Final Evaluation and Learning Exercise of the Colombia Domestic Refrigeration Project

Project Evaluation and Learning Exercises for the Mitigation Action Facility

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Final Report

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Disclaimer

The results and analysis included in the report are based on an external and independent evaluation conducted by the consortium AMBERO-OPM. The conclusions drawn in the report do not necessarily reflect the official views of the Mitigation Action Facility and/or of the project under evaluation.

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Preface

The Mitigation Action Facility is a joint initiative of the German Federal Ministry for Economic Affairs and Climate Action (BMWK), the UK's Department for Energy Security and Net Zero (DESNZ), the Danish Ministry of Climate, Energy and Utilities (KEFM), the Danish Ministry of Foreign Affairs (MFA), the European Union and the Children's Investment Fund Foundation (CIFF). The Mitigation Action Facility evolved from the NAMA Facility, which was established in 2012. The Mitigation Action Facility's vision is to accelerate decarbonisation to keep temperature rises below 1.5 degrees Celsius by financing measures that shift priority sectors in a country towards a sustainable, carbon-neutral pathway. All projects with an overall duration of more than three years are subject to a mid-term and a final evaluation and learning exercise.

The Technical Support Unit (TSU) functions as the secretariat of the Mitigation Action Facility. The TSU commissioned AMBERO and Oxford Policy Management to conduct mid-term and final Evaluation and Learning Exercises (ELEs). Each ELE is conducted using the same Theoretical Framework (FW), which involves the application of a document review, participatory workshops, and stakeholder interviews to collect evidence about projects' results and lessons analysed using a Theory-based approach centred on the use of contribution analysis reinforced by elements of process tracing.

This document presents the findings of the **final ELE of the Colombia Domestic Refrigeration project.** The report has been reviewed by Luca Petrarulo (Technical Lead, project ELE team). For further information, please contact davita.steinemann@ambero.de.

Executive summary

This document presents the findings of the **final Evaluation and Learning Exercise (ELE) of the Colombia Domestic Refrigeration project.** The ELE was undertaken during the period January - March 2024. In accordance with its Terms of Reference, the ELE sought to address the following questions:

- Has the project achieved its planned results?
- Has the project started to trigger transformational change?
- What can be learnt from the project?

More information about the focus of this ELE and the methodology followed can be found in Section 1 and Section 2, respectively. The rest of the executive summary provides the highlights of the ELE's findings and key lessons. Please refer to Sections 3 and 4 for the detailed findings and conclusions and Section 5 for the full lessons and recommendations. A mid-term ELE of the project was conducted in 2021 and can be found on the Mitigation Action Facility website or by clicking here.

At the time of the preparation of the Project Proposal in 2014, Colombia's domestic refrigeration sector's greenhouse gas (GHG) emissions were estimated to be around 5.5 Mt CO_{2eq} a year and were expected to double by 2030. According to the Project Proposal, the Colombian Government identified a GHG reduction potential of over 50% for this sector to be achieved through energy-efficiency measures, changes to the refrigerant agent and appropriate End-of-Life (EoL) disposal of older refrigerators. Based on these figures, the Colombian Government submitted a proposal to the Mitigation Action Facility for a Colombia Domestic Refrigeration project. The project aimed to develop and implement regulations, provide training to domestic refrigerator manufacturers, servicing and disposal staff, conduct technical studies, and provide equipment for three lines of transformation: (i) replacement of refrigerant agents, (ii) improvement of energy efficiency, and (iii) appropriate and financially sustainable disposal of refrigerators at their end of life. The project also included financial support in the form of loans and incentives to encourage investments by manufacturers or Waste of Electric and Electronic Equipment (WEEE) disposal organisations. Additionally, some incentives were offered to consumers or retailers to encourage the substitution of old and less efficient refrigerators for new ones that are more energy-efficient and use an ozone and climate-friendly refrigerant agent.

As of the final ELE, the Colombia Domestic Refrigeration project was expected to be executed between April 2017 and June 2024 and consisted of a EUR 3.4 million Technical Cooperation (TC) Component and a EUR 5.6 million Financial Cooperation (FC) Component. The *Deutsche Gesellschaft für Internationale Zusammenarbeit* (GIZ) GmbH is in charge of the execution of both components, although Bancoldex, the Colombian Government's industrial development bank, is supporting the execution of the FC Component.

The project was very successful in achieving the intermediate outcome related to the transformation of Colombia's refrigerator producers and their portfolios to "green refrigerators", which combined the R-600a refrigerant with energy efficiency improvements. Thanks to this transformation, most of the refrigerators on sale in Colombia can be classified as "green refrigerators" (i.e. using the R-600a refrigerant and adhering to energy efficiency classes A or B), placing the country on a path for the complete transformation of the domestic refrigeration sector.

However, the project has struggled to get a refrigerator substitution or trade-in scheme to work and, due to the difficulty in creating and consolidating a stable supply of old refrigerators, to establish clear and sustainable EoL processing and disposal of those old refrigerators. Problems with these two intermediate outcomes may affect the times and scale of the project's benefits, with the substitution process having a much slower speed than expected and many old fridges not being subjected to appropriate EoL processing and disposal.

From the evidence collected and the analysis carried out by the ELE team, the difficulties with the substitution component derive from problems with the customer and retailer behaviour assumptions upon which the project was created. The project expected that a small incentive would be enough to get consumers to update their old fridge to a new one and that retailers would find it convenient to support a substitution effort. The evidence collected during the mid-term and final ELEs suggests consumers need more substantial incentives to replace their working fridges with new ones. It also suggests that many retailers will avoid supporting the substitution scheme as it implies higher administrative and logistics costs, with similar or less profit for them. The retailers who made the most significant contributions to the project's results were the ones who were able to combine incentives from multiple schemes, increase their marketing efforts, form partnerships with utility companies or local governments, and provide micro-credit to their clients.

The delays in the substitution effort have caused issues with the WEEE final disposal workstream. The substitution was considered a prerequisite for this component as it would ensure the flow of old refrigerators on which the WEEE disposal organisations would depend for growth and investment.

An even more significant issue with this component is the lack of working groups bringing together all the different stakeholders of this project to address the challenges of refrigerator trade-in and WEEE disposal towards creating a circular economy around appliances. The project included a steering committee and several technical committees. Interviewees noted that the steering committee mainly followed up on activities rather than providing coordination or guidance, while the technical committees focused on specific topics. The ELE evidence indicates that these groups did not effectively serve as cross-stakeholder collaboration bodies. As discussed in the report, the absence of true multi-stakeholder working groups made it harder to communicate or address the challenges and barriers related to product substitution and WEEE disposal outcomes during the project.

The project received support mainly from the Ministry of Environment and Sustainable Development's Ozone Technical Unit. This support was adequate for carrying out the technical tasks of the project. However, **the lack of higher-level support made it difficult to establish and manage the groups necessary for implementing the FC Component and its incentives.** Additionally, it was challenging to create and strengthen the working groups that are crucial for a multisector and multistakeholder approach to (i) ensure the coordination and collaboration needed across sectors to increase the speed and effectiveness of the substitution effort and (ii) create appropriate conditions for a WEEE disposal effort that contributes to circular economy rather than to final disposal.

The ELE made inquiries about the Gender Equality and Social Inclusion challenges and progress for the domestic refrigeration sector, even though the project had no specific targets in this regard. No quantitative data was collected in this regard under the umbrella of the project, but most interviewees coincided in that, on the one hand, most of the project's beneficiaries were women heads of families and, on the other, there is large participation of women in administrative, financial, commercial, and

other more "skilled" jobs. Participation in production or other more physically demanding jobs is increasing as these are mechanised and automated, and the physical strain is reduced. According to interviewees from the refrigeration production, retail and WEEE disposal activities, the reason why women are not considered for physically demanding jobs is not due to their lack of ability. Rather, it is because some companies have had experiences where women would get bored or tired quickly of these types of jobs and subsequently quit. This would force the companies to find and train new workers, incurring additional selection, onboarding and training efforts.

In conclusion, for the ELE team, it is undeniable that Colombia entered a path of transformation of the sector after domestic refrigerator producers and importers adjusted their portfolios to sell only green refrigerators. **However, the substitution programme and the WEEE disposal effort are still facing important hurdles that may lead to longer than expected times for the sector transformation or to losing some of the GHG savings from WEEE disposal** after the old refrigerators end up in the hands of informal technicians or disposal operations, which do not follow appropriate procedures, venting gases into the atmosphere.

The main recommendations arising from this ELE are:

Recommendations to the project partners for sustaining the project's legacy

1. Conduct a comprehensive review of the incentives and mechanisms used to increase the number of refrigerators taken to WEEE disposal facilities for appropriate processing. This review should consider feedback and lessons learned from this and other projects and propose new incentives and actions to improve the potential for success of the programme.
2. Working, discussion, or steering groups need to be created and consolidated from the project's multiple stakeholders to successfully pursue and achieve the substitution and WEEE disposal goals. Substitution targets will not be achieved if consumer and retail behaviours are not changed through effective incentives, and coordination and collaboration efforts. Adequate WEEE disposal targets will not be met if formal WEEE disposal organisations are not able to create and consolidate a financially viable and sustainable business model (underpinned by circular economies of refrigerator materials and components), thereby maintaining the traditional practice of old fridges being processed and disposed of informally or, alternatively, being resold and remain in use for many additional years.
3. High-level policy- or decision-makers (Minister or Viceminister level) need to be involved in these working groups to ensure that activities are delivered appropriately and on time within each of the participating sectors.

Recommendations to the Mitigation Action Facility for the review, approval, and management of future interventions

1. The Mitigation Action Facility should create a specialised section within its Knowledge & Learning Hub to share lessons from its projects and other general advice on how to design and manage mechanisms or incentives for large and diverse groups like micro or small enterprises or private consumers.
2. To improve project risk management, it is suggested that projects establish checkpoints or milestones associated with intermediate outcomes and final outcomes beyond the traditional

"outputs." This will help the Mitigation Action Facility and the project team better understand the likelihood of the project achieving its outcomes and impact.

3. Implement regular in-country visits as a means to raise and maintain high-level officials' awareness of and commitment to Mitigation Action Facility projects.

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List of abbreviations

BANCOLDEX	Colombian Development Bank for Industries and the Private sector
BMWK	German Federal Ministry for Economic Affairs and Climate Action
CFC	Chlorofluorocarbons
CIFF	European Union and the Children's Investment Fund Foundation
COP	Colombian Pesos
COVID-19	Corona Virus Disease 2019
DESNZ	UK's Department for Energy Security and Net Zero
EE	Energy Efficiency
EEE	Electric and Electronic Equipment
ELE	Evaluation and Learning Exercise
ELEQ	Evaluation and Learning Exercise Question
EoL	End of Lifetime
EPR	Extended Producer Responsibility
EQ	Evaluation Question
ESG	Environmental, Social and Governance
EUR	Euro
FC	Financial Cooperation
FENOGE	(Colombian) Fund for Non-Conventional Energy Sources and Efficient Energy Management
FW	Theoretical Framework
GHG	Greenhouse Gas
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GWP	Global Warming Potential
HFC	Hydrofluorocarbons
IDB	Interamerican Development Bank
KEFM	Danish Ministry of Climate, Energy and Utilities

KfW	KfW Development Bank (KfW – Kreditanstalt für Wiederaufbau)
KII	Key Informant Interview
KMLS	Knowledge Management and Learning Strategy
Logframe	Logical Framework
M&E	Monitoring and Evaluation
MADS	Ministry of Environment and Sustainable Development's (Acronym in Spanish)
MEPS	Minimum Efficiency Performance Standard
MFA	Danish Ministry of Foreign Affairs
MME	Ministry of Mines and Energy (Acronym in Spanish)
MRV	Measuring, Reporting, and Verification
NAMA	Nationally Appropriate Mitigation Action
NDC	Nationally Determined Contributions
OECD DAC	Organisation for Economic Co-operation and Development's Development Assistance Committee
OPM	Oxford Policy Management
PROURE	(Colombian) Programme for the Rational and Efficient Use of Energy
QA	Quality Assurance
QC	Quality Control
RAG	Red Amber Green
TC	Technical Cooperation
ToC	Theory of Change
TS	Types of Sources
TSU	Technical Support Unit, Mitigation Action Facility
UTO	Ozone Technical Unit (Acronym in Spanish)
VAT	Value Added Tax
WEEE	Waste of Electric and Electronic Equipment

1 Introduction

This document presents the findings of the **final Evaluation and Learning Exercise (ELE) of the Colombia Domestic Refrigeration project.** The ELE was undertaken during the period January – March 2024. A mid-term ELE of the project was conducted in 2021 and it can be found on the Mitigation Action Facility website or clicking here.

1.1 Project overview

The problem

At the time of the project proposal preparation, in 2014, Colombia's domestic refrigeration sector's Greenhouse gas (GHG) emissions were estimated to be around 5.5 Mt CO_{2eq} per year and were expected to double by 2030. The proposal cites a study of the Hydrofluorocarbon's (HFC) market in Colombia, commissioned by the Technical Ozone Unit of Colombia in 2014 estimated that Colombia had 12.5 million refrigerators in use in 2015, of which 10% were still using Chlorofluorocarbon compounds (CFCs) as a refrigerant agent, with the remaining 90% using mostly HFC. Both these substances are to be phased out in compliance with the 1987 Montreal Protocol on ozone-depleting substances and 2016's Kigali Amendment. The reasons for their withdrawal were the ozone-depleting qualities of CFCs and the high Global Warming Potential (GWP) of HFCs. The proposal document mentions that 85% of the refrigerators were owned by lower-income households with this group making up 85% of the total number of households in Colombia.

The refrigerant is not the only source of GHG emissions from domestic refrigerators. The project team and other project stakeholders mentioned in the mid-term and final ELEs that 4% of the GHG emissions were generated during production, 68% during operation due to energy consumption, and 28% at final disposal. Emissions from production and final disposal are mostly related to the refrigerator's materials and components and, more specifically, from the refrigerant agents (gases) and insulation foam. Emissions from the operation phase come from energy used to cool down and maintain the set temperature of the refrigerator, consumption that may be affected by external conditions like local climate or the placement of the refrigerator within the dwelling.

Achieving the project's goal of 2.2 Mt CO_{2eq} emission savings within the project's lifetime, or even the revised 2020 NDC target of 3.14Mt CO_{2eq} by 2030 (which are both based on a target replacement of 300,000 fridges) will require the coordination of actions across stakeholders and stages of a refrigerator lifecycle. Greener fridges need to be produced and marketed; households need to trade up their old refrigerator for one of the greener ones, and old fridges need to be collected and properly disposed of by Waste of Electric and Electronic Equipment (WEEE) disposal organisations. Any problems would lead to a lower impact or a slower transformation speed.

The expected impact and outcomes of the project

To address the opportunity for GHG reductions in the domestic refrigeration sector, the Colombian Government prepared and submitted in 2015, under the Mitigation Action Facility's Thirdd Call, a proposal for a Colombia Domestic Refrigeration project. The project aims to support the complete

transformation of the domestic refrigeration sector in Colombia towards using green (i.e. climate-friendly and energy-efficient) technologies, thus fostering Colombia's transition to a low-carbon economy. Specifically, the project sought to act to achieve two outcomes: Increasing the uptake of green fridges; and the appropriate collection and disposal of older and inefficient ones. To get there, the project's Theory of Change (ToC) pursued three intermediate outcomes: (i) Supporting changes in the regulatory environment and increasing the capability of domestic refrigerator producers to get all new refrigerators to contribute to reduced GHG emissions; (ii) Supporting the creation and consolidation of a refrigerator substitution programme to achieve the substitution of 300,000 older fridges to greener ones under the project and continue supporting old fridge (or appliance) collection and appropriate disposal under Extended Producer Responsibility (EPR) regulations; and (iii) Assisting WEEE processing and disposal companies in developing business models and capabilities for appropriate recycling or disposal of old refrigerators.

According to the proposal submitted to the Mitigation Action Facility, the Colombia Domestic Refrigeration project was expected to be executed between April 2017 and March 2022, combining a EUR 3.4 million Technical Cooperation (TC) Component focused on technical assistance and capacity-building for key project stakeholders (i.e. the government, refrigerator producers, WEEE processing and disposal companies and Red Verde[1]), and a EUR 5.6 million Financial Cooperation (FC) Component targeted at financing the refrigerator substitution "incentive", along with the investments that refrigerator producers and WEEE processing and disposal companies would need in line with the project's goals. Specifically, the FC Component initially considered EUR 3 million of soft loans for refrigerator producers to finance their refrigerant conversion and energy efficiency investments, EUR 2.2 million to support the refrigerator replacement scheme, EUR 70,000 directed to Red Verde's financial mechanisms, and the rest to other administrative and execution costs.

In 2023, an amendment was approved for the project, which, besides extending its execution period till June 2024, made some changes to the instruments considered in the FC Component to adapt them to current Colombian conditions and the lessons of the project. The contract amendment reduced the funds for refrigerator producers to EUR 1.7 million due to lower-than-expected demand and redistributed the remaining funds between Red Verde's operations, soft credit lines for WEEE disposal organisations, and a significant portion of the refrigerator substitution effort. The latter involved the creation of additional mechanisms, including a new bonus "2.0" that seeks increased commitment from refrigerator producers to the substitution effort and soft credit lines for banks, utilities, or retailers to incentivise financing schemes to match the bonuses and benefits.

With these changes, the project is proposing three types of incentives to encourage the substitution or replacement effort. The first incentive corresponds to "results-based payment" schemes (bonuses) to be paid to retailers (the original scheme) or to retailers and refrigerator producers (the proposed bonus 2.0) that expect to make these crucial partners more committed to the substitution effort. The second types of incentives are soft loans to be made available to utilities, large banks, or retailers to reduce financing costs for new refrigerators. The third type of incentive is directed at consumers and

[1] Red Verde is a not-for-profit organisation that was established in Colombia in 2014 by five appliance makers (two domestic and three foreign) to help them comply with the EPR demands that Colombia regulations would impose on all appliance producers for appropriate WEEE processing and disposal. Because of the affinity between Red Verde's EPR collection and disposal task, and the needs of the substitution effort, Red Verde became the organisation in charge of executing the refrigerator substitution effort.

consists of a VAT discount from the traditional 19% to 5% if the old fridge is traded in. This incentive is considered to be part of the project as it comes from a tax reform passed by the Colombian Congress in 2017, whose operation is also supported by Red Verde and the registry that was developed with support from the project. It is important to mention that, at the time of this final ELE, there were reports of these bonuses or credit lines still awaiting the finalisation of some legal or administrative details to start being offered to potential beneficiaries.

In terms of project governance, GIZ is in charge of the execution of both the TC and FC Components. The project implementation is supported by multiple public and private sector partners, being the three main partners the Ministry of Environment and Sustainable Development's (MADS – Acronym in Spanish) Ozone Technical Unit (UTO – Acronym in Spanish), Bancoldex (Colombian Development Bank) and Red Verde. MADS supports the outreach and coordination with refrigerator producers and WEEE processing and disposal companies' improvements, Bancoldex focuses on the feasibility and implementation of the project's financial mechanisms, and Red Verde's effort concentrates on the design and implementation of the substitution programme.

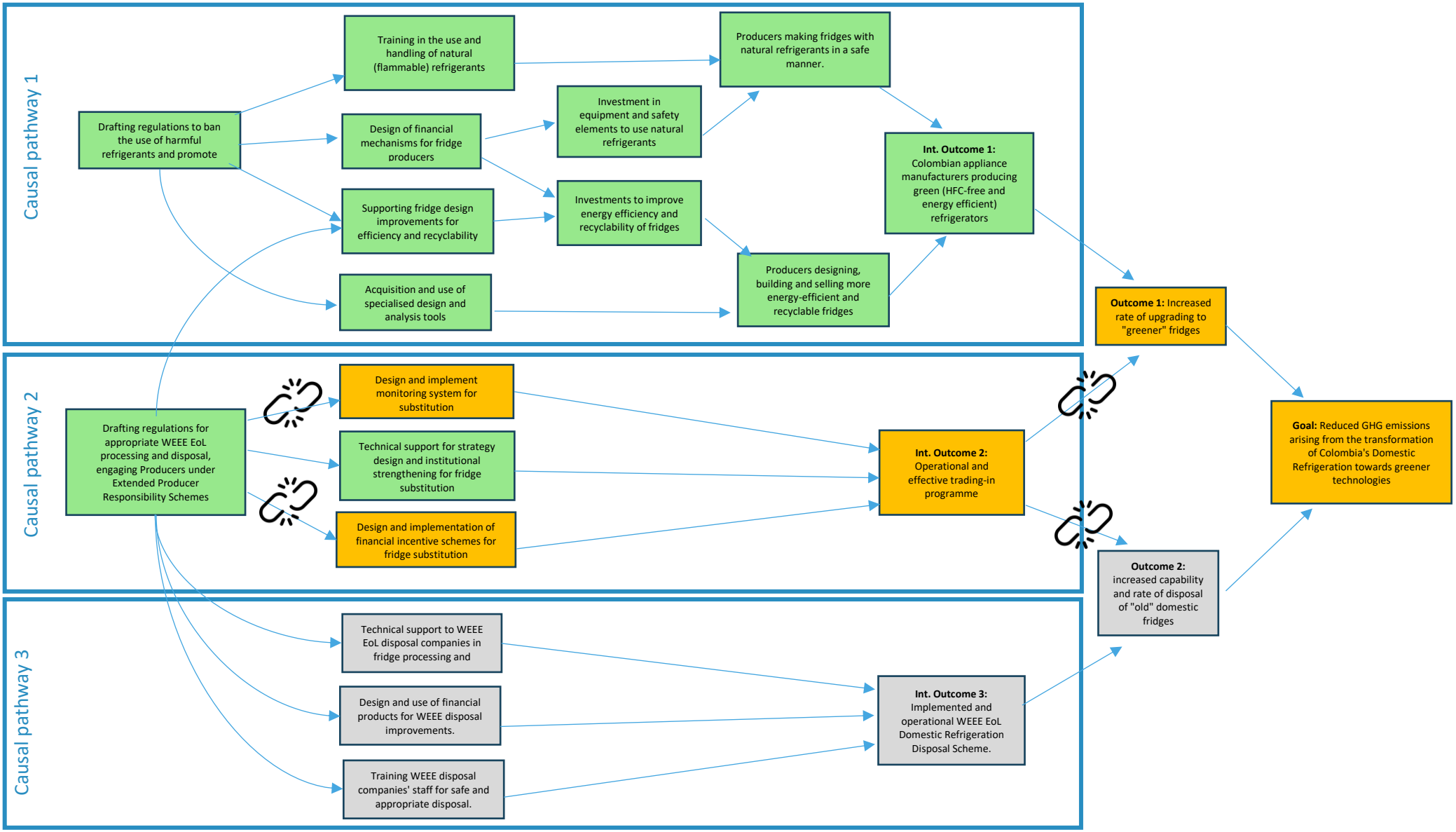
The causal pathways at mid-term

During the mid-term ELE, the robustness of the original causal pathways underpinning the project's strategy to move from the initial problem and barriers to the achievement of the intended outcomes were assessed. The mid-term ELE identified the following causal pathways sustaining each of the three intermediate outcomes and two final outcomes of the project:

- **Causal pathway supporting Intermediate Outcome 1 – Enabling the production and sale of green refrigerators:** If appropriate climate and energy efficiency regulations are adopted and supported with the corresponding technical and financial support, refrigerator producers will speed up the conversion of their production lines to natural refrigerants and to designing, manufacturing, and selling "green" (HFC-free and energy-efficient) refrigerators (Intermediate Outcome 1). Having green fridges in the market is necessary for an increased rate of consumers upgrading to greener fridges (Outcome 1), hence achieving reduced direct and indirect emissions.

- **Causal pathway supporting Intermediate Outcome 2 – Consolidation and scale-up of the refrigerator substitution programme:** If adequate WEEE regulations that consider EPR are adopted and, if technical support is provided for strategy design and institutional strengthening for the refrigerator substitution and impact monitoring schemes, and design and implementation of financial incentive schemes for fridge substitution are also offered, then it will be possible to have an effective refrigerator trading up programme in place, and monitoring and impact assessment (in terms of energy efficiency and GHG emissions reductions) in operation (Intermediate Outcome 2). An effective substitution programme will help to increase both the rate of upgrading to greener fridges (Outcome 1) and the speed of adequate disposal and recycling of old fridges (Outcome 2).

Figure 1. Overview of the project's Causal Pathways Assessment at mid-term



- **Causal pathway supporting Intermediate Outcome 3 – Enabling and promoting adequate processing and disposal of old fridges and their constituents:** If an appropriate WEEE disposal regulatory framework is enacted, and if WEEE processing and disposal companies are provided technical support for improved final disposal and recycling of refrigerators, design and use of financial products for recycling capability upgrades or improvements, as well as training of recycling staff for safe and appropriate disposal is granted, then proper refrigerator recycling will be in operation (Intermediate Outcome 3). This will increase old fridges' adequate disposal and recycling rates (Outcome 2).

The results of the mid-term assessment of the project's causal pathways are illustrated in Figure 1. The figure uses a Red-Amber-Green (RAG) rating to illustrate the strength of causal pathways according to the evidence collected by the ELE following the scale: Good / Very good = Green; Problems = Amber; Serious deficiencies = Red; Not enough info to rate = Grey. At the mid-term ELE, the causal pathway related to Intermediate Outcome 1 had made significant progress, even though COVID-19 had delayed some activities related to energy efficiency and health and safety training for refrigerator producers. The causal pathway associated with Intermediate Outcome 2 was given an amber rating mostly due to the delays and difficulties in getting the trade-in/substitution scheme going, which included some administrative delays and some external aspects, such as problems caused by the no-VAT (Value Added Tax) days in 2020 and 2021 and the realisation that getting households to trade-in their old fridge was more difficult than expected. Finally, for Intermediate Outcome 3, a rating of grey was given, as the work with WEEE disposal organisations was only starting at that point in time.

1.2 Focus of the Evaluation and Learning Exercise

In accordance with its Terms of Reference, this ELE seeks to address the following General ELE Questions (ELEQs):

- Has the project achieved its planned results?
- Has the project started to trigger transformational change?
- What can be learnt from the project?

For the final ELE of the Colombia Domestic Refrigeration project, the Mitigation Action Facility Technical Support Unit (TSU) and the project team asked to include the following specific questions:

- Has the project strengthened and empowered the domestic refrigerator producers to develop and implement projects to reduce their (the company as a whole) or their products' environmental footprint, like energy efficiency, proper disposal of WEEE through the EPR scheme Red Verde or other environmental protection initiatives?
- Is there a commitment from producers and/or from Red Verde to maintain a substitution scheme for domestic refrigerators after the end of the Colombia Domestic Refrigeration project or to develop one for other RAC appliances?

- Do the project's public sector partners consider it helped develop their ability to produce financial and non-financial instruments to address financial barriers blocking sectoral transformations to reduce GHG emissions? What are their main lessons from the project?
- Was the project's financial mechanism successful in incentivising (i) refrigerator producers to embrace greener technologies and designs for their products, (ii) retailers to commit to a substitution scheme, and (iii) the general population to trade in their old refrigerator for a new one instead of passing on the older one?
- Have the WEEE disposal companies in Colombia been able to consolidate capacities and technological developments to achieve appropriate End-Of-Life (EOL) disposal for electronic appliances such as domestic refrigerators and to maintain it beyond the lifetime of the project?

The General ELEQs presented above were broken down and operationalised into Specific ELEQs that are answered in this report. In Table 1, the General and Specific ELEQs are mapped against the Organisation for Economic Co-operation and Development's Development Assistance Committee's (OECD DAC) evaluation criteria[2], which are widely used as international standards for evaluations of development interventions. Reference to the relevant report section where each ELEQ / evaluation criterion is treated is also given. Finally, the specific ELEQs were broken down further into sub-questions, which are included in the official ELE Matrix, approved by the TSU, and reported in Annex B.

Table 1. General and specific ELE questions and their link to the ELE Report sections

General ELE Question	Specific ELE Question	Evaluation criteria (relevant ELE Report section)
Has the project achieved its planned results?	To what extent does the project address an identified need (by the National or Local Governments in Colombia, refrigerator producers, refrigerator retailers and WEEE disposal companies)?	Relevance (Section 3.1)
	To what extent has the project achieved intended (and unintended) outcomes?	Effectiveness (Section 3.2)
	To what extent was the delivery of outputs timely and to expected quality standards?	Efficiency (Section 3.3)
Has the project started to trigger transformational change?	What evidence is there that the project has been contributing to the intended impact in the ToC (incl. transformational change)?	Impact (Section 3.4)
	What is the likelihood that the outcomes will be sustained after the end of the project funding period?	Sustainability (Section 3.5)
What can be learnt from the project?	What key lessons can be learnt to the benefit of the legacy of this project or other projects funded by the Mitigation Action Facility in achieving their results?	Learning (Section 5.1)

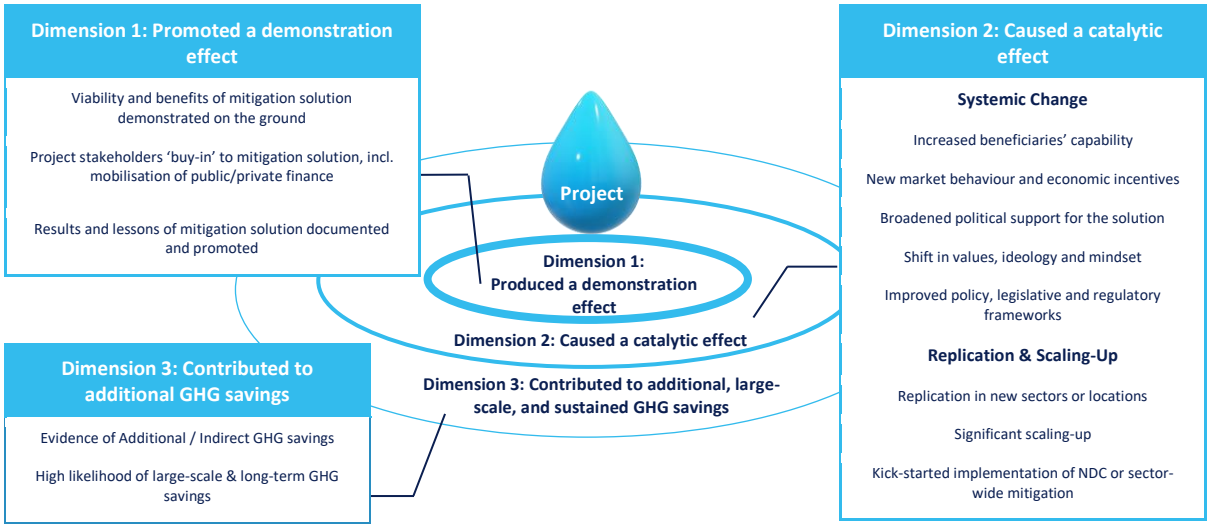
[2] Relevance, Effectiveness, Efficiency, Impact, Sustainability. The ELE team added a 6th criteria, namely Learning.

1.2.1 The Mitigation Action Facility Transformational Change Measurement Framework

Some words need to be spent on the concept of transformational change, which is included in the General and Specific ELEQs. The enabling of transformational change is one of the key aims of the Mitigation Action Facility and, therefore, of projects. The Mitigation Action Facility defines Transformational Change as "*Catalytic change in systems and behaviours resulting from disruptive climate actions that enable actors to shift to carbon-neutral pathways*"[3]. The Mitigation Action Facility ToC explains how transformational change is expected to be achieved through its outputs and outcome. The ToC is broad, and there are different ways in which transformational change can be achieved through the projects. Figure 2 illustrates three dimensions that interact and reinforce each other to produce project-induced transformational change. Each project will work on different elements of the three dimensions to define its own pathway to or "recipe" for transformational change. A more detailed explanation of the ELEs' Transformational Change Measurement Framework (TCMF) summarised in Figure 2 is presented in Annex A.

The ELE used the TCMF to assess the project's progress towards its impact in Section 3.4. In particular, in the evidence gathered through the ELE, the evaluators have looked for "signals" of the materialisation of the three dimensions and classified them as early, interim, and advanced signals according to the definitions in Table 2. Table 3 shows the minimum level of signals of each of the three transformational change dimensions that projects are expected to have achieved by respectively their mid-line and final.

Figure 2. Transformational Change Measurement Framework for projects



[3] https://mitigation-action.org/wp-content/uploads/Mitigation-Action-Facility_TC-factsheet.pdfhttps://www.nama-facility.org/concept-and-approach/transformational-change

Table 2. Transformational Change "Signals" assessment by ELEs

Signal level	Definitions
No evidence	Evidence suggests little to no progress is being made in line with the ToC causal pathways to Transformational Change.
Early signals	There is emerging evidence of the transformation related to the dimension, or the foundations for the transformation have been laid by the project but no signals of the change are present.
Interim signals	Evidence shows some signals that the transformation related to the dimension is underway and it is likely to continue.
Advanced signals	Evidence shows strong signals that the transformation related to the dimension is underway and there is little doubt that it will continue.

Table 3. Minimum expected signals of project-induced transformational change

Dimension	Mid-point	End-point
1: Promoted a demonstration effect	Interim signals	Advanced signals
2: Caused catalytic effect	Early signals (of one or more of the types of possible changes)	Interim signals
3: Contributed to additional GHG savings	None	Early signals

2 Methodological approach

The ELE entailed activities under four main phases: inception, fieldwork, analysis, and reporting.

During the inception phase, the ELE team reviewed key project documentation, including the project Proposal, Annual and Semi-Annual Reports, the project Monitoring and Evaluation (M&E) Plan, any amendments made to the project since 2021 and, very importantly, the report of the mid-term ELE (see the complete list of documents reviewed in Annex C). The team used the information from the document review to validate the **ToC diagram and Causal Pathway Maps produced by the mid-term ELE.** From this review, the ELE team suggested that **some adjustments to them could be in order, particularly in relation to Intermediate Outcome 2 and the substitution scheme**. These changes were put on hold to be confirmed during the fieldwork.

The data from the document review and the ToC served as a reference point to **develop a tailored matrix including the ELEQs** (ELE Matrix – see Annex B), which the ELE team **integrated with the initial hypotheses** to be tested by the fieldwork. The **rating assigned to the Causal Pathways at the mid-term ELE served also to prepare the questions and to focus the efforts of this final ELE:** links that were rated in yellow and grey in the mid-term ELE would receive priority attention by the ELE group, as failing to achieve Intermediate Outcomes 2 and 3 would limit the project's ability to deliver the domestic refrigeration sector's transformation at the scale and speed required by the project to meet its goals.

The ELE team **applied a *purposive sampling* approach of the key informants considering their involvement with the project across three general categories: (i) project team**, i.e. members of the organisations directly involved in project execution; **(ii) project partners**, which included government officials, company representatives and individuals who have had an active role in delivering the outputs and achieving the intermediate outcomes of the project; and **(iii) third parties**, i.e. organisations and individuals who needed to comply with new regulations developed with project-support, benefitted from policies, projects or incentives, or other organisations who work in sectors or activities related to the project and did not participate or benefit from the initiatives. This categorisation helped the ELE team test, triangulate the evidence, and assess its strength using the ratings in Table 6. Table 4 summarises the number of interviews and people interviewed (some interviews had multiple interviewees) by each sampling category. For a detailed list of the institutions and organisations interviewed, refer to Annex C.

Table 4. Overview of number of interviews and interviewees by sampling category

	Project Team	Project Stakeholders	Third Parties	TOTAL
No. interviews	4	8	9	**21**
No. interviewees	4	14	14	**32**

The fieldwork phase began with a Kick-Off Workshop on January 31st, 2024. Conducted at GIZ offices in Bogota, Colombia, with the participation of two GIZ staff that belong to the project team.

Considering that a mid-term ELE had been conducted for the project, the workshop focused on: (i) reminding the project team (or informing any new staff) about the purpose, scope, and expectations of the ELE; (ii) getting information from the project team about amendments, project progress, challenges and outstanding activities; and (iii) review the project's ToC and Causal Pathways presented in the mid-term ELE Report, and mention how they would be used to focus the final ELE's work.

The initial workshop was followed by **ten days of primary data collection using in-depth interviews with the project team and Key Informant Interviews (KIIs) with project partners and third parties. In-person and virtual interviews were used** to adapt to the location or availability of the interviewees. **Tailored ELE Interview Guides** were prepared during the inception phase **for each of the three types of sampling categories**. This was a means to ensure that all relevant questions and aspects were covered for all sampling categories in a way that was relevant and meaningful to them.

Following the intense period of interviews, the ELE team presented preliminary findings and lessons to the project team in a **Validation Workshop held on February 21st, 2024,** at GIZ's offices in Bogota. The Validation Workshop was also used to validate a **small adjustment to the Causal Pathway Map and, crucially, to produce or refine any lessons and recommendations for the TSU and future projects**.

Table 5. Summary of the ELE Analysis Methodology

Integrating Primary & Secondary Data	Evaluating Strength of Evidence	Draft Contribution Story
Tailor analytical tools	Assess strength of evidence of common themes	Draft contribution stories in the ELE report for each ELEQ and causal pathway
Tidy up notes	Identify concurrent / alternative explanations in ToC causal pathways	Final QC / QA
Data mining and evidence mapping from interviews and docs along ELEQs	Agreement on contribution of project vs Context	
Extract positive and negative common themes for each ELEQ	Perform process tracing formal tests of causal pathways	
Consolidate and cross-check common themes	Develop figure with RAG rating of causal pathways	
1st Quality Control (QC) / Quality Assurance (QA)		

All the information collected during the inception and fieldwork phases was brought into the analysis phase, characterised by a more in-depth effort to **evaluate the project's performance against the OECD DAC criteria** (relevance, effectiveness, efficiency, impact, and sustainability), against the **intermediate and final outcomes and goals** defined in the Project Proposal and any applicable amendments (under the effectiveness criteria) and, finally, against **the TCMF** presented earlier in this report (under the impact criteria). Performance was summarised for each DAC criterion and/ or ToC intermediate outcome, in the form of a **Red-Amber-Green (RAG) rating**: Good / Very good = Green; Problems = Amber; Serious deficiencies = Red; Not enough info to rate = Grey.

One crucial aspect of the ELE is establishing the strength of the evidence, which is done using the rating scheme detailed in Table 6. The evidence for a specific condition or performance is strongest in those cases where three or more KIIs, cutting across all three Types of Sources (sampling categories) mention the same condition or performance. When two KIIs of the same Type of Source mention the same condition or performance, the evidence is considered to be weak. When only one interviewee makes a statement or claim, the methodology considers that it is a "Single Source" evidence. The ELE team went over all the information identifying common themes and the strength of the evidence of those common themes.

Table 6. Score card for assessing the strength of evidence

Quantity (number of sources reporting the evidence)	Variety (number of types of sources (TS) reporting the evidence)		
	1 TS only	**2 TSs**	**3 TSs**
1 interview only	Single source		
2 interviews	Weak evidence	Medium evidence	
3+ interviews	Medium evidence	Strong evidence	Very strong evidence

The final ELE phase is the reporting phase, in which the ELE team compiles the analysis into this report. The report is subjected to multiple internal quality assurance exercises, including an initial internal review, a round of comments from the TSU and the project team, and a final round of review and comments by the Mitigation Action Facility Board.

2.1 Limitations

ELEs use a methodology that was defined by the Mitigation Action Facility to balance the challenges of working across sectors and operating in developing countries while being able to tell whether progress was being made. A general methodological limitation is that ELEs focus on understanding the contribution of the project to its intended outcomes and impact and the lessons generated but do not undertake a thorough verification of the delivery of the project's outputs, e.g. reviewing minutes of meetings, counting male and female participants to events, etc. However, as per the ELE methodology, a rapid review of the quality of the data produced by the project M&E system is carried out, including how regular and comprehensive they are and how reliable the data sources are.

An important limitation that the ELE experienced was that, due to the timing of the ELE, **the ELE team was only able to review the 2023 Annual Report** (AR) in the final stages of the ELE effort, after the interviews were carried out and a lot of the analysis had been made, losing the opportunity to ask more specific questions about the progress that the project made during 2023 in relation to the project's outputs and outcomes. The ELE Team was also only able then to read the formal response provided by the project team to the recommendations made to the project in the mid-term ELE Report, having realised only then that the 2023 AR only included responses to the recommendation made to the Project Team, and that no information was provided on how the project partners had taken up or responded to the recommendations made to them, which referred to important

governance and commitment issues. The late arrival of the 2023 AR meant that the ELE Team did not try to get additional information from the project partners interviewed.

3 Key Findings

In this section, the ELE team presents the main findings of the ELE. These are structured according to the ELE Questions in Table 1. At the beginning of each section, a RAG rating of the strength of the project's contribution story to the ToC and the OECD DAC criteria is included, following the scale: Good / Very good = Green; Problems = Amber; Serious deficiencies = Red; Not enough info to rate = Grey.

3.1 Relevance of the project

Relevance	**1. To what extent does the project address an identified need (by the National or Local Governments in Colombia, refrigerator producers, refrigerator retailers and WEEE disposal companies)?**

Domestic producers sell three-quarters of all refrigerators sold in Colombia each year and are, therefore, the crucial stakeholder for any initiative that seeks to reduce emissions from the refrigeration sector in Colombia. Colombian refrigerator producers were aware of the phasing-out requirements for CFC and HFC-based refrigerant agents for domestic refrigerators and the need to shift towards R-600a (isobutane), which, due to its flammability, required investment in training and tools to handle it properly and safely.

Colombia has had energy efficiency (EE) targets since Law 697 of 2001. The current version of the Action Plan for the Programme for the Rational and Efficient Use of Energy (PROURE) covers the period 2022-2030 and links EE with GHG emissions savings. According to the current PROURE Action Plan, cooking and refrigeration consume the most energy from all residential activities. This latest iteration of the Action Plan estimates that a shift to energy-efficient fridges could produce reductions in energy consumption of up to 71.31 PJ (Peta Joules) and GHG emissions of up to 3.28 Mt CO_{2eq}. These savings represent 26.8% of the GHG reductions to be achieved for residential energy consumption over the 2022-2030 period.

Law 1672 of 2013 set the legal underpinnings for electric and electronic equipment producers to develop EPR schemes and requested the establishment of certified waste management companies to ensure appropriate collection and End-of-Lifecycle (EoL) disposal of appliances. This norm set a goal of adequately disposing of 90% of the WEEE by 2032. To achieve that goal, it was necessary to: (i) improve the WEEE EoL companies' and facilities' capacity to dispose of the refrigerators properly; and (ii) create and consolidate some mechanisms and dynamics that ensured that old refrigerators were collected and taken to the WEEE EoL disposal facilities for processing.

Red Verde was established in 2014 by appliance producers and importers as a collective that would help them comply with their WEEE EPR requirements. Red Verde was established as a non-profit organisation whose income comes mainly from its members' contributions every year. Red Verde's non-profit nature highlights its role of providing operational and support services. Given the novelty of these requirements and the different alternatives to achieve the objectives, along with the usual funding constraints of these types of organisations, Red Verde stood to benefit from support to define strategies and develop the procedures and capabilities required.

At the end of 2020, Colombia submitted its updated Nationally Determined Contributions (NDC), which explicitly include the Domestic Refrigeration project's GHG emissions reductions among the revised targets. The NDC mentions reducing GHG emissions from substituting ozone-depleting substances and potent GHG in refrigerators, and EE improvements achieved from upgrading to newer fridges.

Resolution 851 of 2022 from MADS increased the pressure on producers (or importers) by changing the former "voluntary" WEEE EoL disposal effort into a mandatory one with enforceable targets beginning in 2024 and growing in later years. This resolution changes the way in which refrigerator producers or importers need to approach and commit to WEEE collection and disposal targets. Since 2024, they must meet a mandatory target for collection and recycling based on the average weight of appliances of the type sold in the three years prior and a collection factor that takes into consideration whether the appliance or equipment has a short, medium, or long lifecycle. The resolution also sets targets on the geographical coverage of the effort. The collection effort considered in the resolution is based mostly on fixed collection points and relies on retailers to communicate about the collection and appropriate disposal of WEEE and provide space in their stores for the clients to return and leave the old appliances.

WEEE disposal companies lacked the technical and scale capacities to properly process and dispose of the number of fridges that the project expected to collect for EoL disposal. Multiple WEEE EoL disposal companies have worked with MADS, and more specifically with its UTO, in improving their technical capabilities, equipment and facilities to process different types of WEEE residue, including that of fridges. However, WEEE disposal organisations mentioned they had many questions and concerns about what would be required to receive, process, and dispose of the number of fridges considered by the project, including some concerns about whether the processing of the fridges could be financially self-sustainable.

The Project Proposal included targets for training women in refrigerator servicing or production but did not define specific goals for gender or social inclusion (this was not mandatory). At the time of project formulation, some indicative targets for inclusion of women in the training for refrigerator servicing or production were included, but that was not based on a detailed analysis of challenges or opportunities to include women or other vulnerable groups in any of the actions related to the project, which were very broad, spanning design, production, commercialisation, collection, and final disposal.

The aforementioned factors support the case for implementing measures that effectively address the issues faced by refrigerator manufacturers, WEEE disposal organisations, the government, and retailers. The project was designed with consideration for Colombia's targets and challenges and aimed to tackle them accordingly. Therefore, **the evaluators assigned a green rating to the Relevance evaluation criterion.**

3.2 Effectiveness of the project

Effectiveness	**2. To what extent has the project achieved intended (and unintended) outcomes?**
	Outcome 1: Increased rate of upgrading to greener fridges
	Outcome 2: Increased rates of adequate disposal and recycling of old fridges

At the time of the mid-term ELE, the project reported significant progress in the execution of the technical component, particularly in relation to the transformation and strengthening of domestic refrigerator producers. At that time, the domestic producers had already made the switch from the R-134a (HFC-based) to the R-600a (isobutane) refrigerant. Progress was being made in introducing health and safety measures for the flammable refrigerant and developing the producers' capabilities and skills to design and build more energy-efficient refrigerators.

The project's substitution scheme, expected to facilitate and speed up the replacement of older fridges with newer and greener ones, was facing delays and challenges at the time of the mid-term ELE. At that time, the project's substitution scheme had been modified from what was in the proposal but was continuing to face difficulties even when used together with the Fund for Non-Conventional Energy Sources and Efficient Energy Management's (FENOGE) *Caribe Eficiente* Pilot Programme for refrigerator substitution in the Caribbean region. The incentive struggled for many reasons, including the lack of interest of families to trade in their old fridge when getting a new one, difficulties in operating the substitution effort when other governmental initiatives like VAT-Free days promised better discounts without a requirement to trade in their older fridge and, among others, the technical and financial challenges of old-fridge collection operations, which were challenging already in the larger cities, and faced important limitations in rural or more distant areas.

The strengthening of WEEE disposal organisations, which is linked to Intermediate Outcome 3, was delayed as they were waiting to create a sustainable flow of old refrigerators. At the time of the mid-term ELE, there was very little progress reported for Intermediate Outcome 3. The project team and partners had focused their efforts on the substitution/trade-in scheme to ensure a constant supply of old fridges for WEEE disposal organisations to process. The real evaluation of this intermediate outcome takes place with the final ELE.

3.2.1 Outcome 1: Increased rate of upgrading to greener fridges

Colombia now has a solid regulatory basis for energy-efficient fridges that combines an updated EE labelling scheme with Minimum Efficiency Performance Standard (MEPS) requirements, preventing less efficient new fridges from being sold. Although the Colombian Ministry of Mines and Energy's Resolution 40427 of 2020 adopted new evaluation and labelling standards for refrigerators, the MEPS requirement for refrigerators only started to apply from 2023 onwards. This implied that, even though energy labels are expected to be reviewed and updated every 5 years, the Ministry of Mines and Energy staff mentioned that they may not be changed in 2025. The interviewees mentioned that beyond the technical aspects of the review and update, there were also some questions as to how that review would be funded.

All three Colombian domestic fridge producers have converted to the R-600a refrigerant, and at least 2 of them are selling only A or B-label products (i.e. energy-efficient ones). Importers are also focusing on more energy-efficient fridges to keep up with the competition as consumers become more aware. The transformation of producers and products sets a clear path for sectoral transformation. Domestic refrigerator producers have benefited from the support of the project to adopt production health and safety measures associated with the new flammable refrigerant and improve their design and production capabilities, to the point that two out of three domestic producers are only selling fridges under EE labels A and B. Interviewees mentioned that this is causing

importers to sell only the more energy-efficient products to be able to compete in a market with growing consumer awareness. With all new fridges on offer in Colombia falling under a “green refrigeration” banner, it is possible to claim that the country is now on a path for sectoral transformation.

Meeting the project's GHG reduction and EE targets for 2030 will depend on the rate at which newer fridges effectively replace older ones. Achieving the goals seems difficult as the project has struggled to get the substitution or trade-in schemes in operation. The project had an initial target of substituting 300,000 fridges during its execution but, as of February 2024, has only managed to substitute ca. 11,300, a figure that could increase after the project officially ends, with Bancoldex continuing to manage the incentives beyond June 2024. The implementation of the project incentive schemes has been a challenging task due to various administrative issues. Bancoldex, the project's financial partner, needed to make some internal changes to be able to pay the incentives themselves. Modifying the incentives proposed in the Project Proposal to align them with the actual conditions has taken a lot of time and effort. Additionally, certain internal procedures within the Colombian Government needed to be changed to declare the project's funds as "tax-free". These changes have created additional obstacles that had to be addressed before the project could move forward.

During the project, it became apparent that there needed to be a better understanding of the consumers’ timing and reasons for buying a fridge or other larger appliances. The project was created on the assumption that providing incentives to consumers (VAT breaks or bonuses) would get them to upgrade their refrigerators. However, during the course of the project, it became increasingly clear that fridges and other large appliances such as washing machines, dishwashers, and ovens are only acquired on specific occasions by people. These occasions include personal or family milestones such as leaving the family home, getting married, having children growing up, or going through a divorce. Alternatively, these appliances are usually purchased in times of emergency when they break down and cannot be repaired. Retailers interviewed mentioned that getting households to update their fridges (or other large appliances) required deliberate efforts to go to their homes and convince them to do the upgrade. Interviewees from all groups mentioned that FENOGE’s refrigerator replacement programme in the Colombian Caribbean region began to be more effective when the amount of the incentive was doubled and when financing options were made available to cover any remaining balance that households needed to pay after using FENOGE's, this project's, and other available incentives. Some interviewees suggested that trade-in efforts should be tailored to the particularities of each of the Colombian regions, even if this meant extra costs.

Increased understanding of the retailers, their challenges and particularities has contributed to developing and tailoring the incentives, but the real effectiveness of the incentives is unknown due to the delays in their implementation. The ELE team sought to better understand whether and how retailers were being engaged in support of the project. Based on the interviews, three types of retailers were identified: large-scale retailers like super or hypermarkets in which inventories and order fulfilment are carried out by the appliance producers; regional retailers that are large enough to buy wholesale from producers, own vehicle fleets, create travelling salesforces, and partner with utilities to promote appliance sales or create financial or other incentives; and, smaller retailers that only sell locally. The differences in the operational schemes and capabilities between these retailers lead to different types of incentives working for each of them. Regional retailers may find the bonus of COP 50,000 (approximately EUR 12) per fridge to be an attractive incentive if they can aggregate

multiple substitution sales. They can use the bonus amount to cover their administrative costs associated with the bonus claims process or to offset a portion of the transportation and logistics expenses associated with collecting the old refrigerators and transporting them to the final disposal sites or alternative regional consolidation centres. The larger retailers may not see a worthy incentive in the COP 50,000, as the salesforce in their showrooms and the logistics costs are assumed by the producers themselves. The smaller retailers may also not find the incentive interesting, as their cost of claiming would have to incur additional costs to collect the old fridges (e.g. renting trucks), and also as getting the VAT break benefit can be too administratively demanding to decide to pursue it. It is worth mentioning that FENOGE's *Caribe Eficiente* programme worked in some smaller cities and towns as FENOGE was arranging and covering the cost of collection points and of any longer distance travel to take the fridges to the disposal facilities, which were located in a few cities. Without that type of support, it is unlikely that retailers would take on that cost in smaller towns.

Retailers that successfully contributed to the substitution effort did it out of conviction in sustainability and the need to combine multiple incentives and financial instruments to get customers to upgrade. Two appliance retailers who made important contributions to the final substitution targets confirmed to the evaluators that their motives were based on their own commitment to sustainability and on a deliberate effort to seize the opportunities created by the (multiple) incentives to increase their sales. These retailers also mentioned that, for them, the incentive scheme also worked as an excuse to be able to attract customers into their stores, where they could take the opportunity to promote and sell other appliances or products that were a better business for them due to their higher margins. The success of these few retailers contrasted with an account of an interviewee in which the retailer recommended the customer to sell or pass on the fridge to family or friends rather than turn it in.

It has been observed that women's participation in refrigerator production, servicing, or logistics is limited due to the physical demands of these jobs. According to the interviews conducted, the primary reason for not encouraging more women to take up these roles is not that they are incapable of doing the job but because they are expected to become tired or disinterested in the work and eventually quit. This would result in higher staff turnover rates, as well as increased hiring and training costs. Most of the interviewees mentioned that women are currently well-represented in administrative, commercial, or financial jobs. There was also mention of the fridge producers having set themselves targets to have equal gender participation in production jobs in the medium term, although most of this is supported by mechanisation or automation jobs, in which the physical strain is reduced. When asked why women were not actively trained and hired for physically demanding jobs, the interviewees expressed their concern that women would get tired or bored and quit to pursue less demanding tasks, which was seen as a reflection of market conditions and business challenges related to human resources. Interviewees emphasised that it was these real-life experiences, rather than some sort of prejudice, that had prevented to push for increased women's participation in production or logistics activities. However, additional analysis would be required to really establish if these claims of women getting bored and quitting are true. Given that this project did not have specific gender or social inclusion actions or goals, it was not possible within the time and scope of this ELE to verify or validate these claims.

Even though exact figures could not be obtained due to the lack of focus by the project on gender details, the project's retail partners interviewed mentioned the important roles of women as

beneficiaries and also in making the decision on which fridge to buy. Retailers mentioned that a significant number of the sales made under the project's framework were made to women heads of families, an assertion that is consistent with the importance of micro-financing options being made available to the customers to pay the balance that remains after all the incentives were applied. They also mentioned that even if the buyers were a couple, women usually had a lot of say in the decision of the fridge that was bought. This information was not readily available for the project team or Red Verde to provide to the ELE team, but they mentioned that some data could be obtained from the information included in Red Verde's fridge trade-in registry, developed as a means of registering and monitoring the payment of the incentives.

Although all fridges currently being sold and used can be considered "green", there are several obstacles preventing households from upgrading and retailers from promoting substitution or trade-in programmes. The ELE team learned about multiple actions and mechanisms being introduced in the last stage of the project to significantly increase the substitution rate. However, these incentives or financial schemes do not seem to address the main problems, which are: (i) households rarely consider changing or upgrading a functioning refrigerator; and (ii) for retailers, supporting substitution scheme means additional administrative and logistic costs that they may not be able or willing to assume. As a result, the ELE team has assigned an Amber RAG rating to the effectiveness towards Outcome 1.

3.2.2 Outcome 2: Increased rates of adequate disposal and recycling of old fridges

WEEE disposal organisations have received technical support in the form of studies, training, and equipment that have improved and increased their ability to process old fridges but have not really started to test or implement any particular solutions. The project team had planned their main effort with WEEE disposal organisations until after the substitution scheme was running, limiting the actual progress achieved with this group of stakeholders. The WEEE disposal organisations expressed gratitude for the support they received in terms of studies, training, and equipment under the project. They emphasised that the knowledge and capabilities acquired increased their ability to process old refrigerators. However, they noted that they had not used that capacity at a scale sufficient to achieve the project's targets. They also mentioned having high expectations about the financing lines that are expected to be made available by the project and Bancoldex before the project ends in June 2024.

There is no clear consensus among the different project stakeholders regarding the outcomes and next steps for the business model investigations carried out for WEEE disposal organisations. This may lead to discussions that could not be solved in the short time remaining in the project. For some of the interviewees, the studies mentioned that processing and disposing of old fridges could be self-sustainable if WEEE disposal organisations made the necessary investments and followed the studies' recommendations. For others, the studies concluded that the model was not self-sustainable, and that funding was required to make the task financially viable. The ELE team believes that the discussion is important and needs to take place at some point, but it seems too late in the project to try, test, and adjust policies or actions.

Red Verde primarily focuses on collecting WEEE and delivering it to licensed WEEE processing and disposal organisations. Although the organisation mentions participating in various initiatives to support disposal, it currently lacks the institutional or legal framework to transition to a WEEE

circular economy model that could contribute to the substitution and EoL disposal efforts. In the Relevance Section of the Mid-Term ELE Report, it was discussed that Red Verde helps producers (and importers) by collecting WEEE from owners' homes and collection points and transporting them to licensed WEEE processing and disposal organisations while relying on these companies for the disposal process. Red Verde faces two main obstacles in leading the push for a WEEE circular economy model that ensures long-term sustainability. Firstly, as a non-profit organisation, it relies on member contributions and lacks funds to pursue additional goals, such as fostering a WEEE circular economy, which the ELE Team considers could help improve conditions for the substitution and EoL disposal efforts. Secondly, its members consist only of electric and electronic equipment producers or importers; there are no WEEE processing and disposal organisations among Red Verde's members. These two elements brought together create a condition in which Red Verde appears unable to innovate or address the needs of WEEE processing and disposal organisations effectively.

Despite the adoption of Resolution 851 of 2022, the ELE Team found no evidence of broader and sustained discussions and collaboration between WEEE disposal organisations and Colombian refrigerator producers to create and execute a joint strategy for collection, disposal, or even recovery of some component for fridges and other appliances. Creating circular economies that make it more appealing and sustainable to reuse WEEE is not solely the responsibility of WEEE disposal companies. International experiences suggest that a joint effort between appliance and electronic equipment producers, and WEEE processing and disposal companies is necessary for achieving this goal. Even a leading global producer like Samsung acknowledges in its circular economy webpage[4] that "[w]*e at Samsung Electronics are collaborating with customers and partner companies to improve the resource circularity*". According to Samsung and other large companies like Apple Inc. and BMW AG, with ambitious circular economy goals, reducing product waste is connected to improving the recyclability and reusability of materials and components. This requires cooperation among multiple stakeholders throughout a product's lifecycle, starting with discussions and shared objectives and evolving into collaboration. The ELE team sought to determine the progress in establishing these collaborative arrangements but found no evidence of such initiatives, even after the adoption of Resolution 851 in 2022. This lack of interaction may be leading to wasted opportunities in both directions, as according to the WEEE disposal companies, they have had to destroy, by grinding, some components that could have been useful (and cheaper to acquire) for appliance producers. The absence of communication between WEEE disposal companies and appliance producers may result in missed opportunities for component or material reuse, perhaps not for fridges themselves, but definitely for other appliances.

Some of the existing WEEE disposal organisations have long-established relations and experience in processing and disposing of commercial refrigerators, so in general, they have the knowledge and capability to process domestic fridges. However, their main concern is the financial viability of that processing. Based on interviews with WEEE disposal organisations, commercial refrigerators are considered a more profitable option for collection, processing, and parts resale. This is because they usually belong to a single large client who often assumes some of the logistical costs associated with collecting and centralising old refrigerators. Additionally, most commercial fridges processed come complete with valuable parts or components that WEEE disposal organisations can resell for a higher

[4] The page can be accessed at: https://www.samsung.com/global/sustainability/planet/circular-economy/

profit. On the other hand, domestic fridges are more difficult to obtain as they come from multiple owners, require some collection and handling costs, and sometimes have had some of the most valuable components removed, which means that WEEE disposal organisations will process that refrigerator at a (financial) loss. Furthermore, WEEE companies have stated that domestic fridges have fewer valuable components installed, which makes an efficient processing process crucial. However, the cost of manual processing is high, and automation machines are expensive. This means that without a clearer perspective on the volume of fridges that need to be processed, WEEE companies may not be willing to invest in them. This is one of the aspects that the project team could consider in order to improve the longer-term viability and sustainability of refrigerator upgrading and proper disposal efforts. It is crucial that any mechanism complements and strengthens the commitment of both private and public sector stakeholders. Without a shared commitment from all relevant stakeholders, creating a circular economy that makes disposing of an old refrigerator an attractive business proposition rather than a burden, any technical and financial efforts risk failing to deliver the desired change.

Women work in various roles within WEEE disposal organisations, including engineering, administration, and commercial positions. Some also work in appliance processing in roles requiring precision and attention, but less physical demand. The interviewees related to WEEE disposal activities concurred in mentioning that plenty of women were working in their companies in administrative or more intellectual roles, with few women working in WEEE processing activities as they were too physical. This is consistent with their claim of currently doing the processing manually, as well as with the aforementioned argument that the main concern was not that women could not do the job but that they would resign soon, increasing hiring and training costs. The small WEEE disposal companies interviewed did not mention having official gender equality or social inclusion policies or targets, but they still considered they had significant participation of women.

With regards to Outcome 2, the ELE has concluded that the WEEE disposal organisations are now more robust and capable than before the project. However, the following multiple factors have led the ELE team to assigned an Amber rating to the effectiveness towards Outcome 2: i) the lack of any significant progress in the actual processing and disposal of domestic fridges; ii) the lack of consensus about a way forward based on the business plan studies, coupled with additional sources of uncertainty and risk in end-of-lifecycle processing and disposal; and iii) the absence of any working groups or discussion groups between domestic refrigerator producers and WEEE disposal organisations. The RAG rating was in the balance between Amber and Red, but the consolidated experience of many WEEE disposal organisations in processing commercial refrigerators played as reason for optimism and determined the final Amber rating.

3.2.3 How external factors impacted the project's effectiveness

The COVID-19 lockdown and its associated social and economic problems have had a significant impact on the project. The higher material and logistics costs, combined with high inflation, have made the incentive less attractive. These issues have compounded already existing difficulties in paying out the incentive due to administrative problems. For comparison, in 2022, FENOGE decided to increase the incentive they were offering for refrigerator substitution from COP 400,000 (ca. EUR 96) to COP 840,000 (ca. EUR 201) to compensate for the higher price of the refrigerator. This change resulted in a significant increase in sales from 200 fridges per month through its partners to almost 2,900.

The new Colombian national government administration that took office in 2022 made changes to the VAT-Free days that eliminated their negative impact on the project's substitution efforts. Despite this, the main achievements of the project's substitution effort can be attributed mostly to retailers that used the project's bonus and bundled it with micro-financing schemes and the larger incentive and other benefits[5] from FENOGE's *Caribe Eficiente* refrigeration replacement pilot to get consumers to trade in their old refrigerators for new ones.

Changes introduced by the new government for the project to get a "common interest certification" for its funds have caused additional delays. The certification is a necessary requirement for any payment to be made, as neither the project nor Bancoldex can allocate any funds to pay taxes. Making any payment without the certification would have resulted in significant legal, fiscal, and funding issues. Previously, Ministries could issue these certifications, but the new administration has mandated that all such certifications must be made by the President's Agency for Managing International Cooperation. This has resulted in an added burden on the agency, as well as the need to learn the proper procedures, leading to delays.

Resolution 851 of 2022 has made it mandatory for appliance producers to comply with collection and disposal targets, but despite its good intentions, its requirements may create unexpected disincentives to the substitution and appropriate disposal desired by the project. Two problems were identified during the discussions and the review of the norm. Firstly, the norm mentions that the target disposal of some appliances may be accomplished with other appliances: this could mean that producers focus their effort on asking consumers to turn in other, more easy-to-carry equipment or appliances than refrigerators. Secondly, the resolution assigns the responsibility of the disposal to the producers, but that responsibility seems to start at "collection points" where the consumers should have left the old appliance by their own means and at their own expense. However, given the size and weight of fridges or other large appliances, assistance is likely to be needed to transport the appliance, which implies substantial efforts or additional costs to the consumers. This could help perpetuate the traditional practice of large appliances (e.g. washers, fridges) being sold to secondary informal markets rather than being withdrawn from use and taken to licensed WEEE disposal organisations for appropriate processing and disposal. Indeed, often, the people operating in the second-hand appliance market are willing to take away the appliance for free or even pay something for it, which for the owner of an old appliance may be an interesting proposition given that his/her alternative would be to spend time and money identifying the suitable collection point and hiring the movers that would collect the old appliance to drop it off at the specified location. This could also lead to problems like those experienced already in Colombia with construction or demolition waste, in which the "movers" hired to pick up and drive the waste to the collection point end up dumping it elsewhere, which may lead to other social and environmental problems.

After considering several factors, such as the RAG ratings given to both project outcomes, the fact that Colombia has transitioned to a new, greener, domestic refrigeration path thanks to regulatory changes and improvements by producers, and the evidence available on how to increase the speed

[5] Among these benefits are the reduced costs that retailers needed to assume from collecting the older fridges and giving them to the programme operator for them to take to the licensed WEEE disposal organisations.

along this path to achieve and surpass the NDC goals, the ELE Team has assigned an Amber RAG rating to the overall Effectiveness dimension of the project.

3.3 Efficiency of the project

Efficiency	3. To what extent was the delivery of outputs timely and to expected quality standards?

During the mid-term ELE, the project displayed progress in two different dimensions. The first dimension was the conversion of producers to the R-600a refrigerant, which made significant progress. The second dimension was the substitution effort, which faced numerous hurdles and was experiencing delays. The mid-term ELE Report highlighted the progress of the conversion of producers to the R-600a refrigerant. The report emphasised that the refrigerator producers had a keen interest in transforming to this refrigerant and had pushed forward with the changeover despite some delays with the project's final approval and implementation. On the other hand, the substitution process was facing difficulties due to the requirement of modifying the project mechanisms as well as making essential changes within Bancoldex to facilitate the process of paying out incentives.

In the mid-term ELE Report, there was evidence of the project encountering difficulties in obtaining and committing relevant stakeholders, especially Ministers or Viceministers, or other organisations that could drive and coordinate the required transformation agenda. It was mentioned that the project showed important technical execution capacity but that it displayed some weaknesses in setting and coordinating a multisector and multistakeholder agenda that the project required, as suggested by the challenging process of getting Bancoldex ready to manage and pay the incentives. The project also displayed an inability to coordinate with FENOGE the refrigeration substitution efforts at the governmental level, although some arrangements had been sorted with that programme's operator to have operations-level coordination and synergies. This weakness led the mid-term ELE team to recommend seeking for ways to involve higher-level officials in the execution of the project.

During the final ELE, it was found that execution conditions remained similar to what was found at mid-term: training and studies under the direct responsibility of the project team were executed satisfactorily, but there was little evidence of collaboration across stakeholders of different types to achieve the substitution and refrigerator EoL disposal goals. The examples discussed in the Effectiveness section confirm this conclusion: although training and technical support were provided, received, and used to improve and increase WEEE disposal organisation processing capacity, the project also faced issues with substitution activities that do not seem to address well old refrigerator owners' or retailers' behaviours, and of limited progress in the appropriate EoL disposal of domestic refrigerators combined with persisting questions about its financial self-sustainability and, finally, the lack of working or discussion groups between fridge (or appliance) producers and WEEE disposal organisations that could help to create a shared commitment to collaborate towards the project's expected outcomes and targets.

The project did not raise its profile or get the Ministers, Viceministers or the President's office engaged to help drive the agenda. According to most interviewees, the MADS' UTO played a crucial role in driving the project forward, providing support and follow-up as needed. However, it is important to note that UTO is just one office within a larger institution, and as such, securing its

ownership is not enough to get high up on the agenda of MADS. Specifically, the head of UTO is subordinate to the Minister, the Viceminister, a Director, and a Group Coordinator. A broader buy-in within MADS would have been beneficial. Moreover, although interviewees mentioned that MADS's Climate Change and Risk Management Directorate (third level) had been asked to participate more actively in the project due to its role as national implementation partner, it seems that it only became more engaged in 2022 after a new national government took office. This late commitment caused some execution issues as the Directorate representatives came with some questions and comments about work that had been done before, and for which the Directorate had not contributed or made remarks at the appropriate moment.

Many of the most important delays in execution were caused by the need for governmental institutions to change or strengthen their procedures and capabilities. This process is usually slow and involves high participation from legal offices, who take their time studying and processing the changes. However, most governmental institutions mentioned that once the changes were made, the new capabilities and procedures remained with the agencies for the long run, supporting legacy efforts from the project or enabling other similar initiatives. During interviews with government agency representatives, it was acknowledged that implementing the necessary institutional and procedural changes was a time-consuming process. However, they emphasised that the changes made would have long-lasting impacts that could support future legacy efforts related to the project or other similar replacement projects, such as those related to air conditioning equipment or commercial refrigeration.

Thanks to the project support, Red Verde is now more likely to continue operating after MADS's Resolution 851 of 2022. However, given Red Verde's non-profit nature, and its membership by appliance producers and importers, both discussed further in Section 3.2.2, it may lack the business focus and independence to address and remove the barriers that are slowing or hindering the substitution/trade-in schemes required to achieve the project or the NDC's 2030 GHG reduction targets. Additionally, it is not equipped to tackle the issues that are preventing the formation and consolidation of working or discussion groups between refrigerator producers and WEEE disposal organisations, which could help to create and consolidate a circular economy around refrigerators or large appliances. Refrigerator manufacturers have taken the first step towards producing green refrigerators, mostly in their own interests. However, to meet the GHG reduction commitments outlined in the NDC or to create circular economies, the required substitution speeds can only be achieved through the collaboration of many stakeholders, including the government.

At the final ELE, it has become more evident that the project was created based on behavioural assumptions of domestic consumers' and retailers' behaviours in relation to refrigerator substitution that were later found to be false. The project team tried to make changes to improve execution, but these adjustments caused delays and low project efficiency. As was discussed in the Effectiveness section, the project has struggled to get the incentive in operation, and most of the accomplishments from the project come from leveraging the incentives provided by FENOGE's *Caribe Eficiente* programme. The project is making a last-minute effort to create incentives that would induce refrigerator producers and retailers to be more involved in supporting the substitution efforts. However, it appears that none of these efforts have taken into account the feedback or lessons learnt from consumers and retailers about when and why they purchase or upgrade their refrigerators. If this feedback and the lessons learnt are not utilised to review the substitution strategy and propose a

different approach, it may not accelerate to the desired level or produce a sufficient reduction in GHG emissions to meet the NDC goals.

The project has made significant contributions from a technical perspective. This includes providing training and equipment to refrigerator producers and WEEE disposal organisations, strengthening Red Verde, and providing inputs required by the Colombian Ministry of Mines and Energy to update the Energy Efficiency Labels and adopt the MEPS ruling for fridges that can or cannot be sold. All of this has created the necessary conditions for a new "path" for domestic refrigeration in Colombia to be dominated by green fridges. **Nonetheless, it is important to note that technical capabilities alone may not provide optimal benefits. Coordination and collaboration among private and public stakeholders are crucial in unlocking the full potential of these capabilities. Because of these contrasts, and also the problems with assumptions about consumers' and retailers' behaviours towards refrigerator substitution that do not seem to have been properly addressed, the ELE team decided to assign an Amber rating to the Efficiency dimension.**

3.4 Impact of the project

Impact	4. What evidence is there that the project has been contributing to the intended impact in the ToC (incl. transformational change)?

As explained in Section 1.2.1, the ELE utilises the TCMF presented in Figure 2 and further explained in Annex A.

3.4.1 Dimension 1: Promoted a demonstration effect

As mentioned in the Project Overview and Relevance Sections, the project was expected to make contributions across multiple environmental, regulatory, and technical dimensions. This usually translates into projects that have multiple stakeholders or elements that need to be aligned in order to achieve the results. The project sought to address challenges across three types of environmental and climate challenges: (i) discontinuing the use of ozone-depleting (CFCs) and climate change-contributing (HFC) substances as refrigerant agents and replacing them for the "greener" R-600a (Isobutane); (ii) reducing GHG emissions through improved EE in domestic fridges, contributing to Colombia's internal EE measures and its NDC commitments; and (iii) improving WEEE waste management following Colombian legal requirements. The project proposal document identified the multiple stakeholders and actions and considered a steering committee that involved most of them.

Actions that focused on specific stakeholders, like technical studies, training or even equipment acquisitions, were conducted mostly in a successful manner, but those that would have benefitted from multisectoral collaboration, like the trade-in / substitution efforts or getting the formal refrigerator EoL processing running, had limited success. Interviewees across the whole spectrum mentioned being satisfied with the technical support received from the project. However, poor coordination or collaboration became apparent for most of the outputs and outcomes associated with the FC Component. Problems here were associated with administrative issues or the fact that the financial mechanisms proposed did not seem to address the real-life barriers of: (i) households not being interested in updating their functioning fridges despite environmental or financial benefits and

(ii) retailers not fully interested in supporting the substitution scheme due to the administrative and logistic costs they generated, which were not appropriately covered by the bonus. The project has undergone numerous changes aimed at enhancing the execution of the FC Component. However, despite the revised activities and mechanisms, these obstacles have not been fully addressed. It is highly probable that they will continue to hinder the project's progress and prevent the necessary collaboration needed to achieve the project's objectives.

Many of the project's achievements could be traced to the interest and commitment of external stakeholders rather than to the project itself. The shift to environmentally friendly refrigerators was primarily driven by refrigerator manufacturers, who were motivated by both commercial and regulatory requirements to make the change. This helps explain why they proceeded with the changes despite initial project delays. The *Caribe Eficiente* pilot programme, implemented by FENOGE, played a significant role in the substitution effort, with its doubled incentives and the assistance of a logistics operator to streamline the collection and transport of old refrigerators. It's worth noting that not all retailers supported the substitution effort, but those that did and were able to combine project incentives and FENOGE support with micro-financing options, as well as leverage their marketing and logistical capabilities, made the most substantial contributions to the effort.

The ELE team believes that the project made important contributions in terms of capabilities and mechanisms for the transformation of the sector but was not able to demonstrate how they should be used in a coordinated fashion to advance towards the project's substitution or disposal targets. Achieving the ambitious goals within and across all the project's dimensions and sectors requires effective coordination and collaboration among many sectors and their stakeholders, and the project has failed to demonstrate how that joint work effort should be approached and achieved. **Because of this, the project is considered to have only achieved "interim signals" in relation to Dimension 1 of the TCMF.**

3.4.2 Dimension 2: Caused a Catalytic Effect

The project made significant contributions to key regulations of EE labels and MEPS, which contributed significantly to the decision of the refrigerator producers to transform their production lines and product portfolios. The updates to the EE labels, along with the MEPS requirements that came into force in 2023, were instrumental in encouraging the transformation of the refrigerators to the new refrigerants and EE requirements, leading Colombia to jump to a new sustainable or green "path" for domestic refrigeration with all the new refrigerators being sold corresponding to "green refrigerator standards". How fast Colombia actually moves down this path and how much GHG emission savings are actually achieved will depend on the rate at which older fridges are withdrawn or removed from service and if they get to undergo adequate EoL processing and disposal. The substitution effort and the WEEE disposal organisations' strengthening are crucial for these latter objectives.

The project team and project partners seemed adamant that, despite the limited results, the project had provided lessons and capabilities that could be used later to scale up or replicate the effort. However, capabilities and mechanisms are not enough to pursue or achieve the outcomes or impacts of complex projects such as this one. Collaboration is key, and the project has catalysed very little of it. At the time of the final ELE, 5 months away from project closure, there was no clear

evidence regarding whether the processing and disposal of refrigerators was financially self-sustainable or not. Additionally, there was no concrete plan in place to handle the processing and disposal of refrigerators beyond the development of a credit line. Red Verde's continuity seems guaranteed by the new requirements of Resolution 851 of 2022, but it is not clear whether it will continue to support "substitution" schemes, as their role may just be limited to collecting "discarded" appliances. No real communication exists between refrigerator producers and WEEE disposal companies, even though the way in which the former ones are set up could help to make the WEEE disposal organisations' business more attractive.

The changes made to the FC Component do not seem able to tackle the real-world barriers that the project found in households not interested in upgrading their working refrigerators, or of retailers not being really motivated to participate in the substitution or trading-in efforts. In 2023, an amendment was approved to modify the incentives for retailers and financing options for WEEE disposal organisations. The low incentive for retailers, known as bonus 1.0, was retained, and a new, higher incentive was introduced to encourage producers to engage in the substitution effort. Additionally, some financing options were proposed for utilities or financial institutions to offer lower interest rates to consumers. However, it appears that these actions may not be sufficient to address the barriers that have been identified.

Because of these considerations and evidence, the ELE team finds that there are **"interim signals" for Dimension 2 of the TCMF for this project.**

3.4.3 Dimension 3: Contributing to additional, large-scale and sustained GHG reductions

With only greener fridges being sold in Colombia, the project was moved to a different developmental path in which, at some point in the future, all domestic refrigerators will be of the "green" type with improved efficiency and adequate EoL disposal. The speed at which that future is achieved depends on the effectiveness of the substitution and EoL disposal efforts. But as these have suffered delays and problems, the expected transformation may take longer than expected, or have less impact, as many older refrigerators are not processed or disposed of properly. The Ministry of Mines and Energy Resolution 40427 of 2020, with which the revised Energy Efficiency Labels and MEPS were adopted, was developed with support from the project. The labels and MEPS are one of the main drivers for the sales of more efficient fridges. Although the project started after refrigerator producers converted to the R-600a refrigerant, it has helped them adopt health and safety policies and equipment and provided support for EE efforts. With all new refrigerators being of the "green type", it is reasonable to expect that, as older fridges age, break down or become obsolete, they will be replaced with newer ones. The substitution effort was expected to increase the rate at which that replacement took place, with the WEEE disposal improvements also helping to ensure that the benefits of that substitution were maximised. The delays and problems of these two activities and intermediate outcomes may lead to the project not achieving its own goal or the revised NDC 2030 one. This would also hamper getting the full savings or improvements expected with the appropriate collection and disposal of the older refrigerators.

The project's Annual Reports have reported GHG savings, but the data provided has some continuity and traceability issues that need to be addressed. This will make it easier for anyone to be confident

about the reported GHG emission savings and validate/verify the information themselves. In the 2022 Annual Report, it was mentioned that the sale of 3.25 million fridges since 2020, with improved refrigerant and efficiency conditions, and the processing/disposal of 4,003 fridges, had led to estimated GHG emission savings of 307,218 tons of CO2eq by 2022. However, the 2023 Annual Report obtained later in the process mentioned that a total of 14,841 refrigerators had been processed/disposed of with the project's support, resulting in GHG emissions savings amounting to 243,448 tons of CO2eq by 2023. The 2023 Annual Report states that the figures for 2023 and the revised-down estimation for 2022 (175,536 tons of CO2eq) result from a revision of the figures, but no detail is provided on why and how the estimation methodology was changed. Considering the importance of reporting and verification for climate change mitigation projects, it is desirable to elaborate on why the change was needed and why it is better than the prior measurement.

As we were only able to view the 2023 Annual Report document and not its annexes, the ELE Team was unable to review or analyse the details of the new procedure or understand the reasons that explain the changes in the figures reported in the 2022 Annual Report. With that caveat in mind, the ELE Team have some comments on the way in which the GHG reduction estimations were made for the 2022 Annual Report that could have led to overestimate some savings and to underplay others. We present these comments below so that they may be used at a later moment of review or validation of the two reports and its figures, also seeking to encourage the establishment of procedures or reporting schemes that develop and strengthen methodologies for the estimation of savings related to similar projects, and also to help present and explain changes in methodology between reports: (i) The estimation considers that all the savings from the replacement of a new fridge take place in year one rather than over time; however, in the relevance section of the Mid-Term ELE report it was mentioned that (for traditional refrigerators) only 4% of emissions came from the production stage, with 68% being associated to its operation and 28% to its final disposal. Given that much of these savings happen over time rather than at the time of a sale, it would be more accurate to estimate the savings over a longer time period, even more so when considering that the reporting scheme considers a multi-year scenario. (ii) Green fridges produced in Colombia and sold without support from the project could be considered as indirect savings as they are based on project contributions but not within the project. (iii) The ELE team did not find a clear analysis on whether the sales of all new refrigerators should be considered as GHG emissions savings or not, considering that without an active removal of old refrigerators, what may be happening is a net addition to overall emissions, rather than a real reduction. With respect to this latter issue, the Project Proposal estimated that in 2015 there were ca. 12.5 million domestic fridges in Colombian households, and the recent sales of about 1 million fridges sold per year since 2020, would amount to a yearly increase of 8-10% in the total stock of fridges in Colombia. This is significantly higher than the estimated growth of 3% considered in the proposal document, hence generating additional net emissions compared to the project assumptions.

Considering that most of the substitution and final disposal of fridges was achieved by work that combined FENOGE's and Mitigation Action Facility's funding, special attention and coordination needs to be taken to avoid double counting the GHG savings by the two projects. As discussed in earlier sections, most of the project's main results in refrigeration substitution were achieved through actions that benefited from both this project's and FENOGE's *Caribe Eficiente* refrigerator substitution programmes. The ELE team's main concern is that FENOGE and the project, given the *informal* nature of that collaboration, could end up reporting the savings as their own, which could lead to a double counting the same benefit. Some interviewees told the ELE team that there was little to no risk or

double counting as FENOGE, due to its nature and focus, only looked at EE benefits while the GHG emissions savings were claimed and considered by this project. However, another interviewee mentioned that those EE gains were also used to estimate some GHG savings, opening up the possibility for double counting to actually happen. Having clarity about how GHG emission savings are to be claimed and reported by different supporters of an initiative is one of the topics that could be addressed and clarified by those initiatives – and by multistakeholder discussion groups.

The ELE Team considers that the project has made some contributions to the reduction of GHG emissions but considers these to be far smaller than those included in the report. On top of that, the reduced speed of transformation resulting from the issues of the substitution effort and also a potential reduction of the GHG reductions from WEEE disposal due also to that reduced substitution effort **led the ELE team to conclude that there are "early signals" of transformation for Dimension 3 of the TCMF.**

3.4.4 Overall impact of the project

In conclusion, at the end of project implementation, the Colombia Domestic Refrigeration project shows interim signals of transformation in Dimension 1, interim signals in Dimension 2 and early signals in Dimension 3. Such progress is partially in line with the expected level of project-induced transformational change in the TCMF (see Table 3). Progress related to the transformation of the refrigerator producers has been important and impactful across the project's three impact dimensions: new technologies and practices were adopted by the refrigerator producers (Dimension 1), the regulatory framework, the consumers and some of the substitution incentives all aligned to increase the interest of consumers in these more efficient refrigerators (Dimension 2), that translated into the current conditions in which only green fridges are sold (Dimension 3). However, the progress achieved by the project is substantially more limited in the substitution and WEEE disposal efforts: they have individually benefitted from studies, training or other types of assistance from the project (Dimension 1), but have had little success in generating the coordination and collaboration structures and processes required for project's own substitution and WEEE disposal efforts to be viable and sustainable, limiting also any potential for scale up or replication (Dimension 2). Without operational and financially sustainable substitution or WEEE disposal efforts, the GHG reductions expected for the project or the NDC may not be met in the timeframes or with the level of impact desired (Dimension 3).

According to the same methodology (see details in Annex A), the ELE provides a comparison between the project team's self-assessment of its Core Mandatory Indicator M3[6] and the evidence identified by the ELE. The project team has given itself a score of 3.5, i.e. between 'Tentative evidence of change – transformation judged likely' and 'Clear evidence of change – transformation judged very likely', for the M3 indicator in the draft Annual Report 2023. However, based on the aspects and evidence

[6] The Core Mandatory Indicator M3 reads: "Degree to which the supported activities are likely to catalyse impacts beyond the projects (potential for scaling-up, replication and transformation)". The project team is asked to self-assess it using the following 0 to 4 scale: 0 = Transformation judged unlikely; 1 = No evidence yet available; 2 = Some early evidence suggests transformation likely; 3 = Tentative evidence of change – transformation judged likely; 4 = Clear evidence of change – transformation judged very likely.

discussed in this section, the ELE team believes an M3 score of 2 ('Some early evidence suggests transformation likely') would be more appropriate.

This score is given to the project mostly due to the remaining challenges that exist to get the substitution or trade-in programme running and also to ensure that there is an appropriate final disposal of the older refrigerators collected. The score assigned also pays significant consideration to the fact that the ELE team found no evidence of working or discussion groups that could eventually take on the leadership and coordination required to meet the GHG reduction targets from domestic refrigeration by 2030 included in the NDCs, or to make progress towards a refrigerator circular economy, or even more broadly, an appliance circular economy.

Based on the matrix in Table 10 (Annex A), an M3 score of 2 at the end of the project corresponds to an Amber RAG rating for the Impact criterion.

3.5 Sustainability of the project

Sustainability	5. What is the likelihood that the outcomes will be sustained after the end of the project funding period?

The mid-term ELE considered that the project demonstrated a robust institutional framework that should be able to make changes required for the project to advance in the substitution effort. This assertion seemed to be based on the progress reported in the conversion of the producers to the R-600a refrigerant, the changes to the financial mechanisms of the project, and the transformation that Bancoldex was going through to assume the execution of the financial mechanisms of the project.

The Sustainability dimension received a green RAG rating in the mid-term ELE, considering that many of the technical and regulatory changes made up until that point had little risk of backsliding or being lost. Back at the time of the mid-term ELE, many of the regulatory pieces prepared with support from the project had been prepared and adopted; many studies also reported being finished or showing progress, and the training was delayed mostly due to COVID-19, but that was being solved. At the final ELE, 2.5 years later, it was possible to verify that that expectation was true, with technical capabilities and regulations still standing and even being further developed, as it happened with MADS's Resolution 851 of 2022.

The coming into force of the MEPS regulations in 2023 has contributed to the offering of higher-efficiency refrigerators by domestic appliance producers and importers. The transformation of the Colombian refrigerator producers, because of their large market shares, to the greener fridges has forced importers to review their refrigerator portfolios to be able to compete with similar performance products. This shift towards greener fridges in the sellers' portfolios has gotten Colombia into a path of substitution of refrigerators, but the speed at which that transformation takes place will be defined by the success of substitution or trade-in efforts.

Colombia's refrigerators will eventually all be of the greener type: the remaining concern is what will be the speed of that transformation if there are no coordination or collaboration groups among the key stakeholders of the substitution or WEEE disposal efforts. For the ELE team, it is clear that Colombia is on that transformation path. However, the limited success that the project had in getting refrigerator substitution or trade-in programmes to work, along with the aforementioned problems

of coordination and collaboration among the multiple stakeholders and sectors, have raised some concerns that the 2030 NDC GHG reduction targets expected from domestic refrigeration may not be met, and that there may be significant issues or hurdles to solve to get the refrigerator disposal part operating adequately.

Large companies involved in the production and retailing of refrigerators have environmental and social compliance goals that they will continue to execute. Like other big companies, large refrigerator producers and retailing companies have developed environmental and social policies to demonstrate compliance and protect investors. These policies are often more focused on serving the company's interests rather than fulfilling government regulations or working group decisions. These companies can afford to have dedicated compliance teams to ensure they meet environmental and social standards. Smaller retailers and WEEE disposal organisations may struggle to develop, apply, and enforce Environmental, Social, and Governance (ESG) policies due to limited resources.

Bancoldex and other governmental agencies mentioned that the project may not have been able to achieve much change so far but that it has provided many lessons and capabilities that will be beneficial for this project's legacy and for other projects. Interviewees from the government agreed that this project has faced numerous setbacks, which have caused delays in its implementation. However, they also mentioned that the lessons they have learned and the capabilities they have acquired, such as Bancoldex's ability to manage and pay incentives, will be helpful for other projects they are putting together. In addition, Bancoldex will continue managing and paying incentives for fridge replacement in the coming years. This seems to consolidate the sustainability of the steady supply of green domestic refrigerators built by the project. The same cannot be said for the substitution and disposal of older and less efficient fridges. Indeed, the absence of leadership and coordination of the actions and activities across the multiple and diverse stakeholders participating in the fridge substitution and WEEE disposal efforts could undermine the completeness of the refrigeration sector's transformation, or at least its reasonable pace.

With the adoption of Resolution 851 of 2022, there is a higher probability of Red Verde continuing to exist. However, due to its ties to producers and its legal status as a non-profit organisation, it cannot be expected to lead substitution or WEEE disposal efforts. Red Verde is an important player for appliance producers' ability to comply with the Colombian government's WEEE collection and disposal requirements and targets, particularly given the EPR requirements, which have only increased after the adoption of Resolution 851. Is it feasible for Red Verde to become the leader and coordinator required to achieve GHG reduction in the NDC for the sector and to establish a circular economy around refrigerators or appliances? This is a possibility but not a guaranteed outcome. Red Verde would need approval and support from appliance producers, additional resources from the producers or other sources, and a different business model and legal framework that does not rely as heavily on contributions in order to operate and carry out the necessary actions.

The project's experience shows that, under the current approach and context, replacing old refrigerators with more environmentally-friendly ones is possible, but it requires significant resources and concerted efforts from multiple stakeholders. The project achieved limited success in substitution only because its own incentives (many of which had not been paid to retailers due to administrative delays at the time of the ELE) were combined with the more generous incentives to consumers by FENOGE's *Caribe Eficiente* pilot programme, which also reduced the burden on retailers

to collect and dispose of old fridges. Importantly, resourceful and committed retailers who provided additional micro-financing, marketing and logistics support, in addition to leveraging further support from local governments or utility companies, played a crucial role in the success. Engaging customers who were initially hesitant to upgrade their refrigerators required a substantial effort, and similar levels of effort will likely be needed if no actions are taken to change the behaviours of refrigerator owners or retailers.

FENOGE is preparing a loan with the Interamerican Development Bank (IDB) to continue and expand the work done with its *Caribe Eficiente* Pilot Programme. The new project will increase funding made available for refrigerator replacement and seek to cover other EE areas, like lighting improvements.

It is unquestionable that the project's outputs helped the Colombian domestic refrigeration sector transition to a sustainable and climate-friendly path, including the Energy Efficiency Labelling and MEPS requirements and the changes made by refrigerator producers and importers to their portfolios towards "green" refrigerators. **These elements are unlikely to backtrack and set a strong foundation for the sector's transformation**.

Yet, the project had a broader scope than just improving products and supporting local producers. It also aimed to remove old refrigerators from use and establish a system for processing and disposing of them at the end of their life. Achieving these goals has proven to be challenging due to the absence of leadership and coordination groups to manage the necessary actions. **Because of these problems, the ELE team decided to assign an amber RAG rating to the Sustainability criterion**.

4 Conclusions

Now that the evidence collected and analysed by the ELE has been explored, this section goes back to the project's Theory of Change to test to what extent the original causal pathways and assumptions behind them (see Section1.1) have held.

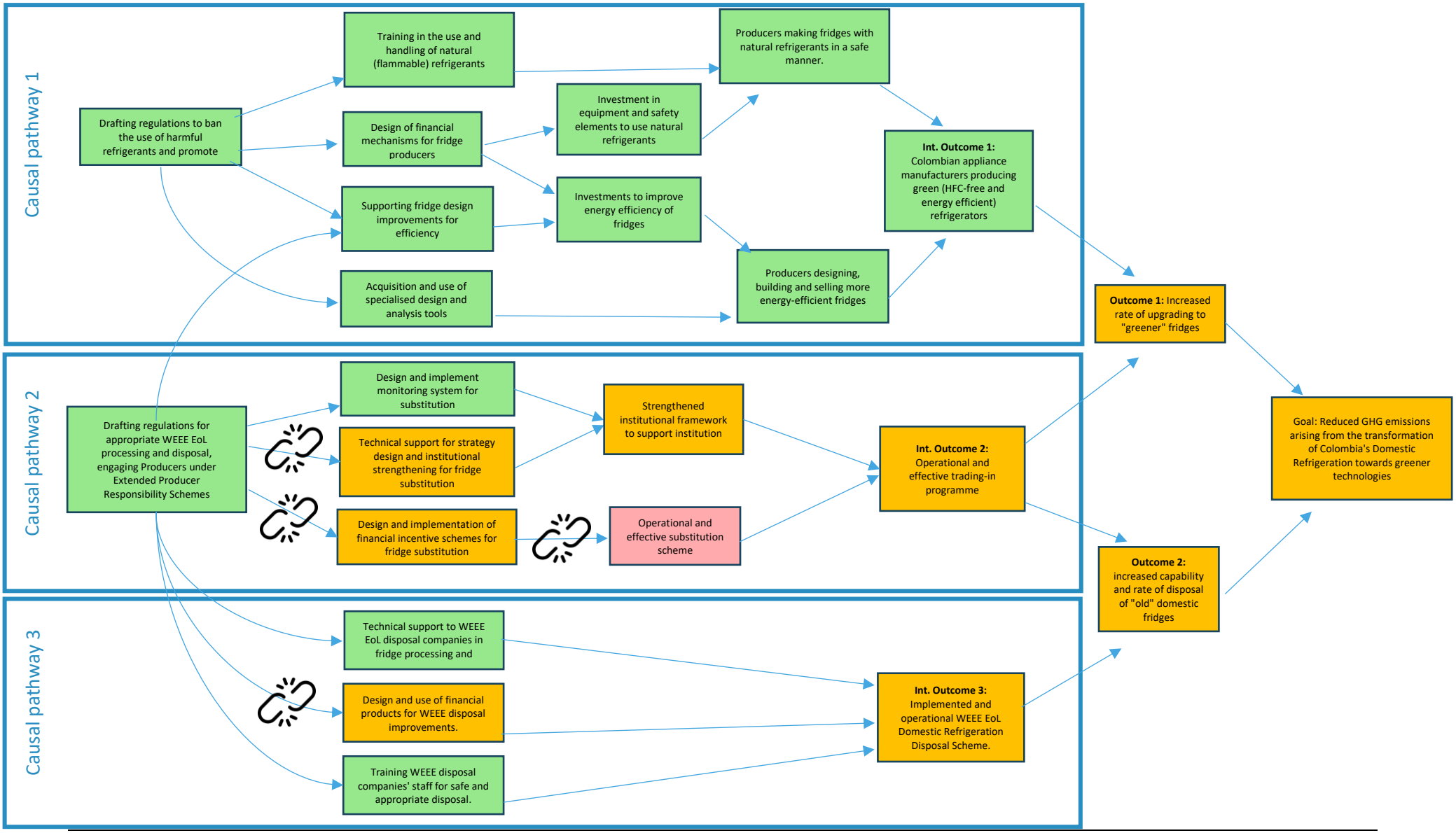
Figure 3 presents an overview of the progress of the project along its ToC causal pathways towards its intended outcomes. The RAG rating uses the same scale as the previous section (i.e. Good / Very Good = Green; Problems = Amber; Serious deficiencies = Red; Not enough info to rate = Grey), and the colours of the Outcomes' shapes are the same colours used in Section 3.2 to rate the project's achievements for each Outcome. This is to be read as an assessment of the project's situation at this point in time, i.e. at final.

Before going into the details of Figure 3, it is important to mention that it has a slight change in the Causal Pathway 2 with respect to the Causal Pathway Map presented in Figure 1. The change consists in having added an intermediate step before the achievement of Intermediate Outcome 2, making it easier to understand the complexity and challenges of the refrigerator substitution effort, which is the focus of that Causal Pathway.

What transpires from Figure 3, based on the final ELE findings, is that the project continues to face difficulties and challenges that are compromising its ability to achieve Outcomes 1 and 2 and its final overall goal of reducing domestic refrigerator-related GHG emissions. The steps in the causal pathway that leads to Intermediate Outcome 1 are all green to represent the transformation that Colombian refrigerator producers underwent to arrive at the current condition, in which all the refrigerators they sell belong to Energy Efficiency Labels A and B and use the R-600a refrigerant. As discussed more extensively across Section 3, this transformation means that Colombia switched to a development path in which all domestic refrigerators will (eventually) be green. How quickly that complete transformation happens and how comprehensive its benefits are will depend on the success of the substitution and WEEE final disposal causal pathways.

The ratings assigned to the different steps of Causal Pathway 2 have been extensively reviewed and considered for this final ELE, arriving at an increased number of steps with the amber RAG rating. The substitution scheme faced multiple problems hampering its progress and its impact, most of which resulted from the project being formulated on assumptions about the behaviours of refrigerator owners and retailers that were later proved to be false, to limited interinstitutional coordination or collaboration efforts. The refrigerator substitution register was created and implemented within Red Verde and has reportedly operated well. According to many interviewees, the funding and technical support provided to Red Verde helped increase its capabilities. Yet, the adjustment and implementation of the incentive scheme have faced multiple hurdles, including the need to review and adjust the financial incentives to the real conditions found, the need for Bancoldex to make internal changes to be able to assume the financial mechanisms of the project, and the complete stop that the project faced due to the new Colombian government's reallocation of the "common interest certifications" issuance (see section 3.2.3). These difficulties are the main reason for the amber RAG rating to the box "Design and implementation of financial incentive schemes for fridge substitution".

Figure 3. Overview of the project's Causal Pathways Assessment at end-of-project



The final ELE team has assigned an amber RAG rating to the "Technical support for strategy design and institutional strengthening for fridge substitution" within Causal Pathway 2. At the mid-term ELE, this element received a green RAG rating. The main reason behind the rating change is the lack of working or discussion groups to lead and coordinate substitution efforts. As described in Section 3, the success of the substitution effort will depend on the coordination and collaboration across types of stakeholders (e.g. public sector, refrigerator producers, appliance retailers, and consumers). The project did not create multistakeholder working or discussion groups, and it is not clear whether they will be created in the future.

The red RAG rating assigned by the ELE team to the "Operational and effective substitution scheme" step derives from wrong assumptions made at the project formulation phase about the consumers' and retailers' drivers for substitution. It was found that a significant portion of the project's substitution results were not solely due to the incentives provided by the project but rather the efforts and incentives of FENOGE's *Caribe Eficiente* Pilot Programme, as well as the dedication and resourcefulness of a few retailers. During the interviews, it was also apparent that both customers and retailers did not behave in the way expected by the project assumptions, and the incentives offered were found to be insufficient. The red RAG rating assigned to that step aims to highlight that the project has been continuing to rely on financial mechanisms that, as described in Section 3.5, seem too costly and incentive-dependent, and that do not help address some of the most significant barriers to the substitution effort including: (i) households showing little interest in updating a working refrigerator, regardless of its inefficiency or lack of environmental friendliness, and (ii) the lack of interest among retailers in taking on the work of processing, collecting, and delivering old fridges to WEEE disposal companies.

Causal Pathway 3 also shows many steps with an amber RAG rating, initially linked to the design of financial products for WEEE disposal organisations. There was some disagreement among stakeholders regarding the results of the studies conducted by the project on the WEEE disposal business model. The amber rating is based on this disagreement. According to some interviewees, the study suggested that refrigerator processing and disposal was not financially self-sustainable. However, others reported that the studies showed ways to increase the model's profitability, but the WEEE disposal organisations lacked commitment. The ELE team did not get to review those studies. Nonetheless, without any multistakeholder coordination efforts, it seems unlikely that WEEE will be reduced or a circular economy around the appliances created.

Because of the broken linkages along Causal Pathways 2 and 3, with their amber RAG ratings, **Outcomes 1 and 2 of the project, along with the project goal, receive an amber rating, too.** This rating is consistent with a project that has successfully achieved one crucial element for the sector's transformation but missed other equally important ones. In simpler terms, the project has set the country on a path towards transformation by strengthening refrigerator producers and promoting environmentally friendly refrigerators in Colombia. However, achieving the project's or the revised NDC's GHG reduction goals by 2030 may only be possible if enough old refrigerators are (i) taken out of use and (ii) processed and disposed of properly by licensed WEEE processing and disposal organisations. Although the project made progress in developing the technical capabilities for substitution and removal, its strategy relies on financial incentives that have not proven to be very efficient, considering the cost per refrigerator removed. This makes the project dependent on external grants or incentives to achieve the desired targets and results.

5 Lessons and recommendations

5.1 Key lessons

The evidence gathered during the ELE, along with the key findings presented in Section 3 and the conclusions in Section 4, have been used by the ELE team to draw the lessons below.

5.1.1 Lessons for the project partners for sustaining the project's legacy

- **Lesson 1. It is important to listen to feedback coming from key project stakeholders and make the appropriate corrections: for this project, there is strong evidence that suggests that the customers and retailers do not respond to the proposed incentives in the way that was assumed during project preparation.** During the interviews, many participants revealed that domestic customers tend to buy or upgrade a fridge or other large appliance only when they have achieved certain milestones or when they face emergencies such as irreparable damage to the appliances. However, the project did not or was unable to use this information to modify its approach and continued to rely on financial incentives that were unlikely to be effective. Additionally, there appeared to be little consideration given to the factors that drove the success of FENOGE's *Caribe Eficiente* Pilot Programme or the success drivers of the retailers that made the most significant contributions to this project and *Caribe Eficiente*.
- **Lesson 2. Goals arising from complex projects will only be really achieved if there is a deliberate multistakeholder coordination and collaboration effort.** Achieving the goals of this project required coordinated actions across topics and goals of removal of ozone-depleting substances, GHG emissions reductions, EE and WEEE processing and disposal. This diversity of lines of action, along with the different types of stakeholders involved, make this a complex project. Without some clear multistakeholder working groups that have the interest and commitment to pursue the goals, it is unlikely that they will be achieved.
- **Lesson 3. Coordination and collaboration need high-level leadership that is able to drive the agenda and help allocate the resources among the stakeholders or activities.** The project has struggled to get the attention of high-level policy- or decision-makers, and that has compromised its ability to move forward with those activities, outputs and outcomes that required coordination and collaboration. In order to successfully achieve the goals of substituting and processing/disposing of WEEE, the project would require support from the Ministries or agencies responsible for driving the agendas in those sectors or areas where MADS's UTO has limited influence.

5.1.2 Lessons for the Mitigation Action Facility for the review, approval, and management of future interventions

- **Lesson 4. Projects that target or expect the transformation of groups with more limited resources, like households or Micro and Small Enterprises, need a high amount of knowledge exchange and project support to deal with a large and diverse set of stakeholders.** This project has produced many lessons about the challenges, hits and misses of designing and executing a

project in which a large and diverse set of stakeholders are expected to contribute to a desired environmental and climate outcome. Efforts to collect and share lessons about working with and influencing these groups that can be used from the project preparation stage can be helpful in designing and managing a project.

- **Lesson 5. To have better control and the ability to terminate projects that are not progressing as expected or do not have the required commitment from policy/decision-makers or other key stakeholders, it is important to incorporate progress or commitment checks within project execution plans for the Mitigation Action Facility.** Financing agreements for Mitigation Action Facility projects, like other contracts, should contain provisions for early termination triggered in case of failure to achieve or maintain key technical or regulatory milestones or if the support or commitment of important stakeholders is not secured. Enforcing these clauses would assist the Mitigation Action Facility in having greater control over the commitments of governments and key partners. In case of failure, it would allow the facility to save money on staff and consultancy costs that would otherwise be spent without any significant impact on the desired results and goals.
- **Lesson 6. Projects may need support from the Mitigation Action Facility to be able to climb and remain high on the policy- and decision-makers agendas.** Sometimes project teams or key project partners may try their best to keep high officials interested and committed to a project, but this can be challenging due to staff turnover or changes in administration. Mitigation Action Facility-supported projects are usually of high complexity and need to be led by high-level staff able to drive agendas or coordinate actions across multiple sectors, which is usually difficult as Ministers or Agency directors lack control over peers in other sectors. In this regard, it is important also to consider the rank of the people seeking to reach out and engage these policy- or decision-makers, as they may not respond to a staff member of a cooperation agency but may require that a minister-level figure from another country or another person with high diplomatic status supports that effort.
- **Lesson 7. Gender equality efforts should take into account the women or vulnerable groups' preferences and the conditions and challenges of the organisations that should execute those efforts.** Although gender equality and social inclusion were not mandatory targets for the project, the ELE team still inquired about the current status and challenges of those agendas in the domestic refrigeration sector. Despite no specific figures being provided, the ELE team learned that the sector has high participation of women in administrative, commercial, financial and engineering activities, as well as in other more intellectually focused jobs. However, women's participation is low in activities that require physical strength, like refrigerator servicing or distribution, reverse logistics or disassembly and final disposal. Most of the interviewees who had these types of activities mentioned that women's inclusion is facilitated by automation and mechanisation efforts. They also mentioned that women are not actively engaged to work in those more physically demanding jobs not because they could not do them but because women tend to get tired or bored with physically demanding work and are expected to resign soon, increasing staff turnover along with hiring and training costs.

5.1.3 Lessons for improving other or future projects' design and implementation

- **Lesson 8. Projects need to be able to make changes to their mechanisms, activities, or outputs if the assumptions upon which they were formulated are proven to be false.** This general lesson

is linked to Lesson 1 above and the project's struggle with financial mechanisms that were not able to tackle or drive the behavioural changes needed from consumers and retailers to advance towards the project's goals.

- **Lesson 9. Projects involving large and diverse groups like households or Micro and Small Enterprises in their transformation effort should be able to test and validate their assumptions before fully committing to a type of technical or financial instrument (incentive) or the transformation effort.** For some years now, the Mitigation Action Facility have considered an initial project preparation phase in which the aspects included in the proposal are further refined and adjusted to the real conditions of the projects. That time should also be used to try and test with more rigour whether key behavioural assumptions like the interests of certain groups, their priorities, their decision drivers, or their response to one (or different) types of incentives correspond to real life. If the behaviour does not match the original assumptions, this could be a time to readjust the technical or financial mechanisms to the real conditions or even decide to terminate the project if there are no alternatives or if the alternatives do not correspond with the acceptable budget or timing.

5.2 Recommendations

5.2.1 Recommendations to the project partners for sustaining the project's legacy

We provide these recommendations to the national project Partners because their contribution is critical in sustaining the project's outcomes in the long term and fostering the envisaged transformational change. However, we do not expect them to provide a written response to these recommendations in the "management response" to the ELE.

- **Recommendation 1. Conduct a comprehensive review of the incentives and mechanisms used to increase the number of refrigerators taken to WEEE disposal facilities for appropriate processing. This review should consider feedback and lessons learned from this and other projects and propose new incentives and actions to improve the success potential of the programme.** FENOGE's *Caribe Eficiente* Programme was able to significantly increase its substitution rate and meet its (revised) targets. Certain retailers effectively combined this project with other incentives as well as micro-financing to drive substitution. However, they observed that even with all the incentives, the substitution may fall short if an appropriate finance or micro-finance solution is not provided to cover the remaining cost of the refrigerators. The project partners should look at these experiences and propose changes to the project's mechanisms and actions that would increase their effectiveness. An additional area to develop and explore is the use of marketing material to try and motivate households to update or upgrade their refrigerators or other appliances more regularly.
- **Recommendation 2. Multistakeholder working, discussion, or steering groups need to be created and consolidated around the substitution and WEEE disposal efforts. Those goals will not be achieved without coordination.** As discussed throughout this report, the project could benefit from the collaboration and lessons learned from various industrial companies, including EEE firms, in creating a circular economy around EEE and WEEE. The fact that Red Verde is a non-profit organisation and is answerable only to EEE producers or importers does not facilitate the necessary discussions and collaborations. It is important to form broader workgroups that involve

all stakeholders, such as refrigerator producers' design and supply chain staff, WEEE disposal organisations, Red Verde, other entities facilitating old appliance collection, and the government. These workgroups should create and consolidate spaces needed to address challenges and lead and coordinate actions. Relying solely on regulations or general policy documents will not be sufficient.

5.2.2 Recommendations to the Mitigation Action Facility for the review, approval, and management of future interventions

- **Recommendation 4. The Mitigation Action Facility should create a specialised section within its Knowledge & Learning Hub to share lessons from its projects and other general advice on how to design and manage mechanisms or incentives for large and diverse groups like micro or small enterprises or private consumers.** Engaging a large and diverse group of stakeholders is a challenging task for many Mitigation Action Facility projects. Technical teams preparing project proposals face time and resource constraints. It is important to help them understand the challenges of engaging and involving such groups in order to improve the effectiveness of the projects. This can also minimise the time and effort required to revise the proposed instruments if they are found ineffective in the proposed context.
- **Recommendation 5: To improve project risk management, it is suggested that projects establish checkpoints or milestones associated with intermediate outcomes and final outcomes beyond the traditional "outputs". This will help the TSU and the project team to better understand the likelihood of the project achieving its outcomes and impact.** The traditional way of measuring project progress, which is mostly associated with outputs or deliverables, may not be enough to ensure the project's success. In the past, some projects have delivered their outputs but have failed to achieve the desired outcomes and goals. The proposed checkpoints or milestones should be associated with (i) the validation of key project assumptions, (ii) the introduction or adoption of important institutional or legal changes that are required to enable the transformation, and (iii) having obtained the active commitment and support of key project stakeholders. These checks are likely to be more important to the project's success and the sector's transformation than studies or training sessions. If properly designed and implemented, these checkpoints could help identify and tackle problems early on within a project's lifecycle. This can even lead to early termination of the project if it is unlikely to achieve the desired goals and impact. Mitigation Action Facility's Knowledge Hub could provide resources or advice on how to identify and set these checkpoints or milestones.
- **Recommendation 6. Implement regular in-country visits as a means to raise and maintain high-level officials' awareness of and commitment to Mitigation Action Facility projects**. Other Development Partners plan and carry out periodic missions in which they meet with high-level officials to follow up on the progress of the project, discuss with the responsible officials the next steps, and even raise and voice any relevant concerns. The Mitigation Action Facility could also leverage its ties with the German, British and Danish governments, as well as the EU, to delegate to the local embassies the scheduling and execution of those follow-up meetings with high-level officials.

Annex A Capturing project-induced Transformational Change

Introduction

This is a brief guide developed by AMBERO/OPM outlining a framework to consistently evaluate Mitigation Action Facility-funded projects' progress towards bringing about transformational change.

Transformational change is embedded in the Mitigation Action Facility's goals, and Theory of Change (ToC), and projects are the main way through which the Mitigation Action Facility will achieve this transformational change. Therefore, the projects need to be aiming to achieve this level of change, and the Evaluation and Learning Exercises (ELEs) of such projects should evaluate their progress.

In a way, key elements of transformational change are already monitored through the project's Mandatory Core Indicators M1-M5, part of the Mitigation Action Facility M&E Framework[7]. However, they only cover partial elements of transformational change. Therefore, clearer guidance in identifying the signals or evidence of project-induced transformational change is needed.

This brief document clarifies how transformational change is expected in projects and provides guidance to both project and ELE teams on how to characterise the elements and evidence of project-induced transformational change.

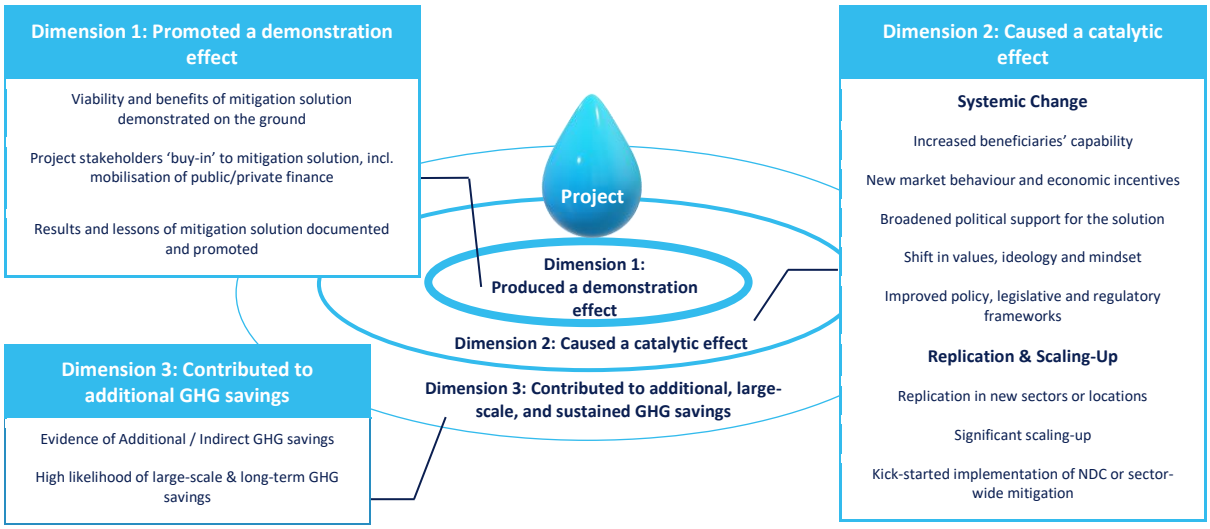
Breaking down project-induced transformational change

The Mitigation Action Facility defines transformational change as "*Catalytic change in systems and behaviours resulting from disruptive climate actions that enable actors to shift to carbon-neutral pathways"*[8].

The Mitigation Action Facility's ToC explains how transformational change is expected to be achieved through its outputs and outcome. The ToC is broad, and there are different ways transformational change can be achieved through the projects, which are simplified into the three *dimensions* summarised in the figure below.

[7] https://mitigation-action.org/our-approach/monitoring-evaluation-learning/
[8] https://mitigation-action.org/wp-content/uploads/Mitigation-Action-Facility_transformational change-factsheet.pdf.

Figure 4. Dimensions of project-induced transformational change



Three dimensions interact and reinforce each other to produce project-induced transformational change (Figure 4). These are described below with an indication of what is expected to be achieved at the project's mid- and end-point (see Table 8 and Table 9 for more details on scoring criteria).

- **Dimension 1: Promoted a demonstration effect.** The most direct way in which a project can contribute to transformational change is to produce a demonstration effect which will imply that:
    - The project has **demonstrated** or proven the viability and benefits of a particular **mitigation 'solution' (e.g. models, practices or technologies)** through implementation on the ground (e.g. using pilot projects), thereby directly contributing to GHG emissions savings;
    - There is **evidence of buy-in by key project stakeholders**, e.g. by mobilising additional public/private finance along with the project Financial Cooperation Component;
    - The demonstrated **results and lessons of the mitigation solution have been documented** (e.g. in knowledge or communication products) **and promoted externally to a wider audience**.

  By mid-line, projects are expected to show interim signals of achieving this demonstration effect, which should have become clear evidence (i.e. advanced signals) by the final.

- **Dimension 2: Caused a catalytic effect.** To amplify the impact of the mitigation solution demonstrated (Dimension 1), the project needs to cause a virtuous catalytic effect in the operating country or region. This can take the form of <u>one or more</u> of the following catalytic changes:
    - **Replication and/or significant scaling-up** of the project's demonstrated solution in other sectors or locations, or of the project itself. This could include kick-starting sector-wide mitigation or the NDC; and/or
    - As a result of the project improving enablers and/or eliminating barriers to the uptake of the mitigation solution, it will result in wider **'systemic' change**, which could be supported by one or more of the following: a) Increased beneficiaries' capability; b) new market behaviour and economic incentives; c) improved policy, legislative and

regulatory frameworks; d) broadened political support for the solution; e) shift in values, ideology and mindset.

By mid-line, projects are expected to have produced some early signals of one or more of these changes (or that they are likely in the near future), which by the end of the project should have been strengthened into interim signals.

- **Dimension 3: Contributed to additional GHG savings**. As a result of contributing to Dimension 1 and Dimension 2, the project will indirectly influence *additional, large-scale and sustained GHG savings*[9].

  During the project's lifetime, projects are not expected to have achieved this. Yet, by the end of the project, there should be early signals of additional (i.e. indirect) GHG savings and evidence that these will become large-scale and sustained GHG savings in the future.

Box 1: Connection between transformational change Measurement Framework and Knowledge Management and Learning Strategy

One of the key objectives of the Knowledge Management and Learning Strategy (KMLS) is to ensure that learning from both successes and failures is taken into account, changes are implemented accordingly, and innovative approaches are replicated. There is therefore an important connection between the ELEs and this strategy, and the learning documented through the ELEs is expected to be used by the Mitigation Action Facility in its function of 'Knowledge and Learning Hub' for the international climate finance community explained in the strategy. In particular, project-specific learning should be proactively shared and discussed with other projects (at least with those funded by the Mitigation Action Facility). The KLMS also expects to engage with and influence international debates on climate finance and transformational change. The Mitigation Action Facility will use and synthesize learning on supporting transformational change, documented through the ELEs, to inform this engagement.

Measuring project-induced transformational change

As shown, the transformational change dimensions come directly from the Mitigation Action Facility ToC. As the projects are expected to be aligned to the overall Mitigation Action Facility ToC, it should be possible to map the dimensions of transformational change in the project ToCs. All projects must monitor their progress using their Monitoring and Evaluation (M&E) Plans which include Mandatory Core Indicators and project-specific indicators.

The ELE teams will be evaluating and learning from the projects' progress in supporting transformational change, which will include reviewing progress against the indicators and milestones set out in their M&E Plans. In addition, this can be complemented (and verified) with more qualitative ELE questions and data sources. Table 7 below provides some guidance to ELE teams in terms of criteria and evidence for assessing the project-induced transformational change. This includes the three dimensions but also the scoring for the Core Mandatory Indicator M3, which can be seen as the summation of results for the three dimensions.

[9] Additional = the GHG savings achieved are in addition to those achieved by the direct implementation of the project. Large-scale = the additional GHG savings will have a significant impact on overall GHG savings in the geography/sector. Sustained = there is no chance of the GHG savings being reversed.

Table 7. Guidance for ELE teams for measuring project-induced transformational change

transformational change Dimension	Element within transformational change Dimension	Alignment with OECD DAC Criteria / ELE report section	Where should it feature in project ToC and M&E Plans	How to measure success	Expectations at mid-line and final ELE
1: Promoted a demonstration effect	**Viability and benefits of mitigation solution demonstrated on the ground**	Effectiveness	• Milestones set for outputs and/or Intermediate Outcomes (if used) should represent the scale of uptake needed to demonstrate the solution is viable (meaning it has been shown to work in practice at a large scale in diverse contexts, and provide the expected economic, social and climate benefits) • Also aligns with M1: Reduced Direct GHG emissions and M2: Number of people directly benefiting	*Quant*: Achievement of project milestones for the adoption of the mitigation solution by target users and resulting direct GHG emission savings Qual: Feedback from target users that viability and benefits have been demonstrated.	• Mid-line: Interim Signals • final: Advanced Signals
1: Promoted a demonstration effect	**Results of mitigation solution documented and promoted**	Effectiveness	• Milestones set for outputs on producing knowledge and learning documents and engaging with wider stakeholders to share this insight. • Seek alignment with the KMLS.	*Quant:* Achievement of project milestones for knowledge and communication products/activities *Qual*: Feedback from other stakeholders (e.g. other funders) on their awareness and understanding of the project and solution.	• Mid-line: Interim Signals • final: Advanced Signals
1: Promoted a demonstration effect	**project stakeholders 'buy-in' to mitigation solution**	Effectiveness	• Milestones set for outputs and/or Intermediate Outcomes for the volume of finance expected to be mobilised and/or other examples of 'buy-in' (e.g. policy statement). • Also aligns with M4-5: Public and Private finance mobilised	*Quant*: Achievement of project milestones for public and private finance mobilised Qual: Feedback from government and other stakeholders that they are convinced of the viability and benefits of the solution	• Mid-line: Interim Signals • final: Advanced Signals

transformational change Dimension	Element within transformational change Dimension	Alignment with OECD DAC Criteria / ELE report section	Where should it feature in project ToC and M&E Plans	How to measure success	Expectations at mid-line and final ELE
2: Caused a catalytic effect	**Systemic change underway to enable widespread adoption of mitigation solution:** • Improved policy, legislative and regulatory frameworks • New market behaviour and incentives • Increased institutional capacity and management practices • Shifts in values, ideology and mindset • Broadened political support for the solution	Effectiveness	• Milestones set for outcomes should indicate specifically what needs to change to enable widespread uptake of the mitigation solution.	*Qual*: Evidence of contribution to achieving expected systemic change and unexpected changes.	• Mid-line: Early Signals • final: Interim Signals
2: Caused a catalytic effect	**Replication and scaling-up of mitigation solution and/or project project** • Replication in new sectors of the mitigation solution and/or project itself • Significant* scaling-up of the mitigation solution and/or project itself • Kick-starting and influencing sector-wide mitigation ** Significant compared to the size of the project and the overall target user group. For example, if the project promoted the installation of 2,000 Solar PV systems (representing approximately 2% of all target users), significant replication would imply that it has reached around 20% of target users. However, there is no quantitative target to meet, and a rationale can be provided to justify it meeting this criteria.*	Effectiveness Sustainability	• Milestones set for outcomes for replication/ scaling-up by others of project activities.	*Quant*: Volume of scaling-up (e.g. # of new geographies/ beneficiaries or $ of new funding) *Qual*: Feedback from other funders and programmes on the influence of project in their decision to scale-up activities and/or invest in the project's sector.	• Mid-line: Early Signals • final: Interim Signals

transformational change Dimension	Element within transformational change Dimension	Alignment with OECD DAC Criteria / ELE report section	Where should it feature in project ToC and M&E Plans	How to measure success	Expectations at mid-line and final ELE
3: Indirectly contributes to additional, large-scale and sustained GHG savings	**As a result of the changes from dimensions 1 and 2, there is evidence of additional and potentially large-scale and sustained GHG emissions savings**	Impact	• Milestones set for Impact should represent the scale of GHG emissions savings required for sector decarbonization. • Also aligns with M1: Reduced Indirect GHG emissions and	*Quant:* Achievement of project milestones for indirect additional GHG emissions savings *Qual*: Given progress for dimensions 1 and 2, an assessment of the likelihood that this will result in additional GHG savings in the future. This is informed by feedback from wider stakeholders in the sector.	• Mid-line: No signals • final: Early Signals
Overall Transformational Change potential	**M3: Degree to which the supported activities are likely to catalyse impacts beyond the projects (potential for scaling-up, replication and transformation)**	Impact		*Mixed*: Based on whether the expected minimum level of signals for each transformational change dimension is found, the ELE gives: 1) a RAG rate to the 'Impact' evaluation criterion; and 2) a rate from 0 to 4 to the M3 indicator.	

Guidance for describing and scoring progress towards transformational change in ELE reports

Although transformational change is ultimately related to the project's Impact, **evaluating progress towards it cuts across different parts of the ELE report related to Evaluation Questions on Effectiveness, Sustainability and Impact (see table above).** In particular, the Effectiveness and Sustainability sections of the ELE report will describe key aspects of dimensions 1 and 2 (which relate to the projects' outputs, intermediate outcomes and outcomes). Therefore, the Impact section will provide an analytical synthesis of the three transformational change dimensions referring to the previously described evidence and assign an overall score to the project's transformational change potential. ELE reports' authors should avoid duplications across the sections and cross-reference to other relevant parts of the report, if some of the evidence has already been discussed.

Each dimension should be described and assessed according to the following "signal levels":

Table 8. Transformational Change "Signals" assessment by ELEs

Signal level	Definitions
No evidence	Evidence suggests little to no progress is being made in line with the ToC causal pathways to Transformational Change.
Early signals	There is emerging evidence of the transformation related to the dimension, or the foundations for the transformation have been laid by the project, but no signals of the change are present.
Interim signals	Evidence shows some signals that the transformation related to the dimension is underway, and it is likely to continue.
Advanced signals	Evidence shows strong signals that the transformation related to the dimension is underway, and there is little doubt that it will continue.

ELEs would expect projects to have achieved at least the "signal levels" in Table 9 by the project's mid-point and end-point for each dimension.

Table 9. Minimum expected signals of project-induced transformational change

Dimension	Mid-point	End-point
1: Promoted a demonstration effect	Interim signals	Advanced signals
2: Caused catalytic effect	Early signals (of one or more of the types of possible changes)	Interim signals
3: Contributed to additional GHG savings	None	Early signals

Within the relevant dimension's sub-sections, these signal levels should be presented and justified by referring to the evidence provided throughout the report (e.g. in the Effectiveness and

Sustainability sections). Below are some guiding questions to support this (aligned to measures presented in Table 7).

For presenting the evidence on **Dimension 1**, the report could provide a narrative answering the following questions:

- Is the project in line with the expected direct GHG savings per M1 and the number of beneficiaries reached per M2?
- Have the key project stakeholders (i.e. those closer to the project implementation) shown concrete evidence of buy-in/adoption of the project's mitigation solution? Is this demonstrated by public and private sector actors investing resources into it, as per M4 and M5?
- Is the project documenting the key results and lessons from the process of demonstrating the validity of the mitigation solution and sharing these with wider stakeholders?
- Do the answers to the above questions constitute interim/advanced signals of Dimension 1 for the mid-line and final ELEs, respectively?

Similarly, for **Dimension 2**, the narrative could present evidence around the following questions:

- Has the project contributed to improving/removing systemic enablers/barriers to the widespread uptake of its demonstrated mitigation solution? What wider effects might this produce?
- What is the evidence that the project's mitigation solution will be scaled-up and/or replicated in new sectors and/or locations?
- Is there evidence that the project has informed or kick-started the implementation of the NDC or sector-wide mitigation?
- Do the answers to the above questions constitute early/interim signals of Dimension 2 for the mid-line and final ELEs, respectively?

Concerning **Dimension 3**, as no signals are expected at mid-term, the following questions are suggested for the analysis in Final ELEs only:

- Is the project in line with the expected indirect GHG savings per M1?
- What is the evidence that the project's mitigation solution will generate additional and large-scale GHG savings in the long term?
- Do the answers to the above questions constitute early signals of Dimension 3?

Finally, the assessment would conclude by providing an overall rating of transformational change potential. This aligns with M3: "Degree to which the supported activities are likely to catalyse impacts beyond the projects (potential for scaling-up, replication and transformation)".

The project will likely have provided a self-score for M3 within their routine M&E reporting. Therefore, the ELE teams can discuss with the project teams their rationale for this score, and then provide their own independent judgement of it.

To do this, the ELE authors should look back on whether the expected minimum level of signals for each transformational change dimension (Table 9) was found by the ELE and, on that basis, rate from 0 to 4 the M3 indicator using the scale recommended in the Mitigation Action Facility M&E Framework:

- 0 = Transformation judged unlikely;
- 1 = No evidence yet available;
- 2 = Some early evidence suggests transformation likely;
- 3 = Tentative evidence of change – transformation judged likely;
- 4 = Clear evidence of change – transformation judged very likely.

Based on that score, a Red-Amber-Green (RAG) rating will be assigned to the Impact evaluation criterion. The RAG rating can follow the guidelines in the matrix below (Table 10), while leaving some flexibility to account for the project-specific trajectories of progress.

Table 10. Indicative project's Impact RAG rating based on its M3 indicator score

M3 score	0	1	2	3	4
mid-term ELE					
Final ELE					

Legend: 0 = Transformation judged unlikely; 1 = No evidence yet available; 2 = Some early evidence suggests transformation likely; 3 = Tentative evidence of change – transformation judged likely; 4 = Clear evidence of change – transformation judged very likely.

Annex B Evaluation and Learning Exercise Matrix

This evaluation and learning exercise matrix is based on the Theoretical Framework provided (version November 2023). It is a working tool that allows the evaluators to focus on a feasible target and assemble information for each question that can be synthesised in the final report, hence creating an integrative overview of the project at large.

ELEQ No.	Evaluation Question	Evaluation criteria	Original hypotheses	Who can answer this question	Source of information / Data gaps
1 RELEVANCE					
1	To what extent did the project address an identified need (by national and local governments, refrigerator producers)?	▪ The project's design addressed the beneficiaries' needs and strategic priorities at the time of execution and responded to priorities even after COVID-19 set in and disruptions. ▪ The project addressed the main barriers that prevented the different stakeholders from introducing and consolidating a clear and dynamic refrigerator substitution scheme to reduce refrigeration-related GHG emissions.	▪ The government was interested in pushing forward energy efficiency and climate-friendly updates in domestic refrigerators but lacked the technical or financial capabilities to do so. ▪ Refrigerator producers were considering upgrading their refrigeration agents and production lines to reduce GHG emissions from their products but lacked the technical or financial capacities. ▪ WEEE disposal companies were interested in expanding their operations to the recycling of appliances but lacked the technical and financial capacities to do it. ▪ Consumers wanted to upgrade their refrigerators for greener more environmentally friendly ones but lacked the knowledge or financial capabilities to do it. ▪ Financial institutions were interested in financing refrigerator upgrades but	▪ project team. ▪ Direct beneficiaries (Government institutions, refrigerator producers, WEEE disposal companies, financial institutions, consumers) ▪ Former members of project team or stakeholder institutions (people that have been involved in project delivery but are no longer with it). ▪ Independent (third party) verifiers (refrigerator producers, WEEE disposal, financial institutions, consumers).	▪ In-depth interviews ▪ Semi-structured key informant interviews (KIIs) ▪ Context analysis ▪ Document review (project proposal and progress reports) ▪ National plans, strategies and other policy instruments such as norms, standards, etc.

ELEQ No.	Evaluation Question	Evaluation criteria	Original hypotheses	Who can answer this question	Source of information / Data gaps
			perceived those operations of being too risky.		
1.1	How well does the project align with national priorities in regard to GHG emissions reduction from industrial and energy sectors?	▪ The project is in line with government targets on environmental emissions (incl. NDC, sectorial plans, etc.). ▪ The project is linked to formal national MRV schemes.	▪ The project supports Colombia's Overall Climate Strategy and MRV systems.	▪ project team ▪ Direct beneficiaries ▪ Former members of project team or stakeholder institutions ▪ Independent (third party) verifiers.	▪ In-depth interviews ▪ Semi-structured key informant interviews (KIIs) ▪ National plans and strategies on climate change and energy ▪ Data from project monitoring system
1.2	Where there any particular gender or inclusion barriers for refrigeration production, commercialisation and end-of-life disposal that the project wanted to address with its gender targets?	▪ Gender or vulnerable group hypothesis or diagnosis tested.	▪ There are either a diagnosis or a hypothesis of the barriers preventing women or vulnerable groups from participating in the activities of interest. ▪ Proposed gender or social inclusion actions are linked to those hypothesis or diagnosis. Targets.	▪ project team ▪ project partners ▪ Beneficiaries (producers, repair, retail or fridge EOL disposal companies)	▪ In-depth interviews ▪ Document review
2 EFFECTIVENESS					
2	To what extent did the implementation of the project achieve intended outcomes in the	▪ Results of the program vis a vis the project's targets in relation to the intermediate and general outcomes: ○ Policy and regulatory changes to promote the	▪ project activities helped increase the technical capacity of producers and WEEE disposal companies to produce and properly dispose of old or End-Of-Life refrigerators.	▪ project team. ▪ Direct beneficiaries ▪ Former members of project team or stakeholder institutions	▪ In-depth interviews ▪ Semi-structured key informant interviews (KIIs) ▪ project proposal

ELEQ No.	Evaluation Question	Evaluation criteria	Original hypotheses	Who can answer this question	Source of information / Data gaps
	short, and medium term?	production and sale of climate-friendly refrigerators. ○ Increased adoption of R600a by Colombian refrigerator producers. ○ Improved climate and environmental commitment by fridge (or appliance) producers. ○ Design, piloting, deployment and consolidation of refrigerator trade-in (upgrade) incentive programmes. ○ Increased awareness and knowledge of technicians on proper servicing of newer refrigerators ○ Increased awareness, knowledge and ability of WEEE disposal companies on proper dismantling and disposal of End-Of-Life refrigerators. ▪ The level of project contribution to the achievement of the results	▪ project activities contributed to develop and consolidate the Red Verde programme and the incentive framework to encourage the trading-in of old refrigerators upon the purchase of a new one. ▪ project activities contributed to improve gender equality in the refrigeration production, servicing, and End-Of-Life disposal recycling activities.	▪ Independent (third party) verifiers.	▪ Progress reports ▪ Data from the project's monitoring system / logframe

ELEQ No.	Evaluation Question	Evaluation criteria	Original hypotheses	Who can answer this question	Source of information / Data gaps
		compared to exogenous factors. ▪ Producers are more committed to climate and other environmental causes after the project's execution. ▪ The Public sector project partners consider that their ability to design financial and non-financial tools to support climate change mitigation goals improved.			
2.1	Did changes in the project-operating context impact (positively and/or negatively) the effectiveness of the project? If so, to what extent (greatly, partially, negligibly)?	▪ Commitment of public or private stakeholders was maintained over the lifetime of the project and is likely to continue after it ends. ▪ The project achieved (most of) its targets and goal despite those changes in the projects' context. ▪ The project team has the resources and the flexibility to adapt the project to changing conditions, helping it to maintain focus on the goals and impact despite delays, setbacks or disruptions by external events. ▪ .	▪ Complex projects are likely to face some unforeseen events or conditions, but are able to adapt to work around them to achieve the project's targets. ▪ COVID's lockdown, travel restrictions and supply chain disruptions caused delays and may have driven the cost of some investments up, but they were mostly resolved in 2022 and 2023 ▪ Some administrative or operative setbacks have occurred that may have delayed or required small adjustment but the project's goals remain the same. ▪ The project team is able to identify context changes that may affect the project and adjust activities or request project amendments to adapt to them.	▪ project team. ▪ Direct beneficiaries ▪ Former members of project team or stakeholder institutions. ▪ TSU Staff ▪ Independent (third party) verifiers.	▪ Progress reports ▪ In-depth interviews ▪ Semi-structured KIIs ▪ Literature review

ELEQ No.	Evaluation Question	Evaluation criteria	Original hypotheses	Who can answer this question	Source of information / Data gaps
			▪ TSU knowledge exchange efforts provide effective information and guidance to project teams.		
2.2	How effective was the project in engaging women and people from vulnerable groups in the Electric and Electronic Equipment Sector's production, repair or EOL disposal?	▪ Participation of women in training sessions for fridge design, production, repair of fridges and in the disposal of WEEE.	▪ Women and vulnerable groups could work in this sector, but there are barriers preventing them from doing so. ▪ If training and job opportunities are provided for women and vulnerable groups, they will become involved.	▪ project team ▪ Direct beneficiaries, especially fridge producers and repair/maintenance services ▪ Former members of project team or stakeholder institutions ▪ Independent (third party) verifiers.	▪ In-depth interviews ▪ Semi-structured key informant interviews (KIIs) ▪
3 EFFICIENCY					
3	To what extent was the delivery of outputs timely and to expected quality standards?	▪ Timeliness of the delivery of outputs and outcomes (incl. budget spending) ▪ In case of delays in the implementation, what were their main causes (endogenous or exogenous factors) and how seriously did they impact the project implementation? ▪ The effectiveness of the measures adopted to prevent or reduce delay impacts.	▪ project activities are implemented on time and on budget. ▪ The upskilling, policy, regulatory, or training or operative outputs can be clearly linked to project activities (improvements in production, EOL disposal, trade-in of old for new refrigerators). ▪	▪ project team. ▪ Direct beneficiaries ▪ Former members of project team or stakeholder institutions. ▪ TSU Staff ▪ Independent (third party) verifiers.	▪ project proposal ▪ Progress reports ▪ In-depth interviews ▪ Data from project monitoring system ▪ Semi-structured KIIs

ELEQ No.	Evaluation Question	Evaluation criteria	Original hypotheses	Who can answer this question	Source of information / Data gaps
		▪ The level of satisfaction of the project's direct beneficiaries ▪ .			
3.1	Structure & steering: Was the project managed, coordinated, and implemented effectively?	▪ The chosen implementation mechanism is conducive to achieving the expected outcomes. ▪ The technical and financial components are appropriate to deliver the planned outputs. ▪ Communication and visibility are implemented according to an integrated approach. ▪ FC and TC Components interacted synergistically. ▪ Stakeholders actively participated and collaborated in the project	▪ The Steering Committee was created and operating as expected in the proposal. ▪ Other key coordination or delivery structures were created and are working according to what was expected in the proposal. ▪ The project team and partners contributed to the project according to their sector and role.	▪ project team. ▪ project Steering Committee members. ▪ project partners. ▪ Direct beneficiaries ▪ Former members of project team or stakeholder institutions ▪ Independent (third party) verifiers.	▪ Progress reports ▪ In-depth interviews ▪ Semi-structured KIIs
3.2	Were all relevant risks identified? When did key risks materialise? How were they dealt with? Which risks only became apparent during implementation and why?	▪ The project structures promptly implemented risk mitigation strategies. ▪ Availability and use of sources of knowledge, guidance of support to the project team for general project management efforts	▪ The project design identified all relevant issues, and the project structures had the capacity and adaptive capacity to implement the foreseen risk mitigation strategies for each risk. ▪ The implemented adjustments helped mitigate the impact of delays.	▪ project team ▪ project stakeholders ▪ Third parties	▪ Interviews ▪ Document analysis

ELEQ No.	Evaluation Question	Evaluation criteria	Original hypotheses	Who can answer this question	Source of information / Data gaps
			▪ TSU guidance and support help add value to the project teams' project management capabilities.		
4. IMPACT					
4	What evidence is there that the project did, in fact, contribute to the intended impact in the ToC (incl. transformational change)?	▪ The strength of the evidence that key outcomes have been achieved and ▪ The robustness of the causal links / pathways to the intended impact (updating and upgrading refrigerator production, improving appropriate and sustainable refrigerator recycling, and promoting consumer exchanges)	▪ The project produced a demonstrational effect and promoted learning across all relevant stakeholders (dimension 1). ▪ The project caused a catalytic effect, in terms of systemic change, replication and/or scale up (Dimension 2) ▪ The project contributed to additional, large-scale and sustained GHG Savings (Dimension 3).	▪ project team. ▪ Direct beneficiaries ▪ Former members of project team or stakeholder institutions ▪ Independent (third party) verifiers.	▪ project proposal ▪ Progress reports ▪ In-depth interviews ▪ Data from project monitoring system ▪ Semi-structured KIIs
5. SUSTAINABILITY					
5	What is the likelihood that the outcomes will be sustained after the end of the project funding period?	▪ The extent of the evidence supporting the project sustainability (e.g. evidence of self-sustaining institutional structures, and political and financial commitment of key stakeholders). ▪ There is little or no risk of backsliding or reversing	▪ project activities have helped establish strong and capable policy, technical and financial frameworks for: ○ Fridge producers or distributors within Colombia sell greener fridges. ○ Appliance (fridge) producers, Red Verde, and or other project stakeholders, like retailers, will maintain or expand the substitution scheme supported by the project.	▪ project team. ▪ Direct beneficiaries ▪ Former members of project team or stakeholder institutions ▪ Independent (third party) verifiers.	▪ project proposal ▪ Progress reports ▪ In-depth interviews ▪ Data from project monitoring system ▪ Semi-structured KIIs

ELEQ No.	Evaluation Question	Evaluation criteria	Original hypotheses	Who can answer this question	Source of information / Data gaps
			○ WEEE disposal companies have consolidated business models to properly dispose of EOL fridges in an appropriate manner. ○ Financial institutions to provide financial instruments for replacement. ○ Households or individual consumers (i) have been convinced by the program to trade in their older fridges for new ones and (ii) are using the incentives or financial tools as a means to upgrade.		
6. LEARNING					
6	What key lessons can be learnt to the benefit of the legacy of this project, other projects and the Mitigation Action Facility as a whole?	▪ The project's generation of important lessons for: 1) itself; and 2) other/future projects.	▪ Lessons from this project were used to improve its execution. ▪ The project generated important lessons for other projects. ▪ The project has held formal knowledge exchange work with other projects or other government or industrial programmes. ▪ The project helped develop technical and financial capabilities that have been (or can be used) for other types of appliances. ▪ Gender and inclusion barrier hypothesis or diagnosis were right and the proposed targets (an activities) helped address them.	▪ project team ▪ Direct beneficiaries ▪ Former members of project team or stakeholder institutions ▪ Independent (third party) verifiers.	▪ Progress reports ▪ In-depth interviews ▪ Semi-structured KIIs ▪ Literature review

Annex C List of ELE sources

C.1 Internal documents

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2. NAMA Facility. 2022. *Annual Report 2022*. Colombian NAMA for the domestic refrigeration sector.
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12. NAMA Facility. 2018. *Annual Report 2017*. Colombian NAMA for the domestic refrigeration sector.
13. NAMA Facility. 2016. NAMA Support project Proposal. Colombian NAMA for the domestic refrigeration sector.
14. NAMA Facility. 2020. Survey on Implications of Covid-19 on projects in Implementation or DPP. Colombian NAMA for the domestic refrigeration sector.

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2. Inter-American Development Bank. 2023. "*Caribbean Sustainable Energy / Energy Efficiency Program (PEECES) – Loan Proposal*". Washington D.C., USA.

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5. Ministerio de Minas y Energía. 2015. *"Anexo General: Reglamento Técnico de Etiquetado RETIQ" – Resolución 41012 del 18 de septiembre de 2015*. Bogotá D.C., Colombia

6. UPME. 2022. *"Plan de Acción Indicativo Programa de Uso Racional y Eficiente de Energía (PROURE) – 2022-2030".* Bogotá D.C., Colombia

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10. Ministerio de Ambiente y Desarrollo Sostenible. 2020. *"Actualización de la Contribución Determinada a Nivel Nacional de Colombia (NDC)".* Bogotá D.C., Colombia.

11. Ministerio de Ambiente y Desarrollo Sostenible. 2017. *"Política Nacional – Gestión Integral de Residuos de Aparatos Eléctricos y Electrónicos – RAEE".* Bogotá D.C., Colombia.

12. Congreso de Colombia. 2013. *"Ley 1672 de 2013: por la cual se establecen los lineamientos para la adopción de una política pública de gestión integral de Residuos de Aparatos Eléctricos y Electrónicos (RAEE), y se dictan otras disposiciones".* Bogotá D.C., Colombia.

C.3 List of organisations interviewed

Institution	Position
project team	
GIZ	Program Director
Consultant - project team	Advisor
GIZ	Advisor

Institution	Position
GIZ	Advisor
project Stakeholder	
ANDI	Appliances Chamber Coordinator
Ministry of Mines and Energy	Regulations Coordinator
FENOGE	Energy Efficiency Advisor
Ministry of Environment and sustainable Development – Ozone Technical Unit	General Director
Ministry of Environment and sustainable Development – Ozone Technical Unit	Program Director
Red Verde	General Director
Red Verde	Program Director
Bancoldex	Head of sustainability
Bancoldex	Staff
Bancoldex	Staff
UPME	Program Director
Ministry of Environment and sustainable Development – Climate Change Directorate	Advisor
Ministry of Environment and sustainable Development – Climate Change Directorate	Staff
Ministry of Environment and sustainable Development – Climate Change Directorate	Staff
Third Party	
ASYCO SAS	Staff
OCADE	General Director
OCADE	Technical Manager
Colventas	Staff
CHEC	Staff
Homecenter (Retailer)	Staff
MABE	Head of sustainability
MABE	Staff
MABE	Technical Manager
IDB Specialist and Ex ViceMinister of Environment of Colombia	Advisor
Banco de Bogotá	Program director
Banco de Bogotá	Head of sustainability
Banco de Bogotá	Staff
LITO	Head of sustainability