Terminal Evaluation of the UNEP Project

"Building high-level support and capacities to enhance climate and ozone protection through cooling efficiency (Cooling Project)"

PIMS no. 01992

2017 – 2022

Evaluation Office of the United Nations Environment Programme

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Front cover: Africa Center of Excellence for Sustainable Cooling, Kigali, Rwanda: under-construction demo hall (left), sign near entrance to campus (middle), adjacent smart farmland (right) ©UNEP/ Eugenia Katsigris, Evaluation Mission (November 2023)

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(Building high-level support and capacities to enhance climate and ozone protection through cooling efficiency or the “Cooling Project”)
(PIMS ID 01992)
(Date 02/24)

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The Evaluation Consultants hope that the findings, conclusions and recommendations will contribute to the successful transition to energy efficient cooling products and processes in all participating countries towards a low carbon economy.

BRIEF CONSULTANTS' BIOGRAPHY

The Principal Evaluator has over 25 years' experience with a recent focus on the development and management of projects in renewable energy and energy efficiency, sustainable transport, and green city development. These projects encompass his experience in environmental management, institutional capacity building, policy and economic analysis, planning, management, monitoring and evaluation for projects in more than 40 countries. His demonstrated abilities and experience include adoption and market transformation of sustainable low carbon technologies; formulation and preparation of low carbon and climate change investment projects; partnership building as a means to achieving adoption of clean technologies and energy efficiency practice; development and mentoring of energy, environmental and water resource professionals; networking, coordinating and negotiating projects in low carbon and climate change in several countries.

The Evaluation Specialist has extensive experience supporting the initiatives of international organizations, NGOs, and business clients across sectors, including energy efficiency, renewable energy, transport, sustainable cities, and industry. She has been involved in numerous development projects, particularly in the complementary areas of project evaluation and project design and also has experience in project implementation. Many of these projects have been GEF (Global Environment Facility) funded projects with a UN entity as Implementing Agency. She also has substantial private sector experience, assisting a range of western companies in their China initiatives and lived in China for 14 years. She brings strengths in analysis, synthesis, and in-depth stakeholder consultation to her evaluation engagements.

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ABOUT THE EVALUATION

Joint Evaluation: No

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Brief Description: This report is the Terminal Evaluation of the UNEP project: "Building high-level support and capacities to enhance climate and ozone protection through cooling efficiency (the Cooling Project)" implemented between November 2017 and November 2022. The Project's overall development objective was to significantly increase and accelerate the climate and development benefits of the Montreal Protocol refrigerant transition by maximizing a simultaneous improvement in the energy efficiency of the cooling sector. The evaluation sought to assess project performance (in terms of relevance, effectiveness and efficiency), and determine outcomes and impacts (actual and potential) stemming from the Project, including their sustainability. The evaluation has two primary purposes: (i) to provide evidence of results to meet accountability requirements, and (ii) to promote learning, feedback, and knowledge sharing through results and lessons learned among UNEP, and the relevant agencies of the project participating countries.

Key words: Building Codes; Building Standards; Energy Efficiency in Buildings; Energy Efficiency Benchmarks; Energy Efficient Cooling; Green Buildings; Kigali Amendment; Minimum Energy Performance Standards (MEPS); Model Regulations; National Cooling Action Plan (NCAP); National Cooling Strategy; Product Registration System (PRS); Refrigerator Standards; Room Air Conditioner Standards; Sustainable Building Practices; Sustainable Cold Chain; Sustainable Cooling; Zero Net Energy Building (ZNEB).

Primary data collection period: November to December 2023

Field mission dates: 12-29 November 2023

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LIST OF ACRONYMS

AC	Air Conditioner
ACES	Africa Centre of Excellence for Sustainable Cooling and Cold-Chain
AO	Administrative Officer
ASEAN	Association of Southeast Asian Nations
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers
AWP	Annual Work Plan
CAP	OzonAction's Compliance Assistance Programme
CC	Climate Change
CCAC	Climate and Clean Air Coalition
CCM	Climate Change Mitigation Results Framework
CFC	Chlorofluorocarbon
CFL	Compact Fluorescent Lamps
CHOGM	Commonwealth Heads of Government Meeting
CLASP	Collaborative Labeling and Appliance Standards Program
Cooling Project	Kigali Cooling Efficiency Project under UNEP
COVID-19	Coronavirus disease
CSC	Centre for Sustainable Cooling
CSA	Country Savings Assessment
CSC/UoB	Centre for Sustainable Cooling/University of Birmingham
CSPF	Cooling Seasonal Performance Factor
DANIDA	Danish International Development Agency
DCS	District Cooling System
DEFRA	Department for Environment, Food and Rural Affairs, UK Government
EAC	East African Community
EACREEE	East Africa Centre of Excellence for Renewable Energy and Energy Efficiency
ECOFRIDGES	ECOWAS Refrigerators and Air Conditioners Initiative
ECOWAS	Economic Community of West African States
EE	Energy Efficiency
EELA	Energy Efficient Lighting and Appliances for East and Southern Africa
EOP	End of Project
ESCO	Energy Service Company
FAO	Food and Agriculture Organization of the United Nations
FMO	Fund Management Officer
GBP	Great Britain Pound
GCF	Green Climate Fund
GCoM	Global Covenant of Mayors for Climate & Energy
GDP	Gross Domestic Product
GEF	Global Environment Facility
GEWE	Gender Equality and Women's Empowerment
GHG	Greenhouse gas
GIFT City	Gujarat International Finance Tech-City
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit (German Corporation for International Cooperation)
GPP	Green Public Procurement
GW	Gigawatt
GWh	Gigawatt-hour
GWP	Global Warming Potential
HCFCs	Hydrochlorofluorocarbons
HFCs	Hydrofluorocarbons

ICAP	India Cooling Action Plan
IEA	International Energy Agency
IFC	International Finance Corporation
IGEF	Indo-German Energy Forum
IIEC	International Institute for Energy Conservation
INV	Investment
ISO	International Organization for Standardization
KCEP	Kigali Cooling Efficiency Program
ktCO2	kiloton of carbon dioxide
kWh	kilowatt-hour
LBNL	Lawrence Berkeley National Laboratory (USA)
M&E	Monitoring and Evaluation
MEPS	Minimum Energy Performance Standards
MLF	Multilateral Fund (associated with Montreal Protocol)
MP	Montreal Protocol
MTE	Mid-Term Evaluation
MTS	UNEP Medium-Term Strategy
MVE	Monitoring, Verification and Enforcement
MW	Megawatt
NCAP	National Cooling Action Plan
NAMA	Nationally Appropriate Mitigation Action
NCs	National Communications
NDC	Nationally Determined Contributions
NEP	National energy policymaker
NGO	Non-Governmental Organization
NIUA	National Institute of Urban Affairs (India)
NOO	National Ozone Officers
NPD	National Project Director
NRDC	Natural Resources Defense Council
OLADE	Organización Latinoamericana de Energía (Latin American Energy Organization)
PCA	Project Cooperation Agreement
PIMS	Program Information and Management System (UNEP)
PM	Project Manager
PLF	Project logical framework
PMU	Project Management Unit
PoW	Programme of Work
PrE	Procurement Expert
ProDoc	Project Document (UNEP)
PRS	Project Registration System (U4E)
PSC	Project Steering Committee
R-12	Dichlorodifluoromethane
R-COOL	Rwanda Cooling Initiative
RAC	Room air conditioner
RACHP	Refrigeration, air conditioning, and heat pumps
RCREEE	Regional Center for Renewable Energy and Energy Efficiency (based in Cairo)
RE	Renewable energy
REMA	Rwanda Environment Management Authority
RMI	Rocky Mountain Institute
RToC	Reconstructed ToC
S&L	Standards and Labelling

SACREEE	South African Development Community Centre for Renewable Energy and Energy Efficiency
SADC	South African Development Community
SAICM	Strategic Approach to International Chemicals Management
SDG	Sustainable Development Goal
SE4ALL	Sustainable Energy for All
SIDS	Small Island Developing States
SMART	Specific, Measurable, Achievable, Relevant and Time-bound
SPOKE	Specialized Outreach and Knowledge Establishment (as an extension of ACES)
SPP	Sustainable Public Procurement
SSC	South-South Cooperation
SSFA	Small-Scale Funding Agreement
tCO_2	ton of Carbon Dioxide (-equivalent)
TABREED	National Central Cooling Company PJSC (UAE)
TAC	Technical Advisory Committee
TE	Terminal Evaluation
ToC	Theory of Change
TWh	Terawatt-hour
UAE	United Arab Emirates
UNDESA	United Nations Department of Economic and Social Affairs
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
UNFCCC	United Nations Framework Convention on Climate Change
UNIDO	United Nations Industrial Development Organization
UNOPS	United Nations Office for Project Services
UNSDCF	United Nations Sustainable Development Cooperation Framework
UoB	University of Birmingham, United Kingdom
USD	US Dollar
U4E	United for Efficiency
WFP	World Food Programme

PROJECT IDENTIFICATION TABLE

Table E-1: Project Identification Table

UNEP PIMS ID:	01992		
Implementing Partners	n/a		
Relevant SDG(s):	SDG 7: Ensure access to affordable, reliable, sustainable and modern energy for all; Target 7.3: By 2030, double the global rate of improvement in energy efficiency; Indicator 7.3.1: Energy intensity measured in terms of primary energy and GDP.		
Sub-programme:	Climate Action	**Expected Accomplishment(s):**	1A, 2A, 3A, 1B and 3B
UNEP approval date:	30 November 2017	**Programme of Work Output(s):**	122.3 Global Action on Energy Efficient Appliances and Equipment
***Expected* start date:**	November 2017	**Actual start date:**	November 2017
***Planned* completion date:**	November 2021	**Actual operational completion date:**	November 2022
***Planned* total project budget at approval:**	USD 11,720,000	**Actual total expenditures reported as of December 2022:**	USD 10,872,834[1]
***Planned* Environment Fund allocation:**	n/a	**Actual Environment Fund expenditures reported as of December 2022:**	n/a
***Planned* Extra-Budgetary Financing:**	USD 11,720,000	**Secured Extra-Budgetary Financing:**	USD 28,658,431
		Actual Extra-Budgetary Financing expenditures reported as of December 2022:	USD 10,872,834[2]
First disbursement:	17 December 2017	**Planned date of financial closure:**	30 May 2023
No. of formal project revisions:	1	**Date of last approved project revision:**	5 October 2022
No. of Steering Committee meetings:	4 (2019, remote in 2020, remote in 2021, February 2023)	**Date of last/next Steering Committee meeting:**	Last: February 2023 / Next:
Mid-term Review/ Evaluation *(planned date):*	n/a	**Mid-term Review/ Evaluation (actual date):**	n/a
Terminal Evaluation *(planned date):*	November 2022	**Terminal Evaluation (actual date):**	November 2023
Coverage - Country(ies):	Bahamas, Barbados, Jamaica, Dominican Republic, Saint Lucia, Rwanda, Senegal, Ghana, Kenya, Nigeria, Egypt, Viet Nam, Cambodia, Singapore, Malaysia, Philippines, India, China	**Coverage - Region(s):**	Latin America and Caribbean, Asia and the Pacific, Africa, Middle East, West Asia
Dates of previous project phases:	n/a	**Status of future project phases:**	Active implementation of *Accelerating the Global Shift to Energy-Efficient and Climate-Friendly Appliances and Equipment* (Project ID: 155056)

[1] This is the Evaluation Team's estimate based on review of financial reports for individual subprojects. A consolidated financial report was initially requested, but the Team was instead referred to these individual subproject financial reports.
[2] As in Footnote 1, this figure is the Evaluation Team's estimate based on review of financial reports for individual subprojects.

EXECUTIVE SUMMARY

Project background

E-1. Annual global emissions from the cooling sector (refrigeration and air conditioning) was more than 3.7 Gt CO_2 in 2014[3], with over 70% due to indirect emissions from electricity consumption. Cooling was often overlooked as an urgent development issue: Over 1 billion people lack access to modern energy and cooling appliances, but only 0.04% of total Official Development Assistance was allocated to cooling solutions in 2015[4]. Lack of access to sustainable and affordable cooling has economic costs related to the unsafe production and storage of food, challenges in health clinics keeping vaccines cold, and lack of human comfort in homes, schools, commercial establishments, and workplaces.

E-2. In many emerging economies, the AC and refrigerators found in the market have suboptimal efficiency, use large amounts of electricity, contain ozone depleting and high global warming potential (GWP) refrigerants that are harmful for the environment. This has been caused by absent or poorly designed regulatory frameworks; governments lacking data on cooling equipment performance; cooling products with the lowest first cost (rather than lowest life cycle cost) being purchased; and little or no incentive for consumers to address electricity waste.

E-3. Decision XXVIII/3 of the 28th Meeting of the Parties to the Montreal Protocol (MP) in 2016 adopted the Kigali Amendment that recognizes the need to couple energy efficiency improvements with reduction in the production and use of high-global warming potential hydrofluorocarbon (HFC) refrigerant. The Decision notes the air-conditioning and refrigeration sector represents a substantial and increasing percentage of global electricity demand and improvements in energy efficiency can deliver co-benefits for sustainable development, including those for energy security, public health and climate change mitigation.

E-4. The Kigali Cooling Efficiency Program or KCEP (renamed Clean Cooling Collaborative or CCC in 2021), managed by Climate Works, is a philanthropic programme of 18 foundations supporting energy efficiency aspect of the Kigali Amendment and representing a major source of funds for the UNEP Project: "*Building high-level support and capacities to enhance climate and ozone protection through cooling efficiency*", often referred to as the Cooling Project. Currently, 155 countries, as signatories of the Kigali Amendment, have committed to cutting production and use of HFCs used in refrigeration and air conditioning by more than 80% over the next 30 years. The UNEP Cooling Project focused on the energy efficiency of cooling to increase and accelerate the climate and development benefits of the Kigali Amendment.

E-5. KCEP funding of UNEP for high-level advocacy and Twinning, as well as for sub-projects competitively bid for, formed the basis of the Cooling Project, to which funding and sub-projects with other donors was later added. The original Project duration of 48 months starting November 2017 was extended to 60 months ending November 2022. By then, the Cooling Project had expended USD10,872,834 of which USD8,669,681 was CCC funds, representing about 17% of the USD52 million allocated by donors to KCEP at that time.

This evaluation

E-6. This Terminal Evaluation (TE) was undertaken 12 months after completion of the Project and is guided by the Terms of Reference in Annex X, UNEP Evaluation Policy, the UNEP Evaluation Manual, and the UNEP Programme and Project Management Manual. This TE set out (i) to provide evidence of results to meet accountability requirements, and (ii) to promote operational improvement, learning and knowledge sharing through results and lessons learned from UNEP, U4E and other executing partners to benefit future project formulation and implementation.

E-7. The primary focus for the TE was to ascertain the effectiveness of technical assistance provided in driving the transition to energy efficient and climate friendly cooling systems for private and

[3] Green Cooling Initiative: *Green Cooling Technologies: Market trends in selected refrigeration and air conditioning subsectors*, GIZ, 2015.
[4] UNEP Cooling Project, Project Document, 2017.

public sector entities, and to develop knowledge and capacities on energy efficiency (EE) in cooling products and processes that show operational cost savings and GHG emission reductions. Stakeholder consultations under this TE focused on confirming the actual outcomes of the Project and understanding their surrounding circumstances.

E-8. Data collection came mainly from Project reports, 44 interviews with relevant stakeholders (the Project team, Project partners, National Executing partners, and beneficiaries), of which 26 were male and 16 female[5], and analyses of the global team. Site visits were made to Malaysia, Rwanda and France (Paris) and interviews were also conducted virtually.

E-9. Limitations to this TE included the inability of the Evaluators to visit many of the stakeholders, particularly those in India, the Middle East, Africa, the Caribbean and Latin America and challenges in determining attribution of impacts. The mitigative strategies were virtual interviews and, based on the RToC, establishment of a credible association between the implementation of Project activities and observed positive effects, namely, a strong causal narrative for a chronological sequence of events and the active involvement and engagement in critical processes of key actors. Further challenges include: the huge quantity of activities and outputs (of varying scale) delivered; the difficulty establishing a financial overview (given multiple donors); and that, while the Project ended in 2022, activities have continued in a second phase, in some cases making it difficult to assess performance up to the end point and offer appropriate lessons and recommendations.

Key findings

E-10. Though the strength of the Project design was in its holistic approach, the Project Logical Framework (PLF) appears to be hastily assembled amidst the rapid approach of anticipated initial round of Twinning Training. There were some indicators that were not appropriate to what the Project could achieve given its activities and original four-year timeline, not SMART in other ways, and that overlapped with one another, leading to confusion over what targets the Project aimed to achieve (Paras 72-73).

E-11. The Project, however, did deliver outputs and achieve outcomes and likelihood of impact:

- the availability of most outputs was generally 'Highly Satisfactory' including the availability of:
    - ample communications campaigns, multi-stakeholder collaboration platforms and supporting material for senior government officials and implementing partners;
    - a global scientific assessment on climate friendly and energy efficient cooling, namely the UNEP/IEA report "Cooling Emissions and Policy Synthesis Report: Benefits of cooling efficiency and the Kigali Amendment" as well as other papers, policy briefs and reports mentioned in Para 86;
    - numerous sustainable cooling reports, model regulations and tools designed to inform and guide senior officials towards the uptake of energy-efficient and climate-friendly products;
    - highly successful twinning workshops to train NEPs and NOOs on climate friendly and energy efficient cooling that were organized to foster collaboration;
    - national policy strategies and programmes such as NCAPs based on the Cool Coalition template and methodology, for several countries (Paras 123-172);
- where the availability of outputs was generally 'Satisfactory' including the availability of:
    - software for product registration systems (which was not limited in use) and country savings assessments (which were widely used) (Paras 100-106);

[5] A few stakeholders were interviewed more than once.

- regional policy roadmaps and programmes available in ASEAN, SADC, and EAC, and the unified template adopted by Caribbean nations for their draft country roadmaps (Paras 107-122);

- The achievement of all three outcomes rated as 'Highly Satisfactory' including:
  - the outcome of "political leaders have the information to understand the challenges posed by market uptake of unregulated products and proactively support the policy measures required to achieve a sustainable, strategic structural change in their cooling product market" achieved through the formation of Cool Coalition and preparation of U4E guidelines for household appliances, specifically for ACs and refrigerators, used (i) extensively by other donors in their projects and, (ii) in the case of China and India, as a result of their involvement in developing the model regulations, together thus influencing MEPs of various countries, requirements for financial mechanisms of donor projects, and green procurement standards of countries (Para 177);
  - the outcome of "National Ozone Officers and Energy Officials from developing countries support the design and implementation of policies that improve cooling product performance to achieve a sustainable, strategic structural change in their cooling product markets" partly achieved through the highly successful twinning workshops (Para 178), which were assessed favourably by attendees; and
  - the outcome of "roadmaps, strategies and related market transformation integrating health, gender, environment and poverty alleviation are officially endorsed by developing and emerging economy national governments to achieve a sustainable, strategic structural change in their cooling product markets" achieved through:
    - catalyzing interest in many countries in the creation of national roadmaps from regional harmonization;
    - dedicated advice on green public procurement in India, Germany, China, Morocco, Ghana, and Egypt with other countries interested; and a set of sustainable public procurement workshops in June 2021 to government officials from multiple ASEAN and Sub-Saharan countries.
    - integration of EE into Montreal Protocol forcing many cooling equipment manufacturers to invest in new production lines starting in 2019 to address EE based on their raised awareness of MEPS and 600+ small projects to be funded by the MLF for upgrading cooling production lines of manufacturers to produce more efficient equipment with each project on the order of USD50,000 to USD250,000;
    - Rwanda serving as a champion country, (i) preparing and adopting a national cooling strategy with MEPS, labels, product registration system, voluntary financial mechanisms, and calling for a cold chain centre of excellence, which was awarded by CCC for being the first developing nation with such a plan adopted by Cabinet; (ii) requiring distributors to import only equipment that meets these MEPS which are the most stringent in Africa and setting the first energy labelling requirements; (iii) securing an entire headquarters campus with facilities for research, testing and training on sustainable cold chain solutions with initial training in October 2023 and continuing thereafter, UNEP and Government of Rwanda preparations for GCF follow-up funding for enabling activities for "Specialized Outreach and Knowledge Establishment" or SPOKEs to expand cold chain to rural Rwanda and other countries (Para 179);

- The achievement of likelihood of impact was 'Moderately Likely' mainly due to the UNEP-led Cool Coalition with the United Arab Emirates' incoming presidency of COP 28, announcing the development of a Global Cooling Pledge and a "Cool COP Menu of Actions" that was featured prominently at COP 28. This should leverage more financing for cooling market transformation. In addition, the high-level political and industry commitments are *only partially in place* with most governments and industry requiring 3 to 5 years for respective changes to current market conditions and production lines to transition to eco-efficient cooling solutions (Paras 180-185).

- Project sustainability is considered 'Likely', with strong socio-political, financial, and institutional groundwork laid for ongoing impact. Key aspects include: The project's model regulations for efficient cooling have been adopted for promotion by other organizations and donors, as well as being adopted as regulations by some countries. The project's efforts to bring together ozone officers and energy officers of countries (via "twinning" workshops) to address the dual energy efficiency and refrigerant aims of the Kigali Amendment have been picked up by the MLF, which is continuing the funding of such efforts. The first-of-a-kind Africa Centre of Excellence for Sustainable Cooling and Cold-Chain (ACES) and sister centres of excellence in Haryana and Telangana, India have received strong support from the Rwandan and Indian state governments and substantial ongoing donor support from the Government of the United Kingdom with over USD20 million in contributions. Satellite demonstration sites ("SPOKEs") are being set up in Kenya, Lesotho, and Senegal. The project's template for NCAPs have been adopted by a number of players resulting in around 20 countries now having NCAPs based on the template. The success of the Cool Coalition and its Global Cooling Pledge contribute to the likelihood of sustainability of results.

Conclusions

E-12. From November 2017 to November 2022, the Cooling Project has performed very well with good timing and high levels of success, raising awareness, securing adoption of new policies and programmes, and building understanding of policymakers and other relevant stakeholders on what is needed to advance the cooling solutions, in a sector that was not given due consideration prior to 2017. The Project promoted prioritization of cooling problems and identified intervention gaps and appropriate approaches to these gaps, encouraging collaboration with academia, civil society and manufacturers of cooling equipment, and countries to adopt and implement their own NCAPs, MEPS, labels, product registration systems, financial mechanisms, enforcement measures, and green procurement.

E-13. The numerous successes of the Cooling Project include:

- Project synergized with the GEF Leapfrogging project to get appliances to be their own EE category with various agencies (such as IEA, UNIDO and CLASP), rather than merely being lumped in with buildings, resulting in more focused, strategic initiatives and financial resource mobilization to address this high potential area for EE ;
- bringing together of over 100 organizations to form the Cool Coalition and the establishment of the Coalition's working groups, raising the profile of cooling as a key sector to address for EE and CCM results;
- model regulation guidelines as a basis for best practices with MEPS, labels, sustainable public procurement, and financial mechanisms, including development and deployment of the first-ever commercial and domestic refrigerators, room ACs (RACs), ceiling fans, to unlock electricity savings and reduce projected GHG emissions and cold chain off-grid refrigeration to reduce food waste and increase access to cooling;
- capacity building integrating EE for Montreal Protocol NOOs from ministries of environment and NEPs from ministries of energy through twinning workshops in 2018 and 2019 with more than 400 officials trained, breaking down silos of EE and MP information between NOOs and NEOs and based on this success has prompted the Multilateral Fund (MLF) of the Montreal Protocol to support a new round of Twinning which is expanding to include financial officials;
- helping to make the case for the MLF allocating pilot funds of USD20 million (aside from the much smaller funds allocated for twinning) for EE, an amount likely to be expanded under the recent, new MLF allocation of almost USD1.0 billion;
- the Project's NCAP guidelines and template led to the development of a number of NCAPs facilitated by other organizations;
- impact on developed economies of CSAs for 156 developing countries and emerging economies for ACs, commercial refrigeration, and domestic refrigeration which serve as a reference in Montreal Protocol Technical Advisory Assessment Panel, CCC and many other's reports;

- wide influence of cooling related model regulations via other donor projects, estimated by sources to represent hundreds of millions of US dollars in investment;
- regional harmonization, which brought together regions in Africa and Asia. Donor funding and time does not allow to work on a individual country basis. Hence, model regulations are needed at the global level, regional harmonization is needed to bring groups of economies together;
- Green Procurement in India where a comparison of specifications from the Indian Government for ACs in 2019 to U4E model regulations led to the Indian Government accepting improved ACs for public procurement with these specifications set to become mandatory from 1 January 2023;
- main manufacturers making investments in new production lines starting in 2019 to address EE based on their raised awareness of MEPS;
- Project's influence on China, which produces 70 to 80% of world's RACs, leading to China targeting substantially higher MEPS for RACs in its 2019 MEPS issuance than initially planned;
- development of strategy considered highly needed and thus highly attractive by donors, government, and evaluators alike, mobilizing both significant donor financing and country interest, for the critical and intractable problem of sustainable cold chain deployment in developing countries, particularly Africa;
- development of Sustainable Public Procurement Toolkit for cooling appliances and lighting, integrating the technical, financial, and governance elements define the sustainability of such products;
- Project's influence in 45 countries included climate-friendly cooling in their enhanced 2020 NDCs.

E-14. There are many other examples. However, there is a need to ramp up market transformation of cooling products to meet net zero targets by 2050 and achieve 67% of the cooling targets by 2030. The Cooling Pledge by the Cool Coalition, while a good achievement, does not go far enough in a compressed period of time to 2030. Over half of the countries still do not have MEPS, and instead have low efficiency levels for ACs, which needs to be addressed (Paras 233-234). Regional harmonisation initiatives in Southeast Asia (10 countries), Southern Africa (16 countries) and Eastern Africa (6 countries) assisted in increasing putting MEPS higher on the political agenda for governments.

E-15. Table 2 summarizes the ratings with respect to the evaluation criteria.

Table E-2: Summarized Rating Table

Criterion	Rating
A. Strategic Relevance	HS
B. Quality of Project Design	S
C. Nature of External Context	MU
D. Effectiveness	HS
E. Financial Management	HS
F. Efficiency	HS
G. Monitoring and Reporting	MU
H. Sustainability	L
I. Factors Affecting Performance	HS
Overall Project Rating	**HS**

E-16. Table 3 summarizes responses to the TOR's five strategic questions.

Table E-3: Strategy Questions and Summary Responses

Strategic Question	Summary Response of Evaluation Team
1. To what extent were synergies created in the training and use of tools between the national and regional levels to achieve full cooling product market transformation?	The Project successfully adopted a cost-effective strategy of leveraging regional work to achieve national results, most notably, the ASEAN EE RAC roadmap work influenced member nations to increase their targets. Other regional work of note that is influencing national action is regional MEPs work in the southern Africa and eastern Africa regions. Caribbean work leveraged a single regional template for individual NCAPs.
2. What worked and what did not work in terms of procurement?	What worked: The Cooling Project engaged organizations with expertise in EE to prepare critical documents of good quality whose adoption will lead to project impact and sustainability. For the substantial equipment required by ACES, to increase cost effectiveness, the project did not outsource procurement, but instead started quite early. What didn't work: With a key partner, LBNL, UNEP was unable to realize a contract due to legal offices of the two agencies not agreeing on content. While the two organizations still benefited from cooperation, finding a direct way to cooperate is desirable.
3. How were linkages made with other UNEP initiatives and opportunities for engagement with UNCT and UNSDCF in the project countries?	Linkages with other UNEP initiatives, UNCTs, and UNSDCF were substantial and strategic. The UNEP Cooling Project built on successes of the UNEP Leapfrogging Project and stimulated a number of country-specific UNEP projects dedicated to cooling efforts. In terms of UN Country Teams (UNCTs), the Project leveraged the newly established India UNEP office, as well as cooperation with UNDP country offices in some follow-on work, such as cooling financial mechanism work in African nations. The Project further broadly adheres to the guidelines of UNSDCF.
4. To what extent has the Public-Private sector partnership collaboration been effective?	Findings indicate that the private sector was invited to be involved in review of model regulations in some countries, in the implementation of financial mechanisms in Africa, in the Caribbean with a private company offering commercially the financial mechanism, and in ACES (such as through demonstration of equipment). The Project facilitated the adoption of ambitious commitments by a key U4E partner[6]. Future work might put a stronger focus on private sector engagement early on to ensure that, as the private sector is upgrading production lines, it takes into account future trends in MEPS.
5. What changes were made to adapt to the effects of COVID-19 and how might any changes have affected the project's performance?	The Project adopted virtual meeting strategies during the height of the pandemic. Challenges in meeting in person, along with economic challenges, such as shutdown of the tourism industry in the Caribbean had a negative effect on project momentum and results. Findings suggest, however, that the Project did the best it could, given the circumstances, and that the project continued with significant progress despite pandemic restrictions in its 3rd and 4th year.

[6] https://www.electroluxgroup.com/en/electrolux-and-the-uns-cool-coalition-30536/

Lessons Learned

E-17. Lesson #1: Adopt Cooling Project best practices in awareness, advocacy and capacity building: include the right parties in capacity building and outreach (e.g. investors, technical persons, academics, private sector); leverage project developed model regulations and templates for plans for wide adoption and impact; leverage early adopter countries for regulatory demonstration; select a single focal institute in a country to lead development and promotion of tools. See Para 240 and Box 1 for details.

Box E-1: Cooling Project Best Practices in Awareness, Advocacy and Capacity Building

a. Capacity building for any of the cooling technologies should include both investors and technical persons, who can deliver energy efficiency in cooling technologies.

b. Academic people should be involved in capacity building for the design of new technological systems to address cold chain problems in Africa.

c. The best outcome for this Project, providing a model for future projects, has been to raise awareness of cooling products and their MEPS, and get governments to adopt Actions Plans and Road Maps that bring whole communities together to facilitate agreements to new standards, despite the 3-to-7-year timeframe.

d. Showcase cooling results in "early adopter" countries to facilitate advocacy and encourage other countries to follow suit.

e. It is important in a country with a large market to have one focal institute where capacity and tools and methodology are pushed.

f. Private developers are the primary stakeholders in the development of district cooling in smaller markets.

E-18. Lesson #2: Video conferencing and remote work have allowed project teams to be functional to engage partners and governments and allowed more participation from country officials in presenting progress and sharing perspectives (Para 241).

E-19. Lesson #3: UNEP's work on model regulations can have an impact far beyond the application on UNEP projects (Para 242).

E-20. Lesson #4: The timeline for desired policy, planning, and regulatory results such as sought by the UNEP Cooling Project may be longer than the 4–5-year timeline of typical UNEP projects (Para 243).

E-21. Lesson #5: Regional work has strong potential to bring a number of countries onboard to adopt higher levels of MEPS (or other regulations and policies UNEP may wish to get adopted) at a lower cost than working in each country individually would (Para 244).

E-22. Lesson #6: In coalition type work, such as that of Cool Coalition, UNEP may carefully consider: (1) how to ensure volunteer contributors to reports receive consistent guidance and appreciation from a consistent coordinator; (2) how to have clear targets and metrics; (3) how such targets will be perceived by participating countries, given other obligations (Para 245).

E-23. Lesson 7: An important contributor to the success of work in individual countries will be a country selection process that assesses attractiveness of the country in terms of it achieving targeted results (Para 246).

E-24. Lesson #8: Software and database tools can be attractive means of supporting implementation of standards and regulations (Para 247).

E-25. Lesson #9: Successful financial mechanisms may end up serving more as awareness building tool than a loan generator (Para 248).

Recommendations

E-26. Recommendation #1: UNEP projects that are comprised of sub-projects should, in their implementation phase, increase their visibility as unified projects with well-known overall aims and with strong attention given to objective level and outcome level indicators of the overall project (Para 249).

E-27. Recommendation #2: Recognizing the time for some countries to achieve adoption of impactful policies and plans, UNEP senior management may consider setting aside contingency allocations or raising funds to permit project teams of various projects to provide ongoing support to countries to shepherd through policies, regulations, and action plans developed under the project once sub-project funding and main activities for the country have been exhausted (Para 250).

E-28. Recommendation #3: Conduct an assessment of past projects to identify the factors for successful, timely results in regions and countries and develop strategies to ensure maximum country and regional level results in the future via an improved design and implementation strategy (Para 251).

E-29. Recommendation #4: ACES should put a strong emphasis on liaising with potential investors and financiers of cold chain equipment as part of its work to ensure its capacity building can be leveraged in the near-term before there is too much of a time gap between learning and application of what is learned (Para 252).

E-30. Recommendation #5: Per Lesson #8, put strong emphasis in future UNEP projects with critical tools, such as the Cooling Project's Model Regulations and its NCAP Template, on the leverage of these tools beyond the project with other donors and with large countries (Para 253).

E-31. Recommendation #6: UNEP should ensure that advocacy platforms it develops have clear metrics and clear aims, and that group reports with outside authors developed to support advocacy and scientific consensus have a clear process that respects the role of various authors and provides them with consistent guidance on a reasonable timeframe (Para 254).

E-32. Recommendation #7: UNEP may reassess its approach to financial mechanism in the future and consider: (1) combining promotion of financial mechanisms with general promotion of the advantages in lifecycle costs of efficient appliances (many may purchase products outright based on savings over the lifecycle); (2) ensuring the financial mechanism is set up so that all players in the "deal" will be satisfied, achieving enough buy-in from partners, so that sales of the efficient appliances (whether with or without loan) will be substantial and scale up over time (Para 255).

E-33. Recommendation #8: Senior management should consider value of LBNL-UNEP collaboration and thus whether action should be taken to enable mutual sub-contracting, something now blocked by the organizations' respective legal departments (Para 256).

I. INTRODUCTION

1. The annual global emission from the cooling sector (refrigeration and air conditioning systems) in 2015 was more than 3.7 Gt CO_2 in 2014 according to the Green Cooling Initiative[7], with over 70% due to indirect emissions from electricity consumption. Cooling was often overlooked as an urgent development issue with more than 1 billion people lacking access to energy and to cooling appliances. With only 0.04% of total Official Development Assistance allocated to cooling solutions, the economic costs of not ensuring access to sustainable and affordable cooling were poorly understood and not widely appreciated[8]. Modern refrigeration and space cooling make possible the safe production and storage of food, allow health clinics to keep vaccines cold, and provide for human comfort in homes, schools, commercial establishments, and workplaces.

2. In general, air conditioning and refrigerator equipment use excessive amounts of electricity, are poor quality, and contain harmful substances such as mercury, lead, and refrigerants. This has been caused by:

   - integrated regulatory policy frameworks that are limited, absent or poorly designed, and insufficiently implemented;
   - governments lacking data on stock and performance of air conditioning and refrigeration products and equipment in their countries;
   - products with the lowest first cost (rather than lowest life cycle cost) being purchased causing manufacturers to minimize costs by using the cheapest available components, refrigerants and construction techniques;
   - little or no incentive for consumers to address electricity waste or emissions.

3. Decision XXVIII/3 of the 28th Meeting of the Parties to the Montreal Protocol (MP)[9] adopted the Kigali Amendment to control hydrofluorocarbons (HFCs) under the Protocol. It recognised the need to couple energy efficiency improvements with the phase-out of ozone-depleting substances and high-global warming potential refrigerants. Decision XXVIII/3 noted that the air-conditioning and refrigeration sectors represented a substantial and increasing percentage of global electricity demand and the fact that improvements in energy efficiency could deliver a variety of co-benefits for sustainable development, including for energy security, public health and climate mitigation. The Decision XXVIII/3 further highlighted the large returns on investment that have resulted from modest expenditures on energy efficiency, and the substantial savings available for both consumers and governments.

4. The Kigali Cooling Efficiency Program or KCEP (presently under the name of Clean Cooling Collaborative as of 2021), is a philanthropic programme with the collaboration of 18 foundations that supports the energy efficiency integration aspect of the Kigali Amendment of the Montreal Protocol, representing a major source of funds for the UNEP Project: "Building high-level support and capacities to enhance climate and ozone protection through cooling efficiency", often referred in short form as the Cooling Project[10]. Under the Kigali Amendment, 197 countries currently are committed to cut the production and consumption of hydrofluorocarbons (HFCs) which are potent GHGs used in refrigeration and air conditioning[11], by more than 80% over the next 30 years. The

[7] Market trends in selected refrigeration and air conditioning subsectors' GIZ, 2015.
[8] For example, previous grant funding for cold chain has been marred by the fact that 98% of farmers who have cold chain within 1 km of their farms did not use these facilities. This is often followed by studies on why farmers do not use them.
[9] Meeting held on 15 October 2016 in Kigali, Rwanda to phase down HFCs. Countries agreed to add HFCs to the list of controlled substances and approved a timeline for their gradual reduction by 80-85 per cent by the late 2040s. Integration of energy efficiency into these efforts is recommended by the Amendment, but not required.
[10] The ToR refers to the Project as the "Climate Friendly Cooling Project."
[11] HFCs were initially used to replace CFCs, as HFCs do not deplete the ozone layer like CFCs do. Yet, it was later realized that HFCs are problematic in that they have very high global warming potential, thus inspiring the Kigali Amendment and its aim to gradually phase them out, along with a concurrent, synergistic aim of increasing energy efficiency in cooling, which also has benefits in reducing GHG emissions.

UNEP Cooling Project focused on the energy efficiency of cooling to increase and accelerate the climate and development benefits of the Kigali Amendment to phase down HFCs.

5. KCEP had commitments from the 18 foundations totalling over USD52 million, to be disbursed in 4 years, to help developing countries transition to energy efficient, climate-friendly, affordable cooling solutions. KCEP was to support developing countries willing to ambitiously and quickly integrate energy efficiency into solutions to meet the cooling challenge, developing country capacity and ownership critical for the achievement of the full market potential for environmentally friendly, energy-efficient cooling. KCEP was also to:

    - leverage further financing to implement energy efficiency plans, policies, standards, and programmes;
    - widen access to cooling; and
    - make environmentally friendly, energy-efficient cooling accessible to all by elevating the profile of cooling as a development priority and by providing support to the poorest countries and people through a range of locally owned cooling solutions.

6. With KCEP financing being managed by Climate Works, the available funding boosted the profile of cooling on the development agenda. KCEP set up a structure to coalesce cooling stakeholders that would allow them to access funds through windows of opportunity such as preparing National Cooling Action Plans (NCAPs), financial mechanisms or building capacity in various disciplines of cooling[12]. This raised the attention of U4E and UNEP into requesting funds from KCEP and Climate Works for developing National Cooling Strategies (NCSs), NCAPs and model regulations for cooling equipment, building local capacities to implement NCSs and NCAPs, and assisting national governments to implement NCSs and NCAPs. In addition, due to what it saw as UNEP's unique capabilities, KCEP approached UNEP to handle high level advocacy work (through its Executive Director's Office) and "twinning work" (as detailed in Paras 95-98), to leverage UNEP's OzonAction's unique regional MP networks in coordination with U4E). By end of 2022, the Cooling Project expended USD10,872,834 out of the USD52 million allocated by donors to KCEP (as detailed in Para 46) and as such, the Cooling Project was:

    - relevant to both Climate Change Mitigation (specifically appliance energy efficiency) and the work of OzonAction[13] on the phase out of HCFCs and the phase down of HFC's under the MP. This was to be achieved by promoting low-carbon approaches, improving energy efficiency, by engaging with state actors and increasing partnerships with the private sector. This would be in line with the objectives of UN Sustainable Energy for All (SE4ALL) and Sustainable Development Goal (SDG) 7 on Energy and SDG13 on Climate Change. Global efforts for phasing down HFCs have also been receiving a boost with the Kigali Amendment which entered into force in January 2019;
    - designed to complement and strengthen the existing national processes and other ongoing and planned projects and programmes on energy efficiency and ozone-related projects. These programmes were expected not to duplicate other interventions, initiatives or projects, and be in line with National Communications (NCs) to UNFCCC as targeted countries' NCs mention energy efficiency and reduction of global warming potential refrigerants;
    - helping targeted countries achieve their goals pledged to the Paris Climate Agreement, and keeping the future temperature increase below 2^{o}C;
    - using the importance of energy efficiency as a driver for emission reductions as recognized in NDCs in more than 140 countries[14];

[12] This included an invitation to all those who were funded to attend an annual summit meeting on advancing the cooling agenda as well as other funders such as DANIDA, DEFRA and GIZ.
[13] OzoneAction is a sister programme to U4E. It is under the Ozone Action Branch under the Law Division of UNEP.
[14] Includes the Bahamas, Barbados and Dominican Republic and other targeted countries that mention HFC reductions as part of their commitments.

- coordinated under the framework of the United for Efficiency (U4E) initiative in particular and later including the Cool Coalition which includes a variety of teams within UNEP, which is also part of a global push to improve energy efficiency in collaboration with SE4ALL;
- broadly adhering to the United Nations Sustainable Development Cooperation Framework (UNSDCF) programme cycle of analysis, planning, monitoring and evaluation with U4E taking into account the UNSDCF guidelines and mandatory steps for harmonized programming cycle.

7. In terms of institutional context, U4E, OzonAction, and other entities under UNEP are brought together in the implementation of the Cooling Project, which is managed by U4E. U4E is a global initiative under UNEP that assists developing countries and emerging economies to move their markets towards energy efficient appliances and equipment. U4E covers five product areas: distribution transformers, electric motors, lighting, refrigeration, and room air conditioners. The last two are the focus of the Cooling Project. The Project is under UNEP's climate change subprogramme and, secondarily, under its chemicals and waste subprogramme[15]. Expected accomplishments related to these subprogrammes are:
   - an increase in the number of countries supported by UNEP that make progress in adopting and/or implementing low GHG development plans, strategies, and measures via plans, strategies, and policies on energy efficiency or renewable energy; and
   - an increase in the number of countries that have used UNEP analysis and guidance for developing or implementing legislation, policies, or action plans promoting sound chemical management and the implementation of relevant multilateral environmental agreements.
8. The Cooling Project is structured into three components: (1) high level advocacy to inform political leaders of energy efficiency in the cooling sector; (2) "twinning" (workshops bringing together national ozone officers and national energy officers) and tools to integrate energy efficiency in the cooling sector with reduction and phase out of the use of HGWP hydrocarbon refrigerants; and (3) national and regional initiatives to develop plans and roadmaps and adopt MEPS in the cooling sector. At the outcome level, the Project targets mainly planning, policy and regulatory results, in particular, regional roadmaps for efficient cooling and national policies, plans, legislation and regulations. The problem tree for the Cooling Project is shown in Figure 1. The Project was approved by the UNEP Director in November 2017. Originally designed as a 4-year project to run from November 2017 to November 2021, the Project was extended for one year and ended in November 2022, spanning over a 5-year duration. There have been no previous reviews or evaluations prior to this terminal evaluation.
9. The Terminal Evaluation (TE) of the UNEP Cooling Project was prepared to assess the performance of the Cooling Project in meeting its intended objective of "significantly increasing and accelerating climate and development benefits of the MP refrigerant transition by maximizing a simultaneous improvement in the energy efficiency of the cooling sector" and its intended aim to "assist the sustained reduction of GHG emissions by some 260 million tonnes CO_{2eq} over the period 2020 to 2030 through improvements in both air conditioners and refrigerators". The purposes of this TE are to provide evidence of UNEP Cooling Project results to meet accountability requirements, and to promote operational improvement, learning and knowledge sharing through results and lessons learned from UNEP and executing partners.

[15] By MTS 2022-2025, these are the climate action subprogramme and chemicals and pollution action subprogramme.

II. EVALUATION METHODS

A. UNEP's Evaluation Approach

10. In line with the UNEP Evaluation Policy[16] and the UNEP Programme and Project Management Manual[17], the UNEP Cooling Project Terminal Evaluation was undertaken after operational completion of the Project, covering the Project period from November 2017 to November 2022, to assess Project performance (in terms of relevance, effectiveness and efficiency), and determine outcomes and impacts (actual and potential) stemming from the Project, including their sustainability. The UNEP Cooling Project TE has two primary purposes: (i) to provide evidence of results to meet accountability requirements, and (ii) to promote operational improvement, learning and knowledge sharing through results and lessons learned amongst UNEP staff involved with UNEP Cooling Project, UNEP Cooling Project's Technical Advisory Committee (TAC), U4E's manufacturing partners, testing laboratories and technical institutions, and national governments of target countries. Therefore, the TE is to identify lessons of operational relevance for future project formulation and implementation, especially given that a second phase of the Project is already underway.

11. This TE is guided by the Terms of Reference in Annex X, and undertaken in line with the UNEP Evaluation Policy, UNEP Evaluation Manual and the UNEP Programme and Project Management Manual. This TE has been carried out using a set of 9 commonly applied evaluation criteria which include: (1) Strategic Relevance[18], (2) Quality of Project Design, (3) Nature of External Context, (4) Effectiveness *(incl. availability of outputs; achievement of outcomes and likelihood of impact),* (5) Financial Management, (6) Efficiency, (7) Monitoring and Reporting, (8) Sustainability and (9) Factors Affecting Project Performance and Cross-Cutting Issues (see Annex VII for Evaluation Framework Matrix for more details on each evaluation criterion).

12. Most evaluation criteria were rated on a 6-point scale as follows: Highly Satisfactory (HS); Satisfactory (S); Moderately Satisfactory (MS); Moderately Unsatisfactory (MU); Unsatisfactory (U); Highly Unsatisfactory (HU). Sustainability and Likelihood of Impact are rated from Highly Likely (HL) down to Highly Unlikely (HU) and Nature of External Context were rated from Highly Favourable (HF) to Highly Unfavourable (HU). The ratings against each criterion were "weighted" to derive the Overall Project Performance Rating. The greatest weight was placed on the achievement of outcomes, followed by dimensions of sustainability.

13. For the matrix of ratings levels for each criterion, the UNEP Evaluation Office has developed detailed descriptions of the main elements required to be demonstrated at each level (i.e. Highly Satisfactory to Highly Unsatisfactory) for each evaluation criterion. The Evaluation Team has considered all the evidence gathered during the evaluation in relation to this matrix in order to generate evaluation criteria performance ratings.

14. With regards to strategic evaluation questions and in addition to the 9 evaluation criteria outlined in Para 11, the TE addresses a number of strategic questions that were formulated in the Terms of Reference. These questions were posed by the UNEP Evaluation Office in conjunction with members of the Project Team.

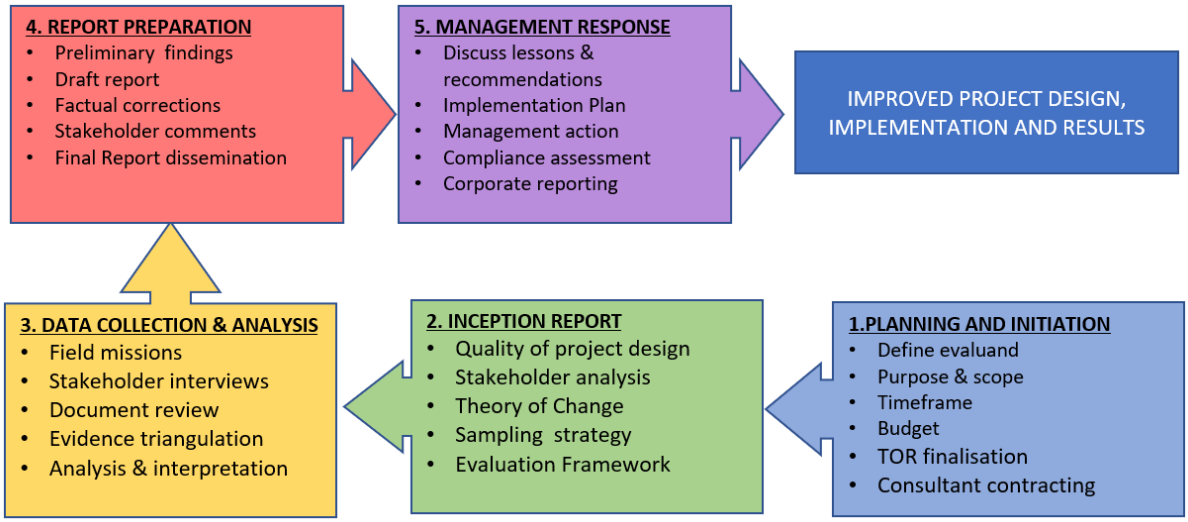
B. Evaluation Process

15. This evaluation adopted a participatory approach, consulting with Project team members, partners and beneficiaries at several stages throughout the process. Central to the evaluation was the analysis (and reconstruction) of the Project's Theory of Change (ToC). Consultations were held during the evaluation inception phase to arrive at a nuanced understanding of how the project

[16] https://www.unenvironment.org/about-un-environment/evaluation-office/policies-and-strategies
[17] https://wecollaborate.unep.org
[18] This criterion includes a sub-category on Complementarity, which closely reflects the OECD-DAC criterion of 'Coherence', introduced in 2019. Complementarity with other initiatives is assessed with respect to the project's design. In addition, complementarity with other initiatives during the project's implementation is assessed under the criterion of Efficiency.

intended to drive change and what contributing conditions ('assumptions' and 'drivers') would need to be in place to support such change. The Reconstructed Theory of Change (RToC), supported by a graphic representation and narrative discussion of the causal pathways, was discussed further with respondents during the data collection phase, and refined as appropriate. The final iteration of the RToC is presented in this final evaluation report and has been used throughout the evaluation process. The Evaluation process is illustrated on Figure 1.

Figure 1. UNEP Evaluation Process



16. The primary challenge for this Terminal Evaluation was to extract from key stakeholders the effectiveness of technical assistance being provided by the UNEP Cooling Project in:

    - getting political leaders to:
        - understand the challenges posed by market uptake of unregulated products;
        - proactively support the policy measures required to achieve a sustainable transformation of cooling product markets; and
    - bring Nation Ozone Officers (NOOs) and National Energy Policymakers (NEPs) together to support design and implementation of officially endorsed regional policy roadmaps and national policy strategies policies that trigger market transformation towards sustainable cooling products.

    Stakeholder consultations under this Terminal Evaluation focused on confirming the actual outcomes of the Project, and the surrounding circumstances of these outcomes that may lead to intermediate states and intended impacts of global reduction of GHG emissions from the promotion of climate-friendly cooling products and equipment. In total, 44 interviews were conducted, of which 16 interviewees were female.

17. This TE was reliant on Project documentation for its initial assessments. This was supplemented by the knowledge and advice of UNEP staff who have assisted in identifying stakeholders to interview during the Evaluation interview period between 13 November and 20 December 2023. A list of stakeholders interviewed by the Evaluators is provided in Annex II.

18. While conducting this TE within the evaluation framework (see Annex VII), the Evaluators were cognizant of a number of important strategic issues including:

    - the degree of success of UNEP Cooling Project interventions to overcome identified barriers, gaps and challenges to the formulation of policies, strategies, regulations and roadmaps for the promotion of energy-efficient and sustainable cooling products;

- the extent of key assumptions identified by this evaluation to achieve the desired impact (and address the challenges in enforcing policies in various countries) and their sustainability during the post-project period. This could include sustained consumer perceptions of the affordability of efficient air-conditioning or refrigeration that enters the market of various countries;
- the existing opportunities that have already been set in motion to stimulate replication or a catalytic effect of positive outcomes and best practice experiences within a country and region;
- identification of any unintended results deriving from UNEP Cooling Project implementation, and if so, characterizing how this would affect the intended impact.
- throughout the evaluation process and in the compilation of the report efforts have been made to represent the views of both mainstream and more marginalised groups. All efforts to provide respondents with anonymity have been made.

19. Gender equity and women's empowerment (GEWE) was incorporated into the evaluation process, both via qualitative interviews and review of gender disaggregated data collected by the Project for workshop attendance. Gender disaggregated data for the financial mechanisms of the Project is of interest but was not obtained. In reconstructing the ToC, the Evaluation Team added gender considerations.

C. Data Collection Process

20. Aside from obtaining information from Project documentation, different key stakeholder groups involved in the Project were interviewed or consulted including:

- Project team. This involved interviews with UNEP Project Manager (PM), Project management team/U4E (at headquarters and in the field), other UNEP units involved in implementation of sub-projects (OzonAction, UNEP Cities Unit, etc.) and the UNEP Fund Management Officer (FMO). The purpose of contact with UNEP staff were issues of implementation and execution. Project team members were quite involved with the Project and thus were able to offer details and missing information;
- National Executing partners. This involved interviews with implementation teams in select countries (i.e. NOOs, NEPs, officials involved in standards development). In addition to implementation teams from governments who have developed and implemented legislation and action plans promoting cooling product market transformation, it also included manufacturers, importers, distributors and retailers of cooling products who have significantly contributed to market transformation of cooling products. These were important groups to consult to determine the real level of results and impact;
- Project partners. This involved consultations with major donors such as UK Defra, the Clean Cooling Collaborative (formerly K-CEP), French Facility for Global Environment (FFEM); industry partners such as International Institute for Refrigeration; and NGO partners such as CLASP, Lawrence Berkeley National Laboratory, SADC Centre for Renewable Energy and Energy Efficiency and Natural Resources Defence Council; and International and Regional Organizations such as IEA, ASEAN Centre for Energy (ACE), the East Africa Centre of Excellence for Renewable Energy and Energy Efficiency. These stakeholders have been contributors in the drive towards cooling product market transformation. As donors and partners in implementation of sub-projects, these groups offered in-depth knowledge of activities and aims from a different angle than the Project team;
- Beneficiaries. This involved consultations with national ministries and public agencies responsible for implementing and enforcing minimum energy performance standards (MEPS), labels, and financial mechanisms consistent with U4E Model Regulation levels on appliances or equipment. These were also important groups to consult to determine the real level of results and impact.

Data Collection - Methods and Tools

21. Findings of the TE were based on:

- face-to-face interviews with the various stakeholders including the Project team (UNEP staff), and selected National executing partners, Project partners, and beneficiaries. Many of these interviews were conducted by the Evaluators during field visits to places where substantial field work or action plans were implemented. This was done during the period of 13-28 November 2023 including a visit to Johor Bahru, Malaysia from 13-17 November for an ASEAN meeting on cooling products, to Kigali, Rwanda from 20-22 November for visit to the Africa Centre of Excellence for Sustainable Cooling and Cold-Chain (ACES) headquarters Team, and to Paris, France from 23-28 November to visit with senior UNEP management, U4E Team Members, the International Institute for Refrigeration, International Energy Agency, OzonAction, and the Climate and Clean Air Coalition. Interviews were conducted mostly one-on-one to allow stakeholders free and frank discussions. Furthermore, stakeholders were typically informed that specific comments shared with the Evaluators would not be directly attributed to them, though their participation would be indicated in an annex listing interviewees;
- virtual interviews with partners in other regions and countries, such as Ghana, Nigeria, India, the Caribbean and Latin America;
- data from Twinning Training Survey Results using survey tools developed by the Project team to mainly collect data from a wider range of National executing partners, Project partners, and beneficiaries.

Annex II presents an extended list of individuals and entities who were consulted or interviewed during the Terminal Evaluation of UNEP Cooling Project. Annex V provides a listing of general questions for all stakeholders according to Outcomes and Outputs.

Secondary Data Sources

22. In summary, secondary information was fed into the Evaluation primarily coming from Project documentation:

- relevant Project background documentation;
- Project design documents (including minutes of the project design review meeting at approval), Annual Work Plans and Budgets or equivalent, revisions to the project (Project Document Supplement), the logical framework and its budget;
- Project reports such as progress and financial reports, progress reports from collaborating partners, meeting minutes, and relevant correspondence;
- Project deliverables such as model regulation guidelines and related regulatory and voluntary market interventions; financial mechanisms; communications strategies; product registration systems; country savings assessments; training curriculum; National cooling strategies; regional policy roadmaps; environmentally sound management of used equipment; market monitoring, verification and enforcement protocols;
- evaluations or reviews of similar projects; and
- stakeholder analysis of Project teams in various countries that were visited.

D. Limitations and Mitigation Strategy

23. Challenges to the data collection included the high likelihood that interviews with some of the selected stakeholders would need to be conducted more than once in an effort to triangulate the quality of information received, and to provide assurance that the findings and conclusions of the evaluation are robust. Furthermore, given the extensive global reach of the Cooling Project, there are many countries that could have benefited through an extensive number of stakeholders. For example, an estimated 138 developing countries participated in the Project's "twinning work," with typically at least two representatives from each country. However, the Project ended in 2022, while the majority of TE interviews were conducted around one year later. This presented challenges

both in differentiated Project results from after-results and in ensuring the timeliness and utility of lessons and recommendations made in this report.

24. Limitations of the data collection involve interviewing an insufficient number of persons from a particular selected country and reaching too few countries given the particular time limitations of the Evaluation and difficulties getting persons to commit to interviews. The Cooling Project was also found to have very substantial influence on the development and activities of other donors, which in turn are achieving important results. This is particularly true in the area of model regulations and MEPS and use of the Project's NCAP guidelines. Yet, to follow up on all these very positive downstream results would be difficult due to time and resource limitations.

25. Lastly, the Project indicators as originally designed were found to overlap and perhaps be overambitious given the Project timeframe (further discussed in Paras 72-73), adding in increased level of challenge in assessing results.

26. A mitigative strategy for some limitations of Project information was the establishment of a *credible association* between the implementation of Project activities and observed positive effects where a strong causal narrative can be made to a chronological sequence of events, and the active involvement and engagement in critical processes of key actors. Via this strategy, the evaluation endeavoured to establish that a *contribution was made* by the Project. A contribution relies heavily on prior intentionality in the form of an approved Project design. For example, the design of Output 1.3, "sustainable cooling reports, model regulations and tools for energy-efficient and climate-friendly products uptake and other guidance to senior officials" is robust evidence that, when delivered as designed, the output would lead to the broader aim that "political leaders have the information to understand the challenges posed by market uptake of unregulated products and proactively support the policy measures required to achieve a sustainable, strategic structural change in their cooling project markets and enable adoption of net zero targets." Another mitigative strategy was to focus on in-depth consultations regarding the more limited group of countries in which there were sub-projects beyond the twinning with its broader reach of around 138 countries, and for the twinning rely more heavily on participant satisfaction surveys (as well as the foregoing credible association with major results, such as MLF funding for continuing the twinning work). To assess attribution and scale of results being achieved via other donor projects, expert opinion was consulted. As for the indicators, these were reconstructed to be differentiated between outcomes and reasonably achievable on the timescale of the project, so that they could be utilized to assess Project effectiveness.

III. THE PROJECT

A. Context

27. UNEP is one of 4 implementing agencies for the MP's Multi-Lateral Fund (MLF). There is a treaty to phase-out the use of ozone depleting chemicals in refrigeration by 2030 with financial assistance being offered through the MLF to developing countries to achieve this. UNEP has two entities within it that play a key role in the Protocol and MLF: OzonAction and the Ozone Secretariat. The OzonAction Branch of UNEP's Law Division provides assistance to developing country governments to strengthen their capacity to develop and enforce policies to implement the Protocol and to make informed choices regarding technology options. It also supports industry in these countries to comply. OzonAction works with 148 countries to meet and sustain their compliance targets under the MP treaties through capacity building, networking, national strategies, and training. Under MLF, there is a well-established network of focal points and National Ozone Officers (NOOs) of National Ozone Units (NOUs) in all 148 developing countries who engage with related stakeholders in their countries intended to enforce ozone-related laws and policies. OzonAction comprised of 46 staff[19] providing support to NOUs and NOOs largely related to the air conditioning and refrigeration sectors, otherwise referred to as cooling products. This is due to the presence of ozone-depleting chemicals including HFCs consumed by this equipment. The Ozone Secretariat under UNEP organizes conferences and meetings for the Vienna Convention and Montreal Protocol, manages the implementation of decisions of those meetings, provides stakeholders data on ozone-depleting substances and HFCs. It also provides information to various parties on the work of the MP and how those parties can protect the ozone layer and the environment.

28. There are 10 regional networks of NOOs along with the Ozone Secretariat in Nairobi, the MP MLF Secretariat and other bilateral partners that share information, talk about MP obligations, identify common problems, and solutions that work (NOOs also have strong working connections with refrigerant personnel in industry). This forum has been effective. The MP has evolved from a sole focus on substances affecting the ozone layer to substances where there are climate concerns. With the MP and its focus on reducing ozone depleting substances and being one of the most successful global environmental treaties and multi-lateral initiatives, the MP was "sub-contracted" by the UNFCCC to address climate change implications of cooling products. This led to the Kigali Amendment to the MP, which was agreed to by the Parties to the MP in October 2016. The first ratification was by Mali in 2017. By 2018, only 38 Article 5 countries (developing countries) had ratified. As of 2023, 155 countries (developing and developed) had ratified, with 78% ratification achieved. The amendment has climate aspirations to phase-down HFCs (which do not have ozone impacts but have high GWP) by 2047 (mandatory) and to consider using more energy efficient equipment (not mandatory). HFC phase-down would have the impact of reducing global warming by 0.5^{o}C with energy efficiency considerations adding another reduction of global warming by 1.0^{o}C. Developing countries should be able to phase-out HCFCs by 2030.

29. With the MP being morphed into a climate agreement, OzonAction (the only UNEP entity implementing the MLF and one of four MLF implementing agencies in total) started talks with KCEP (now Clean Cooling Collaborative run by Climate Works) and U4E (as a potential key implementer) in late 2016 (with U4E recognized as the expert in energy efficiency) to fund a joint project. According to sources, KCEP viewed U4E under UNEP as having a solid track record and existing work on sustainable cooling funded by GEF[20], and being a cross-cutting inclusive organization. In addition, sources indicate that KCEP recognized that UNEP and U4E had abilities to do in-depth "hand-holding" market transformation in countries, using a classic integrated policy approach: MEPS, labels, financial mechanism, recycling, marketing monitoring verification and enforcement. Twinning workshops bringing together NOUs with energy efficiency personnel (mainly National Energy Policymakers or NEPs), were to be done to break an environment where competing institutions (mainly Ministries of Environment and Energy) encouraged siloed

[19] Located in Paris, Nairobi, Beirut, Bangkok and Panama City. OzoneAction is a Global Compliance Assistance Program (CAP) team and regional CAP teams. The global team is comprised of two segments: (1) Clearinghouse Policy, Projects & Partnerships (2) Global Finance and Administration. The regional teams include Africa, Asia and the Pacific, Europe and Central Asia, Latin America and the Caribbean, and West Asia.
[20] This included U4E publications on refrigerators and ACs as well as lighting and transformers.

information gathering. NOOs and NEPs were to be invited to start forging relationships and initiate discussions on the Kigali Amendment to garner support from the MLF and KCEP to ratify the Amendment, prepare them for additional commitments under Kigali, identify policies that can be done jointly, and identify joint projects. *This resulted in KCEP formation of the UNEP Cooling Project*.

30. Considering the results of the UNEP Cooling Project and other KCEP-funded initiatives, which show various countries and regions to be on the path to more efficient cooling via roadmaps, legislation, and other measures, KCEP was highly effective in providing ample resources to get stakeholders in advance of commitments to start the process of regulating EE with MP protocol obligations. Under KCEP funding "windows", Cooling Project personnel would submit sub-project proposals resulting in UNEP being the largest single grantee for KCEP. Outside of twinning workshops and high-level advocacy sub-project, where UNEP was seen by KCEP to have unique qualifications, UNEP had to compete against other UN agencies and NGOs.

31. In 2019, the MLF would not fund any climate issues within MP. OzonAction personnel, noting the importance of EE in MP discussions, informed MLF of their intention to use staff time to implement the EE component of the Project. No objections were raised to this EE work which was low profile and MLF was not funding this work. Today, there are 198 MP ratifications from developing and developed countries with huge capacity gaps in countries. Though ratification of its Kigali Amendment was slow given what countries had to understand before ratification and a previous lack of mandate to act on Kigali, there was a recent adjustment in 2022 to the MLF, so that now funding guidelines include EE in OzonAction work. OzonAction with funding from MLF is continuing twinning exercises in 2024 as a carry-on to the EE and MP work on the Project with U4E doing some presentations. NCAPs were being financed by KCEP.

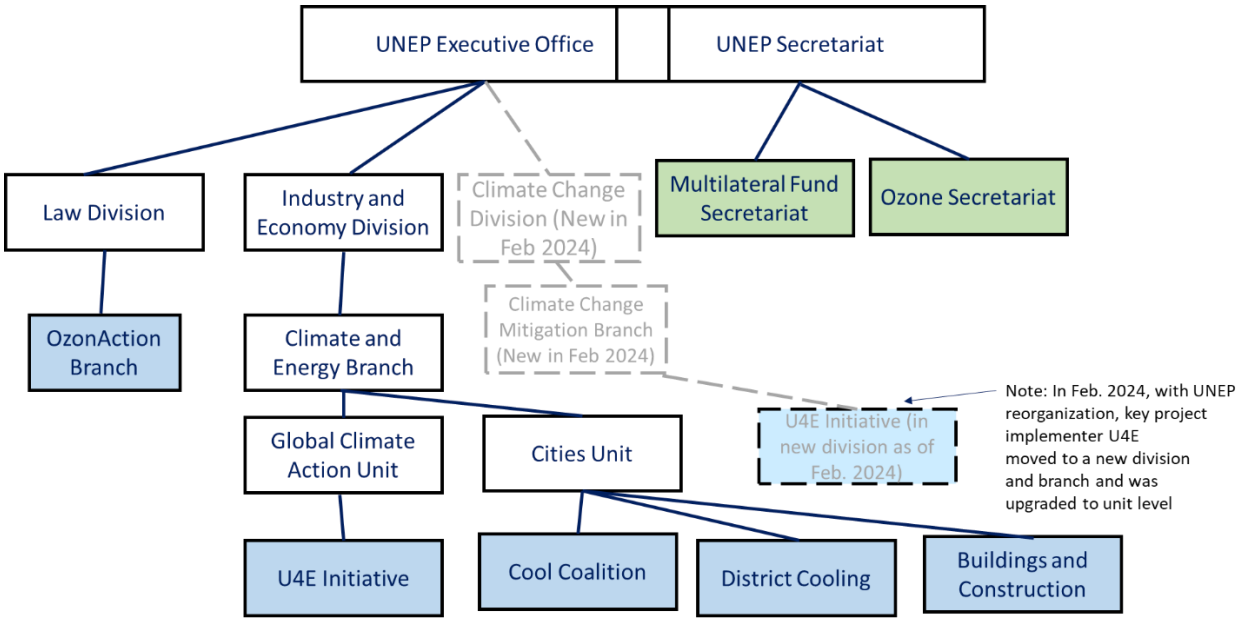
32. The UNEP Cooling Project was being implemented by UNEP's Global Climate Action Unit, Energy and Climate Branch, Industry and Economy Division (formerly the Climate Change Mitigation Unit, Energy Branch, Economy Division) under the Subprogramme: Climate Change (secondary subprogramme: Chemicals & Waste) under the PoW 2018-2019, 2020-2021, 2022-2023 (see Para 56). Outcome indicators include, but are not limited to:

    - an increase in the number of countries supported by UNEP that make progress in adopting and/or implementing low greenhouse gas emission development plans, strategies and/or policies. Unit of measure: Number of countries that have adopted or are implementing plans, strategies or policies on energy efficiency, renewable energy;

    - an increase in the number of countries that have used UNEP analysis or guidance, and where possible are applying a multi-sectoral approach, in developing or implementing legislation, policies or action plans that promote sound chemicals management and implementation of the relevant multilateral environmental agreements and SAICM. Unit of measure: Number of countries reporting new legislation, policies or action plans developed/adopted concerning general issues as well as specifics on lead in paint, mercury, persistent organic pollutants, ozone-depleting substances and other chemical priority areas.

33. As such, the majority of the Cooling Project (considering total funding) is executed by U4E. The Project also collaborates with Cool Coalition and some other initiatives under the Cites Unit (which are not part of U4E), OzonAction (as introduced above), and some initiatives under UNEP's Cities Unit also involved in implementation. Figure 2 shows the UNEP entities actively involved in Cooling Project implementation (light blue) and also the UNEP secretariat organizations of relevance to the Project (light green). U4E started in lighting and then extended itself to cooling products, motors and transformers. The Cooling Project helped to develop model regulations for cooling products with regional agreements (ASEAN, SADC) and individual country work (e.g. Rwanda and 5 countries in the Caribbean as individual countries) with current Phase II work now to implement with regions and countries that are collaborative. OzonAction serves as a sister program to U4E that is under the OzonAction Branch under the Law Division of UNEP to service the Montreal Protocol obligations under MLF funding. Other UNEP divisions and regional offices involved with the Cooling Project include the Communications Division, Regional Offices for Africa, Latin America and the Caribbean, the Caribbean Sub-Regional Office, and Asia and the Pacific.

Figure 2. UNEP Entities Involved in Implementation of the Cooling Project (*light blue*) and UNEP Secretariat Entities of Relevance (*light green*)



34. Though the total Project duration was supposed to be 48 months starting November 2017, the actual Project duration was 60 months to November 2022. The original design of the UNEP Cooling Project was UNEP receiving USD6,045,000 secured funding from KCEP's 18 foundations and individuals (as listed in Appendix B of the UNEP Cooling Project Document) who pledged to help increase the energy efficiency of cooling in developing countries. An additional USD22,613,431 in secured funding was later added to the overall budget as detailed in Para 46. KCEP funding was secured through a number of sub-projects, all funded by KCEP. Funding that came in later from other donors was also divided into several sub-projects, with one donor funding several sub-projects. The sub-project structure of the Cooling Project influenced the way the Project was carried out, communicated, and reported upon, with separate financial reports and separate progress reports for each of the various subprojects.

35. Though many organizations working for the Cooling Project are independent, these organizations and manufacturers brought different data, analysis and views that enlightened the process of developing cooling strategies and policies that could be implemented. Some of these strategies and policies have been implemented under Cooling Project funding along with many other funds. These implemented strategies and policies have managed to leverage and push other donors to fund work under the Cooling Project and other initiatives. Climate Works who funds the Cooling Project through KCEP have brought a higher profile to EE in ACs and refrigerators through high profile advocacy and capacity building for 115 countries for NCSs, NCAPs, MEPS and model regulations with stakeholder buy-in as well as regional agreements for SADC and ASEAN, followed by national workshops.

B. Project Logical Framework

36. The UNEP Cooling Project has a Project Logical Framework (PLF) that focuses on:

- Outcome 1: global high-level leadership, education and communication campaigns to build cases for action, lever political leadership and engage the private sector;
- Outcome 2: capacity building measures for NOOs and technical support that links energy efficiency with the Montreal Protocol objectives;
- Outcome 3: supporting awareness raising, harmonisation of policies and MEPS development for energy-efficient and climate-friendly cooling in select countries and support for regional harmonization of standard and regulation for cooling products and preparation of NCSs and NCAPs.

37. Outcome 1: UNEP was supposed to undertake a high-level advocacy and political communication campaign, harnessing the strategic leadership and knowledge base of UNEP by:

    - strengthening the scientific case for action with UNEP (being a co-founder and co-parent of the IPCC) emphasizing the need to base policies on sound and neutral scientific assessments that address political concerns and questions;
    - raising awareness of UNEP's Annual Emissions Gap Reports, a flagship publication that informs Parties to the UN Climate Change Convention about the gap that exists between political ambitions and where current policies lead;
    - creating general awareness of the Kigali Amendment concerning the advantages of combining the phase-out of HFCs with efforts to improve the energy efficiency of cooling products. This was supposed to help build momentum for ratification of the Amendment and accelerated adoption of energy-efficient and climate-friendly cooling options in countries throughout the world. The work was to be supported by award-winning scientists and the Project's Executive Director to promote the findings tailored to address impacts on various audiences including gender considerations. The Executive Director and the Ozone Secretariat were also to inform ministers and other political leaders about the Kigali Amendment and raise awareness of the benefits of ratification;
    - engaging the private sector through UNEP's work with manufacturers, governments, and civil society organizations to gather endorsements for model policies targeting energy-efficient and climate friendly cooling products. The policies were to enable greater consistency across markets, which will lower compliance costs for manufacturers and prices for consumers;
    - incorporating gender dimensions where gender equality is not only a declared objective of both the Countries and the Donors, but where gender dimensions were to be integrated in different activities under the Project framework. With participation of women from UNEP, the Donors and the participating countries, the Project was to ensure coherence with a gender strategy that includes a gender analysis to identify the gender gaps in participation and decision making in environment and climate issues, addressing gender gaps in energy access and different needs on cooling energy on women and men. This was to involve formative research to assess current awareness, behavior, drivers and barriers to adoption of desired technology, financial and behavioral changes in the target groups as appropriate.

38. Outcome 2: UNEP was supposed to build the capacity of National Ozone Officers (NOO) so that they can be strengthened to adjust their national MP compliance programmes to respond to the Kigali Amendment and incorporate energy efficiency considerations in the cooling capacity of the refrigeration and air conditioning sector. Initiatives that were to be undertaken included:

    - building upon OzonAction's Compliance Assistance Programme (CAP) which has 147 developing country clients that cover a broad spectrum in terms of size, population, consumption and production of ozone depleting substances, from Niue to China. CAP has widened its scope and outreach to forge new partnerships essential to support countries in their technology choices for HCFC phase-out and HFC phase down and sound management of refrigerants with due consideration for technology choices, energy-efficient alternatives and sustaining the critical skilled workforce;
    - leveraging 10 regional networks of NOOs as an existing, cost-effective, and appropriate platform to build capacity for the rapid uptake of refrigeration and air conditioning products in developing countries. The networks are a flagship activity of UNEP and a core mechanism of the MP-MLF family of institutions, and managed and operated by CAP staff with financial support from multilateral funds;
    - regional network meetings which were to take place under the Kigali Amendment to phase down HFCs, which was to include specific targets and timetables to replace HFCs with more climate-friendly alternatives, provisions to prohibit or restrict countries that have ratified the protocol or its amendments from trading in controlled substances with states that are yet to ratify it, and an agreement by developed countries to contribute funding to assist developing countries to transition to climate-friendly and energy-efficient alternatives;

- regional network meetings to identify and engage one NEP per country to participate and promote the concept of "twinning" with the NOO from the same country to exchange experiences, develop skills, and share knowledge and ideas on energy efficient refrigerant transition, with specific consideration for the needs of female stakeholders. This was to result in better cooperation at the national level between NOOs and NEPs with UNEP providing tools and insights essential for market transformation of the cooling sector;
- training under the Project to be designed to enhance policy maker awareness on energy efficient cooling in households, industrial and service sectors, highlighting those sectors where women are primary stakeholders in energy resource management. This includes recognition of the potential benefit of energy efficiency investments for women and also the necessity of ensuring substantive women's participation and men's support to realise the benefits of energy efficient cooling. It also includes priority to promote women's involvement at ten regional workshops per year for the Project's 147 countries with a target of at least 25% women participation as experts and trainees.

39. Outcome 3: UNEP was to support awareness raising leading to the harmonisation of policies and MEPS development for energy-efficient and climate-friendly cooling in select countries. This was to be done to transform national and regional markets to energy-efficient and climate friendly cooling products. Initiatives that were to be undertaken included:

    - technical support to be provided to convene key stakeholders to work together to develop national cooling strategies, based on the successful U4E integrated policy approach, which has been shown to accelerate the transition to energy efficient products in an affordable and environmentally sound manner. This was to make up for the lack of robust policies for energy and climate impacts of the cooling sector in many developing and emerging countries. National strategy support was to include, but not be limited to:
        - an overview of the cooling sector with a detailed market assessment in the country;
        - a roadmap to adopt MEPS, supporting policies (such as labels, communication campaigns), monitoring, financial mechanisms (such as addressing the higher first cost of more efficient products), and environmentally sound and safe management guidelines (such as proper handling and disposal of obsolete or replaced equipment and the refrigerants);
        - linkages to refrigerant transition opportunities (such as HFC phase-out management plans);
        - assessment of additional opportunities to use voluntary market pull programmes;
        - assistance with initial implementation (such as with conducting communications and outreach to explain the policies and programmes to constituents);
    - support target countries such Bahamas, Barbados, Dominican Republic, Jamaica, Saint Lucia, Ghana, Rwanda, Kenya, Senegal, Egypt, India, and Viet Nam, all of which import cooling products but have similar aims to mitigate the energy and climate impacts of cooling products. These countries were highly motivated to address rampant growth in electricity demand and emissions and were to serve as the initial Project focus for national-scale engagement;
    - support regional cooperation and policy coordination such as in the Caribbean, where UNEP was to work on a regional scale to encourage countries to adopt similarly robust policies (such as referencing the same test procedures for evaluating product performance) and share resources (such as using the same product labels to inform customers of product performance) to the extent practicable. These approaches were to help minimize manufacturer's compliance costs and simplify administrative requirements for officials.

40. The UNEP Cooling Project Document had one revision during the lifetime of the Project. Table 1 provides the UNEP Cooling Project outcomes and outputs after Project Revision #1 to guide the utilization of the additional USD16,773,541 secured resources from various donors for the final year of UNEP Cooling Project (Year 5) as mentioned in Para 46. While there was some revision of the PLF, the main components and targets of the Project remained the same, with the addition of funding and extension of time being the main changes.

Table 1. Project Components, Outcomes and Outputs

Outcomes	Outputs
Outcome 1: Political leaders have the information to understand the challenges posed by market uptake of unregulated products and proactively support the policy measures required to achieve a sustainable, strategic structural change in their cooling product markets	Output 1.1: Global Communications Strategy and Briefing Materials for Policymakers
	Output 1.2: A Global Scientific Assessment on Climate Friendly and Energy Efficient Cooling
	Output 1.3: Additional sustainable cooling reports, tools and/or guidance for senior officials
Outcome 2: National Ozone Officers and Energy Officials from developing countries support the design and implementation of policies that improve cooling product performance to achieve a sustainable, strategic structural change in their cooling product markets	Output 2.1: Training on Climate Friendly and Energy Efficient Cooling organised for National Ozone Officers and Energy Officials
	Output 2.2: Database and Templates for Gathering Data on Cooling Products Sold in a Country
Outcome 3: Roadmaps, strategies and related market transformation integrating health, gender, environment and poverty alleviation are officially endorsed by developing and emerging economy national governments to achieve a sustainable, strategic structural change in their cooling product markets	Output 3.1: Regional Policy Roadmap/Programmes
	Output 3.2: National Policy Strategy / Programmes

C. Stakeholders

41. The stakeholders identified by the Project Document were key players essential to the transformation of the cooling product markets to energy efficient and environment-friendly coolants globally. More broadly, stakeholders of the Project were a broad coalition of public institutions, accreditation agencies, and NGOs who supported energy efficiency and a reduction of ozone-depleting refrigerants in cooling products and processes globally. They are grouped into:

    - governments;
    - manufacturers, importers, distributors and retailers of cooling products;
    - testing laboratories and technical institutions;
    - environmental advocates and consumer groups.

    An analysis of these categories of stakeholders is provided on Table 2. The list of main stakeholders on the Cooling Project is extensive and listed in Annex 3, Section 4 of the "Project Revision #1 PoW: 113.3 Public support and political engagement for climate action are catalysed. Project ID 01992 Building High-Level Support and National Capacities to Enhance Climate and Ozone Protection through Cooling Efficiency".

D. Project Implementation Structure and Partners

42. UNEP served as the Implementing Agency for the Project, responsible for the supervision of Project execution to ensure consistency with UNEP policies and procedures and overall Project reporting. Under the Industry and Economy Division's UNEP Project Manager for the Cooling Project:

    - Outcome 1 would be overseen by the Head of the Communication Division;
    - Outcome 2 would be overseen by the Head and Network and Policy Manager of OzonAction as well as U4E's lead person on Air Conditioners and Refrigerators under the Energy and Climate Branch;

Table 2. Stakeholder Analysis

Stakeholders	Explain the power they hold over the project results/ implementation and the level of interest	Did they participate in the project design, and how?	Potential roles and responsibilities in project implementation	Changes in their behaviour expected through implementation of the project
Type A: ***High power / high interest = Key player***				
Governments	Policymakers, officials and technical staff within government ministries and agencies were to play a crucial role in the implementation of the UNEP Cooling Project. The Ministry of Environment, Industry and Energy and National Ozone Units are national project partners in each country. Other ministries such as trade, commerce, finance, standards and quality control are supposed to participate in Cooling Project oversight and implementation of market control activities.	Yes, governments have been consulted to understand their needs.	Government officials are key stakeholders in every aspect of UNEP Cooling Project and have the responsibility to develop and enhance policies for energy-efficient cooling products. For each component, government was to be included in the following manners: • **Component 1:** Governments will be engaged to inform them on the benefits of EE and low-GWP cooling products through developed tools and model policies to assist them in implementing projects in their country; • **Component 2:** An energy official and National Ozone Officer were to work together to build capacities and share experiences; • **Component 3:** Governments were to be the primary stakeholders to convene industry and civil society to assess existing policies and determine opportunities for market transformation projects.	Government officials would have capacities to prioritize projects, policies and strategies to accelerate the market transformation to energy-efficient and low-GWP cooling products (including considerations for gender aspects of policies and programmes).

Stakeholders	Explain the power they hold over the project results/ implementation and the level of interest	Did they participate in the project design, and how?	Potential roles and responsibilities in project implementation	Changes in their behaviour expected through implementation of the project
Type B: ***High power/ low interest over the project = Meet their needs***				
Manufacturers, importers, distributors and retailers of cooling products	Manufacturers, importers, distributors and retailers are directly affected by energy efficiency regulations and possess valuable information about production costs and market structures. MEPS impose some burdens on manufacturers and importers, but these can be acceptable as long as they affect all companies equally and also introduce new business opportunities. Domestic and international firms provide inputs with equipment retailers commenting on the sales programme and its future implementation by characterizing the market and consumer response to product efficiency and pricing.	Yes, manufacturers have been consulted through the U4E initiative as well as members of the Cool Coalition through its private sector working group, to understand their viewpoints on activities	International and local manufacturers were to be engaged on Cooling Project including the following areas: • **Component 1:** Project communication campaign was to include manufacturers as a key target to gain their high-level commitment to support projects and policies to advance EE and low-GWP cooling products. This included manufacturers review of model policies to ensure they are aligned with the industry; • **Component 2:** Manufacturers were to provide in-kind support, such as developing training material and support in carrying out training; • **Component 3:** Manufacturers were to be engaged in each national or regional sub-project to ensure their viewpoint and expertise are properly reflected.	Growing support of local and international manufacturers for development and implementation of policies and projects promoting energy-efficient and low-GWP cooling products.
Type C: ***Low power/ high interest over the project = Show consideration***				
Testing laboratories and technical institutions	Testing laboratories were to take part in the process of developing standards and quality control measures for developing MEPS.	Yes, some testing laboratories have been consulted in project development.	Testing laboratories and institutions were to be engaged on **Component 3** where testing laboratories are to receive training support to ensure that	Increased capacities of testing laboratories will ensure products sold on the market comply with new standards and regulations.

Stakeholders	Explain the power they hold over the project results/ implementation and the level of interest	Did they participate in the project design, and how?	Potential roles and responsibilities in project implementation	Changes in their behaviour expected through implementation of the project
			products on the market comply with the relevant standards.	
Type D: Low power /low interest over the project = Least important				
Environmental advocates and consumer groups	Environmental advocates and consumer groups advocate responsible energy policies and were to contribute their perspectives during the development of the national strategy for energy-efficient products. They were to provide a balancing perspective to manufacturers with regard to the stringency of MEPS and MVE schemes. Inputs from civil society consumer groups was to ensure that regulations do not require overly expensive or less functional cooling products. This could also include educational institutions to provide capacity building training required to demonstrate the technical feasibility and cost-effectiveness of using energy efficient and environment-friendly cooling technologies. There are also regional organizations to provide guidance for developing standards and regulations for implementing (regional or national) energy efficiency codes and MEPS for cooling products and appliances.	Yes, some NGOs have been consulted such as ASHRAE, CLASP, NDRC, Centre for Human Rights and the Environment, Energy Foundation China.	Environmental advocates and consumer groups were to be engaged on: • **Component 1:** Environmental and consumer groups were to be invited to participate in high-level events to provide a balance to the participation of the manufacturers. Environmental groups and consumer groups were also to be requested to review draft model policies to ensure they are stringent enough yet do not put undue financial burdens on consumers; • **Component 2:** Environmental advocates, educational institutions and regional organizations all to provide capacity building training at twinning workshops; • **Component 3:** Environmental and consumer groups and regional organizations of each national or regional sub-project were to be engaged to ensure that their viewpoint and expertise are properly reflected.	Environmental and consumer groups, educational institutions and regional organizations were to provide capacity building and enhanced and increased awareness raising to the importance of energy-efficiency and low-GWP cooling products that can meet climate and environment targets.

- Outcome 3 would be overseen by the Chief of the Energy and Climate Branch, and managed by a U4E Programme Officer and an OzonAction Programme Officer;
- Additional UNEP staff would be to support the activities.

43. K-CEP have a Technical Advisory Committee (TAC) that provides guidance and oversight to the Cooling Project on strategy, investments, and reporting, monitoring, and evaluation. The TAC is comprised of personnel from a wide range of entities including independent consultants, IIEC, the Rocky Mountain Institute, ASHRAE, IEA, CLASP, NDRC, ICA, NDRC, LBNL, Energy Foundation China, the Government of Burkina Faso, SE4ALL, UNDP and the World Bank.

44. U4E's manufacturing partners were also to be engaged for inputs throughout the duration of the Cooling Project including Arçelik A.Ş., BSH Hausgeräte GmbH, AB Electrolux, Mabe and the Whirlpool Corporation.

45. Beyond the involvement of several UNEP entities on the Project as shown in Figure 2, it can be seen that an extensive number of partners were involved in the Project. Table 3 lists selected partners organized by involvement in global initiatives, regional initiatives or national ones for illustration of the type of partners.

Table 3. Selected Cooling Project Partners Organized by Involvement in Global, Regional, or Country Initiatives

Global Initiatives	Regional Initiatives	Country Initiatives
• LBNL and CLASP (MEPS and labels) • IEA (NCAP template, policymaker training) • IIEE (project registration databases, etc.)	• Centre for Sustainable Cooling (all of Africa via ACES) • EACREEE (East Africa) • SACREEE (Southern Africa) • ACE (Southeast Asia)	• Energy Foundation China • National Institute of Urban Affairs (India) • Rwanda Environmental Management Authority • Government of Ghana • University of Rwanda

E. Project Financing

46. The original design of the UNEP Cooling Project of November 2017 was UNEP receiving USD6,045,000 secured funding from 18 foundations and individuals supporting UNEP Cooling Project (listed in Appendix B of the UNEP Cooling Project Document) who pledged to help increase the energy efficiency of cooling in developing countries. The total planned budget from the November 2017 Project Document was USD11.72 million. Additions to the secured budget at the revision in 2021 is equal to USD22,613,431 (as portrayed on pg 4 of Project Revision #1) with total of secured resources of funding for the Cooling Project being USD28,658,431. This includes:

- USD15,429,195 from the Department for Environment, Food and Rural Affairs, UK Government (Defra);
- USD11,393,336 from the Clean Cooling Collaborative (formerly KCEP);
- USD1,579,700 from Danida;
- USD120,000 from the Government of Norway and Swedish International Development Cooperation Agency;
- USD136,200 from TABREED.

Table 4 shows the UNEP Cooling Project revision version of funds expended by year. During the first four years of the Project (the original timeline from November 2017 to November 2021), a total of USD10,872,834 was secured, similar to the target of USD11,720,000 in the Cooling Project Document. During Year 5, only USD1,192,975 was expended up to November 2022 as compared to USD16,773,541 secured that year. The remaining USD17,785,597 was to be expended on Phase 2 of the Cooling Project, after the formal end of Phase I in November 2022. Expenditures by Outcome were estimated by the Evaluation team according to the assigned sub-projects of donors.

Table 4. Cooling Project Expenditures

Outcomes	Resource Allocation (from ProDoc)	2018	2019	2020	2021	2022	Total Disbursed	Total Remaining
Outcome 1: Political leaders have the information to understand the challenges posed by market uptake of unregulated products and proactively support the policy measures (*Estimated expenditures based on sub-projects below*)	n/a	490,338	220,489	546,411	424,926	336,926	**2,019,090**	**n/a**
Outcome 2: National Ozone Officers and Energy Officials from developing countries support the design and implementation of policies that improve cooling product performance (*Estimated expenditures based on sub-projects below*)	n/a	1,141,108	1,580,828	831,554	819,543	119,893	**4,492,926**	**n/a**
Outcome 3: Regional policy roadmaps and national policy strategies are officially endorsed by developing and emerging economy national governments *(Estimated expenditures based on sub-projects below)*	n/a	1,019,189	1,095,557	926,347	583,569	736,156	**4,360,818**	**n/a**
Management activities	n/a	n/a	n/a	n/a	n/a	n/a	**n/a**	**n/a**
Actual Secured Income by Year	**28,658,431**	**1,581,301**	**2,844,961**	**2,396,086**	**5,062,542**	**16,773,541**	**n/a**	**n/a**
Total Estimated Expenditures	n/a	**2,650,635**	**2,896,874**	**2,304,312**	**1,828,038**	**1,192,975**	**10,872,834**	**17,785,597**
KCEP – High level support and capacities	n/a	490,338	220,489	221,287	102,367	7,323	**1,041,804**	
KCEP – Twinning	n/a	1,141,108	1,360,478	710,325	192,127	29,209	**3,433,247**	
KCEP – Caribbean	n/a	726,075	229,878	7,302	26,797	10,188	**1,000,240**	
KCEP – Rwanda	n/a	293,114	146,729	49,388	98,988	0	**588,219**	
KCEP – Africa	n/a	0	718,950	869,657	353,903	0	**1,942,510**	
KCEP – Regional Harmonization	n/a	0	0	0	0	152,472	**152,472**	
KCEP – EE HH appliances	n/a	0	0	0	0	63,280	**63,280**	
KCEP – access to urban sc and cold chain	n/a	0	0	0	0	447,909	**447,909**	
Danida – Cool Coalition	n/a	0	0	325,124	322,559	329,603	**977,286**	
Defra-HFC phase down and EE	n/a	0	220,350	121,229	509,870	90,868	**942,317**	
ESCAP-Passive Cooling for Cambodia	n/a	0	0	0	0	31,389	**31,389**	
Norway	n/a	0	0	0	117,546	-184	**117,362**	
Tabreed – India	n/a	0	0	0	103,881	30,918	**134,799**	

47. Financing for the Cooling Project did not come as a lump sum. Rather, it was a series of funds that were provided to UNEP's Cooling Project as *sub-projects* in the amounts of USD150,000 to USD2,000,000 from the various donors to the Project, mainly KCEP, Defra, and Danida. There were consistent replenishments of funding to the Cooling Project where UNEP and U4E personnel did not anticipate such growth. KCEP alone had USD52 million which was to bring in EE with the Kigali Amendment of the Montreal Protocol. During its 5-year duration, the Cooling Project expended USD8,669,681 received from philanthropists of KCEP to manage EE for Kigali Amendment through the KCEP windows of funding comprising of institutional strengthening (which wrapped up in 2020), standards and regulations, and access. ACES received USD3.3 million (GBP2.5 million) from Defra in November 2021 supported by the UNEP-U4E Cooling Project and partners to scale-up its work and develop a pan-continental network of outreach centres. The MLF took care of the MP funding for refrigerants.

F. Project Mid-Term Evaluation and Changes in Design During Implementation

48. There was no Mid-Term Evaluation (MTE) undertaken for the Cooling Project. However, there was a Project Revision conducted on July 2021 to accommodate the additional Defra and other funds being received by the Project. Changes in the design were reflected in the revised PLF shown in Annex VI with edits in red font. In general, PLF changes consisted of:

- Outcome 1 targets changed;
- Outputs 1.1 and 1.3 were changed along with targets;
- Outcome 2 indicators have a slight tweak in wording;
- Output 2.2 has an indicator added "Number of Governments apprised of the opportunity to utilise this new software / guidance" with a target of 125;
- Outcome 3 wording has been tweaked along with tweaks to indicators and targets;
- Outputs 3.1 and 3.2 have had the word of "programme" added to their description. National policy strategy target has been changed from 6 to 8.

IV. RE-CONSTRUCTED THEORY OF CHANGE AT EVALUATION

49. A Theory of Change (ToC) for a project essentially describes the roadmap of developmental pathways driven by regulatory or market drivers in combination with project activities to reach intended project outcomes as well as long-term outcomes that reflect the sustainability of the project activities. There were two UNEP Cooling Project Documents, one dated November 2017 and the other July 2021 (Project Revision #1). The second and revised Project Document of July 2021 contains activities for the November 2021 to November 2022 period utilizing USD2,678,653 (as detailed in Para 47) with a PLF that evolved over time from November 2017. As such, a new PLF and a reconstructed ToC (RToC) were developed for this Evaluation to highlight causal pathways and appropriate indicators that measure the delivery of all intended outputs and outcomes of the Project from November 2017 to November 2022.

50. Table 5 and Annex VI provide the UNEP Cooling Project PLF's original language with July 2021 revisions to outcomes, outputs, indicators and targets, displayed in a RToC. Though minimal corrective actions were taken in Table 5 to reword impact, intermediate states, project outcomes, outputs, an RToC diagram for the Cooling Project was developed as illustrated on Figure 3 by the Evaluators. The logic of the ToC diagram flows in a horizontal direction (from the baseline on the left to the long-term impact on the right) flowing from Project activities (green boxes) to outputs (yellow boxes) to outcomes (red boxes) to intermediate states (blue boxes) to long-term impacts (aqua boxes), namely from the accelerated market transformation to eco-efficient products and equipment to GHG emission reductions. The intended direct outcomes of UNEP Cooling Project from the PLF for this evaluation and RToC formulation has slightly changed from the original PLF to become clearer with outputs to be delivered as a means to achieve the Project outcomes. These PLF clarifications are made in green font in Annex VI, reflecting the RToC wording of these development pathways on Figure 3.

51. The RToC clarifies these development pathways from the baseline and identifies where there are drivers behind the intended Project activities to deliver outputs, outcomes, intermediate states and impacts. The draft RToC in Figure 3 has been reconstructed to:

- clarify project outcomes of the UNEP Cooling Project that would lead to intermediate states which, in the opinion of the Evaluators, would include intermediate states of:
    - decision makers at all levels adopt decarbonization, dematerialization, and resilience pathways;
    - countries and stakeholders have increased capacity, finance and access to technologies to deliver on adaptation and mitigation goals;
    - human health and environmental outcomes are optimized through enhanced capacity and leadership in the sound management of chemicals and waste; and
    - waste management is improved including through circular processes, safe recovery of secondary raw materials and progressive reduction of open burning and dump sites;
- illustrate an impact of "accelerated market transformation to eco-efficient cooling solutions to contribute with integrated policy approach to achieve a just transition to clean energy" that would lead to tangible reductions in electricity consumption and related GHG emissions;
- harmonize the language of the RToC, and UNEP Cooling Project's PLF outputs, indicators and targets mentioned in the two UNEP Cooling Project Documents. There are simplifications suggested to more clearly state intended outputs that are required from the Project, and to provide SMART indicators for the purposes of project monitoring;
- reflect the baseline conditions of the UNEP Cooling Project;
- show common drivers to deliver outcomes to intermediate states, and intermediate states to impacts including:
    - governments seeking solutions to higher fuel prices and climate change, and stakeholders seeking relief from high energy costs;
    - gender initiatives harness talents of women to decarbonize the cooling sector;
    - high-level political and industry commitment is sustained over time;

Table 5. Proposed Changes in ToC and Project Logical Framework (PLF) Language

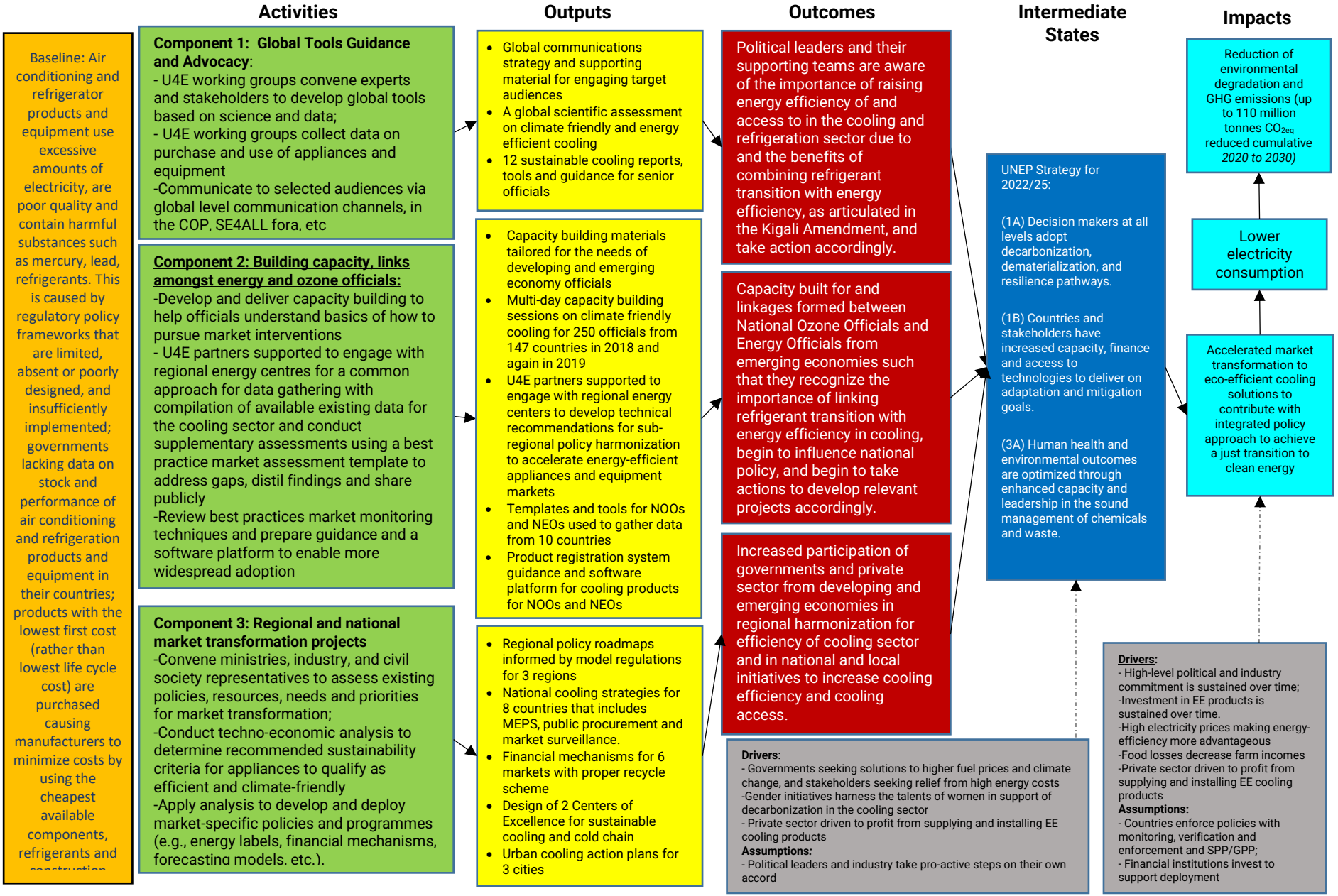
Original PLF and ToC language for Outcomes, Outputs and Indicators	Justification for Re-formulation	Formulation for Reconstructed ToC (RToC) under Project Revision #1 at Evaluation
Impact: Reduction of environmental degradation and GHG emissions (up to 110 million tonnes CO2eq), lower electricity consumption, accelerated market transformation to energy-efficient and climate-friendly cooling products	On original ToC, no dates were provided for the reduction of GHG emissions. Wording needed changing for clarity.	**Impact:** Reduction of environmental degradation and GHG emissions (up to 110 million tonnes CO_{2eq} reduced cumulative 2020 to 2030), lower electricity consumption, accelerated market transformation to eco-efficient cooling solutions to contribute with integrated policy approach to achieve a just transition to clean energy
Intermediate State: Global best practice policies are implemented by an array of emerging and developing economies	Original ToC said "global best practice policies are implemented by an array of emerging and developing economies". This could be changed to a more specific statement of an "increased number of countries that outlines the UNEP MTS Strategy for 2022/2025.	**Intermediate State:** UNEP Strategy for 2022/25: (1A) Decision makers at all levels adopt decarbonization, dematerialization, and resilience pathways. (1B) Countries and stakeholders have increased capacity, finance and access to technologies to deliver on adaptation and mitigation goals. (3A) Human health and environmental outcomes are optimized through enhanced capacity and leadership in the sound management of chemicals and waste.
Outcome 1: Political leaders have the information to understand the challenges posed by market uptake of unregulated products and proactively support the policy measures required to achieve a sustainable, strategic structural change in their cooling project markets	ToC clarified Outcome 1 by being more specific to the outcome.	***Outcome 1***: Political leaders and their supporting teams are aware of the importance of raising energy efficiency of and access to in the cooling and refrigeration sector due to and the benefits of combining refrigerant transition with energy efficiency, as articulated in the Kigali Amendment, and take action accordingly (supporting full cooling product market transformation to climate friendly and higher efficiency appliances at the global level). Outcome indicators changed to: • Number of countries that have signed a voluntary global pledge to reduce energy consumption in cooling sector (as of 11/30/22) • Number of countries that have officially developed NCAPs either (a) directly facilitated by project, (b) utilizing methodology developed by the project, or (c) via assistance of other projects that were clearly

Original PLF and ToC language for Outcomes, Outputs and Indicators	Justification for Re-formulation	Formulation for Reconstructed ToC (RToC) under Project Revision #1 at Evaluation
		designed/ launched as result of the Cooling Project (as of 11/30/22) • Number of countries that have incorporated findings from UNEP advocacy (such as NCAPs, model regulations/ MEPS, or labeling) into their NDCs (as of 11/30/22)
Output 1.1: Global communications strategy and briefing	2023 ToC mentions Output 1 as "U4E working groups convened with experts and stakeholders to develop global tools based on science and data and made them available at the U4E website". This statement was subsumed under "Component 1 activities".	***Output 1.1***: Communications campaign, multi-stakeholder collaboration platform and supporting material for engaging target audiences
Output 1.2: Materials for policymakers		***Output 1.2***: A global scientific assessment on climate friendly and energy efficient cooling
Output 1.3: A global scientific assessment on climate friendly and energy efficient cooling		***Output 1.3*****:** 12 sustainable cooling reports, model regulations and tools for energy-efficient and climate-friendly products uptake and other guidance to senior officials
Outcome 2: National Ozone Officers and Energy Officials from developing countries support design and implementation of policies that improve cooling product performance to achieve a sustainable, strategic structural change in the cooling product markets. A common approach for data gathering is adopted and yields the cooling market data required to inform the strategic policy measures.	In the original ToC, a statement of "a common approach for data gathering is adopted and yields cooling market data required to inform strategic policy measures" was provided. This statement has been subsumed under "Outputs". In addition, the Outcome needs simplification for clarity that emphasizes capacity building.	***Outcome 2***: Capacity built for and linkages formed between National Ozone Officials and Energy Officials from emerging economies such that they recognize the importance of linking refrigerant transition with energy efficiency in cooling, begin to influence national policy, and begin to take actions to develop relevant projects accordingly (to support full cooling product market transformation to climate friendly and higher efficiency appliances at country level). Outcome indicators changed to: • Number of countries for which twinning work accelerated/ influenced to some extent country's pursuit of Kigali Amendment; • Number of countries that are confirmed to have used country savings assessments or model regulations to inform their draft MEPS, NCAP, or NDCs; • Number of countries that are confirmed to be pursuing integrated work on refrigerants and energy efficiency in the cooling sector (such as via proposed activities with MLF or other donor funding) as a result of participation in twinning.

Original PLF and ToC language for Outcomes, Outputs and Indicators	Justification for Re-formulation	Formulation for Reconstructed ToC (RToC) under Project Revision #1 at Evaluation
Output 2.1: Training on climate friendly and energy efficient cooling organized for National Ozone Officers and Energy Officials	In the original ToC, the statements of "capacity building materials tailored for the needs of developing and emerging economy officials (including gender considerations)" and "multi-day capacity building sessions conducted for officials from 147 countries in 2018 and again in 2019" were provided. These statements have been added to the additional outputs. In addition, the new 2023 ToC mentions "U4E partners supported to engage with regional energy centers to develop technical recommendations for sub-regional policy harmonization to accelerate energy-efficient appliances and equipment markets". This statement has been subsumed in Component 2 outputs.	***Output 2.1***: Capacity building materials tailored for the needs of developing and emerging economy officials
		Output 2.2: Multi-day capacity building sessions on climate friendly for 250 officials from 147 countries in 2018 and again in 2019
		Output 2.3: U4E partners supported to engage with regional energy centers to develop technical recommendations for sub-regional policy harmonization to accelerate energy-efficient appliances and equipment markets.
Output 2.2: Database and templates for gathering data on cooling products sold in a country	In the original ToC, the statement of "template used to gather data from approximately 20 pilot countries" was provided. With the revisions, a software for a project registration system has been added and target for the first item lowered to 10. Both outputs are now included with revised output numbers and lowered target for the first item.	**Output 2.4:** Templates and tools for NOOs and NEOs used to gather data from 10 countries
		Output 2.5: Product registration system guidance and software platform for cooling products for NOOs and NEOs
Outcome 3: Roadmaps and strategies are officially endorsed by developing and emerging economy national governments to achieve a sustainable, strategic structural change in their cooling product markets (to support full cooling product market transformation at regional and country level)	A new outcome in the new February 2023 ToC mentions "increased number of countries from developing and emerging economies that have adopted MEPS, labels, and/or financial mechanisms consistent with U4E Model Regulation levels on appliances or equipment". There is a need to simplify the outcome wording.	***Outcome 3***: Increased participation of governments and private sector from developing and emerging economies in regional harmonization for efficiency of cooling sector and in national and local initiatives to increase cooling efficiency and cooling access. Outcome indicators changed to: • Number of countries that have officially signed on/ committed to regional roadmaps to adopt policies or programmes in line with the project's guidance and tools; • Number of countries that have officially adopted MEPS in line with project's model regulations;

Original PLF and ToC language for Outcomes, Outputs and Indicators	Justification for Re-formulation	Formulation for Reconstructed ToC (RToC) under Project Revision #1 at Evaluation
		• Number of countries that have committed to or realized significant investments (e.g. USD10 M or more from national or state government or private sector) in specific cooling areas to increase cooling efficiency or access as a result of the project (such as through cold chain, district cooling projects, passive cooling projects, financial mechanisms).
Output 3.1: Regional policy roadmap for at least one region	Output intent is clear. However, a new output in the new February 2023 ToC mentions "national and subnational governments and their stakeholders in developing countries supported to benefit from U4E through financial mechanisms, MEPS, public procurement and market surveillance". This statement has been translated into additional Outputs and activities.	***Output 3.1:*** Regional policy roadmap informed by model regulations for 3 regions
Output 3.2**:** National cooling strategies for at least 4 countries		***Output 3.2*****:** National cooling strategies for 8 countries that includes MEPS, public procurement and market surveillance
		Output 3.3: Financial mechanisms for 9 markets with proper recycle scheme (design of 6 and pilot 3)
		Output 3.4: Design of 2 Centres of Excellence for sustainable cooling and cold chain
		Output 3.5: Urban cooling action plans for 3 cities

Figure 3. Re-Constructed Theory of Change



  - investment for deployment of products is sustained over time;
  - high electricity prices making energy-efficiency more advantageous;
- show common assumptions to deliver outcomes, intermediate states and impacts including:
  - political leaders and industry take pro-active steps on their own accord;
  - countries enforce policies with monitoring, verification and enforcement and SPP/GPP;
  - financial institutions invest to support deployment;
- successful roll-out of policies and financial mechanisms, to support deployment of eco-efficient cooling products and equipment.

A. Causal Pathways from Outputs to Project Outcomes

52. With regards to the ToC causal pathways from the newly worded outputs to the Project outcomes, Project partners within U4E are crucial:

- for delivery of all Outputs and achieving all direct Outcomes driven by governments seeking solutions to higher fuel prices and climate change, and stakeholders seeking relief from high energy costs. This would include the ministries in all participating countries related to the energy and environment portfolios to facilitate and encourage the development of necessary standards and regulations for cooling products;
- to the use of KCEP, Defra and other funds to bring together NOOs and NEOs to use capacity building materials, to use data collection templates, to review best practices for market monitoring techniques and to collaborate on policy harmonization that accelerates energy-efficient cooling appliance and equipment markets; and
- to convene ministries, industry, and civil society representatives to assess existing policies, resources, needs and priorities for market transformation that can lead to regional and national policy roadmaps, national cooling strategies, and financial mechanisms for markets with proper recycling schemes.

B. Causal Pathways from Project Outcomes to Impacts

53. With regards to the ToC causal pathways from the Project outcomes to impacts, achievement of the 3 Project outcomes was expected to lead to intermediate states of:

- decision makers at all levels adopt decarbonization, dematerialization, and resilience pathways;
- countries and stakeholders have increased capacity, finance and access to technologies to deliver on adaptation and mitigation goals;
- human health and environmental outcomes are optimized through enhanced capacity and leadership in the sound management of chemicals and waste; and
- waste management is improved including through circular processes, safe recovery of secondary raw materials and progressive reduction of open burning and dump sites.

54. The impacts of “accelerated market transformation to eco-efficient cooling solutions to contribute with integrated policy approach to achieve a just transition to clean energy”, leading to “lower electricity consumption” and “reduction of environmental degradation and GHG emissions”, can be reached provided high-level political and industry commitment is sustained over time, investment for deployment of products is sustained over time, and there are high electricity prices making energy-efficiency more advantageous. This would eventually lead to a more rapid uptake of EE cooling products. Moreover, the governments of participating countries, through improved MVE capacities, will be able to witness first-hand the benefits of Project activities, its impact on energy consumers to use higher EE cooling products, and to reduce electricity demand and consumption that meets the objectives of low carbon development strategies of the participating countries. This will positively reinforce the assumed participating Government actions, leading to a sustained period of time of rapid uptake of EE cooling products until market saturation.

V. EVALUATION FINDINGS

A. Strategic Relevance

Alignment to UNEP MTS, POW and Strategic Priorities

55. The Project aligns with the UNEP Medium-Term Strategy (MTS) 2018 to 2021[21], specifically proposed outcomes in Climate Change where there are "reduced emissions consistent with a 1.5/2^{0}C stabilization pathway" through "emission reductions of greenhouse gases and other pollutants from renewable energy and energy efficiency", and where countries "increasingly adopt and/or implement low greenhouse gas emission development strategies and invest in clean technologies".

56. The Project was being implemented by UNEP's Global Climate Action Unit, Energy and Climate Branch, Industry and Economy Division (formerly the Climate Change Mitigation Unit, Energy Branch, Industry and Economy Division) under the Subprogramme: Climate Change (secondary subprogramme: Chemicals & Waste) under PoW 2018-19, PoW 2020-21 and PoW 2022-23 (under Project Revision #1):

- Subprogrammes for 2025 outcomes of Climate Stability;
    - *Outcome 1A: Decision-makers at all levels adopt decarbonization, dematerialization and resilience pathways;*
    - *Outcome 1B: Countries and stakeholders have increased capacity, finance and access to technologies to deliver on the adaptation and mitigation goals of the Paris Agreement;*
- Subprogrammes for 2025 outcomes of a Pollution-Free Planet;
    - *Outcome 3A: Human health and environmental outcomes are optimized through enhanced capacity and leadership in the sound management of chemicals and waste*;
    - *Outcome 3B: Waste management is improved including through circular processes, safe recovery of secondary raw materials and progressive reduction of open burning and dump sites.*

57. The Project also aligns with the UNEP Medium-Term Strategy (MTS) 2022 to 2025[22], specifically proposed outcomes in Climate Change where actions are to "hold the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C" and "increasing the ability to adapt to the adverse impacts of climate change and foster climate resilience and low greenhouse gas emissions development". The Project was being implemented under PoW 2018-19, PoW 2020-21 and PoW 2022-23 (under Project Revision #1) under the Sub-Programme: Climate Change:

- Outcome 1: Decision-makers at all levels adopt decarbonization, dematerialization and resilience pathways; and
- Outcome 2: Countries and stakeholders have increased capacity, finance and access to technologies to deliver on the adaptation and mitigation goals.

58. The *Bali Strategic Plan* (BSP)[23] has objectives to "strengthen the capacity of governments of developing countries through targeted capacity building within the mandate of UNEP, using and sustaining the capacity of technology obtained through training or other capacity building efforts, and developing national research, monitoring and assessment capacity that supports national institutions in data collection, analysis and monitoring of environmental trends and in establishing infrastructure for scientific development and environmental management (that will ensure sustainability of capacity building efforts)".

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[21] http://wedocs.unep.org/bitstream/handle/20.500.11822/7621/-UNEP_medium-term_strategy_2018-2021-2016MTS_2018-2021.pdf.pdf?sequence=3&isAllowed=y
[22] https://wedocs.unep.org/handle/20.500.11822/42683
[23] https://wedocs.unep.org/bitstream/handle/20.500.11822/26642/Annex%202%20to%20the%20briefing%20on%20South-South%20Cooperation.pdf?isAllowed=y&sequence=1

59. The BSP also has other specific objectives of "promoting, facilitating and financing as appropriate, access to and support of environmentally sound technologies and corresponding know-how, especially for developing countries as well as countries with economies in transition", and "strengthening cooperation amongst UNEP, multilateral agreement secretariats (that take into account their autonomous decision-making processes), and other bodies engaged in environmental capacity building including GEF". The Project was aligned to the BSP through its emphasis and efforts to achieve these objectives through local capacity building activities and providing inputs into the Project where appropriate from other developed countries (such as Germany). The results of local capacity building are discussed in the Section V D.7 of this report.

60. With regards to South-South Cooperation (SSC), the Project was designed to foster partnerships between developed countries with best international practices and regional countries for the purpose of information exchanges to facilitate market transformation for energy efficient cooling technologies globally. As such, SSC was designed to be prominent in the Project. In summary, rating for Alignment to UNEP's Medium-Term Strategy, Programme of Work and strategic priorities is *Highly Satisfactory.*

Alignment to UNEP/Donor Strategic Priorities

61. Over 97% of the funding for the Cooling Project comes from KCEP, Defra and Danida. Only the strategic priorities of KCEP and Defra (the 2 largest donors to the Project) were reviewed in this section.

62. KCEP is supporting countries, companies and communities to achieve energy efficiency objectives related to the Kigali Amendment. Launched in 2017, KCEP was deploying USD 52 million of philanthropic funds to strengthen institutions, support adoption of model policies, scale-up technology deployment, leverage finance and help make cooling more affordable and sustainable. With the Cooling Project with UNEP, KCEP's priorities are:

- strengthening capacity of NOOs in Article 5 countries so they can adjust their national MP compliance programmes to respond to the Kigali Amendment and incorporate EE considerations into their countries' work with the refrigeration and the AC sector;
- updating existing Country Savings Assessments for refrigerators and air conditioners for all developing and emerging economies with new data provided by NOOs and NEPs;
- supporting a select group of developing countries that volunteer to participate in the national cooling product registration pilot program to the extent to which they are committed and able to sustain the registry once the pilot is complete.

63. Defra's priorities are an adopted "Sustainable Consumption and Production" programme to address the increasing environmental impacts from the lifecycles of goods, services and materials growth. The programme activity is focused around measures to achieve:

- better products and services, which reduce the environmental impacts from the use of energy, resources (such as water), or hazardous substances;
- cleaner, more efficient production processes, which strengthen competitiveness; and
- shifts in consumption towards goods and services with lower impacts.

In summary, rating for Alignment to UNEP/Donor Strategic Priorities is *Highly Satisfactory*.

Relevance to Global, Regional, Sub-regional and National Priorities

64. The Project is highly relevant to:

- global priorities such as:
    - SDG 7 to ensure access to affordable, reliable, sustainable and modern energy for all, specifically Target 7.3: By 2030, double the global rate of improvement in energy efficiency, Indicator 7.3.1: Energy intensity measured in terms of primary energy and GDP; and
    - SDG13 on Climate Change,

- Climate Change Mitigation, specifically appliance energy efficiency related to the Kigali Amendment, and the work of OzonAction on the phase out of HCFCs and the phase down of HFC's under the Montreal Protocol;
- most countries with priorities of achieving their goals pledged to the Paris Climate Agreement, under which all countries are committed to keeping the future temperature increase below 2°C with 165 Parties and 155 Parties submitting respectively their INDCs and their first NDCs;

- regional priorities such as "A Sustainable and Resilient Caribbean" for the period 2017-2021, and ASEAN's Sustainable Development Scenario (SDS) of 2019 with the hope of deploying more efficient equipment and building efficiency improvements including efficient ACs;
- national priorities: more than 155 countries as signatories of the Kigali Amendment, have recognized the importance of energy efficiency as a driver for emission reductions, incorporating their NCSs and NCAPs into their NDCs. This is a strong indication that cooling is a national priority within these countries.

As such, rating for relevance to global, regional, sub-regional and national priorities is rated ***Highly Satisfactory***.

Complementarity with Existing Interventions/ Coherence

65. There were and are a number of ongoing sub-projects to complement the Cooling Project:

- the KCEP-funded World Bank-implemented "Efficient, Clean Cooling Program" for USD3.0 million starting in 2019 covering developing countries;
- work of OzonAction on the phase out of HCFCs and the phase down of HFC's under the Montreal Protocol, joint development and deployment by OzonAction and U4E on the Energy Efficiency Literacy Course; Twinning Training builds directly on their regional ozone network training platform, with technical advice delivered directly in response to requests by officials in these network (i.e. in Turkey, Kyrgyzstan);
- IGSD and CLASP efforts to mitigate the dumping of used and waste appliances was buttressed by U4E organization and facilitation of the Cool Coalition Used Cooling Product Dumping in Africa working group;
- U4E expertise was contributed to reports prepared by external entities on sustainable cooling, including by AEEE, LBNL, University of Birmingham, and SE4ALL;
- The Efficiency for Access Coalition Verasol programme used for testing off-grid appliances is the basis for verifying compliance for U4E's Model Guidelines for Off-Grid Refrigerating Appliances;
- IEA's Energy Efficiency Training Week in which U4E served as an expert trainer on how to utilize energy efficiency tools, guides and lessons learned from market transformation projects;
- GIZ Green Cooling Initiative - GIZ Proklima which is a project cluster focused on the promotion of Green Cooling, formed through a union of various projects. U4E and GIZ collaborate in several regions/countries to support aligned recommendations, including in Southern Africa and Southeast Asia.
- "Energy Efficient Lighting and Appliances Project in Eastern and Southern Africa" (EELA Project), which is in collaboration with UNIDO, East African Community (EAC), Southern African Development Community (SADC), and funding from the Swedish International Development Cooperation Agency (Sida). U4E and EELA collaborated on together with the regional centers (SACREEE and EACREEE) on regional MEPS for the respective regions.
- Energy Foundation China which is a grant-making foundation active in the space of sustainable energy in China and elsewhere. U4E and Energy Foundation China have collaborated in sharing experiences and best practices.

Rating for Complementarity with Existing Intervention/Coherence is ***Highly Satisfactory***.

Rating for Strategic Relevance:	Highly Satisfactory

B. Quality of Project Design

66. A review of the Project design is crucial towards a comprehensive understanding of Project outcomes and the actual Project outcomes achieved. A summary of this review is contained in the following paragraphs.

Project Design Strengths:

67. The Project was originally designed to transition in 2017 from the UNEP project "Establishing the Foundations of a Partnership to Accelerate the Global Market Transformation for Efficient Appliances and Equipment" (GEF ID 5831) to the "Global Project to Leapfrog Markets to Energy Efficient Lighting, Appliances and Equipment" (GEF ID #9337) or the "Leapfrogging project" that included 5 appliances (lighting, air conditioners, refrigerators, motors and transformers). However, air conditioners and refrigerators (or cooling products) were separated from the Leapfrogging project because funding for cooling products with a focus on refrigerants and energy efficiency dramatically increased in 2017.

68. While work under U4E was progressing on all 5 products in early 2017, work was first done on defining an integrated policy approach (inclusive of MEPS, labels, financing, market monitoring verification and enforcement, and sustainable end-of-life management of products) for all 5 products through task forces to develop policy reports[24]. Due to GEF supporting the U4E platform, KCEP had an interest to strengthen U4E and scaling up, in part due to the issues of energy efficiency and refrigerants under the Kigali Amendment. A UNEP technical advisor was recruited in 2017 for the Leapfrogging project, who managed also to get funding from KCEP focusing on air conditioners and refrigerators. A ProDoc was prepared in 2017 for the Cooling Project for KCEP funding where the Project sought for more implementation in countries after the global aspects of the Project were underway. Myanmar, Chile and Ghana were some of initial countries that focused on the refrigerators and to some extent air conditioners. The institutional and agency setup for the Project was replicated from the "en.lighten project" with an integrated approach with a slight change: dedicated focus on financing. Prior to this, financing was integrated with other aspects.

69. The objective as stated in the Project Document of the Project was to "*significantly increase and accelerate the climate and development benefits of the Montreal Protocol refrigerant transition by maximizing a simultaneous improvement in the energy efficiency of the cooling sector*". The design of the Project focused on a holistic approach to removing barriers to widespread adoption of energy efficiency in cooling products including:

- higher utility bills throughout the lifetime of the product for the residence with less disposable income and making business less competitive;
- excessive peak electricity demand causes supply disruptions unless utilities build more power plants or run existing power plants more;
- public funds must be diverted from other development priorities to address additional electricity infrastructure needs;
- more severe water, air and soil quality degradation as powerplant emissions increase;
- worse global warming due to rise in direct (from refrigerants) and indirect (from electricity generation) emissions.

[24] These reports on each product area were critical foundations to the work that followed through this Project. Available on: https://united4efficiency.org/resources/accelerating-global-adoption-energy-efficient-climate-friendly-refrigerators/

70. As such, the design of the Project incremental support was to augment the 2017 baseline to meet the intended results of the Project by:

- strengthening the competencies of high-level government staff at regulatory entities across the globe;
- strengthening collaboration between NOOs and NEOs to collaborate on harmonized regulatory frameworks for EE cooling technologies;
- providing support for participating countries for developing policies, regulatory frameworks, national strategies and policy roadmaps for environmentally sound management, increased user acceptance, and demand for high efficiency cooling products and systems; and
- considerations of gender integrated in different activities to be undertaken within the Project framework including ensuring the participation of women from UNEP, the Donors and the Countries, ensuring coherence of the gender strategy with the Project, and supporting Project implementation with proactive enabling measures. This aspect would include identifying gender gaps in participation and decision making in environment and climate issues and the gender gaps in energy access and women's and men's different needs on cooling energy.

71. In conclusion and considering the size of donor support of USD11.720 million over a 4-year period, at the time of original Project design, the design of the Project was clearly scoped to provide (large) incremental support to strengthen high-level knowledge and awareness and enable government officials to develop supporting policies, regulatory frameworks, national strategies and national policy roadmaps for environmentally sound management and increased user acceptance and demand for high efficiency cooling products and systems. The strength of the Project is in its holistic approach to achieving the Project objective.

Project Design Weaknesses:

72. A review of the PLF revealed in what appears to be a hastily assembled PLF amidst the rapid approach of anticipated initial round of Twinning Training and other additional opportunity areas being defined with the lead donor which itself was a nascent organization, so "insufficiently-specific" intended objective in addition to some poorly worded Project outcomes and outputs; achievement of those outcomes and outputs were to be measured with poorly worded indicators and targets. While a small number of indicators and targets were SMART, there were several more examples of the indicators that were not SMART in the PLF which led to overlaps and confusion over what are the indicators and targets to be achieved for the Project. There was a need to improve the description of indicators and targets for Project management personnel to deliver the intended outputs of the Project which was done by the Evaluation Team in Section IV: Re-Constructed Theory of Change at Evaluation (Paras 49-54 as well as Table 5 and Figure 3).

73. Recognizing that the original PLF does not align with the best practices in preparing PLFs, comments are provided in Paras 49-54 and Table 5 to simplifying and clarifying the achievement of intended outcomes through delivery of outputs as measured with SMART indicators and targets. While there were issues with the PLF, other aspects of the design were strong and rated 'satisfactory' to 'highly satisfactory'. The Project Design Quality (PDQ) matrix is summarized in Annex VIII. Overall, the design of the Cooling Project is rated as *Satisfactory*.

Rating for Project Design: Satisfactory

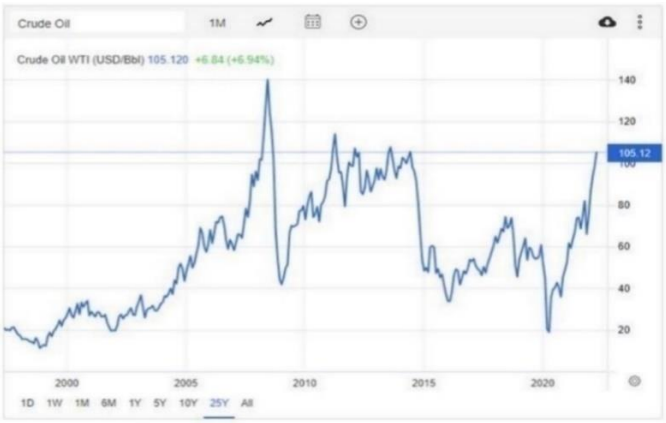
C. Nature of the External Context

74. Project operations can be affected by externalities beyond the control of the Project. This may include externalities such as severe and unexpected climatic events, high-risk security situations, poor or lack of supporting infrastructure, economic instability, and politics. A review of the factors in assessing the nature of external context for all countries participating in the Cooling Project reveals that the Project operations were affected by a number of issues as described below. Some of these factors quite seriously affected many or most of the many countries with which the Cooling Project worked. Despite the immense challenges, however, most involved countries obtained varying levels of benefits from the Project (some, very strong benefits) and it was rare (i.e. Myanmar) that a country completely dropped out of the Project. These issues include:

- firstly, hurricanes cause major damage and flooding to several countries especially SIDS. Hurricane Dorian struck the Bahamas in September 2019, destroying much of the regional infrastructure. As can be imagined, resources in countries impacted by severe weather events are diverted from attention to the Project to reparations after these events;
- secondly, there were elections in all countries that caused delays in the delivery of the outputs;
- thirdly, there were coups with military governments. Myanmar is one country that was severely affected by a military coup in February 2021. As a result, their efforts to join ASEAN to harmonize their AC and refrigerator MEPS were terminated;
- fourthly, there was the COVID-19 pandemic. The pandemic had the impact of especially seriously slowing down Project implementation in some cases, where COVID-19 severely affected the tourism sector on which the economies of these countries is dependent (such as St. Lucia and the Maldives). In all countries, COVID-19 required major reorientation as finances of governments and businesses were severely strained contending with the cost of lockdowns with stagnating economic activity, loss of staff due to illness, ceasing of some business operations, etc. on a scale not seen in living memory for many of these countries. Nearly all countries which were supported by UNEP suffered the impact of these unprecedented times. Even in stable periods, absent pandemics, the project would have faced a difficult feat, working across so many developing and emerging economies.
- fifthly, the drop in crude oil prices in 2015-18 affected government priorities and interest in promoting energy efficiency and renewable energy for cooling products. This lasted until 2021 when crude oil prices started to rise again as shown on Figure 5. High oil prices, though they can be motivating for energy efficiency efforts in the long-term, can sometimes be so immediate and crippling as to take attention away from such efforts. In general, exporters benefit with the rise in prices and importers face the opposite situation. The Project, with so many countries involved, includes both types of countries, though more that are importers. As an example of the impact of rapid price rises, many small island developing states use heavy fuel oil for electricity in addition to a near total reliance in the powered transport sector, so, when prices rapidly climb, the impact on the economy is disastrous and little time and attention can be paid to future energy savings when contending with current crisis.

Despite all these externalities of climatic events, economic conditions, pandemic, and politics, the Cooling Project has managed to perform at a highly satisfactory level with a critical number of countries participating in the Project as detailed in Paras 75-185. To achieve such success in the face of the pandemic along with the other challenges mentioned is an impressive feat.

Figure 5. Yearly oil prices[25]



Rating for Nature of the External Context: Moderately Unfavourable

[25] https://tradingeconomics.com/commodity/crude-oil

D. Effectiveness

D.1. Availability of Outputs for Outcome 1: Political leaders have the information to understand the challenges posed by market uptake of unregulated products and proactively support the policy measures required to achieve a sustainable, strategic structural change in their cooling product markets

75. *Output 1.1: Communications campaign, multi-stakeholder collaboration platform and supporting material for engaging target audiences*. UNEP has been a convener and global voice and authority on sustainable cooling for decades and has several global and country programs and partnerships supporting member states on cooling as well as associated Centres. In 2018, high level communications came out from corporate communications with strong outreach to the public with intentions of doing a full-fledged roll out on sustainable cooling under KCEP funding.

76. UNEP and a small number of partners launched the Cool Coalition in 2019 under a consortium approach as a global initiative to advocate for and take comprehensive action on cooling by raising the political momentum of cooling and getting UNEP to convene all ongoing activities on cooling[26]. The Coalition had its origins in the "First Global Conference on Synergies between the 2030 Agenda and the Paris Agreement", where partners defined "comprehensive" in the area of cooling as delivering on the Paris Agreement, the Sustainable Development Goals, and the Kigali Amendment to the Montreal Protocol. Within a few months, the Cool Coalition mobilized several high-level commitments to fast action on cooling from state and non-state actors and became a transformative initiative of the UN Secretary-General's Climate Action Summit in September 2019; efforts of the Coalition were aided by a number of "Cool Champions" who are thought leaders from government, private sector and civil society to amplify the messages of the Cool Coalition, raise awareness about the need for efficient and climate-friendly cooling, and mobilize their peers to join this effort. The Cool Coalition serves as a unified front that links action across the Kigali Amendment, Paris Agreement and Sustainable Development Goals to inspire ambition, identify solutions and mobilize action to accelerate progress toward clean and efficient cooling.

77. The strength of the Cool Coalition lies in its members[27] and the Secretariat helps to link together activities of several hundred organizations and achieve synergies through the establishment of working groups and technical advisory committees. As such, the Coalition is a political and a global knowledge platform, a convener of industry and government, and is a host for tools and methodologies with the aim to apply them in some countries. In addition, a significant part of Cool Coalition is fundraising for other partners. Coalition members adopted a ToC in 2020 and a formal governance structure in 2021. The governance comprises an executive committee and steering committee which includes members from countries, industry, finance, academia, civil society, and international organizations. A technical committee and 9 thematic working groups led by members drive delivery of the workplan. The Cool Coalition Secretariat is housed under the direct authority of the Head of UNEP's Energy and Climate Branch, Industry and Economy Division, and is comprised of a full-time team of 6 staff and consultants with additional 12 staff and consultants providing part-time technical support, drawing on UNEP's Senior Management Team and regional offices for high-level political engagement of countries and to ensure incorporation of cooling in global political processes (such as COP 28, G20, G7, Climate Weeks, UN Food Systems Summit). The Coalition team is also able to leverage UNEP's internal Global Environment Facility (GEF) and

[26] There are 3 UNEP units with staff involved in the Coalition: one is the Climate and Clean Air Coalition to Reduce Short-Lived Pollutants (CCAC), second is the Cities and Buildings Unit, and third is the U4E Team. Another team is in Nairobi who are looking at the phase out of refrigerants.

[27] Key members of the Coalition include Basel Agency for Sustainable Energy, C40, Care Without Harm, CLASP, Climate and Clean Air Coalition (CCAC), Danfoss, ENGIE, Energy Foundation China (EFC), Environmental Investigation Agency, *Global Cool Cities Alliance*, International Solar Alliance, Kigali Cooling Efficiency Programme, Empower, Arcelik, Minister of Environment of Chile, Minister of Environment of Rwanda, Minister of Foreign Affairs of Denmark, Natural Resources Defense Council, REN21, Rocky Mountain Institute, Sustainable Energy for All Initiative, Toby Peters - Professor in Cold Economy University of Birmingham, Shakti Sustainable Energy Foundation, The Energy and Resources Institute (TERI), and UNEP.

Green Climate Facility (GCF) to put together proposals for climate finance on cooling with other members of the Cool Coalition.

78. The Secretariat manages the coordination functions of the Coalition, including day-to-day operating decisions relating to advocacy and communications activities, the coordination of Working Groups, and other activities supported under the Workplan. The Secretariat benefits from close collaboration with different teams under UNEP, including OzonAction and the Ozone Secretariat, U4E, the Global Alliance for Buildings and Construction (GABC), District Energy Initiative, the Climate and Clean Air Coalition (CCAC), the UNEP Copenhagen Climate Centre, and the Nature for Climate Branch and Regional Offices as well as the Basel Agency for Sustainable Energy (BASE). Activities of the Coalition includes global advocacy that aligns with UNEP global and country-level activities on cooling that contribute to the Coalition's ToC.

79. The Coalition undertook several initiatives to build a global communications strategy and briefing materials for policymakers. The Cool Coalition started the "Cooling Pledge" which had its communications campaign of advocacy work which grew immensely in scale and received a higher profile on global agendas in 2020. The Cool Coalition did work on ACs, refrigeration, cold chain and passive cooling strategies with the objective of the Coalition "to bring countries on board to make pledges in cooling", and resulting in over 40 reports, policy briefs, methodologies and toolkits that have been produced by various members of the Coalition. By implementing or adopting different policies and measures developed by the team (i.e. model regulations, harmonization approaches), countries are able to adopt MEPS and other regulations for a better impact. Furthermore, if one country can deliver MEPS and standards that have more impact, it can be replicated by other countries providing an even greater impact.

80. The 40 reports, policy briefs, methodologies and toolkits getting used and applied by member countries to accelerate action on sustainable cooling, got the Coalition directly involved in country level implementation in critically under-addressed areas. The Coalition provided scalable models for other countries with Cambodia, Indonesia, Türkiye, Egypt, Jordan, Maldives, Tunisia and Viet Nam all preparing NCAPs based on the Cool Coalition methodology as of November 2022. The Coalition were and are still trying to engage large countries such as China and Brazil who have recently joined; engagement of India and other G20 countries is ongoing, especially those countries with weather conditions that necessitate cooling approaches. This is done through working groups who provide technical support, co-finance and peer review to the activities to ensure they meet a high global standard that can be replicated by all members.

81. Since its founding, the Coalition has grown in membership and impact. The Coalition currently has 130 members who are collaborating on science and policy development, knowledge exchange, advocacy and joint action directed at governments and industry. Key results of the Cool Coalition between 2019 and 2023 include UN Climate Change Conferences and raising ambition on cooling in NDCs:

    - Cool Coalition has been building increased momentum for action on cooling, using UN Climate Change Conferences, Climate Action Summit and the Regional Climate Weeks to increase ambition and spotlight new commitments and leading actors. This includes numerous financing announcements and country commitments on cooling showcased at COP 26 in Glasgow (2021) and COP27 in Sharm-El-Sheikh (2022);
    - the COP 28 UAE presidency asking the Cool Coalition to become its main delivery partner on cooling, a reflection of the Coalition's collective achievements and growing reputation. The UNEP-led Coalition secretariat and Coalition members have been supporting the COP 28 Presidency on three anticipated outcomes:
        - mobilization of transformative measurable commitments by state and non-state actors through a Global Cooling Pledge;
        - input to the Global Climate Stocktake; and
        - demonstrating technologies and cooling innovations during COP 28;
    - The Cooling Pledge has drawn on the Coalition's technical expertise while the Coalition secretariat has supported United Arab Emirates (UAE) consultations with 40 countries and 100+ non-state actors. The UAE and the Coalition set up a country advisory group to finalize the text of the Pledge. Countries helping in this effort are Denmark, Kenya, the Maldives,

Panama, Rwanda, and the United Kingdom with the United States, Japan, India, South Africa, all considering joining the group. Currently, there are more than 66 countries joining the Cool Coalition's Cooling Pledge;

- Cool Coalition has organized one event in each Regional Climate Week since 2019 working with the host country and UNEP Regional Offices to bring regional stakeholders together on cooling;
- Cool Coalition has held numerous events during Climate Week and supported inclusion of cooling at the Bonn Climate Change Conference (June 2023) and Climate Ambition Summit in New York (September 2023);
- Since 2021, the Cool Coalition has been working with multi-lateral development banks and financial institutes to enable knowledge exchange and enhanced strategic understanding of cooling within lending operations, develop guidance to help countries access finance to cooling, and create knowledge on funding facilities and proposal preparation processes;
- Cool Coalition has launched in 2019 at the United Nations Secretary General's Climate Action Summit in New York in September that year and featured at many other events, including High-Level Dialogue on Energy, 33rd Meeting of Parties to the Montreal Protocol, New York and London Climate Weeks, Energy Action Day hosted by Denmark, Regional Climate Week in Africa, Innovate4Cities Plenary Session hosted by GCOM and UN-Habitat as well as COP 26. The topic of sustainable cold chains was firmly anchored in the UN Food Systems Summit and its Pre-Summit's narrative and agenda.

82. The Coalition maintained visibility for cooling through representation at high-level conferences and meetings including:

- World Urban Forum where the Coalition hosted side events on sustainable cooling and heat adaptation in cities (2022);
- United Nations Environment Assembly (2022);
- the UN Food Systems Summit (2021) firmly anchoring the Coalition's advocacy work on sustainable cold chains that included Coalition-led mobilization to ensure inclusion of Community Cooling Hubs as a transformative solution at the Summit;
- Cool Coalition hosting several events at the Meeting of Parties to Montreal Protocol (MOPs) (2022 and 2023) and Open-Ended Working Group (OEWG) (2022) meetings, using the opportunity to engage country representatives and build the case for refrigerant phasedown, enhanced efficiency through holistic approaches to cooling, cold chain and NCAPs;
- Clean Energy Ministerial (CEM) where the Coalition hosted side events on cooling and linked events with India as host of 2023 CEM and G20[28];
- the G20 in September 2023 where Cool Coalition have participated in the Energy Transitions Working Group and organized numerous side events as a lead knowledge partner with Ministries of Power to raise cooling ambitions from countries in advance of COP 28 as well as holding ministerial roundtables (including with Danish minister) and bilaterals on cooling at the G20 (this includes working with India's National Institute of Urban Affairs to incorporate cooling into the Urban 20 that included events, podcasts and a white paper[29]);

[28] In the lead up to the COP 28 in UAE, India also hosted the G20 and CEM, making 2023 a unique opportunity to raise the profile of cooling and extreme heat and influence a global movement particularly in the global south on these two critical issues. This roundtable was to bring together key stakeholders to collaborate and identify specific action points in the global agenda that will highlight cooling and heat resilience; develop a joint agenda for India; and contribute to global initiatives such as the COP 28 UAE mobilization efforts towards a Global Cooling Pledge.

[29] This includes India's Cooling Action Plan by MoEFCC which aims to reduce total cooling demand by 20-25% by 2038, prepare city heat action plans, integrate passive cooling in buildings and on an urban scale, and implement energy efficiency measures through Energy Conservation Building Code (ECBC), EcoNiwas Samhita (ENS) and the Energy Conservation Act by MoP.

- other convening summits including in August 2022, when Clean Cooling Solutions and UNEP conducted a Climate Change Adaptation and Mitigation Workshop on the District Cooling Systems (DCS), developing GHG emissions inventories, disaster resilience plans and climate actions in the Gujarat International Finance Tech-City (GIFT City) in India[30].

83. The Cool Coalition has organized numerous study tours, capacity building events and webinars to enhance knowledge sharing and raise ambition with public officials. Few key highlights include:

- Singapore study tour: week-long study tour and workshop series on district cooling and passive cooling in Singapore bringing 53 stakeholders from 10 developing countries together (2023);
- Presentation of a case study on a Paris district cooling system for the National Institute of Urban Affairs (NIUA) of India (2023);
- workshop in India on health sector measures to mitigate and adapt to impact of extreme heat (2022);
- national training workshop under the initiative "Sustainable Urban Cooling Tackling Extreme Heat in Vietnam Cities" (2023);
- a webinar entitled "Planning for Extreme Heat with the Heat Action Platform" (2022).

84. Preparations were also underway in September-November 2022:

- to enable a "Global Transition to Sustainable Cooling under the G20 India Presidency" through an Energy Transition Working Group in Gandhinagar in April 2023 that essentially helps accelerate the coupling of the phase-down of HFCs with improved cooling efficiency under the Kigali Amendment and fast-tracks improved design of buildings and districts, as well as passive, nature-based solutions to increase access to affordable sustainable cooling for all;
- for a strategic roundtable organized by NRDC India, UNEP India, Cool Coalition, and TERI under the aegis of the World Sustainable Development Forum 2023 on "Moving the Global Agenda on Cooling: Spotlight on India" that was held on 22 February 2023;
- to hold a G20 Side Event on "Enabling a Global Transition to Sustainable Cooling" that generated more momentum for global action and increased ambition on sustainable cooling. The Side Event was organized by the India G20 Presidency, UAE COP 28 Presidency, the Bureau of Energy Efficiency (under the Ministry of Power, Government of India), and UNEP-led Cool Coalition. The Side Event convened senior official representatives from G20 and non-G20 countries as well as private sector, development banks, financial institutions, and philanthropies to:
    - share high-level interventions on their actions on sustainable cooling;
    - discuss how G20 and COP 28 processes can amplify such action and enhance global collaboration;
    - seek feedback and participants' initial perspectives on the Global Cooling Pledge; and
    - discuss how the transition to sustainable cooling can be accelerated through collaborative approaches;
- to hold a Singapore Study Trip on 7-12 May 2023 that was organized by UNEP with support from the Government of Singapore, Government of Colombia, UNIDO, Swiss State Secretariat for Economic Affairs, Tabreed, GIZ, Danida, Indo-German Energy Forum (IGEF), International Finance Corporation (IFC), and the local district cooling industry in Singapore, under the

[30] The workshop provided the interrelation between rising climate change issues and the increase in demand for district cooling in India, introducing mechanism and overall flow to DCS in India, UNEP's work across 45 cities in 16 developing nations on DCS through private-sector engagement, and the 69 partners who are supporting this initiative under District Energy in Cities Initiative. Within India, Hyderabad Pharma City, Rajkot, and Thane are currently being supported as pilot cities with Energy Efficiency Services Limited (EESL) acting as the National Coordinator for India. Best practices for DCS are demonstrated in GIFT City India, Cyberjaya Malaysia, Singapore, Hong Kong, and China.

framework of the Cool Coalition. Attendees of the study tour included 56 country officials from Cambodia, Chile, Colombia, India, Indonesia, Malaysia, Singapore, Tunisia, Viet Nam, Vietnam and two observers from the UK and USA. The week-long study tour and workshop focused on district cooling and passive cooling in Singapore, bringing together key stakeholders from multiple countries for:

- technical visits to three high-class and diverse district cooling projects across Singapore and three passively cooled buildings;
- dedicated workshops on national and local policy development, led by UNEP and Singapore's Urban Redevelopment Authority, Energy Market Authority, Building and Construction Authority and partners with opportunities for presentations and exchanges by each country on their current and planned policy frameworks;
- dedicated workshops on technology, business models and financing for district cooling and passive cooling, led by UNEP, IFC as well as local industry experts including Singapore Power, Tabreed and Keppel;
- raising awareness and capacity of countries, cities, and industry on the diverse benefits of district cooling and passive cooling, challenges and opportunities for their deployment and the policies and support needed to accelerate the market for these approaches;
- providing strong opportunities for country governments and cities to exchange their policy approaches and build long-term collaborations; and
- industry to exchange on best practices and interact with leading players in district cooling and passive cooling with UNEP and its partners under the Cool Coalition continuing to support officials and industry on policy and best practice exchange between the international participants present at the workshop.

85. The availability of Output 1.1 is *Highly Satisfactory* considering the availability of ample communications campaigns, multi-stakeholder collaboration platforms and supporting material for senior government officials and implementing partners.

86. *Output 1.2: A global scientific assessment on climate friendly and energy efficient cooling*. A sample of some of the major reports and toolkits is here:

- Paper 2019: Cooling in a warming world – Opportunities for delivering efficient and climate friendly cooling for all, UNEP and IEA;
- Guide 2020: UK Leadership on sustainable cooling: From COVID-19 to COP 26, Carbon Trust, UK Government, UNEP and other Cool Coalition partners
- Report 2020: Cooling Emissions and Policy Synthesis Report: Benefits of cooling efficiency and the Kigali Amendment, UNEP and IEA;
- Brief 2020: Net Zero Cold Chains for Food, Carbon Trust, Cool Coalition, KCEP;
- Brief 2021: Sustainable Cooling in Support of a Resilient and Climate-Proof Recovery, Cool Coalition and CCAC's Efficient Cooling Initiative;
- Brief 2021: Not Passing on Passive Cooling: How Philanthropy Can Help Accelerate Passive Cooling Solutions and Their Climate Benefits, Cool Coalition, KCEP, SE4ALL, CEA Consulting;
- Action Plan 2021: Pathway to Net Zero Cooling Action Plan, KCEP, Cool Coalition, The Carbon Trust, Oxford Martin School, Race To Zero;
- Report 2021: Cooling Suppliers: Who's Winning the Race to Net Zero, KCEP, The Carbon Trust, supported by Race To Zero, Cool Coalition;
- Action Plan 2021: National Cooling Action Plan Methodology, Cool Coalition, AEEE, UNEP, UNESCAP, World Bank Group, UNDP, KCEP, SE4ALL, GiZ, U4E, OzonAction, CLASP, Energy China Foundation, University of Birmingham;
- Policy Brief 2021: Opportunities to Address Used Cooling Product Imports into Africa - Cool Coalition Used Products Working Group;

- Handbook 2021: Beating the Heat: A Sustainable Cooling Handbook for Cities, Cool Coalition, UNEP, RMI, Global Covenant of Mayors for Climate & Energy (GCoM), Mission Innovation, Clean Cooling Collaborative;
- Leadership Guide 2021: France Leadership on Efficient Climate-Friendly Cooling, French Ministry of Ecological Transition, CCAC, Cool Coalition, The Carbon Trust;
- Achievement Report 2022: The Cool Coalition: Jointly facing the challenge of a warming world, Cool Coalition Secretariat;
- Report 2022: Sustainable Food Cold Chains: Opportunities, Challenges and the Way Forward, UNEP and FAO;
- Online Cool Cities Knowledge Hub with National Institute of Urban Affairs Denmark and UNEP, 2023;
- Heat Action Platform: The Cool Coalition, the Extreme Heat Resilience Alliance and partners developed an online tool that provides an easily accessible, actionable one-stop resource for city officials on implementing solutions to strengthen heat-resilience in urban areas. The tool was based on key insights from "Beating the Heat: A Sustainable Cooling Handbook for Cities". The Heat Action Platform was developed for cities, providing a roadmap to assess, plan, implement and evaluate different heat resilience strategies. It includes technical resources, case studies, a curated inventory of solutions, as well as guidance on monitoring and evaluation frameworks. Several cities around the world are using the Platform to find the means to protect the health and livelihoods of urban communities from the effects of extreme heat.

87. The joint 2019 UNEP/IEA report on "Cooling Emissions and Policy Synthesis Report: Benefits of cooling efficiency and the Kigali Amendment" is based on the UNEP and IEA assessment of development and climate benefits of efficient and climate friendly cooling and drawn from a longer analysis of the climate and development benefits of efficient and climate-friendly cooling available[31]. This report also lays out ways to resolve this dilemma by delivering efficient and climate friendly cooling for all, in particular by rapidly phasing down HFCs in the cooling sector and delivering cooling more efficiently through more efficient equipment and more efficient buildings. The report offers suggestions to slow global warming, improve the lives of hundreds of millions of people, and realize huge financial savings through:

    - phase down of HFC refrigerants through Kigali Amendment on substances that deplete the ozone layer and have a GWP thousands of times more than CO_2;
    - implementing proven policies such as MEPS;
    - activation of NCAPs;
    - integration of efficient cooling into enhanced NDCs of the Paris Agreement;
    - implementation of transformative initiatives such as the Cool Coalition.

88. This report also aimed to provide policymakers and practitioners with a non-technical summary of recent research on the topic and provide policy options to accelerate action, focusing on the following questions:

    - What is the climate mitigation impact of the HFC phase-down?
    - What are the current uses of HFCs and what are their substitutes?
    - What is the status of cooling energy efficiency and its potential for improvement?
    - What technologies are available to hasten the transition to climate friendly and energy-efficient cooling?

[31] https://www.ccacoalition.org/resources/cooling-emissions-and-policy-synthesis-report-benefits-cooling-efficiency-and-kigali-amendment

- What policies and measures can countries apply to unlock the multiple benefits of climate friendly and energy-efficient cooling?

89. The availability of Output 1.2 is *Highly Satisfactory* in consideration of the availability of a global scientific assessment on climate friendly and energy efficient cooling, namely the UNEP/IEA report on "Cooling Emissions and Policy Synthesis Report: Benefits of cooling efficiency and the Kigali Amendment" as well as other papers, policy briefs and reports mentioned in Para 86.

90. *Output 1.3: 12 sustainable cooling reports, model regulations and tools for energy-efficient and climate-friendly products uptake and other guidance to senior officials*. Since the establishment of the Cool Coalition in 2019, over 40 reports, policy briefs, methodologies and toolkits have been produced. This included NCAP methodology which included NCAP templates, guidelines on how to collect and process data, and how to develop recommendations. These are getting used and applied by members in countries to accelerate action on sustainable cooling in countries listed in Para 123 who are all preparing NCAPs based on the Cool Coalition methodology under Outcome 3.

91. Model regulations were drafted by U4E as a tool or template to promote MEPS and labels for different equipment that can be set in different countries. By the completion of the Cooling Project in November 2022, model regulations for ACs and refrigerators (commercial and residential and off-grid) along with transformers, motors, lighting and fans, U4E were successfully deployed allowing countries to start from scratch to set regulations from testing standards to efficiency assessments (as per Article 1: Scope of Equipment, Article 2: ISO compliant testing matrix, and another Article on recycling cooling equipment). The voluntary guidance for air conditioners, refrigerators and ceiling fans was intended for developing and emerging economy governments considering a regulatory or legislative framework requiring new refrigeration equipment used in commercial applications to be energy efficient and use refrigerants that have lower GWP compared with typical legacy refrigerants. The aim was to balance ambitious energy performance and refrigerant requirements while limiting adverse impacts on the upfront costs and availability of products. Regulatory processes were intended to be undertaken transparently and with sufficient time to address local circumstances such as availability and prices of products, income levels, and utility tariffs. Regulatory transformation was intended to be typically led by an energy ministry with the support of a national standards body and an environment ministry through its NOU and conducted in consultation with many experts from the public and private sectors, and civil society. Model regulation guidelines on cooling were developed by U4E with a technical lead from LBNL including:

    - *"Accelerating the Global Adoption of Energy-Efficient and Climate-Friendly Air Conditioners*" in September 2019 to supplement the U4E Air Conditioner Policy Guide, published in Chinese, Portuguese, French;
    - "*Energy-Efficient and Climate-Friendly Commercial Refrigeration Equipment*" in December 2022 to complement U4E's "Model Regulation Guidelines for Refrigerating Appliances" and other supporting resources;
    - *"Off-Grid Refrigerating Appliances - Model Quality and Performance Guidelines*" prepared during the Cooling Project in 2021 and 2022 by UNEP's U4E initiative, in collaboration with LBNL with funding from the U.K. Dedra and the Clean Cooling Collaborative and completed in early 2023. While many countries set MEPS and energy labelling requirements for grid-connected refrigerating appliances, off-grid refrigerators were not covered where requirements must be tailored to the unique technology and use-case considerations. In most off-grid appliances markets, there remains a significant need to expand access as technologies, companies, business models and policy development are nascent. Affordability is one of the biggest challenges prohibiting refrigerators from reaching off-grid consumers at a greater scale;
    - "*Energy-Efficient Ceiling Fans - Model Regulation Guidelines*" prepared during the Cooling Project in 2021 and 2022 and completed in early 2023, covering ceiling fans commonly used in residential and light commercial applications;
    - model regulations for fans and off-grid refrigeration in 2022;
    - LBNL Paper with UNEP and two IIEC papers, all to support ASEAN regional roadmap and model regulations.

92. Rwanda and Brazil were first to adopt model regulations, identifying model regulations as the minimum and determining what MEPS to adopt countrywide. UNDP, GIZ and CLASP used these model regulations to drive the ambition of MEPS. An expansion on model regulations for ACs and heat pumps is expected in the near future.

93. U4E's model ceiling fan regulation was modelled after India's ceiling fan regulations which are the world's most ambitious standards. These standards were to set the stage for similar replicable standards for other countries in ASEAN that adopt the ceiling fan standards as well as Bangladesh, Pakistan, and Nepal.

94. The availability of Output 1.3 is *Highly Satisfactory* considering the availability of numerous sustainable cooling reports, model regulations and tools designed to inform and guide senior officials towards the uptake of energy-efficient and climate-friendly products.

D.2. Availability of Outputs for Outcome 2: National Ozone Officers and Energy Officials from developing countries support the design and implementation of policies that improve cooling product performance to achieve a sustainable, strategic structural change in their cooling product markets

95. *Output 2.1: Capacity building materials tailored for the needs of developing and emerging economy officials*. With the Kigali Amendment in 2016, there was a paucity of organizations working on cooling in 2017. Under this Output, USD1,200,000 was allocated from the Project to prepare capacity building materials based on model regulation guidelines on cooling developed by U4E mentioned in Para 91. This material brought a higher profile to EE, convincing participating countries to consider EE alongside refrigerant transitions. This was accomplished by advocacy efforts, specifically from the highest levels in UNEP at the level of Executive Director to bring together NEPs in Article 5 parties and the NOOs at twinning workshops using capacity building materials to thematically discuss ways they can work together to pursue EE and climate friendly solutions in the RACHP sector (refrigeration, air conditioner, and heat pumps). EE was also bolstered by tools and knowledge and insights of other organizations, namely IEA, UNIDO and UNDP who had trainers at these workshops to feed them information and data for modelling work, enhancing cross-fertilization. As a result, twinning workshops were able to transfer knowledge on efficiency using some of the processes already developed instead of developing something entirely new. The availability of Output 2.1 is *Highly Satisfactory* considering the abundance of capacity building materials available to all participants.

96. *Output 2.2: Multi-day capacity building sessions on climate friendly for 250 officials from 147 countries in 2018 and again in 2019*. The Project started with the twinning component with 2 rounds of workshops to introduce NOOs with NEPs to each other. This went reasonably well though there were countries where there were some difficulties introducing NEPs and NOOs. Funding for capacity building sessions or twinning workshops became available to UNEP from KCEP since KCEP was aware of what U4E has done on sustainable cooling under GEF funding. In addition, KCEP brought a lot of solid fundraising along with discussions with senior UNEP management staff.

97. The first phase of the twinning workshops was conducted during a 2-day period from April to October 2018 at 10 regional levels and 4 locations with strong inputs from Climate Works and U4E leads, which was well structured[32]. The thematic workshops were organized by UNEP's OzonAction CAP and U4E. This collaboration initiated the partnership and combined the expertise between the two national groups facilitating their working together in linking energy efficiency improvements while phasing out HCFCs and begin considering HFCs for effective implementation of current and future projects. These workshops were 2 days of crash courses on basics training on "EE 101", "MP 101", and policy instruments. NEPSs were taught why do refrigerants matter. NOOs were taught about the different forms of energy. During these workshops, surveys were conducted asking participants what action they needed to take to address MP and EE issues with

[32] Workshops were in Gaborone, Botswana on 24-25 May 2018 for Anglophone and Francophone Africa; Beijing, China on 11-12 April 2018 for South Asia, South-East Asia and West Asia; Guatemala City, Guatemala on 27-28 June 2018 for Latin America; Bangkok, Thailand on 1-2 October 2018 for Pacific Island Countries; Antalya, Turkey on 9-10 October 2018 for Europe and Central Asia; and Quito, Ecuador on 30 -31 October 2018 for the Caribbean.

the response being the need to develop model regulation guidelines and the other tools. In summary, over 400 NOOs and NEPs participated in these workshops.

98. The survey results were used to justify funding for the second phase of twinning workshops which were held in Paris in February 2019 for over 400 regional and national stakeholders over a period of one week. The workshops included MP panel discussions, working group discussions, and a repeat of 2 days of crash courses on "EE 101", "MP 101", and policy instruments. All this was designed to start dialogue between NOOs and NEPs on areas where there is commonality such as labelling programmes and enforcement. Documentation of these workshops was available to the Evaluation team. These twinning workshops were organized back-to-back with the Second Global Inter-Regional and Parallel Network Meetings for NOOs and NEPs in Paris, France from 17 to 20 February 2019. Information on the relevant meeting was documented under the title of "Parallel Twinning of National Ozone Officers and Energy Policymakers for Energy Efficient and Climate-Friendly Cooling, Paris, France, 21-22 February 2019". The availability of Output 2.2 is *Highly Satisfactory* considering the availability of highly successful twinning workshops to train NEPs and NOOs on climate friendly and energy efficient cooling that was organized to foster collaboration.

99. *Output 2.3: U4E partners supported to engage with regional energy centers to develop technical recommendations for sub-regional policy harmonization to accelerate energy-efficient appliances and equipment markets*. The KCEP-funded Project supported twinning workshops that brought two ministries, Environment and Energy, together which was important for funding EE and allowing NOOs and NEPs to work with regional energy centres and local industry to get resources to support an efficient transition to EE for cooling equipment. The Project along with U4E and its partners (IIEC, the Rocky Mountain Institute, ASHRAE, IEA, CLASP, NDRC, ICA, NDRC, LBNL, and Energy Foundation China) supported technical recommendations to harmonize policies to accelerate the transition of energy efficient cooling equipment. This included effective removal of HFCs in refrigerants as well as market surveillance and customs inspections, also funded by the MLF. The availability of Output 2.3 is *Highly Satisfactory* considering the availability support to engage regional centres.

100. *Output 2.4: Templates and tools for NOOs and NEOs used to gather data from 10 countries*. The main tool for gathering data for various countries and regions was country savings assessment (CSA) developed by the Project for 156 developing countries and emerging economies per UN list of countries. U4E's product portfolio of 5 products was lighting, ACs, refrigerators, industrial motors, and distribution transformers, products that are responsible for over 50% of electricity consumption worldwide. As such, most CSAs for refrigerators and ACs were developed under the Cooling Project (with KCEP and Defra funding) starting in 2019 with revisions in July and August 2022 (introduced commercial refrigerators during 2022 revision).

101. CSAs set the MEPS for all the five products (including commercial refrigeration) through a modeling expert, collection of data from manufacturer and commercial partners who were generous enough to share data through an NDA, analysing several theoretical papers and market assessments, and making assumptions through domain experts who can validate operating hours, cooling temperatures and macroeconomic factors such as population, grid emissions, electricity tariffs, and electrification level. This generally took more than 30 person-days per country.

102. Three CSA scenarios were considered: 1) business-as-usual (BAU) with no policies adopted; 2), minimum ambition scenario where MEPS are implemented at the lowest level; and 3) high ambition where higher tier MEPS are implemented. Savings are computed by subtracting the BAU or minimum ambition from the high ambition. Some CSAs for refrigerators and ACs were developed before 2018 under a GEF project. When Climate Works was prioritizing their work, they used the CSAs to decide on priority countries and areas before 2019. It has also been used by a number of different organizations and contains information not available for many of the countries.

103. CSAs had an impact not only on developing countries, but on developed countries for ACs, commercial refrigeration, and domestic refrigeration. With information for 156 countries, the CSAs have brought attention to EE for these appliances in G-7 and G-20 countries, and the need to update MEPS and quantifying savings in Europe and the United States. These appliances were thrust onto the mainstream through IEA and UNEP messaging. One example is the German

Government claiming the use of Green Procurement Guidelines for which the Project received thanks.

104. Regional savings Assessments were made for:

- the Southern African Development Community in January 2020 for potential benefits attained from the implementation of MEPS for lighting, appliances and equipment at a regional level. The impacts were assessed at minimum and high ambition levels as detailed in the Model Regulation Guidelines available from UNEP/U4E;
- the East African Region in July 2022 for potential benefits from implementation of MEPS for improved energy efficiency and climate friendly lighting, cooling appliances, and equipment for the East African Region through product labelling, market monitoring and verification, and financial incentives.

As such, the availability of Output 2.4 is *Highly Satisfactory* considering the availability of CSAs to gather data from more than 156 countries and 2 regions.

105. *Output 2.5: Product registration system guidance and software platform for cooling products for NOOs and NEOs*. The Project funded development of software for a product registration system (PRS) for individual countries. The Project had 2019-2020 workshops between countries about project registration right before COVID-19. One of the original agreements for the ASEAN plan of action for energy cooperation was to develop a regional product registration system and database. The work for a regional product registration system, which was an additional effort beyond that of the PRS software for the individual country systems, started in ASEAN in 2020 with UNEP developing the software and with ACE engaged in review and individual country meetings. The aim was for ACE to take over the regional system after UNEP had concluded its work on it. In September 2022, activities for the ASEAN Regional Product Database included software development, training and capacity building, and development of tools. The ASEAN regional database allowed for visibility of products allowed for sale in other countries, notification of new products in other countries, and notification of new products revoked in other countries. However, the regional database has not yet been populated with data due to local regulations in Malaysia and Singapore which do not allow the sharing of data. The regional database was supposed to help ASEAN countries adjust their policies to create synergies in transforming their cooling markets to EE products. There are doubts that the regional database will be functional and in use soon.

106. This work, however, still requires more resources with current efforts used to develop the product registration system prototype and regional database and raise awareness on them. The ASEAN countries were not quite ready to share data within the regional product database. These developments used resources from KCEP to develop software and communicate with countries on how they could update or develop their PRS, costing over USD100,000. The availability of Output 2.5 is *Satisfactory*. This considers the uptake/ promotion of the prototype product registration system by other donors, its utilization or potential utilization by specific countries, and its strong promotion around the world. GIZ Proklima published a handbook on Measurement, Reporting, and Verification (MRV), which references the U4E PRS prototype as a key tool to implement PRS. Both GIZ Green Cooling Initiative and CLASP have referenced the U4E PRS in webinars (in 2023 and 2021, respectively). The U4E prototype PRS is mentioned as a key activity of the National Policy Roadmaps of Botswana, Malawi, Zambia, and Zimbabwe; and the prototype was used by these countries to leapfrog to more efficient refrigerators. Rwanda received in-depth technical assistance regarding the PRS and used the prototype to update their existing PRS. Chile updated their PRS based on guidance provided by the project in 2019 and its later phase in 2023. In 2022 and during the project's follow up phase 2023, the prototype was presented during several trainings in Central and Latin America (twice in Honduras, once in Bolivia, and during OLADE). The PRS was presented at the 11th International Conference on Energy Efficiency in Domestic Appliances and Lighting (2021) and a paper was published in that context.

D.3. Availability of Outputs for Outcome 3: *Roadmaps, strategies and related market transformation integrating health, gender, environment and poverty alleviation are officially endorsed by developing and emerging economy national governments to achieve a sustainable, strategic structural change in their cooling product markets*

107. *Output 3.1: Regional policy roadmap informed by model regulations for 3 regions*: Regional roadmaps have advantages for national development since they set the baseline in countries and the stakeholders have a platform on which to work[33]. The Project prepared regional cooling policy roadmaps and programmes based on model regulations for the Association of Southeast Asian Nations (ASEAN), Southern African Development Community (SADC), and East African Community (EAC). It also worked to prepare a regional cooling strategy for the Caribbean, though this morphed into the use of a common template for individual national cooling strategies instead of a joint regional strategy at the request of the involved nations.

ASEAN

108. Previously, an ASEAN roadmap for room air conditioners (RACs) was conducted in 2015. CSPF[34] levels in this earlier roadmap were only up to 3.0, which is very low compared to global technology trends and equipment already present in the market. Yet, the document had many components, as at that time the countries in the region had no unified testing system or standards, no testing labs, and had different efficiency metrics, all of which the earlier roadmap addressed. In September 2021, ASEAN nations agreed on a new RAC roadmap which received assistance from the Project (using funding from KCEP) and Japan Ministry of Foreign Affairs[35]. The Cooling Project work ensured the levels were ambitious, and the roadmap drew on the Project's model regulations. The work entailed the Project along with LBNL performing market assessments, conducting home energy audits, and preparing draft roadmaps and technical reports (an LBNL Paper and two IIEC papers[36]). The achieved adoption of the RAC roadmap is considered impactful, as ASEAN governments have a history of feeling obligated and responding proactively to regional roadmaps they sign on to. ASEAN countries have thus been preparing their own RAC MEPS based on the regional roadmap with enforcement for some since 2022 and for others (or for higher levels for those already enforcing) enforcement by 2025. The experience of regional roadmaps in ASEAN is that once agreement has been reached at the regional level, each country tries to follow. In cases where there is no regional target, country uptake of new standards is much slower, likely taking 5 or more years for adoption. In the absence of a regional roadmap, country adoption of higher standards would also take more resources to achieve.

109. With its approach of looking at similar activities in adjacent regions and major economies, the Project's work with partners in developing a room AC roadmap on a regional level in ASEAN served to accelerate country implementation for roadmaps for Singapore, Malaysia, the Philippines and Vietnam. The work of the Project and LBNL in harmonizing EE standards for room air conditioners (RACs) in ASEAN countries played a key role in a new version of the ASEAN regional roadmap with the ASEAN Centre for Energy (ACE) shopping it around to all of the countries[37]. Initial country feedback was "maybe this ambition is too high" or "our temperature trend needs to be adjusted in

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[33] Though it still takes them time to implement the roadmap. For example, there was a lighting roadmap worked on with ACE. When countries sought to improve standards for lighting, they referred to that roadmap for higher levels.

[34] CPSF=Cooling Seasonal Performance Factor: According to the U4E model regulations for RAC, CSPF is defined as "the ratio of the total annual amount of heat that the equipment can remove from the indoor air when operated for cooling in active mode to the total annual amount of energy consumed by the equipment during the same period.

[35] For market assessments, testing of equipment and drafting of the roadmap.

[36] IIEC reports for some of the market assessments had separate funding from Japan.

[37] Having contact with all 10 ASEAN countries, ACE served as the Project's partner and facilitator in the region. These contacts made it easy for them to convene meetings, with the Project providing presentations and experts. While recognizing that work with individual countries is important, the Project did not have the resources to work in all 10 countries individually. Being a regional secretariat, ACE helped the efficiency of working at the ASEAN regional level. As such, ACE provided the regional platform for working with individual countries (of which ACE had 10% of the ASEAN budget of USD1.1 million for 2 years with the focus on their ASEAN work being mainly national with the roadmap on where countries should go). When additional resources outside the Project were available, some in-country support was provided such as the Lao GCF Readiness Project.

this way" or "our metric needs to be adjusted in that way." However, Project involvement ensured that the levels were ambitious, and not to a lower standard. Support to implement these ambitious standards came in the form of separate KCEP funding to the World Bank to provide support to local manufacturers to manufacture high efficiency ACs (see Para 65).

110. With a strong connection to twinning workshops and ASEAN regional initiatives to get cooling higher on the agenda in ASEAN, there are similar cooling roadmaps within ASEAN countries. In February 2021, a study "Harmonizing of Energy-Efficiency Standards for Room Air Conditioners in Southeast Asia - ASEAN Cooperation Project" by UNEP and LBNL, was completed to support ASEAN efforts to improve and harmonize AC energy-efficiency standards by adopting a "Cooling Seasonal Performance Factor" (CSPF) in accordance with ISO 16358. In promoting higher efficiency air conditioners in ASEAN through harmonisation of ISO 16358 and strengthening of market verification and enforcement capabilities (as a part of Phase I), this report provided an overview of seasonal AC energy-efficiency metrics, assessed regional climatic conditions in ASEAN countries, and made recommendations for adopting ISO 16358 in a harmonized way across the region including:

- combining fixed-speed and variable-speed AC product categories under the same metric so that consumers clearly differentiate between the two and benefit from the energy savings from variable-speed AC;
- determine CSPF while reducing compliance costs by using two sets of test data at full- and half-capacity operation at 35°C and another set of data points at 29°C calculated by ISO 16358-determined equations, for variable-speed units;
- develop a regional policy roadmap to harmonize national and regional energy-efficiency standards and labelling and test standards aligned with international standards and U4E Model Regulation Guidelines. This will capture cost and energy savings while minimizing environmental impacts and encouraging innovation in the industry;
- update standards periodically to mitigate risk of obsolete technology being deployed in markets without updated standards, as well as reflect benefits of commercially available and emerging technology.

111. In May 2021, a study was prepared for Phase I entitled: "Promotion of higher efficient air conditioners in ASEAN through harmonisation of standards (ISO 16358) and strengthening of market verification and enforcement capabilities (Phase I) - Recommendations for Updating the ASEAN Regional Policy Roadmap on Energy Efficient Air Conditioners" by IIEC. By September 2022, U4E and LBNL completed under Project financing, the aforementioned "Harmonizing energy-efficiency standards for room air conditioners in Southeast Asia" for 156 developing countries and emerging economies under the U4E Country Saving Assessments[38]. Some of the recommendations provided include:

- conducting detailed market assessments and various relevant analyses with detailed assessment and analysis of energy use, cost efficiency, lifecycle cost, national impact, and manufacturer impact related to the proposed aspirational MEPS and labelling levels for each ASEAN country. This was completed in 2022;
- implementing a phase-step approach in updating ASEAN regional MEPS:
    - by 2023, Step 1 was to achieve the aspirational target of 20% more stringent MEPS (ISO CSPF of 3.7 which are about the same MEPS levels in India and Rwanda) adopted
    - by 2025, Step 2 was to achieve a more stringent MEPS of ISO CSPF of 6.09 (which is identical to the current MEPS level in China) adopted. This delayed implementation should give ample time for AMS to benefit from the economy of scale of energy efficient ACs in China, and also for the local industry to react to the new MEPS levels;
- combining fixed speed and inverter efficiency metrics and consider adoption of technology neutral MEPS by 2023;

[38] https://united4efficiency.org/countries/country-assessments/

- extending the scope of the ASEAN Regional Policy Roadmap for AC MEPS by 2023, the scope of which the ASEAN Regional MEPS is extended to cover all ACs with cooling capacities up to 4.5 kW.

112. In September 2022, a CSPF Closing Meeting Hybrid Meeting was conducted by the ASEAN Centre for Energy (ACE) in Bangkok, Thailand. The meeting was attended by the members of the Policy Working Group as well as the AC laboratories representatives from ASEAN Member States (AMS), consultants (UNEP and IIEC experts), representatives from The Institute of Energy Economics, Japan (IEEJ), and ACE. Comments on regional MEPS target from AMS included:

    - Myanmar stating that the target of 6.09 CSPF is too high with the country relying on imports from China, Thailand, Malaysia, and Indonesia. Affordability of higher efficient AC is one of the important concerns;
    - Lao PDR stating concerns similar to Myanmar;
    - Singapore expressing that a holistic analysis which includes a local market assessment needing to be conducted to determine the impact on increasing the MEPS level and determine the correct policy to support it;
    - Malaysia stating that it has a current plan to revise the MEPS, minimum to increase by 20%;
    - Indonesia needing to review to reach the target. With manufacturers increasing MEPS that will increase the selling price of the AC, this will not be suitable to Indonesia's AC market. Indonesia will consider learning from other countries in providing the incentives to manufacturers.

113. The Project also supported ASEAN countries with its Product Registration System (PRS), which is a prototype developed for individual country use. Countries in the region without such a system (Laos and Cambodia) have shown an interest in adopting one based on the prototype (global achievements associated with this prototype are discussed in Para 106). In September 2022, there was also activity overviewing the UNEP-U4E ASEAN Regional Product Database. Activities of the U4E Product Registration System (PRS) included software development, training and capacity building, and development of tools. The ASEAN regional product database allowed for visibility of products allowed for sale in other countries, notification of new products in other countries, and notification of new products revoked in other countries. This was supposed to help ASEAN countries adjust their policies to create synergies in transforming their cooling markets to EE products. There were challenges populating the regional database with country data, namely concerns of those countries about keeping manufacturer data confidential as mentioned in Para 105.

SADC and EAC

114. There is a strong connection to the twinning and the regional initiatives of Southern and East Africa to get cooling higher on the agenda in Africa. With a number of countries with similar roadmaps and one year required to do regional harmonization and roadmaps, regional policy roadmaps for cooling have progressed for Africa, particularly the Southern Africa region through SADC. While the EAC regional centre has made some progress, it does not have the capacity to implement any initiatives and regional processes are very bureaucratic.

115. The Project undertook capacity building workshops for SADC (comprised of 16 Southern African countries) and EAC, floating MEPS recommendations and providing technical assistance for baseline market assessments. In June 2020, a Virtual Inception Workshop on Clean Cooling was conducted for the EAC and SADC regions through a UNEP U4E initiative in collaboration with the Energy Efficient Lighting and Appliances for East and Southern Africa (EELA) project, the East African Centre of Excellence for Renewable Energy and Efficiency (EACREEE), the Southern African Development Community Centre for Renewable Energy and Energy Efficiency (SACREEE), and UNIDO, all of whom support the SADC and EAC regions on energy-efficient and climate friendly cooling. The Virtual Inception Workshop introduced the topic of clean cooling with a special focus on Room Air Conditioners (RACs) and refrigerating appliances, and the potential path toward regional policy alignment.

116. In December 2020, UNEP/U4E, EACREEE, SACREEE and UNIDO organized a stakeholder workshop to support the harmonization of MEPS on RACs and residential refrigerators in EAC and SADC

regions. The workshop presented the draft findings of the market assessment as well as the recommendations of the technical notes to key stakeholders and the EAC and SADC countries and EELA project team. Furthermore, the workshop solicited comments from EAC and SADC countries and key stakeholders on both of these documents, and the planned development process of the MEPS for refrigerators and cooling products.

117. In October 2021, a consultative workshop was organized on draft MEPS and labels for RACs and residential refrigerators for 21 countries in SADC and EAC. Workshop discussions included market assessments, technical notes on harmonized EE policy framework, engagement with regional technical committees (including national ozone units, energy ministries, national standards bodies, the Regional Electricity Regulators Association, and the Southern African Power Pool).

118. By May 2022, most countries in EAC and SADC had MEPS for ACs and refrigerators in progress or mandatory. By May 2022, there were several recommendations for SADC and EAC including:

- establishing and harmonizing EE standards and labelling requirements, and test standards aligned with international standards, best practices, and U4E Model Regulation Guidelines. This was to be done by developing an energy efficiency roadmap for cooling equipment that considered the use of low GWP refrigerants along with improvement of safety standards;
- with countries in other regions (including Asia and Latin America) having already moved to, or are planning to, adopt the ISO 16358 standard for rating the performance of ACs, AC MEPS need to be aligned with international best practices of China;
- refrigerator MEPS need to be largely aligned with international best practices of the EU (2021/2024), India, Mexico, and the United States;
- consider adopting the IEC 62552 2015 standards to improve standards and labelling for refrigerating appliances in SADC and EAC countries, while facilitating harmonization with international refrigerator efficiency efforts.

119. By November 2022, SADC have officially announced their AC MEPS, 4.5 in 2024, and 6.09 in 2027, after consultations with each of the 16 countries and Executive Committee approval. With regional MEPs decided, a Project Registration System (PRS) was developed and promoted for use by individual SADC countries, using experiences from PRS work for ASEAN. Thus, there were 2 systems, a national database and a regional database with the respective government ministries (mainly Ministries of Industry) pleased to have it, with products registered with the national PRS and with different levels of approval. The regional PRS is basically being shared with limited data but facilitating free trade in the region; if there is any manufacturer whose license gets revoked, all the other members would get notified about it with adjustments made to meet their guidelines.

The Caribbean

120. The Caribbean countries were one of the first projects designed in 2019 with a regional cooling strategy, to build capacity on EE and refrigerants, design of a financial mechanism to pull EE equipment into their markets. Regional consensus to use NCAP methodologies and templates was a result of good early political engagement with permanent secretaries. These secretaries joined inception meetings to discuss market assessments with limited data and all countries had a tourism approach, building on existing cooling audits for the tourism sector. Countries where work started separately in 2019 and 2020 were Dominican Republic, Bahamas, Jamaica, St. Lucia and Barbados. As noted, these countries eventually expressed a preference to focus on individual country strategies, though a common regional template was used for these.

Latin America

121. The UNEP Cooling Project developed model regulations for commercial refrigeration. Both Brazil and Chile, with the support of other projects, adopted these regulations. The case of Brazil is particularly important as there are around 100 manufacturers of commercial refrigeration in the country that, as a group, distribute all around the Latin America region. It was a GCF project that supported work to adopt the commercial refrigeration model regulations in Brazil. OLADE and ASECA are, respectively, the Latin American and Central American NGO working on cooling regionally. ASECA has GCF linkages to national projects in both Brazil and Chile.

122. The availability of Output 3.1 is *Satisfactory* considering the regional policy roadmaps and programmes available in ASEAN, SADC, and EADC, and the regional template adopted by

Caribbean countries in their draft regional roadmaps (Barbados has adopted theirs) and synergistic activity on commercial refrigeration in Latin America's Brazil and Chile carried out by GCF project leveraging the UNEP Cooling Project's Commercial Refrigeration model regulations.

123. *Output 3.2: National cooling strategies for 8 countries that includes MEPS, public procurement and market surveillance*: The Project through assistance from key UNEP/U4E personnel prepared NCSs and NCAPs for a number of countries and stimulated preparation of NCAPs in other countries. Early on, it supported preparation of Rwanda's NCS and NCAP, which was then officially adopted by Cabinet, garnering the country a grant prize for being first. NCSs and draft NCAPs were developed for each of the project's five Caribbean nations using a regional template created by the Project: Bahamas, Jamaica, Dominican Republic, Barbados, and St. Lucia. Of these nations, Barbados was the first to officially adopt its NCAP. Afterwards, the Project convened a number of stakeholders including various donors and think tanks, to develop NCAP guidelines and template to make it easier for other countries to prepare NCAPs. The effort drew from the existing NCAPs of Rwanda, India, and China. Several of the donors involved in preparing the guidelines expressed interest in developing NCAPs for various countries. As one source put it: "Maybe we had around 20 institutions active on those calls and they endorsed the methodology and expressed their intention to use in their work at least for some of the sectors." At present, there are about 20 NCAPs in existence (including finalized drafts and adopted ones) and almost all are believed to be linked to the UNEP Cooling Project either directly or indirectly through use of the Project-developed NCAP guidelines. The Project supported NCAP drafting efforts using the Project's guidelines including Cambodia and Vietnam. Stimulation of NCAPs via other donor projects using the Project guidelines and referring to its NCAPs include the cases of Kenya (prepared by CLASP) and Grenada. Other countries that have developed NCAPs presumably using the guideline work of the UNEP Cooling Project, include Malaysia, Indonesia, the Maldives, Turkey, Egypt, Jordan, and Mexico.

124. The end point of Climate Works KCEP and Project funding coincided with different expectations between countries from achieving more ambitious policy, MEPS, S&L programmes for certain countries and regions, to introducing MEPS and S&L standards and regulations in other countries that were commensurate with model regulations. Most of this work was done with through communications programmes to educate and raise awareness. Climate Works were satisfied with Project efforts to achieve targets on global advocacy, capacity building, training, tool development.

125. The Project established country-level programs and projects in critically under-addressed areas including Global Nature for Cool Cities Challenge with Global Environment Facility and SE4ALL. Policies, strategies and model regulations were customized for particular countries with the assistance of the Project. Details of these activities are provided in the following paragraphs.

China

126. China's national cooling strategy is the setting of MEPS for ACs and refrigerators, originally setup in 1989. With China producing 80% of the world's ACs, China has learned a lot from best international practices for ACs and other electrical appliances. This learning intensified from the 1980s to the 2010s with assistance from LBNL and others. This learning has been less intensive through COVID-19 pandemic, in part due to China having adopted many best international practices of electrical appliances. As such, the Project (U4E) and LBNL were involved in revising China's standards for RACs and refrigerators in 2018, 2019, and 2020 with the China National Standardization Bureau. In addition, China also contributed to the U4E's model regulations for ACs and refrigerators with a contribution from China National Standardization Bureau, which attended conference calls on model regulations and reviewed the detailed background data and reports supporting development of the regulations.

127. With original MEPS for ACs and refrigerators in China in 1989, successive Chinese drafts went out for public comment in 2018. Although the analysis supporting development of the new China RAC standards, which included input from UNEP Cooling Partner, LBNL, recommended high levels similar to those of the model regulations the Cooling Project was working on at the time, the AC industry in China opposed those and, in the end, the draft standards that went out for comment that did not target as high of levels as had been recommended by experts. U4E submitted comments on the Chinese draft RAC standards, proposing higher targets. U4E also gave presentations in China at Project-sponsored meetings with government and industry (including with Gree, China's largest RAC manufacturer, in attendance), letting them know that U4E was

moving forward with publishing higher level targets in its model regulations underway. China, likely realizing the importance to be harmonized with the U4E targets, then went ahead, and revised its targets to the higher, recommended levels, issued end of 2019, for implementation in mid-2020. It can be concluded that, without the Project, China would not have gone for the higher level.

128. This contribution of U4E and the Project to ensure China went for higher level RAC MEPS, when China had been influenced by industry to circulate lower ones, is very meaningful and perhaps the Project's most consequential impact in terms of GHG emissions reductions in the near term. China manufactures 70 to 80% of the world's RACs. At the same time, it is important to note that China's RAC MEPS apply only to room ACs sold domestically. This still represents a large amount of annual AC sales, considering China's population, income levels, and climate zones. Yet, findings indicate China still exports RACs of much lower standards than are sold domestically, as exports must comply with destination MEPS and not China's standards. In addition, exports account for over half of China's production. The fact that China is exporting lower standard room ACs to other countries is an issue some groups are working on. At the same time, it is believed that the result to which the Cooling Project contributed, that China went beyond the draft standards it issued and chose to issue standards more harmonized with the Project's model regulations, will eventually trickle down to higher standard exports, as production lines are upgraded.

129. Indeed, one source indicates that China does aim to have a higher standard for exports in line with Chinese MEPS when manufacturers are ready for new production lines manufacturing ACs with China's updated MEPS. In addition, efforts are underway to establish MEPS by 2024, and then through IEA efforts, ramp up the MEPS every 2 years in a ladder rather than a star level. With its huge purchasing power, China is also promoting green public procurement (including ACs and refrigerators). The Project, however, did not have any access to Chinese market surveillance data.

Cambodia

130. Work on Cambodia's ACs, fridges, fans and cold chain was achieved through the Cool Coalition with work with ESCAP on Cambodia's NCAP (considered a "second generation" NCAP, as it uses the Project's national methodology for NCAPs and was one of the first to do so); formation of a working group; and conducting market assessment on ACs, fridges, fans and cold chain (difficult considering many were not willing to give out their information). Many partners had joined in efforts to develop the new NCAP guidelines, including UNDP, World Bank, Energy Foundation China, CLASP, AEEE (India), UNIDO, and U4E. Work on the NCAP identified "hot topics," particularly that the rate of residential building is very high and that there is a need to address cooling space with an emphasis on passive cooling, as many could not afford AC. Starting early 2022, USD0.6 million is being spent on Cambodia's NCAP implementation with regard to space cooling and emphasizing passive cooling. This includes an assessment of all technologies, modelling of different architectural designs (shading and windows and passive cooling) for temperature inside buildings, and adopting energy performance ratings that could be integrated with various buildings and how temperatures could be managed in particular buildings. A report on this was completed in early 2023, and the sub-project was funded by KCEP (or CCC) and EFC. ESCAP has started a passive cooling project in Cambodia in early 2023.

131. In the KCEP-EFC funded Cambodia space cooling sub-project, much focus was placed on residential apartments with passive cooling solutions with works being performed with a private developer to measure temperature in new buildings of various architectural designs, resulting in a 3-D model on how to manage temperature in these buildings. Impact has been Cambodia placing NCAP-derived cooling recommendations in their NDCs, a move reflecting political will that includes MEPS for ACs and fridges, development of passive cooling performance ratings and an energy building code. Initial signs of potential impact of the space cooling work now underway are its connecting with a group conducting heat stress studies and an NGO involved in NCAP making the second phase of their EE competition focused on passive cooling and construction. No market surveillance data is yet available on these Cambodian projects.

Nigeria

132. Nigeria started work on its national cooling strategy through the (Nigeria) Cooling Project, responding to a 2020 Climate Works call for proposals for including cooling in their revised NDCs. With Nigeria selling more than 1 million ACs per year due to a large population, it is estimated to be the largest market in Africa so U4E work there has a massive potential spillover effect for

industry and neighbouring countries in terms of accelerating widespread market transformation. The first year of work starting in mid-2021 was difficult given changes in UN project implementation with divisions responsible for procurement and regional UNEP offices responsible for advocacy and stakeholder engagement (whereas previously the regional offices may have led the project, with technical support only from HQ divisions). These changes resulted in blockages to Project funds for 6 months and a startup date in 2022.

133. Planning, assessment and analysis for Nigeria's activities was done during UNEP Cooling Project. The Nigerian programme was actually built on the 2021/22 NCAP (funded by KCEP and implemented by UNDP), which did not provide clear implementation strategies. The Project supported complementary reports which were developed as a supplement to the NCAP. U4E's expertise was used to develop a work plan from recruitment of Nigerian experts who focused on review of existing standards and then recommendations for standards and MEPS for EE cooling. Planning for capacity building was conducted in 2022, with actual workshops for capacity building conducted in 2023 for:

    - standards organization of Nigeria;
    - customs personnel; and
    - other regulators and policy makers who are going to implement the MEPS policy.

134. Impact has been work started with developing analysis of how energy efficiency of ACs can contribute to Nigeria's NDCs, data on energy savings for this NDC and the next one, and market assessment based on local teams collecting data. Plans for this work have been included in Nigeria's NDC. Current efforts in 2023 include:

    - next steps to increase MEPS that can be adopted for ACs;
    - efforts to enforce 2017 standards and regulations (training customs officers, market surveillance specialists and technicians on MEPS, standards and product registration systems); and
    - managing the refrigerants of ACs moving away from the high GWP refrigerants of HFCs to more climate friendly a low environmental impact.

135. GIZ have started some of the training, and the Nigerian Government commissioned a testing lab for ACs in 2023. There is ongoing planning to scale up access to EE ACs through finance assistance. A top priority for the Nigerian programme is tacking the high cost of these ACs. The budget for the Nigerian programme is USD0.5 million from CCC but U4E still seeking additional funding. GHG emission reductions will start to happen once MEPS enforced, access to the efficient ACs in the market for demo projects is improved, and more training is conducted to build the capacity of the regulators and technicians. Cold chain is needed but not yet being done with a focus instead on ACs and refrigerators.

Egypt

136. Egypt's efforts on a national cooling strategy focused on district cooling in commercial buildings. District cooling is mostly done by international firms with the backing of private developers from the Gulf States. There was Project activity in Egypt from 2019-21 on the development of district cooling with an allocation of USD0.5 million to work with the Egyptian Government's Housing and Buildings Research Center. Activities revolved around district cooling in El Amin, a new city by the Mediterranean Sea, using seawater as an innovative approach for Africa but proven in Northern Europe. Though a very positive techno-economic feasibility was done by a local Egyptian company (who were well connected with government) with international assistance, work was hampered by COVID-19 with difficulties getting government and other stakeholders engaged with the concept of district cooling. Challenges included the lack of local technical capacity in cooling technologies, affecting responses in calls for proposals, and local leadership to take on district cooling.

137. The Project tried to raise awareness of the benefits of district cooling with relevant Egyptian stakeholders through a large event "Africa Climate Week" in 2021. IFC and EBRD also became interested in funding pilots and establishing partnerships in other cities in 2021. Despite the end of COVID-19 in 2021, the Government of Egypt (GoE) was pre-occupied with building new cities with the discussions on district cooling placed on hold. GoE, however, was developing in parallel a new cooling code for low GWP refrigerants; discussions on this new code are also on hold. The

impact of this work was getting dialogue started in 2022 on district cooling with the Regional Center for Renewable Energy and Energy Efficiency (RCREEE) based in Cairo in efforts to raise funding and to get training on district cooling. Lessons learned from this experience is that the primary stakeholders in the development of district cooling are the private developers with whom stakeholder discussions should take place at the earliest. In addition to private developers being included in these district cooling discussions, engaging the right institution to work with was and still is critical to success along with competent procurement personnel and technicians. GoE has said the decision on what AC system to use is up to private developers who will partner with an international firm with a local partner. No work was done on MEPS for RACs.

138. In addition to the support on District cooling activities, the UNEP team integrated with the HPMP Phase II project, supporting the capacity building and awareness raising on sustainable procurement of cooling equipment in Egypt. The work included the refinement and customization of UNEP's Sustainable Public Procurement Toolkit to Egypt, including weather patterns, usage of equipment, pricing and availability of sustainable AC units. In addition, the team trained representatives of the Housing and Buildings Research Center on Sustainable Procurement practices for cooling equipment.

India

139. The India Centres of Excellence for Sustainable Cooling and Cold-Chain (sister Centres to ACES) have been established by the state Governments of Haryana and Telangana, the UK Department for Environment Food and Rural Affairs (Defra), the Centre for Sustainable Cooling's (CSC) consortium of universities, and UNEP. The Centres are funded by the Governments (Indian partners covering infrastructure and equipment) with technical assistance by CSC and UNEP enabled through Defra grants. The Centres are open to industry and civil society partners and encourage south-south collaboration with ACES and beyond. They complement the India Cold Chain Project, work by the Alliance for an Energy Efficient Economy, World Food Programme, Food and Agriculture Organization of the UN, German Development Agency, etc. It is a collaborative effort, where the Centre of Excellence in Haryana on food cold chain is led by U4E, supported by the Cool Coalition team, and the Centre in Telangana on vaccine cold chain is led by U4E. The British High Commission is also actively involved in this initiative to set the foundation of the Centres in India.

140. In March 2019, India became the first country to complete their own NCAP. With one of the fastest growing economies in the world, 1.78 billion m^2 of commercial building floor area, and a population of 1.3 billion, India is very vulnerable to the impacts of rising and extreme temperatures with air-conditioner penetration of only 5-10%. India escalated the opportunities and challenges in cooling to a national priority level in the India Cooling Action Plan (ICAP), a flagship initiative of the Ministry of Environment, Forest & Climate Change. As such, the Cool Coalition worked with India to establish a global NCAP methodology and template with around 30 countries using the methodology and templates including Indonesia, Cambodia, Nigeria, and Vietnam under the Cooling Project and ESCAP. The Indian NCAP had a number of initiatives that were supported by the Cooling Project:

    - Urban Cooling Programme (“Cool Cities Hub”) with National Institute of Urban Affairs, Embassy of Denmark in India;
    - National Cold Chain Programme with Ministry of Agriculture and Farmers Welfare, India;
    - Medical and vaccine initiative.

141. One area where India made progress was in “green procurement” in 2019 where a comparison of specifications from the Indian Government for ACs to U4E model regulations led to the Indian Government accepting top 3 AC products for public procurement. These specifications were set as mandatory from 1 January 2023.

142. UNEP’s India work had a separate GEF-funded “District Energy and Cities Initiative,” which worked on district cooling from 2017 to 2019. Under the UNEP Cooling Project, India work expanded to a broader “urban cooling” scope with Danida funding in 2019. Danida gave USD800,000 under the Cooling Project to India to start a project on urban cooling starting in July 2021, approaching the issues of district cooling in an integrated way, through looking at building efficiency and outdoor air temperatures, and discussing with cities about urban heat island and energy pricing. This

entailed a more comprehensive approach that included passive cooling, public procurement of equipment, urban design changes, all precursors to district cooling work. The ProDoc entitled "Decentralized Energy" was built off of the district energy program and the Cooling Project and expanded from district cooling to decentralized energy. Under the Cool Coalition, the UNEP global political platform has established under the Cooling Project, work proceeding on cooling, heating, and power as a decentralized energy approach.

143. The Indian Cooling Program sub-project of the UNEP Cooling Project was launched in 2019, setting up with India Government the "Cool Cities Hub" in the National Institute of Urban Affairs (NIUA). NIUA is a government think tank to help cities on urban planning and climate issues at the city level and chaired by a leading civil servant in the Ministry of Housing and Urban Affairs who used to work as the head of UN Habitat India with strong political support. The advantages of having a "hub" as a focal institute where capacity, tools and methodologies are promoted, is that district energy work from one city to another city is siloed; as a result, knowledge is lost and dissipated and not really getting any ministerial attention. The hub concept in India works due to the large size of its market with the hub serving like a "Center of Excellence" that helps the Institute talk to individual cities about district cooling, passive cooling, nature for cooling and urban heat island analysis. The Hub was originally designed as a program the NIUA could scale up to 100 cities and get support.

144. By December 2022, "District Cooling Guidelines" were prepared for India by the Project in cooperation with GIZ and BEE encompassing information about District Cooling Systems (DCS) technology and associated benefits, key components in a DCS and the requirements for Operations and Maintenance (O&M). The guidelines provide information on the relevant business models that have been successfully adopted globally with respect to DCS including:

- information on the key components and technologies in DCS;
- project selection criteria and the pre-requisites for a DCS project;
- information on the different stages of the project development cycle;
- the economics of DCS, business models and enabling mechanisms;
- bidding choices that can be adopted for the execution of DCS projects; and
- some state-level actions that can be adopted for the promotion of DCS.

The Caribbean

145. All 5 Caribbean countries had work started separately, emanating from the Caribbean regional cooling strategy, and to build capacity on EE and refrigerants. Starting in 2019, stakeholder consultations were conducted in 5 Caribbean countries that gathered input on draft NCSs, a Caribbean regional NCAP template developed by the Project. This confirmed interest in proceeding on a pathway toward finalisation and ultimate adoption of NCSs. There was good early political engagement with permanent secretaries joining inception meetings to discuss market assessments with limited data and with all countries having a tourism approach on existing cooling audits. With electricity being very expensive in the Caribbean, work entailed the following:

- reframe and rephrase and update their MEPS and labels in 2 to 5 years' time;
- adopt recommendations from U4E on their NCSs and drafted strategies with several countries including EE with MP obligations;
- deliver draft NCSs published in Barbados that started 2018 and was completed in 2022 and a regional training was hosted on U4E's Product Registration System and related monitoring verification and enforcement;
- organized meetings to build capacity on EE and refrigerants in Bahamas. There were, however, challenges in managing the interest due to Hurricane Dorian in 2019 downturn, and the downturn in tourism from COVID-19;
- organized meetings to build capacity on EE and refrigerants, recycling of ACs and refrigerators, and sustainable procurement programmes in the Dominican Republic. There were, however, issues Ministry of Environment and Ministry of Energy awaiting a new EE law to be passed. Daikan is offering cooling as a service already in the country;

- St. Lucia had good engagement on building cooling pledges. However, changes in government and the recovery of the tourism sector were issues in sustaining cooling pledge momentum. There are international agencies assisting in the updating of NCSs to kickstart actions.

Latin America

146. After the Project developed commercial refrigeration model regulations, follow-on projects in Brazil and Chile were implemented. This led to the adoption of these regulations and started the transformation of those markets with potential impact continent wide, given the reach of the manufacturers based in these countries. OLADE and ASECA are the Latin American and Central American respectively NGO working on cooling regionally. ASECA has GCF linkages to national projects. This catalysed developments in other countries (such as Mexico) with same KCEP funding but with different grantee under a different project. In addition, U4E had a GCF funded project with the governments of Cuba, El Salvador, and Honduras on leapfrogging to superior cooling solutions, through enhancing stakeholder capacity for pursuing strategic priorities, implementing a framework for MEPS and labels for room air conditioners appliances, and awareness raising. The sustainable public procurement toolkit and the training material on market monitoring and verification developed under the Cooling Project were leveraged in this GCF funded project.

147. In summary, availability of Output 3.2 is *Highly Satisfactory* considering more than 20 countries were engaged in national cooling strategies that included MEPS, public procurement and market surveillance.

148. *Output 3.3: Financial mechanisms for 9 markets with proper recycle scheme (design of 6 and pilot 3)*. There were 6 financial mechanisms tested on the Cooling Project in Rwanda, Ghana, Senegal, Nigeria, and 5 Caribbean countries.

Rwanda

149. In Rwanda, a financial mechanism named RCOOL came from the Kigali Amendment to help address the need to transition to EE and environmentally friendly coolants for air conditioning and refrigeration markets in Rwanda. RCOOL has been funded since 2018 through KCEP. Activities included:

    - conducting landscape and market assessments on ACs and refrigeration, both residential and commercial;
    - efforts to train importing vendors, technicians and engineers to phase-out R-12 coolants and transition towards EE fridges with natural refrigerants (such as R-600 and R290) and product registration systems. These efforts combined awareness raising and training on regulations[39] with the Rwandan Standards Board. These efforts also promoted replacement of the refrigerators[40];
    - promotion of a financial mechanism for purchase of refrigerators and ACs through loans (@18% interest rate)[41] and a 10% rebate for exchanging a new fridge for an old fridge (10% going to the recycling company);
    - the presence of a company that recycles old equipment that needs to be phased out in exchange for a replacement EE refrigerator.

150. The end result of R-COOL was moderate successes. On the positive side, R-COOL has guided the GoR into the import of EE refrigerators with environmentally friendly refrigerants with more than 80% share of the refrigeration market in Rwanda. As such, customs officers in Rwanda are aware of the need to import only EE refrigerators, and there are technicians and engineers with the

[39] Regulations training included reducing the danger of handling flammable R-600 and R-290 coolants.
[40] REMA used to do retrofits for improved coolants. R-COOL programme is more about incentive mechanisms such as rebates, to attract consumers to buy new refrigerators.
[41] R-COOL financial mechanism included vendor switch to selling only EE ACs and refrigerators (towards R-610 refrigeration products and R-32 AC products of Daiken), informing financial institutions of the need for financing for consumers to buy EE products, and setting up of an on-wage finance "loan" whereby an AC or refrigerator is bought under condition that the used appliance would be recycled under a sanctioned company in exchange for a rebate on the purchase.

capacity to manage issues with these refrigerators. However, the financial mechanism did not function as designed due to the lengthy administration required for the purchaser to get the rebate (and the need to become a more user-friendly process), and the vendor going towards a straight sale of the appliance without the rebate, but with a discount from the vendor independent of recycling scheme[42]. In addition, the Government were not guaranteeing the loans; hence the high cost of loans. The result was only less than 50 fridges were transacted through this financial mechanism. However, the market in Rwanda for refrigerators and ACs is small and the country was able to enact the legislation since Rwanda is small and does not have difficulties implementing laws, as compared to other countries. They are able to conduct a lot of different meetings, from training of technicians to meeting vendors, resulting in almost everyone informed at different levels.

Ghana

151. Ghana had a number of old ACs and refrigerators that needed replacement. A financial scheme was introduced in 2012-2015 to Ghana through UNDP and GEF that uses a coupon that allows the buyer to access a discount for an EE fridge (R-600 and 5-star), with the discount provided by Government. This scheme did not have much success. The Project formulated an "EcoFridges" programme in 2019 to get the financial institutes to fund discounts for buyers for refrigerators with R-32 refrigerants[43], leading to institutional cooperation between the banks, the vendor and the buyer. This involved formal institutions (involving salaried personnel with loan deducted from salaries) and "informal" institutions. Two institutions were managing EcoFridges: EPA was mandated to manage refrigerants; Energy Commission regulates the product in terms of EE and refrigerants, requiring them to partner with the EPA to manage the equipment in an environmentally friendly manner.

152. The EcoFridges Programme aimed to scale-up the earlier UNDP-GEF program, with technicians needing to be educated on handling new refrigerants. Initial EcoFridges Ghana activities involved recruitment of a local energy consultant, sales consultant, international waste management consultant, and communications expert as well as a team of 20 people to review and implement the financial mechanisms; development of legal agreements, terms and conditions; engaging 3 private banks and 4 private sector entities for the financial mechanism. The launch in October 2020 had issues with COVID which prevented transport from operating normally, raising the cost of transport of EE equipment, and delaying the arrival of EE refrigerators and ACs to stores. Activities resumed to normal in April 2021 involving the on-wage financial mechanism implemented under a PPP for MEPS-environmentally friendly (natural) refrigerant-refrigerators (R-600) and ACs (R-290)[44]. However, the 4,000 fridges which were sold up to December 2022 involved over 90% of the participants paying cash to get EE fridges, and not having to go through the bank scheme to give back the old appliances. Vendors were making make more money off cash sales since they do not need to share their profits through rebates.

153. AGORA is an expansion of the EcoFridges project in Ghana and expands it in Nigeria (building directly off of U4E's Nigeria AC MEPS and labelling project, as well). It is funded by the French GEF and others and implemented by UNDP and UNEP together. This project was approved in late 2022 and was to put emphasis on capital investment in equipment, given the French GEF's mandate. The project agreement was signed in May 2023 with the acceptance that a part of the financial mechanism would work, and part of the purchase of EE refrigerators would be by cash only. There are plans in place to launch in January 2024 a more ambitious programme with natural refrigerants and efforts to minimize cash sales and giving a 10% discount to buyer to garbage old fridges. The 10% will go to a government-funded private sector waste management company who will manage wasted electronic equipment. It is possible vendors will like this scheme as it

[42] There is also another scheme that was pursued to provide loans to large consumers (such as hotels) for increased efficiency in cooling. This scheme, called "Cool Ease," however, was not able to attract interest from relevant establishments.

[43] The financial mechanism works in the following manner: the buyer upon purchasing the refrigerator fills out a bank form; the bank pays the vendor up front; the bank deals directly with the buyer for a loan of 12 months with 0% interest.

[44] These refrigerants were sanctioned by the Energy Commission under which the Project functioned.

stimulates interest in recyclable materials from fridges. Under consideration is a program that would go through the electricity company with "on bill" or rebates to purchasers.

154. U4E team supported the Energy Commission by adapting UNEP's Sustainable Public Procurement Toolkit to Ghana, including weather profiles, equipment available for sale, currency, etc. Together with Ghana's Energy Commission, in September 2022, U4E trained government officials from the Ghana Health Service in the sustainability procurement criteria of cooling products.

Senegal

155. The Senegal programme got started with Project funds from April 2020 to April 2021 with capacity being built for government personnel, vendors, technicians and financing personnel on MEPS and associated legal and technical agreements for EE refrigerators and ACs. These served as a basis for a financial mechanism that was designed based on household electricity bills and launched in April 2021. The financial mechanism was modelled after Tunisia where loans on EE ACs and refrigerators were paid back through savings of electricity.

156. Sales of these appliances in Senegal from April to December 2021 were estimated to be only around 200 units. These were not good results since vendors shared profits with a financial institutions bank, and a utility was involved saying it would do the financial mechanism for free. However, government personnel did not appreciate the additional workload involved unless there was a management fee added to the financial mechanism.

157. The Senegal programme included component on re-cycling old equipment. There have been several attempts to advance this including a German company that was going to operate the recycling plant, a scheme to send old equipment to Spain, and a PPP involving a local company to transport old equipment to an internationally operated recycling plant. All these options were turned down by the Government who wanted a local company to operate a recycling plant. The issue with the local company is that they do not have the required capacity and desperately need international assistance. As such, there is currently no recycling plans for old appliances in Senegal.

Nigeria

158. There is ongoing planning in Nigeria Cooling to scale up access to EE ACs through financial mechanism assistance as part of AGORA (see Para 153). Nigeria Cooling is also funded by the French GEF and others and implemented by UNDP and UNEP. A top priority for the Nigerian programme is tackling the high cost of these ACs. The budget for the Nigerian programme is USD0.5 million from CCC but U4E is still seeking additional funding. GHG emission reductions will start to happen once MEPS enforced, access to the efficient ACs in the market for demo projects is improved, and more training is conducted to build the capacity of the regulators and technicians.

The Caribbean

159. In addition to working on their NCSs as noted in Para 145, all 5 Caribbean countries had design work on financial mechanisms to pull EE equipment into their markets. Starting in 2019, stakeholder consultations were conducted in 5 Caribbean countries that gathered input on draft NCSs, and financial mechanisms were developed with cooling as a service paying monthly for AC services instead of purchasing an AC unit with a supplier of ACs installing the ACs. This mechanism is popular with all hotels in the Caribbean. In particular:

    - Jamaica had good engagement on building capacity for EE and refrigerants and design of a financial mechanism to pull EE equipment into their markets. Jamaica had already set up testing labs for ACs and fridges so that ACs tested in Jamaica will be good for entire Caribbean region. However, a change in government in 2021 caused personnel trying to inform and push the cooling agenda with the new government;
    - Grenada developed an NCAP with GIZ in parallel with U4E's C-COOL's related activities;
    - Daikin and CABEF started investing in the development of the Cooling as a Service financial mechanism which was designed by the project and made it available as a commercial product in the Dominican Republic and Jamaica respectively. They offered in-kind marketing, business development and expert hours. Daikin/SAEG promoted the product for 1 year prior to the global pandemic and sent 3 offers to a hospital and two shopping malls, though these were not pursued further;

- There was a launch and promotion event of the financial mechanism Cooling as a Service in Dominican Republic for the sector: Ministries of Environment and Natural Resources, Energy and Mines, Tourism and a variety of key stakeholders, such as the Dominican association of air conditioning and refrigerator technicians (ADOMTRA) and the association of mechanical contractors (ACMERD), the council of free trade zones and exports among others attended;
- Representatives from Customs and Energy Ministries in Caribbean countries participated in a two-day workshop in Bridgetown, Barbados, on product registration systems. United for Efficiency (U4E) organized the workshop. The participants from Bahamas, Barbados, Dominican Republic, Grenada, Jamaica and Saint Lucia were trained on how to set up, implement and manage a Product Registration System;
- Regional strategic workshop with HVACR Technicians authorities a few months after.

160. In summary, the availability of Output 3.3 is *Moderately Satisfactory* considering the design of 9 financial mechanisms with marginally successful pilot financial mechanisms and proper recycle schemes for only 3 markets. Notwithstanding, Ghana and Nigeria's AGORA financing mechanism model as well as models from Tunisia, Senegal and Rwanda are generating interest in other African countries such as Benin and Kenya who want lessons learned from these countries. Given the widespread interest in EcoFridges and RCOOL financial mechanisms, U4E was requested to present its resulting report to nearly 400 senior officials at the Montreal Protocol's 35th Meeting of the Parties energy efficiency workshop in Nairobi, Kenya.

161. *Output 3.4: Design of 2 Centres of Excellence for sustainable cooling and cold chain*. In Rwanda, a centre of excellence was designed and implemented. The African Centre of Excellence for Sustainable Cooling and Cold Chain (ACES) was funded mainly from Defra, the Government of Rwanda (GoR), and other donors. ACES was conceived as an international NGO out of Rwanda's 2019 NCS with support of UNEP, with a focus on sustainable cooling and cold chain technologies and systems. One main area ACES is helping to address is food loss where Africa in general experiences 30 to 50% food loss (see Box 1).

162. A second area ACES is addressing are "next-generation" vaccine cold-chain infrastructure and systems to accommodate the advent of lipid-enveloped mRNA vaccine technologies planned in 2022 and developed through the recent COVID-19 pandemic against a plethora of infectious diseases, many of which are endemic to Africa and having high-priority for vaccine development. The mRNA vaccines require ultra-cold long-term storage at -20°C or colder, unavailable to many African countries. The mRNA vaccine platform offers major advantages in flexibility for re-design towards new climate threats and relative ease of large-scale manufacturing. Rwanda's existing vaccine program had deployed several energy-consuming freezers to the extent that there was excess freezer volume deployed at every level. An effort had to be made to predict what vaccines should be distributed and optimize freezer storage for vaccines to conserve freezer space[45]. ACES has recognized the need to review at a whole-systems level how vaccine cold-chains need to look and operate for reliable, resilient and sustainable vaccine security for Africa. ACES health cold-chain work is underpinned by a core research programme that focus on optimizing and designing the "next generation" vaccine cold-chain systems for future resilience, sustainability and value-for-money in low-income settings. A second programme has specific focus on integrating biomedical data (serology) into improved vaccine needs forecasting, and a third programme is looking to use bioinformatics to better understand the effects of climate change on future threats.

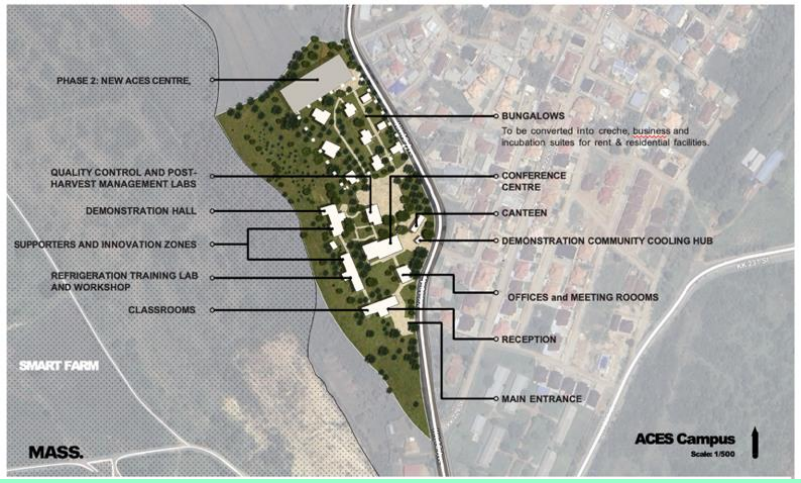
[45] The idea of a "Vaccmap," an activity under the vaccine aspect of ACES, is to map every single vaccine and the space used.

Box 1. The Africa Centre of Excellence for Sustainable Cooling and Cold Chain (ACES)

During the Cooling Project, ACES was conceived as an international NGO out of Rwanda's 2019 NCS with support of UNEP, with a focus on sustainable cooling and cold chain technologies and systems, and to lead the way in the development and roll-out of affordable, sustainable, resilient and equitable cooling and cold-chain solutions for agriculture, dairy, fisheries and health sectors in Africa, all critical infrastructure for a functioning society. One main area ACES is helping to address is food loss where Africa in general experiences 30 to 50% food loss. With 70% of people in Rwanda engaged in agriculture, cold chain systems are needed to preserve and export the food, and to earn incomes. There are about 200 milk cooperatives, 1,000 horticulture cooperatives and more than 500 farmer cooperatives in Rwanda, each cooperative with 200 to 500 small scale farmers mostly with holdings of 1-2 ha. The development and roll-out of affordable, sustainable, resilient and equitable cooling and cold-chain solutions for agriculture, dairy, and fisheries in Rwanda and Africa is crucial for a functioning society.

Starting in November 2020, ACES has been focused on the productive use of energy, taking a needs-driven, system-level approach to economically empower farmers, increase export revenues, enhance job creations in rural areas, ensure food and energy security, improve vaccine and pharma supply chains, mitigate climate and environment impacts of cooling technologies and food loss, and foster resilient low-carbon development. ACES is a strong collaboration between UNEP, the Governments of Rwanda and the United Kingdom (UK); the UK's Centre for Sustainable Cooling (CSC) under the University of Birmingham (UoB); a consortium of leading UK and international universities; and the University of Rwanda. Funding and support has exceeded USD25M with further funding approved. Two further Centres are in development in India in the states of Telangana and Haryana. CSC and its academic partners are lead developers of the ACES, SPOKE and India projects, and the associated intellectual property is vested in UoB and its academic partners.

ACES is currently the only Centre of Excellence of its kind *globally* with a focus on holistic and sustainable cold-chain solutions. It has a uniquely situated 4-hectare headquarters campus in Kigali (as shown below) operated by the ACES Institute under in Kigali Cabinet Resolution of 30/01/2023 and equipped with a state-of-the-art in-market technology test and demonstration centre; off-grid community cooling demonstration and test facilities; a fully equipped refrigeration *and* data telemetrics training centre; a business hub to accelerate to market and scale up their businesses; renovated conference hall and classrooms; an adjacent nearly 200-hectare model smart farm which will allow research of cooling in the Water-Energy-Food nexus and wider climate adaptation challenges.



ACES uses a hub and Specialized Outreach and Knowledge Establishments (SPOKEs) throughout Africa to showcase how solutions can be deployed in practical, real-world applications and provide the on-site and outreach learning, training and knowledge transfer and technical assistance centres to support local community uptake. SPOKEs will offer technical assistance and training to ensure that the required capacities and skills are transferred to the in-country partners to successfully establish, operate and manage solutions and deliver the expected benefits. SPOKEs will also run a novel "Try Before You Buy" initiative to engage the farmer communities and co-operatives, enabling them to experience the value of cold-chain (through improved quality and market connectivity) and helping them develop robust business models. Alongside the Kigali campus, ACES is also establishing the first SPOKE model in Kenya with the African Centre for Technology Studies (ACTS). Further SPOKEs are being planned in other countries within Africa.

ACES is addressing a key global challenge: "How can we provide sustainable and resilient cooling and cold-chains for all in a warming world?". Although ACES will have a strong technological and energy (and energy storage) underpinning, including circularity, it applies a systems approach focusing on non-technological and behavioural issues as well, recognising that technologies need to be financeable, integrated into processes and be accepted by end users, while some solutions can be achieved though changes or adaptations to operational practices. From a technology research perspective, ACES will primarily focus on four integrated technology areas: demand mitigation; conversion to renewables; thermal energy storage; and data and control systems. A range of training and education programmes are under development that include bespoke training for community uptake, capacity building, and demonstration programs; tailored MSc degree programs fully accredited by partner UK academic institutions, and targeted Executive Education courses for development of senior managers within the sector.

163. A significant achievement of the ACES initiative is its approach to cold chain as a system with energy resources, technology, lower GWP refrigerants, innovative business model, and policy environment; failure of any of these aspects of the system will mean a failed business model and reduced efficiency of the system and loss of food or vaccines. Examples of this would be district cooling versus individual units or using a block of ice for vaccines for a 10-hour cooling period where there is not always a need for technological solutions. ACES learned from past histories of failed projects to incubate a business model around cold chain, providing student research, and a business hub supporting early-stage technology companies to accelerate to market and scale up their businesses.

164. The key pillars of ACES (training and capacity building, finance and business models, technologies, systems design and modelling, and policy) focus on improving infrastructure. This includes a cold room that demonstrates the use of refrigerants that are not ozone-depleting, are energy efficient (including the integration of solar) to reduce overall costs, increase environmental benefits, and reduce GHGs (from fuel in transport and food lost when degraded into methane).

165. Work done on ACES since its launch in November 2020 includes:

- engaging with stakeholders in early 2021 to assemble a National Advisory Committee (NAC) to guide the concept, importance, engagement. This includes the National Agricultural Export Board (NAEB), African Organizations of Refrigeration Air Conditioning (U3AC) and REMA;
- customs officers, clearing agency staff and technician training of EE and environmentally friendly refrigerant system in cold chain components. Most of these trained personnel were in a position to train other customs officers, farmers and fishermen on the usage of the cold chain equipment, ranging from the engineering complexities of each system from single unit cold chain cooling rooms to transport. This included visits to refrigeration training centers and community cooling hubs in Rwanda and large cooling facilities in the UK;
- assessment of lands to be used by ACES where the center could be hosted headed by the University of Rwanda completed in April 2021 resulting in the NAC assembling funding documents;
- commitment of the GoR who pledged land worth USD2.0 million in May 2021 for construction of a 4.58 ha training campus to include buildings where technologies will be demonstrated to users, and where farmers and exporters will be trained on how to care for their products. The ACES training and research program serves as a platform whereby industry, government, academia, or policy makers and farms and private sector come together to discuss issues of food preservation and vaccination. These buildings were nearing completion in December 2023;
- donation of 200 ha of government land for a “SMART farm” near Kigali’s airport as a part of the ACES campus and showing high level commitment from the Rwanda Environmental Management Authority (REMA). The SMART farm will have different technologies, first used for research purpose, but also the produce from the SMART farm will be used for demonstration purposes in relation to cold chain research;
- additional USD5.0 million of funding from Defra through UNEP’s Cooling Project as of July 2021 for additional training activities towards cold chain business concepts and technical training through the Cooling Project.
- since early 2022, 100 cooperatives have attended ACES awareness events and webinars where agri-food systems are taught instead of just agriculture. There are trainees who help small holder farmers improve their agriculture, using *cooling* technologies to increase production, access financing, and improve access to markets. Many farmers who are into maize, beans, soybeans (since cooling technologies for these products is not critical), want to get into horticulture, but lack access to cooling technologies;

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- customs officers, clearing agency staff and technician training of EE and environmentally friendly refrigerant system in cold chain components. Most of these trained personnel were in a position to train other customs officers, farmers and fishermen on the usage of the cold chain equipment, ranging from the engineering complexities of each system from single unit cold chain cooling rooms to transport. This included visits to refrigeration training centres and community cooling hubs in Rwanda and large cooling facilities in the UK;
- assessment of lands to be used by ACES where the centre could be hosted headed by the University of Rwanda completed in April 2021 resulting in the NAC assembling funding documents;
- commitment of the GoR who pledged land worth USD2.0 million in May 2021 for construction of a 4.58 ha training campus to include buildings where technologies will be demonstrated to users, and where farmers and exporters will be trained on how to care for their products. The ACES training and research program serves as a platform whereby industry, government, academia, or policy makers and farms and private sector come together to discuss issues of food preservation and vaccination. These buildings were nearing completion in December 2023;
- donation of 200 ha of government land for a "SMART farm" near Kigali's airport as a part of the ACES campus and showing high level commitment from the Rwanda Environmental Management Authority (REMA). The SMART farm will have different technologies, first used for research purpose, but also the produce from the SMART farm will be used for demonstration purposes in relation to cold chain research;
- additional USD5.0 million of funding from Defra through UNEP's Cooling Project as of July 2021 for additional training activities towards cold chain business concepts and technical training through the Cooling Project*;*
- since early 2022, 100 cooperatives have attended ACES awareness events and webinars where agri-food systems are taught instead of just agriculture. There are trainees who help small holder farmers improve their agriculture, using *cooling* technologies to increase production, access financing, and improve access to markets. Many farmers who are into maize, beans, soybeans (since cooling technologies for these products is not critical), want to get into horticulture, but lack access to cooling technologies;
- in 2022, trips were made to Washington DC, USA to meet with MCC and IFC was met, and to London where high-level strategic meetings were conducted and where Rwandan officials and academic stakeholders met with London South University officials who specialize in refrigeration. The importance of this type of capacity building for academic people cannot be sufficiently underscored. Persons who have knowledge at a high level can design new technological systems to address cold chain problems in Africa. They would then be enabled to train farmers on harvesting and how to store products under certain conditions;
- The President of Rwanda made a speech at an SE4All event in 2022 and spoke of ACES as one of the programmes the GoR was going to support;
- just started intensive training in late 2023 for future trainers who have good potential to work with cooperatives and communities. The training will last 8 months and teach learners how to improve produce (bananas, avocados, beans, passion fruit, tea and coffee) through a farm-to-market cold chain system for export to Europe and the Middle East to a high quality and safety standard;
- since mid-2022, there is ongoing research to demonstrate the benefit of cold chain at large scale and the return on investment of cold chain systems with the help of refrigeration manufacturers such as Danfoss, Daiken and the Inspira Fund. This should encourage governments to invest in cold chain on a larger scale to benefit small-scale farmer;

- by November 2022, the ACES refrigeration training lab was designed, and construction plans finalized for the demonstration hall;
- COP President, the Rt. Hon. Alok Sharma MP, visited ACES during his attendance at the Commonwealth Heads of Government Meeting (CHOGM) in Rwanda, in June 2022. The COP President said, "ACES is a demonstration of how we can work together, to help tackle rising emissions and keep alive the goal of limiting average global temperature rises to 1.5°C;
- The Rwanda and UK governments joined forces at COP27 (November 2022) to help speed the delivery of innovative cooling technologies in Africa through ACES, by signing a Statement of Cooperation.

India

168. In 2021, cold chain was initiated in India with Danida funding for USD1.3 million to tackle massive food loss, estimated at 25-30% fruit and vegetable losses due to the lack of cold chain refrigeration. Perishable produce needs to stay fresh for quick use (such as lettuce and eggplants) and move from farms to cities. With the Government of India acknowledging that only 3% of the country had the infrastructure required for cold chain, impacts of the lack of cold chain in India are methane emissions from food losses, and the production of the same crops in one region (such that all farmers producing the same crops cannot get their produce to market or the price of the produce is as much as 90% lower). The ICAP had activities planned for pack houses and cold chain transport.

169. Danida funds expended by the Project were used mostly for capacity building and technical assessments on demonstration projects, setting up a national bank for SMEs to set up risk sharing facility to finance cold chain, and working with 2 state governments to develop policy framework that integrates with their climate plans. The Danida funds expended by the Project also included work in Tamil Nadu on district cooling under 3 departments, natural and passive cooling, urban heat island assessment and cooling assessments.

170. Tabreed, a private UAE company that provides high quality, efficient and environmentally friendly district cooling solutions, provided add-on funding to support the cold chain work in India and helped global communications for the Cool Coalition using the funds for a feasibility study for a cold chain project in India. They are currently working to get grant finance from IFC.

171. A Centre of Excellence was started in India under U4E as an extension to Rwanda's ACES. This effort was planned in early 2022 and got linked to 2 states where two ACES-inspired centres were performing work around testing, standards, training of technicians, demonstration project, policy and business models, aspects where Indian stakeholders did not have any focus on (one in Teleganna as a strategic cold chain place for medicines and vaccines and one cold chain CoE in Haryana under the Department of Horticulture done in late 2022). In 2022, trips were made to London where high-level strategic meetings were conducted and where Indian and Rwandan officials and academic stakeholders met with London South University officials who specialize in refrigeration. These ACES-inspired centres are still being designed in 2023 with 1 Project Manager, 5 personnel, 1 researcher in each state with invitations extended to visit Rwanda. Training is scheduled to start in 2024 for teams already on-board with the initiatives for introductory training on process management, cold chain technologies, business models and types of refrigerants. Though there are challenges to understand state funding and politics, Defra is interested in replicating the Rwandan ACES centre in India.

172. The availability of Output 3.4 is *Highly Satisfactory* considering the availability of the design of 2 Centers of Excellence for sustainable cooling and cold chain for agricultural produce and vaccines and that the strength of the design is validated by post-end of project impacts observed in 2023. These post-EOP impacts include: increase in aggregate grant funding received to nearly USD20M, an entire campus with building under construction, allocation of land for smart farm, a project team with over 50 leading experts, training programmes under implementation, industry commitments of equipment, many leading universities as partners, and additional support now from Canada, FAO, and IFC. In addition, similar progress is unfolding in two analogous Indian centers.

173. *Output 3.5: Urban cooling action plans for 3 cities*. In Viet Nam, the cities of Can Tho and Tam Ky were selected as pilot cities to carry out capacity building activities including city level extreme

heat assessment and promoting urban cooling strategies including a building project pipeline to facilitate investment mobilization in the urban cooling segment. Additionally, Dong Hoi is also being considered as a potential city for scale-up activities at a later stage after successful implementation and lessons learned from the pilot phase. The availability of Output 3.5 is *Moderately Satisfactory* considering the availability of pilot cooling action plans for only 2 cities in Viet Nam with one still to be implemented as a result of scaled-up activities of the pilot cities.

Overall summary of Outputs

174. An "estimated" 90% of the Outputs were available. With highly available Outputs 1.1, 1.2, 1.3, 2.1, 2.2, 2.3, 2.4. 3.2 and 3.4, there were moderately available Outputs 3.3 and 3.5 as well as available Outputs 2.5 and 3.1. Overall rating for availability of Outputs is *Satisfactory*.

The overall rating for the availability of the Project outputs is Satisfactory

D.4. Achievement of Outcomes as Defined in the Reconstructed ToC

175. The RToC on Figure 2 illustrates the outputs and outcomes that the Project sought to achieve to contribute to an overall impact of "reducing environmental degradation and GHG emissions (up to 110 million tonnes CO_{2eq} reduced cumulative 2020 to 2030), lower electricity consumption, accelerated market transformation to eco-efficient cooling solutions to contribute with integrated policy approach to achieve a just transition to clean energy". In the RToC in Figure 2, this impact is spread along a development pathway with the following "intermediate state" to be achieved as a part of UNEP's Strategy for 2022/25: "decision makers at all levels adopt decarbonization, dematerialization, and resilience pathways", "human health and environmental outcomes are optimized through enhanced capacity and leadership in the sound management of chemicals and waste", and "waste management is improved including through circular processes, safe recovery of secondary raw materials and progressive reduction of open burning and dump sites". The evaluation of the effectiveness of the Project consisted of an assessment of causal pathways from the baseline to the outputs of the Project to generate the outcomes and intermediate states that would eventually lead to impacts and generate global environmental benefits (all based on the RToC in Figure 2). As such, the revised outcomes of the Project include:

- Revised Outcome 1: "Political leaders and their supporting teams are aware of the importance of raising energy efficiency and access to cooling and refrigeration due to benefits of combining refrigerant transition with energy efficiency, as articulated in the Kigali Amendment, and take action accordingly";
- Revised Outcome 2: "Capacity built among, tools provided to, and linkages formed between National Ozone Officials and Energy Officials from emerging economies such that they recognize the importance of linking refrigerant transition with energy efficiency in cooling, begin to influence national policy, and begin to take actions to develop relevant projects accordingly"; and
- Outcome 3: "Increased participation of governments and private sector from developing and emerging economies in regional harmonization for efficiency of cooling sector and in national and local initiatives to increase cooling efficiency and cooling access".

176. With regards to drivers supporting the transition from outputs to outcomes, the driver of "rationale and path for pursuing opportunities is sufficiently appreciated by decision-makers and their constituents" *is in place* due to a large proportion of stakeholders being convened and concerned about high costs of cooling technologies. The driver "gender initiatives harness the talents of women in support of decarbonization in the cooling sector" *is only partially in place* due to governments having other higher spending priorities and stakeholders still needing financial concessions before committing to an EE cooling technology investment. Overall, drivers to support the transition from outputs to direct outcomes are only "*partially in place*" and the assumption of "political leaders and industry take pro-active steps on their own accord" *holds fully*.

177. The achievement of the Outcome 1 of "political leaders have the information to understand the challenges posed by market uptake of unregulated products and proactively support the policy measures required to achieve a sustainable, strategic structural change in their cooling product markets" can be described as follows:

- the Cool Coalition has the formal structure and global outreach with technical committees to be well organized. The Coalition has managed to strongly influence governments and industry and raise political momentum to advocate for and take comprehensive action on cooling. By using UNEP as the convener of all ongoing activities on cooling, there is an assuredness of follow-ups with political leaders and industry with strong prospects for further funding for needed activities. These prospects and opportunities come from the numerous Coalition members. Examples include Defra, MLF, Danida, SIDA and CCC providing continuous follow-up funding, such as that for model regulations development for heat pumps, and that for further regional policy harmonization and national implementation;
- the U4E guidelines for household appliances, specifically for ACs and refrigerators, was extensively used by the World Bank, GIZ, UNDP, CLASP and other NGOs for preliminary market assessments and financial mechanisms. This implies that there are a lot of political leaders of governments using these guidelines for their projects with the assistance of donor organizations or NGOs;
- this has resulted in:
    - more than 66 countries signing the Cool Coalition's Cooling Pledge to reduce energy consumption in cooling sector;
    - more than 20 countries officially developing NCAPs that has been directly facilitated by the Project, by utilizing methodology developed by the Project, or via assistance of other projects that were clearly designed or launched as a result of the Cooling Project;
    - more than 20 countries incorporating advocacy findings from the Project or UNEP into their NDCs. NDCs would include NCAPs, model regulations, MEPS, and labelling schemes.

The overall rating for achievement of Outcome 1 of "political leaders have the information to understand the challenges posed by market uptake of unregulated products and ….." is ***Highly Satisfactory***.

178. The achievement of the Outcome 2 of "National Ozone Officers and Energy Officials from developing countries support the design and implementation of policies that improve cooling product performance to achieve a sustainable, strategic structural change in their cooling product markets" can be described as follows:

- the pairing of NOOs and NEPs at twinning workshops has strengthened collaboration in efforts to support design and implementation of policies to improve cooling product performance, in effect doubling the impact of the Kigali Amendment. These workshops would not have happened without the Project. Though this outcome is still evolving with more twinning workshops to come, the attitude of NOOs has changed from "wanting nothing to do with energy" to "EE needs to be some part of their consideration". This has created "friends or frenemies" between the Ministries of Energy who is responsible for EE, and Ministries of Environment in almost all countries. The latest replenishment of Montreal Protocol MLF was around USD1.0 billion, a portion of which will go to EE, specifically for twinning workshops. All countries are aware that they need to improve EE and to build capacity through twinning workshop to improve EE for the regulatory side;
- twinning workshops influenced cooling product performance to achieve a sustainable, strategic structural change in cooling product markets, particularly the adoption of MEPS and NCAPs. With ratification usually done in Parliament, ministries feed information on NCAPs and MEPS to Minsters of Environment and parliamentarians. With Kigali Amendment funding of NOUs from MLF, funding goes to both the energy and environment ministries for both ACs and refrigerators. A new round of Twinning, this time funded by the MLF, started in September 2023 and included Montreal Protocol Officers, National Energy-Efficiency Policy Makers, and Financial Mechanism Focal Points. It was held in Jordan for Central Asia, Europe and North Africa. Subsequent twinnings will occur in 2024 for the remaining regions;
- NOOs work with industry in manufacturing countries and vendors in other countries in efforts to change the refrigerant line to a higher efficiency to improve the minimum standards. However, there are still issues with industry not talking to energy personnel, and some

pushback from manufacturers on changing their production lines to manufacture refrigerators to a higher efficiency (regardless, they end up implementing the changes);

- software development for a product registration system (PRS) has assisted NOOs and NEPs in the design and implementation of policies that improve cooling product performance. This allows governments to inform vendors on what can be imported based on the official PRS. The Project-developed PRS tools have been used to train several countries, many of which have their own PRSs already. The project's prototype PRS is intended in such cases to play the role of informing these countries how to improve their existing systems. The aim is the assist the countries in achieving a well-functioning PRS software of their own, typically built within the broader national government IT systems. Those that lack PRSs would be interested in using the Project's country-level PRS to customize to their own needs. At present, Lao PDR and Cambodia are developing their own PRSs; ASEAN is developing a regional PRS, and providing training for government agency IT teams to manage PRSs;
- this has resulted in:
    - more than 156 countries for which twinning work accelerated or influenced to some extent a country's pursuit of Kigali Amendment;
    - more than 156 countries that are confirmed to have used country savings assessments or model regulations to inform their draft MEPS, NCAP, or NDCs; and
    - more than 40 countries that are confirmed to be pursuing integrated work on refrigerants and energy efficiency in the cooling sector via proposed activities with MLF or other donor funding, and as a result of participation in twinning workshops.

The overall rating for achievement of Outcome 2 of "National Ozone Officers and Energy Officials from developing countries support the design and implementation of policies…." is *Highly Satisfactory*.

179. The achievement of the *Outcome 3 of "roadmaps, strategies and related market transformation integrating health, gender, environment and poverty alleviation are officially endorsed by developing and emerging economy national governments to achieve a sustainable, strategic structural change in their cooling product markets"* can be described as follows:

- twinning workshop efforts have catalysed interest in many countries to the creation of roadmaps from regional harmonization. This includes NCAPs and a 2020 regional roadmap (updated from 2015) for ASEAN with around 9,000 AC models, categorizing the most popular and efficient ACs. With COVID slowing progress, there were now commitments for ASEAN individual member states for their national plans to meet the 2023 target of 3.72 CSPF and 2025 target of 6.09 CSPF in 4 pilot countries: Singapore, Malaysia, Philippines, and Viet Nam. Singapore has already launched and will implement 6.09 by April 2025 with these targets already officially notified on their website to the manufacturers. There has been work with the Malaysian Energy Commission in June 2023 to revise their MEPS in Jan 2024 from 3.2 to 4.0 CSPF, and plans to extend MEPS improvements to Indonesia and Thailand;
- achieving a sustainable, strategic structural change has not yet materialized in ASEAN cooling product markets. MEPS is not leading the AC and refrigeration market (instead, it is trailing manufacturers), and ASEAN ministerial approval is required to apply peer pressure for more ambitious standards on all ASEAN countries with the only outstanding issue of when the transformation will occur;
- green public procurement has been a success in India, Germany and China with other countries interested and the model regulations' MEPS of the project may contribute to the target levels in these programs;
- policymakers are using CSAs to prepare their NDCs for their minimum MEPS. This extends to the use of regional CSAs that includes ASEAN, the Middle East, and SADC;
- integration of EE into Montreal Protocol has forced many cooling equipment manufacturers to invest in new production lines starting in 2019 to address EE based on their raised awareness of MEPS. Examples include:

- Brazil where commercial refrigeration MEPS was adopted using model regulations from the Project in 2021 and 2022. Adoption was funded by GCF for USD600,000, with an estimated 100 manufacturers of commercial refrigeration equipment in Brazil supplying almost all of South America;
- 600+ small projects to be funded by the MLF, many likely to be implemented by OzonAction, are for upgrading cooling production lines of manufacturers to more efficient equipment with each project on the order of USD50,000 to USD250,000; and
- separate KCEP funding to the World Bank to provide support to local manufacturers of ASEAN countries to manufacture high efficiency ACs;

- the Rwanda NCAP has led to ToT in cold chain started in Rwanda via ACES in October 2023 and concluding in June 2024. Trainers will extend training to students, cooperatives, traders of equipment, and traders of food, focusing on equipment, economics behind equipment, assessed benefit to food for cooperative farmers, and how to facilitate cooperatives to overcome challenges faced by farmers who do not have capacity for preparing good business plans. FAO is providing USD300,000 for capacity building, identifying cooling solutions on post-harvest handling and cold chain management, and research. Defra has been funding cold chain equipment management and capacity building through the Cooling Project for ACES since 2019[46];
- the Rwanda NCAP also led to UNEP and REMA preparations for USD 1 million in GCF Readiness follow-up funding for enabling activities for "Specialized Outreach and Knowledge Establishment" or SPOKEs to expand cold chain to rural Rwanda and other countries and implementation of Rwanda's MEPS, labels and product registration system which had been prepared previously with CCC funding. Lessons from what was seen in the ACES Kenya would be tailored to Rwanda with the assistance of an international and local consultant and community-level engagement with needs and market assessments. Funds for equipment should come later when larger GCF funds arrives. While SPOKE funding will provide equipment and technicians, the ACES hub will provide additional training for introductory courses on cooling, cold chain, refrigeration, business models, and testing equipment. With farmers currently restricted from growing green crops and fruit without cold chain, small adjustments for farmers are proposed to use pre-cooling, cold storage, renting a cold truck, and then to the factory cold room, to overcome these restrictions;
- the ACES SPOKE model with its technology demonstrations, business models and expertise is proposed to be replicated to other countries such as Kenya (with SPOKE already established), Senegal, Lesotho and in Rwanda. With a high proportion of cold dependent food traded in non-refrigerated areas, perishable produce, fisheries[47], meats and horticulture can flourish if cold chain is properly deployed, reducing food loss at significant levels, generating additional income, and contributing to food security. There is excitement and intense interest amongst farmers to these opportunities through extended community outreach and trainings on post-harvest management and cold chain;
- this has resulted in:
  - more than 25 countries that have officially signed on or committed to regional roadmaps to adopt policies or programmes in line with the Project's guidance and tools (ASEAN

[46] This also includes hub funding for ToT aimed at organization technicians for equipment installation and maintenance with a focus on safety and safe drone delivery of vaccines. This is through USD4.0 million funding from DEFRA, though much of this committed amount remained after the close date of the project phase under evaluation. Capacity building takes place at the ACES campus and included production managers from food companies, and ToT to do commodity assessments with farmers. Training was also for the many small land holders including causes of food losses, how cold storage and cold chain can be adopted, and the use of a pre-cooling "shading system" followed by a cold room.

[47] Tilapia and Nile perch aquaculture is starting now in Rwanda in ponds, lakes, and cage farming. There is also a 20-year aquaculture strategy for Rwanda, an area that needs to be supported now to increase their agricultural, animal, and fisheries product outputs to USD1.0 billion by 2030.

countries of Malaysia, Singapore, Viet Nam and the Philippines and all 16 SADC countries);

- more than 30 countries that have officially adopted MEPS in line with Project's model regulations. This would include 4 ASEAN countries, all 16 SADC countries, 5 Caribbean countries, China, India, Brazil and Chile;
- more than 9 countries that have committed to or realized significant investments of more than USD10 million from the national government or private sector in specific cooling areas to increase cooling efficiency or access as a result of the Project (through cold chain, district cooling projects, passive cooling projects, and financial mechanisms). This included Rwanda, Ghana, Senegal, India, China, Singapore, Cambodia, Jamaica and Grenada.

The overall rating for achievement of Outcome 3 of "roadmaps, strategies and related market transformation….." is *Highly Satisfactory*.

The overall rating for achievement of all Outcomes is Highly Satisfactory

D.5. Likelihood of Impact

180. The "likelihood of impact assessment" (LIA) is based mainly on the holding of drivers and assumptions being in place to advance developmental results towards desired impacts. The following comments are made in response to the RToC drivers and assumptions in Figure 3 for the LIA:

- With regards to drivers to support the transition from outcomes to the intermediate states, the following comments are made by the Evaluation Team:
  - the driver of "governments seeking solutions to higher fuel prices and climate change, and stakeholders seeking relief from high energy costs" *is only partially in place.* This includes new NCAPs and MEPS for several participating countries for reducing GHG emissions and developing eco-efficient cooling solutions that contribute to achieving a transition to clean energy. There are, however, discussions amongst several countries on whether or not to adopt more ambitious MEPS. In addition, there are many countries that have adopted the Global Cooling Pledge, which includes adoption of MEPs;
  - the driver "gender initiatives harness the talents of women in support of decarbonization in the cooling sector" *is only partially in place*. This is due to the Project not focusing on implementing policies at the local level (where decision-making in energy and climate issues can be gender-biased), but had a focus on guidelines, twinning workshops, and regional and national strategies and roadmaps which did not have clear gender equality advancement opportunities except the participation of women;
- With regards to drivers to support the transition from intermediate states to impact, the following comments are made:
  - the driver of "high-level political and industry commitment is sustained over time" *is only partially in place* with most governments and industry. While there is commitment from most governments, some industries are balking at changes to their production lines; in the end, though, they make the changes demonstrating commitment to eco-efficient cooling due to porous borders and lack of resources to enforce local standards and regulations translates into the countries being in alignment and in lock step with regional policies that are likely being practised in neighbouring countries (Para 182, 3rd bullet). While there is an appearance in some countries of no accelerated market transformation to eco-efficient cooling solutions, time is needed (3 to 5 years) for changes to current market conditions and production lines to eco-efficient cooling solutions;
  - the driver of "investment in EE products is sustained over time" *is only partially in place* with partial commitments to eco-efficient cooling by industry who need time (3 to 5 years) for changes to production and manufacturing lines to eco-efficient cooling solutions;

- the driver of "high electricity prices making energy-efficiency more advantageous" *is in place*. This includes several participating countries seeking to reduce their GHG emissions and develop eco-efficient cooling solutions through new NCAPs, MEPS and national programmes such as Rwanda, Brazil and Malaysia;
- the driver of "food losses decrease farm incomes" *is in place*. This includes several participating countries seeking to reduce their food losses and their GHG through developing eco-efficient cold chain through new NCAPs and national programmes such as Rwanda and India.

181. With regards to the evaluation of assumptions:

- the assumption from outcomes to intermediate states of "political leaders and industry take pro-active steps on their own accord" *is only partially held in all participating countries*. The COVID-19 pandemic destabilized the tourism sector for a number of SIDS, taking away opportunities for eco-efficient cooling investments in tourism facilities. While there are a few manufacturers leading the production of eco-efficient cooling products (such as in China), other political leaders are awaiting decisions by industry to manufacture more efficient cooling products. There are also a few countries where a mandated MEPS is leading the transformation to eco-efficient cooling products (such as in China, Rwanda, Singapore, Brazil and Chile);
- the assumptions from intermediate states to impacts are as follows:
  - the assumption of "countries enforce policies with monitoring, verification and enforcement and sustainable public procurement (aka green public procurement (SPP/GPP)" *is only partially held in participating countries*. Not all countries have MVE policies. This will come within 3 to 5 years or more;
  - the assumption of "financial institutions invest to support deployment" is *only partially held in participating countries*. Not all countries have investment opportunities in cooling equipment deployment. This may come within 3 to 5 years or more;

182. The likelihood of impact is assessed by considering:

- the likelihood of maximum impact of GHG emission reductions from ACs lies with the rate of adoption of ambitious MEPS by all countries. While China globally has the best MEPS for ACs and produces 70 to 80% of the world's RACs, it only manufactures ACs that comply with the importing country's MEPS and well below their own MEPS. As such, there needs to be drivers (such as high-level political and industrial commitments, sustained investments and high electricity prices) to promote adoption of more ambitious MEPS for ACs as well as refrigerators and other cooling products in these import countries;
- China has likely had some GHG emission reductions from their conversion to the 6.1 standard in 2020, due to sustained high-level political commitment of UNEP over time. While there are reports that all of China's domestic ACs meet the 2020 MEPS (which is roughly 40% of all ACs manufactured globally), this is more likely to have resulted in less than 50% of the 40% of RACs manufactured in China (for the Chinese market) being converted to the 6.1 standard. As mentioned in the previous bullet, China still exports ACs that comply with the importing country's MEPS that generally is well below their own MEPS;
- regional policies in cooling products generally have traction with member countries. For example, manufacturers need to comply with regional policies, standards and regulations in many African countries such as Ghana and Nigeria. Porous borders and lack of resources to enforce standards and regulations translates into the countries being in alignment and in lock step with regional policies that are likely being practised in neighbouring countries. If one country is accused of non-compliance, the neighbouring country would also be implied to be non-compliant, leading to a massive loss of business with ASEAN and Southern Africa being in such situations. Hence, countries are likely to comply with regional policies similar to a European Union approach or Canada, US, Mexico on Energy Star (all 3 countries use it, sharing notes and testing with a lot of linkages). This has resulted in national consultations and voting underway by East and Southern African governments on U4E recommended contents on policy harmonization. As such, there are indications that there are political and industrial drivers to sustain investments amidst high electricity prices, to promote adoption of more

ambitious MEPS for ACs as well as refrigerators and other cooling products in Africa, ASEAN countries and other regions;

- after China and India, ASEAN is the largest and fastest-growing market for cooling products. With the Project getting ASEAN energy ministers to endorse a standards roadmap that was supported by the Project's model regulations (prepared by U4E and LBNL), the ASEAN countries and local manufacturers are stating that the strategy of matching more ambitious MEPS standards of large markets that share the same supply chain for ACs and refrigerators will take some time, either 2025 or 2026. While technically feasible and economically justified for consumers, ASEAN countries now want to move to the MEPS minimum standard of China amidst issues with manufacturers and market surveillance. This is all due to the political and industrial drivers to adopt the Project standards roadmap that will sustain investments amidst high electricity prices that will promote adoption of more ambitious MEPS for ACs as well as refrigerators and other cooling products in ASEAN countries;
- using lessons learned with the UNEP project in Tunisia in solar water heaters and solar PV panels, the on-wage financial mechanism extended to sub-Saharan African countries has the potential to improve household access to high EE refrigeration and AC equipment. However, there will still be households not able to access this highly efficient equipment, leaving government needing to enhance financial mechanisms to improve access. As such, the drivers of high electricity prices should translate into political and industrial commitments, and sustained investments to improve purchases of EE ACs, refrigerators and other cooling products;
- though attribution is difficult, the Project is extremely likely to have contributed to current and planned allocations for EE under the MLF and obviously played the decisive role in the portion of that funding allocated to twinning. U4E twinning workshops directly addressed the issue of the MP and EE, effectively doubling the climate benefit of the Kigali amendment. With all MP decisions partly driven by ozone officers in all countries, more twinning workshops are now planned with some of the USD1.0 billion of MLF funds allocated to build more capacity on regulatory issues and test labs as a part of EE:
    - funding from the MLF for EE was directly due to the reports prepared by the EE Task Force cross-referencing KCEP-funded tools and case studies[48]. This gave credibility at MP meetings for the MLF invest in EE;
    - this led to USD20 million of pilot funding in 2021 from the prior MLF for energy efficiency conversion projects, not on HFCs. Countries are proposing "a transition from this refrigerant to another refrigerant and also wanting to improve EE from this level to another level", and need funding for this purpose;
    - an unknown portion of the USD1.0 billion was to be allocated to EE in December 2023;
    - there are drivers of high-level political commitments to build more capacity on regulatory issues and test labs as a part of EE and the MP;
- impacts of the Cooling Project can be attributed to GEF and GCF for funding U4E, other entities within UNEP or the World Bank for "readiness projects" with each country allocated up to USD1.0 million (with most Cooling readiness projects in area of USD350,000 to 500,000) to design larger projects through NCAPs using UNEP templates:
    - UNEP had completed a GEF 6 global project and a coordination project and about 9 national projects in March 2022, some of which were national projects that are soon to be concluded, and some UNDP projects;
    - Chile projects consisting of GEF project implemented by UNEP and LBNL on domestic fridges (built off of domestic refrigerator model regulations of the Project), a UNIDO-implemented project with LBNL (that also built off of customized U4E model regulations)

[48] Climate Action wanted new reports very year since 2022 to understand the latest developments that are to inform their next round of investments.

for commercial refrigeration as well as a major re-cycling programme[49]. Chile has strong institutions which raises the probabilities of success;

- the USD900 million World Bank GCF Facility has 9 countries approved as part of a GCF overarching project starting in 2024 focusing more on loans with a lot of information coming from cooling workshops, NCAP methodologies of the Project and awareness raising on the needs of EE for cooling products. U4E, LBNL, GIZ, UNIDO and Project personnel influenced World Bank personnel who were designing this GCF Facility;
- impacts also include over USD4.0 million in additional funding received from Defra for ACES, model regulations development for heat pumps, regional policy harmonization and national implementation.

This is all due to high-level political drivers to adopt the Project standards roadmap that assists countries in implementing NCAPs to sustain investments in EE ACs as well as refrigerators and other cooling products amidst high electricity prices.

183. The likelihood of impact was enhanced in October 2022 when ACES in Rwanda had a major event attended by 70 experts attending the Global Off-Grid Solar Forum and Expo in Kigali to attract other countries to join the sustainable cold chain program. With ACES focused on cold chain and use of good refrigerant and proper management of cooling system to reduce GHG emissions, the focus in 2024 is now expanded to other countries and regions:

- Kenya is now a SPOKE of ACES through testing of equipment, setting up "try before you buy" initiatives, working directly with farmers and their cooperatives to provide demonstration of technologies of interest for 3 to 4 months. Training started in early 2023 on equipment usage and company to supply equipment has just been selected;
- In Rwanda, there are more people buying cold rooms and cold chain in the country brought on by ACES awareness work including an example of someone buying a cold truck to transport avocado to the city. There are some companies that have been invited and people following up on where to buy this equipment. Though the equipment is not yet available, some stakeholders are reaching out to ACES to ask where they can get an EE cold room;
- Senegal is currently developing an MOU for an international SPOKE specifically for cold chain in fish harvesting with negotiations commencing during the Project and it being finalized and signed in 2024;
- Since 2021, ACES has worked with REMA to build the capacities of over 200 technicians during several sessions about handling new refrigerants (which are flammable) through international training and certification on use of new refrigerant. Capacities were also built for young and established farmers in agricultural areas on topics such as the use cold rooms and cooling trucks. In July 2023, ACES had farmers engagement coinciding with flooding disasters in May 2023 in western Rwanda to cover topics such as basic skills on how they can maintain their produce, and how to preserve the products;
- ACES in Rwanda started inviting banks in 2023 to enhance their understanding in cold chain business models. If cold chain technologies are applied to managing produce to easily get to market, there is an assurance that loans will be paid back. Cold chain is important as it supports the national strategy to double exports to USD1.0 billion by 2024;
- ACES, the Rwanda Biomedical Center, and Circular (a private UK-based international company) are undertaking a research project to use block chain technology to map vaccines. Circular is famous for using block chain technology to map out precious stones, now wanting to demonstrate block chain technology to map the value chain of cold chain items of vaccine distribution, providing precise quantities of vaccines and predicting how much volume of freezer space is required at every level of distribution;

[49] There was the engagement of Cámara de Comercio Santiago comprised of 16 companies to establish a Clean Production Agreement (starting in August 2019) for developing an integrated management system or Chile's first Collection Recycling System Organization for WEEE, driven by Chile's policies for a circular economy.

- ACES is going to start the use of Vaccmap results in March 2024. This initiative will specify how drones owned by a Rwandan company operating for 5 years, Zipline, can distribute vaccines and other medical commodities including blood products and special drugs. The company has a station and a warehouse from where the drones are deployed. Vaccair will use Zipline system to distribute vaccines with drones having some cooling capacity, instead of a freezer at every health centre;

This is all due to the high-level political drivers to adopt the ACES roadmap prepared by the Project that Rwanda and other countries in developing SPOKES will sustain investments in cold chain amidst food losses decreasing farm incomes.

184. Further spillovers in Project work have resulted in:

- a twinning workshop in the Middle East for 12 countries proposed for 2024, funded by the MLF, but a direct impact of twinning workshops under the Project. However, geopolitical tensions in the Middle East make regional cooperation difficult;
- Twinning Workshop for Pacific Island Countries Ozone Officers, Energy-Efficiency Policy Makers, and Financial Mechanisms in February 2024. African Anglophone in Mozambique, Caribbean in Jamaica, Latin America and Asia in China will take place in Q2 and Q3 2024, funded by the MLF;
- a competition under Sir Richard Branson and the Government of India during COVID to design and implement an AC unit that is cheap and 5 times more efficient than current residential ACs. Two awards were given to GREE (China) and Daikin (Japan) with the winners pledging to bring the efficient ACs to market by 2025;
- generation of a large India program to finance Asia's largest district cooling platform. Due to the long-term presence of the Project and UNEP in India since 2017 on district cooling, UNEP has provided the same consistent personnel to move the public-private partnerships forward with persistence for long-term district cooling projects. Finance is being provide by Tabreed and is a result of UNEP's efforts to engage IFC and Tabreed to build up district cooling finance in Asia, leading to Tabreed-IFC developing a USD400 million district energy investment platform**.** Meantime, the UNEP team in India has been supported by a mix of Danida and Climate Works funding;
- Swiss funding in India scaled-up to USD7 million for a project related to passive cooling in buildings (not district cooling) in India in October 2023. The funds were to be spent on the building energy code under Ministry of Power, and the ability of cities to mandate that building code under Ministry of Urban Affairs and getting these two ministries to coordinate[50]. This project is to work with both ministries in efforts to strengthen coordination in 2 pilot states with the states having the mandate for urban planning building policies to adapt to their climate conditions;
- plans to work with the World Bank to implement a financing component in these two Indian states with passive cooling with a possible 2 to 3% increment in cost concessional finance;
- plans for UNEP to enter agreements with 20 real estate firms in India for long-term partnerships of 3 to 4 years to promote decarbonization strategies related to passive cooling;
- preliminary discussions started in 2023 on Lesotho as a SPOKE for vaccines and health with the involvement of the University of Lesotho. A delegation from Lesotho was received at ACES Rwanda wanting to learn what activities the ACES hub is undertaking;
- the French Government is awarding in 2024 over USD2.2 million as a direct result of KCEP financial mechanisms in West Africa. The proposed project will be a joint U4E project with UNDP;

[50] India has had building code for 20 years, but its implementation is weak with less than half the states implementing. Despite having a good code, the capacity of Ministry of Urban Affairs as well as state and city levels is constrained and the real estate lobby is pushing against any kind of code.

- GCF proposal for USD105 million to do EE in industry with USD100 million of soft loans to local banks and asset guarantees;
- Korean Development Bank for USD100 million for industry as a guarantee managed through ADB;
- USD100 million for Indonesia pilot industrial project under which USD5 million in grants for green technical assessment and capacity building, and USD0.5 to 20 million for EE in SME industry;
- other countries being interested in the eco-fridge scheme and cold chain. Benin, Kenya and other countries want lessons learned from Tunisia, Ghana, Senegal and Rwanda with all the difference types of financial mechanisms in those countries;
- UNEP has published a "Cooling Stocktake" report ahead of COP 28. The report assesses implemented country actions on sustainable cooling, evaluates new opportunities and offer insights into political action that can reduce GHG emissions from the cooling sector. This has led Damilola Ogunbiyi, CEO and Special Representative of the UN Secretary-General for SE4All and Co-Chair of UN-Energy to state: "Today we have heard clearly from the COP 28 Presidency that sustainable cooling is on the agenda for 2023 – and so it should be. Access to cooling is an issue of equity for the over 1 billion people who face serious cooling access risks. Life doesn't stop when temperatures go above 35 degrees. But when it does, equality of opportunity, productivity, and health is at stake for the most vulnerable. I hope you'll join me this year in working hard to address this".

185. Overall, the likelihood of impact is rated as *Moderately Likely*. This was mainly due to the partial achievement of intermediate states, namely:

- "decision-makers at all levels adopt decarbonization, dematerialization, and resilience pathways" as demonstrated by the UNEP-led Cool Coalition, with the United Arab Emirates' presidency of COP 28, announcing the development of a Global Cooling Pledge and a "Cool COP Menu of Actions" that was featured prominently at COP 28;
- "countries and stakeholders have increased capacity, finance and access to technologies to deliver on adaptation and mitigation goals, as demonstrated by the Project impacts described in Paras 182 to 184;

The intermediate states of "human health and environmental outcomes are optimized through enhanced capacity and leadership in the sound management of chemicals and waste" and "waste management is improved including through circular processes, safe recovery of secondary raw materials and progressive reduction of open burning and dump sites" were not fully achieved. This was due to less than successful results in pilot programmes to manage recycling initiatives for old ACs and refrigerators (this evaluation only counts Chile and Rwanda with successful recycling programmes). Notwithstanding, the RToC pathways from outcomes to impacts have been partially achieved. The driver of "high-level political and industry commitments" is *only partially in place* with most governments and industry requiring 3 to 5 years for respective changes to current market conditions and production lines to eco-efficient cooling solutions and re-cycling programmes. This should leverage more financing for cooling market transformation towards circular economies.

The overall rating for Likelihood of Impact of the Project is Moderately Likely

The overall rating for Effectiveness of the Project is Highly Satisfactory

E. Financial Management

Adherence to UNEP's Financial Policies and Procedures

186. The main aspects to overall adherence of the Project to UNEP's financial policies and procedures were:

- KCEP and other donor funds were managed by an Administrative Officer (AO) under the Fund Management Officer (FMO) that is under the Energy and Climate Branch. This AO is the only certifying officer available to the Project;
- the close relationship between the FMO and the donors augments UNEP fiscal policies and procedures. This includes timely bi-weekly calls between the AO and main donors (KCEP, Defra and Danida), and allows the FMO AO to monitor progress of the various activities on the ground;
- there was the issue of adding funds during Project implementation that proceeded smoothly. The funds were converted to payments to partners, contractors or vendors which had to go through several different channels to ensure the funds are sent to the proper parties in an effort to avoid corruption. This means delays experienced are usually with UNEP payments;
- there are funds spent on 3 types of Project personnel: UNEP staff (who are paid via payroll automatically on a monthly basis), UNEP consultants (paid by milestone deliverables), and UNOPS personnel who work for a long time[51] through the Project's life cycle (salaried personnel paid by UNOPS through UNEP who ensure the Project receives consistent expertise);
- partnerships with an implementing partner involves clearance under a due diligence process to become a UN partner (NGOs and govt agencies) in the partnership portal. Once cleared, a small-scale funding agreement or an SSFA (under USD200,000) or project cooperation agreement or PCA (over USD200,000) is signed. Once the implementation plan and agreement is drafted, the agreement goes for legal review, then to the AO and Director for approval prior to the partner signature. This is followed by a small advance to allow activities to proceed. Payments are made in instalments. With 70% spent and a progress report, another advance can be requested. Final payments can be made with a final progress report. Over USD200,000, an audit must be provided;
- UNOPS contracts to work for UNEP are under a UNEP "umbrella" global HR agreement that was signed with UNOPS (negotiated by the Corporate Services Division, Nairobi) for a 4% fee. UNOPS personnel are administered by UNEP with UNOPS in charge of the recruitment, sending out notices to UNEP for payments to personnel based on deliverables, which UNEP signs off and instructs UNOPS to pay the salaries of UNOPS personnel working for UNEP;
- procurement of equipment through UNEP must undergo a rigorous process that includes a procurement assessment; clearance by UNEP's procurement office; the PM, the FMO-AO and a Nairobi-based Procurement Expert (PrE) meeting well ahead of a procurement date to plan how equipment was to be procured efficiently by the Project on behalf of UNEP. In the case of the Cooling Project, the ACES procurement initiative was being done in 2019 under a PCA (with the University of Rwanda) with the PM working directly with the Nairobi-based PrE and the local ACES (UNEP) team to monitor and assess procurement, specifically on behalf of UNEP with assistance form the University of Birmingham. The PrEs went to the ACES site in Rwanda to provide training on the technicalities of what was needed in the terms of reference. The Cooling Project management team did procurement the correct way, setting this modality of procurement as a model for other procurement within UNEP. USD4 million was allocated from Defra for equipment for ACES up to the end of 2022 all (with USD495,000 spent early on for cooling needs assessment which triggered the equipment purchases); there is a target of June 2024 to get all equipment in place. Without this clearance mechanism, UNEP may not have delivered for ACES or the Project[52].

187. Rating for adherence to UNEP's policies and procedures is ***Highly Satisfactory***.

[51] This involves consultants on UNOPS contracts. ST/AI/2013/4 on Consultants and Individual Contractors, 5.8 and 5.9 specifies that "no consultant shall provide services for more than 24 months in a 36-month period, whether continuous or not, and irrespective of the cumulative months of actual work" and "services of an individual contractor shall be limited to 6 or, in special circumstances, 9 work-months in any period of 12 consecutive months".

[52] Equipment procurement could have also been done by UNOPS for an 8% fee. The Project saved the 8% by doing procurement through UNEP, even if procurement is more complex through UNEP.

Completeness of Financial Information

188. The following financial information was made available to the Evaluation from UNEP:

- official UN reporting for Project expenditures by financial year by donor for 2017 to 2022 were reported against the 7 cost categories within UMOJA (staff salaries, travel etc). Donors were from KCEP, Defra, Danida, SIDA, Government of Norway;
- expenditures were linked to outputs and outcomes as reported in progress reports;
- donors were sent regular financial reports about how the funds were spent. The reports were created by the AO accompanied by a progress report from the PM;
- no co-financing was monitored. Co-financing was mainly in-kind and staff time which was not monitored;
- audit reports for all the years of implementation (2018-2022);
- budget revisions mainly from 2021. This included USD16 million of funding received from Defra in 2019-20 and 2021 with UNEP serving as the implementing agency mainly for ACES[53];
- all relevant Project legal agreements including PCA1, PCA2, amendments, and extension applications.

189. Overall, the completeness of financial information for the Project is rated *Highly Satisfactory*. The final disbursements of the Project are shown on Table 3.

Communication Between Finance and Project Management Staff

190. Communications between finance personnel, Project Management staff and donors can be characterized as follows:

- there is a close relationship between the FMO Administrative Officer and the donors. This includes bi-weekly calls between the AO and the donors. No problems experienced reporting back to the donor. Donors have verified that there has been good communication with the AO;
- communications between the PM and AO were excellent and augmented by a senior finance person who prepares finance reports on a regular basis. These reports would be sent to Project donors;
- the Project Management team often communicated with the FMO-AO with expenditure reports, audit reports, work plans, budget revisions and commitment from all the countries with requests for funds to execute the work plans for Outcome 3. This resulted in timely disbursements to the personnel and teams covering work on national policies and strategies;

191. The aforementioned provides the Evaluation with sufficient evidence of excellent communications between the Project Management team, the FMO and the donors. Overall, the communication between finance and Project management staff for the Project is rated *Highly Satisfactory*.

Rating for Financial Management: Highly Satisfactory

F. Efficiency

Timeliness

192. The Cooling Project with all of its cash infusions from donors was deemed very successful, forcing Project personnel to re-write the ProDoc to capture all of the Project activities, achievements, lessons and projections. In a good way, the Project extension could not have been avoided considering the avalanche of achievements through strong Project management. Timeliness is assessed to be relatively strong, considering:

[53] Other DEFRA work streams are HFC efficiency modelling, sustainable public procurement for SADC and EADC, and model regulations. An estimated 85% of DEFRA funding was towards ACES.

- the challenge to implementation posed by the COVID-19 pandemic, which began to affect Project activities about 2.25 years into the project's original four-year duration;
- the intrinsically high level of challenge in achieving Project aims, such as adoption and implementation of model regulations and their minimum efficiency performance standards on the original 4-year timescale of the project; and
- various political and capacity challenges in regional and country work.

193. Evidence shows that delivery of activities targeted at the time of Project launch in 2017 was timely, with the added year of Project duration (2022) used primarily to expand earlier activities to push progress or to enter new areas (such as Cool Coalition, an expansion of high-level advocacy, or ACES, Africa Center of Excellence for Sustainability of Cold Chain, a new initiative). Yet, in cases where targeted results are challenging, relevant achievements began to roll in long after the related activity was completed. The Project used a strong virtual meeting strategy to mitigate the impact of the COVID-19 pandemic on timeliness, which also reduced the UNEP environmental footprint associated with the Project. Some examples of timeliness of activities, the last two showing the time lag between activities and targeted results, are:
    - the main work for the Twinning (being two annual workshops across eight regions for NOOs and NEPs) was completed with the second round of annual workshops in February 2019, just about 1.25 years into the originally targeted 4-year duration of the Project;
    - the Caribbean work completed draft NCSs for all 5 involved countries in 2020, within about three years of project launch. Yet, due to challenges, such as the precipitous decline of the tourism industry due to the COVID-19 pandemic and the general nature of such work, the first official adoption of such a plan (Barbados) did not occur until about 11 months after the draft was submitted for review. Adoption of the 4 other NCSs is still pending;
    - Rwanda adopted its NCS supported by the Project in July 2019, just 20 months into the Project. In 2020 and 2021, the Government began communicating MEPS requirements to suppliers, achieving significant compliance. Yet, legally binding standards are in the pipeline with adoption expected in early 2024;
    - procurement of equipment for ACES in Rwanda experienced delays due to the challenge of procuring items uncommon in the region, as well as the processes of University of Rwanda, a partner in implementation. At the same time, the Project had been quite timely in reaching out to UNEP's procurement department well in advance regarding plans for handling procurement of equipment directly, rather than outsourcing to UNOPS as is more common. More details are provided in Para 186, 7th bullet.

Cost Efficiencies

194. Evidence shows financial delivery (expenditure of allocated funds, another aspect for assessing timeliness) is relatively strong, when one considers those funds that were expected at the time of Project launch as shown on Table 3. With USD28,658,431 secured during Project implementation, actual expended funds was only USD10,872,834, a large shortfall of USD17,785,597. This is believed in large part to represent Defra funding towards cold chain in Africa, which resulted from a concept newly developed during the course of the Project and meant to extend the Project well beyond its end date of November 2022. Considering donor sources in which funding was initiated around the start of the Project in early 2017 or 2018, it can be seen that the Project was quite timely in spending the funds with the vast majority of those funds spent in the first 4 years of the Project, mainly on KCEP-funded high-level support, twinning, Rwanda, and the Caribbean.

195. Evidence also shows that Project implementation leveraged cost efficiencies, via synergies with other initiatives and organizations, smart planning, and working in strategic areas where limited investment in the present can lead to outstanding long-term GHG emissions reductions. Examples include:
    - OzonAction staff's contribution to the Twinning workshops which was without cost to the Project, as staff time was covered by MLF funds. OzonAction has 46 staff across 5 locations. Many supported the twinning work via their ongoing liaison with NOOs in regional networks;

- the second series of twinning workshops which was held concurrently for all 8 regions and was in Paris, right after MP meetings. As such, the NOOs (one of at least two persons from each country involved) already had their transportation covered by the MLF. Furthermore, the various international trainers involved made just one trip to cover up to 8 workshops, moving from workshop to workshop to share their knowledge;
- instead of focusing only on developing NCAPs which can be relatively costly and requiring on-the-ground liaison, the Project also convened a number of key stakeholders (including other donor agencies) to develop guidelines and a template for NCAPs. Many are using the template guidelines in their own projects and promoting the development of NCAPs, thus multiplying the impact of the Cooling Project;
- the Project's work on model regulation guidelines (which include MEPS) for RACs and domestic refrigerators, represents a relatively low-cost investment in an area that, if leveraged well so as to result in widespread adoption of MEPS (or adoption in very large countries), can result in extremely extensive GHG emission reductions. The KCEP-funded sub-project of the UNEP Project that includes the model regulations guidelines work and a number of other initiatives, had realized expenditures of only USD1.042 million during the lifetime of the Project as seen on Table 4. The Project's model regulations work is assessed to have had a substantial impact on China adopting a higher level of MEPS for RACs in its initially circulated draft regulations. The model regulation guidelines leveraged resources from GEF and other projects as well as in-kind contribution of experts' time.
- while UNEP projects typically outsource procurement of substantial amounts of equipment to UNOPS, the Cooling Project decided to handle procurement of equipment directly. It thus saved on the fees that would have been charged for third party handling of procurement.

196. Overall, the efficiency of the Project is rated as *Highly Satisfactory*.

Rating for Efficiency: Highly Satisfactory

G. Monitoring and Reporting

Monitoring Design and Budgeting

197. The monitoring design of the Project was weak due to the indicators for the overall Project being weak. The indicators for the different outcomes overlapped significantly and were not clearly enough delineated in some cases to be sure of their meaning (see Table 6). While there was some revision of these indicators in the Project Revision, this was not sufficiently substantial to eliminate the problems. Furthermore, there was some inconsistency in the indicators in the Project Document listed in Section 7, the Monitoring Plan, and Section 3.2, the Project Logical Framework (PLF). While challenging, more could have been done to distinguish targeted results of the different outcomes. In retrospect, some targets were overly ambitious, and the Project may have instead more realistically reflected what could be achieved in 4 years, such as by aiming for intermediary achievements as compared to adopted policies. There may be a challenge that donors who require such overly ambitious targets would need to be informed about the importance of intermediary targets during a project's lifetime as indicators of very substantial impacts.

198. While the table in the Project Document that comprises the monitoring plan did list for each indicator baseline, target, data source, data collection method, frequency, and responsible party, the indicators were not fully consistent with those in the PLF. The template of this table had a column to list budgeted amount for the assessment of each indicator. This column was left blank. Furthermore, gender-specific indicators were not developed even though the Project Document mentioned that a gender sensitive and awareness end-user assessment was to be conducted. For this type of project and the type of indicators to be assessed, it may have been more useful to simply allocate some budget for an indicator assessment overall to ensure this work received adequate attention; however, no such budget was included in the Project Document. There was no explanatory text accompanying the Monitoring Plan's indicator table, but there was a separate Section 10 that discusses the plans for a terminal evaluation. The monitoring design and budgeting has been rated as *Moderately Unsatisfactory*.

Monitoring of Project Implementation

199. Monitoring of Project implementation at the sub-project level appears stronger than that at the level of the overall UNEP Cooling Project. Reports to donors assess indicators specific to the sub-projects. The only place that assessment of the overall Project indicators (as in the PLF of the Project Document) was found was in the PIMS progress report and in the Project Revision. Yet, assessment in PIMS did not offer explanation of how the assessment of indicators was made and was not fully complete. There is thus a need for a system that better tracks overall Project indicators.

200. UNEP has recently shifted from PIMS to Integrated Planning, Management, and Reporting or IPMR for project reporting, but the Evaluation Team lacked information as to whether IPMR will foster more comprehensive reporting on Project indicators. Furthermore, given the problems with indicator design as discussed in Para 197, monitoring of Project implementation should have included some reconstruction of indicators to ensure they were useful in keeping the Project on track, rather than simply a task to be fulfilled. As noted, the Project Revision did make some adjustments to the indicators, but not sufficient to address the problems identified. While monitoring of sub-projects is important, strong monitoring of the overall Project is needed to ensure the broader aims of the Project are being achieved and that measures can be taken to course correct if progress is not on track. Overall, the monitoring of Project implementation has been rated as *Moderately Unsatisfactory*.

Table 6: Outcome-Level Indicators: Overlap and insufficient delineation between outcomes/clarity issues[54]

Outcome 1	Outcome 2	Outcome 3	Comment
Number of **regional roadmap**s and/or **national cooling strategies** committed by governments (Baseline:0, Target:15)	Number of countries in which national ozone officers/energy officials have prepared **roadmaps** and/or **national cooling strategies** for adoption by the government (Baseline:0, Target:15).	Number of **regional policy roadmaps** that are endorsed / adopted by national governments. (Baseline:0, Target 1 with Secured Funding, Overall Target 3).	*Overlap*: Substantial overlap of the first indicator for Outcome 1 and 3 ("regional roadmaps committed by governments" and "regional policy roadmaps endorsed by national governments," respectively). Some overlap between second indicator of Outcome 1 and of Outcome 2 ("national cooling strategies committed by governments" and "national cooling strategies [prepared] for adoption by the governments.") *Delineation needed:* Perhaps the second outcome's "national cooling strategies" target is preparation of drafts for the "national cooling strategies" target of Outcome 1. In that case, however, it would be useful to differentiate the tasks of each outcome in pushing towards the same ultimate goal of adoption of such a strategy. *Note*: As noted by a reviewer of a draft version of this report, regional roadmaps are different from national roadmaps, with the latter tending to be more detailed.
Number of governments reporting **new legislation, policies or action plans** developed/adopted concerning ozone-depleting substances and energy efficient cooling. (Baseline:0, Target:15)	Number of countries in which NOOs and NEPs have prepared **guidance in developing action plans on** climate friendly and energy efficient cooling products **policies** for review by the government (Baseline:0, Target:15).	Number of **national policy strategies** that are endorsed/ adopted by national governments concerning ozone-depleting substances and energy efficient cooling. (Baseline:0, Target 6 with Secured Funding, Overall Target 30).	*Overlap*: Some overlap: Outcome 1 includes "action plans developed/ adopted" whereas Outcome 2 includes "guidance in developing action plans." Outcome 1 includes "policies" while Outcome 3 includes "policy strategies." *Delineation*: For Outcome 1/ Outcome 2 overlap: "Guidance in developing action plans" may be a step feeding into "action plans" but more delineation of the relevant tasks/division of labor between the two outcomes in advancing towards the same ultimate target is then needed. For Outcome 1/Outcome 3 overlap, while a policy can be different from a strategy, in some countries, policies are broad strategies. Further, it's not clear what "policy strategies" (Outcome 3) are as compared to "policies" (Outcome 1). Are the former strategies of how to develop policies? *Note:* As noted by a reviewer of a draft version of this report, "legislation" of Outcome 1 is setting the broad enabling environment,

[54] Based on Original Project Document

			whereas Outcome 2's "guidance in developing action plans" is more like steps of how to implement policies [though, as noted under "overlap," Outcome 1 also has "action plans"]. "National policy strategies" may refer to strategic planning and targets [though, as noted under "delineation," it would be helpful to know the difference between a "policy" as in Outcome 1 and a "policy strategy" as in Outcome 3.]
Number of references of UN Environment's new global scientific report findings in official communications and policy documents in emerging and developing economies. (Baseline:0, Target:10)	---	---	---

Project Reporting

201. The Evaluation Team had access to the consolidated PIMS report for the overall Project, covering all years and a number of annual reports to donors including:

- annual reports to KCEP on (i) Advocacy subproject, (ii) Caribbean subproject, (iii) Rwanda subproject, (iv) Twinning sub-project, and (v) Ecofridges (financing) subproject;
- report to Danida on India work; and
- similar reports that are assumed to exist for the other donors, Defra, ESCAP, Norway, and TABREED.

202. These reports were useful in understanding the work of the Project, though the PIMS reporting framework could be improved to ensure all indicators are assessed and a detailed explanation given for each of the indicator values is claimed. For projects that aggregate subprojects from multiple donors, this Project shows that there may be a tendency among UNEP staffers to emphasize reporting to the donor with overall reporting on the full Project neglected. At the same time, findings indicate that main donors Defra and CCC found sub-project reporting to be highly satisfactory in terms of timeliness and thoroughness. The Evaluation also had access to financial reports on the sub-projects of all donors. These were useful in understanding the annual spent and total spent on each sub-project. Yet, there was no consolidated financial report to give an overall view of annual spending on the Cooling Project and how it breaks down among different types of line items. Project reporting has been rated as *Moderately Satisfactory*.

Rating for Monitoring and Reporting:	**Moderately Unsatisfactory**

H. Sustainability

Socio-political Sustainability

203. The socio-political sustainability of the Project is primarily assessed across the 3 Outcomes of the Project:

- For Outcome 1, there is strong ownership by those that have joined the Cool Coalition to facilitate knowledge exchange, advocacy and joint actions towards a rapid global transition to efficient and climate-friendly cooling. The Coalition consists of 26 countries, 25 additional countries developing NCAPs that are to be reflected in their NDCs, 13 cities working on urban cooling, 35 private sector entities consisting of manufacturers and industry associations, 20 international and intergovernmental organizations, 38 CSOs, and 5 from academia. The wide range of key actors of the Coalition are connected through steering committees, the TAC and working groups with oversight from a 4-person Executive elected by Steering Committee members to work closely with the Secretariat. The Coalition's activities are mentioned in Paras 77-83. There is the perception that all members including senior government officials have embraced major sustainable cooling reports and toolkits, model regulations and tools for energy-efficient and climate-friendly products uptake. The socio-political sustainability of Outcome 1 is assessed as *Likely.*
- For Outcome 2, the introduction of NOOs to NEOs was reasonably successful involving 140+ countries. The crash courses in "EE 101", "MP 101", and policy instruments have led to the awareness of the need for NOOs at Environment ministries, to communicate and dialogue with NEPs at Energy ministries, and collaboration in some countries between NOOs and NEOs (such as Viet Nam, Laos, Cambodia, Thailand, Malaysia, India, Rwanda, Ghana, Senegal, Jamaica, Bahamas, Barbados, Chile and Brazil). In countries where there was good cooperation between NOOs and NEOs, there has been uptake in the product registration systems though not yet at the regional level. Uptake in country savings assessments was also good for all countries in estimating the impact of a minimum MEPS for ACs and refrigerators for their country. As such, the socio-political sustainability assessment for Outcome 2 is *Likely*.
- For Outcome 3, regional roadmaps for policy development and NCAPs had moderate success:

- ASEAN nations had regional draft roadmaps that were to serve as accelerants for roadmap country implementation for Singapore, Malaysia, the Philippines and Vietnam with other countries eventually following in the next 5 years (Para 108-109);
- A good regional result was achieved in most countries in EAC and SADC where MEPS for ACs and refrigerators was in progress or mandatory (Paras 114-119);
- Caribbean countries were one of the first sub-projects designed in 2019 with a regional cooling strategy, to build capacity on EE and refrigerants, design of a financial mechanism to pull EE equipment into their markets. However, much of the momentum of these efforts in the Caribbean were stalled with the tourism sector being down during the COVID pandemic (Para 120);
- ACES has thorough capacity building as a part of its sustainability strategy for regional agriculture and vaccines for the health sector[55];

- For Outcome 3, several countries embraced the development of NCAPs, adoption of MEPS, setting up financing schemes and conducting market surveillance of cooling products:
  - NCAPs were developed using the Cool Coalition template and methodology for several countries including Cambodia, Indonesia, Malaysia, Viet Nam, the Maldives, Rwanda, Türkiye, Egypt, Jordan, Indonesia, Dominican Republic, Jamaica, St. Lucia, Bahamas, Barbados and Grenada;
  - adoption of MEPS was done in China, Cambodia, Singapore, Malaysia, Ghana (for refrigerators only), Nigeria, the Caribbean countries, Brazil and Chile as well as several other countries who followed the lead of these countries;
  - financing schemes were setup in Rwanda, Senegal and Ghana, with other countries such as Benin and Kenya wanting lessons learned from these countries as well as Tunisia;
  - market surveillance was conducted with very little available data in Cambodia, Malaysia, Viet Nam, Rwanda, Dominican Republic, Jamaica, St. Lucia, Bahamas, Barbados and Grenada with other countries to follow the lead of these countries;
  - there are still a number of countries where Project products have not yet been adopted.

  As such, the socio-political sustainability of Outcome 3 is *Moderately Likely*.

204. In conclusion, considering overall results and that two of three outcomes are rated as 'Likely' and one rated as 'Moderately Likely', the overall socio-political sustainability of the Project is rated as '*Likely*'. This positive rating is based on strong stakeholder interest in the activities of the Cooling Coalition, the successful outcomes of the twinning workshops, and good participation in several countries with respect to national NCAPs, MEPS adoption, financial mechanisms and market surveillance. The *'Moderately Likely'* rating for Outcome 3 has much to do with countries that were not involved with these initial activities who could well be involved at a later date, probably in less than 5 years.

Financial Sustainability

205. Financial sustainability of the Cooling Project is assessed across the 3 Outcomes:

- For Outcome 1, financial support has continued for efforts of the Cool Coalition to continue raising the profile of cooling:

[55] Capacity is being built for the "system": protocols and performance, design of technologies for the Center and SPOKEs, demonstration and testing, integration of control systems, telemetrics and datalogging, technology assessments, and equipment landscaping database, "try before you buy" sales strategy, and training of trainers. "Blood spotting" is delivery of vaccines by drones in insulated bags, reducing the dependence on the use of refrigerated trucks. In an effort to stay ahead of the curve, this covers every aspect of capacity building to ensure all stakeholders will have the skills to operate and maintain cold chain equipment; if any piece of capacity building is pulled out, the "system" collapses and no benefits will be derived from cold chain.

- there was funding from the MLF for EE to produce reports prepared by the EE Task Force cross-referencing KCEP-funded tools and case studies, giving credibility at MP meetings for the MLF to invest in EE;
- there was USD20 million in pilot funding allocated in 2021 from the MLF for energy efficiency conversion projects, not on HFCs, to facilitate "country transition from this refrigerant to another refrigerant and also wanting to improve EE from this level to another level", addressing a need of funding for this purpose;

As such, the financial sustainability of Outcome 1 is *Likely*.

- For Outcome 2, there is ongoing continuation of twinning workshops for all countries with a portion of the USD975 million in funding from the MLF to continue improving technical capacities and awareness for all countries. As such, the financial sustainability for Outcome 2 is ranked as *Likely*;
- For Outcome 3, there has been future funding and funding in 2023 for several national and regional initiatives:
  - GEF and GCF readiness projects which should lead to larger GCF investments including the USD900 million World Bank GCF Facility for 9 countries as part of a GCF overarching project focusing on loans, NCAP methodologies and awareness raising on the needs of EE for cooling products ;
  - Further financing in India for USD400 million for Asia's largest district cooling system financing platform by Tabreed, and Swiss and World Bank funding scaled-up to USD7 million for a project related to passive cooling in buildings (not district cooling) in October 2023;
  - GCF proposal for USD105 million to do EE with industry in specific countries with USD100 million of soft loans to local banks and asset guarantees;
  - Korean Development Bank for USD100 million with industry in specific countries as a guarantee managed through ADB;
  - USD100 million for Indonesia pilot industrial project under which USD5 million in grants for green technical assessment and capacity building, and USD0.5 to 20 million for EE in SME industry;
  - ACES in Rwanda working with banks in 2023 to enhance their understanding in cold chain business models with the aim of getting financing for loans that can be easily paid back, and funding from the private sector and Vaccmap for demonstrating block chain technology to map items of vaccine distribution of cold chain and Vaccair using Zipline drones having some cooling capacity to distribute vaccines;

As such, the financial sustainability of Outcome 3 is ranked as *Likely*.

206. In conclusion, the financial sustainability of the Project is rated as *'Likely'* based on strong commitments to future funding from donors for the outcomes. There are still funding needs for certain activities which will likely be addressed by the current donors, new donors and the private sector.

Institutional Sustainability

207. The institutional sustainability of the Project is assessed across the three outcomes:

- For Outcome 1, the indicator for institutional sustainability is the number of countries ratifying the Kigali Amendment. With the work of the Cooling Coalition to bring cooling higher on the development agenda, first ratification of the Kigali Amendment grew from 1 country in 2017 to 5 countries in 2018 with additional ratifications up to 2022 of 155 countries with 78% ratification as of 2023. All countries had climate aspirations to phase-down HFCs (which do not have ozone impacts but have high GWP) by 2047, and to consider using more energy efficient equipment. The remaining issue for institutional sustainability is the capacity of governments to manage such a transition to cooling equipment that is EE and has environmentally friendly refrigerants, which is managed in Outcome 2. As such, the institutional sustainability for Outcome 1 is ranked as *Likely;*

- For Outcome 2, government institutions in all countries will sustain their capacity to manage such a transition to cooling equipment that is EE and has environmentally friendly refrigerants by maintaining their technical capacities and awareness from twinning workshops and enhanced collaboration for EE cooling. Improvements and updating the skills of government personnel in building design, contracting, cooling equipment installations, maintenance, and management of cooling equipment is ongoing with donor pledges for future financing from MLF amongst other donors. The websites established under the Project and government websites to share knowledge on these topics sustains the capacity building efforts for EE and climate-friendly cooling equipment. As such, the institutional sustainability for Outcome 2 is ranked as *Likely*;
- For Outcome 3, there are a handful of countries where government institutions have facilitated strong stakeholder participation and cooperation, and efforts to raise public awareness. These countries include Cambodia, Malaysia, Singapore, Thailand, India, Rwanda, Ghana, Brazil and Chile amongst others. Countries that have moderately strong stakeholder participation and cooperation, and efforts to raise public awareness include the Philippines, Viet Nam, Kenya, Senegal, Dominican Republic, Jamaica, Barbados, Bahamas, St. Lucia and Grenada. The remaining countries are engaged with activities that are expected to lead towards enhanced stakeholder participation and raised public awareness in the next 2 to 5 years, and mainly based on peer pressure from neighbouring countries that are managing the transition to cooling equipment that is EE and has environmentally friendly refrigerants. As such, the institutional sustainability for Outcome 3 is ranked as *Moderately Likely*.

208. In conclusion, considering overall results and that two of three outcomes are rated as 'Likely' and one rated as 'Moderately Likely', the overall institutional sustainability of the Project is rated as *Likely*. This positive rating is based on the high rate of ratification of the Kigali Amendment by more than 155 countries, government institutions in all countries sustaining their capacity to manage such a transition to cooling equipment that is EE and has environmentally friendly refrigerants, and several countries where government institutions have facilitated stakeholder participation and cooperation, and efforts to raise public awareness.

Rating for Sustainability: **Likely**

I. Factors Affecting Performance and Cross-Cutting Issues

Preparation and Readiness

209. The Cooling Project has been a series of smaller-funded projects by KCEP and Defra and others where funds from donors have been added. During the 2017-22 period of the Project, there was ample evidence of proper preparation and readiness of the Project:

- measures were taken to mobilize activities in the Project design in a timely manner and through the securing of funds for activities. Once the Cooling Project was approved in November 2017, there were initial efforts within 3 months to setup institutional arrangements such as the Steering Committee and TAC to support awareness of political leaders and their supporting teams of the importance of raising energy efficiency of and access to cooling and refrigeration sector as articulated in the Kigali Amendment;
- from April to October 2018, twinning workshops were conducted to build capacity of NOOs and NEPs from emerging economies to recognize the importance of linking refrigerant transition with energy efficiency in cooling as per the Kigali Amendment. These workshops were well organized with UNEP staffing, implementing partner participation and appropriate financing arrangements;
- by 2019, the successes of twinning activities were very significant in some countries (for example in Rwanda and Ghana) that funds from KCEP, Defra and other donors were provided in addition to the already secured funds for "unplanned" activities, mainly for Outcome 3 with regional and national policy programmes of Outcome 3 resulted in unforeseen successes. This resulted in increased participation of governments and private sector from developing and emerging economies on national initiatives to increase cooling efficiency and cooling

access. Many of these activities were not well defined in the original Cooling Project Document;

- this resulted in the Revision No. #1 in July 2021 (see Para 41) attempting to document the changes to the Cooling Project activities;
- the funds from KCEP, Defra and other donors for "unplanned" activities were expended with strong stakeholder engagement, and again with strong UNEP staffing and implementing partner participation.

As such, the Project preparation and readiness is rated as *Highly Satisfactory*.

Quality of Project Management and Supervision

210. The quality of Project management and supervision by UNEP has been consistently good, considering that all outcomes have been achieved with considerable success. This is quite a feat considering the complexity of the Project, with its many sub-projects, and covering multiple regions and countries and multiple products and angles, and involving multiple groups/ departments at UNEP:

- direct involvement in the content of the Project resulted in Project management and other supervisors being well-prepared to guide the strategic development of the Project. For example, the head of OzonAction and the Project Manager of the UNEP Cooling Project both travelled around the world to attend and provide training at all 6 of the regional twinning workshops in 2018 and attended and provided training at many of the workshops in Paris in 2019;
- the timeliness in rolling out activities, cost effectiveness (in leveraging other resources and implementing activities strategically), and the progress in building on initial results to develop further funded activities and sub-projects, as discussed above, all attest to the strength of management and supervision;
- findings suggest a highly motivated team that works well together and benefits from an environment in which they can thrive and leverage their technical expertise, also attesting to good quality of Project management and supervision. Furthermore, managers of subprojects exhibited strong knowledge of their subject matter, progress of initiatives, and stakeholders involved.

211. During the course of document review and consultation, a few issues for the consideration of supervisors and higher-level management arose:

- a key partner of UNEP's in developing state-of-the-art MEPS and model regulations is LBNL. Yet, since 2017, LBNL's and UNEP's legal offices cannot agree on a contract whereby one organization can sub-contract to another. Intellectual property rights (IPR) may be the stumbling block, though the items LBNL and UNEP work on together are all made publicly available. Thus far, the two organizations have found workarounds, such as both getting funding from the same donor to cooperate on the same initiative. Yet, this may create challenges in timing if the two grants have different timelines, and other donors may not necessarily be as supportive of such a workaround. Senior management at UNEP may wish to consider whether the value of the LBNL-UNEP collaboration would merit more concerted attention to working out a contract amenable to both sides;
- learning new systems, such as IPMR which is replacing PIMS, can place a lot of additional burden on project managers, particularly when changeover is required mid-project. Some additional support, such as simple documentation of the five or so steps needed to carry out 6 to 8 most common tasks may be helpful. There is feedback that increasing automation has raised the burden on project managers, whereby they pick up tasks previously handled by administrative staff such as having to log into UMOJA system for simple acknowledgement of reports, payments, and other routine matters. Thus, senior management or other responsible parties may wish to consider how to support them in simplifying their learning curve and generally simplifying or reducing burdensome requirements;
- there is a challenge that sub-projects can get delayed for external reasons, such that funds are all spent, but there is a need of UNEP staff to continue to support the countries, especially

small countries, to shepherd through legislation or plans. In a sense, the timeliness of fund mobilization has a downside. It may be useful to have a contingency set aside or other source of funding to support the person-hours involved in continuing to support countries to get policies and plans adopted, even after the most active times of sub-projects are over. Senior management may wish to consider how this very valuable function of UNEP staff to truly leverage project work into results may be better supported.

Overall, the quality of Project management and supervision was ***Highly Satisfactory*** considering the timeliness in rolling out activities, cost effectiveness in leveraging other resources and implementing activities strategically, and a highly motivated team that managed the Project who worked well together in an environment where they have apparently thrived and leveraged their technical expertise.

Stakeholders Participation and Cooperation

212. The best indicators for stakeholder participation lies in Outcome 2 with the participation of NOOs, NEOs and other officials and technical staff within the 140+ government ministries and agencies. The level of participation in the first and second phases of twinning workshops was remarkable. Previously, NOOs and NEOs were not working together, and in some countries, ministries have territorial tendencies while others were quite good. Good working relationships developed through the twinning workshops led to a number of regional and national initiatives described in Paras 107 to 172. While some country initiatives were quite strong (i.e. Rwanda, Ghana, India and Malaysia), others were mobilizing to the point where cooperation with more ambitious MEPS and standards was becoming inevitable.

213. Equally remarkable was the UNEP/U4E engagement of high-level actors to facilitate high-level advocacy and political communication campaigns to provide strategic leadership and a knowledge platform for cooling work done by UNEP and other stakeholders. The Cool Coalition was formed as a result:

- firstly, there were partner stakeholders who strengthened the scientific case for action including ASHRAE, CLASP, LBNL and IIEC;
- secondly, there were partner stakeholders who were engaged in political leadership including IEA, UNIDO, UNDP, the World Bank, GIZ, funders of the Cooling Project (such as the 18 foundations forming KCEP, Defra, Danida, SIDA, the Norwegian Government, TABREED), the Japanese Government, and internal UNEP stakeholders (such as OzonAction, the Ozone Secretariat, the MLF Secretariat, Climate and Clean Air Coalition (CCAC) under the Energy and Climate Branch);
- thirdly, there was engagement of the private sector partnerships including manufacturers such as Daiken, GREE, Mabe, DanFoss, Arcelik, private consultants and private companies specializing in cooling products;
- the end game of high-level advocacy is funding from donors as well as action and implementation of projects.

214. UNEP's comparative advantage is that UNEP runs OzonAction with a representative in each country, such that stakeholders are guaranteed that reports and work with U4E and UNEP will leverage to 147 Article 5 countries. This leads to a diversity of opinion with a good proportion of them valuing feedback provided by U4E partners and moving their standards to line up with the recommendations. With the partners UNEP/U4E has relationships with, their reach is exceptional. In particular, the UNEP and LBNL partnership is the most fruitful of the partnerships, providing the scientific basis for energy efficiency for all cooling products. Another example is the work with 10-20 manufacturers to get higher efficiency levels of equipment which is much easier than enforcing building codes all over the world. This could not have been done without the model regulations of U4E. This is the *unique aspect of the strategy stakeholder participation and cooperation*.

215. The IEA has been a powerful stakeholder, taking ownership of an "appliances category" that includes cooling products with over 250 people working on this topic. Regular liaising with IEA is getting the message of EE for ACs, refrigerators and other appliances disseminated. Prior to the Project, IEA lumped ACs and refrigerators into building or industry categories, not giving the higher

profile needed. The Project has significantly raised the profile of ACs and refrigerators with IEA's Energy Efficiency week having appliances in its own category.

216. The stakeholder partnership with CCAC has been beneficial to the Project with CCAC's focus on short-lived climate pollutants, black carbon and HFCs where they:

- collaborate with high-level participation with colleagues who work directly on the Project and contribute funding for some of the different projects implemented by Cool Coalition colleagues and U4E;
- pushed for the Kigali Amendment along with the USA and helped push EE after Kigali;
- assisted with funding for AC from KCEP;
- funded some country projects;
- would convene and ask countries to include EE in communiques and high-level meetings as a part of work with France in developing the Biarritz Pledge for Fast Action on Efficient Cooling (a city in France) where G7 or G8 countries pledged on EE under *CCAC* funding;
- provided advice on the development of the Cool Coalition with the cooling space eventually drawing its own high-level champions and ministers through work by U4E and Danish ministers through Cool Coalition. High level contacts for CCAC includes US Special Presidential Envoy for Climate, John Kerry, and the Canadian Minister of Environment;
- partnered with the World Bank; and
- worked with Cooling Project with African countries on anti-dumping of cooling appliances and destruction of ozone depleting refrigerants, issues that do not have much focus with the Cool Coalition. There has been a focus on African countries that have difficulty articulating their issue to the MP community in negotiations[56].

217. Overall, the quality of stakeholder participation and cooperation has been ***Highly Satisfactory*** considering the level of engagement of stakeholders who strengthened the scientific case for action, stakeholders who were engaged in political leadership, and finally, stakeholder engagement of the private sector.

Responsiveness to Human Rights and Gender Equality

218. There were specific UNEP requirements to respond to human rights and gender issues. Gender, however, was mentioned in the Project Document with:

- a gender score of 2a[57];
- gender equality a declared objective of both the Countries and the Donors with gender dimension integrated in the different activities under the Project;
- participation of women on the Project ensured from UNEP, the Donors and the Countries; and
- assured Project coherence with gender strategy with implementation support with proactive enabling measures including a social assessment with a gender analysis to identify the gender gaps in participation and decision making in energy and climate issues and gender gaps in energy access and women's and men's different needs on cooling energy.

219. The Project made efforts to mainstream gender through the constitution of the Project management team. The PMU at U4E constituted 3 males and 2 females and includes a dedicated gender focal point. Even though the Project could advocate for gender equality, it had no control over the gender composition of the National counterparts, most of whom were male.

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[56] CCAC and U4E had an inexpensive workshop for a decision to get policies in place for importing and exporting countries to prevent dumping of inefficient appliances with obsolete refrigerants. The Children's Investment Fund Foundation in the UK and one of biggest funders of KCEP, funded first two reports of CLASP and IGDS on dumping of appliances in Southeast Asia.

[57] This indicates that "gender is reflected in the context, implementation, logframe, ***AND*** the budget".

220. In the context of UNEP requirements, however, a large proportion of the Project was the production of technical guideline publications where there was no scope for gender. Moreover, measures were taken to ensure the writing in publications does not use gender neutral language. There are gender implications when countries start enacting supporting policies. For example, a financial incentive campaign must ensure women are able to participate. However, the Project was only able to facilitate the participation of women including having good gender representation at a particular workshop. Conversely, there is no point in having women coming to a meeting if they are not key personnel. Though the Project Document had a 25% target for women, the Project endeavoured to not exclude key stakeholders instead of focusing on gender. In certain countries, this would have included more women, while in other countries there would have been more men.

221. It is also common knowledge that a significant percentage of households in several regions are headed by women, and more importantly, they are the primary users of EE cooling technologies in the home who may have had specific concerns in how they embrace EE cooling technologies. However, this Project did not focus on implementing policies at the local level (where decision-making in energy and climate issues can be gender-biased), but had a focus on guidelines, twinning workshops, and regional and national strategies and roadmaps which did not have clear gender equality advancement opportunities except the participation of women and indigenous groups (wherever applicable) in the workshops. The Evaluators have some certainty that gender equality was advanced in workshop participation. As such, the rating for the Project's responsiveness to gender equality and human rights is *Moderately Satisfactory* on the basis of gender being partially mainstreamed based on current UNEP evaluation criteria.

Environmental and Social Safeguards

222. In terms of environmental and social safeguards, the Project Document raised two relevant risks, both of which were found to have received attention in Project implementation. The first is the risk of dealing with hazardous substances used as refrigerants. In Rwanda, ACES training plans call for special attention to this issue. It is not clear whether the issue was addressed in other countries, though some findings suggest that other programs under the MLF may provide such training. The second was the risk that higher up-front costs of efficient low-GWP cooling equipment caused economic hardship. The Project design pointed out that over the lifetime of the equipment, the user would save funds and the Project worked to reduce the hardship imposed by high up-front costs by various financing mechanisms. While the reach of the financial mechanisms in terms of persons and organizations benefiting is small compared to the potential number of persons and organizations that would eventually be affected by high up-front costs of more efficient cooling equipment, these represented a good start in addressing the challenge.

223. Other social and environmental risks not included in the risk log were those related to the poor, to gender and to the retiring of old equipment, and to minimizing the Project's environmental footprint:

- the ACES subproject, by focusing on access to cold chain in Africa, has the potential to improve the livelihoods of poor farmers. Its work with farmers would likely be done via liaison with farmers cooperatives. Thus, it would be important for ACES to work with those cooperatives that have good benefits and spread the benefits fairly among their members. Initial findings suggest that ACES is screening for such cooperatives and intends to continue to do so;
- the Project used a strong virtual meeting strategy to mitigate the impact of the COVID-19 pandemic on timeliness, which also reduced the UNEP environmental footprint.

224. As for gender, consultations suggested that the financing mechanisms to support purchase of high efficiency domestic refrigerators may be an important area to ensure that women were included. These programs deduct periodic payments from wages of government employees or included those payments on electricity bills. The Evaluators did not find any special gender approaches were being taken to support the involvement of women. As the financing mechanisms faced challenges just getting started and ramping up in the early days, gender approaches may be something to consider as they become more established. The Project also aimed to promote the recycling of out-of-date refrigerators, such as through its financing mechanism in Rwanda, for which it identified a recycler to which old refrigerators were to be taken. Findings suggest some challenges in this area, as the recycling increased costs to the distributer of the new refrigerator.

225. Based on the Project having been approved after consideration of its plans to address environmental and social risks, this Evaluation confirms that in most countries, UNEP requirements to monitor hazardous substances used as refrigerants and higher up-front costs of efficient low-GWP cooling equipment causing economic hardship, were *monitored* in a few countries (such as in Rwanda and Ghana) for safeguard issues. However, Project stakeholders were unable to *respond* to safeguard issues through risk avoidance, minimization, mitigation or offsetting. Environmental and social safeguards is rated as *Moderately Satisfactory*.

Country Ownership and Driven-ness

226. While the UNEP Cooling Project is a global initiative, substantial interest and ownership is evidenced at the country and regional level. There have been challenges in moving forwards from outputs to Project outcomes as the market transformation interventions require years to go from enabling policies to adoption to enforcement, so moving forward from Project outcomes towards intermediate states, in working with some regions and countries. Notwithstanding, evidence of ownership is found in most countries. Rwanda is considered a champion of the Project, taking very strong ownership, with early adoption of its NCS and requesting manufacturers and vendors to abide by the Project MEPS, despite not having MEPS before. Several countries, whether or not they have adopted the NCS, model regulations, MEPS, or other items supported by the Project, have included some content of the Project in their NDCs, and some with actions beyond NCSs. Examples include:

- Cambodia adopting a Project-supported NCAP and included elements from in their NDC;
- Nigeria with the Project's enabling effort of gathering data on ACs and initial recommendations for transitioning toward more sustainable models included in their NDC;
- Barbados with the Project-supported NCAP adopted and elements of this included in NDC;
- St. Lucia not yet adopting Project supported NCAP but elements of the NCAP included in NDC;
- Dominican Republic not yet adopting Project supported NCAP but elements of the NCAP included in NDC;
- India with its NCS and actions to move forward with green public procurement, district cooling and cold chain for food and vaccines;
- Chile with its NCS and movement towards MEPS for residential and commercial refrigeration;
- Ghana, Morocco and Egypt incorporating U4E training and guidance on sustainable public procurement;
- Ghana continuing to operate the EcoFridges financial mechanism and scaling it up via AGORA;
- Ghana serving as Chair of the U4E facilitated Cool Coalition working group championing the mitigation of used cooling appliance dumping into Africa, leading to workshops hosted by CCAC and formal actions pursued via the Montreal Protocol Meeting of the Parties

227. Country ownership is also evidenced (post-project) in that more than 66 countries, many of them developing nations, have signed the Global Cooling Pledge initiated by the Project's Cool Coalition:

- The Global Cooling Pledge was one of nine non-negotiated declarations, pledges, and charters that constitute key outcomes for the COP 28 Presidential Action Agenda;
- For the first time, countries committed to collective global targets to reduce cooling related emissions by 68% from today by 2050, to significantly increase access to sustainable cooling by 2030, to increase the global average efficiency of new air conditioners by 50%, to develop NCAPs, and to quicken pace of refrigerant phasedown;
- Combined with existing NCAPs, this means over 90 countries have or have committed to develop NCAPs and UNEP Cool Coalition has significantly helped raised this global commitment and is providing the methodology and partner coordination to help deliver it.

228. At the same time, findings indicate there may be a need to assess the factors that contribute to success on a country level and increase strategy focus on these elements in UNEP's country work. Country ownership may be strongest where a dedicated person or team are on the ground, which

was the case in Rwanda, with one strong local team member leading efforts before ACES work took off and more persons were hired. Yet, stakeholders point out that having an in-country team can be costly, and hence the benefit of regional efforts and working in regions with dedicated staff at regional centres. Pre-implementation scoping may also be important. In Egypt, a USD500,000 grant was spent mostly on a feasibility study for district cooling, but the plan was not taken up by building owners and relevant stakeholders and individual building cooling was used instead for the development targeted. Some suggest partnership with an organization that has a local office (such as UNDP or an NGO) is important. Yet, another issue as discussed under Project Management and Supervision was that the long-time horizon of results in some cases may require contingency funding so that UNEP staff can continue to follow up on "adoption" once the main funds for activities have been expended. Overall rating of country ownership and drivenness is *Satisfactory*.

Communication and Public Awareness

229. Communications and public awareness in the Project Document were to be undertaken as a global high-level leadership, education and communication campaign that would build the case for action on cooling technologies, leveraging political leadership and engaging the private sector. Communications for the Cooling Project has been done along the lines of a dedicated website for U4E projects (in close collaboration with the Cool Coalition) that includes the other projects such as lighting and motors. Cooling publications are posted including model regulations guidelines on refrigeration (household and commercial) and ACs. These platforms significantly heightened public awareness of cooling technologies and initiatives conducted by the Cooling Project to senior government officials and implementing partners.

230. Much of the challenge for communications was the difficulty at the national level where there was "hand holding" of governments with targeted stakeholders, not the general public, to show the process. Communication work at national and regional levels was not with U4E but with EE personnel working in partnership with U4E on Twinning Workshops. However, the U4E website covers Cooling Project topics as well as many other individual projects. As such, it was difficult for the evaluators to attribute initiatives, efforts or activities to the Cooling Project or other individual projects. For example, the Ghana Eco-fridges project had several grantees including U4E under the Cooling Project, who led activities that included financing, market assessments, MEPS formulation, decisions on what technical level to set the MEPS, roll out of the scheme, management enforcement, capacity building, study tours, testing laboratories, and verification.

231. The Cooling Project communications under the U4E website, however, are a general success. U4E lighting projects have been successful considering the early start of lighting projects in 2010. Chile had an excellent UNEP lighting project with an excellent communications website. The experience of the Chile lighting project was applied to its refrigeration project (which is similar in regulatory reform to government-backed financial support, and an active refrigeration re-cycling program), also with an excellent communications website. The Ghana Eco-Fridges project has a website with promotional campaigns, mandatory MEPS and financing mechanisms in place, to a point where there can be successes.

232. Communications and public awareness on the Project were *Highly Satisfactory* due to the U4E and other websites allowing learning and sharing of Project experiences between Project partners and interested stakeholder groups. During Project implementation, the U4E website received visits from over 53,000 users with nearly 230,500 associated page views. The Model Regulation Guidelines for refrigerator appliances and ACs being amongst the top 10 landing pages. There are resources and continual efforts to update the U4E website and social media with current news and events on cooling initiatives and other electrical appliances. During implementation, 59 articles on cooling related projects and achievements were added to the U4E website. The U4E Twitter (X) account was established in July 2020 and currently has approximately 1,350 followers. Between its inception and the end of the implementation period in November 2022, the account received just over 190,000 impressions, with tweets focused on cooling products consistently receiving good user attention. Cool Coalition's communications work under the Project was also very strong with the website having strong reach. Additionally, its LinkedIn page has over 4,000 followers and its Twitter account 1,600. Furthermore, Project stakeholder meetings have been featured in national TV and newspapers in Nigeria, Ghana, Senegal, Vietnam, Cambodia, Rwanda. Finally, a well-known US magazine, the New Yorker, had a feature article in 2022 on the Project's

Rwanda Cold Chain work. In countries that have been contacted by the Evaluators, the websites enhanced public awareness during Project implementation to influence attitudes amongst wider communities and civil society at large. The Evaluators can assume that existing communication channels and networks were used effectively.

Rating for Factors Affecting Performance and Cross-Cutting Issues: Highly Satisfactory

VI. CONCLUSIONS AND RECOMMENDATIONS

A. Conclusions

233. From November 2017 to November 2022, the Cooling Project has performed very well with good timing and high levels of success, raising awareness and understanding of policymakers and other relevant stakeholders on what was needed to advance the cooling solutions, a sector that was not given due consideration prior to 2017. The Project promoted prioritization of cooling system problems and identified research gaps and appropriate approaches to these gaps, encouraging collaboration with academia and manufacturers of cooling equipment, and countries to implement their own NCAPs. The Cooling Project contributed strongly to the development of a separate "appliance category" by IEA (as opposed to the traditional treatment of lumping appliances in with building energy), which in turn resulted in a whole day dedicated to appliances at COP 28. Funding with multilateral (such as GEF and GCF) and bilateral institutions was then leveraged for new solutions addressing appliances specifically. The numerous successes of the Cooling Project include:

- Success #1: The Project synergized with the GEF Leapfrogging project to get appliances in its own EE category with various agencies (such as IEA and CLASP). Appliances that account for 40% of global energy-based GHG emissions and include cooling products (Paras 67, 68 and 215);
- Success #2: The bringing together of over 100 organizations to form the Cool Coalition and the establishment of the Coalition's working groups, raising the profile of cooling as a key sector via which to pursue EE and CCM results. Post-project impact includes the COP 28 President recognizing the Cool Coalition's Cooling Pledge and 66 or more countries (as well as many non-state actors) signing on to the Pledge (Para 79);
- Success #3: More model regulations from the Cooling Project (beyond initially targeted work for RACs and domestic refrigerators), including for commercial refrigerators, RACs[58], ceiling fans, passive cooling, and cold chain refrigeration to reduce food waste (Paras 91, 93, 121);
- Success #4: Capacity building integrating EE with Montreal Protocol for NOOs from ministries of environment and NEPs from ministries of energy through twinning workshops in 2018 and 2019, breaking down silos of EE and MP information between NOOs and NEOs. The fact that the MLF has now allocated some funding for continued twinning attests to the value seen by the parties to the MP of the twinning work (Paras 95-99);
- Success #5: MLF allocating pilot funds of USD20 million (aside from the much smaller funds allocated for twinning) for EE, an amount likely to be expanded under the recent, new MLF allocation of almost USD1.0 billion. Cooling Project work and results are believed to have influenced this decision by participation of Cooling Project staff in the EE Task Force of the MP's Technical and Economic Assessment Panel. The Task Force provides reports on requested topics to the MP (Paras 182-7th bullet and 205);
- Success #6: The Project's NCAP guidelines and template led to the development of a number of NCAPs facilitated by other organizations. It is estimated that there are around 20 NCAPs now. Most of these are either based on the Project's template (and many funded by other donors, such as Kenya's and Grenada's NCAPS) or, prior to template preparation, supported by the Project (Para 123);
- Success #7: Impact of CSAs for ACs, commercial refrigeration, and domestic refrigeration for 156 countries on developed countries. This has brought attention to EE for these appliances in G-7 and G-20 countries for updating MEPS and quantifying savings in Europe and the United States, pushing these appliances onto the mainstream through IEA and UNEP messaging (Para 103);

[58] The Cooling Project in-part contributed the AC model regulations and was included as co-financing under the GEF project.

- Success #8: Wide influence of cooling related model regulations via other donor projects, probably representing hundreds of millions of US dollars in investment. Previously, these donors may have had to begin projects with market assessments to benchmark standards based on products already available on the market. They currently can leverage the Cooling Project's model regulations, which go beyond benchmarking and consider potential EE improvements based on detailed findings from research organizations and industry. The World Bank, for example, instead of doing assessments has been known to leverage the Cooling Project's model regulations and CSAs and thus be able to go straight to the developing of financing mechanisms. GIZ, UNDP, and the NGO CLASP are all active in EE for the cooling sector and are known to leverage the Cooling Project's model regulations in many of their projects;
- Success #9: Achievement of regional cooling roadmaps for ASEAN and for Southern Africa, respectively, which delineate target MEPS and are officially endorsed by member countries making it much more likely that they will adopt ambitious national MEPS on a much faster timeline than in the business-as-usual scenario (Paras 107-122);
- Success #10: Regional harmonization, which brought together regions in Africa and Asia and where donor funding and time do not allow for work on a individual country basis. Model regulations are needed at the global level, regional harmonization is needed to bring groups of economies together. Benefits of regional harmonization include:
    - increases the availability of energy-efficient products in the region;
    - fosters economic development as importers and manufacturers just have to comply to one set of regulations;
    - laboratories can be used by multiple countries;
    - less dumping of inefficient appliances and many more
- Success #11: Green Procurement in India where a comparison of specifications from the Indian Government for ACs in 2019 to U4E model regulations led to the Indian Government accepting improved ACs for public procurement with these specifications set to become mandatory from 1 January 2023 (Para 141);
- Success #12: Impact on cooling equipment manufacturers starting in 2019 with main manufacturers making investments in new production lines to address EE based on their raised awareness of MEPS (Para 179);
- Success #13: The Cooling Project's influence on China, which produces 70 to 80% of world's RACs, leading to China targeting substantially higher MEPS for RACs in its 2019 MEPS issuance than was included in the draft regulations it circulated for comment. This was achieved via Project response in a follow-up to China's draft regulations and, earlier, via involvement of Chinese standard setting organization on the team developing Project's model regulations (Paras 126-129);
- Success #14: Development of highly attractive strategy (per stakeholder feedback and Evaluation team's own assessment), mobilizing both significant donor financing and country interest, for a critical and intractable problem of sustainable cold chain deployment in developing countries, particularly Africa. The UK Government has provided over USD25.0 million to build upon initial Cooling Project work on Africa Center for Excellence in Sustainable Cooling (ACES), with hub in Rwanda and SPOKES in other areas of Rwanda and in Kenya, Senegal, and, potentially, Lesotho. Canadian Government is providing funding via UNDP for the SPOKE in Senegal. The Rwandan Government has shown its strong enthusiasm by allocating 4.58 ha of land near the Kigali Airport for the ACES Campus, along with another adjacent 200 ha for a smart farm to be integrated with the cooling centre's efforts (Box 1);
- Success #15: Project's influence in 45 countries included climate-friendly cooling in their enhanced 2020 NDCs.

234. There are many other examples. However, there is a need to ramp up market transformation of cooling products to meet net zero targets by 2050 and achieve 67% of the cooling targets by 2030. The Cooling Pledge by the Cool Coalition, while a good achievement, does not go far enough in a

compressed period of time to 2030. Over half of the countries still do not have MEPS with low efficiency levels for ACs which needs to be addressed. There is still a lot of resistance from the chemical industry such as Honeywell, who make USD10 billion per year in fluorinated gases (or f-gases). Efforts are underway to address this with model regulations, and to ensure their customers are provided with quality service. Green public procurement is still a big opportunity.

235. Considering the above successes and other findings as articulated in this report, key Project strengths include: (1) strong advocacy work that made notable contributions in getting cooling to be recognized as a key sector for energy efficiency and GHG emissions reduction work; (2) development and promotion of key, high quality documents (e.g. model regulations) related to cooling efficiency that are picked up by multiple regions, countries, and donors, thus leading to widespread impact; (3) bringing together those responsible for ozone (NOOs) with those responsible for energy efficiency at national level, thus creating recognition of potential synergies of the two areas via Montreal Protocol work; and (4) taking a systems approach to promote sustainable cold chains in countries where previous, isolated efforts have failed.

236. Weaknesses of the Project include: (1) lack of a strong identity of the Project as a whole within and without UNEP, with sub-projects instead being the focus; (2) relatedly, lack of a strong indicator system for the Project as a whole and, relatedly, lack of attention to track and course correct the progress of the Project as a whole; and (3) lack of planned activities, resources, and on the ground support on the timescale needed, so as to follow up on initial activities and see key documents through to adoption and implementation in certain of the countries in which work was done. This follow-up work may require much less in resources than the initial work, but still requires some inputs to fully leverage earlier work done.

237. The ToR for the Terminal Evaluation assignment includes 5 strategic questions where various aspects of these questions are addressed in prior sections of the report. Full responses to each question are consolidated below:

- *To what extent were synergies created in the training and use of tools between the national and regional levels to achieve full cooling product market transformation?* The Project successfully adopted a cost-effective strategy of leveraging regional work to achieve national results. This strategy was most effective in regions where countries take regional agreements seriously, so that such agreements are followed by national actions. This is the case in ASEAN. Thus, the ASEAN EE RAC roadmap work, supported in part by the Project, influenced member nations to increase their targets. Other regional work of the Cooling Project that is influencing national action is regional MEPs work in the southern Africa and eastern Africa regions. Sources indicate the southern Africa work to have been the more influential due to stronger regional coordination capacity. While the Caribbean work initially envisioned a regional cooperation document, in the end, the countries made it known they preferred individual country action plans. Yet, synergy was still achieved in that the Caribbean work leveraged a single regional template for individual NCAPs;

- *What worked and what did not work in terms of procurement?* The Cooling Project engaged organizations with expertise in EE to prepare critical documents of good quality. Due to their quality, these documents, particularly the model regulations, are already being leveraged and are expected to be adopted and have wide impact around the world. For the substantial equipment required by ACES, to increase cost effectiveness, the Project did not outsource procurement, but instead started quite early by liaising with UNEP procurement on the necessary processes. As such, the Project is considered a positive model for other projects to look to in the future. At the same time, one important challenge in procurement was identified: with a key partner, LBNL, UNEP was unable to realize a contract due to legal offices of the two agencies not agreeing on content. The two organizations still benefited from cooperation (generating the aforementioned model regulations which are set to have wide impact), but they did so by each obtaining separate grants. Yet, finding a direct way to cooperate is desirable and needed to leverage the complementarity of the two organizations. Having separate grants presents challenges in terms of timing (the two different grants may have different timelines) and requires that the donor agree to this workaround to the problem of the organizations not being able to sub-contract to one another;

- *How were linkages made with other UNEP initiatives and opportunities for engagement with UNCT and UNSDCF in the project countries?* The UNEP Cooling Project built on successes of

the UNEP Leapfrogging Project and then, subsequently, stimulated a number of country-specific UNEP projects dedicated to cooling efforts. These subsequent efforts include projects funded by the GEF and the GCF. The "offspring" projects are seen to leverage the work of the Cooling Project in a substantial and strategic way. In terms of UN Country Teams (UNCTs), the Project extensively leveraged the newly established India UNEP office in the Project's India work. It also leveraged cooperation with UNDP country offices in some follow-on work to the Cooling Project, such as cooling financial mechanism work in African nations. Furthermore, the Project broadly adheres to the guidelines of UNSDCF;

- *To what extent has the Public-Private sector partnership collaboration been effective?* Findings indicate that the private sector was invited to be involved in review of model regulations in some countries and in the implementation of financial mechanisms in Africa, and in ACES (such as through demonstration of equipment). Yet, stronger private sector involvement is desirable. Project design might have included private-sector related targets to ensure that private sector engagement was prioritized. Future work might put a stronger focus on private sector engagement early on to ensure that, as the private sector is upgrading production lines, it considers future trends in MEPS.
- *What changes were made to adapt to the effects of COVID-19 and how might any changes have affected the project's performance?* The Project adopted virtual meeting strategies during the height of the pandemic. Challenges of meeting in person, along with economic challenges, such as shutdown of the tourism industry in the Caribbean, had a negative effect on Project momentum and results. Findings suggest, however, that the Project did the best it could, given the circumstances, and that the project continued with significant progress despite pandemic restrictions in its third and fourth years. Due to the Project moving quickly in its first two years, it already had a firm foundation to continue work in virtual format during the height of the pandemic.

238. The Project put some attention on the gender by tracking attendance by gender at its many twinning workshops. The findings indicate that ACES is seeking to work with those cooperatives that have good governance, especially those that treat their smallholder farmer members fairly. Overall, this TE did not identify strong attention to human rights and the gender dimension, though otherwise did not find major problems in these areas. The gender tracking at meetings showed significant representation by women and this was also seen in terms of UNEP staff involved in the project and at the regional workshop attended by the Evaluation team. The very technical nature of some of the Project's work may have precluded a strong gender and human rights dimension, but downstream work, such as NCAPs and their implementation may incorporate these.

B. Summary of project findings and ratings

239. Table 7 provides a summary of the ratings and finding discussed in Chapter V.

Rating for Overall Project Performance: Highly Satisfactory

Table 7. Summary of the Project findings and ratings

Criterion	Summary assessment	Rating
Strategic Relevance		**HS**
1. Alignment to UNEP MTS, POW and Strategic Priorities	Strong alignment with MTS, BSP and SSC (see Paras 55-60)	HS
2. Alignment to UNEP Donor/Partner strategic priorities	Strong Project alignment with donor priorities including KCEP, Defra and Danida funding (Paras 61-63)	HS

Criterion	Summary assessment	Rating
3. Relevance to global, regional, sub-regional and national environmental priorities	Relevance to SDG7, SDG 13, Climate Change Mitigation, specifically appliance energy efficiency related to the Kigali Amendment, the Work of OzonAction on the phase out of HCFCs and the phase down of HFC's under the Montreal Protocol, and most countries with priorities of achieving their goals pledged to the Paris Climate Agreement (Para 64)	HS
4. Complementarity with existing interventions/ Coherence	A number of complementary projects have been and are being funded for EE cooling technologies globally and regionally (Para 65).	HS
Quality of Project Design	Project design strength is in its holistic approach to achieving the Project objective (Paras 67-71). Project design weakness was a hastily assembled PLF with a "non-specific" intended objective in addition to poorly worded Project outcomes and outputs; overlap of indicators for different outcomes; and the indicators are not as clear and suitable as they might have been for a project of 4-5 years duration. This led to the measurement of outcome and output achievements with poorly worded indicators and targets (Paras 72-73).	**S**
Nature of External Context	Project operations in some countries was affected by hurricanes in the Caribbean, elections in all countries causing delays in the delivery of the outputs, coups with military governments, the COVID-19 pandemic, and a drop in oil prices between 2015 and 2018 (Para 74).	**MU**
Effectiveness		**HS**
1. Availability of outputs	Availability of outputs from Outcome 1 is *Highly Satisfactory* considering the availability of ample communications campaigns, multi-stakeholder collaboration platforms and supporting material for senior government officials and implementing partners, availability of a global scientific assessment on climate friendly and energy efficient cooling, and the availability of numerous sustainable cooling reports, model regulations and tools designed to inform and guide senior officials towards the uptake of energy-efficient and climate-friendly products (Paras 75 to 94) Availability of outputs from Outcome 2 is *Highly Satisfactory* considering the availability of twinning workshops to train NEPs and NOOs on climate friendly and energy efficient cooling that was organized to foster collaboration, product registration systems and templates for gathering data on cooling products sold in a country as country and regional savings assessments (Paras 95-106). Availability of outputs from Outcome 3 is *Satisfactory* considering the availability of regional policy roadmaps and programmes available in ASEAN, SADC, and EADC, the regional template adopted by Caribbean countries in their draft regional roadmaps (Paras 107-122), national policy strategies and programmes such as NCAPs based on the Cool Coalition template and methodology for more than 20 countries (Paras 123-172), financial mechanisms attempted in 9 countries (Paras 148-159), two centres of excellence designed and implemented (Paras 161-172), and urban cooling plans for 2 cities in Viet Nam (Para 173).	S

Criterion	Summary assessment	Rating
2. Achievement of project outcomes	Overall, drivers to support the transition from outputs to direct outcomes are only "partially in place". This has led to all outcomes being achieved including: • the Cool Coalition has managed to strongly influence governments and industry and raise political momentum to advocate for and take comprehensive action on cooling. This was done with U4E guidelines for ACs and refrigerators was used extensively by the multilateral and bilateral agencies and other NGOs for preliminary market assessments and financial mechanisms, implying that there are a lot of political leaders of governments using these guidelines for their projects with the assistance of donor organizations or NGOs (Para 177); • the pairing of NOOs and NEPs at twinning workshops has strengthened collaboration in efforts to support design and implementation of policies to improve cooling product performance, in effect doubling the impact of the Kigali Amendment (Para 178); and • twinning workshop efforts have catalysed interest in many countries to the creation of roadmaps from regional harmonization. This has spurred green public procurement in several countries, policymakers using CSAs to prepare their NDCs for their minimum MEPS, forced many cooling equipment manufacturers to invest in new production lines starting in 2019 to address EE based on their raised awareness of MEPS, and numerous activities in Rwanda (including training of trainers in cold chain, replication of the ACES SPOKE model to other countries) (Para 179).	HS
3. Likelihood of impact	The likelihood of impact is rated as *Moderately Likely* mainly due to the UNEP-led Cool Coalition with the United Arab Emirates' incoming presidency of COP 28 announcing the development of a Global Cooling Pledge and a "Cool COP Menu of Actions" that was featured prominently at COP 28. This should leverage more financing for cooling market transformation. In addition, the high-level political and industry commitments are only partially in place with most governments and industry requiring 3 to 5 years for respective changes to current market conditions and production lines to eco-efficient cooling solutions. Furthermore, the Project stimulated a large amount of follow-on work, such as World Bank, GIZ, and UNDP projects, leveraging the Cooling Project's Model Regulations and other donor projects that leveraged NCAP guidelines and templates prepared by the Project. It is also clear that the Project influenced China, responsible for 70 to 80% or the world's RAC production, to target higher RAC MEPS for domestic product than it had targeted in the first version of regulations shared with the public for comment. Lastly, the Cool Coalition post-project, has achieved a high level of attention to cooling and has gotten 66 or more countries to sign its Global Cooling Pledge. Notwithstanding, the driver of "high-level political and industry commitments" is only partially in place with most governments and industry requiring 3 to 5 years for respective changes to current market conditions and production lines to eco-efficient	ML

Criterion	Summary assessment	Rating
	cooling solutions and re-cycling programmes. (Paras 182-185).	
Financial Management		**HS**
1. Adherence to UNEP's financial policies and procedures	The close relationship between the FMO and the donors augments UNEP fiscal policies and procedures. This includes procurement procedures which were followed during the Project with an early start pursued for direct procurement by UNEP for ACES equipment. Proper financial reporting carried out (Paras 186-187).	HS
2. Completeness of project financial information	All expenditure reports available (Para 188).	HS
3. Communication between finance and project management staff	There was excellent communication between finance and PM staff (Paras 190-191).	HS
Efficiency	Delivery of activities at the time of Project launch in 2017 was timely, with the added year of Project duration (2022) used primarily to expand earlier activities to push progress or to enter new areas (Para 193). Evidence shows expenditure of allocated funds was relatively strong, and that Project implementation leveraged cost efficiencies, via synergies with other initiatives and organizations, smart planning, and working in strategic areas where limited investment in the present can lead to outstanding long-term GHG emissions reductions. An example of this was the Project finding ways to economize fund expenditures, such as holding twinning workshops in 2019 right after MP meeting of parties in Paris (Paras 194-195).	**HS**
Monitoring and Reporting		**MU**
1. Monitoring design and budgeting	Monitoring design is weak due to the indicators for the overall Project being weak. The indicators for the different outcomes largely overlap, were not clearly delineated in some cases to be sure of their meaning, and in some cases may have been too ambitious, considering the duration of the Project (Para 197-199).	MU
2. Monitoring of project implementation	While monitoring of sub-project was adequate, monitoring of overall project indicators was not adequate. In a few places, results of indicator assessment are shown, but nowhere was it found that the levels assessment are explained. While monitoring of sub-projects is important, strong monitoring of the overall Project is needed to ensure the broader aims of the Project are being achieved and that measures can be taken to course correct if progress is not on track. (Para 200-200).	MU
3. Project reporting	Sub-project reports were useful in understanding the work of the Project, though the PIMS reporting framework (which is the main progress reporting system covering the project as a whole) may in the future be improved by UNEP to ensure all indicators of Projects are assessed and a detailed explanation is provided for each of the indicator values. For projects that aggregate subprojects from multiple donors, there may be a tendency among UNEP staffers to emphasize	MS

Criterion	Summary assessment	Rating
	reporting to the donor with overall reporting on the full Project neglected (Paras 201-202).	
Sustainability		**L**
1. Socio-political sustainability	Socio-political sustainability is rated as *Likely* based on strong stakeholder interest in the activities of the Cooling Coalition, the successful outcomes of the twinning workshops, and good participation in several countries with respect to national NCAPs, MEPS adoption, financial mechanisms and market surveillance. The contribution of the Cooling Project, along with other efforts, to bringing cooling to the table as its own sector is also recognized Yet, there are still a number of countries where Project products have not yet been adopted (Para 203).	L
2. Financial sustainability	Financial sustainability is rated as *Likely* based on strong commitments to future funding from donors for the outcomes. There are still funding needs for certain activities which will likely be addressed by the current donors, new donors and the private sector (Para 205).	L
3. Institutional sustainability	Institutional sustainability is rated as *Likely* based on the high rate of ratification of the Kigali Amendment by more than 155 countries, government institutions in all countries sustaining their capacity to manage such a transition to EE cooling equipment and environmentally friendly refrigerants. here are several countries where government institutions have facilitated strong stakeholder participation and cooperation, and efforts to raise public awareness, though results in many more countries are needed (Paras 207-208).	L
Factors Affecting Performance		**HS**
1. Preparation and readiness	Cooling Project has been a series of smaller-funded projects by KCEP and Defra and others where donor funds were promptly made available and initial activities were rolled out in a timely fashion. During implementation, there was ample evidence of proper preparation and readiness of the Project (Para 209).	HS
2. Quality of project management and supervision	Project management and supervision was *Highly Satisfactory* considering the timeliness in rolling out activities, cost effectiveness in leveraging other resources and implementing activities strategically, and a highly motivated team that managed the Project who worked well together in an environment where they have thrived and leveraged their technical expertise (Para 210-211).	HS
3. Stakeholders' participation and cooperation	Quality of stakeholder participation and cooperation has been *Highly Satisfactory* considering the level of engagement of stakeholders who strengthened the scientific case for action, stakeholders who were engaged in political leadership, and finally, stakeholder engagement of the private sector (Paras 212-217).	HS
4. Responsiveness to human rights and gender equality	The Project made efforts to mainstream gender through the constitution of the Project management team. However, a large proportion of the Project was the production of technical guideline publications where there was no scope for gender. Indigenous issues were not addressed (Paras 218-221).	MS

Criterion	Summary assessment	Rating
5. Environmental and social safeguards	In most countries, UNEP requirements to monitor hazardous substances used as refrigerants and higher up-front costs of efficient low-GWP cooling equipment causing economic hardship, were monitored in a few countries (such as in Rwanda and Ghana) for safeguard issues. However, Project stakeholders were unable to respond to safeguard issues through risk avoidance, minimization, mitigation or offsetting (Paras 222-225).	MS
6. Country ownership and driven-ness	Country ownership is evidenced during the post-project period in 63 countries, many of them developing nations, who have signed the Global Cooling Pledge initiated by the Project's Cool Coalition and in over 40 countries developing NCAPs as of the writing of this report. However, in general, country drivenness varies. An estimated 45 countries as of the writing of this report have incorporated aspects of their draft or adopted NCAPs into their NDCs. Some individual countries that the Project did work in, such as Rwanda, were very proactive and driven. Country ownership may be strongest where a dedicated person or team are on the ground, which was the case in Rwanda. However, having an in-country team can be costly, and contingency funding may be required to achieve long-time horizon of results permitting UNEP staff to continue to follow up on "adoption" once the main funds for activities have been expended (Paras 226-228). An exception to be considered may be Ghana, where the Project partnered with the government (without a dedicated project paid staff member on the ground). The financial mechanism developed there continues to be operated by the government and they continue delivering training on sustainable procurement based on the tools developed.	S
7. Communication and public awareness	Communications and public awareness were *Highly Satisfactory* due to the U4E website and associated websites to allow learning and sharing of experiences between project partners and interested stakeholder groups arising from the Project. These websites and existing communication channels and networks were effectively used to enhance public awareness during Project implementation to influence attitudes amongst wider communities and civil society at large (Paras 229-232).	HS
Overall Project Performance Rating		**HS**

C. Lessons Learned

240.

Lesson Learned #1:	Adopt Cooling Project best practices in awareness, advocacy and capacity building to: • include the right parties in capacity building and outreach: ○ capacity building for any of the cooling technologies should include both investors and technical persons, who can deliver energy efficiency in cooling technologies. This would include increased awareness of business opportunities, and a lot of advocacy in efforts

	to influence a change of mindset for investors and local financial institutions; ○ academic people should be involved in capacity building for the design of new technological systems to address cold chain problems in Africa; ○ private developers are the primary stakeholders in the development of district cooling in smaller markets; • leverage project developed model regulations and templates for plans for wide adoption and impact: The best outcome for this Project, providing a model for future projects, has been to raise awareness of cooling products and their MEPS, and get governments to adopt Actions Plans and Road Maps that bring whole communities together to facilitate agreements to new standards, despite the 3-to-7-year timeframe; • leverage early adopter countries for regulatory demonstration by showcasing the results in these countries for advocacy and to encourage other countries to follow suit; • Select a single focal institute in a country to lead in the development and promotion in the use of tools. In countries with a large market, it is important to have one focal institute where capacity and tools and methodology are pushed.
Context/comment:	*Regarding involvement of investors and technical persons*: ACES in Rwanda is being approached with a strong view to involve all stakeholders from those who can operate and maintain cold chain technologies to financial institutions and investors. In working with investors and local financial institutions, they are being made more aware of business opportunities in cold chain along with efforts to change investment mindsets. UNEP involvement with financial institutions and institutional investors informs them the areas where they can provide investment. UNEP has been disseminating what ACES is doing to other financial stakeholders globally. *Regarding involvement of academics:* In 2022, trips were made to Washington DC, United States to meet with MCC and IFC officials, and to London where high-level strategic meetings were conducted between Rwandan officials and academia and London South University officials who specialize in refrigeration. The importance of this type of capacity building for academic people cannot be understated (Para 167, 8th bullet). *Regarding involvement of private developers in district cooling*: Smaller markets refer to countries such as Egypt where district cooling exists in commercial buildings done by international firms from the Gulf States. Lessons learned from this experience is that one must influence private developers as primary stakeholders in the development of district cooling. There was funding of USD0.5 million and activity in Egypt from 2019-21 to develop district cooling. The allocation targeted the Government of Egypt's Housing and Buildings Research Center, revolving around district cooling in El Amin, a new city by the Mediterranean Sea, using seawater as an innovative approach for Africa but proven in Northern Europe. Techno-economic feasibility analysis by a local Egyptian company indicated the scheme was very positive. Work was hampered by COVID-19 with difficulties getting government and other stakeholders engaged with the concept of district cooling. Despite the impact of this work to get dialogue started in 2022 on district cooling with the Regional Center for Renewable Energy and Energy Efficiency (RCREEE) based in Cairo in efforts to raise funding and to get training on district cooling, the lesson learned from this experience is that the primary stakeholders in the development of district cooling are the private

	developers with whom stakeholder discussions should take place at the earliest (Paras 136-138). *Regarding raising awareness of cooling products and their MEPS*: Though UNEP is not a financial institution, it does support design of policy, design of regulations, and enforcement structures with the expectation that government (with its numerous priorities) takes it forward. While getting governments to adopt NCAPs and roadmaps, UNEP does not have resources to implement the NCAPs that are technically approved with guidance on an integrated approach to finance including linkages to financial institutions. The next step of development is political over which the Project or UNEP has no influence, and the government has to find resources to implement. With donors pushing for achievement of unrealistic ambitious targets, it is more prudent to look at future targets, such as emissions reductions being achieved 5-8 years after the end of project. This should also address the real gap of finances for market transformation of cooling products and getting investors behind the market transformation (such as venture capitalists, bilateral financiers, multilateral financiers such as GCF) for subsidies or concessional loans. *Regarding early adopted countries as models*: An example of this is Rwanda which adopted best practices for cooling and demonstrated these practices that serve as a model for other countries to follow. *Regarding having a single focal institute per country*: An example of this is in the Indian Cooling Program where in 2022, the Indian Government set up a "Cool Cities Hub" within the National Institute of Urban Affairs (NIUA), a government think tank to help cities on urban planning and climate issues at the city level. NIUA has several cities where there is district cooling work. Without the Cool Cities Hub, a number of these cities would not get attention at the ministerial level; with a cooling market as large as India, knowledge at the city level may be lost and dissipated (Para 143).

241.

Lesson Learned #2:	Video conferencing and remote work has allowed project teams to be functional to engage partners and governments and allow more participation from country officials in presenting progress and share perspectives.
Context/comment:	Video conferencing and remote work has been a mainstay in communications between the project team, its partners and government country officials in presenting progress and sharing perspectives. While some videoconferencing fatigue has also set in, this has been mitigated through making events more dynamic, avoiding overloaded agendas, and implementing more breaks. Cooling has gained an important space in the international agenda as per the Cooling Synthesis report prepared by the Project and many other partner efforts.

242.

Lesson Learned #3:	UNEP's work on model regulations can have an impact far beyond the application on UNEP projects. Thus, even more important than individual project applications may be the work to leverage such regulations via their uptake by other donors and by large countries that have organizations participating in model regulation design. Both are attracted by the quality of the model regulations which go beyond the more typical benchmarking of products already on the market, instead incorporating findings about future potential products based on information gathered from research institutions and industry. Thus, it is critical to continue such high-quality model regulation

	work via partnerships that facilitate it, such as the UNEP-LBNL partnership, and to leverage such work with other donors, other UNEP projects, and large country involvement in the model regulation development process.
Context/comment:	While the Project achieved some important successes in model regulation uptake, such as in Rwanda, there are many more instances of usage and uptake in the work of other donors, particularly World Bank, GIZ, and UNDP, and in UNEP's other projects funded by GEF and GCF. Further, evidence suggests that, although the project did not directly work to influence China or India in uptake of the regulations, involvement of organizations from these countries in development of the regulations and more limited efforts of the Project (such as commenting on China's draft regulations) have resulted in uptake of the regulations in these countries with very large markets, that are also large exporters.

243.

Lesson Learned #4:	The timeline for desired policy, planning, and regulatory results such as sought by the UNEP Cooling Project may be longer than the 4-5 year timeline of typical UNEP projects. Thus, there may be a need to develop intermediate indicators to be achieved by EOP for similar projects. Further, to really leverage the intense work during the lifetime of such projects, there should be more limited long-term funding, so that individual country policy, plans, and regulations that are being pursued can continue to get ongoing support on the timescale needed for their adoption, so as to "shepherd them through."
Context/comment:	The UNEP project made some good progress in some countries, but the targeted result was not achieved. If the work is completely abandoned by UNEP, there is less chance of adoption of the draft policy, regulation, or plan. Examples include lack of adoption of the NCSs of four of the five Caribbean countries supported by the Project. Given the significant effort in developing the strategies, it will be worthwhile to provide more limited funds to continue to follow up to promote adoption of these NCSs (see Recommendation #2, Para 250).

244.

Lesson Learned #5:	Regional work has strong potential to bring a number of countries onboard to adopt higher levels of MEPS (or other regulations and policies UNEP may wish to get adopted) at a lower cost than working in each country individually would. Yet, the success of such work may depend on: (1) the strength of the regional organization partnered with to achieve buy-in for a regional roadmap; (2) the characteristics of the region vis-à-vis whether countries feel obligated to adopt similar standards to their regional neighbors. Thus, regional work should strategically choose those regions that both have a strong regional organization to work with and have the kind of cohesiveness that would lead member countries to adopt regional standards
Context/comment:	The Project has had some good success with regional work in ASEAN and SADC where the partners have influence over its members and the region is cohesive. Progress has been stymied in EADC where the regional structure and its capacity are weaker and the situation more bureaucratic.

245.

Lesson Learned #6:	In coalition type work, such as that of Cool Coalition, UNEP may consider: (1) how to ensure volunteer contributors to reports receive consistent guidance and appreciation from a consistent coordinator; (2) having clear targets and metrics; (3) carefully considering how such targets will be perceived by participating countries, given other obligations.

Context/comment:	Despite the incredible success of Cool Coalition as outlined above under "successes", some challenges were identified. In preparation of the Global Stocktaking Report utilized at COP 28 where the Global Cooling Pledge was also showcased, Cool Coalition brought together both volunteers and paid consultants to contribute sections of the report. Findings suggest that the authors were rushed in their delivery, dealt with multiple coordinators, and were not given the opportunity to review and discuss the extensive edits that were made to their work. Furthermore, before development of the Cooling Pledge, it was perceived by some that Cool Coalition had no metrics to measure its success and no real targets other than "meetings". Lastly, when the Cooling Pledge was finalized, it contained targets not only for energy efficiency but also for HFC phase out. Yet, under the Kigali Amendment, countries had already committed to HFC phase out targets, and some (particularly the very important player India) perceived it unacceptable diplomatically to commit to a higher target than what was committed to in acceding to the Kigali Amendment. For this reason, India did not sign the Pledge.

246.

Lesson Learned #7:	An important contributor to the success of work in individual countries will be a country selection process that assesses attractiveness of the country in terms of it achieving targeted results (Para 235). Furthermore, initial scoping work is needed to identify the correct partners and organizations to work with to maximize success.
Context/comment:	The Project had remarkably good results in Rwanda as the country felt highly motivated to respond to the EE mandate of the Kigali amendment and also develop sustainable cold chains for its farmers. Some other countries, such as some of those in the Caribbean, had more trouble achieving lasting results, sometimes because of changes in or lack of cooperation between government ministries and departments. In Egypt, as noted in Lesson 1, the Project worked hard to bring the government on board for a district cooling project. Government capacity building in this area is important, but it turns out the private sector is the decision maker for such projects in Egypt, a stakeholder that should have been involved from the start.

247.

Lesson Learned #8:	Software and database tools primarily inspired and improved capacity to develop and update PRS systems in several countries. This can be an attractive means of supporting implementation of standards and regulations.
Context/comment:	The UNEP Cooling Project prepared software for a regional project registration and a country project registration database with the following actions and results: • GIZ Proklima published a handbook on Measurement, Reporting and Verification (MRV) where the U4E PRS prototype is referenced as a key tool to implement a PRS; • the GIZ Green Cooling Initiative references the U4E prototype in capacity buildings, such as during a webinar in May 2023; • CLASP referenced the U4E PRS in an IEA webinar (ASEAN-IEA webinar: improving compliance for cooling products in Southeast Asia) in April 2021; • Botswana, Malawi, Zambia and Zimbabwe utilized U4E guidance through the PRS prototype and further PRS tools to leapfrog to energy efficient refrigerators in Southern Africa. The U4E prototype is mentioned as a key activity to be implemented as part of the National Policy Roadmaps;

	• several countries have considered implementation of the system: Myanmar's political situation changed, while Lebanon showed high interest in implementing the system and was advised during several calls; however, due to budget constraints, the initiative did not move forward; • Rwanda received in-depth technical assistance and updated their system along the U4E prototype; • Chile was advised in 2019 and 2023 during several calls and presentations on how to update their system along the prototype PRS as a best practice example. Their national system was thereafter updated based on the provided guidance; • during 2022 and 2023, the prototype was presented during several trainings in Central and Latin America (Bolivia, twice for Honduras and during OLADE) and stakeholders showed high interest in pursuing with the implementation; • the PRS was presented during the 11th International Conference on Energy Efficiency in Domestic Appliances and Lighting (EEDAL'21) and a paper was published in that context.

248.

Lesson Learned #9:	Successful financial mechanisms may end up serving more as an awareness building tool than a loan generator. Thus, special attention should be paid to promotion in financial mechanism work. Financial mechanisms face challenges in ensuring all partners are satisfied with the "deal" (e.g. customer, vendor, bank or utility, recycler). If a key player is not satisfied, the scale of the program will probably not be large. Thus, more consideration should be made on how the program benefits each key stakeholder segment.
Context/comment:	Ghana was the most successful of the Cooling Project's financial mechanism efforts. Yet, it resulted in the sale of only 4,000 refrigerators, 90% of which did not involve the taking out of loans, but occurred perhaps because purchasers learned about the high efficiency products and lifecycle costs through financial mechanism promotion (Paras 151-153). Among the three involved countries, dissatisfaction or concerns about the "deal" may have limited involvement by the vendor, bank, or utility. For example, for Senegal, which was "on-bill" (with payments for the refrigerator to be charged on the utility bill), it turns out while higher ups in the utility wanted to provide the service for free, working level persons did not agree to this (Paras 155-157). In Rwanda, there was a problem that vendors would have to bear the full cost of the 10% rebate for recycling an old refrigerator and thus did not encourage this (Paras 149-150). In Ghana, the bank was said to be conservative and only let their existing clients know about the programme.

D. Recommendations

249.

Recommendation #1	UNEP projects that are comprised of sub-projects should, in their implementation phase, increase their visibility as unified projects with well-known overall aims and with strong attention given to objective level and outcome level indicators of the overall Project.
Challenge/problem to be addressed by the recommendation:	The Cooling Project's indicators were not successfully utilized to guide the project. They overlapped and ended up not being good measures of what the project achieved. Solid assessment of the indicators explaining how values were arrived at was lacking. Further, many were unaware of what the Cooling Project was and were instead mainly focused on its sub-projects. Many within and without of UNEP were unaware of what the Cooling Project was and were instead mainly focused on its sub-projects. UNEP projects comprised of sub-projects should not be simply matters of convenience but maintain a "the whole is greater than the sum of parts" strategy. To achieve this, UNEP as an organization must develop a culture where overall projects are an important unit of analysis and engagement. There should be strong overall project indicators differentiated (not overlapping) and suitable for each outcome, with indicators being suitably challenging and meaningful, but achievable in the timeframe of the project.
Priority Level:	Important
Type of recommendation	Project level
Responsibility:	UNEP senior management, UNEP project managers
Proposed implementation time-frame:	As soon as possible

250.

Recommendation #2	Recognizing the time for some countries to achieve adoption of impactful policies and plans, senior UNEP management may consider setting aside contingency allocations or raising funds to permit project teams of various projects to provide ongoing support to countries to shepherd through policies, regulations, and action plans developed under the project once sub-project funding and main activities for the country have been exhausted. In small countries where the nature of external context can be severe enough to affect implementation in a country to the extent that funding may become exhausted, such allocations could be used for subsequent phases to continue follow-up and support for the country for model regulations and MEPS adoption for RACs, domestic refrigeration, and commercial refrigeration and NCAP adoption. Follow-up and support towards full adoption may not be achieved in a 4- or 5-year project, necessitating more limited post-project funding and more labour intensive efforts through to adoption. Contingency funds should be set aside from the start of a sub-project as a part of an exit strategy for sub-projects or the project overall.
Challenge/problem to be addressed by recommendation:	UNEP staff are informally providing ongoing support to countries, such as the 4 Caribbean nations who have not yet adopted their draft NCAPs. Yet, the incredibly important basis set by the Project has a much higher potential of coming to fruition if there is ongoing technical support and encouragement to shepherd adoption of these items through at the country and regional level.

	Adoption of model regulations and MEPS and NCAPs can be a long process. The nature of external context can be due to severe weather events (such as hurricanes), changes in government, civil strife, pandemics and decline of tourism in tourism dependent countries leading to some expected and many unexpected challenges. This may greatly affect the ability of a small country to implement to the extent that funding may become exhausted. Thus, a 4–5-year project may not be able to follow through to see the extensive potential benefits that the sub-project intends to provide; these potential benefits may not be realized unless there are more resources or contingencies left in a budget for continued technical assistance and follow-up. For these small countries, the installer or supplier are sometimes connected with government due to the small number of energy professionals to supply and install cooling equipment. In this context, a focus on small and medium-size enterprises may be ineffectual due to the lack of such actors in these countries.
Priority Level:	Important
Type of recommendation	Organization level, project level, partner level
Responsibility:	UNEP senior management, U4E and other division management, project management, donors
Proposed implementation time-frame:	March-September 2024 and ongoing

251.

Recommendation #3	Conduct an assessment of past projects to identify the factors for successful, timely results in regions and countries and develop strategies to ensure maximum country and regional level results in the future via an improved design and implementation strategy. The strategy may include criteria for country selection, more extended scoping to determine best partners and best country strategy for the sub-project. For regions, a strong regional partner with buy-in from the countries may be needed, as well as a cohesiveness of the region such that countries in it have a desire to adopt similar standards to each other. In the case of the Cooling Project Phase I, this may be part of the exit strategy for scaling up and/or replication.
Challenge/problem to be addressed by the recommendation:	Some country and regional efforts under the Cooling Project have seemed to struggle. While this may be due to the challenging nature of the work and the time needed to see impact and various external factors, the importance of increasing success rates suggests a serious, documented review of factors leading to success and those hindering success be prepared.
Priority Level:	Medium
Type of recommendation	Organization level or, if too difficult, Project level
Responsibility:	UNEP
Proposed implementation time-frame:	If at organizational level February - June 2024. If at project level, March – May, 2024

252.

Recommendation #4	ACES should put a strong emphasis on liaising with potential investors and financiers of cold chain equipment as part of its work. There is an assumption

	that with ACES providing the TA and training, then there will be more than enough funding to roll out associated infrastructure. While this may be true, time is of the essence to ensure the momentum continues and that there is not too much of a time gap between learning and application of what is learned. Thus, there should be a targeted outcome of ACES work to stimulate investment for cold chain rollout.
Challenge/problem to be addressed by recommendation:	ACES will not be providing infrastructure investment for cold chain roll out. Other donors are expected to have strong interest in picking up this need. However, it is important that the investment comes concurrently or soon after TA and training to leverage ACES's momentum.
Priority Level:	Critical
Type of recommendation	Project level, partner level
Responsibility:	Project Manager, ACES General Manager, Defra Officer, UNEP leadership
Proposed implementation time-frame:	March – December 2024

253.

Recommendation #5	Per Lesson #3, put strong emphasis in future UNEP projects on critical tools, such as the Cooling Project's Model Regulations and its NCAP Template, on the leverage of these tools beyond the project with other donors and with large countries (the latter via their close involvement in development of the tools). While such leveraging occurred organically in the Cooling Project, it might be increased in future projects by being a part of the project design. Results achieved via such leveraging should be carefully tracked and may even become part of the project's result framework
Challenge/problem to be addressed by recommendation:	UNEP's expert work produces very valuable tools that literally have the potential to change the world, but UNEP projects typically only have enough funds to target results in a limited number of countries. To really leverage UNEP's comparative advantage, future projects could more strategically pursue what happened organically with the Cooling Project in that key documents were leveraged by others beyond the Project.
Priority Level	High
Type of Recommendation	Project-level, Partner-level
Responsibility	Designers of future projects, UNEP management
Proposed Implementation Time-Frame	March – December 2024 and ongoing.

254.

Recommendation #6	UNEP should ensure that advocacy platforms it develops have clear metrics and clear aims. It should further ensure that group reports with outside authors developed to support advocacy and scientific consensus have a clear process that respects the role of various authors and provides them with consistent guidance on a reasonable timeframe. In particular, revisions to authors' work should be shared in track change for discussion to ensure the original meaning is not lost. Given their importance to the organization, management should review processes for these joint reports and develop guidelines to ensure an orderly process and that input and role of experts, whether volunteers or paid consultants, is adequately respected. Such work

	should also adhere to UNEP's science publication review process, as overseen by its Chief Scientist.
Challenge/problem to be addressed by recommendation:	An important role of UNEP is to convene experts to prepare joint reports. Findings suggest that in the Cooling Project (though perhaps mostly occurring in follow-on work related to Cool Coalition), the Cooling Stocktaking Report process was not as organized and orderly as it could have been and authors' work was revised extensively without track change, so that they could not easily comment on changes made. Furthermore, while the Cool Coalition Platform later developed the Cooling Pledge earlier in its life, it did not have a clear metric to measure its success and was perceived by some as unfocused, mainly holding and attending many meetings.
Priority Level	High
Type of Recommendation	Project-level, partner-level
Responsibility	UNEP management, UNEP project teams, Cool Coalition
Proposed Implementation Time-Frame	March – December 2024 and ongoing.

255.

Recommendation #7	UNEP may reassess its approach to financial mechanism in the future and consider: (1) combining promotion of financial mechanisms with general promotion of the advantages in lifecycle costs of efficient appliances (many may purchase products outright based on savings over the lifecycle); (2) ensuring the financial mechanism is set up so that all players in the "deal" will be satisfied, (3) achieving enough buy-in from partners, so that sales of the efficient appliances (whether with or without loan) will be substantial and scale up over time.
Challenge/problem to be addressed by recommendation:	The financial mechanisms of the Project provided a good basis for learning, but even in the country with the most sales, Ghana, only 4,000 refrigerators were sold under the sub-program and 90% did not use loans. In each country's financial mechanisms, it seems dissatisfaction by one of the players led to the lack of success in the programme. In Rwanda, the vendors did not like forfeiting 10% for recycling and also having to pay to get the refrigerator to the recycler. Banks in Ghana were not proactive enough. In Senegal, utility stakeholders were not fully on-board with on-bill billing.
Priority Level	Medium
Type of Recommendation	Project-level, partner-level
Responsibility	Project designers, UNEP unit managers and project managers and financial mechanism specialists
Proposed Implementation Time-frame	March – December 2024 and ongoing

256.

Recommendation #8	Senior management should consider the value of LBNL-UNEP collaboration and thus whether action should be taken to enable mutual sub-contracting, something now being blocked by the organizations' respective legal departments.

Challenge/problem to be addressed by recommendation:	Due to concerns over intellectual property by the legal departments of both organizations, it was not possible for UNEP to sub-contract under its grants to LBNL and vice versa. Thus, the organizations had to use separate grants and this created some challenges in timing of resources. Yet, the product of joint work was some of the most impactful on the Project.
Priority Level	Medium
Type of Recommendation	Senior management level
Responsibility	UNEP senior management, UNEP legal department, LBNL senior management, LBNL legal department
Proposed Implementation Time-frame	March – September 2024

ANNEX I. RESPONSE TO STAKEHOLDER COMMENTS

Table I-1: Response to stakeholder comments received but not (fully) accepted by the reviewers, where appropriate

Page Ref	Stakeholder comment	Evaluators' Response	UNEP Evaluation Office Response
General comment	I genuinely think the cool Coalition is the best example I have ever seen of UNEP playing its role as global leader on an important environmental subject. I find the overall mark Overall Project Performance rating of Satisfactory [in this draft] to be not generous and would ask the evaluation team to consider moving to Highly Satisfactory. The Project should be a model example for all UNEP projects	The overall performance rating for the project is based on a UNEP evaluation formula that considers many sub-ratings for different areas and gives relevant ones a weight in the final computation for overall performance rating. In the final analysis, the project was awarded an overall rating of 'Highly Satisfactory'.	The Evaluation Team has revised rating in-line with UNEP Evaluation Office guidance on evaluation criteria ratings.
General comment Country assessments	I think the assessment of the country-level work is a little light. I do think future focus of UNEP's cooling should be on global level initiatives, rather than direct government support, and therefore looking into whether the projects (e.g. in Ghana) were genuinely good value for money, would be good to investigate more fully. I think in several countries UNEP worked in, they relied on local partners to implement, which is a better approach	The Project covers a large number of countries, often with multiple efforts per country. It is a limitation of the evaluation process that we could not give too much attention to any one country project. Indeed, in the text, it is mentioned that: "*Limitations of the data collection involve interviewing an insufficient number of persons from a particular selected country and reaching too few countries given the particular time limitations of the Evaluation and difficulties getting persons to commit to interviews*." Considering the example you raise of Ghana, we were able to interview just one person from Ghana and also get feedback from UNEP persons involved with the Ghana work. It is difficult to evaluate deeply country results with such limited consultations. At the same time, the lessons section conveys a number of considerations in doing country work. For example, Lesson 7 reads "*An important contributor to the success of work in individual countries will be a country selection process that assesses attractiveness of the country in terms of it achieving targeted results*	The Evaluation Team has addressed the comment.

Page Ref	Stakeholder comment	Evaluators' Response	UNEP Evaluation Office Response
		(Para 234). Furthermore, initial scoping work is needed to identify the correct partners and organizations to work with to maximize success." This lesson and other lessons about country work show that in aggregate, the evaluation was able to come up with some learnings to assist future UNEP projects in their country work. Recommendation 3 also addresses country (and regional) work: *"Conduct an assessment of past projects to identify the factors for successful, timely results in regions and countries and develop strategies to ensure maximum country and regional level results in the future via an improved design and implementation strategy. The strategy may include criteria for country selection, more extended scoping to determine best partners and best country strategy for the sub-project. For regions, a strong regional partner with buy-in from the countries may be needed, as well as a cohesiveness of the region such that countries in it have a desire to adopt similar standards to each other. In the case of the Cooling Project Phase I, this may be part of the exit strategy for scaling up and/or replication."* With explanation offered: *"Some country and regional efforts under the Cooling Project have seemed to struggle. While this may be due to the challenging nature of the work and the time needed to see impact and various external factors, the importance of increasing success rates suggests a serious, documented review of factors leading to success and those hindering success be prepared."*	

Page Ref	Stakeholder comment	Evaluators' Response	UNEP Evaluation Office Response
Pages 90-91, Monitoring and Reporting	Table 5 row 1 misconstrues an overlap. A regional policy roadmap means that a regional body comprised of committee members representing member states agree to harmonizing core requirements (type of testing to be done, scope of technologies covered, energy efficiency levels to be achieved) while leaving some flexibility for national circumstances such as year when enforcement commences. Each country in the region then approves the regional roadmap. This differs from a National Cooling Action Plan / Strategy (or NDC) which are far more detailed and unique and covers many more technologies. The names may sound similar, but the outputs are different and these differences are necessary. Table 5 row 2 is a slight misconception. The first column pertains more to the initial enabling environment (i.e. new legislation gives a government agency authorization to undertake policy interventions such as regulatory interventions), whereas column 2 pertains to the specific guidance on how particular policies can be implemented (such as MEPS framework indicating	The clarification that regional roadmap content may not overlap with the "national roadmaps" or "national cooling strategies," given different level of detail, is added to the comment column in Table 6. Yet, close review shows there is still major overlap even when this is considered. More explanation of the overlap is offered now in the comment column. Explanation is as follows: First, overlap between Outcome 1 and Outcome 3 indicators: Outcome 1 indicates "Regional Roadmaps committed by Governments" while Outcome 3 indicates "Regional Policy Roadmaps that are adopted or endorsed by national governments." This is clearly an overlap, or at least more clarification is needed to understand how these two differ. Between Outcome 1 and Outcome 2, there is similar overlap, but with qualification offered in the comment column. Outcome 1 indicator mentions "National cooling strategies committed by governments" and Outcome 2 indicator mentions "roadmaps [that are prepared by national ozone officers] or National cooling strategies [prepared for] adoption by government." The table indicates that the overlap of these two might be less if we consider one as a pre-requisite step to the second, but nevertheless it would have been useful for project design to point out the different roles of the two outcomes in dealing with essentially what would have been the same draft document. For row 2, we appreciate the clarifications for some of the different items, some of which has been added to the comment column. However, just looking at all the bolded words we still see overlap or at least lack of clarity in the distinction between the two. Outcome 1 indicators include legislation, policies, or action plans, whereas Outcome 2 mentions guidance in developing action plans. Your comment says column 2 pertains to specific guidance on how particular policies can be followed (e.g. steps to be followed), but that is what an action plan (Outcome 1) is. So, the only differentiation might be that the guidance in developing action plans precedes the action plan. As for Outcome 3, it mentions "National Policy Strategies." We are not sure that can be distinguished from the	The Evaluation Team has addressed the comment.

Page Ref	Stakeholder comment	Evaluators' Response	UNEP Evaluation Office Response
	steps to be followed), whereas column 3 pertains to strategic planning and targets (i.e. in 2030, the country aims to have reduced energy waste by 25%, to enable access to basic cooling services for 80% of rural households, etc.).	"Policies and Action Plans" of Outcome 1. While a policy and a strategy can be seen as different, more clarity on what a "policy strategy" is would be needed to distinguish. Is it a strategy for preparing policies? And in some countries, policies really are strategies. Comparing Outcome 1 and 3 indicators, Outcome 1 mentions Policies and Action Plan whereas Outcome 3 mentions National Policy Strategy. Some of this additional clarification is also added to the comment. Further the title as been adjusted from referring to overlap only to mention lack of clarity.	

ANNEX II. PEOPLE CONSULTED DURING THE EVALUATION

Organization or Location	Name	Position	Gender
UNEP	Brian Holuj	Programme Management Officer, United for Efficiency (U4E), Global Climate Action Unit (GCAU), Mitigation Branch	M
UNEP	Patrick Blake	Programme Management Officer, U4E, GCAU, Mitigation Branch	M
UNEP	Saikiran Kasamsetty	Energy Efficiency Specialist, U4E, GCAU, Mitigation Branch	M
UNEP	Moira Mathers	Communications Specialist, U4E, GCAU, Mitigation Branch	F
UNEP	Miriam Hinestroza	Head, GCAU, Mitigation Branch	F
UNEP	Marco Duran	Energy Efficiency Specialist, U4E, GCAU, Mitigation Branch	M
UNEP	Alice Morneau	Energy Efficiency Specialist, U4E, GCAU, Mitigation Branch	F
UNEP	Souhir Hammami	Energy Efficiency Specialist, U4E, GCAU, Mitigation Branch	M
UNEP	Amanda Lees	CFO, Mitigation Branch	F
UNEP	Paul Kellet	Programme Manager, U4E, GCAU, Mitigation Branch	M
UNEP	Jonathan Duwyn	Programme Management Officer, Buildings and Construction, Cities Unit, Mitigation Branch	M
UNEP	Celia Martinez	Programme Officer and former Lead for Egypt	F
CCAC	Denise San Valentin	Programme Management Officer, CCAC	F
UNEP	Jim Curlin	Chief, OzonAction, Law Division	M
Energy Foundation China, Beijing	Tan Zhang	Program Officer, Industry Program	M
IIEC, Bangkok	Sommai Phon-Amnuaisuk	Director, Asia-Pacific	M
ACE	Septia Buntara Supendi	Senior Officer	M
WWF	Richard Scotney	Global EE Lead.	M
LBNL	Nihar Shah	Presidential Director, Global Cooling Efficiency Program Energy Technologies Area	M
CCC	Mirka Della Cava	Standards and Policy	F
U4E, Kigali	Carole Gwiza,	ACES Finance and Contracts Management Specialist	F
Hollanda Fair Foods, Kigali	Enatha Uwiringgiyimana	Production manager	F
Clinton Development Initiative, Kigali	Alice Uwanyirigira	Monitoring and Evaluation Manager	F
ACES, Kigali	Issa Nkurunziza	ACES Rwanda lead	F
RCOOL, Kigali	Basile Seburikoko	Refrigeration Expert	M
NAEDB, Kigali	Innocent Mwarimu	Cold Chain Specialist	M
REMA, Kigali	Martine Uwera	Ozone Focal Point	F
IPRC, Kigali	Joesph Hakuzimana	Head of Department	M
RW Biomed, Kigali	J.P. Musabyimana	Genomics and Bioinformatics Analyst	M
ACES, Kigali	Morris Kayitura	ACES General Manager	M

Organization or Location	Name	Position	Gender
University of Rwanda	Jean Baptiste Ndahetuye	ACES Operations and Research Coordinator	M
University of Birmingham	Toby Peters	Professor in Cold Economy	M
Defra	Steve Cowperthwaite	Head of International Stratospheric Ozone and Fluorinated Greenhouse Gases	M
International Institute of Refrigeration	Yosr Allouche	Head of Projects	F
IEA	Ksenia Petrichenko	Analyst	F
French Facility For Global Environment	Diane Menard	Project Manager Ozone	F
Energy Commission Ghana	Hubert Zan	Project Manager	M
Nigeria Energy Commission	Okon Ekpengyong	Director, Linkages, Research & Consultancy	M
FAO	Joseph Bizima	Project Manager	M
ABG Group, Kigali	Menon Murli	Regional Business Development Manager	M

ANNEX III. PROJECT COSTS AND FINANCIAL MANAGEMENT

Outcomes	Resource Allocation (from ProDoc)	2018	2019	2020	2021	2022	Total Disbursed	Total Remaining
Outcome 1: Political leaders have the information to understand the challenges posed by market uptake of unregulated products and proactively support the policy measures	n/a	490,338	220,489	546,411	424,926	336,926	**2,019,090**	**n/a**
Outcome 2: National Ozone Officers and Energy Officials from developing countries support the design and implementation of policies that improve cooling product performance	n/a	1,141,108	1,580,828	831,554	819,543	119,893	**4,492,926**	**n/a**
Outcome 3: Regional policy roadmaps and national policy strategies are officially endorsed by developing and emerging economy national governments	n/a	1,019,189	1,095,557	926,347	583,569	736,156	**4,360,818**	**n/a**
Management activities	n/a	n/a	n/a	n/a	n/a	n/a	**n/a**	**n/a**
Actual Secured Income by Year	**28,658,431**	**1,581,301**	**2,844,961**	**2,396,086**	**5,062,542**	**16,773,541**	**n/a**	**n/a**
Total Estimated Expenditures	n/a	**2,650,635**	**2,896,874**	**2,304,312**	**1,828,038**	**1,192,975**	**10,872,834**	**17,785,597**
KCEP – High level support and capacities	n/a	490,338	220,489	221,287	102,367	7,323	**1,041,804**	
KCEP – Twinning	n/a	1,141,108	1,360,478	710,325	192,127	29,209	**3,433,247**	
KCEP – Caribbean	n/a	726,075	229,878	7,302	26,797	10,188	**1,000,240**	
KCEP – Rwanda	n/a	293,114	146,729	49,388	98,988	0	**588,219**	
KCEP – Africa	n/a	0	718,950	869,657	353,903	0	**1,942,510**	
KCEP – Regional Harmonization	n/a	0	0	0	0	152,472	**152,472**	
KCEP – EE HH appliances	n/a	0	0	0	0	63,280	**63,280**	
KCEP – access to urban sc and cold chain	n/a	0	0	0	0	447,909	**447,909**	
DANIDA – Cool Coalition	n/a	0	0	325,124	322,559	329,603	**977,286**	
DEFRA-HFC phase down and EE	n/a	0	220,350	121,229	509,870	90,868	**942,317**	
ESCAP-Passive Cooling for Cambodia	n/a	0	0	0	0	31,389	**31,389**	
Norway	n/a	0	0	0	117,546	-184	**117,362**	
Tabreed – India	n/a	0	0	0	103,881	30,918	**134,799**	

ANNEX IV. KEY DOCUMENTS CONSULTED

- UN Environment Medium-Term Strategy (MTS) 2014-2017;
- Project Document for the "Building high-level support and capacities to enhance climate and ozone protection through cooling efficiency" Project, November 2017;
- Project Document for Project Revision #1 for Project ID 01992, "Building high-level support and capacities to enhance climate and ozone protection through cooling efficiency" Project, July 2021;
- UNEP MTS for 2014-17, 2018-21, 2022-25;
- UNEP PoW for 2016-17, 2018-19, 2022-23;
- Cooling Project Progress Reports from K-CEP (Annual from 2018-2021 on Advocacy, Twinning, R-COOL, EcoFridges);
- Cooling Emissions and Policy Synthesis Report: Benefits of cooling efficiency and the Kigali Amendment, IEA and UNEP, 2020;
- Report of the Stakeholder Workshop on Presentation of Market Assessment and Technical Note for the Harmonization of Minimum Energy Performance Standards for Room Air Conditioner and Household Refrigerators, East African Centre of Excellence for Renewable Energy and Efficiency (EACREEE) and SADC Centre for Renewable Energy and Energy Efficiency (SACREEE), 1 December 2020;
- Twinning of National Ozone Officers and Energy Policymakers for Energy Efficient and Climate-Friendly Cooling: Conclusions and Recommendations for South East Asia and PICs, 2019;
- Room Air-conditioner Data in the ASEAN (2021 Update) Gaining Commitment and Providing Technical Assistance for Updating the ASEAN Standards for Room Air Conditioners, IIEC, 16-17 February 2022;
- Promotion of higher efficient air conditioners in ASEAN through harmonization of standards (ISO 16358) and strengthening of market verification and enforcement capabilities (Phase I): Recommendations for Updating the ASEAN Regional Policy Roadmap on Energy Efficient Air Conditioners, IIEC, May 2021;
- Barbados National Cooling Strategy for the Refrigeration and Air Conditioning Sector, Government of Barbados, 2022;
- Estrategia Nacional de Refrigeración y Acondicionamiento de Aire de la República Dominicana, Government of Dominicana, July 2019;
- Jamaica National Cooling Strategy, Government of Jamaica, July 2019;
- National Cooling Strategy: The Commonwealth of the Bahamas Caribbean Cooling Initiative, 17 June 2019;
- U4E Model Regulations for ACs, Ceiling Fans, and Refrigerators.

ANNEX V. INTERVIEW QUESTION LIST

This question list may be referred to for interviews with project management, donors, consultants/ contractors, other partners, and beneficiaries. Before each interview, the TE Team will select questions relevant to the particular stakeholder to be interviewed. And, as the TE progresses, it is likely some questions will be adjusted, added, or deleted.

In order to reach more beneficiaries a questionnaire will likely be prepared to circulate across a wide group of participants in Components 1, 2, and 3. The content will follow the queries in Section D below, but will be tightened up and adjusted to include close-ended questions once the TE team gains a better understanding of the actual activities of the project as implemented. An effort will be made to interview some beneficiaries live, to allow for more open-ended discussions and this will then be supplemented by results of the questionnaire.

A. Relevance

1. Was the UNEP cooling efficiency project in line with your priorities?

2. Was the project really needed in your country/ region/ organization/ donor portfolio? Or did it do things that others had already done or that would have been achieved without the UNEP project?

3. Were there other similar projects around the time the UNEP project started? If so, was there good complementarity of the projects? How did the UNEP project's design ensure there was not duplication with other Cooling Project initiatives (and other similar programs) and that there were instead synergies?

B. Design

1. The Project has three main components: A high level communications program (including a scientific study and briefings for policy makers), a program to build capacity of national ozone officers and energy policy makers and bring them together, and a program to develop regional and national roadmaps and national policies for cooling efficiency to be integrated with HFC phase-out. What's your view of this design? Are all parts important? Were some more needed than others?

2. Was something important left out of design?

3. Are there other things you noticed about the design of activities that you see as strengths or weaknesses?

C. External Context

1. In your country or region, did you notice factors external to the project that made it difficult to implement? This might include political instability or economic dislocation or natural disasters.

D. Results/ Effectiveness

<u>D1. Component 1</u>

Outputs

1. Are you familiar with the project's scientific assessment report on cooling efficiency and HFC phase out? Was the report important in your country/ region/ or in having an effect on developments in this sector? How? Was the report quoted or referenced in your policies or communications?

2. Are you familiar with the high level policy briefing prepared by the project? Do you think these had an effect on developments?

3. What about the project's high level outreach strategy? Did you notice communications from the project? How impactful were they?

4. Did the project involve the private sector in its communications? What was the result?

5. Did the project provide useful tools and/or cooling reports related to cooling efficiency? Did you make use of it?

6. Did the project provide useful data on the purchase and use of relevant equipment?

Outcome

7. What was the overall result of this communications program and scientific study? Did you find that it made a change in what political leaders were doing? Did they proactively pursue policies as a result? Or would they have done that anyway?

D2. Component 2

Outputs

1. What's your view of the capacity building materials for the national ozone officers and energy policy officers? And the training for these individuals? Did the training or materials have a direct influence on what these officers did in the cooling efficiency area? Were there specific draft items that resulted?

2. The project has also developed templates for data gathering. Did you/ people in your country use these? Did they have an influence on what you/ these officers are doing?

3. The project developed guidance and software for cooling product registration? Are you aware of this? If so, are you making use of these items?

4. Did the project carry out market assessments? Were these useful to your country? How?

Outcome

5. Were there actual results in terms of draft policies or roadmaps or strategies that came out of the ozone and energy officer training? Were these drafted by those officers that were trained? What about standards? Did you (or ozone or energy officer in your country) draft any of these as a result of the training?

6. What about sub-regional harmonization of policies and standards? Did this occur as a result of the project? Did your country participate?

7. Did the data tool result in you gathering data and making policy more strategically as a result of the data?

D3. Component 3

Outputs

1. Was a cooling efficiency policy roadmap prepared by the project for your region or country? Did people from your country actively participate in its preparation?

2. Was there a market assessment for your country?

3. Was a cooling strategy prepared for your country? Does it include plans for MEPs? Does it include plans for financial mechanism?

4. Was there support from the project for implementation of the policy?

5. Are you familiar with any cooling efficiency centers of excellence set up by the project? If so, what is their impact?

6. Was a cooling action plan developed for your country? What is its main focus? Will it be impactful?

Outcome

1. Was a roadmap or strategy and/or policy officially adopted in your country as a result of the project? What will be the results of this? Is it being implemented?

2. What about MEPs or standards? What about labels? Were these adopted in your country as a result of the project? Are they being implemented?

3. Is your country officially involved in any regional harmonization for cooling? If so, is this a result of te project? Is the regionally harmonized policy or standard being implemented?

4. Is there a financial mechanism in your country/ region to support the transition to more efficient cooling and phase out of HFCs? Did the project help to make this happen? Is it being implemented?

D4. Likelihood of impact

1. How likely is it that any policies, roadmaps, MEPS, labels etc. supported by/ resulting from the project will be implemented?

2. For those likely item to be implemented, how big of an impact will they have on the market/ speeding up transition to higher efficiency cooling? How does this compare to what would have happened in the absence of the project?

3. Have you noticed any changes in the cooling sector in your country or region already as a result of the above-discussed initiatives?

E. Financial Management

1. Please explain the funding situation of this project. The project revision shows a budget of around USD29 M, compared to USD6 M or so confirmed at project launch. Will all of the USD29 M all be spent by EOP? How much of it was spent before Year 5?

2. Is there GEF funding? (Noticed some of the Energy Branch people's time is funded with GEF funds.)

3. Please discuss how UNEP's financial policies and procedures were followed.

4. Have all the required financial documents been completed?

5. Was there much communication between finance and project management staff?

F. Efficiency

1. In implementation, was there duplication with other initiatives that were part of Cooling Project or of other initiatives outside of Cooling Project? Or, were there synergies with such other efforts?

2. What evidence is that that the project was a good value for the money? Could you discuss the rough total costs of some of the main activity areas and why these are considered a good (or poor) value for the money?

3. Can you please provide us with a list of contracts, their topics, and costs?

G. Monitoring and Reporting

1. Is the project using its original indicators at the outcome and output level? How often were they assessed?

2. Were the indicators useful in tracking progress? It seems that the TOC underwent pretty substantial changes. Does this mean that the indicators were no longer as relevant as before?

3. Please explain the main reporting the project did and discuss how complete it was.

H. Sustainability

1. What evidence is there that the major results of the project will be sustained?

a. If there are policies, standards, or strategies that were adopted, how likely are they to be implemented or to continue to be implemented? If they haven't been adopted yet, how likely is adoption and implementation? What's the evidence?

b. Regarding the training of ozone officers and energy officers and the software shared with them for data collection: How likely are these officers to remain in their positions? Have there already been results that are sustainable even if they leave their positions?

c. Regarding the high-level communications program, how sustainable are those results? In terms of policy makers? Are they likely to stay in place? What about sustainability of results with the private sector?

d. Considering the most important results of the project, is financing needed to sustain them? If so, is it available?

e. What about socio-political sustainability? Will the measures raise the price of equipment for households? Is the private sector onboard?

f. And institutional sustainability?

I. Other Factors Affecting Performance and Cross-cutting issues

<u>1. Preparation and readiness:</u>

a. How smooth was project launch? Was there an inception workshop? Were recommendations of the review committee adopted?

<u>2. Quality of project management</u>

a. Did the project steering committee take an active role?

b. How was handover when team members left?

c. What kind of problems were faced in implementation? How were they handled?

<u>3. Stakeholder participation and cooperation</u>

a. Please talk about the involvement of country stakeholders and beneficiaries: How active were their contributions to the outputs of the project?

b. Were there challenges in getting government officials and policy makers involved? How as this handled?

<u>4. Responsiveness to human rights and gender equity</u>

a. Please discuss the project's efforts to mainstream gender. Was there any concerted effort besides the training target discussed below?

b. Why did the project pursue a 25% share of women in training? Was that ambitious enough?

c. Please discuss how the project engaged or looked out for the benefits of other marginalized groups, such as the poor and minorities.

5. Environmental and social safeguards

a. Please discuss what the project did to keep refrigerants from polluting the environment or endangering human health. Did the project support disposal and/or recycling of old refrigerators and ACs? How?

6. Country ownership and driven-ness

a. What is the evidence that the activities of the project were country driven? Please give examples.

7. Communication and public awareness

a. Aside from what has already been discussed for Component 1, did the project have other communication and awareness efforts? Please discuss.

Additional Questions

1. Did you notice any synergies between regional and national level as facilitated by the training and the tools of the project?

2. Please discuss procurement. Which methods of procurement were successful and which were not?

3. What linkages did the project make with other UNEP initiatives in project countries? What about engagement with UNCT and UNSDCF in those countries?

4. Did the project have effective public-private sector collaboration? How so?

5. What changes were made by the project to adapt to the effects of COVID-19? Did this effect project performance?

ANNEX VI. PROJECT LOGICAL FRAMEWORK (WITH EDITS IN RED FONT AS UPDATE TO REVISION #1 AND GREEN FONT REFLECTING THE REVISIONS PROPOSED BY THE EVALUATORS)

Table VI-1: Reformulation of Project Logical Framework

Project Outcome/Output	Indicators	Relevant PoW Outcome(s) and indicator(s)
Project Outcome 1: ~~Political leaders have the information to understand the challenges posed by market uptake of unregulated products and proactively support the policy measures required to achieve a sustainable, strategic structural change in their cooling product markets~~ Political leaders and their supporting teams are aware of the importance of raising energy efficiency and access to cooling and refrigeration due to benefits of combining refrigerant transition with energy efficiency, as articulated in the Kigali Amendment, and take action accordingly (supporting full cooling product market transformation to climate friendly and higher efficiency appliances at the global level)	*~~Number of regional roadmaps and/or national cooling strategies committed to by governments are amplified by UNEP communications (Baseline:0, Target:15)~~ Number of countries that have signed a voluntary global pledge to reduce energy consumption in cooling sector (as of 11/30/22)* *~~Number of governments reporting new legislation, policies or programmes developed/adopted concerning refrigerants and energy efficient cooling that are amplified by UNEP communications. (Baseline:0, Target:30)~~ Number of countries that have officially developed NCAPs: either (a) directly facilitated by project, (b) utilizing methodology developed by the project, or (c) via assistance of other projects that were clearly designed/ launched as result of the Cooling Project as of 11/30/22.* *~~Number of references of UNEP's new global scientific report findings and other knowledge products (e.g. reports, tools) in official communications and policy documents. (Baseline:0, Target:25)~~* *~~Number of governments, organisations and companies joining the Cool Coalition (Baseline:0, Target:100)~~* *Number of countries that have incorporated findings from UNEP advocacy into their NDCs as of 11/30/22*	*(i) Climate Change Mitigation of up to 110 million tonnes CO2eq cumulative 2020 to 2030, Approx. 70% of which is from the indirect emissions savings from electricity generation from fossil fuels (Energy) and 30% from the direct refrigerant emissions savings with the utilization of low GWP refrigerants (Chemicals).* *(ii) Increase in the number of countries that have used UNEP analysis or guidance in developing or implementing legislation, policies or action plans that promote sound chemicals management and implementation of the relevant multilateral environmental agreements concerning climate friendly and energy efficient cooling products.* *The primary indicator is the number of regional roadmaps and/or national cooling strategies committed to by governments (Baseline:0, Target:25).* ***Funding Secured.***
Output ~~1A) Global Communications Strategy and Briefing Materials for Policymakers. 1.1: Communications campaign, multi-stakeholder collaboration~~	*~~Final Communications Strategy to establish Cool Coalition provided to CCC (Baseline 0; Target 1)~~* *~~Final Global Scientific Assessment completed (Baseline 0; Target 1)~~*	*1.7 Public support and political engagement for climate action are catalysed*

Project Outcome/Output	Indicators	Relevant PoW Outcome(s) and indicator(s)
~~platform and supporting material for engaging target audiences~~ Output ~~1B~~ 1.2: ~~A Global Scientific Assessment on Climate Friendly and Energy Efficient Cooling.~~ Output ~~1C~~ 1.3: ~~Additional sustainable cooling reports, tools and/or guidance for senior officials.~~ ~~12 sustainable cooling reports, model regulations and tools for energy-efficient and climate-friendly products uptake and other guidance to senior officials~~	~~Final sustainable cooling reports, tools and/or guidance completed (Baseline 0; Target 18)~~ ~~Final Global Scientific Assessment disseminated (Baseline 0; Target 20)~~ ~~Final sustainable cooling reports, tools and/or guidance disseminated (Baseline 0; Target 20)~~ ~~The governance for the Cool Coalition is established and administered (Baseline 0; Target 1)~~	
Project Outcome 2: ~~National Ozone Officers and Energy Officials from developing countries support the design and implementation of policies that improve cooling product performance to achieve a sustainable, strategic structural change in their cooling product markets~~ Capacity built among, tools provided to, and linkages formed between National Ozone Officials and Energy Officials from emerging economies such that they recognize the importance of linking refrigerant transition with energy efficiency in cooling, begin to influence national policy, and begin to take actions to develop relevant projects accordingly (to support full cooling product market transformation to climate friendly and higher efficiency appliances at country level)	~~Number of countries in which national ozone officers/energy officials have prepared roadmaps and/or national cooling strategies for adoption by the government as a result of the Twinning or subsequent training (Baseline:0, Target:15).~~ Number of countries from which surveyed twinning participant confirms that twinning work accelerated/ influenced to some extent country's pursuit of Kigali Amendment ~~Number of countries in which national ozone officers/energy officials have prepared guidance in developing action plans on climate friendly and energy efficient cooling products policies for review by the government as a result of the Twinning or subsequent training (Baseline:0, Target:15).~~ Number of countries that are confirmed to have used country savings assessments or model regulations to inform their draft MEPS, NCAP, or NDCs Number of countries that are confirmed to be pursuing integrated work on refrigerants and energy efficiency in the cooling sector (such	i) Climate Change Mitigation, of up to 55 million tonnes CO2eq cumulative 2020 to 2030, Approx. 70% of which is from the indirect emissions savings from electricity generation from fossil fuels (Energy) and 30% from the direct refrigerant emissions savings with the utilization of low GWP refrigerants (Chemicals). (ii) Increase in the number of countries that have used UNEP analysis or guidance in developing or implementing legislation, policies or action plans that promote sound chemicals management and implementation of the relevant multilateral environmental agreements concerning climate friendly and energy efficient cooling products. The primary indicator is the number of the governments' adoption of new legal frameworks and/or action plans concerning ozone-depleting substances and energy efficient cooling. (Baseline:0, Target:15) ***Funding Secured.***

Project Outcome/Output	Indicators	Relevant PoW Outcome(s) and indicator(s)
	as via proposed activities with MLF or other donor funding) as a result of participation in twinning	
Output ~~A)~~ ~~2.1: Training on Climate Friendly and Energy Efficient Cooling organised for National Ozone Officers and Energy Officials~~	~~*Number of National Ozone Officers and Energy Officials Trained (Baseline:0, Target: 250)*~~ ~~*Number of regional training sessions organised for National Ozone Officers and Energy Officials (Baseline:0, Target: 6)*~~	
Output ~~B)~~ ~~2.2: Database and Templates for Gathering Data on Cooling Products Sold in a Country~~	~~*Completed Online Database (Baseline:0, Target: 1)*~~ ~~*Number of Templates for data gathering developed and disseminated (Baseline:0, Target: 4)*~~ ~~*Number of Governments apprised of the opportunity to utilise this new software / guidance (Baseline:0, Target: 125)*~~	
Project Outcome 3: ~~Regional policy, Roadmaps, and national policy strategies and related market transformation integrating health, gender, environment and poverty alleviation are officially endorsed by developing and emerging economy national governments to achieve a sustainable, strategic structural change in their cooling product markets (to support full cooling product market transformation at regional and country level)~~ Increased participation of governments and private sector from developing and emerging economies in regional harmonization for efficiency of cooling sector and in national and local-initiatives to increase cooling efficiency and cooling access	~~*Number of regional policy roadmaps/programmes that are endorsed and/or adopted by national governments. (Baseline:0, Target 3 with Secured Funding, Overall Target 3 15).*~~ *Number of countries that have officially signed on/ committed to regional roadmaps to adopt policies or programmes in line with the project's guidance and tools* ~~*Number of national policy strategies that are endorsed / adopted by national governments concerning ozone-depleting substances, and refrigerants and energy efficient cooling.*~~ ~~*(Baseline:0, Target 8 with Secured Funding, Overall Target 10 30).*~~ *Number of countries that have officially adopted MEPS in line with project's model regulations* *Number of countries that have committed to or realized significant investments (e.g. USD10 M or more from national or state government or private sector) in specific cooling areas to increase*	*(i) Climate Change Mitigation, up to 55 million tonnes CO2eq cumulative 2020 to 2030, Approx. 70% of which is from the indirect emissions savings from electricity generation from fossil fuels (Energy) and 30% from the direct refrigerant emissions savings with the utilization of low GWP refrigerants (Chemicals). The primary indicator is the number of national cooling strategies delivered to designated ministries.* *(ii) Increase in the number of countries that have used UNEP analysis or guidance in developing or implementing legislation, policies or action plans that promote sound chemicals management and implementation of the relevant multilateral environmental agreements concerning climate friendly and energy efficient cooling products.* *The primary indicator is the number of national policy strategies that are endorsed / adopted by national governments.* *(Baseline:0, Target 6 with Secured Funding, Overall Target 30).*

Project Outcome/Output	Indicators	Relevant PoW Outcome(s) and indicator(s)
	cooling efficiency or access as a result of the project (such as through cold chain, district cooling projects, passive cooling projects, financial mechanisms)	*Part funded (for five Caribbean countries and Rwanda) which will accomplish a 5 million tonne total CO2eq cumulative mitigation 2020 to 2030.* *Part-funded (Ghana and Senegal):* • *Reduce indirect emissions by 5,076 kgCO2e through energy efficiency improvement.* • *Reduce direct emissions by 4,000 kgCO2e, assuming a switch from CFC 12 to R-600a and using cyclopentane 11 as the foam blowing agent.* *Part-funded (Egypt):* • *Reduce direct emissions by 1.7 million tonnes of CO2e over 20 years* • *Reduce 99% the HFC emissions in the area of implementation of the district cooling projects* *Part-funded (for ASEAN)* • *If MEPS and labels for air conditioners and refrigerators are adopted by the region, the estimated cumulative electricity savings for both products could amount to 468 terawatt hours – equivalent to USD 51 billion savings on electricity bills and 322 million tonnes indirect CO2 emissions by 2030.* *Part-funded (for sub-Saharan Africa)* • *If MEPS and labels for air conditioners and refrigerators are adopted by the region, the estimated cumulative electricity savings for both products could amount to 42 terawatt hours – equivalent to USD 4 billion savings on electricity bills and 28 million tonnes indirect CO2 emissions by 2030.* *Part-funded (India)* • *If two pilot states adopt new policies for cold chain that expand and shift rural cold chain to sustainable technologies and if pilot city results and national support programmes enable cities to decarbonise 5% of cooling demand, 90 million tonnes indirect CO2 emissions by 2030 can be avoided.*

Project Outcome/Output	Indicators	Relevant PoW Outcome(s) and indicator(s)
		Part-funded (Viet Nam) • *If five cities prepare Urban Cooling Action Plans with actions partially funded with support from a new national cooling fund, 50 million tonnes indirect CO2 emissions by 2030 can be avoided.*
~~*Output A) 3.1: Regional Policy Roadmap/Programmes*~~	~~*Number of regions with roadmaps delivered to national governments (Baseline:0, Target 3).*~~	
~~*Output B) 3.2: National Policy Strategy / Programmes*~~	~~*Number of strategies delivered to designated ministries (Baseline:0, Target 8).*~~	

ANNEX VII. EVALUATION FRAMEWORK

TOR Ref	Main Evaluation Criteria / Questions	Evaluation indicators	Sources / means of verification
Key strategic questions from the TOR			
Para 44	To what extent were synergies created in the training and use of tools between the national and regional levels to achieve full cooling product market transformation?	Qualitative	Interviews / surveys with responsible government entities and PMU
Para 44	What worked and did not work in terms of procurement?	Qualitative	Interviews / surveys with responsible government entities and PMU
Para 44	How were linkages made with other UNEP initiatives and opportunities for engagement with UNCT and UNSDCF in the project countries?	Qualitative	Progress reports, interviews with project team and all stakeholders
Para 44	To what extent has the Public-Private sector partnership collaboration been effective?	Qualitative.	Interview / survey question to all stakeholders, Project reports
Para 44	What changes were made to adapt to the effects of COVID-19 and how might any changes have affected the project's performance?	Qualitative. Any evidence of unintended consequences of Project	Project reports, interviews with project team and all stakeholders
A. Strategic Relevance: The extent to which the activity is suited to the priorities and policies of the target group, recipient and donor?			
Para 47	Alignment to the UNEP Medium Term Strategy (MTS), Programme of Work (POW) and Strategic Priorities. Alignment with the sponsoring parties' priorities? Bali Strategic Plan? South-South Cooperation? GEF? What was the scale and scope of the contributions to any of these?	Confirmation against past and updated priorities and strategies; Evidence of cooperation / networking / information sharing with region and other similar climatic regions.	Desktop review (already confirmed for design phase). Project documentation and all relevant frameworks and reports; interviews with country stakeholders; interviews with relevant UNEP interfaces.
Para 48	Alignment to Donor/GEF/Partner Strategic Priorities Alignment with the sponsoring parties' priorities? GEF?	Confirmation against past and updated priorities and strategies; Evidence of cooperation / networking / information sharing with region and other similar climatic regions – most notably related UNEP projects.	Desktop review (already confirmed for design phase). Project documentation and all relevant frameworks and reports; interviews with country stakeholders; interviews with relevant UNEP and/or GEF interfaces.

TOR Ref	Main Evaluation Criteria / Questions	Evaluation indicators	Sources / means of verification
Para 49	Relevance to Global, Regional, Sub-regional and National Environmental Priorities. Assess alignment with (i) SDGs and Agenda 2030, (ii) stated environmental concerns and needs of the countries, sub-regions or regions where it is being implemented, (iii) Nationally Appropriate Mitigation Action (NAMA) plans or regional agreements; and (iv) current policy priority to leave no one behind.	Confirm alignment with (i) SDGs and Agenda 2030, (ii) stated environmental concerns and needs of the countries, sub-regions or regions where it is being implemented, (iii) Nationally Determined Contributions (NDCs) or regional agreements; and (iv) current policy priority to leave no one behind.	Desktop review (already partly confirmed). Project documentation and all relevant frameworks and reports; interviews with country stakeholders; interviews with relevant UNEP and Project team.
Para 50	Complementary with existing Interventions?	Confirm against past and recently introduced interventions for synergies and alignment. Include in the assessment linkages with any UN Development Assistance Frameworks or One UN programming and/or where the UN's comparative advantage had been particularly well applied	Desktop review (already confirmed for design phase). Interviews with country stakeholders and project team.
B. Quality of Project Design			
Para 51	How satisfactory was the project design? Were any PRC responses (if any) adequately addressed, or did concerns materialize?	Assessment / rating template completed. Any further insights gained during the evaluation with specific consideration of: - Stakeholder participation and cooperation; - Responsiveness to human rights and gender equity.	Inception Report has a matrix of Project Design Quality from desktop review Project documentation and all relevant frameworks and reports Interviews with project team
C. Nature of External Context			
Para 51a	Where there any unforeseen developments that impacted the project success?	None anticipated or documented at design phase. Mention made of multiple changeovers in government during implementation period – confirm and clarify extent of impact.	Interviews with project team, triangulation through stakeholder interviews and supporting information available in public domain, as relevant.
D. Effectiveness: To what extent have the expected outcomes and objectives of the project been achieved?			
Para 52	Availability of Outputs – How successful was the project in producing the programmed outputs and delivery targets / milestones.	Evidence of programmed activities such as draft & adopted building codes, reports, publications, trainings, demonstration projects as per the revised indicators defined for the 12 re-worded outputs.	Interviews with project team (primarily) and partners Review of related documentation and progress and final project reports.

TOR Ref	Main Evaluation Criteria / Questions	Evaluation indicators	Sources / means of verification
	Were there any formal modifications / revisions made during the project implementation phase?	Challenges identified with completing deliverables and measures taken to mitigate. Impact of challenges with recruiting and retaining a PM Occurrence of change in project design/ implementation approach (i.e. restructuring) when needed to improve project efficiency	
Para 53	Achievement of Project Outcomes – How successful was the project interventions and implementation in achieving the intended outcomes not within the control of the team. What evidence supports attribution of success to UNEP's interventions? Also prompt around cross-cutting themes in the discussion i.e. factors and processes affecting project performance: (i) quality of project management and supervision, (ii) stakeholder participation and cooperation, (iii) responsiveness to human rights and gender equity, (iv) communication and public awareness.	Adoption of policies, strategies and roadmaps; Qualitative. Evidence of knowledge base and tools used to inform policy and developmental planning and decision-making (or commitment to do so) Evidence of improved awareness levels (general, ministries, manufacturers, installation and retail professionals; training feedback; Progress on adoption and implementation of policies, strategies, programmes, roadmaps and range of influence / leverage; Quantified and projected CO_2 emission reductions; Any evidence of growth in sales of sustainable cooling products and equipment seen i.e. available technologies, increased use of cooling installation professionals	Interviews with project team and partners. Interviews with stakeholders regarding adoption and implementation of sustainable cooling programmes Review of all related documentation and annual and quarterly reports. Survey of sustainable cooling professionals to test reach and influence of the project. Potential survey of regional representatives to test reach outside of selected countries.
Paras 54-57	Likelihood of Impact - How likely are the positive, intended impacts to occur? To what extent did the project catalyse, scale up or replicate positive impacts, such that they would have a long-term effect?	Further improvements to codes, standards or regulations planned / goal for sustainable cooling products and equipment being considered; Additional capacity created to drive increased deployment of sustainable cooling products and equipment and a reduction in GHG emissions; Have revisions to codes, building standards and regulations been adopted and/or embraced by building and cooling professionals? Have training and capacity building been done within relevant institutions? Evidence of financial mechanisms and framework e.g. green loans;	Interviews with project team and partners; Record of workshops / training events and attendance; Survey of NOOs and NEOs. Review of all related documentation, progress reports, final project report.

TOR Ref	Main Evaluation Criteria / Questions	Evaluation indicators	Sources / means of verification
		Catalytic effect of policies, National strategies and roadmaps; Quantified and projected CO2 emission reductions Examples of new partnerships and/or evidence that particular partnerships/linkages will be sustained. Types/quality of partnership cooperation methods utilized. Test the causal pathways, assumptions and drivers suggested by the reconstructed TOC. Evidence of reach beyond the borders in all 147 countries in terms of awareness, established capacity and/or adoption of sustainable cooling products and equipment.	
E. Financial Management: Completeness of information and communication between financial and project management staff			
Para 58	Adherence, Completeness & Communication – Are all records available? How much of the funds (from each source) were spent, and for which outputs? Compared to budget? How was co-funding released? Were the funds administered cost-effectively? How effectively did the Project & Task Managers & Fund Management Officer exchange information and adapt as needed to changes? Did any communication issues affect the quality of the project performance?	Availability and quality of financial and progress reports Timelines and adequacy of reporting provided Level of discrepancy between planned and utilized financial expenditures Planned vs. actual funds leveraged. Agility in responding to delays. Timing of advances and expenditure. Quality and regularity of reporting and communication Efficiency of communication and processing of funding reallocations for activities / outputs if needed.	Audits, Progress Reports, financial reports, Interviews with PM and financial team members / officers at UNEP
F. Efficiency: Extent to which the project delivered maximum results from the given resources			
Para 57-59	How cost effective was the project? Was it executed in a timely manner? How were delays managed to minimize impacts? Were events sequenced efficiently?	Adequacy of project choices in view of existing context, infrastructure and cost? Cost associated with delivery mechanism and management structure compared to alternatives?	Progress Reports, financial reports, comparative project and carbon costs

TOR Ref	Main Evaluation Criteria / Questions	Evaluation indicators	Sources / means of verification
	Could the project extension have been avoided? What was its cost impact? Were any cost-saving measures introduced? Were any efforts made during project implementation to make use of/build upon pre-existing institutions, agreements and partnerships, data sources, synergies and complementarities with other initiatives, programmes and projects etc. to increase project efficiency. Was anything done to minimise the UNEPs environmental footprint? What was the impact of no-cost extensions on partners / implementing parties?	Efforts for coordinated actions with other regional or national relevant initiatives	Interviews with PM and financial team members / officers at UNEP.
G. Monitoring and reporting			
Para 63	What was the performance at the project's completion against Core Indicator Targets?	GHG reductions by % reduction	Monitoring reports Interviews with PMU and stakeholders
Para 64	(i) Monitoring design and budgeting – was the M&E plan clear, SMART, adequate. Was there a budget allocation made for M&V	Monitoring plan; Effective tracking tool progress; adequacy of budget allocation; budget spend; challenges with plan and/or budget.	Monitoring reports, Interviews with PM and financial team members / officers at UNEP
Para 65	(ii) Monitoring of project implementation - Was the monitoring system operating? Did it facilitate timely tracking? Were allocated funds expended for monitoring?	Submissions of reports timeous and complete with respect to requirements of respective monitoring plans. Expenditures & payments align with approved budgets.	ProDoc, all relevant reporting. Interviews with Project team
Para 66	(iii) Project reporting - How regularly and completely were project reports and tracking tools completed and submitted?	Quality of results-based management reporting (progress reporting, monitoring and evaluation) Quality of project documentation and records Timelines and adequacy of reporting provided Dated reports; signed (or email) acknowledgements of receipt of reports. Completeness of reports, per agreed-upon requirements.	Reports, budgets, financial statements and correspondences. Interviews with PMU and relevant stakeholders.

TOR Ref	Main Evaluation Criteria / Questions	Evaluation indicators	Sources / means of verification
H. Sustainability: Probability of direct outcomes being maintained and developed after close of intervention			
Para 68	Socio-Political Sustainability – to what extent do social and political factors support the continuation and further development of the outcomes in terms of (a) level of ownership, interest and commitment to take the project forward, and (b) whether individual capacity development efforts are likely to be sustained.	Energy efficient policies for cooling products implemented and likely to be implemented (confirm extent of commitment). Evidence of developments (especially government) adopting energy-efficient cooling products into designs and construction Any additional institutional capacity for cooling products established? Quality / evidence of commitment (i.e. level and resource allocation) Quality / evidence of compelling EE and economic benefits or potential demonstrated Evidence of any innovative financial measures or incentives introduced.	Interviews with project team and project partners; Review of all related documentation, PIRs, and half-yearly and final project reports.
Para 69	Financial – Which, if any, outcomes require additional funding to be sustained? Were financial risks analyzed and adequately addressed in proposals and plans?	Identified outcomes requiring additional funding to be sustained	Interviews with project team and stakeholders; Budgets and reports
Para 70	Institutional – To what extent is sustainability dependent on institutional frameworks and governance	Adequacy of capacity to pursue, implement and enforce new policies across all areas of government. Quality / evidence of commitment (i.e. level and resource allocation) to the above. Structures created or in place to support this implementation e.g. workgroup, forum? Evidence of developments (especially government) adopting EE cooling practices into designs and construction Any additional institutional capacity established to drive EE in cooling products?	Interviews with project team and country partners; Review of all related documentation, progress and final project reports.

TOR Ref	Main Evaluation Criteria / Questions	Evaluation indicators	Sources / means of verification
I. Factors Affecting Project Performance			
Para 74	Stakeholder Participation and Cooperation: What were the progress, challenges and outcomes regarding engagement of stakeholders in the project?	Progress reports	Interviews with project team and country partners; Progress reports
Paras 75-77	Responsiveness to Human Rights and Gender Equality: What were the completed gender-responsive measures and, if applicable, actual gender result areas? (This should be based on the documentation at Approval, including gender-sensitive indicators contained in the project logical framework or gender action plan or equivalent)	Gender disaggregated data on the participation of women and marginalized groups to the Project activities	Progress, final project reports.
Para 78	Environmental and Social Safeguards: What was the progress made in the implementation of the management measures against the Safeguards Plan submitted at CEO Approval? The risk classifications reported in the latest progress report should be verified and the findings of the effectiveness of any measures or lessons learned taken to address identified risks assessed.	No environmental and social safeguard reports available from Project	No means of verification

ANNEX VIII. PROJECT DESIGN QUALITY SCORE

A.	Operating Context		YES/ NO	Comments/Implications for the evaluation design *(e.g. questions, TOC assumptions and drivers, methods and approaches, key respondents etc)*	Section Rating: 5
1	Does the project document identify any unusually challenging operational factors that are likely to negatively affect project performance?	i) Ongoing/high likelihood of conflict?	No	Likelihood of conflict is low	
		ii) Ongoing/high likelihood of natural disaster?	No	Likelihood of natural disasters is low	
		iii) Ongoing/high likelihood of change in national government?	Yes	Change in government for all the participating countries was highly likely, possibly delaying project approvals and investments	
B.	**Project Preparation**		**YES/ NO**	**Comments/Implications for the evaluation design** *(e.g. questions, TOC assumptions and drivers, methods and approaches, key respondents etc)*	**Section Rating: 5**
2	Does the project document entail clear and adequate problem and situation analyses?		Yes	Includes an extensive discussion of activities prior to Cooling Project for each country and an overview of their government's commitments, programmes and policies to address market transformation of cooling products	
3	Does the project document include a clear and adequate stakeholder analysis, including by gender/minority groupings or indigenous peoples?		Yes	A clear picture of stakeholders including gender and indigenous groupings.	
4	*If yes to Q3:* Does the project document provide a description of stakeholder consultation/participation during project design process? *(If yes, were any key groups overlooked: government, private sector, civil society, gendered groups and those who will potentially be negatively affected)*		Yes	Pg 17 of the Project Document	
5	Does the project document identify concerns with respect to human rights, including in relation to sustainable development? (e.g. integrated approach to human/natural systems; gender perspectives, rights of indigenous people).		Yes	Addresses sustainable development and human rights (notably in the SESP of Annex D)	

C	Strategic Relevance		YES/ NO	Comments/Implications for the evaluation design *(e.g. questions, TOC assumptions and drivers, methods and approaches, key respondents etc)*	Section Rating: 5
6	Is the project document clear in terms of its alignment and relevance to:	i) UNEP MTS, PoW and Strategic Priorities (including Bali Strategic Plan and South-South Cooperation)	Yes	Acknowledges UNEP's priority to promote resource efficiency but not referring to the BSP or South-South Cooperation	
		ii) GEF/Donor strategic priorities	Yes	n/a	
		iii) Regional, sub-regional and national environmental priorities?	Yes	National and regional priorities	
		iv) Complementarity with other interventions	No		
D	**Intended Results and Causality**		**YES/ NO**	**Comments/Implications for the evaluation design** *(e.g. questions, TOC assumptions and drivers, methods and approaches, key respondents etc)*	**Section Rating: 5**
7	Are the causal pathways from project outputs (Availability of goods and services to intended beneficiaries) through outcomes (changes in stakeholder behaviour) towards impacts (long lasting, collective change of state) clearly and convincingly described in either the logframe or the TOC? *(NOTE if there is no TOC in the project design documents a reconstructed TOC at Evaluation Inception will be needed)*		Yes	The language of the Output and Outcome indicators and targets is clear. However, the clarity of targets for Outcome 3 (Project Revision #1) needs improvement	
8	Are impact drivers and assumptions clearly described for each key causal pathway?		Yes	There are impact drivers and assumptions that are useful for the ToC.	
9	Are the roles of key actors and stakeholders, including gendered/minority groups, clearly described for each key causal pathway?		Yes	Key actors and stakeholders are described in the Project Document including gendered groups.	
10	Are the outcomes realistic with respect to the timeframe and scale of the intervention?		Yes	Yes, considering the actual project was achieved within a 60-month period.	
E	**Logical Framework and Monitoring**		**YES/ NO**	**Comments/Implications for the evaluation design** *(e.g. questions, TOC assumptions and drivers, methods and approaches, key respondents etc)*	**Section Rating: 4**
11	Does the logical framework …	i) Capture the key elements of the Theory of Change/intervention logic for the project?	Yes	Interventions have been well articulated.	

		ii) Have appropriate and 'SMART' results at output level?	Yes/ No	Small number of indicators and targets were not SMART leading to overlaps and confusion over what targets are to be achieved	
		iii) Have appropriate and 'SMART' results at outcome level?	No	Clarity of Outcome 3 results or targets needs to be improved. Hastily prepared PLF with a "non-specific" intended objective in addition to poorly worded Project outcomes with too many conditions and words for results and targets.	
		iv) Reflect the project's scope of work and ambitions?	Yes	Targets reflect the project scope and ambition in a specific manner.	
12	Is there baseline information in relation to key performance indicators?		Yes	Baseline information in general terms with some baseline information at the country level being good.	
13	Has the desired level of achievement (targets) been specified for indicators of outputs and outcomes?		Yes		
14	Are the milestones in the monitoring plan appropriate and sufficient to track progress and foster management towards outputs and outcomes?		Yes		
15	Have responsibilities for monitoring activities been made clear?		Yes	In Section 7 of the Project Document	
16	Has a budget been allocated for monitoring project progress?		Yes	In Section 7 of the Project Document	
17	Is the workplan clear, adequate and realistic? *(e.g. Adequate time between capacity building and take up etc)*		Yes	In Section 7 of the Project Document	
F	**Governance and Supervision Arrangements**		**YES/ NO**	**Comments/Implications for the evaluation design** *(e.g. questions, TOC assumptions and drivers, methods and approaches, key respondents etc)*	**Section Rating: 6**
18	Is the project governance and supervision model comprehensive, clear and appropriate? *(Steering Committee, partner consultations etc.)*		Yes	In Section 4 of the Project Document	
19	Are roles and responsibilities within UNEP clearly defined? *(If there are no stated responsibilities for UNEP Regional Offices, note where Regional Offices should be consulted prior to, and during, the evaluation)*		Yes	In Section 4 of the Project Document	
G	**Partnerships**		**YES/ NO**	**Comments/Implications for the evaluation design** *(e.g. questions, TOC assumptions and drivers, methods and approaches, key respondents etc)*	**Section Rating: 6**

20	Have the capacities of partners been adequately assessed? *(CHECK if partner capacity was assessed during inception/mobilisation where partners were either not known or changed after project design approval)*	Yes	In Section 4.2 of the Project Document	
21	Are the roles and responsibilities of external partners properly specified and appropriate to their capacities?	Yes	In Section 4.2 of the Project Document	
H	**Learning, Communication and Outreach**	**YES/ NO**	**Comments/Implications for the evaluation design** *(e.g. questions, TOC assumptions and drivers, methods and approaches, key respondents etc)*	**Section Rating: 5**
22	Does the project have a clear and adequate knowledge management approach?	Yes	See Section 5 in Project Document.	
23	Has the project identified appropriate methods for communication with key stakeholders, including gendered/minority groups, during the project life? *If yes, do the plans build on an analysis of existing communication channels and networks used by key stakeholders?*	Yes	See Section 5 in Project Document.	
24	Are plans in place for dissemination of results and lesson sharing at the end of the project? *If yes, do they build on an analysis of existing communication channels and networks?*	Yes	See Section 5 in Project Document.	
I	**Financial Planning / Budgeting**	**YES/ NO**	**Comments/Implications for the evaluation design** *(e.g. questions, TOC assumptions and drivers, methods and approaches, key respondents etc)*	**Section Rating: 5**
25	Are the budgets / financial planning adequate at design stage? *(coherence of the budget, do figures add up etc.)*	Yes	See Annex 1 in Project Revision #1	
26	Is the resource mobilization strategy reasonable/realistic? *(E.g. If the expectations are over-ambitious the delivery of the project outcomes may be undermined or if under-ambitious may lead to repeated no cost extensions)*	Yes	See Annex 1 in Project Revision #1	
J	**Efficiency**	**YES/ NO**	**Comments/Implications for the evaluation design** *(e.g. questions, TOC assumptions and drivers, methods and approaches, key respondents etc)*	**Section Rating: 5**
27	Has the project been appropriately designed/adapted in relation to the duration and/or levels of secured funding?	Yes	Duration and funding adequate for implementing Project activities	
28	Does the project design make use of / build upon pre-existing institutions, agreements and partnerships, data sources, synergies and complementarities with other initiatives, programmes and projects etc. to increase project efficiency?	Yes		

29	Does the project document refer to any value for money strategies (i.e. increasing economy, efficiency and/or cost-effectiveness)?	No	Instead, value for funding or money strategies "will allow UN Environment to promote the faster uptake of energy efficient, low global warming potential/climate friendly refrigeration and cooling equipment".	
30	Has the project been extended beyond its original end date? *(If yes, explore the reasons for delays and no-cost extensions during the evaluation)*	Yes	However, the Project received additional funds in July 2021, extending the Project by 12 months.	
K	**Risk identification and Social Safeguards**	**YES/ NO**	**Comments/Implications for the evaluation design** *(e.g. questions, TOC assumptions and drivers, methods and approaches, key respondents etc)*	**Section Rating: 5**
31	Are risks appropriately identified in both the TOC/logic framework and the risk table? *(If no, include key assumptions in reconstructed TOC at Evaluation Inception)*	Yes	Project Document pays a lot of attention to the risks of refrigerants in manufacture, shipping, and decommissioning/disposal and list this risk and 5 mitigation measure to be undertaken with regard to the "hazardous waste". Yet, in the Environmental Social and Economic Review Note (Annex D of the Project Document), "No" is the answer to every single question, even though there are mitigating measures in some cases for items in that annex. See Section 8 of Project Document	
32	Are potentially negative environmental, economic and social impacts of the project identified and is the mitigation strategy adequate*? (consider unintended impacts)*	Yes	See Section 8 of Project Document and response to Question 31.	
33	Does the project have adequate mechanisms to reduce its negative environmental foot-print? *(including in relation to project management and work implemented by UNEP partners)*	Yes	See Section 8 of Project Document and response to Question 31.	
L	**Sustainability / Replication and Catalytic Effects**	**YES/ NO**	**Comments/Implications for the evaluation design** *(e.g. questions, TOC assumptions and drivers, methods and approaches, key respondents etc)*	**Section Rating: 5**
34	Did the design address any/all of the following: socio-political, financial, institutional and environmental sustainability issues?	Yes	See Section 9 of Project Document	
35	Was there a credible sustainability strategy and/or appropriate exit strategy at design stage?	Yes	See Section 9 of Project Document	

36	Does the project design present strategies to promote/support scaling up, replication and/or catalytic action? *(if yes, capture this feature in the reconstructed TOC at Evaluation Inception)*	Yes	Rwanda pilots from Twinning 2.0 and national cooling strategy has since been picked up and scaled up in many other countries, with model regulation guidelines serving as the basis for MEPS and labels in entire regions.	
M	**Identified Project Design Weaknesses/Gaps**	**YES/ NO**	**Comments/Implications for the evaluation design** *(e.g. questions, TOC assumptions and drivers, methods and approaches, key respondents etc)*	**Section Rating: 5**
37	Were recommendations made by the PRC adopted in the final project design? If no, what were the critical issues raised by PRC that were not addressed.	No		
38	Were there any critical issues not flagged by PRC? (If yes, what were they?)	No		
N	**Gender Marker Score**	**SCORE**	**Comments**	**No rating.**
39	What is the Gender Marker Score applied by UNEP during project approval? *(This applies for projects approved from 2017 onwards)* UNEP Gender Scoring: **0 = gender blind:** Gender relevance is evident but not at all reflected in the project document. **1 = gender partially mainstreamed:** Gender is reflected in the context, implementation, logframe, **or** the budget. **2a = gender well mainstreamed throughout:** Gender is reflected in the context, implementation, logframe, **and** the budget. **2b = targeted action on gender:** (to advance gender equity): the principle purpose of the project is to advance gender equality. **n/a = gender is not considered applicable:** A gender analysis reveals that the project does not have direct interactions with, and/or impacts on, people. Therefore gender is considered not applicable.	2a		

CALCULATING THE OVERALL PROJECT DESIGN QUALITY SCORE

	SECTION	**RATING** (1-6)	**WEIGHTING**	**TOTAL** (Rating x Weighting)
A	Operating Context	5	0.4	0.2
B	Project Preparation	5	1.2	0.6
C	Strategic Relevance	5	0.8	0.4
D	Intended Results and Causality	5	1.6	0.8
E	Logical Framework and Monitoring	4	0.8	0.32
F	Governance and Supervision Arrangements	6	0.4	0.24
G	Partnerships	6	0.8	0.48
H	Learning, Communication and Outreach	5	0.4	0.2
I	Financial Planning / Budgeting	5	0.4	0.2
J	Efficiency	5	0.8	0.4
K	Risk identification and Social Safeguards	5	0.8	0.4
L	Sustainability / Replication and Catalytic Effects	5	1.2	0.6
M	Identified Project Design Weaknesses/Gaps	5	0.4	0.2
			TOTAL SCORE (Sum Totals)	**5.04 Satisfactory**

1 (Highly Unsatisfactory)	< 1.83	4 (Moderately Satisfactory)	>=3.5 <=4.33
2 (Unsatisfactory)	>= 1.83 < 2.66	5 (Satisfactory)	>4.33 <= 5.16
3 (Moderately Unsatisfactory)	>=2.66 <3.5	6 (Highly Satisfactory)	> 5.16

ANNEX IX. BRIEF CV OF THE EVALUATORS

Name:	ROLAND WONG
Position:	Chief Executive Officer of Clean Energy Alternatives Inc. International Energy and Environment Expert
Nationality:	Canadian
Education:	M.Eng., Civil Engineering (Water Resources and Environment), University of British Columbia, 1981 B.Eng., Civil Engineering, McGill University, Montreal, 1977
Professional Affiliations:	Registered Professional Engineer in British Columbia
Areas of Expertise:	Renewable energy development with a focus on waste to energy, hydropower and solar energy Energy efficiency in transport Evaluations of climate change mitigation projects
Countries of work experience:	Canada, Bangladesh, India, Pakistan, the Maldives, Cambodia, China, Malaysia, Thailand, Viet Nam, the Philippines, Indonesia, Fiji, Solomon Islands, Tuvalu, Tonga, Samoa, Georgia, Belarus, Bosnia and Herzegovina, Serbia, Slovakia, Romania, Russian Federation, Montenegro, Turkey, Kyrgyz Republic, Kazakhstan, Tajikistan, Egypt, Ethiopia, South Africa, Costa Rica, Dominican Republic, Haiti, St. Vincent and the Grenadines, Dominica and Peru.

Employment:		
	Clean Energy Alternatives Inc President, Vancouver, Canada	2005 to date
	Manager, Business Development, Vancouver, Canada *Klohn Crippen Consultants Limited*	2002-2005
	Environmental Management Specialist, Dhaka, Bangladesh and Halifax, Nova Scotia, Canada *KPMG Consulting*	1999-2002
	Manager, Watershed Division, Richmond, B.C., Canada *Klohn Crippen Consultants Limited*	1993-1999
	Water Resources Technical Advisor, Dhaka, Bangladesh *Northwest Hydraulics Consultants*	1988-1993
	Area Engineer/President, Williams Lake, B.C., Canada *Ducks Unlimited/Cariboo Engineering Limited*	1984-1988
	Hydropower Intermediate and Area Engineer, Vancouver, B.C. and Nipawin, Saskatchewan, Canada *Klohn Crippen Consultants Limited*	1981-1984
	Junior Hydraulics Engineer, Montreal, Quebec, Canada *Montreal Engineering Company Limited*	1978-1980

Roland has over 25 years' experience with a recent focus on the development and management of projects in sustainable transport, green city development, renewable energy and energy efficiency. These projects encompass his experience in environmental management, institutional capacity building, policy and economic analysis, planning, management, monitoring and evaluation for projects

in more than 35 countries. His demonstrated abilities and experience include adoption and market transformation of sustainable low carbon technologies; formulation and preparation of low carbon and climate change investment projects; partnership building as a means to achieving adoption of clean technologies and energy efficiency practice; development and mentoring of energy, environmental and water resource professionals; networking, coordinating and negotiating projects in low carbon and climate change in several countries.

Key assignments that he is undertaken in climate change mitigation includes:

- Serving as a Senior Director since 2008 for a private sector company based in Vancouver, Canada developing investments in biomass waste-to-energy and solar power development using patented technologies. This includes the use of a unique gasification / thermo-oxidizer unit to produce heat sufficient for 5.7 MW of power generation. This has involved preparation of "white papers" for the firm, studies on the comparative advantages of the WTE technology to competitors and dissemination of technical and financial information to prospective investors, financers, government policymakers and international donor institutions;
- Lead consultant in the formulation, preparation and evaluation (midterm and terminal) of several GEF projects since 2008 in low carbon/renewable energy development, energy efficiency, sustainable transport and green cities for several countries mainly in Asia, Eastern Europe and the Caribbean. Also involved with providing technical assistance in the management of these projects, sourcing of technical experts, strategic planning and strengthened monitoring and evaluation activities;
- Principal designer and international team leader for UNDP Bangladesh and UNDP-GEF (2002-2010) for a project to reduce GHGs from the brick making industry in Bangladesh. Completed concept formulation and PDF B (project preparation) phase that resulted in GEF commitment for full project funding in August 2006. GHG emission reductions based on market transformation and adoption to cleaner coal-fired kiln technology from China, increased awareness of the economic, environmental and social benefits on the use of a cleaner technology, increasing industry capacity to attract financial support for clean technologies, dissemination of a cleaner burning kiln throughout the industry. Facilitated discussions with stakeholders in the brick industry in Bangladesh, and provided a logical framework analysis in collaboration with a high calibre Bangladeshi team consisting of engineers, economists, financial and ex-government officers, and facilitated South-South cooperation on the project to access less energy intensive Chinese brick making technology. Provided assistance and negotiations to develop carbon finance that served as a means to reduce debt servicing costs for entrepreneurs;
- Served as environmental management specialist (1999-2002) for a CIDA-funded demonstration project in Bangladesh to introduce natural gas as an alternate fuel to mitigate urban air pollution for the Government of Bangladesh's Department of Environment. Activities were geared towards providing better stakeholder outreach in the planning and implementation of environmental management projects, to demonstrate credible efforts required to effect changes in environmental quality, to allow DoE an opportunity to review their policies and standards against project results, and to improve enforcement capacities. The project started with the conversion demonstration of the highly polluting two-stroke auto-rickshaws to CNG, a domestically available fuel. A monitoring program comparing CNG and gasoline-fueled auto-rickshaws revealed operational costs and emissions of CNG converted auto-rickshaws were reduced by over 75%. The project was widely viewed by all to be a major success since it catalyzed the alternate fuel debate and industry development and transformed the alternate fuels market in Bangladesh where over a 24-month period, the number of alternate fuel vehicles rose from 1,000 to over 20,000, and the sale of compressed natural gas (CNG) increased 10-fold.

Name: EUGENIA KATSIGRIS

PROFESSIONAL EXPERIENCE

PARNON GROUP, Dallas, Texas USA 2009 - present
Consultancy specializing in international development and cross-border business with focus on energy, environment, and natural resource sectors.
Principal: Both lead and team member in international development projects with focus on energy (renewable energy and energy efficiency), environment, and natural resources. Led design, mid-term review, or evaluation of multiple Global Environment Facility (GEF) Projects. Implementation of cross-border business projects and analyses.

ENERGY-ENVIRONMENT/BUSINESS CONSULTANT, Beijing, PRC; Dallas, USA 2000 - 2007
International development and business consultant with project-based work for organizations listed below:
Consultant: Extensive project-based engagements related to energy, the environment, and natural resources: United Nations Development Programme, World Bank, and Forest Trends. Additional engagements related to business and China: Hills & Co., China Institute

KAI, Beijing, PRC 1997† - 2009
First US consultancy to operate in PRC; has facilitated $4 billion in China business deals.
Principal, Managing Director, Project Director, and Project Manager: Both full-time and project-based work over the years† 1997-2001, 2003, 2005-2009, serving private equity and corporate clients in achieving China objectives. Roles included: management and recruiting for China operations; leading small, highly-focused project teams in analysis, strategy, partner identification, due diligence, and implementation for clients entering or expanding activities in China across of range of sectors.

JET PROPULSION LABORATORY, Pasadena, California, USA 1987 - 1991
One of world's premier research facilities; annual budget of over $1 billion; lead for NASA unmanned space missions.
Member of Technical Staff: Modeling and simulation, data analysis, and presentation of results related to satellite-based geodesy.

EDUCATION

UNIVERSITY OF CALIFORNIA AT BERKELEY
Interdisciplinary training in energy, natural resources, development, economics, and environment.
M.S. Energy and Resources, M.A. Asian Studies
1996
National Science Foundation and Social Science Research Council graduate fellowships. Extensive, original field work on technology transfer to rural enterprises in Qinghai Province and Mandarin training in China.

HARVARD UNIVERSITY
A.B. *summa cum laude* in Physics
1987
Phi Beta Kappa; Detur Prize; National Merit Scholar

ANNEX X. EVALUATION TORS (WITHOUT ANNEXES)

Section 1. OBJECTIVE AND SCOPE OF THE EVALUATION

Objective of the Evaluation

X-1. In line with the UNEP Evaluation Policy[59] and the UNEP Project and Programme Management Manual[60], the Terminal Evaluation is undertaken at operational completion of the project to assess project performance (in terms of relevance, effectiveness and efficiency), and determine outcomes and impacts (actual and potential) stemming from the project, including their sustainability. The Evaluation has two primary purposes: (i) to provide evidence of results to meet accountability requirements, and (ii) to promote operational improvement, learning and knowledge sharing through results and lessons learned among UNEP and project partners, including manufacturing partners and country partners. Therefore, the Evaluation will identify lessons of operational relevance for future project formulation and implementation, especially where a second phase of the project is being considered. Recommendations relevant to the whole house may also be identified during the evaluation process.

Key Evaluation Principles

X-2. Evaluation findings and judgements will be based on **sound evidence and analysis**, clearly documented in the Evaluation Report. Information will be triangulated (i.e. verified from different sources) as far as possible, and when verification is not possible, the single source will be mentioned (whilst anonymity is still protected). Analysis leading to evaluative judgements should always be clearly spelled out.

X-3. **The "Why?" Question.** As this is a Terminal Evaluation and a follow-up project or phase is envisaged for the future, particular attention will be given to learning from the experience. Therefore, the "*why*?" question should be at the front of the consultants' minds all through the evaluation exercise and is supported by the use of a theory of change approach. This means that the consultant(s) needs to go beyond the assessment of "*what*" the project performance was and make a serious effort to provide a deeper understanding of "*why*" the performance was as it was (i.e. what contributed to the achievement of the project's results). This should provide the basis for the lessons that can be drawn from the project.

X-4. **Attribution, Contribution and Credible Association:** In order to *attribute* any outcomes and impacts to a project intervention, one needs to consider the difference between what has happened with, and what would have happened without, the project (i.e. take account of changes over time and between contexts in order to isolate the effects of an intervention). This requires appropriate baseline data and the identification of a relevant counterfactual, both of which are frequently not available for evaluations. Establishing the *contribution* made by a project in a complex change process relies heavily on prior intentionality (e.g. approved project design documentation, logical framework) and the articulation of causality (e.g. narrative and/or illustration of the Theory of Change). Robust evidence that a project was delivered as designed and that the expected causal pathways developed supports claims of contribution and this is strengthened where an alternative theory of change can be excluded. A *credible association* between the implementation of a project and observed positive effects can be made where a strong causal narrative, although not explicitly articulated, can be inferred by the chronological sequence of events, active involvement of key actors and engagement in critical processes.

X-5. **Communicating evaluation results.** A key aim of the Evaluation is to encourage reflection and learning by UNEP staff and key project stakeholders. The consultant(s) should consider how reflection and learning can be promoted, both through the evaluation process and in the

[59] *https://www.unenvironment.org/about-un-environment/evaluation-office/policies-and-strategies*

[60] *https://wecollaborate.unep.org*

communication of evaluation findings and key lessons. Clear and concise writing is required on all evaluation deliverables. Draft and final versions of the Main Evaluation Report will be shared with key stakeholders by the Evaluation Manager. There may, however, be several intended audiences, each with different interests and needs regarding the report. The consultant(s) will plan with the Evaluation Manager which audiences to target and the easiest and clearest way to communicate the key evaluation findings and lessons to them. This may include some, or all, of the following; a webinar, conference calls with relevant stakeholders, the preparation of an Evaluation Brief or interactive presentation.

Key Strategic Questions

X-6. In addition to the evaluation criteria outlined in Section 10 below, the Evaluation will address the **strategic questions** listed below. These are questions of interest to UNEP and to which the project is believed to be able to make a substantive contribution:

- To what extent were synergies created in the training and use of tools between the national and regional levels to achieve full cooling product market transformation?
- Identify what worked and did not work in terms of procurement?
- Examine how linkages were made with other UNEP initiatives and opportunities for engagement with UNCT and UNSDCF in the project countries?
- To what extent has the Public-Private sector partnership collaboration been effective?
- What changes were made to adapt to the effects of COVID-19 and how might any changes have affected the project's performance?

Evaluation Criteria

X-7. All evaluation criteria will be rated on a six-point scale. Sections A-I below, outline the scope of the criteria. A weightings table in excel format will be provided by the Evaluation Manager to support the determination of an overall project rating. The set of evaluation criteria are grouped in nine categories: (A) Strategic Relevance; (B) Quality of Project Design; (C) Nature of External Context; (D) Effectiveness, which comprises assessments of the availability of outputs, achievement of outcomes and likelihood of impact; (E) Financial Management; (F) Efficiency; (G) Monitoring and Reporting; (H) Sustainability; and (I) Factors Affecting Project Performance. The Evaluation Consultant(s) can propose other evaluation criteria as deemed appropriate.

Strategic Relevance

X-8. The Evaluation will assess the extent to which the activity is suited to the priorities and policies of the donors, implementing regions/countries and the target beneficiaries. The Evaluation will include an assessment of the project's relevance in relation to UNEP's mandate and its alignment with UNEP's policies and strategies at the time of project approval. Under strategic relevance an assessment of the complementarity of the project with other interventions addressing the needs of the same target groups will be made. This criterion comprises four elements:

i. Alignment to the UNEP Medium Term Strategy[61] (MTS), Programme of Work (POW) and Strategic Priorities

X-9. The Evaluation should assess the project's alignment with the MTS and POW under which the project was approved and include, in its narrative, reflections on the scale and scope of any contributions made to the planned results reflected in the relevant MTS and POW. UNEP strategic priorities include the Bali Strategic Plan for Technology Support and Capacity Building[62] (BSP) and South-South Cooperation (S-SC). The BSP relates to the capacity of governments to: comply

[61] UNEP's Medium Term Strategy (MTS) is a document that guides UNEP's programme planning over a four-year period. It identifies UNEP's thematic priorities, known as Sub-programmes (SP), and sets out the desired outcomes, known as Expected Accomplishments (EAs), of the Sub-programmes. https://www.unenvironment.org/about-un-environment/evaluation-office/our-evaluation-approach/un-environment-documents

[62] http://www.unep.fr/ozonaction/about/bsp.htm

with international agreements and obligations at the national level; promote, facilitate and finance environmentally sound technologies and to strengthen frameworks for developing coherent international environmental policies. S-SC is regarded as the exchange of resources, technology and knowledge between developing countries.

ii. Alignment to Donor/Partner Strategic Priorities

X-10. Donor strategic priorities will vary across interventions. The Evaluation will assess the extent to which the project is suited to, or responding to, donor priorities. In some cases, alignment with donor priorities may be a fundamental part of project design and grant approval processes while in others, for example, instances of 'softly-earmarked' funding, such alignment may be more of an assumption that should be assessed.

iii. Relevance to Global, Regional, Sub-regional and National Environmental Priorities

X-11. The Evaluation will assess the alignment of the project with global priorities such as the SDGs and Agenda 2030. The extent to which the intervention is suited, or responding to, the stated environmental concerns and needs of the countries, sub-regions or regions where it is being implemented will be considered. Examples may include: UN Development Assistance Frameworks (UNDAF) or national or sub-national development plans, poverty reduction strategies or Nationally Appropriate Mitigation Action (NAMA) plans or regional agreements etc. Within this section consideration will be given to whether the needs of all beneficiary groups are being met and reflects the current policy priority to leave no one behind.

iv. Complementarity with Relevant Existing Interventions/Coherence[63]

X-12. An assessment will be made of how well the project, either at design stage or during the project inception or mobilization[64], took account of ongoing and planned initiatives (under the same subprogramme, other UNEP subprogrammes, or being implemented by other agencies within the same country, sector or institution) that address similar needs of the same target groups. The Evaluation will consider if the project team, in collaboration with Regional Offices and Sub-Programme Coordinators, made efforts to ensure their own intervention was complementary to other interventions, optimized any synergies and avoided duplication of effort. Examples may include UNDAFs or One UN programming. Linkages with other interventions should be described and instances where UNEP's comparative advantage has been particularly well applied should be highlighted.

Factors affecting this criterion may include:

- Stakeholders' participation and cooperation
- Responsiveness to human rights and gender equality
- Country ownership and driven-ness

Quality of Project Design

X-13. The quality of project design is assessed using an agreed template during the evaluation inception phase, ratings are attributed to identified criteria and an overall Project Design Quality rating is established. The complete Project Design Quality template should be annexed in the Evaluation Inception Report. Later, the overall Project Design Quality rating[65] should be entered in the final evaluation ratings table (as item B) in the Main Evaluation Report and a summary of the project's strengths and weaknesses at design stage should be included within the body of the report.

Factors affecting this criterion may include (at the design stage):

- Stakeholders participation and cooperation
- Responsiveness to human rights and gender equality

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[63] This sub-category is consistent with the new criterion of 'Coherence' introduced by the OECD-DAC in 2019.

[64] A project's inception or mobilization period is understood as the time between project approval and first disbursement. Complementarity during project implementation is considered under Efficiency, see below.

[65] *In some instances, based on data collected during the evaluation process, the assessment of the project's design quality may change from Inception Report to Main Evaluation Report.*

Nature of External Context

X-14. At evaluation inception stage a rating is established for the project's external operating context (considering the prevalence of conflict, natural disasters and political upheaval[66]). This rating is entered in the final evaluation ratings table as item C. Where a project has been rated as facing either an Unfavourable or Highly Unfavourable external operating context, and/or a negative external event has occurred during project implementation, the ratings for Effectiveness, Efficiency and/or Sustainability may be increased at the discretion of the Evaluation Consultant and Evaluation Manager together. A justification for such an increase must be given.

Effectiveness

Availability of Outputs[67]

X-15. The Evaluation will assess the project's success in producing the programmed outputs and making them available to the intended beneficiaries as well as its success in achieving milestones as per the project design document (ProDoc). Any *formal* modifications/revisions made during project implementation will be considered part of the project design. Where the project outputs are inappropriately or inaccurately stated in the ProDoc, reformulations may be necessary in the reconstruction of the Theory of Change (TOC). In such cases a table should be provided showing the original and the reformulation of the outputs for transparency. The availability of outputs will be assessed in terms of both quantity and quality, and the assessment will consider their ownership by, and usefulness to, intended beneficiaries and the timeliness of their provision. It is noted that emphasis is placed on the performance of those outputs that are most important to achieve outcomes. The Evaluation will briefly explain the reasons behind the success or shortcomings of the project in delivering its programmed outputs and meeting expected quality standards.

Factors affecting this criterion may include:

- Preparation and readiness
- Quality of project management and supervision[68]

Achievement of Project Outcomes[69]

X-16. The achievement of project outcomes is assessed as performance against the project outcomes as defined in the reconstructed[70] Theory of Change. These are outcomes that are intended to be achieved by the end of the project timeframe and within the project's resource envelope. Emphasis is placed on the achievement of project outcomes that are most important for attaining intermediate states. As with outputs, a table can be used where substantive amendments to the formulation of project outcomes is necessary to allow for an assessment of performance. The Evaluation should report evidence of attribution between UNEP's intervention and the project outcomes. In cases of normative work or where several actors are collaborating to achieve common outcomes, evidence of the nature and magnitude of UNEP's 'substantive contribution' should be included and/or 'credible association' established between project efforts and the project outcomes realised.

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[66] Note that 'political upheaval' does not include regular national election cycles, but unanticipated unrest or prolonged disruption. The potential delays or changes in political support that are often associated with the regular national election cycle should be part of the project's design and addressed through adaptive management by the project team. From March 2020 this should include the effects of COVID-19.

[67] Outputs are the availability (for intended beneficiaries/users) of new products and services and/or gains in knowledge, abilities and awareness of individuals or within institutions (UNEP, 2019)

[68] 'Project management and supervision' refers to the supervision and guidance provided by UNEP to implementing partners and national governments.

[69] Outcomes are the use (i.e. uptake, adoption, application) of an output by intended beneficiaries, observed as changes in institutions or behavior, attitude or condition (UNEP, 2019)

[70] All submitted UNEP project documents are required to present a Theory of Change. The level of 'reconstruction' needed during an evaluation will depend on the quality of this initial TOC, the time that has lapsed between project design and implementation (which may be related to securing and disbursing funds) and the level of any formal changes made to the project design.

Factors affecting this criterion may include:

- Quality of project management and supervision
- Stakeholders' participation and cooperation
- Responsiveness to human rights and gender equality
- Communication and public awareness

Likelihood of Impact

X-17. Based on the articulation of long-lasting effects in the reconstructed TOC *(i.e. from project outcomes, via intermediate states, to impact),* the Evaluation will assess the likelihood of the intended, positive impacts becoming a reality. Project objectives or goals should be incorporated in the TOC, possibly as intermediate states or long-lasting impacts. The Evaluation Office's approach to the use of TOC in project evaluations is outlined in a guidance note available and is supported by an excel-based flow chart, 'Likelihood of Impact Assessment Decision Tree'. Essentially the approach follows a 'likelihood tree' from project outcomes to impacts, taking account of whether the assumptions and drivers identified in the reconstructed TOC held. Any unintended positive effects should also be identified and their causal linkages to the intended impact described.

X-18. The Evaluation will also consider the likelihood that the intervention may lead, or contribute to, unintended negative effects (e.g. will vulnerable groups such as those living with disabilities and/or women and children, be disproportionally affected by the project?). Some of these potential negative effects may have been identified in the project design as risks or as part of the analysis of Environmental and Social Safeguards.

X-19. The Evaluation will consider the extent to which the project has played a catalytic role[71] or has promoted scaling up and/or replication as part of its Theory of Change (either explicitly as in a project with a demonstration component or implicitly as expressed in the drivers required to move to outcome levels) and as factors that are likely to contribute to greater or long-lasting impact.

X-20. Ultimately UNEP and all its partners aim to bring about benefits to the environment and human well-being. Few projects are likely to have impact statements that reflect such long-lasting or broad-based changes. However, the Evaluation will assess the likelihood of the project to make a substantive contribution to the long-lasting changes represented by the Sustainable Development Goals, and/or the intermediate-level results reflected in UNEP's Expected Accomplishments and the strategic priorities of funding partner(s).

Factors affecting this criterion may include:

- Quality of Project Management and Supervision (including adaptive management)
- Stakeholders participation and cooperation
- Responsiveness to human rights and gender equality
- Country ownership and driven-ness
- Communication and public awareness

[71] The terms catalytic effect, scaling up and replication are inter-related and generally refer to extending the coverage or magnitude of the effects of a project. Catalytic effect is associated with triggering additional actions that are not directly funded by the project – these effects can be both concrete or less tangible, can be intentionally caused by the project or implied in the design and reflected in the TOC drivers, or can be unintentional and can rely on funding from another source or have no financial requirements. Scaling up and Replication require more intentionality for projects, or individual components and approaches, to be reproduced in other similar contexts. Scaling up suggests a substantive increase in the number of new beneficiaries reached/involved and may require adapted delivery mechanisms while Replication suggests the repetition of an approach or component at a similar scale but among different beneficiaries. Even with highly technical work, where scaling up or replication involves working with a new community, some consideration of the new context should take place and adjustments made as necessary.

Financial Management

X-21. Financial management will be assessed under three themes: *adherence* to UNEP's financial policies and procedures, *completeness* of financial information and *communication* between financial and project management staff. The Evaluation will establish the actual spend across the life of the project of funds secured from all donors. This expenditure will be reported, where possible, at output/component level and will be compared with the approved budget. The Evaluation will verify the application of proper financial management standards and adherence to UNEP's financial management policies. Any financial management issues that have affected the timely delivery of the project or the quality of its performance will be highlighted. The Evaluation will record where standard financial documentation is missing, inaccurate, incomplete or unavailable in a timely manner. The Evaluation will assess the level of communication between the Project Manager and the Fund Management Officer as it relates to the effective delivery of the planned project and the needs of a responsive, adaptive management approach.

Factors affecting this criterion may include:

- Preparation and readiness
- Quality of project management and supervision

Efficiency

X-22. Under the efficiency criterion, the Evaluation will assess the extent to which the project delivered maximum results from the given resources. This will include an assessment of the cost-effectiveness and timeliness of project execution.

X-23. Focusing on the translation of inputs into outputs, *cost-effectiveness* is the extent to which an intervention has achieved, or is expected to achieve, its results at the lowest possible cost. *Timeliness* refers to whether planned activities were delivered according to expected timeframes as well as whether events were sequenced efficiently. The Evaluation will also assess to what extent any project extension could have been avoided through stronger project management and identify any negative impacts caused by project delays or extensions. The Evaluation will describe any cost or time-saving measures put in place to maximise results within the secured budget and agreed project timeframe and consider whether the project was implemented in the most efficient way compared to alternative interventions or approaches.

X-24. The Evaluation will give special attention to efforts made by the project teams during project implementation to make use of/build upon pre-existing institutions, agreements and partnerships, data sources, synergies and complementarities[72] with other initiatives, programmes and projects etc. to increase project efficiency.

X-25. The factors underpinning the need for any project extensions will also be explored and discussed. As management or project support costs cannot be increased in cases of 'no cost extensions', such extensions represent an increase in unstated costs to implementing parties.

Factors affecting this criterion may include:

- Preparation and readiness (e.g. timeliness)
- Quality of project management and supervision
- Stakeholders participation and cooperation

Monitoring and Reporting

X-26. The Evaluation will assess monitoring and reporting across three sub-categories: monitoring design and budgeting, monitoring implementation and project reporting.

[72] Complementarity with other interventions during project design, inception or mobilization is considered under Strategic Relevance above.

Monitoring Design and Budgeting

X-27. Each project should be supported by a sound monitoring plan that is designed to track progress against SMART[73] results towards the provision of the project's outputs and achievement of project outcomes, including at a level disaggregated by gender, marginalisation or vulnerability, including those living with disabilities. In particular, the Evaluation will assess the relevance and appropriateness of the project indicators as well as the methods used for tracking progress against them as part of conscious results-based management. The Evaluation will assess the quality of the design of the monitoring plan as well as the funds allocated for its implementation. The adequacy of resources for Mid-Term and Terminal Evaluation/Review should be discussed if applicable.

Monitoring of Project Implementation

X-28. The Evaluation will assess whether the monitoring system was operational and facilitated the timely tracking of results and progress towards projects objectives throughout the project implementation period. This assessment will include consideration of whether the project gathered relevant and good quality baseline data that is accurately and appropriately documented. This should include monitoring the representation and participation of disaggregated groups, including gendered, marginalised or vulnerable groups, such as those living with disabilities, in project activities. It will also consider the quality of the information generated by the monitoring system during project implementation and how it was used to adapt and improve project execution, achievement of outcomes and ensure sustainability. The Evaluation should confirm that funds allocated for monitoring were used to support this activity.

Project Reporting

X-29. UNEP has a centralised Project Information Management System (PIMS) in which project managers upload six-monthly progress reports against agreed project milestones. This information will be provided to the Evaluation Consultant(s) by the Evaluation Manager. Some projects have additional requirements to report regularly to funding partners, which will be supplied by the project team. The Evaluation will assess the extent to which both UNEP and donor reporting commitments have been fulfilled. Consideration will be given as to whether reporting has been carried out with respect to the effects of the initiative on disaggregated groups.

Factors affecting this criterion may include:

- Quality of project management and supervision
- Responsiveness to human rights and gender equality (e.g disaggregated indicators and data)

Sustainability

X-30. Sustainability[74] is understood as the probability of the benefits derived from the achievement of project outcomes being maintained and developed after the close of the intervention. The Evaluation will identify and assess the key conditions or factors that are likely to undermine or contribute to the endurance of achieved project outcomes (i.e. 'assumptions' and 'drivers'). Some factors of sustainability may be embedded in the project design and implementation approaches while others may be contextual circumstances or conditions that evolve over the life of the intervention. Where applicable an assessment of bio-physical factors that may affect the sustainability of project outcomes may also be included.

Socio-political Sustainability

X-31. The Evaluation will assess the extent to which social or political factors support the continuation and further development of the benefits derived from project outcomes. It will consider the level of ownership, interest and commitment among government and other stakeholders to take the

[73] SMART refers to results that are specific, measurable, achievable, relevant and time-oriented. Indicators help to make results measurable.

[74] As used here, 'sustainability' means the long-lasting maintenance of outcomes and consequent impacts, whether environmental or not. This is distinct from the concept of sustainability in the terms 'environmental sustainability' or 'sustainable development', which imply 'not living beyond our means' or 'not diminishing global environmental benefits' (GEF STAP Paper, 2019, Achieving More Enduring Outcomes from GEF Investment)

project achievements forwards. In particular the Evaluation will consider whether individual capacity development efforts are likely to be sustained.

Financial Sustainability

X-32. Some project outcomes, once achieved, do not require further financial inputs, e.g. the adoption of a revised policy. However, in order to derive a benefit from this outcome further management action may still be needed e.g. to undertake actions to enforce the policy. Other project outcomes may be dependent on a continuous flow of action that needs to be resourced for them to be maintained, e.g. continuation of a new natural resource management approach. The Evaluation will assess the extent to which project outcomes are dependent on future funding for the benefits they bring to be sustained. Secured future funding is only relevant to financial sustainability where a project's outcomes have been extended into a future project phase. Even where future funding has been secured, the question still remains as to whether the project outcomes are financially sustainable.

Institutional Sustainability

X-33. The Evaluation will assess the extent to which the sustainability of project outcomes (especially those relating to policies and laws) is dependent on issues relating to institutional frameworks and governance. It will consider whether institutional achievements such as governance structures and processes, policies, sub-regional agreements, legal and accountability frameworks etc. are robust enough to continue delivering the benefits associated with the project outcomes after project closure. In particular, the Evaluation will consider whether institutional capacity development efforts are likely to be sustained.

Factors affecting this criterion may include:

- Stakeholders participation and cooperation
- Responsiveness to human rights and gender equality (e.g. where interventions are not inclusive, their sustainability may be undermined)
- Communication and public awareness
- Country ownership and driven-ness

Factors Affecting Project Performance and Cross-Cutting Issues

Preparation and Readiness

X-34. This criterion focuses on the inception or mobilisation stage of the project (i.e. the time between project approval and first disbursement). The Evaluation will assess whether appropriate measures were taken to either address weaknesses in the project design or respond to changes that took place between project approval, the securing of funds and project mobilisation. In particular the Evaluation will consider the nature and quality of engagement with stakeholder groups by the project team, the confirmation of partner capacity and development of partnership agreements as well as initial staffing and financing arrangements. *(Project preparation is included in the template for the assessment of Project Design Quality).*

Quality of Project Management and Supervision

X-35. In some cases, 'project management and supervision' may refer to the supervision and guidance provided by UNEP to implementing partners and national governments while in others, it may refer to the project management performance of an implementing partner and the technical backstopping and supervision provided by UNEP. The performance of parties playing different roles should be discussed and a rating provided for both types of supervision (UNEP/Implementing Agency; Partner/Executing Agency) and the overall rating for this sub-category established as a simple average of the two.

X-36. The Evaluation will assess the effectiveness of project management with regard to: providing leadership towards achieving the planned outcomes; managing team structures; maintaining productive partner relationships (including Steering Groups etc.); maintaining project relevance within changing external and strategic contexts; communication and collaboration with UNEP colleagues; risk management; use of problem-solving; project adaptation and overall project execution. Evidence of adaptive management should be highlighted.

Stakeholder Participation and Cooperation

X-37. Here the term 'stakeholder' should be considered in a broad sense, encompassing all project partners, duty bearers with a role in delivering project outputs and target users of project outputs and any other collaborating agents external to UNEP and the implementing partner(s). The assessment will consider the quality and effectiveness of all forms of communication and consultation with stakeholders throughout the project life and the support given to maximise collaboration and coherence between various stakeholders, including sharing plans, pooling resources and exchanging learning and expertise. The inclusion and participation of all differentiated groups, including gender groups should be considered.

Responsiveness to Human Rights and Gender Equality

X-38. The Evaluation will ascertain to what extent the project has applied the UN Common Understanding on the human rights-based approach (HRBA) and the UN Declaration on the Rights of Indigenous People. Within this human rights context the Evaluation will assess to what extent the intervention adheres to UNEP's Policy and Strategy for Gender Equality and the Environment[75].

X-39. In particular the Evaluation will consider to what extent project implementation and monitoring have taken into consideration: (i) possible inequalities (especially those related to gender) in access to, and the control over, natural resources; (ii) specific vulnerabilities of disadvantaged groups (especially women, youth and children and those living with disabilities) to environmental degradation or disasters; and (iii) the role of disadvantaged groups (especially those related to gender) in mitigating or adapting to environmental changes and engaging in environmental protection and rehabilitation.

X-40. Note that the project's effect on equality (i.e. promoting human rights, gender equality and inclusion of those living with disabilities and/or belonging to marginalised/vulnerable groups) should be included within the TOC as a general driver or assumption where there is no dedicated result within the results framework. If an explicit commitment on this topic is made within the project document then the driver/assumption should also be specific to the described intentions.

Environmental and Social Safeguards

X-41. UNEP projects address environmental and social safeguards primarily through the process of environmental and social screening at the project approval stage, risk assessment and management (avoidance, minimization, mitigation or, in exceptional cases, offsetting) of potential environmental and social risks and impacts associated with project and programme activities. The Evaluation will confirm whether UNEP requirements[76] were met to: *review* risk ratings on a regular basis; *monitor* project implementation for possible safeguard issues; *respond* (where relevant) to safeguard issues through risk avoidance, minimization, mitigation or offsetting and r*eport* on the implementation of safeguard management measures taken. UNEP requirements for proposed projects to be screened for any safeguarding issues; for sound environmental and social risk assessments to be conducted and initial risk ratings to be assigned, are evaluated above under Quality of Project Design). The Evaluation will also consider the extent to which the management of the project minimised UNEP's environmental footprint.

Country Ownership and Driven-ness

X-42. The Evaluation will assess the quality and degree of engagement of government / public sector agencies in the project. While there is some overlap between Country Ownership and Institutional

[75] The Evaluation Office notes that Gender Equality was first introduced in the Project Review Committee Checklist in 2010 and, therefore, provides a criterion rating on gender for projects approved from 2010 onwards. Equally, it is noted that policy documents, operational guidelines and other capacity building efforts have only been developed since then and have evolved over time.
https://wedocs.unep.org/bitstream/handle/20.500.11822/7655/-Gender_equality_and_the_environment_Policy_and_strategy-2015Gender_equality_and_the_environment_policy_and_strategy.pdf.pdf?sequence=3&isAllowed=y

[76] For the review of project concepts and proposals, the Safeguard Risk Identification Form (SRIF) was introduced in 2019 and replaced the Environmental, Social and Economic Review note (ESERN), which had been in place since 2016. In GEF projects safeguards have been considered in project design since 2011.

Sustainability, this criterion focuses primarily on the forward momentum of the intended projects results, i.e. either a) moving forwards from outputs to project outcomes or b) moving forward from project outcomes towards intermediate states. The Evaluation will consider the engagement not only of those directly involved in project execution and those participating in technical or leadership groups, but also those official representatives whose cooperation is needed for change to be embedded in their respective institutions and offices (e.g. representatives from multiple sectors or relevant ministries beyond Ministry of Environment). This factor is concerned with the level of ownership generated by the project over outputs and outcomes and that is necessary for long-lasting impact to be realised. Ownership should extend to all gender and marginalised groups.

Communication and Public Awareness

X-43. The Evaluation will assess the effectiveness of: a) communication of learning and experience sharing between project partners and interested groups arising from the project during its life and b) public awareness activities that were undertaken during the implementation of the project to influence attitudes or shape behaviour among wider communities and civil society at large. The Evaluation should consider whether existing communication channels and networks were used effectively, including meeting the differentiated needs of gendered or marginalised groups, and whether any feedback channels were established. Where knowledge sharing platforms have been established under a project the Evaluation will comment on the sustainability of the communication channel under either socio-political, institutional or financial sustainability, as appropriate.

Section 2. EVALUATION APPROACH, METHODS AND DELIVERABLES

X-44. The Terminal Evaluation will be an in-depth evaluation using a participatory approach whereby key stakeholders are kept informed and consulted throughout the evaluation process. Both quantitative and qualitative evaluation methods will be used as appropriate to determine project achievements against the expected outputs, outcomes and impacts. It is highly recommended that the consultant(s) maintains close communication with the project team and promotes information exchange throughout the Evaluation implementation phase in order to increase their (and other stakeholder) ownership of the evaluation findings. Where applicable, the consultant(s) will provide a geo-referenced map that demarcates the area covered by the project and, where possible, provide geo-reference photographs of key intervention sites (e.g. sites of habitat rehabilitation and protection, pollution treatment infrastructure, etc.)

X-45. The findings of the Evaluation will be based on the following:

A desk review of:

- Relevant background documentation;
- Project design documents (including minutes of the project design review meeting at approval); Annual Work Plans and Budgets or equivalent, revisions to the project (Project Document Supplement), the logical framework and its budget;
- Project reports such as six-monthly progress and financial reports, progress reports from collaborating partners, meeting minutes, relevant correspondence etc.;
- Project deliverables: Model Regulation Guidelines and related regulatory and voluntary market interventions; Financial Mechanisms; Communications Strategies; Product Registration Systems; Country Savings Assessments; Training Curriculum; National Cooling Strategies; Regional Policy Roadmaps; Environmentally Sound Management of Used Equipment; Market Monitoring, Verification and Enforcement protocols; etc.;
- Evaluations/reviews of similar projects.

Interviews (individual or in group) with:

- UNEP Project Manager (PM);
- Project management team/ U4E;
- UNEP Fund Management Officer (FMO);
- Project partners, including major donors such as UK Defra and the Clean Cooling Collaborative (formerly K-CEP), industry partners such as International Copper Association

and Mabe; NGO partners such as CLASP, Lawrence Berkely National Laboratory, SADC Centre for Renewable Energy and Energy Efficiency and Natural Resources Defense Council; International and Regional Organizations such as SEforALL and the East Africa Centre of Excellence for Renewable Energy and Energy Efficiency;
- Sub-Programme Coordinator;
- Relevant resource persons;
- Representatives from civil society and specialist groups (such as women's, farmers and trade associations, etc.).

Surveys – The Evaluation Team will develop survey tools, as appropriate during the inception phase of the evaluation, to collect data from key stakeholders. Existing survey sources that may be useful include: Twinning Training Survey Results; voting results of East African Community and Southern African Development Community Technical Committees regarding proposed regional policy harmonization efforts.

Field visits – The Evaluation Team will assess feasibility of possible field visits during the inception phase of the evaluation. Possible locations include: Africa Centre of Excellence for Sustainable Cooling and Cold-Chain (ACES) headquarters in Kigali, Rwanda. Shop in Accra, Ghana selling EcoFridges appliances.

Other data collection tools – The Evaluation Team will assess need for and availability of other data collection tools during the inception phase of the evaluation. Possible sources are the regional Product Registration System findings from ASEAN; and Country Savings Assessment methodology.

X-46. An **Evaluation Reference Group** (ERG) is good practice for TEs of larger programmes or large 'flagship' projects. The members of the ERG will provide strategic direction to the Evaluation - based on their own experiences and contextual knowledge - and boost buy-in to, and the credibility and legitimacy of, the evaluation process across the range of evaluation stakeholders).

X-47. The ERG for this evaluation will be comprised of key selected stakeholders representing donors, the Technical Advisory Committee, manufacturing partners, and country level partners.

X-48. The ERG will discuss and provide comments on:

- the demand for the Evaluation – to ensure the Evaluation will meet the needs of its intended users (through a review of the evaluation terms of reference);
- the overall evaluation approach and the reconstructed Theory of Change of the project to help shape the Evaluation;
- the preliminary findings and recommendations of the Evaluation; and
- the Draft Evaluation Report, including the evaluation recommendations.

X-49. The ERG will appoint one of their members as the Chair or the Evaluation Office of UNEP may be the Chair. The Evaluation Office will provide the secretariat to the ERG. ERG feedback and comments at different stages of the evaluation process will be collated by the Evaluation Manager during planned discussion meetings. The Evaluation Manager will, in consultation with the Chair and other ERG members, set the agenda for the discussion meetings and support these meetings logistically. It is expected that four such meetings will be held during the evaluation process, as shown in Table 6.

Table 5. Evaluation Reference Group meetings

Meeting	Purpose	Location	Tentative date
1st	Introduce the ERG members and the Evaluation Team Elect the Chair	Virtual	June-July 2023
2nd	Discuss the preliminary findings of the Evaluation	Virtual	October 2023
3rd	Discuss the draft evaluation report, including the recommendations	Virtual	November-December 2023

Evaluation Deliverables and Review Procedures

X-50. The Evaluation Team will prepare:

X-51. **Inception Report:** (see Annex 1 for a list of all templates, tables and guidance notes) containing an assessment of project design quality, a draft reconstructed Theory of Change of the project, project stakeholder analysis, evaluation framework and a tentative evaluation schedule.

X-52. **Preliminary Findings:** typically in the form of a PowerPoint presentation, the sharing of preliminary findings is intended to support the participation of the project team, act as a means to ensure all information sources have been accessed and provide an opportunity to verify emerging findings. In the case of highly strategic project/portfolio evaluations or evaluations with an Evaluation Reference Group, the preliminary findings may be presented as a word document for review and comment.

X-53. **Draft and Final Evaluation Report:** containing an executive summary that can act as a stand-alone document; detailed analysis of the evaluation findings organised by evaluation criteria and supported with evidence; lessons learned and recommendations and an annotated ratings table.

X-54. A **Communications Product**, such as **Evaluation Brief** (a 2-page overview of the evaluand and evaluation findings) or **Infographic** for wider dissemination through the UNEP Evaluation Office website and LinkedIn account may be required. This will be discussed with the Evaluation Manager no later than during the finalization of the Inception Report.

X-55. **Review of the Draft Evaluation Report**. The Evaluation Consultants will submit a draft report to the Evaluation Manager and revise the draft in response to their comments and suggestions. Once a draft of adequate quality has been peer-reviewed and accepted, the Evaluation Manager will share the cleared draft report with the Project Manager, who will alert the Evaluation Manager in case the report contains any blatant factual errors. The Evaluation Manager will then forward the revised draft report (corrected by the Evaluation Consultants where necessary) to other project stakeholders, for their review and comments. The members of the Evaluation Reference Group and interviewed stakeholders will be invited to provide feedback on any errors of fact and may highlight the significance of such errors in any conclusions as well as providing feedback on the proposed recommendations and lessons. Any comments or responses to draft reports will be sent to the Evaluation Manager for consolidation. The Evaluation Manager will provide all comments to the Evaluation Consultants for consideration in preparing the final report, along with guidance on areas of contradiction or issues requiring an institutional response.

X-56. Based on a careful review of the evidence collated by the Evaluation Consultants and the internal consistency of the report, the Evaluation Manager will provide an assessment of the ratings in the final Main Evaluation Report. Where there are differences of opinion between the evaluator and the Evaluation Manager on project ratings, both viewpoints will be clearly presented in the final report. The Evaluation Office ratings will be considered the final ratings for the project.

X-57. The Evaluation Manager will prepare a **quality assessment** of the first draft of the Main Evaluation Report, which acts as a tool for providing structured feedback to the Evaluation Consultants. The quality of the final report will be assessed and rated against the criteria specified in template listed in Annex 1 and this assessment will be appended to the Final Evaluation Report.

X-58. At the end of the evaluation process, the Evaluation Office will prepare a **Recommendations Implementation Plan** in the format of a table, to be completed and updated at regular intervals by the Project Manager. The Evaluation Office will track compliance against this plan on a six-monthly basis for a maximum of 12 months.

The Evaluation Team

X-59. For this Evaluation, the Evaluation Team will consist of a Principal Evaluator and one Evaluation Specialist who will work under the overall responsibility of the Evaluation Office represented by Susanne Bech, Evaluation Manager, in consultation with the UNEP Project Managers Brian Holuj and Patrick Blake, Fund Management Officer, Amanda Lees and the Sub-programme Coordinator of Climate Action, Niklas Hagelberg. The Evaluation Team consultants will liaise with the Evaluation Manager on any procedural and methodological matters related to the Evaluation,

including travel. It is, however, each consultants' individual responsibility (where applicable) to arrange for their visas and immunizations as well as to plan meetings with stakeholders, organize online surveys, obtain documentary evidence and any other logistical matters related to the assignment. The UNEP Project Manager and project team will, where possible, provide logistical support (introductions, meetings etc.) allowing the consultants to conduct the Evaluation as efficiently and independently as possible.

X-60. The Principal Evaluator will be hired over a period of 9 months (June 2023-February 2024 and should have the following: a university degree in environmental sciences, international development or other relevant political or social sciences area is required and an advanced degree in the same areas is desirable; a minimum of 8 years of technical / evaluation experience is required, preferably including evaluating large, regional or global programmes and using a Theory of Change approach; and a good/broad understanding of climate change mitigation and adaptation is desired. English and French are the working languages of the United Nations Secretariat. For this consultancy, fluency in oral and written English is a requirement and proficiency in French or Spanish is desirable. Working knowledge of the UN system and specifically the work of UNEP is an added advantage. The work will be home-based with possible field visits.

X-61. The Evaluation Specialist will be hired over a period of 9 months (June 2023- February 2024) and should have the following: an undergraduate university degree in environmental sciences, international development or other relevant political or social sciences area is required; a minimum of 7 years of professional experience is required and working experience with evaluation of projects and a broad understanding of climate change mitigation and adaptation are required. English and French are the working languages of the United Nations Secretariat. For this consultancy fluency in oral and written English is a requirement and proficiency in French or Spanish is desirable. Working knowledge of the UN system and specifically the work of UNEP is an added advantage. The work will be home-based with possible field visits.

X-62. The Principal Evaluator will be responsible, in close consultation with the Evaluation Office of UNEP, for overall management of the Evaluation and timely provision of its outputs, described above in Section 11 Evaluation Deliverables. The Evaluation Specialist will make substantive and high- quality contributions to the evaluation process and outputs. Both consultants will ensure together that all evaluation criteria and questions are adequately covered.

X-63. Specifically, Evaluation Team members will undertake the following:

Specific Responsibilities for Principal Evaluator:

X-64. The Principal Evaluator will be responsible, in close consultation with the Evaluation Manager, for overall management of the Evaluation and timely provision of its outputs, described above in Section 11 Evaluation Deliverables.

Specific Responsibilities for the Evaluation Specialist:

X-65. The Evaluation Specialist will make substantive and high-quality contributions to the evaluation process and outputs. Both consultants will ensure together that all evaluation criteria and questions are adequately covered.

X-66. Requirements to the evaluation process and outputs entails:

Inception phase of the Evaluation, including:

- preliminary desk review and introductory interviews with project staff;
- draft the reconstructed Theory of Change of the project;
- prepare the evaluation framework;
- develop the desk review and interview protocols;
- draft the survey protocols (if relevant);
- develop and present criteria for country selection for the evaluation mission;
- plan the evaluation schedule;
- prepare the Inception Report, incorporating comments until approved by the Evaluation Manager

Data collection and analysis phase of the Evaluation, including:

- conduct further desk review and in-depth interviews with project implementing and executing agencies, project partners and project stakeholders;
- (where appropriate and agreed) conduct an evaluation mission to selected countries, visit the project locations, interview project partners and stakeholders, including a good representation of local communities. Ensure independence of the Evaluation and confidentiality of evaluation interviews.
- regularly report back to the Evaluation Manager on progress and inform of any possible problems or issues encountered and;
- keep the Project Manager informed of the evaluation progress.

Reporting phase, including:

- draft the Main Evaluation Report, ensuring that the evaluation report is complete, coherent and consistent with the Evaluation Manager guidelines both in substance and style;
- liaise with the Evaluation Manager on comments received and finalize the Main Evaluation Report, ensuring that comments are taken into account until approved by the Evaluation Manager
- prepare a Response to Comments annex for the main report, listing those comments not accepted by the Evaluation Consultant and indicating the reason for the rejection; and
- (where agreed with the Evaluation Manager) prepare an Evaluation Brief (2-page summary of the evaluand and the key evaluation findings and lessons) or Infographic(s).

Managing relations, including:

- maintain a positive relationship with evaluation stakeholders, ensuring that the evaluation process is as participatory as possible but at the same time maintains its independence;
- communicate in a timely manner with the Evaluation Manager on any issues requiring its attention and intervention.

Schedule of the Evaluation

X-67. The table below presents the tentative schedule for the Evaluation.

Table 6. Tentative schedule for the Evaluation

Milestone	Tentative Dates
Evaluation Initiation Meeting	June-July 2023
Inception Report	June-July 2023
Evaluation Mission	July-August 2023
E-based interviews, surveys etc.	July-September 2023
PowerPoint presentation on preliminary findings and recommendations	October 2023
Draft report to Evaluation Manager (and Peer Reviewer)	October 2023
Draft Report shared with UNEP Project Manager and team	November 2023
Draft Report shared with Evaluation Reference Group	November 2023
Draft Report shared with wider group of stakeholders	December 2023
Final Report	February 2024
Final Report shared with all respondents	February 2024

Contractual Arrangements

X-68. Evaluation Consultants will be selected and recruited by the Evaluation Office of UNEP under an individual Special Service Agreement (SSA) on a "fees only" basis (see below). By signing the service contract with UNEP/UNON, the consultant(s) certify that they have not been associated with the design and implementation of the project in any way which may jeopardize their independence and impartiality towards project achievements and project partner performance. In addition, they will not have any future interests (within six months after completion of the contract) with the project's executing or implementing units. All consultants are required to sign the Code of Conduct Agreement Form.

X-69. Fees will be paid on an instalment basis, paid on acceptance by the Evaluation Manager of expected key deliverables. The schedule of payment is as follows:

Schedule of Payment for the Principal Evaluator:

Deliverable	Percentage Payment
Approved Inception Report (as per annex document #9)	30%
Approved Draft Main Evaluation Report (as per annex document #10)	30%
Approved Final Main Evaluation Report	40%

Schedule of Payment for the Evaluation Specialist:

Deliverable	**Percentage Payment**
Approved Inception Report (as per annex document #9)	30%
Approved Draft Main Evaluation Report (as per annex document #10)	30%
Approved Final Main Evaluation Report	40%

X-70. Fees only contracts: Where applicable, air tickets will be purchased by UNEP and 75% of the Daily Subsistence Allowance for each authorised travel mission will be paid up front. Local in-country travel will only be reimbursed where agreed in advance with the Evaluation Manager and on the production of acceptable receipts. Terminal expenses and residual DSA entitlements (25%) will be paid after mission completion.

X-71. The consultants may be provided with access to UNEP's information management systems (e.g PIMS, Anubis, Sharepoint etc.) and if such access is granted, the consultants agree not to disclose information from that system to third parties beyond information required for, and included in, the evaluation report.

X-72. In case the consultants are not able to provide the deliverables in accordance with these guidelines, and in line with the expected quality standards by the UNEP Evaluation Office, payment may be withheld at the discretion of the Director of the Evaluation Office until the consultants have improved the deliverables to meet UNEP's quality standards.

X-73. If the consultant(s) fail to submit a satisfactory final product to UNEP in a timely manner, i.e. before the end date of their contract, the Evaluation Office reserves the right to employ additional human resources to finalize the report, and to reduce the consultants' fees by an amount equal to the additional costs borne by the Evaluation Office to bring the report up to standard[77].

[77] This may include contract cancellation in-line with prevailing UN Secretariat rules.

ANNEX XI. QUALITY ASSESSMENT OF THE EVALUATION REPORT

Quality Assessment of the Evaluation Report

Evaluand Title:

Terminal Evaluation: "Building high-level support and capacities to enhance climate and ozone protection through cooling efficiency (Cooling Project)" PIMS no. 01992, 2017 – 2022

All UNEP evaluations are subject to a quality assessment by the Evaluation Office. This is an assessment of the quality of the evaluation product (i.e. evaluation report) and is dependent on more than just the consultant's efforts and skills.

	UNEP Evaluation Office Comments	Final Report Rating
Report Quality Criteria		
Quality of the Executive Summary Purpose: acts as a stand alone and accurate summary of the main evaluation product, especially for senior management. To include: • concise overview of the evaluation object • clear summary of the evaluation objectives and scope • overall evaluation rating of the project and key features of performance (strengths and weaknesses) against exceptional criteria • reference to where the evaluation ratings table can be found within the report • summary response to key strategic evaluation questions • summary of the main findings of the exercise/synthesis of main conclusions • summary of lessons learned and recommendations.	Final report *(coverage/omissions)*: All required elements are addressed. Project background and project identification table completed. Short description of evaluation approach and methods in This evaluation section. Key findings section with statement on achievement of outcomes, likelihood of impact and sustainability, summarized ratings table, overall performance rating and table with responses to the five strategic questions, Conclusions section, and summarized Lessons Learned and Recommendations. Final report *(strengths/weaknesses)*: Well-written and summarized executive summary highlighting key successes of the project. Lesson 1 includes a text box with 'Cooling project best practices in awareness, advocacy and capacity building'.	5.5
Quality of the 'Introduction' Section Purpose: introduces/situates the evaluand in its institutional context, establishes its main parameters (time, value, results, geography) and the purpose of the evaluation itself. To include: • institutional context of the project (subprogramme, Division, Branch etc) • date of PRC approval, project duration and start/end dates • number of project phases (where appropriate) • results frameworks to which it contributes (e.g. POW Direct Outcome) • coverage of the evaluation (regions/countries where implemented) • implementing and funding partners • total secured budget	Final report *(coverage/omissions)*: All required elements are addressed. Detailed description of context of project scope and wider institutional context, project funding project framework and purpose and audience of the evaluation. Final report *(strengths/weaknesses)*: Good concise introduction to the evaluand including context description of complex multi actor environment in state of change.	5

• whether the project has been evaluated in the past (e.g. mid-term, external agency etc.) • concise statement of the purpose of the evaluation and the key intended audience for the findings.		
Quality of the 'Evaluation Methods' Section Purpose: provides reader with clear and comprehensive description of evaluation methods, demonstrates the credibility of the findings and performance ratings. To include: • description of evaluation data collection methods and information sources • justification for methods used (e.g. qualitative/ quantitative; electronic/face-to-face) • number and type of respondents *(see table template)* • selection criteria used to identify respondents, case studies or sites/countries visited • strategies used to increase stakeholder engagement and consultation • methods to include the voices/experiences of different and potentially excluded groups (e.g. vulnerable, gender, marginalised etc) • details of how data were verified (e.g. triangulation, review by stakeholders etc.) • methods used to analyse data (scoring, coding, thematic analysis etc) • evaluation limitations (e.g. low/ imbalanced response rates across different groups; gaps in documentation; language barriers etc) • ethics and human rights issues should be highlighted including: how anonymity and confidentiality were protected. Is there an ethics statement? E.g. *'Throughout the evaluation process and in the compilation of the Final Evaluation Report efforts have been made to represent the views of both mainstream and more marginalised groups. All efforts to provide respondents with anonymity have been made.*	Final report *(coverage/omissions):* All required elements described including UNEP's evaluation approach, the evaluation process, data collection process including data collection methods and tools, and secondary data sources, and limitations and mitigation strategy. Final report *(strengths/weaknesses):* Mention of gender equity and women's empowerment inclusion in the evaluation process. Ethics and human rights considerations included.	5
Quality of the 'Project' Section Purpose: describes and verifies key dimensions of the evaluand relevant to assessing its performance. To include: • *Context:* overview of the main issue that the project is trying to address, its root causes and consequences on the environment and human well-being (i.e. synopsis of the problem and situational analyses)	Final report *(coverage/omissions):* All required elements described including description of context, project logical framework, stakeholders, project implementation structure and partners, project financing, and that there was no project mid-term evaluation but there were changes in design during implementation, and project financing.	5

• *Results framework*: summary of the project's results hierarchy as stated in the ProDoc (or as officially revised) • *Stakeholders:* description of groups of targeted stakeholders organised according to relevant common characteristics • *Project implementation structure and partners:* description of the implementation structure with diagram and a list of key project partners • *Changes in design during implementation:* any key events that affected the project's scope or parameters should be described in brief in chronological order • *Project financing:* completed tables of: (a) budget at design and expenditure by components (b) planned and actual sources of funding/co-financing	Final report *(strengths/weaknesses):* Stakeholder analysis of key actors by power and interest and role in the project in table 2.	
Quality of the Theory of Change Purpose: to set out the TOC at Evaluation in diagrammatic and narrative forms to support consistent project performance; to articulate the causal pathways with drivers and assumptions and justify any reconstruction necessary to assess the project's performance. To include: • description of how the *TOC at Evaluation*[78] was designed (who was involved etc) • confirmation/reconstruction of results in accordance with UNEP definitions • articulation of causal pathways • identification of drivers and assumptions • identification of key actors in the change process • summary of the reconstruction/results re-formulation in tabular form. *The two results hierarchies (original/formal revision and reconstructed) should be presented as a two-column table to show clearly that, although wording and placement may have changed, the results 'goal posts' have not been 'moved'.* This table may have initially been presented in the Inception Report and should appear somewhere in the Main Evaluation report.	Final report *(coverage/omissions):* All required elements presented including detailed review of the TOC and presentation of RTOC in view of project revision. Table with RTOC changes and figure depicting the RTOC included. Description of pathways from outputs to outcome and from outcomes, intermediate state to impact, drivers and assumptions. Final report *(strengths/weaknesses):* Table for formulation of RTOC and RTOC figure presented with narrative of causal pathways.	5

[78] During the Inception Phase of the evaluation process a *TOC at Evaluation Inception* is created based on the information contained in the approved project documents (these may include either logical framework or a TOC or narrative descriptions), formal revisions and annual reports etc. During the evaluation process this TOC is revised based on changes made during project intervention and becomes the *TOC at Evaluation*.

Quality of Key Findings within the Report Presentation of evidence: nature of evidence should be clear (interview, document, survey, observation, online resources etc) and evidence should be explicitly triangulated unless noted as having a single source. Consistency within the report: all parts of the report should form consistent support for findings and performance ratings, which should be in line with UNEP's Criteria Ratings Matrix. Findings Statements (where applicable): The frame of reference for a finding should be an individual evaluation criterion or a strategic question from the TOR. **A finding should go beyond description and uses analysis to provide insights that aid learning specific to the evaluand.** In some cases a findings statement may articulate a key element that has determined the performance rating of a criterion. Findings will frequently provide insight into 'how' and/or 'why' questions.	Final report *(coverage/omissions):* Findings presented with evidence and triangulated. Consistency within the report of evidence and findings. Final report *(strengths/weaknesses):* Concise and evidence-based findings presented. Detailed presentation of availability of outputs in this large project expands 25 pages.	5.5
Quality of 'Strategic Relevance' Section Purpose: to present evidence and analysis of project strategic relevance with respect to UNEP, partner and geographic policies and strategies at the time of project approval. To include: Assessment of the evaluand's relevance vis-à-vis: • Alignment to the UNEP Medium Term Strategy (MTS), Programme of Work (POW) and Strategic Priorities • Alignment to Donor/GEF/Partners Strategic Priorities • Relevance to Regional, Sub-regional and National Environmental Priorities • Complementarity with Existing Interventions: complementarity of the project at design (or during inception/mobilisation[79]), with other interventions addressing the needs of the same target groups.	Final report *(coverage/omissions):* Section covers the sub-criteria and provides evidence of analysis. Rating for sub-criteria and overall rating of strategic relevance provided. Final report *(strengths/weaknesses):* Detailed section on complementarity with existing interventions/ coherence.	5
Quality of the 'Quality of Project Design' Section Purpose: to present a summary of the strengths and weaknesses of the project design, on the basis that the detailed assessment was presented in the Inception Report.	Final report *(coverage/omissions):* Section presents in detail both strength and weaknesses of the project design with insights. Final report *(strengths/weaknesses):*	5

[79] A project's inception or mobilization period is understood as the time between project approval and first disbursement. Complementarity during project implementation is considered under Efficiency, see below.

	Project Design Quality template included as Annex VIII to the report.	
Quality of the 'Nature of the External Context' Section Purpose: to describe and recognise, when appropriate, key external features of the project's implementing context that limited the project's performance (e.g. conflict, natural disaster, political upheaval[80]), and how they affected performance. While additional details of the implementing context may be informative, this section should clearly record whether or not a major and unexpected disrupting event took place during the project's life in the implementing sites.	Final report *(coverage/omissions):* Section describes events that occurred over implementation period and their effect. Final report *(strengths/weaknesses):* Effects of the COVID-19 pandemic and oil prices are assessed.	5
Quality of 'Effectiveness' Section **(i) Availability of Outputs:** Purpose: to present a well-reasoned, complete and evidence-based assessment of the outputs made available to the intended beneficiaries. To include: • a convincing, evidence-supported and clear presentation of the outputs made available by the project compared to its approved plans and budget • assessment of the nature and scale of outputs versus the project indicators and targets • assessment of the timeliness, quality and utility of outputs to intended beneficiaries • identification of positive or negative effects of the project on disadvantaged groups, including those with specific needs due to gender, vulnerability or marginalisation (e.g. through disability).	Final report *(coverage/omissions):* A very detailed review of available outputs delivered by the project is presented. Final report *(strengths/weaknesses):* A very detailed description of a large project with many outputs includes regional and country level outputs. Assessment of quality and utility of outputs.	5.5
ii) Achievement of Project Outcomes: Purpose: to present a well-reasoned, complete and evidence-based assessment of the uptake, adoption and/or implementation of outputs by the intended beneficiaries. This may include behaviour changes at an individual or collective level. To include: • a convincing and evidence-supported analysis of the uptake of outputs by intended beneficiaries	Final report *(coverage/omissions):* Section covers purpose and elements required. Achievement of 3 outcomes as defined in the RTOC. Assessment of drivers in place.	5

[80] Note that 'political upheaval' does not include regular national election cycles, but unanticipated unrest or prolonged disruption. The potential delays or changes in political support that are often associated with the regular national election cycle should be part of the project's design and addressed through adaptive management of the project team.

• assessment of the nature, depth and scale of outcomes versus the project indicators and targets • discussion of the contribution, credible association and/or attribution of outcome level changes to the work of the project itself • any constraints to attributing effects to the projects' work • identification of positive or negative effects of the project on disadvantaged groups, including those with specific needs due to gender, vulnerability or marginalisation (e.g. through disability).	Final report *(strengths/weaknesses):* Assessment of outcomes as defined in the reconstructed ToC.	
(iii) Likelihood of Impact: Purpose: to present an integrated analysis, guided by the causal pathways represented by the TOC, of all evidence relating to likelihood of impact, including an assessment of the extent to which drivers and assumptions necessary for change to happen, were seen to be holding. To include: • an explanation of how causal pathways emerged and change processes can be shown • an explanation of the roles played by key actors and change agents • explicit discussion of how drivers and assumptions played out • identification of any unintended negative effects of the project, especially on disadvantaged groups, including those with specific needs due to gender, vulnerability or marginalisation (e.g. through disability).	Final report *(coverage/omissions):* Assessment of drivers and assumptions, mostly these are partially held. Final report *(strengths/weaknesses):* Assessment includes reference to other interventions and relevant events as well as spill-over.	5
Quality of 'Financial Management' Section Purpose: to present an integrated analysis of all dimensions evaluated under financial management and include a completed 'financial management' table (may be annexed). Consider how well the report addresses the following: • *adherence* to UNEP's financial policies and procedures • *completeness* of financial information, including the actual project costs (total and per activity) and actual co-financing used • *communication* between financial and project management staff	Final report *(coverage/omissions):* All required elements are covered. Adherence to financial policies and procedures, completeness of financial information and communication between finance and project management staff are described. Final report *(strengths/weaknesses):* Concise description and assessment. Details of staff, consultants and procurement provided.	5
Quality of 'Efficiency' Section Purpose: to present an integrated analysis of all dimensions evaluated under efficiency (i.e. the primary categories of cost-effectiveness and timeliness). To include:	Final report *(coverage/omissions):* Assessment of efficiency include timeliness and timeline with the project duration and cost efficiencies.	5

• time-saving measures put in place to maximise results within the secured budget and agreed project timeframe • discussion of making use, during project implementation, of/building on pre-existing institutions, agreements and partnerships, data sources, synergies and complementarities with other initiatives, programmes and projects etc. • implications of any delays and no cost extensions • the extent to which the management of the project minimised UNEP's environmental footprint.	Final report *(strengths/weaknesses):* Many examples from the project provided as evidence. UNEP carbon footprint mentioned under virtual meeting strategy under COVID.	
Quality of 'Monitoring and Reporting' Section Purpose: to present well-reasoned, complete and evidence-based assessment of the evaluand's monitoring and reporting. Consider how well the report addresses the following: • quality of the monitoring design and budgeting *(including SMART results with measurable indicators, resources for MTE/R etc.)* • quality of monitoring of project implementation *(including use of monitoring data for adaptive management)* • quality of project reporting *(e.g. PIMS and donor reports)* \	Final report *(coverage/omissions):* Satisfactory assessment of monitoring design and budgeting, monitoring of project implementation and project reporting. Final report *(strengths/weaknesses):* Evidence-based assessment with the Evaluation Team's findings and conclusions including review of overlap and insufficient delineation between outcomes/ clarity issues.	5.5
Quality of 'Sustainability' Section Purpose: to present an integrated analysis of all dimensions evaluated under sustainability (i.e. the endurance of benefits achieved at outcome level). Consider how well the report addresses the following: • socio-political sustainability • financial sustainability • institutional sustainability	Final report *(coverage/omissions):* Satisfactory assessment of sustainability and the 3 sub-criteria by each of the 3 project outcomes. Final report *(strengths/weaknesses):* Evidence-based assessment of the project's three outcomes.	5
Quality of Factors Affecting Performance Section Purpose: These factors are not always discussed in stand-alone sections and may be integrated in the other performance criteria as appropriate. However, if not addressed substantively in this section, a cross reference must be given to where the topic is addressed and that entry must be sufficient to justify the performance rating for these factors. Consider how well the evaluation report, either in this section or in cross-referenced sections, covers the following cross-cutting themes: • preparation and readiness	Final report *(coverage/omissions):* All sub-criteria under factors affecting performance assessed and sufficient to justify for ratings. Final report *(strengths/weaknesses):* Concise and satisfactory assessment provided.	5

• quality of project management and supervision[81] • stakeholder participation and co-operation • responsiveness to human rights and gender equality • environmental and social safeguards • country ownership and driven-ness • communication and public awareness		
Quality of the Conclusions Section **(i) Conclusions Narrative:** Purpose: to present summative statements reflecting on prominent aspects of the performance of the evaluand as a whole, they should be derived from the synthesized analysis of evidence gathered during the evaluation process. To include: • compelling narrative providing an integrated summary of the strengths and weakness in overall performance (achievements and limitations) of the project • clear and succinct response to the key strategic questions • human rights and gender dimensions of the intervention should be discussed explicitly (e.g. how these dimensions were considered, addressed or impacted on)	Final report *(coverage/omissions):* Conclusions presented as a summarized narrative of successes of the project and weaknesses of the project, responses to the five strategic questions and table with summary of project findings and ratings. Final report *(strengths/weaknesses):* Concise and conclusive presentation of success and weaknesses as assessed by the Evaluation Team in the report.	5
ii) Utility of the Lessons: Purpose: to present both positive and negative lessons that have potential for wider application and use (replication and generalization) Consider how well the lessons achieve the following: • are rooted in real project experiences (i.e. derived from explicit evaluation findings or from problems encountered and mistakes made that should be avoided in the future) • briefly describe the context from which they are derived and those contexts in which they may be useful • do not duplicate recommendations	Final report *(coverage/omissions):* Nine lessons presented in the prescribed format. Final report *(strengths/weaknesses):* Well formulated lessons.	5
(iii) Utility and Actionability of the Recommendations: Purpose: to present proposals for specific action to be taken by identified people/position-holders	Final report *(coverage/omissions):* Eight recommendations presented in the prescribed format.	5

[81] In some cases 'project management and supervision' will refer to the supervision and guidance provided by UNEP to implementing partners and national governments while in others, specifically for GEF funded projects, it will refer to the project management performance of the executing agency and the technical backstopping provided by UNEP. This includes providing the answers to the questions on Core Indicator Targets, stakeholder engagement, gender responsiveness, safeguards and knowledge management, required for the GEF portal.

to resolve concrete problems affecting the project or the sustainability of its results. Consider how well the lessons achieve the following: • are feasible to implement within the timeframe and resources available (including local capacities) and specific in terms of who would do what and when • include at least one recommendation relating to strengthening the human rights and gender dimensions of UNEP interventions • represent a measurable performance target in order that the Evaluation Office can monitor and assess compliance with the recommendations. NOTES: **(i)** In cases where the recommendation is addressed to a third party, compliance can only be monitored and assessed where a contractual/legal agreement remains in place. Without such an agreement, the recommendation should be formulated to say that UNEP project staff should pass on the recommendation to the relevant third party in an effective or substantive manner. The effective transmission by UNEP of the recommendation will then be monitored for compliance. **(ii)** Where a new project phase is already under discussion or in preparation with the same third party, a recommendation can be made to address the issue in the next phase.	Final report *(strengths/weaknesses):* Recommendations with focus on project level, organizational level and partner level.	
Quality of Report Structure and Presentation **(i) Structure and completeness of the report:** To what extent does the report follow the Evaluation Office structure and formatting guidelines? Are all requested Annexes included and complete?	Final report *(coverage/omissions):* Structure and format in-line the guidelines. All requested Annexes included and complete. Final report *(strengths/weaknesses):* Fully complete report.	5.5
(ii) Writing and formatting: Consider whether the report is well written (clear English language and grammar) with language that is adequate in quality and tone for an official document? Do visual aids, such as maps and graphs convey key information?	Final report *(coverage/omissions):* Well-written and clear English language. Final report *(strengths/weaknesses):* Well written and readable with moderate use of the many technical terms and abbreviations in the substantive area. Good use of figures and tables.	6
OVERALL REPORT QUALITY RATING		**5.3**

A number rating 1-6 is used for each criterion: Highly Satisfactory = 6, Satisfactory = 5, Moderately Satisfactory = 4, Moderately Unsatisfactory = 3, Unsatisfactory = 2, Highly Unsatisfactory = 1. The overall quality of the evaluation report is calculated by taking the mean score of all rated quality criteria.

At the end of the evaluation, compliance of the evaluation process against the agreed standard procedures is assessed, based on the table below. *All questions with negative compliance must be explained further in the table below.*

Evaluation Process Quality Criteria	**Compliance**	
	Yes	**No**
Independence:		
1. Were the Terms of Reference drafted and finalised by the Evaluation Office?	**x**	
2. Were possible conflicts of interest of proposed Evaluation Consultant(s) appraised and addressed in the final selection?	**x**	
3. Was the final selection of the Evaluation Consultants made by the Evaluation Office?	**x**	
4. Were the evaluators contracted directly by the Evaluation Office?	**x**	
5. Were the Evaluation Consultants given direct access to identified external stakeholders in order to adequately present and discuss the findings, as appropriate?	**x**	
6. Did the Evaluation Consultants raise any concerns about being unable to work freely and without interference or undue pressure from project staff or the Evaluation Office?		**x**
7. If Yes to Q6: Were these concerns resolved to the mutual satisfaction of both the Evaluation Consultants and the Evaluation Manager?		
Financial Management:		
8. Was the evaluation budget approved at project design available for the evaluation?	**x**	
9. Was the final evaluation budget agreed and approved by the Evaluation Office?	**x**	
10. Were the agreed evaluation funds readily available to support the payment of the evaluation contract throughout the payment process?	**x**	
Timeliness:		
11. If a Terminal Evaluation: Was the evaluation initiated within the period of six months before or after project operational completion?		**x**
12. Were all deadlines set in the Terms of Reference respected, as far as unforeseen circumstances allowed?	**x**	
13. Was the inception report delivered and reviewed/approved prior to commencing any travel?	**x**	
Project's engagement and support:		
14. Were the project team, Subprogramme Coordinator and identified project stakeholders given an opportunity to provide comments on the evaluation Terms of Reference?	**x**	
15. Did the project make available all required/requested documents?	**x**	
16. Did the project make all financial information (and audit reports if applicable) available in a timely manner and to an acceptable level of completeness?	**x**	
17. Was adequate support provided by the project to the evaluator(s) in planning and conducting evaluation missions?	**x**	
18. Was close communication between the Evaluation Consultants, Evaluation Office and project team maintained throughout the evaluation?	**x**	
19. Were evaluation findings, lessons and recommendations adequately discussed with the project team for ownership to be established?	x	
20. Were the project team, Subprogramme Coordinator and any identified project stakeholders given an opportunity to provide comments on the draft evaluation report?	**x**	
Quality assurance:		

21. Were the evaluation Terms of Reference, including the key evaluation questions, peer-reviewed?	**x**	
22. Was the TOC in the inception report peer-reviewed?	**x**	
23. Was the quality of the draft/cleared report checked by the Evaluation Manager and Peer Reviewer prior to dissemination to stakeholders for comments?	**x**	
24. Did the Evaluation Office complete an assessment of the quality of both the draft and final reports?	**x**	
Transparency:		
25. Was the draft evaluation report sent directly by the Evaluation Consultants to the Evaluation Office?	**x**	
26. Did the Evaluation Manager disseminate (or authorize dissemination) of the cleared draft report to the project team, Subprogramme Coordinator and other key internal personnel (including the Reference Group where appropriate) to solicit formal comments?	**x**	
27. Did the Evaluation Manager disseminate (or authorize dissemination) appropriate drafts of the report to identified external stakeholders, including key partners and funders, to solicit formal comments?	**x**	
28. Were all stakeholder comments to the draft evaluation report sent directly to the Evaluation Office?	**x**	
29. Did the Evaluation Consultants respond adequately to all factual corrections and comments?	**x**	
30. Did the Evaluation Office share substantive comments and Evaluation Consultants responses with those who commented, as appropriate?	**x**	

Provide comments / explanations / mitigating circumstances below for any non-compliant process issues.

Process Criterion Number	**Evaluation Office Comments**
11.	Evaluation planning process took long due to the contracting of the evaluation consultants.