following and implementation of building energy codes, reflecting requirements of cooling equipment standards (MEPs, in particular) and regarding natural alternatives to HFCs and ODS.

- Building codes for residential and commercial sectors to include passive measures. For reducing cooling demand, we will support the refinement of and further development of the site planning and building regulations regarding building position, facade orientation and site planning, size and share of window areas on building façade, shading requirements on building façade, optimal combination of window thermal transmittance and solar transmittance according to the climate conditions.
- Executive regulations (sector-focused), appliance and equipment MEPS e.g. refrigerants code and district cooling code. International best practice examples such as German certification “Blue Angel” will be used to derive learnings on their success in creating favourable market conditions and incentives and key elements of their programmes.
- Political objectives and quantitative targets for the short, medium, and long term that can frame the national cooling strategy or NDCs in relation to energy savings and use of natural refrigerants

d) National certification scheme for RAC technicians:

Under this menu option COOL_ME will support the development of a work plan, providing feasibility studies and assistance in technical scoping to establish national certification schemes in partner countries. A national certification scheme for RAC technicians is a prerequisite for the acceptance and uptake of technician trainings. It sets the legal basis for certification and related standards and paves the way for the market introduction and increased market penetration of alternative technologies, in particular regarding alternatives to HFCs and ODS. None of the partner countries have implemented such a scheme so far.

The EU’s experience setting up national certification schemes and training programmes over the last decades will be relevant. Existing structures for professional trainings, curricula, and project work funded under the MLF (which might also focus on ODS) will be taken into account.

Within COOL_ME, we will investigate the possibility for mutual recognition of certificates at a regional level among the partner countries (and possibly beyond the MENA region). This would follow the EU’s example, where certificates attained in one member state, are recognised in all others and support the cross-border trade and employment opportunities. Mutual recognition of certificates at regional level requires similar minimum standards for certification of service technicians in RAC sector, national certification schemes in place in several countries, and administrative procedures for recognition. The duration and regional coverage of the COOL_ME project provides the chance to initiate a regional approach and exchange for interested countries. This is not the case for projects working on national level or at shorter timescales.

e) End-of-life management and extended producer responsibility approach

To avoid large quantities of end-of-life emissions from HFCs and ODS in RAC equipment, well-established waste management systems and collection mechanisms are necessary. This menu option aims at strengthening the technical and organisational capabilities of partner countries for disposing F-gases or export waste to countries capable of reusing it.

In all partner countries there is a significant need for strengthening waste collection efforts, defining take-back and recycling obligations, setting up regulatory provisions for rebate schemes. We will provide technical assistance on EPR policies to incentivise product design that encourages reuse and recycling. This can involve EPR activities such as:

- Support for creating take-back programmes
- Support in arranging waste collections, recycling or other suitable disposal
- Assistance in designing products for reuse or recyclability

Additionally, provided that there are interested public bodies in the country for establishment of or extension of waste treatment facilities, we will provide technical assistance by developing work plan, providing feasibility studies and guiding in technical scoping of reclamation and/or destruction of F-gases (HCFCs, HFCs) and organising the exchange with operators of reclamation facilities in other countries.

Awareness raising activities for various stakeholder groups and trainings for technicians will refer to end-of-life equipment management with a particular focus on the recovery of refrigerants under activities of output VI and output VII.

f) Strengthening enforcement of legislation for sustainable cooling

During the preparatory phase we identified that supporting enforcement is essential, despite the efforts within MLF projects in each of the countries. Talking to political partners in each country, we identified that countries face challenges in implementing MLF-funded schemes where ad hoc support from consortium may overcome barriers and strengthen enforcement. In this context, continuous dialogue with those ministries and competent authorities, with special focus on the NOUs, will be established to ensure that priorities are addressed.

Based on the preparatory phase findings, some preliminary ideas were marked at the highest need for action. For example, in Turkey, focus is needed to increase market surveillance and RAC equipment testing capacity, including comprehensive product labelling. In all partner countries, a lack of technical and organisational capabilities for local bodies to conduct performance measurement (for gathering product data and for development) was identified.

The establishment of laboratories and accredited certification bodies provides the foundation for proofing on national MEPS and labelling and safety of cooling equipment. This is necessary for controlling the local cooling markets. The technical project experts will support the responsible national entity through providing technical advice that can support setting up new (or improving existing) performance and safety testing laboratories and in specifying technical requirements and financial needs to conduct performance and safety testing for sustainable RAC (safety aspects are addressed in the safeguard section). Technical assistance will be provided, such as developing a work plan, providing feasibility studies, and assisting in technical scoping based on country needs. Depending on the situations in the different countries, different actions are required:

In Lebanon, the priority is to support drafting the procedure for enforcement of energy conservation law with respect to MEPS and labelling for RAC equipment. In Egypt, MEPs and energy efficiency labelling is mandatory for RAC sector. However, an enforcement plan for the other existing and newly developed codes, regulations, standards, and updated labels (new MEPs with natural refrigerants) is needed.

A market surveillance study can contain a desk study and a testing programme for existing products placed on the market. The study may also control the labelling of products in the market that contain HFC and determine the target areas that need more focus and improvement.

OUTPUT IV: Improved understanding of sustainable cooling financing strategies by the financial sector

In Output IV we will develop business cases and financing models that boost the cooling transition. All activities described in this section will involve significant engagement and collaboration with financial institutions. This close engagement and collaboration is expected to facilitate knowledge sharing and capacity building with the financial institutions, and link strongly to Output VI.

- **<u>Indicators for output IV:</u>**

Indicator IV.1: Financial market assessments of drivers, barriers and opportunities for a sustainable cooling transition have been conducted, results shared and discussed with key stakeholders.

Unit	Baseline (start of programme)	Target value and planned date of attainment:
Market assessment studies	0	Four financial market assessments (one per country) by December 2021.
Means of verification: • Four market assessment studies in MS word and PDF available for download; around 15 pages each.		

Indicator IV.2: Feasibility studies of projects with high implementation potential that were selected in agreement and close collaboration with local partners have been carried out and submitted to each partner country and brought up for discussion, serving as basis for implementation at dialogue platform meetings and investor conference.		
Unit	Baseline (start of programme)	Target value and planned date of attainment:
Feasiblity study report	0	Four feasibility studies (one per country) by December 2023.
Means of verification: • Four financial feasibility study reports and minutes of follow up discussion		

Indicator IV.3: Financing strategies or business models for relevant RAC technologies have been developed, submitted to key stakeholders and discussed with the aim to be incorporated into existing national financing schemes or IFI schemes.		
Unit	Baseline (start of programme)	Target value and planned date of attainment:
Financing strategies/business models	No technologies nor accompanying financing solution or product exist within the current schemes for sustainable cooling technology.	Four financing strategies/business models (at least one per country) by December 2024
Means of verification: • Documentation of the financing strategies/business models as well as documentation of efforts to pursue implementation in each country.		

Work package IV.1: Conduct specific assessment of the finance market

Lead: FS

The objective of this work package is to quantify the potential and likelihood of client segments of various banks switching to or adopting sustainable cooling technologies and to measure the needed resources and resource modalities to support the switch or adoption.

A range of research methods will be used to collect information from primary and secondary sources to capture disaggregated data on the financing needs in the cooling technology value chain. The methodology for capturing a representative dataset will consider the financial market structures of each country. We will produce and circulate market assessment information. Each market assessment report will include the following:

- Sustainable cooling technology concepts, such as the definition of sustainable cooling business models and other related concepts; categorisation of sustainable cooling business models, and stages of development
- Segmentation analysis of the sustainable cooling technology business models across bank portfolios including capital requirements, demand and growth potential, perceived viability, and opportunity cost
- Assessment of sustainable cooling technology business models based on drivers and barriers

- Sources of finance for different segments including own funds, conventional banks, alternative financing, investors, and other
- Modalities of suitable financing including terms, structures, enhancements, collateral, and other conditions

Activity IV.1.1. Analyse the sustainable cooling financing landscape and collect data

The project team will collect and analyse information about the drivers, barriers, and opportunities for financing the cooling transition from a representative sample of stakeholders, including:

- Financial intermediaries: Commercial banks, national and regional investment funds, and international financial institutions in each of the four Partner countries.
- Ultimate beneficiaries: Real estate developers, Homeowners Associations, public building users (e.g., hospitals, schools), commercial property lessors (e.g., mall companies, stores), utilities.
- Technology providers: Importers, distributors, manufacturers.

Actions that will be in focus for each country:

- Turkey: Use knowledge and data available from country financial assistance/support programmes and bank portfolios.
- Jordan: Use knowledge and data available at JREEEF and several bank portfolios.
- Lebanon: Use knowledge and data available from NEEREA and several bank portfolios.
- Egypt: Use knowledge and data available from EEAA and leading bank portfolios.

Activity IV.1.2. Identify matching opportunities for financing sustainable cooling technologies

Mainstreaming of sustainable cooling technologies is only achievable with a clear business case and matching opportunities (matching intrinsic interests) across stakeholders. The project team will map potential opportunities across stakeholders as a guide to defining concrete technical assistance services offered to all actors along the financing value chain. The project team will synthesise the data and information collected to specify target groups (IFIs, financial institutions, technology providers, ultimate beneficiaries), and corresponding potential financial product designs, financing schemes, and explore applicability of alternative financing options

Activity IV.1.3. Map the evolutionary market potential

In this activity, we will assess the evolving market potential by matching sustainable cooling finance opportunities with potential market demand over the lifetime of the COOL_ME project. This will support stakeholders to consider evolutionary aspects of these technologies given the policy, regulatory, and technology context through time to provide mutually beneficial returns for both technology users and banks.

Work package IV.2: Conduct financial feasibility studies of potential sustainable cooling technology investments for both clients and financial institutions.

Lead: FS

Work package IV.2 illustrates to stakeholders the degree to which the technology is financially feasible to stakeholders. Using robust analysis and modelling, it identifies the financial feasibility by examining the expected market developments, the risk-return characteristics for a given technology in a client segment, and the most appropriate financing strategies.

Activity IV.2.1 Conduct market scoping and bankability screening

The activity will screen and identify specific clients within market segments for detailed business case assessments whose results can be extrapolated to develop addressable market statistics and define the market situation. Applied economic analysis will be used to develop a representative sample from which to further hone and apply to a bankability rating tool. The bankability tool will be developed with the programme for each country specific to the financing context, cooling technology and business model (e.g. public-private partnership, vendor/distribution oriented, real estate developer – homeowner relationship). The tool will predominately be oriented towards financial institutions - they can use the tool to help assess if the project risks and returns meet their requirements so that they can provide credit for it. It could also be used by the end-benefi-

ciaries to determine if they would be able to raise funds and assess their own financial benefit from undertaking the investment. The tools would be made publicly available and presented in workshops with different banking sector stakeholders.

Activity IV.2.2. Derive inputs for the financial feasibility assessment

In this activity, the project team will collaborate with financial institutions and the selected clients to derive inputs for the financial feasibility assessment. This collaboration includes possible engagement with other COOL_ME project partners regarding technical assessments to develop economic models and undertake the financial feasibility assessment.

Financial institutions and clients will need assistance to derive inputs and quantification of risks. Assistance will include help from technical experts to populate economic models and assess the financial viability of potential projects. Work will be will coordinate with work package V.2, V.3 to derive technical assessment inputs needed to run economic models and analysis.

Activity IV.2.3. Develop financing solutions using outputs from financial feasibility assessment

This activity will develop potential financial solutions, including parameters of financial products such as debt/equity mix, collateral valuation, tenor, interest rate, and other terms and conditions. The project team will discuss terms and conditions with the client and financial institutes. Terms and conditions will include required returns and the design of an appropriate product under the constraints of financial institutes and client constraints while meeting the needs of both. If not financially viable, the project team will work with the financial institute and client to explore options to improve viability and help implement those measures. The action will depend on financial viability assessment.

Work package IV.3: Develop financing strategies and business models by assessing potential for integrating sustainable cooling technologies into existing financial schemes

Lead: FS

The project team will engage and collaborate with existing mechanisms and scheme sponsors to assess the potential for integrating sustainable cooling technologies. The team's objective is to show programme sponsors how the technology fills a climate-market gap, advances overall sponsor objectives, and is financially attractive for end users and financial institutions.

Activity IV.3.1. Provide robust proposals of given technology/solution for inclusion into an existing scheme/mechanism

In this activity, the project team will leverage outputs from earlier activities of Output IV to develop proposals for a given technology or solution for it to be included in an existing scheme/mechanism. The connection to Output V (demonstration projects) will be critical as assessment criteria and the methodologies for validating and monitoring environmental impacts will need to accompany proposals. Criteria and methodologies will also need to elaborate on environmental impacts, technology nuances, and utilisation of the technology and its alignment with the potential schemes. For example, the potential inclusion of proposals for a given technology or solution within the Green Economy Financing Facility (GEFF) scheme of the European Bank of Reconstruction and Development (EBRD) may need a technological rationale that answers how the proposed technology is energy-efficient or is to be used in an energy-efficient way, how it can be integrated with renewable energy solutions, or how it meets any other environmental impact criteria (such as HFC reduction). The project team will support these proposals with financial models and proposed financial products that would best fit and aligned with the financial support structure/mechanism.

The activity's objective is to identify replicable or bespoke sustainable cooling technologies that can be integrated within existing financial schemes/mechanisms and illustrate impacts at the programme level and from a green perspective. General actions and methodologies include combining and synthesising analysis from previous activities and mapping out processes for integration inclusive of the scheme/mechanism modalities, constraints, and objectives. The main actors relevant to this action are sponsors of schemes/mechanisms, participating financial institutions, and technology providers.

Among the actions in focus for each country are the following:

- All: International and regional schemes (GCF, EIB, carbon credits markets, and others)
- Turkey: Examine potential for inclusion into any of several schemes that exist (TuREEFF, TurSEFF, MidSEFF)
- Jordan: Examine potential for inclusion into GEFF
- Lebanon: Leverage NEEREA, LEEREF, GEFF
- Egypt: Leverage Egypt GEFF and other starting financing mechanisms and funds (for EE measures); MIF, IEE, etc.

Activity IV.3.2. Support the rollout of the new technologies in financing schemes

The project team will coordinate with existing schemes/mechanisms to help rollout the new technologies by providing technical assistance in marketing packages, developing financing tools, adjusting reporting/financial/economic tools, or demonstrating investments.

For a given technology to be included within a financing scheme, a successful proposal submission requires substantial technical assistance to all stakeholders involved in preparing for the subsequent successful implementation and rollout. Each stakeholder involved (primarily financial institutions) will require a mix of technical assistance packages to fit within the parameters of various schemes and must demonstrate alignment with the scheme objectives. This could include digitising applications, developing marketing packages, developing financing tools from different perspectives, designing reporting templates, and creating fact sheets for demonstration investments. The main actors relevant to this action are sponsors of schemes/mechanisms, participating financial institutions, and technology providers.

Activity IV.3.3. Support designing additional schemes/mechanisms

In this activity, the project team will collaborate and coordinate with IFIs and domestic financial intermediaries to help design additional schemes and mechanisms to augment existing programmes or serve as an additional programme to help roll out the new technologies and elaborate business case for these schemes/mechanisms. The project team will examine new instruments or business models that can augment sustainable cooling technology impacts, such as combining a guarantee scheme, designing a cooling as a service scheme, designing incentives, energy savings insurance, and any other feasible model. This activity will leverage experiences of existing schemes, financial institutions, and synthesis of outputs from the market assessments and financial feasibility assessments. It will also gather additional insights from IFIs and financial institutes.

The main actors relevant are scheme managers, financial institutions, and IFIs.

OUTPUT V: Technical knowledge on sustainable cooling improved and showcased through demonstration projects

Output V's objective is to support the uptake of sustainable cooling by improving the technical knowledge on sustainable solutions in the partner countries. As sustainable cooling is in its early stages of market maturity (mostly part of a very few showcase projects) in MENA region, we aim to specifically share implementation-based knowledge on cooling technologies that include low-GWP solutions, integration of renewable energy and/ or demand reduction.

The main beneficiaries and collaborators of this output include decision-makers (construction, policy, and finance sectors), supermarkets, residential/commercial building owners, RAC equipment assemblers/installers can pilot new technologies running on natural refrigerants (CO_2 systems, propane, or others) (e.g. Turkey, Jordan, and Egypt are examples where local manufacturers can participate in demos and technical assistance packages (Petra/Abdeen Engineering companies from Jordan, Arcelik/Vestel/Beko and others from Turkey). Additionally, private sector can play a good role in replication of demonstrated approaches in the future based on national policies related to promotion of energy-efficient approaches. In Jordan, the public sector is not key to replication due to its dynamics and lack of interest in promoting energy efficiency; Turkey can scale-up new innovations as TOKI (Housing Development Administration of Turkey) showed interest in participating in investments to replicate sustainable cooling applications based on COOL_ME demonstration results.

Activities under output V will be executed applying strict safeguard measures (please see section 2.3).

- **<u>Indicators for output V:</u>**

Indicator V.1: A country-specific catalogue of technical solutions for sustainable cooling is prepared and shared with key stakeholders		
Unit Reports	Baseline (start of programme) No or limited documentation on technical solutions for sustainable cooling solutions exists. On technological developments Technology and Economic Assessment Panel (TEAP) provides info on OEWG /MOP meetings. This information, however, is not sufficient and not easily accessible.	Target value and planned date of attainment: Four national good practice solution reports (one per country) completed, submitted by December 2021.
Means of verification: • Four national good practice solution reports, in MS word format; around 15 pages each.		

Indicator V.2: The technical and economic feasibility of sustainable cooling technologies has been demonstrated through the implementation (or technical assistance) of demonstration projects with quantifiable greenhouse gas mitigation potential.		
Unit: Realised and documented projects	Baseline (start of programme) A small number of projects implementing sustainable cooling exist (to be specified under V.1)	Target value and planned date of attainment: Demonstration projects* by October 2026. **the final number of demonstration projects depends on the size and cost of each selected demonstration project.*
Means of verification: • One document containing evaluation and documentation of the selected demonstration projects in MS word format		

Work package V.1: Build up country-specific catalogue of technical solutions

Lead: UNDP

The country-specific catalogue of technical solutions will build on the initial top-down work package 1.1. While the baseline analysis in work package 1.1. focuses on the RAC market, the country-specific catalogue will go further in technical detail. This task aims to provide in-depth information for decision-makers in industry, policy, and finance to get an overview about local and international best practice cooling solutions, and will provide tailored recommendations for national conditions that can be use as a role model for further projects, the basis to shape regulations, financing instruments, as well as development of demonstration projects (see work package V.2).

We will consider the following items in development of the country-specific catalogue:

- Proven[5] efficient and low-GWP technologies (air conditioning and chillers using natural refrigerants, sorption chillers, trigeneration) without fluorinated refrigerants and optimised to local climates (suitable for high ambient temperatures >35°C).
- Integrative concepts including renewable energy supply (form follows function, district solutions, solar cooling [electrical and thermal] District Cooling (DC) may apply to new business centre/cluster constructions, and selective initial assessments can be promoted during the project. Turkey is rapidly developing and could be a good candidate for exploring these avenues. In Egypt, there have been discussions about applying DC systems. Jordan has developed some DC systems that are in operation.
- Cooling demand reduction (shading, insulation, high thermal mass, airtightness, reduction of heat loads, operational optimisation, user feedback on consumption), automated systems sensing when cooling is required (people in/out of facility, for example), excessive heat absorption and conversion into cooling energy (example Santa Bremor in Belarus), performance optimisation equipment, and preventive maintenance techniques.

[5] Either by research and demo projects or products already holding market shares in the partner countries or countries with similar conditions.

Some ongoing projects exist that were identified during the preparatory phase as national best practices and provide input for the catalogue. We will acquire information on national best practices, building on baseline study in work package I.1 and other available information to avoid duplication such as stakeholder inquiries and contacting other international parties, which are supposed to have local or at least regional/global information TEAP committee on RAC and energy efficiency improvements in technology Climate and Clean Air Coalition (CCAC), GIZ Green Cooling Initiative, K-CEP, International Institute of Refrigeration (IIR).

We will use advanced tools (like dynamic thermal building simulation) to determine the (operational) costs and benefits (savings in energy demand and CO_2) in comparison to local business as usual concepts, e.g., to evidence the economic feasibility of the developed recommended solutions. We will provide up-to-date, customised documentation on workable and economical recommendations for technical cooling solutions. The results of this activity will provide further insight and considerations in the update of country pathways (work package I.2) and identification of demonstration projects (work package V.2).

Work package V.2 Deploy demonstration projects

Lead: UNDP

Activities in this work package are steps to implement financial as well as technical models/prototypes for future applications of sustainable RAC solutions and monitor for their performance to determine their operation effectiveness.

In COOL_ME demonstration projects, funding will be used to purchase cooling and monitoring equipment that will be installed in the demonstration projects. Together with UNDP clear procedures for the equipment purchasing will be established in line with the IKI requirements. The sustainability of the demonstration projects will be secured by following steps

- Ensuring local ownership by considering high interest (e.g. co-financing/funding)
- Ensuring technical maintenance capacities exists in country or to be supported during the project.
- Ensuring economic viability or the conditions that are needed to meet the viability by activities under work package IV

COOL_ME will consider monitoring existing demonstration projects provided that they support the COOL_ME vision e.g. results would otherwise not be sufficiently disseminated. We aim for lessons learned from initial demonstrations, through monitoring, will support a larger scale adoption in the market and influencing end user choices over RAC technology during installation/replacement of old equipment and better maintenance approaches during operations.

Activity V.2.1. Project identification selection and tendering

Based on the results of the preparatory phase, the following project types are broadly identified as potential demonstration applications, this list can be extended based on the results of the catalogue of technical solutions and interest and potential in each partner country:

- Demonstration of sustainable refrigeration systems for commercial refrigeration
    - Plug-in equipment used in small stores and supermarkets, such as vending machines demonstrating CO_2-based systems
    - In large refrigeration systems for supermarkets (’centralised systems’), CO_2 cascade systems as an alternative to commonly used HFC systems in many climates.
- Application of stationary AC units for space cooling
    - Residential space cooling focusing on the existing range natural refrigerant solutions in single split units, multiple split units, heat pumps and not-in-kind technologies in consultation with participating partners (e.g. for Housing Development Administration of Turkey (TOKİ) mass housing projects).

The understanding gained during the preparatory phase shows a general interest in RAC solutions with natural refrigerants but less interest in not-in-kind technologies (e.g. solar thermal cooling and district cooling) among country stakeholders. Despite little focus put not-in-kind technologies in the partner countries they may prove to have technical and economic viability when country conditions are analysed in detail. Therefore, we will consider them in work package V.1 and determine applicability options for demonstration cases.

A demonstration deployment team consisting of UNDP and Guidehouse will be set up to support the selection of the best possible set of demonstration project against the COOL_ME objectives, distribution in the partner countries and following the procurement rules of UNDP. In the final selection phase, a country-specific selection committee including country governments is envisaged. This will evaluate projects based on its assessment of their potential to contribute to the goal of accelerating uptake of sustainable cooling, the potential of scale economies and future learning opportunities considering findings of work package V.1.)

The political support for the demonstration projects will be ensured by following established UNDP working protocols with national governments and providing platforms for further dialogue with public stakeholders regularly in advisory committee meetings. The selection of the demonstration projects will be based on predefined criteria including e.g.:

- Ensuring safe (health and environment) operation and compliance with (local) regulations
- Emission reduction potential (of the single case and under consideration of the scaleability potential)
- Replicability and scaleability potential
- Equipment and installation costs, payback period compared to standard technology
- Technical feasibility and availability, installation and maintenance requirements, required special skills
- Existence of actors, who are willing to realise a pilot project
- Opportunities for co-funding

COOL_ME will strive to keep a balance of country representation in the implementation of the demonstration projects. Depending on the country and selected building/equipment size for implementation, the total number of demonstration projects and scope can vary. Based on previous experience, it is expected that the cost of demonstration projects can vary between approx. 170,000.00 Eur and 1,000,000.00 EUR. Considering the predefined selection criteria including co-financing/funding from beneficiaries, the consortium expects to implement 2-4 demonstration projects in total and make optimal use of the resources.

Activity V.2.2. Implementation of demonstration projects

Depending on the nature of the demonstration projects, the project team will support the required steps for a successful implementation of the selected demonstration projects. We can provide different level of support in demonstration projects, the table below outlines three options. High involvement mode outlines the unlikely case where interested actors and co-funding opportunities are scarce and demonstration projects are fully implemented by the COOL_ME project team with full funding. The technical guidance mode seems to be the realistic mode of operation based on the high interest and feedback we received from the stakeholders during preparation phase. In this mode the efforts required for determining technical specifications, purchase and installation of equipment is carried out in cooperation with the beneficiary and other investors with their co-funding and shared responsibilities with COOL_ME. The monitoring support mode can be carried out if already implemented promising sustainable cooling system, which is apparently lacking the evidence to reach market acceptance is identified and the results can be monitored, optimized and disseminated via COOL_ME to reach out to stakeholders.

Table 1 Scope matrix and COOL_ME involvement in demonstration projects

	General steps of demonstration project deployment		
COOL_ME support types	Technical assistance in specifications and design	Purchase of equipment, installation and commissioning (and financing of those)	Monitoring and performance optimization (see Activity V.2.3) and publication
High involvement	high	high	high
Technical guidance	limited	limited	high
Monitoring support	no	no	high

The following steps will be taken depending on the COOL_ME support type ;

a) Technical assistance during specification design for new technology demonstration or EE design in produced RAC equipment (experts' mission to Partner countries and home-based support will be included per project)

b) Technical assistance in assessment of facility level performance in terms of other aspects on equipment maintenance, cold storage conditions (insulation, vending equipment design), automation systems regulating performance parameters (remote reading modules).
c) Tendering (RAC equipment and services) and contracting for equipment delivery that will adhere with IKI requirements and UNDP procurement guidelines.
d) Selection of qualified manufacturing companies for household/commercial equipment to provide technical assistance on EE redesign options in their products
e) Logistics planning for transport and delivery of the equipment to the building site
f) Guiding proper installation and commissioning of the sustainable cooling system on building site (installation of the equipment in the building, safety reviews, parameter setting)

As result of this activity the demonstration projects are realised as planned and carefully commissioned. The results of the demonstration projects will be used for dissemination in all partner countries and additionally to overall MENA region based on the integrated approach to the resource mobilisation efforts envisaged by the programme, outlined in output VII. Training of service technicians for the sustainability of the process will be covered under output VI.

Activity V.2.3. Performance monitoring of demonstration projects

The performance of each technology and the whole system of demonstration projects during the operation will be evaluated and, when possible and appropriate, compared to a reference technology. A data collection system and monitoring plan will be developed prior to finalisation of demonstration projects to start monitoring. The project team will collect and use the demonstration data to monitor and optimise the performance and to evidence cost, advantages, limitations, and field applicability of each technology. The following steps will be taken:

a) Work plan and implementation regarding determination of monitoring and data collection equipment for performance testing and optimisation monitoring for performance verification (measurements in EE gains will require seasonal work to determine all parameters).
b) Work plan and implementation regarding operational optimisation, maintenance and safety considerations
c) Evaluation reports for dissemination

OUTPUT VI: Technical capacity on sustainable cooling increased and support to vocational education provided

The preparatory phase provided evidence that continuous capacity building is needed in partner countries; this was a common message raised by both the public sector and private sector stakeholders. Output VI focuses on capacity development, starting from existing capacities and then reinforcing national efforts to extend and retain them. In order to ensure long-term effects and institutional capacity building, we will establish technical training modules and support curriculum development of vocational schools and universities. Regional conferences will further accelerate the transition to sustainable RAC technologies through regional and international cooperation. Conferences also encourage knowledge sharing on new solutions and approaches towards low-GWP refrigerants and energy-efficient cooling equipment. Study tours will be provided for decision-makers to present the most recent cooling technologies onsite; these tours will provide participants the opportunity to exchange knowledge and experiences. Webinars will be hosted to address broader audiences interested in sustainable cooling technology. Media and online events, published documents, and other material will be made available for key stakeholders and the public over the course of the project. All events will be gender inclusive with the ambition to reach 50/50 male/female participation.

- **Indicators for output VI:**

Indicator VI.1: Key stakeholders have increased their capacities on sustainable cooling to support a successful market and technology transformation through trainings

Unit	Baseline (start of programme)	Target value and planned date of attainment:
Number of participants / Contents taught	0	Trainings implemented and around 662 participants trained in total throughout the project for industry sector, financial sector and public sector. All trainings will be completed by October 2026. Milestone: Of these 20 trainings will be implemented by October 2023.
Means of verification: • Participants list with signatures of attendees monitoring the share of male/female participation, • At least 60% of the participants that have provided feedback say they have gained new knowledge on relevant topics and they can start implementing it in their profession		

Indicator VI.2: One Curriculum for vocational schools and technical education has been developed and considered by key institutions in partner countries.		
Unit	Baseline (start of programme)	Target value and planned date of attainment:
Curricula	0	One Curriculum for all countries by December 2025.
Means of verification: • Project document in MS word format • List of institutions that consider curriculum within their educational programme		

Indicator VI.3: Conference participants from the cooling sector have increased their understanding, developed new plans/ideas to apply this understanding in their countries, and identified new opportunities for collaboration in the sector.		
Unit	Baseline (start of programme)	Target value and planned date of attainment:
Regional conferences	0	Three Regional conferences implemented at years 2021, 2023, 2026. 40% of participants have provided feedback saying they have identified new opportunities for collaboration or have plans/ideas for using their learnings in their country
Means of verification: • Conference participants list and agenda • Evaluation result from digital platform; real time evaluation of conferences via digital platforms and knowledge gained monitored.		

Indicator VI.4: International best practices are demonstrated to key decision-makers/investors via study tours; feedback from the participants on their key lessons learned, plans/ideas for using their learnings in their country context, newly identified opportunities of collaborations are collected.		
Unit	Baseline (start of programme)	Target value and planned date of attainment:
Study tours	0	Two study tours (2021, 2025) with 28 participants each (7 from each partner country) plus COOL_ME consortium partners.

Means of verification:

- List of participants and study tour agenda
- Real time evaluation of study tour via digital platforms and knowledge gained monitored.

Work package VI.1: Plan and deliver technical skills training

Lead: Guidehouse

This work package has two main components. As a first component, direct trainings will target political partners and financial sector stakeholders and as a second component, we will run train-the-trainer modules for the technician trainings that will be delivered in each country by a combination of certified trainers (who address safety risks, where needed) and by COOL_ME experts.

Activity VI.1.1. Assess needs for technical training

The needs assessment for technical training, development of customised training, and the roll out of training modules applies to all training in the fields of policy, finance, and technical knowledge. Since technical trainings are more complex, the next chapter highlights necessary requirements for the technical trainings.

We will examine relevant stakeholders´ levels of expertise, practical experience, existing knowledge gaps, and their expectations for different training programmes. Furthermore, we will build on existing national and international training possibilities and link them to results in the needs assessment. This process identifies the best existing trainings, which then initiates the discussion of possible collaboration. To this end, we will reach out to training programme holders of IKI projects (e.g., GIZ Proklima) discuss possible synergies and revise existing material to the COOL_ME programme scope. In the preparatory phase, we identified possible sources and training providers. Examples of existing trainings for RAC technicians include the following:

- Nationally established qualification schemes for technicians: Professional education facilities, state vocational education institutions, and universities
- Programmes within the HPMPs: Technician trainings, trainings of customs officers, workshops for policymakers
- Train-the-trainer workshops provided with the EU funding, e.g., Turkey F-gas project
- Trainings provided by Centro Galileo from Italy (under various Montreal Protocol projects and possibly self-funded or organised in cooperation with national associations)
- E-learning courses by Air-Conditioning, Heating, and Refrigeration Institute (AHRI-UNEP) (Refrigerant driver's licence), real alternatives programme

Activity VI.1.2. Develop customized training modules

While training materials for RAC technician trainings is available at a national level and from international sources, the content may need certain updates regarding the Kigali Amendment and related changes to technologies in particular with regard to natural refrigerants. For technicians we will establish a train-the-trainer framework for potential training instructors or subject matter experts. For trainings targeted towards other stakeholders (public and financial), relatively few materials seem to be available.

The project team will develop and provide training modules that will cover the political level, financial instruments, and technical details (not exclusive) to accelerate the implementation of sustainable cooling. Examples:

- **Industry sector:**
    - Content: Focus on technical understanding including practical information on energy efficiency and safety, cost benefit analysis. Also, the basics regarding political and financial frameworks and instruments.
        - Level: Train-the-trainer followed by intensive courses

- We will run train-the-trainer modules for the technician trainings that will be delivered in each country by a combination of certified trainers (who address safety risks, where needed) and by COOL_ME experts. COOL_ME will organise four train-the-trainer sessions to create a trainer pool in partner countries. This set of training will focus on the industry sector as the biggest need for training is identified among service technicians, installers and maintenance personnel during the preparatory phase. Participants will become trainers affiliated with the consortium and trainers who represent cooling

sector associations, NGOs, or vocational schools. It will be ensured that trainers will share a common understanding of key principles, information and the process of instruction to effectively delivering knowledge and new skills to recipients. Trainers affiliated with the consortium will deliver 10 trainings within COOL_ME in each country, specifically to the industry sector, and focus on manufactures, installers, and service technicians. We will facilitate and search for synergies to enable further trainings that can be delivered by trainer that are affiliated to cooling sector associations, NGOs, or vocational schools.

- **Public sector:**
    - Content: Updates on international regulations and the basic understanding of technical and financial frameworks.
        - Level: High-level focused course

We will provide 10 trainings for political stakeholders (to be customised per country and target audience) customised for each workstream and country where technical capacity within the organisations will be increased. At least 50 people within the ministries and public administrations receive trainings on international regulations, best practice examples and basic understanding of technical and financial framework related to Kigali Amendment and sustainable cooling systems.

- **Finance sector:**
    - Content: Focus on the cost-effectiveness of technical measures, provide a basic understanding of political, financial, and technical trends (instruments), support selected financial institutes by building internal capacities (such as trainings, adaptation of internal products, marketing materials, development of new lending products, adjustment of relevant processes and documentation) to properly acquire, assess, monitor, and report investments in eligible technologies.
        - Level: High-level focused course

We will provide10 training for supporting Financing Institutions (FIs) (to be customised per country and FI target audience). At least 80 people from FIs receive trainings on cost-effectiveness of technical measures, basic understanding of political, financial and technical trends (instruments), development of new lending products, monitor and report investments in sustainable cooling technologies.

We will specify appropriate formats, set-ups, and processes to ensuring the continuity and sustained impact of capacity building activities (e.g., train-the-trainer approach and use of open sources available after the duration of the programme.). Experienced RAC technician trainers from the EU (holding EU certification under the F-gas regulation) will perform parts of the technician trainings, particularly the practical elements.

Activity VI.1.3. Rollout of technical training modules

To ensure the trainings are high quality and used over the long-term, we plan to implement trainings with a staged approach:

- Rollout of first-tier group: The trainings will be tested with a first-tier group (incl. relevant stakeholders).
- Evaluate training experiences and improve: In line with the previous working step, we will evaluate trainings and seek improvement.
- Enlarge group/Scale-up: To scale-up the amount of the trained experts, we plan to enrol the training annually, which will be implemented by the trained trainers.

The country-specific overview based on outcomes from the preparatory phase and experience of implementation partners and COOL_ME experts is provided in section 4.1. COOL_ME can further support ongoing efforts with specific modules for addressing sustainable cooling and flammable refrigerants.

Work package VI.2: Support curriculum development in vocational and technical education

Lead: Guidehouse

This activity will support the country in ensuring that the mix of vocational and technical education corresponds to the required skills in the RAC sector. These skills include the application of sustainable cooling technologies, for example, extending the curricula content – where needed – to natural refrigerants and not-in-kind technologies. We will increase collaboration among academic and vocational teachers to exploit synergies, giving to emphasise attention on the skills and knowledge students need to transition effectively from

school to industry applications. Increasing institutional capacities for technical education is an effective way to educate a large number of people. In the preparatory phase, we identified that technical schools in Partner countries are not prepared for various upcoming aspects of sustainable cooling – such as natural refrigerants, safety issues, and waste management – since these are not addressed in technical and vocational education.

We will follow the steps below to implement tailored curriculum in vocational and educational training (VET) considering gaps and synergies:

- Assess the status of main VET programmes in the country related to RAC sector and distinguishing opportunities.
- Establish/expand the curriculum content: Identify factors that determine content and the formalities involved in how it is presented and how the goals and objectives should be set.
- Implement the curriculum: Identify or develop appropriate materials, developing curriculum for school-to-work transition.

This activity will be aligned with activities that support the set-up of national certification schemes under Output III. Local partners IDG, NERC, LCEC, and IAU will have a primary role in reaching out to and assessing the needs of VET programmes including public and private universities, research institutes, and training centres.

Work package VI.3: Foster regional exchange with regional conferences

Lead: Guidehouse

Regional conferences aim to disseminate the results of the project and enhance knowledge sharing between countries. The conferences support COOL_ME's objective to emphasise best practices and provide a platform for the countries to exchange information. Conferences offer a forum for knowledge sharing and presenting findings through demonstration projects in relation to the use of natural refrigerants, successful implementation, and feasibility. These activities are essential for scaling experiences from a single country to the regional level to increase the market uptake of sustainable cooling.

Three regional conferences are planned during the programme duration in the target region. Each conference envisages up to 120 participants in a 2-day session. The conferences serve the purpose of ownership, outreach, and dissemination depending on the stage of the programme. The conferences will consist of the following elements:

1. Country examples allow countries to demonstrate their engagement with the international climate agenda and create political momentum
2. COOL_ME findings in the three areas of policy, finance, and technology (small working groups)
3. Workshops that focus on a particular barrier and challenge that were identified in COOL_ME, exchange findings with participants, and define how to solve it from a regional perspective

The conference participants will be selected from COOL_ME stakeholders. Depending on the topic, the participants may vary in numbers. One of the conferences will target participants beyond the four participating countries to foster regional exchange. Possible themes for the conferences include:

- Natural cooling solutions in the region: Opportunities and challenges (brings stakeholders and the country together and to get to know each other)
- Technology and finance opportunities: Getting private sector involved
- Final Programme Conference: Bring everything together
- Opportunities for mutual recognition of technician certificates at a regional level among the partner countries (and possibly beyond the set of countries within the MENA region)

Work package VI.4: Deliver further forms of capacity building

Lead: Guidehouse

At this stage in the technology market entry cycle, new technologies are developing fast and knowledge is generated internationally. First-hand experience with technology options and their implementation can play an important role in achieving acceptance from policy makers and technicians. In the preparatory phase, demonstration of existing technologies and available products on the market were mentioned as being of high interest by all country stakeholders. Study tours have in other contexts (e.g., Energiepartnerschaften) shown to be a good way to address this acceptance with technology and policy makers who can then incentivise this behaviour.

To increase regional outreach and allow for the sharing of results, we will include webinars that address a broader audience. Topics that will be presented could cover various aspects of sustainable cooling in the field of policy, finance and technology.

Activity VI.4.1. Study Tours

We will conduct two study tours during the 6-year programme. Seven participants from each of the four countries, (i.e., 28 people) will be invited to Germany. The study tour will be accompanied by international experts. Study tours demonstrate the technical options, the institutional set-up, and the market implications of a transition to sustainable cooling technologies to stakeholders (in particular technical experts) from the partner countries. The tours include site visits at RAC installations including an exchange with the equipment operators, discussions with training bodies and relevant authorities, and a visit of Chillventa, the leading trade fair for RAC in Europe, which takes place in Nuremberg, Germany every 2 years.

Study tours provide opportunities for exchange (e.g., with national/local environmental inspectorates or European Environmental Agency) on the implementation of F-gases and energy efficiency related legislation. These organisations can share their enforcement experiences and provide input on established procedures, related challenges, and lessons learned.

Participants will be selected based on suggestions from the political partners of each country and complemented through identified representatives of the industry and finance sector by the COOL_ME consortium.

Activity VI.4.2. Webinars

Webinars allow a broad audience to benefit from the COOL_ME activities. This will support the objective to increase knowledge and understanding on the natural refrigerant technologies and can contribute to remove barriers in acceptance. According to the experience of regional partners, web-based activities are an essential component to reach out to the target audience in the MENA region. Access to webinar participants is facilitated through the COOL_ME consortium and international network.

We will establish a regular webinar cycle of around two webinars per year. Topics will be selected across policy, finance, and technical themes considering most relevant topics. During the preparatory phase we heard that there is interest by different stakeholder groups especially on new developments.

The webinars bring together different audiences from the climate and ozone worlds, and we will give specific attention to this fact when defining the topics. In the preparatory phase, we identified interest from other international organisations in the cooling space about including cooperate outreach activities like webinars (e.g., K-CEP and Cool Coalition).

To increase the reach of the webinars, sessions are recorded and made publicly available through our website and other channels for example YouTube.

OUTPUT VII: Project information of sustainable cooling disseminated, and awareness raised

To transform the whole cooling value chain and establish natural refrigerants as an accepted alternative to other mainstream products, we will share knowledge and the results of the project activities to a wide audience. The market transition to energy-efficient cooling technologies with natural refrigerants is determined by its costs and availability of the products as well as the perception of risks, especially for new technology (e.g., safety questions of natural refrigerant).

- **<u>Indicators for output VII:</u>**

Indicator VII.1: The knowledge gained in the project is made available to stakeholders through a project website. The website serves as a central communication platform.		
Unit Website	Baseline (start of programme) 0	Target value and planned date of attainment: One website online not later than 9 months after the start of the programme At least 10,000 visitors of the website by the end of the project

Means of verification: • Publicly available website online • Regular updates published on the website (at least 4 new information per year) • User numbers monitored via google analytics or similar

Indicator VII.2: The knowledge gained in the project is documented in various formats and made available to different target audiences.		
Unit Reports/ Newsletters / Videos	Baseline (start of programme) 0	Target value and planned date of attainment: Reports, Newsletters and Videos will be provided annually and completed by October 2026
Means of verification: • Word documents • Event reports • Download of snapshot reports from website		

Work package VII.1: Develop a communication and dissemination plan

Lead: Guidehouse

To ensure a structured approach to COOL_ME communication and dissemination activities over the 6 years of the project, we will develop a communication and dissemination plan to share the various project activities, results, and products.

COOL_ME's communication concept will define the dissemination framework. This framework will include the recommended use of information channels by project team members and will also serve as a plan for the activities in this work package. The concept will be periodically reviewed and adapted.

Project communication and dissemination focuses on the COOL_ME implementation results and further needs identified for implementation and technologies.

Internal knowledge management, in particular the results of Output I, III, IV, and V, can be used for external public relations if prepared correctly. For this purpose, texts are condensed into a fact sheet or poster and, for example, prepared as newsletter contributions or presented at conferences. The combination of COOL_ME results and external communication ensures the added value of public relations. It also enables integration with external research projects and initiatives.

Relevant communication formats, which will be considered for the development of the concept, include the following:

- Classic materials:
    - Snapshots: Summarise factual and technical results and insights from countries e.g., findings of demonstration projects, regional insights. Distributed via various channels including e.g. website. Key target audience is project developers, industry associations, and other end users in Partner countries and the MENA region.
    - Internal project update letters: Conceivable for different target groups, both internal (knowledge management) and external (public relations); also, contributions for other newsletters.
      Key target audience is COOL_ME cross-sector dialogue platform, its advisory committee members, further COOL_ME network.
    - Regional cooling status reports –comprehensive reports (approx. 30 pages) that will be published each year of the project (e.g., before each Meetings of the Parties [MOP]) since there is no comprehensive regional cooling status report published; available information is patchy and incomplete. They will serve as a key publishable output of the project results and insights

as well as results of various activities linked to sustainable topics. Furthermore, it will provide a platform for experts of the region and beyond to share valuable developments and insights and to bring together the cooling, efficiency, ozone, and climate worlds.
Key target audience is region beyond the Partner countries, international organisations, decision-makers from the finance and policy sectors, industry associations.

- Online offerings and social media:
    - A website will be designed and include a COOL_ME logo. It will be developed and maintained as platform for project outputs and general dissemination. To track the impact and success of the website, analytics will provide details of users' behaviour and data on how many people from the region/country visited the site. The website will be made available 4 years after the programme finalisation. The website will enable integration for the following options:
        - Blog posts: Blogs allow for easy publication of short background articles. The possibility of a dedicated blog will be integrated in the website and will allow project members to regularly share short insights of the latest results. Alternatively, contributions can be published on webpages and blogs of the partners.
        - Short videos: Short recordings of project events or interviews with target group representatives can attract attention and communicate individual content at a low threshold. Videos can be placed on existing online platforms.
        - Videos: Longer recordings. These can be explanatory videos or animated short videos used to convey knowledge, to cooperate with other channels (e.g., Deutsche Welle), and to distribute for regional outreach and web applications (e.g., experiences based on the IKI MED-ENEC documentary film *Energy Efficiency in Buildings in the MENA Region* shows that this format is well accepted).
        - Integration of recorded webinars into the website serves both internal knowledge management and external communication of results.
        - Photo or poster contest: Recommended to make the sustainable cooling topic visible and reach a wide audience in the target regions. The idea is to make the impacts of climate change tangible for the general public (non-technical audience) and engage with them. The contest can be carried out among children, high school students as well as technical school students.
    - Twitter: Social media is an influential tool in the region. We will establish a Twitter account in the project's name that will be moderated by the COOL_ME team. The account will provide regular updates on the project's progress; hashtags will be defined for consistent communication.

Work package VII.2: Implement communication and dissemination plan

Lead: Guidehouse

During the course of the COOL_ME project, work package activities will generate additional knowledge for stakeholders, specifically through Outputs I, III, IV, and V. The knowledge and dissemination plan will coordinate preparatory and outreach activities. COOL_ME team will create templates and guidelines for selected materials (for knowledge management and public relations), assist with or manage text work, aggregate contents, and place them on the appropriate platforms. The COOL_ME team will create comprehensive materials (as described in work package VII.1) and coordinate and model the project's social media appearances.

Activity VII.2.1. Preparation and dissemination of project contents as communication materials

All COOL_ME partners will contribute with their experience in the individual outputs. Results of all outputs serve as input to create communication material in the formats as described in work package VII.1. Since communication material will target either broader or specific stakeholder group, appropriate language and illustrations must be selected to convey messages in the most appealing way. Material will be developed in close cooperation with project team and involve relevant stakeholder input. Communication material will be – depending on the type – formatted and designed by professional agencies and checked by the COOL_ME consortium before publication. Products will be available in English and (in selected cases) COOL_ME country languages.

Cooperation with local multipliers (stakeholders that are influential in each country for transfer of ideas and replication of project activities, as well as exchange of inter-country know-how) is a central component of the project's communication strategy.

Activity VII.2.2. Participation in workshops, conferences, and related events

Participation is crucial at workshops, conferences, and other events related to the programme to share results and exchange knowledge with stakeholders. These meetings are a platform for presenting COOL_ME findings in the form of speaker slots or side events.

- During the preparatory phase, we observed that hardly any climate experts attend MOP meetings and hardly any ozone experts attend conference of parties (COP).

2.2.6 Technical, political and economic Risks	In below table we present the list of the key risks (technical, political, economic, etc.) to the programme's success and classification of the degree of risks and present controllability and risk minimisation strategies.

	of risk		Level and control-lability of the risk		Risk minimisation
#	Type of risk	Name of risk	Impact	Probabil-ity	Mitigation
1	Political	Political instability and unrest in a partner country may result in changing political responsibilities and would endanger political dialogue thus achievement of the corresponding outcome of the project	Low	Medium to high	This risk factor is beyond the control of the project team. Such unrest would particularly risk achievements under output III but in principle not the rest of the work plan unless the political unrest is major and would also have substantial economic effects. Political instability may of course lead to increased security situations (see Risk No.2). Guidehouse as the project coordinator has installed "country lead staff" – a dedicated person to follow all project activities in one country and who is in continuous exchange with the local partner. Together, country lead and local staff will closely analyse and monitor such situations and undertake according action. Since the preparation mission to Lebanon in September 2019 the political situation in Lebanon became fragile. In combination with country-specific COVID-19 measure this situation had slowed down the reactiveness of the Lebanese government. The recent information we received from the ministry through our local partner LCEC highlighted that the government is operational. Our flexible approach in country focus, and timeline will be maximized in the event of unforeseeable situations, such as the recent explosion in Beirut.
2	Political	Security situation prevents the international project team from travelling to a partner country	Low	Medium to high	This risk factor is beyond the control of the project team. We have included very strong local partners in the consortium with topic expertise, wide national network and visibility. They will be the front-runners of project implementation tailored to each country with close cooperation with the international team. Collaboration between international team and national partners via online communication channels has proven efficient during the appraisal period. We plan regular online meetings within the consortium during the project and ensure the availability of video conference technology. Thus, strong national presence of the COOL_ME team by national partners and regular online communication and internal knowledge plan will ensure smooth running of work even in cases security concerns limits the travels.
3	Political	Political decision-makers or other stakeholders are not willing to co-operate, participate in workshops or roundtables	Me-dium	Low (private sector partners) Medium (political partners)	This risk factor is partly within the sphere of influence of the project team. By contacting the responsible governmental authorities during the preparatory phase and presenting the project and obtaining political support letters, this risk is reduced regarding current decision-makers. Furthermore, the

		e.g. due to a lack of interest or trust. This can pose a risk of achieving the outcome, especially if there is a change of government (see Risk 1) and contact persons change, or new political priorities are pursued.			risk, regarding private actors, is reduced by the fact that the project team includes Arabic and Turkish speaking team members who have already implemented projects in the region, have local contacts, are familiar with regional structures and customs and thus have good access to relevant contacts. In addition, the consortium consists of strong local partners that have well-established connections with private sector as well as political decision-makers, which in turn helps to reduce the risk.
4	Technical	Lack of data availability in literature	Medium	Low	The risk is relevant for output I and partly for developing the catalogue of technologies in output V. Desk-based data collection will be complemented by our subject matter experts that have in-depth knowledge of the multiple disciplines in this study. The consortium has working experience in the Partner countries, and is familiar with potential data sources and gaps and methods to eliminate those. In addition, we foresee a role for the country working groups (output II) to provide input and review the data sets where appropriate, bringing in their first-hand knowledge. This three-level approach will ensure access to the right experts to advise on any missing data gaps to develop a high-quality data set for this study.
5	Technical	Low attendance at trainings and regional conferences	High	Low	This risk is relevant for output VI- technical capacity building. The well-established contacts and networks of the project team will be activated to generate enough interest in project activities. The preparatory phase also has shown that there is a high interest on the topic among stakeholders, especially with the growing relevance of the cooling sector. The project team will focus on content, delivery and timing in relation to trainings and regional conferences. In terms of content, the project team ensures that it provides an up-to-date and interesting mix of relevant topics for the participants. Regarding timing, the project team makes sure that there is enough time to manage attendance at regional conferences and COOL_ME events. A flexible approach on topics can react to stakeholder's needs and interests and ensure high participation. Experience from the BUILD_ME project has shown a large interest and willingness to participate in events by similar stakeholder groups.
6	Technical	Low interest for application of demonstration projects	High	Low	The risk is relevant for Output V. Identification of partners willing to cooperate on demonstration projects carried out in the

					preparatory phase shows that there is significant interest in all COOL_ME partner countries. The well-established national contacts and networks of the project team will be activated to generate enough interest and early on at the project implementation to mitigate the risk and work on alternative options.
7	Technical	Low interest and low acceptability of results from private sector and finance institutions	High	Low	In the country missions a risk of low acceptance of the private sector in HFC-free cooling, due to the lack of economic incentives, was mentioned. The risk is relevant for output III, output IV and output VI. Our team acknowledges that this holistic study is a novel integrated study combining insights of multiple disciplines in a unique programme. To ensure acceptability of the results, the team foresees a role for the country COOL_ME cross-sector dialogue platform' advisory boards and working groups (activities under output II) that will serve as a sounding board throughout the study ensuring involvement of key stakeholders, acceptability of the study, the analysis and the results across the relevant actors in cooling market.
8	Organisational	Conflict among consortium partners/ subcontractors	Medium	Low	A large consortium with multiple partners brings in risks on efficient management of the team. These risks are mitigated by proposing a transparent approach built up and applied already in preparatory phase of the project; a. Partners have a shared vision, understand the big picture of the project and what it aims to achieve and where they fit in b. Partners have adopted effective and collaborative ways of working within and between sectors for delivery, coordination, learning and mutual support c. Partners have a (growing) sense of ownership for the process, progress, milestones and outcomes of the overall project and the parts for which they are (co)responsible d. Tasks and responsibilities for each partner have been clearly defined and discussed, especially in countries with more than one partner. These are defined in the contracts. Whenever we become aware of a conflict between consortium partners or between partners and Guidehouse, we will discuss issues in an open and transparent manner and will find solutions.
9	Organisational	Coronavirus Pandemic (COVID-19)	High	Medium	There is a high risk that the Coronavirus Pandemic has an influence on the project implementation. This is specifically related to travel and in person meetings. We have

					developed mitigation measures to address this risk and minimise the impact on the programme. These have already been applied in our other ongoing IKI programme. The measures include: Video conferencing options to facilitate remote exchange. Online workshop and meeting facilities including agile online workshop formats. Depending on the travel advice virtual project activities will be implemented instead of in person activities.

2.3 Other characteristics of the programme	
2.3.1 Innovation character	COOL_ME adapts an innovative and flexible approach on programme management and technical content in following aspects: • Connection of policy, finance and technical in one program show innovative holistic approach. Brings different stakeholders together to develop solutions that are more likely to be implemented and faster than single approach. This will also inform the UNFCCC audiences on international level with country-specific information and the other way around. • Addressing country-specific activities and linking this to regional outreach increases visibility and trust in the developed solutions. This will also increase peer pressure. • Diversifying partners that will increase faster uptake because of trust with the different stakeholder groups and “same language spoken”. • Addressing sustainable cooling from the perspective of climate/Paris agreement and ozone/Montreal protocol and Kigali Amendment will bring both currently separated groups and discussions closer together advancing knowledge base and joint implementation. • Discussing sustainable cooling with focus on natural refrigerants in the context of Montreal Protocol and Kigali Amendment will support the joint thinking of efficiency and natural refrigerants which is currently not at the core focus of Montreal Protocol and Kigali amendment (there other low-GWP refrigerants are accepted). • Thinking from NDC to implementation on the ground. • Implementing a flexible approach that allows adaptive management during the course of the 6 years to ensure that there is no lock-in effect because of a pre-agreed project outline that will ensure actions are demand driven and thus effective especially when considering the long project duration.
2.3.2 Ambition and transformative character	Increasing cooling demand implies growing energy demand and GHG emissions, challenging the implementation of NDCs. To date no country-specific pathways in the COOL_ME partner countries on space cooling and refrigeration exist. COOL_ME partner countries did so far not include specific elements in relation to cooling into their NDCs. By addressing the information gap and providing support for the implementation on energy-efficient and low-GWP cooling and refrigeration, the governments will be in a better position to understand the international developments, the national potential and the technical potential, thus allowing for improved information to feed into the NDCs s and as a result allowing for scaling up ambitions and national climate targets. Through the COOL_ME programme we are aiming to accelerate the F-gas phase-down processes that have to happen under the Kigali Amendment. By focusing on sustainable cooling solutions which are at the early phase of market entry a paradigm shift is supported towards low emission solutions.

2.3.3 Securing sustainability and multiplier effect after termination of funding	Several mechanisms are considered within COOL_ME to ensure that the results and achievements of the programme will be maintained and benefit the target groups even after the programme terminates. Institutional embedding • Long-term recommendations and early action plans as well as cooling sector pathways in close cooperation with ministries to anchor the activities in the countries and support ownership • Programme supports implementation of NDCs and further development in efficiency and sustainable cooling • COOL_ME cross-sector dialogue platform to transfer project results among businesses and beyond project duration • UNDP and other partners anchors project activities in Partner countries Long-term financing • Identification of projects that have tangible economic and environmental impacts via scaleability and replicability beyond project duration • Integration of replicable sustainable cooling technologies into existing financial schemes/mechanism to ensure long-term impact Multiplier effect • Demonstration projects to showcase feasibility of sustainable cooling • Dissemination of results from feasibility studies to increase awareness in the technology and finance sector providing sound basis for replicability Capacity building/knowledge sharing • Curricula developed close to needs for lasting impact • Train-the-trainer programme in cooperation with industry associations • Build knowledge for requirements on appliance testing infrastructure that are needed for future establishment of laboratories • Trainings for the finance sector in cooperation with associations that is needed to establish and further develop financing schemes for sustainable cooling • Evaluation of the capacity building activities will be implemented.
2.3.4 Visibility of the programme	The programme visibility will be ensured with the dissemination activities as outlined in output VII. The objective of output VII is to address the need of the stakeholder group for a holistic and tailored awareness raising and information sharing programming. To this end, project results and corresponding information will be disseminated to various audiences and relevant stakeholders on national, regional and international level. The strategy and tools for the dissemination of results and information will be laid down in a dissemination plan which describes target groups, communication formats and channels. The main platform for distribution will be a COOL_ME website complemented with targeted outreach via other channels as described. Association of COOL_ME with IKI and BMU will be highlighted in activities for dissemination and programme visibility. For further details on the activities planned to increase visibility of the programme to partner governments, international stakeholder, etc. please see output VII.
2.3.5 Mechanisms for the mobilisation of investments in climate protection and biodiversity measures	During the preparatory phase private investors (FIs) mentioned their interest in investing in emerging technologies, attracted by high potential returns, portfolio diversification and exploration of new markets. However, they need help in overcoming a number of barriers. First, FIs are reluctant to invest in projects, and ventures in emerging markets because of perceived high risk and low returns due to the lack the fully established market infrastructure (relates to technical capacity and sector) and regulatory framework in Partner countries. COOL_ME aims to mitigate capacity and sector risks by providing technical assistance for capacity building, project preparation, research or impact assessments. In that way, COOL_ME have the ability to improve the risk-return perception of a variety of investors, such as development finance institutions, or banks. It is planned that COOL_ME mobilises investment & scale-up through sustainable financing solutions for uptake by the local financial sector through Output IV and Output V.

	Similarly, with the activities under Output III COOL_ME provides support on improving the regulatory framework and compliance that are needed to attract and direct private investment for development. We have received interest from the industry to engage in COOL_ME activities (see Annex 8: Support letter).
2.3.6 Co-Benefits (Contributions to economic, social, environmental development as well as the development of good governance)	Reduction of short-lived climate pollutants (SLCPs) such as HFCs used in cooling can lead to considerable co-benefits for countries taking early action. This goes beyond the impact on slowing the pace of global warming, especially in the short- to mid-term. Early action on SLCPs can reduce the impact of small particles and other forms of air pollution on health and agriculture. COOL_ME meets the projected increased need for space cooling in the Middle East in the face of a changing climate, reducing heat stress in vulnerable groups, creating subsequent health and wider societal costs. COOL_ME directly contributes to a number of the Sustainable Development Goals (SDGs) (e.g., 3, 7, 11, 12, 13), the Paris Agreement, and the Sendai Framework priority 4 to Build Back Better. Improving the availability and rollout of sustainable cooling will positively affect populations that are vulnerable to climate change and rising daily temperatures (health and societal costs of inadequate cooling). Access to efficient cooling is improved through accelerated roll out and creation of labels. The safe, coordinated disposal of HFC pollutants will positively impact communities living in disadvantaged areas close to former informal disposal sites. COOL_ME's engagement with the local industry yields economic co-benefits. By positioning producers and suppliers early in the technological change process, economic benefits first mover advantage can be reaped. Developing curricula and training installers on the efficient set up, operation, and inspection of RAC appliances leads to new business opportunities, higher added value, and increased efficiency and ensures safety when handling flammable refrigerants (e.g., AC maintenance emits/wastes 100% of the HFCs inside in Jordan). Improved commercial refrigeration can reduce food waste and provide public health benefits. In which pillars of sustainable development are the described co-benefits located? ☒ social ☒ environmental ☒ economic ☐ good governance

3	**Interaction with international cooperation programmes and other relevant aspects**
3.1 Synergies with and links to other relevant programmes and sectors (of German and international cooperation)	COOL_ME will – through its dense network of local and multilateral partners – actively use following synergies: - K-CEP activities to promote early moving, e.g. through national cooling plans in Egypt & Lebanon (KCEP_Support), contacts established and agreed that in full project synergies will be developed. - Contacts with Cool Coalition CCAC established which can be leveraged in the full programme and contacts have been established already in the preparation phase. - Financial mechanisms in Jordan and Lebanon (JREEF, LREEF and NEEREA) co-funded by IFIs and some of them implemented by COOL_ME consortium partners; - Diverse cooperation projects in countries (e.g. Heat Pump Project - Italian Ministry of Environment; GIZ Solar Cooling project; World Bank projects on natural refrigerants in Jordan), many of which the consortium is involved in (Efficiency atlas & EuropeAid efficient cooling/F-gas legislation in Turkey, TUREFF and MIDSEFF projects with EBRD, CIF, EU, EBRD, EIB, EU) - We are in close contact with IKI funded GIZ ProKlima (Mr. Bernhard Siegele.) COOL_ME local partners involved in international cooperation projects in each country are essential to the effective use of these resources.

3.2 Knowledge management in IKI programmes	Guidehouse has carried out several IKI projects, such as “Accelerating ambitions for 0-emission buildings in the MENA region”, “Mitigation momentum I and II”, “Supporting Nationally appropriate mitigation actions (NAMA) registry” or “Climate Action Tracker”. While being a private company with a turnover of more than 10 million EUR per year, our organisational set-up allows us to receive grants and conform with the requirements of IKI. COOL_ME will comply with the IKI guidelines on Knowledge Management. In addition, we can draw from established working relationships, strong stakeholder networks and insights into country contexts developed within key reference projects. These include the ongoing IKI project “Accelerating ambitions for 0-emission buildings in the MENA region” 16_I_276_MENA_A_0_Emission_Gebäude) implemented by Guidehouse, NERC, LCEC and IDG, where the focus countries are Jordan, Lebanon and Egypt Other Guidehouse energy efficiency and cooling projects, many of which implemented in the Middle East and Turkey (efficiency atlas, minimum performance standards, cooling in hot climates), UNDP’s activities in relation to Montreal Protocol negotiations, the Frankfurt School of Finance’s leading expertise on financing sustainable energy transitions, RCREEE’s regional outreach, local partners implementation capacities and anchoring and our subcontractors’ strong local references ranging from F-gas legislation to minimum energy performance standards form a sound basis for COOL_ME. The internal knowledge management will focus on informing project members about the results of all work packages and thus also promoting efficient cooperation and interlinked work packages in this project. At the same time, the internal knowledge management also serves to deepen cooperation and mutual learning, which enables comprehensive and more relevant project results. Facilitation of cooperation will be facilitated by structured project filing and data saving/sharing system. Guidehouse has already given the project team access to a common "sharepoint" during COOL_ME preparatory phase. Sharepoint is a web application that enables cross-company and cross-location collaboration on a common online portal. All information and documents within the project are stored and organised here. Materials are thus automatically made available to all project staff (including local partners). Additionally, we will utilise video conferencing and online solutions for meetings which reduces travel expenses and enables increased productivity within COOL_ME team while maintaining improved communication and meeting efficiency. Knowledge dissemination aiming COOL_ME target audience (apart from the COOL_ME team is outlined under output VII. The proposed methodology is in full alignment with IKI Knowledge Management guidelines, and we are dedicated to comply with the IKI Knowledge Management guidelines. Nesen Surmeli-Anac will be the primary responsible to ensure this as Knowledge Management contact person.
3.3 Notes on - own funds - external funding - third-party grants	Please break down the secured funds noted as ‘own funds’, ‘external funding’, ‘third-party grants’ under 1.1 and list how they are used. The own funds will be used to include additional activities of the COOL_ME programme with specific focus on “hot topics” that we expect to identify during the first year of the programme and to be flexible to adapt to this. For example, additional ad hoc support in WP III.1. Are you expecting (other) third-party funding? If so, by whom and how much? Yes, we are expecting contribution from UNDP to support the demonstration activities to be defined during the course of the programme. We are also in contact with KCEP to identify opportunities for funding.
3.4 Other aspects relevant to funding	Please explain aspects that could not be described under section 1.1 to 5.3, but which are, nevertheless, of relevance for the approval of the programme.

Annex 1: Political Partners

Political partners in the implementing country		
Implementing country 1	1st Political partner	Jordan Ministry of Agriculture and Environment
	Department	National Ozone Unit
	Additional address	
	Street Nr.	
	Postal code, town/city	P.O. Box: 1408, 11914, Amman
	Country	Jordan
	Website	
	Contact person	Mr. Ahmed Al-Qatarneh, Secretary General to Ozone Unit
	Telephone number	+962 6 5560113
	Email address	alqatarneh@yahoo.com / info@moenv.gov.jo
Implementing country 2	1st Political partner	Lebanon - Ministry of Environment
	Department	Environment Regulation
	Additional address	
	Street Nr.	Azarieh Bld - 7th & 8th floor, the new Block A-4, Block A-4 and B5
	Postal code, town/city	
	Country	Lebanon
	Website	
	Contact person	Ms. Samar Malek, Head of Environment Regulation
	Telephone number	+961 1 976555
	Email address	S.Malek@moe.gov.lb
	2nd Political partner	Lebanon - Ministry of Energy and Water (MEW)
	Department	2nd Floor, Minister Office
	Additional address	Corniche du Fleuve , Beirut
	Street Nr.	
	Postal code, town/city	
	Country	Lebanon
	Website	https://energyandwater.gov.lb/ar/home
	Contact person	Mr. Raymond Ghajar, Minister

	Telephone number	+961 1 565040
	Email address	minister@energyandwater.gov.lb
Implementing country 3	1st Political partner	Turkey - Ministry of Environment and Urbanization (MoEU)
	Department	Department of the Climate Change
	Additional address	Mustafa Kemal Mahallesi Eskişehir Devlet Yolu (Dumlupınar Bulvarı) 9. km. No: 278 Çankaya
	Street Nr.	
	Postal code, town/city	Ankara
	Country	Turkey
	Website	
	Contact person	Mr. Muhammet Ecel General Director of DG Environmental Management / Mr. Orhan Solak, Head of Climate Change Department
	Telephone number	+90 312 474 03 37 / +90 312 586 3171
	Email address	muhammet.ecel@csb.gov.tr / orhan.solak@csb.gov.tr
Implementing country 4	1st Political partner	Ministry of Environment, Egyptian Environmental Affairs Agency (EEAA)
	Department	
	Additional address	
	Street Nr.	30 Misr Helwan El-Zyrae Road, Maadi
	Postal code, town/city	11728, Cairo
	Country	Egypt
	Website	http://www.eeaa.gov.eg/en-us/home.aspx
	Contact person	Dr. Sherif Abdelrehim (Head of Climate Change Department), Dr. Ezzat Lewis (Head of National Ozone Unit)
	Telephone number	+202 25256452
	Email address	**sherif_a2z@yahoo.com**, eztlws@yahoo.com
	2nd Political partner	Housing and Building National Research Center (HBRC), Ministry of Housing
	Department	
	Additional address	
	Street Nr.	87 Tahrir St., Dokki

	Postal code, town/city	11511, Giza
	Country	Egypt
	Website	http://www.hbrc.edu.eg/
	Contact person	
	Telephone number	Prof. Dr. Khaled El-Zahaby, Chairman
	Email address	+202 37617102, +202 37617092
	3rd Political partner	Ministry of Trade and Industry
	Department	
	Additional address	
	Street Nr.	2 Latin America, Garden City
	Postal code, town/city	Cairo
	Country	Egypt
	Website	http://www.mti.gov.eg/English/Pages/default.aspx
	Contact person	Eng. Hanan El-Hadary, Head of Technology and Innovation Industrial Council
	Telephone number	+202 27921167, +202 27921168
	Email address	elhadaryhanan@gmail.com

Annex 1: Implementing partners

Implementing partner(s) / Subcontractor(s)		
1. Implementing partner (= consortium member) / Subcontractor	Name	Frankfurt School of Finance & Management gGmbH
	Department	
	Additional address	
	Street Nr.	Adickesallee 32-34
	Postal code, town/city	60322 Frankfurt am Main
	Country	Germany
	Institution	[private sector]
	Website	Frankfurt-school.de
	Legal structure	Non-profit limited liability company
		Non-profit status: ☒ yes ☐ no
	Contact person	Marjan Stojiljkovic
	Telephone number	+49 69 154007-747

	Email address	m.stojiljkovic@fs.de
	Total staff	432
	Staff for the programme	3
	Year established	1957
	Experience in the target region [years]	22
	Experience in activities relevant to the programme [years]	12
2. Implementing partner (= consortium member) / Subcontractor	Name	Öko-Recherche Büro für Umweltforschung und -beratung GmbH
	Department	
	Additional address	
	Street Nr.	Münchener Str. 23a
	Postal code, town/city	60329 Frankfurt
	Country	Germany
	Institution	[private sector]
	Website	Oekorecherche.de
	Legal structure	GmbH
		Non-profit status: ☐ yes ☒ no
	Contact person	Barbara Gschrey
	Telephone number	
	Email address	barbara.gschrey@oekorecherche.de
	Total staff	7
	Staff for the programme	3
	Year established	1995
	Experience in the target region [years]	5
	Experience in activities relevant to the programme [years]	24
3. Implementing partner (= consortium member) / Subcontractor	Name	The Lebanese Center for Energy Conservation (LCEC)
	Department	
	Additional address	Ministry of Energy & Water

	Street Nr.	Corniche El Nahr
	Postal code, town/city	Beirut
	Country	Lebanon
	Institution	Center for Energy Conservation
	Website	Lcec.org.lb
	Legal structure	Governmental Association
		Non-profit status: ☒ yes ☐ no
	Contact person	Pierre Khoury
	Telephone number	+961 1 565 108
	Email address	Pierre.khoury@lcec.org.lb
	Total staff	22
	Staff for the programme	6
	Year established	2011
	Experience in the target region [years]	17
	Experience in activities relevant to the programme [years]	17
4. Implementing partner (= consortium member) / Subcontractor	Name	Royal Scientific Society / National Energy Research Center
	Department	
	Additional address	P.O. Box 1945
	Street Nr.	Ahmad Tarawneh Street-Aljubeiha
	Postal code, town/city	11941 Amman
	Country	Jordan
	Institution	University/Research institution
	Website	Rss.jo
	Legal structure	NGO
		Non-profit status: ☒ yes ☐ no
	Contact person	Muhieddin Tawalbeh
	Telephone number	+962 65338014 Ext. 107
	Email address	m.tawalbeh@nerc.gov.jo
	Total staff	500

	Staff for the programme	3
	Year established	1970
	Experience in the target region [years]	32
	Experience in activities relevant to the programme [years]	17
5. Implementing partner (= consortium member) / Subcontractor	Name	Integrated Development Group (IDG)
	Department	
	Additional address	
	Street Nr.	129 Mostafa El Nahas Street
	Postal code, town/city	11765 Nasr City, Cairo
	Country	Egypt
	Institution	Private sector
	Website	
	Legal structure	Free professional establishment – TAX registered
		Non-profit status: ☐ yes ☒ no
	Contact person	Mohamed Salheen
	Telephone number	+20 10000 23 444
	Email address	salheen@idg.com.eg
	Total staff	35
	Staff for the programme	8
	Year established	1993
	Experience in the target region [years]	26
	Experience in activities relevant to the programme [years]	17
6. Implementing partner (= consortium member) / Subcontractor	Name	Istanbul Aydin University (IAU)
	Department	
	Additional address	
	Street Nr.	Beşyol Mah.Inönü Cad.No: 38, Sefaköy–Küçükçekmece
	Postal code, town/city	Istanbul
	Country	Turkey

	Institution	University/Research institution
	Website	Aydin.edu.tr
	Legal structure	foundation university
		Non-profit status: ☒ yes ☐ no
	Contact person	Hasan Heperkan
	Telephone number	+905327122981
	Email address	heperkan@yahoo.com
	Total staff	3000
	Staff for the programme	3
	Year established	2007
	Experience in the target region [years]	10
	Experience in activities relevant to the programme [years]	10
7. Implementing partner (= consortium member) / Subcontractor	Name	Chemonics Egypt Consultants
	Department	
	Additional address	
	Street Nr.	6 Al Doki, Ad Doqi, Dokki
	Postal code, town/city	Giza Governorate
	Country	Egypt
	Institution	Private sector
	Website	Chemonicsegypt.com
	Legal structure	Corporation company
		Non-profit status: ☐ yes ☒ no
	Contact person	Ahmed Huzayyin
	Telephone number	
	Email address	a.huzayyin@chemonicsegypt.com
	Total staff	86
	Staff for the programme	1
	Year established	1992
	Experience in the target region [years]	25

	Experience in activities relevant to the programme [years]	25
8. Implementing partner (= consortium member) / Subcontractor	Name	United Nations Development Programme (UNDP)
	Department	Istanbul Regional Hub
	Additional address	
	Street Nr.	Merkez Mahallesi, Abide-i Hürriyet Cd No:142
	Postal code, town/city	34381 Sisli/ Istanbul
	Country	Turkey
	Institution	international/multilateral institution
	Website	
	Legal structure	UN specialised agency
		Non-profit status: ☒ yes ☐ no
	Contact person	Etienne Gonin
	Telephone number	Undp.org
	Email address	etienne.gonin@undp.org
	Total staff	300
	Staff for the programme	9
	Year established	1965
	Experience in the target region [years]	53
	Experience in activities relevant to the programme [years]	22
9. Implementing partner (= consortium member) / Subcontractor	Name	ILK Dresden gGmbH
	Department	
	Additional address	
	Street Nr.	Bertholt-Brecht-Allee 20
	Postal code, town/city	01309 Dresden
	Country	Germany
	Institution	Private sector
	Website	ilkdresden.de
	Legal structure	Non-profit limited liability enterprise
		Non-profit status: ☒ yes ☐ no

	Contact person	Mathias Safarik
	Telephone number	
	Email address	Mathias.safarik@ilkdresden.de
	Total staff	146
	Staff for the programme	2
	Year established	1990
	Experience in the target region [years]	5
	Experience in activities relevant to the programme [years]	27
10. Implementing partner (= consortium member) / Subcontractor	Name	Regional Center for Renewable Energy and Energy Efficiency (RCREEE)
	Department	
	Additional address	Hydro Power Building (7th Floor)
	Street Nr.	Block 11 - Piece 15, Melsa District, Ard El Golf,
	Postal code, town/city	Nasr City, Cairo
	Country	Egypt
	Institution	NGO
	Website	Rcreee.org
	Legal structure	Regional intergovernmental non for profit organisation
		Non-profit status: ☒ yes ☐ no
	Contact person	Ashraf Kraidy
	Telephone number	+20 2 2415 4755 Ext. 124
	Email address	Ashraf.kraidy@rcreee.org
	Total staff	29
	Staff for the programme	3
	Year established	2008
	Experience in the target region [years]	11
	Experience in activities relevant to the programme [years]	11
11. Implementing partner (= consortium	Name	7Gen

member) / Subcon-tractor	Department	
	Additional address	Im Güetli
	Street Nr.	5
	Postal code, town/city	9490 Vaduz
	Country	Liechtenstein
	Institution	Private sector
	Website	www.7genconsulting.com
	Legal structure	Limited liability company (GmbH)
		Non-profit status: ☐ yes ☒ no
	Contact person	Yvonne Deng
	Telephone number	+423 79 111 29
	Email address	yvonne@7genconsulting
	Total staff	2
	Staff for the programme	1
	Year established	2020
	Experience in the target re-gion [years]	n/a
	Experience in activities rele-vant to the programme [years]	15

Annex 2: Application of GCF Safeguards under the International Climate Initiative

IKI project and programme implementing organisations are expected to apply the GCF Safeguard System (interim IFC Performance Standards).

Please elaborate on **potential environmental and social risks**, which could be caused **by programme activities or programme-related activities**. The overall suggested risk category should be based on a **screening of all Performance Standards in conjunction with planned measures to avoid and mitigate the risks.** The identification of risky activities according to several Performance Standards may still result in an overall low risk categorisation (C), if the risks are not significant and/or appropriate measures to prevent and mitigate potential risks are included in the programme concept. **Please outline sufficiently the resulting significance of risk for every Performance Standard. Please also provide justifications, where you expect no risks to occur.**

"Significance" should be determined based on the following aspects:

- Scale (i.e. number of affected people) and intensity (e.g. degree of marginalization of minorities, degree of restriction of water access) of the (potential) impacts/disturbances
- Frequency/recurrence, place, duration and timing of the (potential) impacts/disturbances
- Sensitivity/vulnerability of affected people, groups, species or habitats (in light of their adaptation capacities)
- Irreversibility of changes (in light of the potential to restore/regenerate the original conditions, after the (potential) impacts/disturbances have materialized)
- Manageability of the (potential) impacts/disturbances

Application of GCF Safeguards will provide both IKI implementing organisations and BMU/IKI Secretariat with a tool to holistically monitor potential negative environmental and social impacts of IKI programmes and guarantee high quality programme implementation. Guiding questions provide orientation on the respective Performance Standards (please note: Performance Standard 1 does not apply in the IKI context), without being comprehensive. For comprehensive guidance about the application of safeguards, which ought to be considered when assessing potential risks, please refer to the IFC documentation.

A) PS 2 – Labour and Working Conditions	Guiding question: Can programme activities possibly cause harm to workers? Please explain sufficiently the resulting significance of risk. Potential risky activities (including contributing factors such as location, associated activities) Output III Activity III.2 identify policy support • indirect impact possible, resulting from policy advice recommending natural refrigeration applications that have a hazard due to flammability, electricity, pressure, temperature (hot, cold). The risk only occurs if applications are not implemented correctly and the installers are not following the required regulations. Output V Activity V.2.2 Implementation and Monitoring of demonstration projects: • hazard due to flammability, electricity, pressure, temperature (hot, cold) during the use of applications implemented as demonstration projects Output VI Activity VI.1.3 rollout of training programmes.: • hazard due to flammability, electricity, pressure, temperature (hot, cold) during the use of applications in the training programme Significance of Risk Output III Activity III.2 identify policy support • low risk in the project activity • risk only during manufacturing, maintenance and disposal • likelihood "possible" and impact "severe" Output V.2.2 and VI.1.3: • high risk during manufacturing, maintenance and disposal

	• likelihood "possible" and impact "severe"
B) PS 3 – Resource Efficiency and Pollution Prevention	Guiding question: Are programme activities consistent with Good International Industry Practice (GIIP), i.e. employ the most appropriate technologies in the programme-specific circumstances? Please explain sufficiently the resulting significance of risk. Potential risky activities (including contributing factors such as location, associated activities) Output III Activity III.2 identify policy support Indirect impact resulting from policy advice recommending natural refrigeration applications that have a risk of for example escaping gases (natural refrigerant low GWP) during the use of applications. The risk only occurs if the installers are not following the required regulations. Output V Activity V.2.2: • risk of for example escaping gases (natural refrigerant low GWP) during the use of applications implemented as demonstration projects Output VI Activity VI.1.3 rollout of training programmes.: • risk of for example escaping gases (natural refrigerant low GWP) during the use of applications in the training programme Significance of Risk Output III and V: • low risk during manufacturing, maintenance and disposal • likelihood "possible" and impact "minor"
C) PS 4 – Community Health, Safety, and Security	Guiding question: Will human rights as expressed in international and regional human rights treaties be safeguarded and potential negative impacts on health and security of the affected population be prevented? Please explain sufficiently the resulting significance of risk. Potential risky activities (including contributing factors such as location, associated activities) Output III Activity III.2 identify policy support • Indirect impact resulting from policy advice recommending natural refrigeration applications that have a hazard due to flammability, electricity, pressure, temperature (hot, cold). The risk only occurs if applications are not implemented correctly and the installers are not following the required regulations. Significance of Risk Output V: • low risk/ no risk during manufacturing, maintenance and disposal • likelihood "unlikely" and impact "minor"
D) PS 5 – Land Acquisition and Involuntary Resettlement	Not applicable
E) PS 6 – Biodiversity Conservation	Not applicable

and Sustainable Management of Living Natural Resources	
F) PS 7 – Indigenous Peoples	Not applicable
G) PS 8 – Cultural Heritage	Guiding question: Could programme activities potentially have adverse impacts on cultural heritage? Does the programme promote the equitable sharing of cultural heritage benefits? Please explain sufficiently the resulting significance of risk. Potential risky activities (including contributing factors such as location, associated activities) Output V • Activity V.2.2demonstration sites: if newly established need to check if cultural heritage is affected Significance of Risk Output V: • likelihood "unlikely" and impact "minor"
Risk avoidance and mitigation strategy	If risks have been identified above, please elaborate on your planned risk avoidance and mitigation strategy in relation to each relevant Performance Standard. As long as the safety standards are respected and risk mitigation measures are applied, health and safety risks are very low and depend on the exact circumstances of the demonstration projects selected. International standards apply for all countries and are respected by established manufacturers/installers/service companies: Product standards (for certain products) IEC 60335-2-24, mainly on domestic refrigeration IEC 60335-2-40, EN 60335-2-40 on air conditioning systems, heat pumps, chillers EC 60335-2-89 on commercial refrigeration Group standards (more generic and overarching requirements based on common characteristics and practices of any air conditioning, refrigeration and heat pump equipment, installations and technician activities): ISO5149-1, -2, -3, -4 and EN 378-1, -2, -3, -4 EN 378 - Refrigerating Systems and heat pumps –Safety and environmental requirements: Please see here an introduction: http://area-eur.be/sites/default/files/2019-07/AREA%20Introduction%20to%20EN%20378%20-%20for%20Publication_0.pdf The standard refers to F-gases as well as F-gas alternatives and sets out requirements for the installation, service, maintenance, operation, dismantling of refrigeration, air conditioning and heat pump equipment at various locations. PS 2 Output V: Relevant safety standards and legislation address the aspects of occupational health and safety for refrigeration, air conditioning and heat pump installations.

	The implementation of safety standards and related legislation are prime responsibility of the contracted manufacturers, installers and service companies. We will include in the selection criteria of the contracting parties the following criteria a) compliance with national employment laws, b) application of GHG standards and Good Industry Practices to ensure health & safety of workers according to IFC PS 2. Output III, IV, VI As part of the policy advice and capacity building activities we will advise and teach according to IFC Performance Standards, particularly with regard to PS 2 labour and working conditions. PS 3 Output V We will conduct hazardous, climate damaging or ozone-depleting waste management (e.g. contracting of licensed enterprises, control of standards of disposal site or destruction facilities) and hazardous material management (ensure safety along entire supply chain) according to IFC PS 3 Output III, IV, VI As part of the policy advice and capacity building activities we will advise and teach according to IFC Performance Standards, particularly with regard to PS 3 resource efficiency and pollution prevention PS 4 Output III, IV, VI As part of the policy advice and capacity building activities we will advise and teach according to IFC Performance Standards, particularly with regard PS 4 community health and safety
Overall risk category:	Your overall risk category should be based on a holistic screening of risks based on the Performance Standards and programme-specific identification of risk avoidance and mitigation measures. ☐ A – Activities with potential significant adverse environmental or social risks and/or impacts that are diverse, irreversible, or unprecedented. ☐ B – Activities with potential limited adverse environmental or social risks and/or impacts that are few in number, generally site-specific, largely reversible, and readily addressed through mitigation measures. ☒ C – Activities with minimal or no adverse environmental or social risks and/or impacts.

Annex 3: Expenditure and Financing

See annex 3 documents as separate files.

Annex 4: Gantt chart on the programme schedule

Annex 4 - Gantt chart on the programme schedule

Programme title	COOL_ME – Scaling Up Sustainable COOLing in the Middle East
Programme number	20_I_379

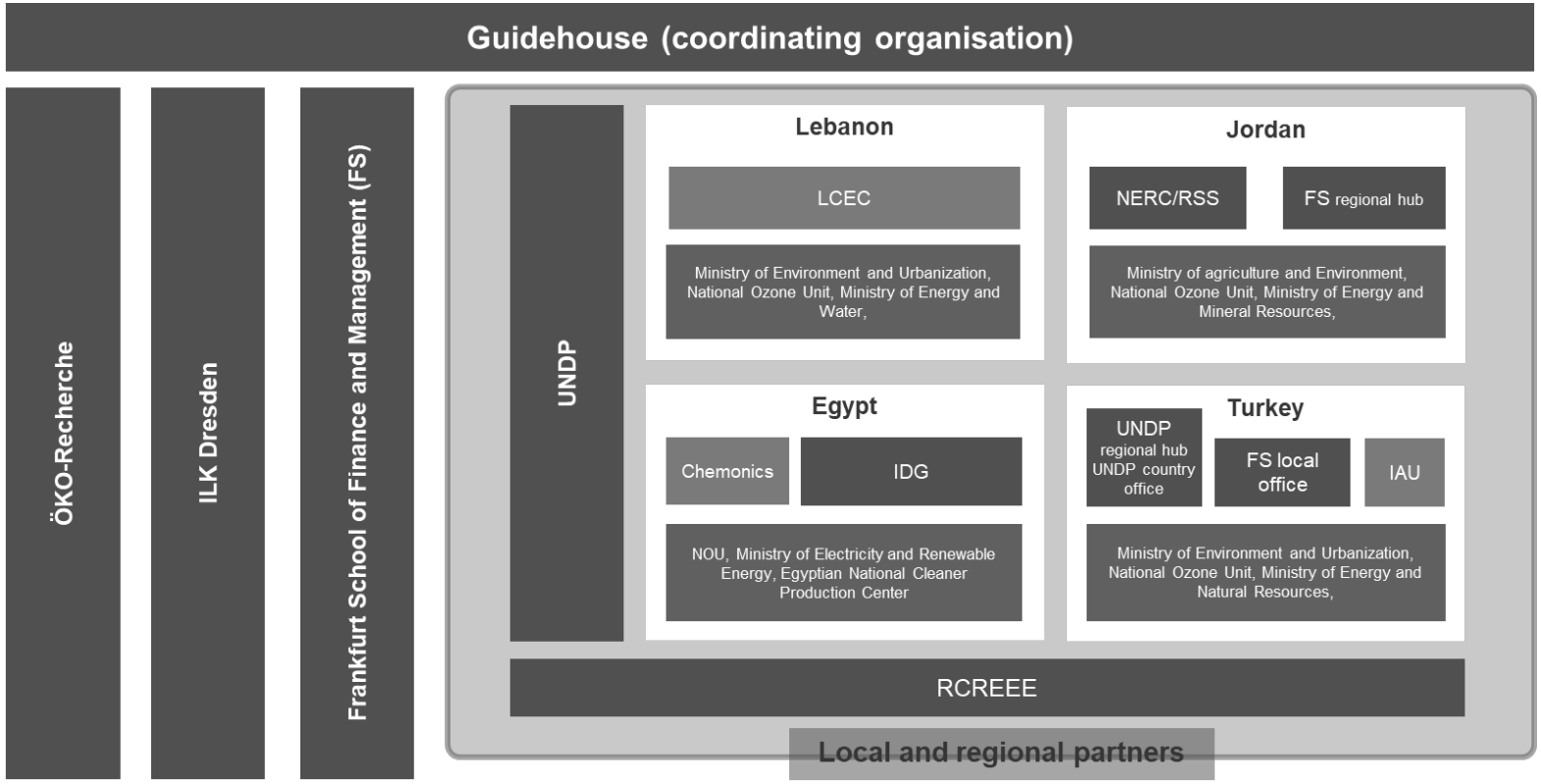
Year		2020	2021				2022				2023				2024				2025				2026			
	Goals and activities	4th quarter	1st quarter	2nd quarter	3rd quarter	4th quarter	1st quarter	2nd quarter	3rd quarter	4th quarter	1st quarter	2nd quarter	3rd quarter	4th quarter	1st quarter	2nd quarter	3rd quarter	4th quarter	1st quarter	2nd quarter	3rd quarter	4th quarter	1st quarter	2nd quarter	3rd quarter	4th quarter
Outcome	Conditions for increased uptake of sustainable cooling technologies in different cooling segments in the building sector (AC in residential and RAC in commercial buildings) encouraging early implementation of Kigali Amendment and Paris Agreement in Jordan, Lebanon, Turkey and Egypt are enabled.																									
Output I	National cooling sector baselines and pathways are developed																									
Work package I.1:	Develop cooling sector baseline study																									
Work package I.2:	Develop sector pathways for the transition of the cooling market																									
Output II	An inclusive and sustainable dialogue platform among dif-ferent stakeholder groups in the cooling sector is estab-lished																									
Work package II.1:	Establish COOL_ME cross-sector platform advisory committee																									
Work package II.2:	Designing and implementing working groups																									
Output III	The partner countries have been enabled to adopt, adjust and implement effective sustainable cooling regulation for early action on the Kigali Amendment																									
Work package III.1:	Conduct a regulatory gap analysis to map regulatory status quo and identify gaps																									
Work package III.2:	Identify and implement policy support using a menu approach and develop recommendations																									
Output IV	Improved understanding of sustainable cooling financing strategies by the financial sector																									
Work package IV.1:	Conduct specific assessment of the finance market																									
Activity IV.1.1	Analyse the sustainable cooling financing landscape and collect data																									
Activity IV.1.2	Identify matching opportunities for financing sustainable cooling technologies																									
Activity IV.1.3	Map the evolutionary market potential																									
Work package IV.2:	Conduct financial feasibility studies of potential sustainable cooling tech-nology investments for both clients and financial institutions.																									
Activity IV.2.1	Conduct market scoping and bankability screening																									
Activity IV.2.2	Derive inputs for the financial feasibility assessment																									
Activity IV.2.3	Develop financing solutions using outputs from financial feasibility assessment																									
Work package IV.3:	Develop financing strategies and business models by Aassessing potential for integrating sustainable cooling technologies into existing financial schemes																									
Activity IV.3.1	Provide robust proposals of given technology/solution for inclusion into an existing scheme/mechanism																									
Activity IV.3.2	Support the rollout of the new technologies in financing schemes																									
Activity IV.3.3	Support designing additional schemes/mechanisms																									
Output V	Technical knowledge on sustainable cooling improved and showcased through demonstration projects																									
Work package V.1:	Build up country specific catalogue of technical solutions																									
Work package V.2:	Deploy demonstration projects																									
Activity V.2.1	Project identification, selection and tendering																									
Activity V.2.2	Implementation of demonstration projects																									
Activity V.2.3	Performance monitoring of demonstration projects																									
Ouput VI	Technical capacity increased and support to vocational education provided																									
Work package VI.1:	Plan and deliver technical skills training																									
Activity VI.1.1	Assess needs for technical training																									
Activity VI.1.2	Develop customized training modules																									
Activity VI.1.3	Rollout of technical training modules																									
Milestone VI.1.1	20 trainings implemented																									
Work package VI.2:	Support curriculum development in vocational and technical education																									
Work package VI.3:	Foster regional exchange with regional conferences																									
Work package VI.4:	Deliver further forms of capacity building																									
Activity VI.4.1	Study Tours																									
Activity VI.4.2	Webinars																									
Ouput VII	Project information of sustainable cooling disseminated, and awareness raised																									
Work package VII.1:	Develop a communication and dissemination plan																									
Work package VII.2:	Implement communication and dissemination plan																									
Activity VII.2.1	Preparation and dissemination of project contents as communication materials																									
Activity VII.2.2	Participation in workshops, conferences, and related events																									

Annex 5: Organisation Chart of the Structural Arrangement of the Consortium

COOL_ME programme governance structure

Programme lead partner: Guidehouse is the coordinating organisation of the overall planning, executing, monitoring, controlling of programme. This includes managing, reviewing, and prioritising the day-to-day project activities with an objective to stay on time and under budget, as well as managing the project resources. Their responsibilities also include status and executive reporting, risk management, quality management, conflict mediation, project communication management, and stakeholder management. Also plays an essential role in capacity planning to ensure resource fulfilment to project demands.

- Leads core coordination team meetings monthly (1 overall meeting/month)
- Leads country planning meetings monthly (at least 1 per country / month)



Core coordination team
comprises of management representatives of Guidehouse, UNDP, FS, ILK and ÖKO-Recherche and oversees the entire project lifecycle, providing guidance on the overall strategic direction. They serve as the 'leadership' support for the project, resolve issues escalated by the Project Manager, and decide on all requests to change key project elements, when needed (e.g. updated status in a partner country).

- Meets monthly via teleconference, at least twice in person (joined with in-country meetings)

Demonstration deployment team
Comprises of UNDP and Guidehouse. Aligned with technical team, evaluate projects based on its assessment of their potential to contribute to the goal of accelerating uptake of sustainable cooling, the potential of scale economies and future learning opportunities

- Prepares and leads tendering (RAC equipment and services) and contracting for equipment delivery that will adhere with IKI requirements and UNDP procurement guidelines.
- Ensure country representation by regularly evaluating options, demonstration project budget availabilities, risk, and correlation with overarching project objectives

Technical team
Comprises of experts of Guidehouse, UNDP, FS, ILK, Öko-Recherche and RCREEE backed up by the technical expertise within IDG, IAU, NERC and LCEC. Takes part in working group meetings in the countries.

- Carries out activities outlined in programme proposal and provide solutions for content maters both country-specific and overarching.
- Identifies needed resources within their own organisations and utilise for programme execution.

Annex 6: Cooperation Agreement

See separate document for cooperation agreement

Annex 7: COOL_ME programme guiding principles

The success of international agreements like the Montreal Protocol and Kigali Amendments lies in bilateral and multilateral cooperation and the International Climate Initative plays an active role. The specific project aim is to support sustainable cooling technologies in **residential air conditioning and commercial air-conditioning and refrigeration focusing on solutions with natural refrigerants, or not-in-kind alternatives (district cooling, solar cooling etc)** The dissemination of knowledge and exchange all levels are central components of this project - both as project content and in project coordination. This is reflected in the guiding principles that will shape the consortium's approach:

Guiding principle 1: Dissemination of sustainable cooling technologies - making the benefits visible
Worldwide there is strong growth in the refrigeration and air conditioning sector; the use of fluorinated greenhouse gases, with their severe impact on the climate, as refrigerants or propellants remains high. The potential for mitigation is currently reflected in the Kigali Amendment of 2016 to the Montreal Protocol, which sets out international agreement on the progressive elimination of hydrofluorocarbons (HFCs). It focuses in particular on the establishment of climate-friendly refrigeration technologies and natural refrigerants and propellants.

- Focus on long-term - not mid-term solutions, sustainable solutions
- Create and verify impacts; be a lighthouse
- Keep the focus on implementation

Guiding principle 2: Cooperation at eye level - critical scrutiny of decisions

Working together at eye level (both within project team and with national stakeholders) creates space for openness and critical self-reflection, leading to more robust solutions. Projects can evolve in different directions, and good solutions for some may not work for all. Design processes should be questioned again and again at important points, and the moments of honest exchange should be used for readjustment.

The exchange of good practices should provide food for thought for one's own solutions instead of being a guideline or a decal. We will refrain from lecturing on "best practices" and instead discuss how challenges have been mastered in the past. We are open to alternative solutions.

Before working on solutions, it must be clear which local needs are central. Solutions can only be developed, and appropriate experiences shared on the basis of dialogue with local stakeholders

The design of the measures on site is iterative, decisions and assumptions are regularly questioned in a cycle and adapted to the available capacities and resources.

- Ensure country ownership; ensure governments are served and listened to
- Work in line with government priorities towards Montreal protocol and support its implementation other countries
- Respect national market structure and learn working with them; build in what is available and improve
- Plan and ensure steady and stable programme implementation within consortium and project partners

Guiding Principle 3: Anchoring and Multiplying Knowledge
The aim of the project is threefold:

Political: Support the implementation of the Paris Agreement (through NDCs) and Kigali Amendment objectives

Technical: Enable F-gas free- and energy-efficient solutions to mitigate the rising cooling demand

Financial: Develop financial models to boost cooling transition

It is important to create robust knowledge on sustainable cooling technologies in such a way that it can be applied after the end of the project or beyond its scope. To achieve this, the team builds on existing structures and needs (see also Guiding Principles 1 and 2), which are identified with the help of local partners and in exchange with country governments.

The aim is to offer sustainable cooling a perspective in the country context and with the different target groups. Approaches such as the capacity building will strengthen local partners and actors in their role and allow them to act as multipliers. Economic incentives, which remain in place even after the end of the project, are a strong driver for sustainable cooling solutions. The exchange among business representatives, for example, can point out sustainable cooling technologies that are successful in other regions.

- Have upscaling in mind, avoid activities isolated, aim for long-standing activities that others can learn from,
- Open to share; ensure documentation of our work, accessibility of materials not only to project partners but to the region and beyond

- Utilise outreach to the maximum by website (links to initiatives, available technologies, available funding per countries, finance component is new - innovative) / involve public to share

Guiding principle 4: Building bridges - creating synergies from different areas

The measurable added value of the project arises from the fact that the different levels are thought together from the outset and thus synergy potentials are identified and fully exploited (three pillars; policy – technology – finance). This is achieved through regular exchange and a permanently involved overall management, which keeps the overview and correlates the activities in the project. The project pays attention to interfaces between the work packages, so that experiences from working on policy, technical and finance perspectives can also flow into the other activities. A prominent example is the joint or coordinated selection process of demonstration processes.

At the same time, country and actor-specific differences are taken into account in terms of Guiding Principles 2 and 3. For us, using synergies does not mean applying a standard solution for all, but learning from and working together without the result having to be the same for different target groups or countries.

The project management and the teamwork out to what extent questions of individual work steps are transferable and to what extent the different target groups of each work package (such as policy makers, technology providers, banks and general public) can mutually reinforce each other. At the same time, flanking measures outside the project or the IKI are also taken into account.

- Keep holistic approach: among policy, finance, technical perspectives, through cradle to grave thinking and by including multi-stakeholders

Guiding Principle 5: Exchange - Building a Network
Through networking and exchange, existing sustainable cooling technologies and their benefits become visible. Well-networked bottom-up activities can thus gain regional importance and influence political decisions.

Where previously expertise was limited, exchanges between local and regional actors can replace the lack of a specialised team. Cooperation thus strengthens the individual and at the same time serves the dissemination of sustainable cooling technologies. The same applies to exchanges between politicians at the national and regional level.

We show the opportunities that sustainable cooling offers. For example, we provide information on available technologies and create networks. The programme facilitates the dissemination process of sustainable cooling directly and indirectly: We help with concrete knowledge as well as by facilitating the exchange and learning among each other at workshops and conferences.

Annex 8: The first support letter from industry

efficient energy
be part of tomorrow

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Fax. +49(0)89-693369-8610

Feldkirchen, January, 29th, 2020

COOL_ME - Scaling up sustainable COOLing in the Middle East

To whom it may concern,

We hereby would like to express our wish to cooperate in the COOL_ME program for promoting sustainable cooling in the Middle East. Among the mentioned countries, Turkey is of special interest for us as we see our technology fits well into the requirements of this market, in terms of climate conditions and regulatory landscape. In case of approval, we will consider to support the program through pro-bono activities e.g. participating in meeting, providing technical equipment, etc.

Efficient Energy GmbH is an innovative manufacturer and system supplier of environmentally friendly refrigeration technology, based in Feldkirchen near Munich, Germany.
The company uses pure water (R718) as the refrigerant in its eChiller product range, thereby entirely avoiding fluorinated refrigerants. The eChiller product series are the only chillers worldwide, which use the natural safety refrigerant water (R718) as the refrigerant, offer outstanding energy efficiency. Already today, our eChillers comply with the F-Gas Directive and any refrigerant-related safety requirements.
The eChillers' cooling capacities range from 20 to 120 kW depending on model, and the individual units are scalable. The refrigeration machines are ideally suited to cooling server rooms, buildings and industrial processes.

Efficient Energy GmbH helps its customers overcome the increasing regulatory challenges of refrigeration technology, and offers them long-term, sustainable solutions with its eChiller model range. With its outstanding cost efficiency and low CO2 footprint, companies benefit on many fronts.

Our pioneering technology has won multiple awards, among them the RAC Cooling Industry Award and the European Business award for the Environment from the European Commission.
We are looking forward to hear back from you and are available for any further questions you may have.

Yours sincerely,

Georg Dietrich
CEO

Annex 9: COOL_ME summary slide deck

See separate document for the slide deck

Annex 10: List of abbreviations

AC	Air conditioning
AKU	Al Kafaat University
BAU	Business as usual
CBD	Convention on Biological Diversity
CCAC	Climate and Clean Air Coalition
COP	UNFCC Conference of Parties
EBRD	European Bank of Reconstruction and Development
EE	Energy efficient
EEAA	Egyptian Environmental Affairs Agency
EPR	Extended producer responsibility
EU	European Union
FI	Financing Institutions
GCF	Green Climate Fund
GEF	Global Environmental Facility
GEFF	Green Economy Financing Facility
GWP	Global warming potential
HBRC	Housing and Building National Research Center
HPMP	HCFC phaseout management plans
HVAC	Heating, ventilation and Air conditioning
IAU	Istanbul Aydin University
IDG	Integrated Development Group
IEA	International Energy Agency
IFC	International Finance Corporation
IFI	International financing institutes
IGS	Indicator Guidance Sheets
IIR	International Institute of Refrigeration
IKI	International Climate Initiative
INDC	Intended nationally determined contributions
ISKID	Airconditioning and refrigeration manufacturers association
ISKAV	Heating Cooling Air Conditioning Research & Education Foundation
IZODER	Association of Insulation material manufacturers
JREEEF	Jordan Renewable Energy & Energy Efficiency Fund
LCEC	Lebanese Center for Energy Conservation
LEEREF	Lebanon Energy Efficiency and Renewable Energy Financing Facility
MENA	Middle East and north Africa
MEPS	Minimum energy performance standards
MEW	Ministry of Energy and Water
MIT	Massachusetts Institute of Technology
MOP	Meetings of the Parties
MLF	Multi-lateral funding
NAMA	Nationally appropriate mitigation Action
NDC	Nationally determined contributions
NEEAP	National Energy Efficiency Action Plan
NEEREA	National Energy Efficiency and Renewable Energy Action
NERC	National Energy Research Center
NOU	National Ozone Unit
ODS	Ozone depleting substances
RAC	air-conditioning and refrigeration
RCREEE	Regional Center for Renewable Energy and Energy Efficiency
RE	renewable energy
SLCP	Short-lived climate pollutants
TEAP	Technology and Economic Assessment Panel
TOKI	Housing Development Administration of Turkey
UNDP	United Nations Development Programme
UNIDO	United Nations Industrial Development Organisation
VET	Vocational and educational training