

Portfolio Study of UNEP's Recent Work on GEF-Funded Energy Efficiency in Buildings

Evaluation Office of the United Nations Environment Programme

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LIST OF ACRONYMS

BEA	Building Efficiency Accelerator
CARICOM	Caribbean Community
CCM	Climate Change Mitigation
CO ₂	Carbon dioxide
DES	District Energy Systems
EE	Energy efficiency
EEBA	Energy Efficiency in Buildings in East Africa
EOI	Expression of Interest
FS	Full Size
GEF	Global Environment Facility
GHG	Greenhouse Gases
Global ABC	Global Alliance for Buildings and Construction
IA	Implementing Agency
IEA	International Energy Agency
LGGE	Low Green House Gas Emissions
LIA	Likelihood of impact assessment
M&E	Monitoring and Evaluation
MS	Medium Size
MTE	Mid Term Evaluation
MTS	Medium Term Strategy
MTR	Mid-Term Evaluation
NGO	Non-Governmental Organisation
NPMU	National Project Management Unit
NSC	National Steering Committee
PCA	Project Cooperation Agreement
PDQ	Project Design Quality
PIR	Project Implementation Review
PMU	Project management unit
PoW	Programme of Work
PRC	Project Review Committee (internal UNEP committee)
PRF	Project Results Framework
ProDoc	Project Document
RE	Renewable energy
RToC	Reconstructed Theory of Change
SDG	Sustainable Development Goals
SE4All	Sustainable Energy for All
SIDS	Small Islands Development States
SMART	Specific, Measurable, Achievable, Relevant and Time-bound
TE	Terminal Evaluation
ToC	Theory of Change
ToR	Terms of Reference
UNEP	United Nations Environment Programme
WRI	World Resources Institute
ZNEB	Zero net energy building

EXECUTIVE SUMMARY

This portfolio brief is prepared for the UNEP Evaluation Office with the primary objective of consolidating lessons learnt and best practices for the acceleration of the uptake of energy efficiency in the building sector across the world, based on the Terminal Evaluation findings of six projects implemented by UNEP and the GEF between 2011 and 2021. The six projects that have been implemented are diversified in scope, both in terms of focal areas and in geography. While the three most recent projects were rated Highly Satisfactory, two were rated Moderately Satisfactory and one Moderately Unsatisfactory.

The evaluation reports suggest that significant gains have been made under each project, and these were as a result of certain critical factors. The success factors highlighted include the following: active involvement of project stakeholders and partner commitments; enhanced participation of the private sector in project activities; the setting of clear policy priorities and targets across cities; an effective consolidation of project lessons and dissemination action; effective integration of project actions with other parallel actions towards energy efficiency in buildings; and appropriate leadership for the implementation of these projects, among others.

However, key gaps have been observed in the implementation of these projects. Some common key gaps observed include: limited sensitivity of projects to gender and indigenous people's needs; limited tracking of emissions from the projects due to capacity and time limitations; inadequate country-ownership in some project countries; and limited funding and time for the implementation of concrete/pilot projects among others.

A set of best practices have thus been proposed for the implementation of future energy efficiency projects based on the lessons learnt. These include the following:

- Best Practice 1: Maximisation of stakeholder representation, particularly at local level.
- Best Practice 2: Revision of project stakeholder analysis presented at CEO approval and re-affirming roles and commitments before commencement of project implementation.
- Best Practice 3: Project activity scheduling in line with anticipated project timeline and budget.
- Best Practice 4: Maximising gender sensitivity and responsiveness of projects to the needs of marginalised and vulnerable people in target project cities.
- Best Practice 5: Integrated approach to Building Efficiency actions and projects with other climate policy or infrastructure development actions.
- Best Practice 6: Future building energy efficiency projects should focus on innovative financing schemes, particularly maximising local resource mobilisation for the implementation of concrete action.

- Best Practice 7: In future projects, there should be clear tracking of GHG emission reductions. Adequate strategies must be taken to develop simple tracking tools and methods for project cities.
- Best Practice 8: Knowledge management is a critical component of project success and project sustainability, and should be an active component of all energy efficiency projects.
- Best Practice 9: Communication and awareness creation should be a core component of all energy efficiency in building actions, and this should be integrated in all project components.
- Best Practice 10: Cities and national governments must set clear policy and project priorities, and these priorities must be realistic within the scope of the project and in line with the project duration, such that funding can easily be secured for the pursuit of such priorities.

The drive to reducing emissions from the building sector is critical in the pursuit of net zero ambitions and the attainment of Nationally Determined Contributions across countries. Given the building sector's relatively high demand for energy, and the emissions that accrue annually from the sector, the relevance of building energy efficiency projects cannot be overstated. Previous actions and investments in the sector by UNEP have yielded significant results, but there is room for improvement. The recommendations specified in this portfolio brief are therefore not finite but are a significant consolidation of best practices for future projects which can contribute towards maximising effectiveness, efficiency and sustainability of all UNEP investments in building energy efficiency. Thus, a holistic adoption of these best practices in addition to others not contained in this document, and their integration in future projects can contribute towards accelerating gains in the climate change mitigation actions of UNEP globally.

I. GENERAL INTRODUCTION

1. Introduction

1. The building sector is a significant consumer of energy, and consequently a high emitter of greenhouse gases. In view of this, decarbonising the sector is critical to the attainment of global climate change mitigation and adaptation targets. In 2018, reports by the International Energy Agency (IEA) suggest that the sector accounted for about 39% of energy and process-related carbon dioxide (CO₂) emissions globally¹. Given this increasing climate concern, countries across the globe have accelerated their efforts to reducing emissions from the sector through the acceleration of the deployment of renewable energy technologies, energy efficient technologies and practices in buildings.
2. Statistics show that in 2021, global investment in building energy efficiency increased by about 16% to 2020 levels, reaching about USD 237 billion². However, this is not sufficient as the gap between the climate performance of the sector and the 2050 decarbonisation pathway is even widening because of rebound effects³. This is further contributed to by increasing rates of infrastructure development and increasing floor spaces in cities across the world: “The increase in global gross floor area between 2015 and 2021 is the equivalent to the total land area covered in buildings in Germany, France, Italy and Netherlands; if it were built on one level, at around 24,000 sq. km”⁴. Accelerated and sustained investments in the building sector are thus undeniably critical to sustaining progress towards global climate emission targets, and the attainment of Nationally Determined Contributions across countries.
3. Consequently, the United Nations Environment Programme (UNEP) and the Global Environment Facility (GEF) have implemented a series of programmes and projects in the last decades towards assisting countries in their efforts to decarbonise the building sector. Notable recent interventions of UNEP/GEF listed in *Table 1* are discussed in this brief.

¹ UNEP, 2019 Global Status Report for Buildings and Construction: <https://www.iea.org/reports/global-status-report-for-buildings-and-construction-2019>

² UNEP, 2022 Global Status Report for Buildings and Construction: <https://www.unep.org/resources/publication/2022-global-status-report-buildings-and-construction>

³ See the report from the Global Alliance for Buildings and Construction (Global ABC)

⁴ UNEP, 2022 Global Status Report for Buildings and Construction: <https://www.unep.org/resources/publication/2022-global-status-report-buildings-and-construction>

Table 1. List of Projects used in the Preparation of the Portfolio Brief

Project ID	Project Title	Project dates	Link to the TE Report
GEF ID 9329	Scaling up the Sustainable Energy for All Building Efficiency Accelerator – (BEA Phase 1)	2016-2017	LINK
GEF ID 9947	The SEforALL Building Efficiency Accelerator (BEA): Expanding Local Action and Driving National Change – (BEA Phase 2)	2018-2020	LINK
GEF ID 9320	Increasing Investments in District Energy Systems in Cities – a SE4All Energy Efficiency Accelerator	2017-2021	LINK
GEF ID 4171	Energy for Sustainable Development in Caribbean Buildings	2013-2020	LINK
GEF ID 4167	LGGE Promoting Energy Efficiency and Renewable Energy in Buildings in Jamaica	2013-2020	LINK
GEF ID 9329	Scaling up the Sustainable Energy for All Building Efficiency Accelerator – (BEA Phase 1)	2016-2017	LINK
GEF ID 3788	Promoting Energy Efficiency in Buildings in East Africa (EEBA)	2011-2017	LINK

4. The projects highlighted in Table 1 have been implemented in the period from 2011 to 2021, and their performance have been evaluated. The various Terminal Evaluations were conducted in line with an evaluation criterion matrix approved by UNEP Evaluation Office at the time the evaluation was triggered. The set of evaluation criteria used for the various projects are grouped into nine (9) dimensions: a. Strategic Relevance; b. Quality of Project Design; c. Nature of External Context; d. Effectiveness (which comprises assessments of the availability of outputs, achievement of outcomes and likelihood of impact; e. Financial Management; f. Efficiency; g. Monitoring and Reporting; h. Sustainability; and i. Factors Affecting Project Performance.
5. Based on the results of the various interventions, this portfolio brief presents key lessons and recommendations for the implementation of building efficiency interventions. Evidence contained in this report is thus drawn from a synthesis of the findings, the lessons learned and the recommendations of the evaluations of these different projects.

2. Purpose of the Portfolio Brief

6. This portfolio brief is prepared to serve two main purposes: a. to assess what worked and what did not work in the various interventions implemented and b. to identify best practices for the implementation of future Energy Efficiency in Buildings projects.
7. The results contained in this document are thus intended to meet the needs of the Implementing Agency (IA) of the various projects (UNEP), the Executing Agencies (EAs), the project partners, stakeholders from the different countries and the

academic community among others. The best practices identified should be of interest to any stakeholders involved in energy efficiency in building projects.

3. Methodology, Scope and Limitations

This portfolio brief was prepared based on an in-depth review of the Terminal Evaluation reports of the various projects listed in

8. Table 1. A thematic approach was adopted in the analysis across the following themes: a. similarities in evaluation findings b. lessons learnt, c. recommendations and d. best practices based on the evaluation findings.
9. A matrix presenting the different evaluation ratings (per evaluation criterion) of the projects is presented in Table 3 and discussed.

The primary data of the analysis were limited to the 6 Evaluation Reports of the recently completed UNEP/GEF projects listed in

10. Table 1. Where necessary, the consultant triangulated various information through a web analysis.
11. Although this portfolio brief is primarily intended to meet the needs of UNEP and its partners, the best practices identified should be of interest to any stakeholders involved in medium or full-sized UNEP projects in the field of infrastructure policy and development.

II. OVERVIEW OF THE PROJECTS

1. Introduction

This chapter presents a description of the various projects listed in

12. Table 1 that were implemented by UNEP and whose evaluation reports have been used in the preparation of this portfolio brief. It highlights key details on the purposes of the various projects, the implementation span and responsible agencies, the geographical and content scope of the projects, the various goals and objectives of the projects and project budgets among others.
13. It must be noted that all these projects were implemented in line with global energy efficiency accelerator ambitions and, in the case of 3⁵ of the 6 portfolio projects particularly within the framework of the Sustainable Energy for All (SE4All) initiative which was launched by the UN in September 2011. The SE4All initiative has the aim of achieving three primary goals by 2030: (i) Ensuring universal access to modern energy services; (ii) Doubling the global rate of improvement in energy efficiency; and (iii) Doubling the share of renewable energy in the global mix.
14. The Initiative adopts the driving action and commitments by national and sub-national leaders at the country, city, state, region or sector level as the main strategy towards achieving its goals, hence most of its interventions were implemented in the form of technical assistance packages and capacity building programmes.
15. Under the SE4All, six sub-accelerator intervention hubs are designed: the Building Efficiency Accelerator (BEA), the Appliances and Equipment Accelerator, the District Energy in Cities Initiative (DES), the Global Fuel Economy Initiative, the Industrial Energy Accelerator and the Lighting Accelerator. The various projects analysed in this portfolio brief fall largely within the scope of two of these intervention platforms (BEA and DES) and were implemented in line with on-going energy efficiency interventions by the national governments in the various project cities.

2. Brief Description of the various Projects

16. The various projects implemented were thus in three forms: 3 global level interventions that targeted the acceleration of energy efficiency in buildings across multiple countries; 2 regional level projects that were implemented in countries within a specific common geographical zone, and 1 country-focused intervention. All the projects were implemented by the same Unit inside UNEP: the Climate Change

⁵ GEF ID 9329 “Scaling up the Sustainable Energy for All Building Efficiency Accelerator” (BEA Phase 1); GEF ID 9947 “The SEforALL Building Efficiency Accelerator (BEA): Expanding Local Action and Driving National Change” (BEA Phase 2) and GEF ID 9320 “Increasing Investments in District Energy Systems in Cities – a SE4All Energy Efficiency Accelerator”

Mitigation Unit⁶. Table 2 below summarizes the main characteristics of the discussed projects.

⁶ Economy Division, Energy & Climate Branch

Table 2. Project Details

ID	Title	Type ⁷	Executing Agency	Planned duration	Actual Start / End Dates	# of ext.	Actual duration	Planned budget (USD)	Actual expenditures (USD)	Geographical scope
GEF 9329	Scaling up the Sustainable Energy for All Building Efficiency Accelerator – (BEA Phase 1)	MS	World Resources Institute (WRI)	1 year 6 months	04/2016 – 12/2017	1	1 year and 8 months	10,268,347	9,184,737	Global
GEF 9947	The SEforALL Building Efficiency Accelerator (BEA): Expanding Local Action and Driving National Change – (BEA Phase 2)	MS	World Resources Institute (WRI)	1 year 6 months	09/2018 – 09/2020	1	2 years	8,116,597	9,622,529	Global
GEF 9320	Increasing Investments in District Energy Systems in Cities – a SE4All Energy Efficiency Accelerator	MS	UNEP Cities Unit	3 years	05/2017 – 05/2021	1	3 years 11 months	11,711,774	14,230,402	Global
GEF 4171	Energy for Sustainable Development in Caribbean Buildings	FS	Caribbean Community Climate Change Centre (5Cs)	4 years	03/2013 – 06/2020	4	7 years and 4 months	12,484,500	33,699,907	Caribbean
GEF 4167	LGGE Promoting Energy Efficiency and Renewable Energy in Buildings in Jamaica	FS	Institute for Sustainable Development (ISD) Univ. of the West Indies (UWI)	4 years	05/2013 – 03/2020	2	7 years 1 month	7,461,000	7,491,146	Jamaica
GEF 3788	Promoting Energy Efficiency in Buildings in East Africa (EEBA)	FS	UN-HABITAT	4 years	08/2011 – 12/2017	4	6 years 4 months	15,336,288	34,798,076	East Africa

⁷ MS: Medium-sized project / FS: Full-sized project

2.1 GEF ID 9329 “Scaling up the Sustainable Energy for All Building Efficiency Accelerator” (BEA Phase I) – *referred as the BEA I project*

17. The medium-sized BEA I project was implemented by UNEP Climate Change Mitigation Unit and executed by the World Resources Institute (WRI). This project started in April 2016 and concluded in December 2017. The GEF provided a grant of USD 2,000,000 matched by USD 8,268,347 of in-kind contributions from key partners, for a total of USD 10,268,347. The actual expenditures of the project were USD 9,184,737. Partners were either governments (e.g. ICLEI Local Governments for Sustainability), research institutes and non-governmental actors (e.g. Copenhagen Centre for Energy Efficiency) or private actors (e.g. Johnson Controls)
18. The project objective was to reduce GHG emissions by supporting market transformations that will enable a doubling of the rate of energy efficiency improvements in buildings by 2030 by linking global market experience with local policy action and capacity building. The Building Efficiency Accelerator project’s efforts was planned to mitigate 3,821,252 tCO₂eq during the project and for 15 subsequent years.
19. The Project Results Framework adhered to the structure of four components: 1. Partnership expansion: Global and local partnerships of businesses, non-governmental organizations and local governments scaled up to transform local efficiency markets. 2. Technical assistance and capacity building for efficiency actions in cities. 3. Place-based market transformation partnerships for policy and project implementation .4. Monitoring and evaluation
20. Under the project, the city partners implemented actions in stakeholder engagement, identification of policy priorities, and reviewing demonstration project options. The project was largely in the form of a public-private partnership network and was largely stakeholder-driven. Each of the cities committed to adopt one energy efficiency building policy measure, implement one energy efficiency building project and track and report the city’s results to an international registry. Six of the cities engaged intensively on a “deep-dive” basis.
21. The project delivered the outputs and achieved all of the direct project outcomes that were originally planned. It was rated Highly Satisfactory (see Table 3).

2.2 GEF ID 9947 “The SEforALL Building Efficiency Accelerator (BEA): Expanding Local Action and Driving National Change” (BEA Phase II) – *referred as the BEA II project*

22. The medium-sized BEA II project was implemented between September 5, 2018, and September 30, 2020, to scale up the work of the predecessor project GEF ID 9329 (BEA Phase 1) described in the section above. The Project received a total GEF financing of USD 2,000,000, with a planned co-financing of USD 6,116,597. Actual

expenditures at the end of the project were USD 9,622,529. Again, the UNEP, Climate Change Mitigation Unit served as the IA and the World Resources Institute (WRI) as the EA.

23. After the BEA I project, further partners joined representing either governments of new acquired cities, NGOs and research institutes (e.g. National Renewable Energy Laboratory (NREL)) or private actors (e.g. Philips).
24. While the BEA I project focussed on local policy action, the BEA II project included the national policy dimension, which slightly transformed the overall objective towards reducing GHG emissions by supporting market transformations that would enable a doubling of the rate of energy efficiency improvements in buildings by 2030, by linking global market experience, *national policy*, and local action and capacity building”.
25. The project was organized in the same four components as the BEA I project, adding only the national policy dimension: 1. Partnership expansion: Global and local partnerships of businesses, NGOs, local governments, *and national governments* scale up efficiency markets. 2. Technical assistance and capacity building for efficiency actions in cities *or subnational governments* (“Light touch”). 3. Place-based market transformation partnerships for policy and project implementation (“Deep dives”) and 4. Monitoring Results.
26. The project generally focused on the delivery of deep-dive city-level engagements in the form of place-based market transformation partnerships for policy and project implementation in Columbia, India, Mexico, Mongolia, South Africa and Turkey. Other cities were engaged as light touch cities in Brazil, Bulgaria, Chile, China, Colombia, Costa Rica, El Salvador, Ghana, Guatemala, Honduras, India, Jordan, Kenya, Mexico, Mongolia, South Africa and Turkey through technical assistance and capacity building for efficiency actions.
27. The major planned outputs were largely delivered, and the target indicators for each output were achieved, with a significant 40 % output gap in target for planned private sector engagement within the project. Beside this, all major outcomes in the revised Theory of Change were achieved, with an observed limitation in the ability of city government to track emissions from the building sector (See Table 3).

2.3 GEF ID 9320 “Increasing Investments in District Energy Systems in Cities – a SE4All Energy Efficiency Accelerator” – *referred as the DES project*

28. The medium-sized DES project was implemented UNEP from May 3, 2017, to May 31, 2021, to accelerate the scale-up of modern district energy systems globally. UNEP Climate Change Mitigation Unit served as the IA, while UNEP Cities Unit⁸ served as

⁸ Economy Division, Energy & Climate Branch

the EA for the project. At CEO approval, the Project received a GEF grant allocation of USD 2,000,000, with total co-financing commitments of USD 9,711,774 from the project's global partners. The actual project expenditure at the end of the project was USD 14,230,402, including co-financing. Partners were either national governments (e.g. DANIDA), research institutes (e.g. Copenhagen Centre for Energy Efficiency) or private actors (e.g. ENGIE)

29. The objective of the project was to assist developing countries and selected cities to accelerate their transition to lower-carbon and climate-resilient societies through promoting modern District Energy Systems (DES). The project thus conceptualised two forms of cities: Pilot cities (including light touch and deep-dive cities), and replication cities.
30. The project was rolled out as a city-level intervention in four components: 1. Assessments and technical assistance for DES actions in cities ("Light touch"); 2: District Energy Demonstrations and city-wide plans ("Deep-dive"); 3: Monitoring Framework; and 4: Outreach, tools and training on DES Initiative.
31. Four countries (Chile, China, India and Serbia) were selected for pilot city work (demonstration of new tools, methodologies, and best practices) to provide lessons for global replication. At city-level, five cities were selected for pilot and demonstration work ("deep-dive"). The city-level experiences were then scaled-up nationally and regionally through awareness-raising, regional capacity building and wider support to multiple countries.
32. The Light-touch cities were supported with Rapid Assessments and stakeholder engagements towards the building of commitment for the implementation of modern DES. The Deep-dive engagements went beyond rapid assessments and supported establishment to provide advanced support through a demonstration of the costs and benefits of applying the modern DES approach in each city, and to provide support for policy adaptation at city, country, and regional levels.
33. The Project was rated Highly Satisfactory (See Table 3).

2.4 GEF ID 4171 "Energy for Sustainable Development in Caribbean Buildings" – referred as the Caribbean project

34. The full-sized Caribbean project was approved in November 2012 by UNEP, but effectively commenced in April 2014 and ended on 30 June 2020. The project had a strategic priority of promoting energy efficient technologies and practices in appliances and buildings in five Caribbean countries (Antigua and Barbuda, Belize, Grenada, Saint Lucia and Saint Vincent and the Grenadines). The Project was implemented by UNEP under its Climate Change Mitigation Unit. It was executed by the Belize-based Caribbean Community Climate Change Centre (5Cs). The Project was supported by a GEF grant of USD 4,859,000 and a planned co-financing (cash

and in-kind) of USD 7,625,500. Total project expenditures at the end accumulated to total of USD 33,699,907. The project included regional and national organisations, public and private stakeholders as well as different NGOs from the Caribbean.

35. The objective of the project was to “reduce the GHG emissions intensity in buildings by 20%”.
36. The project was structured in six (6) components: 1: Establishment of an assessment and monitoring system for energy efficiency and renewable energy in buildings, 2. : Strengthening of national capacity for energy efficiency and renewable energy to support long-term development of the five SIDS, 3: Development and use of appropriate financial and market-based mechanisms that support sustainable energy use in buildings, 4: Development and implementation of a demonstration program for sustainable energy use in buildings, 5: Development and adoption of a regulatory framework for energy efficient buildings (building codes) and MEPS for appliances and equipment, 6: Increasing regional awareness and improving knowledge management and sharing with regard to the benefits of energy efficiency and renewable energy and the development of a replication strategy
37. The project contributed to the improvement of the institutional capacity for management of the RE and EE sectors by implementing energy audits and demonstration buildings in 5 countries. Technical capacity and awareness for EE and RE was build and appropriate financial and market-based mechanisms supporting energy efficiency in Belize, Grenada and St. Lucia with significant co-financing from national development banks were adopted. Furthermore, the project led to the adoption of some regulatory instruments that covers standards and codes for both commercial and residential construction for solar PV installations. However, there were also several failures including a failure to establish an assessment and monitoring system for EE and RE in buildings. Gender or human rights aspects have not been considered.
38. Although most outputs were delivered, the overall Project objectives were not achieved, and it seems highly unlikely that cumulative target reductions were reached (See Table 3).

2.5 GEF ID 4167 “LGGE Promoting Energy Efficiency and Renewable Energy in Buildings in Jamaica” – *referred as the Jamaica project*

39. UNEP approved this full-sized project for implementation in 2012, but effective implementation began in mid-2013 and closed in March 2020. The project was conceived to demonstrate (i) the extent to which the energy requirements of buildings in sub-tropical climates can be reduced and (ii) the potential energy and cost savings possible from more sustainable energy practices, targeting a zero net energy building (ZNEB) as one of the demonstration projects. The Project was implemented by the UNEP Climate Change Mitigation Unit, and the Institute of Sustainable Development (ISD) at the University of the West Indies (UWI) served as

the EA. The project received a GEF grant allocation of USD 2,361,000, with total co-financing commitments of USD 5,100,000 from the project's partners. The total actual project expenditures at the end were USD 7,491,146. The partners included governmental players such as ministries as well as regional and national associations.

40. The project objective was to "Increase energy efficiency (EE) and the use of renewable energy (RE) in the building sector in Jamaica thus reducing energy consumption and greenhouse gas (GHG) emissions."
41. To achieve this objective, the project was structured into five project components aimed at advancing the adoption of energy efficient and sustainable energy measures into building practices, namely: 1. Technical design, 2. Retrofit solutions, 3. Zero-net energy building, 4. Policy and regulatory framework, and 5. Dissemination.
42. The project targeted a strengthening of the policy framework, building on the policy intentions of the National Energy Policy, by promoting (i) far higher standards of energy efficiency, (ii) the increased use of renewable energy sources within the Caribbean built environment, and (iii) supporting the development and implementation of appropriate regulatory and technical tools.
43. Given the budget, the project produced a relatively small number of outputs with the bulk of the effort and resources invested in the high-impact demonstration projects (62% of the budget). Of the 14 outputs, 10 were considered achieved and 3 were partially achieved (See Table 3).

2.6 GEF ID 3788 "Promoting Energy Efficiency in Buildings in East Africa (EEBA)" – referred as the East Africa project

44. This full-sized UNEP/GEF project was implemented from 2011 to 2017 by UNEP Climate Change Mitigation Unit in close coordination with the UNEP Regional Office for Africa. UN-Habitat Urban Energy Unit served as the EA. The project sought to address the inefficient use of energy in buildings in the East African partner countries. A grant of GEF financing of USD 2,853,000 was provided for the project, with USD 12,483,288 in-kind co-financing from project partners, giving a total project budget of USD 15,336,288. The total actual project expenditures at the end of the project were USD 34,798,076. UN-Habitat managed the project in close collaboration with partner Governments of Kenya, Uganda, Tanzania, Rwanda and Burundi, particularly with the respective national Ministries of Housing. Also, regional and national associations were involved.
45. The stated objectives of the project were "to mainstream energy efficiency measures into housing policies, building codes, municipal bylaws and building practices in East Africa and to achieve considerable avoidance of energy-related greenhouse gas emissions as a result of improved buildings and building practices".

46. The project offered comprehensive technical assistance across five project components towards achieving the targeted mainstream energy efficiency measures into housing policies, building codes, municipal bylaws and building practices in East Africa: 1. Energy Efficiency Data and Benchmarks in the Building Sector; 2. Formulation and Adoption of Energy Efficiency Codes in Buildings; 3. Awareness Raising, Capacity Building in Energy Efficiency, and Best Practices in the Building Sector; 4. Appropriate Financial Framework for the Promotion of EE Measures in Buildings; and 5. Development and Implementation of Pilot Projects.
47. These components provided a comprehensive approach for creating an environment conducive to the adoption of energy efficient buildings, addressing the major barriers to adoption and entrenching energy efficient building practices into policies, regulations and bylaws.
48. The Project faced many challenges such as the lack of support from Governmental partners and political unrest particularly in Burundi. Accordingly, the availability of outputs was Moderately Satisfactory and limiting the outcomes (See Table 3).

III. SYNTHESIS OF THE EVALUATION FINDINGS

1. Introduction

This chapter discusses the various main findings of the previous terminal evaluations of the projects listed in

49. Table 1 and their ratings. The similarities in the findings are further discussed, which provided an input into the identification of best practices for the implementation of Building Energy Efficiency actions in future projects in the fifth chapter of this brief. The following Table 3 summarizes the ratings of the six projects:

Table 3. Summary of Ratings⁹

Criterion	GEF ID 9329	GEF ID 9947	GEF ID 9320	GEF ID 4171	GEF ID 4167	GEF ID 3788
Strategic Relevance	HS	HS	HS	S	HS	HS
1. Alignment to UNEP MTS, POW and strategic priorities	HS	HS	HS	HS	HS	-
2. Alignment to UNEP/GEF/Donor strategic priorities	HS	HS	HS	HS	HS	-
3. Relevance to global, regional, sub-regional and national environmental priorities	HS	HS	HS	HS	HS	-
4. Complementarity with existing interventions / Coherence	HS	HS	HS	MU	MS...	-
Quality of Project Design	S	S	S	MU	MS	S
Nature of External Context	HF	F	F	U	MU	F
Effectiveness	HS	S	HS	MS	MS	MS
1. Availability of outputs	HS	S	S	MS	MS	MS
2. Achievement of project outcomes	HS	S	HS	MS	MS	MS
3. Likelihood of impact	HL	L	ML	ML	ML	ML
Financial Management	HS	HS	HS	S	S	MS
1. Adherence to UNEP's financial policies and procedures	-	HS	HS	MS	S	-
2. Completeness of project financial information	HS	HS	HS	HS	S	MS
3. Communication between finance and project management staff	HS	HS	HS	MS	S	S

⁹ Most evaluation criteria are rated on a six-point scale as follows: Highly Satisfactory (HS); Satisfactory (S); Moderately Satisfactory (MS); Moderately Unsatisfactory (MU); Unsatisfactory (U); Highly Unsatisfactory (HU). Sustainability and Likelihood of Impact are rated from Highly Likely (HL) down to Highly Unlikely (HU) and Nature of External Context is rated from Highly Favourable (HF) to Highly Unfavourable (HU).

Criterion	GEF ID 9329	GEF ID 9947	GEF ID 9320	GEF ID 4171	GEF ID 4167	GEF ID 3788
Efficiency	S	S	HS	MU	MU	U
Monitoring and Reporting	S	HS	HS	MU	MU	MS
1. Monitoring design and budgeting	S	HS	S	MU	HU	MS
2. Monitoring of project implementation	S	HS	HS	MU	MU	MS
3. Project reporting	S	HS	HS	MS	S	S
Sustainability	HL	L	ML	MU	ML	U
1. Socio-political sustainability	HL	L	L	MU	ML	ML
2. Financial sustainability	HL	L	ML	MU	L	U
3. Institutional sustainability	HL	L	ML	ML	L	MU
Factors Affecting Performance	HS	HS	HS	MU	MS	MS
1. Preparation and readiness	HS	S	HS	MU	MU	MS
2. Quality of project management and supervision	HS	HS	HS	MU	MS	MU
3. Stakeholders' participation and cooperation	HS	S	S	MU	MS	S
4. Responsiveness to human rights and gender equality	MS	S	MS	U	MU	-
5. Environmental and social economic safeguards	HS	S	S	-	N/A	
6. Country ownership and driven-ness	HS	HS	S	MS	MU	U
7. Communication and public awareness	HS	HS	HS	MU	MS	S
Overall Project Performance Rating	HS	HS	HS	MU	MS	MS

2. Major Findings

2.1 BEA I project

50. The BEA I project was rated **Highly Satisfactory** at evaluation. The project was found to have laid a strong foundation for accelerating commitment among public and private sector actors towards the implementation of Building Efficiency action in a very short time. This was reported to have been largely attributable to the extensive leveraging of support, and active engagement of stakeholders through public-private partnerships. With the project primarily seeking to build partnership for further Building Efficiency Actions, a total of 30 cities (or states); 26 civil society organizations; 10 private businesses; and 4 international bodies were found to have committed to Building Efficiency Actions at exit.

51. At project exit, it was observed that 24 cities were able to have defined 24 policies and 21 projects during Phase 1 (of which 6 were deep-dive cities and 18 light touch cities, representing a total of 80% of cities engaged against the base target of 30%). Effective leadership was found to be a key driver to the effectiveness and efficiency of the project, which was reflected in the establishment of a well-organised

coordination structure across the city, national, regional and global levels of the project. To further consolidate the project's experience, an effective knowledge management system was constituted. Thus, an adaptive learning approach facilitated the highly satisfactory performance of the project and set the ground for the implementation of the second phase of the project (as a separate GEF funded project, BEA Phase 2, GEF ID 9947 described below).

52. Major weaknesses observed in the project related to the low sensitivity to gender disaggregated performance, and the exposure of the project to changes in governments, which even though was mitigated, affected the engagement of local governments in some originally planned deep-dive cities and led to a three-month cost neutral extension of the project. Overall, the project's exceeded expected performance, in relation to the USD 2,000,000.00 GEF financing budget that was secured.

2.2 BEA II project

53. Building upon the BEA I project, the BEA II project was rated **Highly Satisfactory** at evaluation. The project was found to have significantly increased the capacity and commitment of cities towards the adoption of building efficiency codes, retrofits and policies, which were the three main areas around which the project actions were planned. The performance of the various cities, especially the deep-dive cities, were found to be largely driven by the level of local and national government support to the project, and this contributed to variations in progress.
54. The project's knowledge management platforms, including its website, facilitated the hosting and sharing of relevant tools and knowledge across stakeholders at different levels, and this contributed to the sustainability of the project results. Thus, cities that sought to join the initiative exceeded planned targets, and recruitment had to be halted at a point to facilitate the implementation of subsequent actions which were phased and could not be done if recruitment continued. In all the deep-dive cities, the evaluation established evidence on the successful completion of the implementation of demonstration actions that were agreed upon.
55. A significant observation made at evaluation was that the multiplicity of actions from governments across the world towards driving energy efficiency action made it difficult to isolate the post-implementation changes that are solely attributable to the BEA II project. The ability of city officials to appropriately utilise MRV frameworks that were developed and adopted also showed a significant gap.

2.3 DES project

56. The DES project was rated **Highly Satisfactory** at evaluation based on the observed performance of the project. The evaluation found to have attained all of its major planned outputs within the USD 2,000,000.00 GEF financing budget that was

allocated. Essentially, the project successfully contributed to the identification of about 33 pilot DES projects and has successfully contributed towards gathering momentum across 40 cities distributed across 14 countries, reflecting an over-attainment of the original planned outcomes.

57. Stakeholder commitment in the various project cities and countries was observed to have been high, which led to the success of the project. At national and city levels, the project teams collaborated strongly with relevant environment and energy ministries, city and municipal governments in rolling out the various technical assistance packages, including the identification of pilot projects, feasibility assessments, and local actions towards the implementation of cost-effective pilot District Energy Systems. Overall, a significant momentum was observed to have been generated for the project towards up scaling the deployment of modern District Energy Systems.
58. Despite this, the involvement of indigenous and local people in the project was found to be generally limited in the various cities. Provisions for gender participation and a consequent estimation of the gender-disaggregated impact of the project were also found to be limited. This was attributed to the nature of the project design and its project's general focus on the delivery of city-based support, rather than the actual development and construction of modern DES systems within the time span of the project. A further limitation in the ability to utilise Monitoring, Reporting and Verification (MRV) frameworks that were developed for the tracking of outcomes. The evaluation noted that the main concern in sustainability, relates to the high capital requirements in financing the construction of modern DES, with implications for the development of sustainable financing schemes if lessons learnt within the context of the project are to be appropriately transformed into rapid concrete action.

2.4 Caribbean project

59. The Caribbean project was rated **Moderately Unsatisfactory** at evaluation based on the overall project performance. Designed as a relevant project to help develop a regional project to address the inefficient use of energy in buildings in 5 countries within the Caribbean Community, the project managed to improve the institutional capacity for management of the RE and EE sectors through the implementation of various energy audits and demonstration buildings. The project contributed to the building of some technical capacity and awareness for EE and RE in participating countries and led to the adoption of appropriate financial and market-based mechanisms to support energy efficiency in Belize, Grenada and St. Lucia.
60. A mid-Term Evaluation was conducted to help review the project activities and re-design certain components. After the MTR, the project gained pace around March 2019, which led to a rapid undertaking of various energy audits in selected demonstration buildings. Despite the gains, the evaluation found that the preparation of the Project Results Framework (PRF) was not compliant with best practices, and there was poor allocation of resources during implementation. This led to significant

degree of project failure, as none of the project outcomes were found to have been achieved at evaluation.

61. The mechanisms that could have facilitated up scaling of the project outputs, and the sustainability were not in place. For example, the evaluation found no formalized project support in existence for the monitoring of energy consumption post-installation on the demonstration buildings. Thus, there was a failure to establish an assessment and monitoring system for EE and RE in buildings. Again, poor progress was observed in launching financial and market-based mechanisms to support EE and RE measures within the scope of the project, as well as a failure to launch a demonstration program for sustainable energy in buildings partly due to the low price of oil. The evaluation found no gender or human rights considerations in the design and implementation of the project.

2.5 Jamaica project

62. The Jamaica project was rated **Moderately Satisfactory** at evaluation based on its overall performance. The project was grounded on two key building blocks of demonstrating the benefits of clean energy technologies and solutions in buildings (new and retrofit) which are very relevant to the Caribbean. At evaluation, the project successfully delivered two prominent and high-quality demonstration facilities on energy efficiency and renewable energy technologies, as well as solutions adaptable to new and existing buildings within the tropical and sub-tropical climates. It led to the building of the first Zero Net Energy Building (ZNEB) in a tropical environment and the retrofitting of the National Housing Trust (NHT) head quarter building, which were significant contributions to the provision of learning and demonstration lessons on Energy Efficiency and Renewable Energy in the region.
63. At evaluation, it was found that progress has been made in the region regarding the formulation and adoption of energy efficiency building codes, particularly in Jamaica. The development of an effective knowledge management platform in the project facilitated the formation of momentum for sharing resources for policy, planning and developmental activities.
64. Despite this, the sequence of activities implemented showed a high degree of causalities and inconsistencies. The evaluation observed significant inconsistencies, not only in the project components, but also in the budget, roles, governance structures, work plan, monitoring plan and costing. Significant external impulse from the devaluation of the Jamaican dollar at the time of implementation of the project was found to have further significantly impacted the project. Again, the project team reportedly had limited experience with the implementation of UNEP/GEF projects, hence faced significant coordination challenges during implementation. Thus, even with the significant extension of the project duration, the attainment of project outputs and outcomes was very limited.

2.6 East Africa project

65. The East Africa project was rated **Moderately Satisfactory** at evaluation, based on the overall performance. Implemented as a regional project, the project offered comprehensive technical assistance across its five project components towards achieving the targeted mainstream energy efficiency measures into housing policies, building codes, municipal bylaws and building practices in East Africa.
66. At evaluation, a highly credible knowledge base was established which will continue to inform policy, planning and development decisions in the region and potentially also other tropical areas. Further, a high-level legal framework which establishes a strong legal, policy and institutional backing to the Building Energy Efficiency action was developed and adopted in three countries within the region. The project was also found to have contributed to an increase in voluntary activity at local government level in Kenya and Tanzania towards accelerating the deployment of building efficiency technologies.
67. The evaluation found that the execution of the project has been slow due to challenges within the external environment such as difficulties in recruiting and retaining suitable team members. This was aggravated by the observed ineffectiveness of focal points within Partner Governments, which led to an over-burdening of the Project Management Unit. A number of UN Volunteers were recruited to help mitigate these challenges and to support the project activities at a national level. Consequently, there was an unplanned cost implication, which affected the efficiency of the project. Other political developments in the region such as the escalation of political unrest in Burundi at the time of implementation of the project, was observed to have significantly affected the country's participation. Thus generally, the project had limited success with the creation of a supportive financing environment but created the momentum for collaboration with other parallel initiatives in the region to unlock green finance opportunities.

3. Comments on Evaluation Findings

68. A common observation across almost all the evaluation findings is the impact of the relatively shorter duration of these projects on the project performance. Aside Caribbean project, which was rated Moderately Unsatisfactory at evaluation despite the significant extension period, other projects achieved very significant successes in stimulating a drive towards accelerating the uptake of EE in the building sector and created structure to sustain the results. However, the core objective of these projects, in terms of contributing to emission reduction, could not be appropriately established due to the relatively shorter duration of the projects. This made it difficult for very concrete actions to be implemented, and in many cases demonstration projects were in the form of retrofits, energy audits, or assessment of investment profitability.

69. Importantly, the various evaluation findings reveal the relevance of effective knowledge management systems to the successful implementation of EE projects. It can be observed that projects such as the DES and BEA I and II projects, significantly performed well at evaluation. This is because the systems contributed to effective dissemination of project action, tools and resources, and helped to consolidate performances of other cities in terms of success. This established effective platforms for target replication cities to learn from and translated into better likelihood of sustainability performances.
70. Another common observation across the projects is the limited sensitivity to gender and the needs of indigenous and vulnerable people. In all the evaluation reports, it is difficult to substantiate the gender-disaggregated impacts of the various investments made. Given that gender empowerment is a critical dimension of sustainable development, it remains a very high gap that a decade of implementation of EE actions could not significantly substantiate. Again, most EE action in buildings significantly could impact marginalised people in cities, and city level interventions in all the projects evaluated were limited in findings on marginalised and vulnerable people. This has implications in recommendations for future development and implementation of Energy Efficiency projects.
71. It could also be observed that there were variations in the performance of projects based on the scope of implementation and the nature of activity scheduling. The Caribbean project that had a regional focus had the lowest rating and performance, and this could be attributed to the nature of activity scheduling. The evaluation report indicated significant impacts of causalities on successful implementation of project action in each country, given that most activities were dependent on the completion of other activities in other countries. A similar regional focus project, the East Africa project had a moderately satisfactory performance, which was better than the Caribbean project, and this could be explained by the less prevalence of country-related causalities in activity scheduling. Again, this is strongly linked to the nature of the project design, as the evaluation report for the Caribbean project noted that the preparation of the Project Results Framework (PRF) was not compliant with best practices, and there was poor allocation of resources during implementation. Such issues were not found in the higher performing projects.
72. Thus, nature of project design (including nature of activity scheduling, setting of targets and indicators, causalities, etc...), the nature of stakeholder participation and collaboration, project management approach are among key factors that accounted for the variations in performance among the various projects. However, notable common key gaps remain in gender and marginalisation sensitivity, sustainable funding and time adequacy, and the ability to track actual emissions from the various projects that have been implemented.

IV. ANALYSIS OF LESSONS LEARNT AND RECOMMENDATIONS

1. Introduction

73. This chapter presents a discussion of the major lessons learnt and recommendations from the Terminal Evaluations of the various projects on the critical factors that contributes to success and failure in the implementation of the various Energy Efficiency interventions.

74. The various conclusions, lessons learnt and recommendations for each project were drawn from series of primary and secondary data, which were largely qualitative, with some quantitative evidence contained in the reports where necessary. It must be noted that for each evaluation, data was drawn from the executing agencies, the implementing agencies, the project partners, the project beneficiaries, national partners, stakeholders from Civil Society Organisations in each country, the private sector and academic institutions. Thus, the lessons learnt, and recommendations can be said to be a comprehensive view of a diversity of stakeholders within the energy efficiency in buildings sector and are thus relevant for evidence-based recommendations on best practices for the design and implementation of future projects on building energy efficiency.

2. Relevant Lessons learnt on Success and Failure Factors

75. The relevant lessons learnt in each project are presented in Table 4 below.

Table 4. Lessons learnt from previous Terminal Evaluations

BEA I project	BEA II project	DES project	Caribbean project	Jamaica project	East Africa project
<p>1: Identification of Policy and Project priorities in cities before solutions to finance barriers facilitates progress.</p> <p>2: Public-private partnership is key to rapid implementation of Building Efficiency action.</p> <p>3: High level global platforms and national engagements facilitates the creation of necessary political linkages towards an energy efficiency movement.</p> <p>4: The buildings markets of cities are not only embedded in national markets but at the same time have complex, very local roots.</p> <p>5: A coordinated approach to action between Building Efficiency Accelerator intervention, and other SE4All interventions enhances project efficiency.</p> <p>6: Effective leadership contributes to accelerated</p>	<p>1: Multinational stakeholders' engagement with national governments contributes to better results</p> <p>2: The city-level government officials in some countries have practically no capacity to formulate policies and regulations for EE in buildings, hence face a lock-in effect in translating learning into action</p> <p>3: Building Efficiency Policies such as building codes are effective in the transformational drive, but their effectiveness can be further enhanced if capacities for simplification of these codes are further developed among cities.</p> <p>4: The thematic interventions areas under the initiative are effective for capacity enhancement, and apt innovative funding schemes are necessary for the implementation and upscaling of city priorities under these themes</p>	<p>1: Comprehensive stakeholder participation is key to successful implementation of DES interventions.</p> <p>2: Private sector-led participation is key to accelerating the adoption of modern DES.</p> <p>3: Impact monitoring is critical, and an integrative approach to MRV frameworks with enhanced localising.</p> <p>4: Deep Dive actions should go beyond demonstration of bankability and Technical Assistance to include actual construction of at least, one or two pilot cases (or even the retrofitting of existing systems).</p> <p>5: Planning officers and utilities are key to promoting the adoption of modern DES.</p>	<p>1: In the context of projects that have multiple target countries, building capacity in these countries should be a major objective.</p> <p>Lesson 2: Sufficient resources allocation for all identified project positions, particularly based on the project context is vital to success.</p> <p>3: In small countries, there will be instances where installer or supplier personnel is connected with government due to the small number of energy professionals to supply and install EE and RE equipment.</p> <p>4: Elections and changes in governments have a significant impact on projects, and should be anticipated and planned for</p>	<p>1: An active Project Steering Committees (PSC) is critical to maximise project results and must be formally constituted and empowered.</p> <p>2: Quality Assurance at design stage needs to check and recheck consistency across the complete set of documents.</p> <p>3: A well-designed M&E plan is an important tool for successful implementation and can be supported with a simple "how-to-guide" and basic tools for low-cost M&E implementation.</p> <p>4: Sequencing of project components requires careful consideration.</p> <p>5: Project team induction or onboarding at project start and key staff change-overs is</p>	<p>1: Dependence on external partners can affect project progress.</p> <p>2: Regional steering committee is an inappropriate governance structure for these kinds of projects.</p> <p>3: Design of the Project Management Unit and satellite implementation structure is critical to project success.</p> <p>4: Projections of energy usage against business as usual is relevant for quantifying project benefits.</p> <p>5: Impact monitoring is critical.</p> <p>6: Capacity development vs technical assistance.</p> <p>7: Technical assistance offered in exchange for data.</p> <p>8: Leveraging successes across partner countries.</p> <p>9: Green Building Councils are strong partners for Energy Efficiency projects.</p>

<p>urban transformation</p> <p>7: Clear identification of responsibilities, accountability targets enhance effectiveness and progress among cities</p> <p>8: Three points of leverage are critical towards accelerating scale-up action Building Efficiency action among cities</p> <p>9: While partners include public sector, private sector, and civil society, some key gaps remain in stakeholder engagement.</p> <p>Lessons 10: Effective organisation and dissemination of professional resources on comprehensive topics contributes to project success</p>			<p>5: Virtual offices can operate within modern business practices (especially with the COVID-19 pandemic) provided there is broad agreement on the mode of execution of a project.</p> <p>6: A project design where countries are assigned responsibilities with causalities, such that the completion of one task by one country is the basis for another country to implement its agreed workplan is too risky</p> <p>7: Project activity scheduling is critical to success, given that the evaluation found out that extending the project for another 1 to 2 months could have helped complete the demonstration buildings and publish energy savings as a result of EE and RE measures undertaken within the project</p>	<p>essential.</p> <p>6: Financial Management opportunity to monitor and flag significant underspending on budget.</p> <p>7: Stakeholder analysis should be critically reviewed at project inception to firm up stakeholder commitments and make sure they understand their commitments.</p> <p>8: Proactive utilisation of the time before finalising the Project Cooperation Agreement (PCA) to improve project efficiency.</p>	
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76. In all the projects evaluated, it was commonly realised that active stakeholder participation, including widening the stakeholder base, contributed to the successful implementation. In the DES project for example, the engagement of public sector institutions such as the Town and Country Planning Departments at the state level was found to be critical for facilitating the inclusion of provisions for construction of distribution networks. Similarly in the BEA I project evaluation, a strong linkage was observed between political interest and accelerated energy efficiency action. The TE report on the Jamaica project similarly noted that a lack of clarity and consistency of those stakeholders who had been identified as priority stakeholders (high influence and interest) affected the performance, particularly when the initial government support that had been pledged was lost.
77. Again, the various evaluations revealed the relevance of private sector participation in accelerating Energy Efficiency action. This was observed to be one major contributing factor to the success of the DES project, particularly in countries such as Serbia and Chile. In many EE actions, especially those that required heavy financing (such as the construction of modern DES, or retrofitting of buildings), private sector firms with significant funding capacity (such as multinational banks and financial institutions) can provide much needed financial resource for the provision, operating and maintenance of the systems with government oversight. The BEA I project for instance highlighted how Public-private partnership can enable actors at higher levels to play important roles as facilitators, technical experts and peer advisors in building efficiency interventions. The limited presence of these private sector actors contributed to the low performance of other projects such as the Jamaica project, where these actors could have provided support in the building of capacity for project management.
78. Further, impact monitoring is critical and more effective when an integrative approach is adopted in the development and implementation of these MRV frameworks with enhanced local sensitivity. In both the BEA I and II projects, as well as the DES project, the most under-developed capacity of officials observed was their ability to effectively conduct impact monitoring using MRV frameworks. This is explainable by weak local capacities and poor localisation of assessment methodologies in cities. Similarly, the evaluation of the East Africa project affirmed this in its observation that several data collection tools and instruments for tracking the various indicators were not implemented. Again, this made it difficult for the project to quantify the impact of activities under some project components. Thus, the importance of establishing baselines, identifying, or establishing instruments, tools and resources to track impacts and then to actually track and report tangible numbers, cannot be over emphasized in the development and implementation of energy efficiency interventions.
79. Beyond impact monitoring, the reports of two main projects shed significant light on the relevance of properly monitoring the implementation of the projects themselves, particularly in terms of appropriate activity scheduling, appropriate monitoring plans development at project design, and the constitution of effective project management

teams to drive action towards success. The Caribbean project for instance indicated that a project design where countries are assigned responsibilities with causalities, such that the completion of one task by one country is the basis for another country to implement its agreed work plan is too risky. Thus, it would include a more appropriate approach to assigning a regional agency to oversee a work activity and advancing a long-term mandate for regional responsibilities for advancing EE and RE standards. Similarly, the Jamaica project evaluation report observed how a well-designed M&E plan is critical, such that the absence of such a monitoring plan for the project offered no support to the project and if it was implemented, it would have been to the detriment of the project. This should extend beyond the mere development of the plan at project design, to include its actual utilisation.

80. In almost all the evaluations, the relevance of knowledge management to enhancing project performance was identified. The BEA I project noted that effective organisation and dissemination of professional resources on comprehensive topics contributes to project success. The project's success was significantly linked to the sharing of multitude of existing and newly developed materials within the project which facilitated quality engagement of partners and contributed to the attainment of significant project success. The East Africa project hinted at this in the need to leverage successes across partner countries, and this could effectively be managed by the creation of effective knowledge management platforms and tools such as websites, brochures, online resources and databases, etc...
81. The impact of the project's environment on critical performance, particularly the political climate, is key. The East Africa project highlighted this in its observation that the dependence on external partners can affect project progress. It stressed how the heavy reliance on Government partners and slow bureaucratic processes to progress key delivery milestones were identified as challenges at inception. In particular the design of the project implementation structure, depending on a small central Project Management Unit (PMU) with Government partners to drive implementation at a national level, proved to be a major challenge. In the Caribbean project, a critical failure factor was as a result of elections and changes in governments, which were not adequately anticipated and planned for.
82. Another critical lesson learnt is the need for the Identification of Policy and Project priorities in cities before solutions to finance barriers facilitates progress. While this was not dominant across the various evaluation reports, it particularly stems out of the BEA I project evaluation. The evaluation realised that centralised financial resources such as GEF funding allocations were not sufficient for influencing policies and projects within the various cities. Thus, for the effective progress on the uptake of energy efficiency action in buildings, cities needed to assess and identify specific policies and projects before they could examine any specific financial barriers to progress. Based on the policy and project priorities, the cities can then effectively standardize finance approaches to scale pilots to programs. While cities can often use local funds for pilot projects, there is a significant barrier to finding sustainable finance approaches to address project pipelines, and Medium-Size budgetary allocations under the GEF were not enough to facilitate concrete action.

3. Previous recommendations

83. The following Table 5 summarizes the main recommendations for each of the projects:

Table 5. Recommendations from previous terminal evaluation reports

BEA I project	BEA II project	DES project	Caribbean project	Jamaica project	East Africa project
<p>1: There is a need for a deeper analysis of what constitutes a “market” for buildings.</p> <p>2: The Finance and Funding Working Group should immediately explore and recommend that the Steering Committee and project managers pursue longer-term funding to sustain, manage and govern the BEA network when the Phase 2 GEF grant ends.</p> <p>3: To better assist the cities that have not progressed beyond Stage 0 (commitment to participate) or Stage 1 (assessment), the BEA Steering Committee should more actively recruit new partners and draw upon experts from existing partner organizations who can rapidly identify appropriate actions and enabling capacities that have been proven to accelerate</p>	<p>1: UNEP CCMU should ensure that the scope of emission reduction interventions such as that would follow the BEA be extended beyond EE in buildings to encompass other dimensions of the city system, given the on-going holistic approach being adopted by city and national governments to transform cities in the drive to Net-Zero.</p> <p>2: UNEP project staff should encourage city officials and other project partners to ensure that specific plans and engagement strategies be developed to foster widening the base of stakeholders that can participate in BE Actions, particularly regarding marginalised gender groups and indigenous people</p> <p>3: UNEP project team should ensure that state and National governments (through the</p>	<p>1: City Officials and local partners should ensure that the scope and depth of active stakeholder participation during active implementation of project action for DES action should be widened beyond the DES team, global partners and city officials at municipal levels.</p> <p>2: PPP arrangements should be adopted by city and national governments in deep dive cities for the successful construction of modern DES in cities with high potential.</p> <p>3: The project team and its partners should ensure that the design of DES interventions and proposition of local action for each city or</p>	<p>1: Secure sustained financial commitment and resources for dedicated training of electrical technicians and energy professionals for the installation of lighting systems, air conditioners and renewable energy systems as well as for updating of best practices for high vocational and market surveillance skills.</p> <p>2: Future initiatives in RE and EE should focus on development banks for financing EE and RE initiatives for commercial and industrial sectors where greater national energy savings can be generated.</p>	<p>1: Integrate the Build Better Jamaica web platform with the university website.</p> <p>2: Secure the commitment to data collection and dissemination from the two demonstration projects.</p>	<p>1: The entire knowledge base and portfolio of resources for communication, training and awareness created by this project should be made available online.</p> <p>2: Fact sheets and case studies should be developed for the few projects that have been implemented to ensure they serve their purpose as demonstration projects.</p> <p>3: The Rwanda’s successes should be developed into a case study to encourage partner countries and provide practical guidelines for implementation, operationalization, and institutionalization:</p> <p>4: Funding leveraged through the project should be quantified and reported, as</p>

<p>the market transformation toward more efficient buildings.</p> <p>4: To scale up and intensify its efforts, the BEA Steering Committee should consider recruiting additional “aspirational” cities from regions, countries or states that have accelerated their mitigation efforts in the building sector and that have pertinent market ties to BEA cities.</p> <p>5: The Steering Committee should consider seeking volunteers, contacting experts and recommending an appropriate party within the partnership to develop and consistently apply a guideline and a template for integrating constructive project activities regarding gender, geographic diversity, and any indigenous groups, that should be encouraged to participate in BEA as stakeholders.</p> <p>6: The BEA in Phase II should consider recruiting more international and local electric utilities and more nationally-based developers.</p> <p>7: When planning future market transformation project proposals, the UNEP CCMU could review all prior, ongoing and planned market</p>	<p>relevant energy and environmental ministries) are engaged as possible leading stakeholders in Building Efficiency initiatives, given that city level governments are sometimes limited in their capacity to actually develop and implement/finance the implementation of building codes and other BE strategies at their local levels.</p> <p>4: UNEP project team should communicate with project partners at the local levels to develop comprehensive proposals for specific priority interventions, particularly with respect to retrofits and new developments towards attracting investment into Energy Efficient building action in their respective jurisdictions in collaboration with local private sector actors.</p> <p>5: UNEP should institute mandatory provisions for participation of marginalised people, particularly the urban poor, in interventions such as the BEA that seek to promote energy efficiency in buildings, particularly through useful inputs for policy and project development, such that planned actions would not lead to worsening their socio-economic conditions or displace them from their</p>	<p>country should be based on a thorough review of their local-specific needs (context-relevance responses and priorities).</p> <p>4: Innovative approaches that will help to enhance the measuring of the impact of DES in terms of emissions and sustainable development outcomes, and how existing frameworks can be enhanced in local sensitivity should be actively researched into, either as complementary actions, or as sub-components of future DES interventions.</p> <p>5: Project partners, city officials and national governments should adopt a common effort through innovative and bottom-up practices to ensure that human rights-sensitivity and gender dimensions in DES project are enhanced, particularly during the formulation of policies and the selection of District Energy projects in the various cities.</p>	<p>3: The Ministries of Environment should seek assistance from CARICOM to facilitate implementation of technical assistance for the provision of international best practices for managing Waste from Electrical and Electronic Equipment (WEEE) waste streams across several countries.</p> <p>4: Continual training is required to sustain the capacities of market surveillance personnel, mainly installation technicians, to identify a broad range of qualities of EE equipment and RE equipment.</p> <p>5: Future projects involving several countries should be executed with a clear Project Cooperation Agreement (PCA).</p> <p>6: Gender and indigenous issues along with other issues of social equity should be considered at design and during implementation of any UNEP/GEF project</p>		<p>this seems to be an area where the project excelled that has been neglected:</p> <p>5: Energy performance of the prototype energy efficient housing units that were built in Nairobi, be measured, and reported to demonstrate and showcase tangible benefits of efficient housing:</p> <p>6: An audit should be done to understand the reported co-finance numbers and obtain evidence of stated contributions:</p> <p>7: Effort should be made to quantify the projected (direct and indirect) emission reductions that will arise from the project</p>
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<p>transformation projects to provide guidance on best practices for projects to new projects.</p> <p>8: Some BEA cities have yet to reach the implementation stage, so BEA project managers should task the appropriate local staff or consultants with creating a plan to increase city awareness of the BEA project.</p>	<p>present habitations as a result of increased property value and higher cost of retrofits among others.</p>		<p>especially for EE and RE projects which have documented differentiated gender impacts. taken on existing projects which did not have to consider these issues at the design stage.</p> <p>7: Terminal evaluations should be conducted in a timely manner.</p>		
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84. A number of critical recommendations have been made in the previous evaluations for the successful implementation of EE efficiency projects in the building sector. A key recommendation across majority of the evaluation reports relates to the need to enhance the scope and depth of stakeholder participation during the design and implementation of these projects, including indigenous and local people. The DES project highlighted this in its first recommendation, noting that city officials and local partners should ensure that the scope and depth of active stakeholder participation during active implementation of project action for DES action should be widened beyond the DES team, global partners and city officials at municipal levels. The Caribbean project stressed this participation in its recommendation that the Ministries of Environment should seek assistance from the Caribbean Community (CARICOM) to facilitate implementation of technical assistance for the provision of international best practices for managing Waste from Electrical and Electronic Equipment (WEEE) waste streams across several countries. The limited sensitivity to local and indigenous people was to be overcome for instance in the BEA II project evaluation report, if UNEP encourages city officials and other project partners to ensure that specific plans and engagement strategies be developed to foster widening the base of stakeholders that can participate in Building Efficiency Actions, particularly including indigenous people.
85. Similarly, the need to enhance gender sensitivity of these projects was well highlighted in the recommendations. The DES and BEA I and II projects both indicated that UNEP should institute mandatory provisions for gender. The Caribbean project similarly stressed how gender issues along with other issues of social equity should be considered at design and during implementation of any UNEP/GEF project especially for EE and RE projects. This would ensure that such gender issues which are very critical to the implementation of any sustainable development actions are appropriately documented and tracked, in terms of differentiated gender impacts. The Mid-Term Review is recommended as a good management tool to reset outcomes which can incorporate gender and indigenous issues into the project design, together with mandatory provisions by UNEP for these to be clear at design.
86. The need to leverage sustainable funding for these interventions is key if sustainability likelihood is to be enhanced. The Caribbean project for example argued for future initiatives in RE and EE to focus on development banks for financing EE and RE initiatives for commercial and industrial sectors where greater national energy savings can be generated. The evaluation noted how Ministries taking care of energy in the project countries are positioned well to promote EE and RE investments to the commercial and industrial sectors and could involve development banks offering concessional EE and RE financing in Caribbean countries such as Belize, Grenada and St. Lucia as well as initiation of engagement of development banks in A&B and SVG. In the East Africa project, the relevance is stressed in the recommendation that the project could note any specific suggestions or recommendations for other projects that may help unlock or crowd in development partners or complementary projects to the same extent.

87. Closely related to the need for sustainable funding, the private sector should be a key player in the EE in building sector project development and implementation. The DES project highlighted this in its recommendation that PPP arrangements should be adopted by city and national governments in deep dive cities for the successful construction of modern DES systems in cities with high potential. This could stem as a solution to enhancing capacity development gaps and financing barriers. The BEA II project for instance noted that the project's Working Group should immediately explore and recommend that the Steering Committee and project managers pursue longer-term funding to sustain manage and govern the BEA network at project completion. While such funding schemes often have huge capital commitments, tailoring interventions to include the private sector and making projects responsive to their needs could be a key game changer. In some cases, full-sized GEF proposals could be initiated through the national GEF Focal Points and could include private sector and municipal government co-financers. UNEP, in cooperation with SE4ALL, should also explore the suitability of "bundling" BEA project-inspired efforts for development as Green Climate Fund climate change mitigation proposals. The huge capital requirement for the development of some of these projects, and limited GEF and private sector funding threatens sustainability. Governments should in these cases explore options for entering into PPP arrangements under mutually beneficial terms to help address this challenge.
88. Given the fundamental objective of these projects towards reducing emissions, a critical recommendation that is derived from the East Africa project is that effort should be made to quantify the projected (direct and indirect) emission reductions that will arise from the project. In almost all the project cases, the actual emissions that have been saved from the investments could not be sufficiently estimated. While this relates to the relatively shorter duration of these projects, it also significantly has an impact on telling how much actual change is being made from these investments. UNEP should thus consider either revising project timelines, or creating synergies with other tools and frameworks in each country for tracking actual and not only potential emissions from the various investments being made. Monitoring and verification of energy savings and emission reductions to an appropriate degree of accuracy is a specialized function, particularly when back fitting ex-post without a baseline. If the project chooses to conduct an M&V study, a scope of work for quantifying actual and projected energy savings should be developed and services procured within three months, ensuring quantified savings can be reported within the window period for financial close.
89. Another critical recommendation is to ensure that effective knowledge management systems developed under these projects, and those already developed are made accessible to the wider public to facilitate exchange of knowledge, tools and training materials among others. The Jamaica project for example noted that given the fact that the Build Better Jamaica online knowledge platform was set up as a standalone project website, there is a risk that the project's knowledge platform, with its wealth of resources, will be lost or inaccessible should funding for maintenance and hosting fall away. Ideally this should be integrated into a university or government website where it can continue as part of the overall online facility or web presence, without

requiring a separate, dedicated budget to be maintained and remain live. Similarly, the East Africa project stressed that the entire knowledge base and portfolio of resources for communication, training and awareness created by this project should be made available online. In view of the fact that the effective constitutions and utilisation of knowledge management platforms contributed to key successes in other projects like the BEA I and II project, and the DES project, this recommendation is very key.

90. The need for localisation of action is a critical recommendation observed for project success. In the DES project evaluation report, it was noted that the project team and its partners should ensure that the design of DES interventions and proposition of local action for each city or country should be based on a thorough review of their local-specific needs (context-relevance responses and priorities). This was based on the fact that heating and cooling require different systems. In some countries, assessments of integrative approaches for utilizing waste heat (using vapour absorption technology for cooling and heat exchangers for heating), wherever such an opportunity exists, or where such opportunities can be created (e.g., integrated facility to produce power and cooling) can be primed focus for heating during Rapid Assessments. Similarly in the BEA I project evaluation report, the relevance for localisation of action in terms of priority formulation among others, was reflected in the recommendation that the BEA II project Steering Committee and thematic work groups should re-examine the BEA II project timeframe, scope and expectations for each city's activities. This does not however imply that the overall project objective gets changed. To further complement this, it was recommended that the BEA II project executing agency should consider recruiting more local electric utilities and more nationally-based developers.

V. BEST PRACTICES FOR IMPLEMENTING FUTURE ENERGY EFFICIENCY IN BUILDINGS PROJECTS

1. Introduction

91. This chapter presents recommended best practices for the design and implementation of future Energy Efficiency in Buildings Projects. The recommendations are drawn from bringing together and synthesizing the similarities, the evaluation findings, the lessons learned and the recommendations of the different projects.

2. Recommended Best Practices for Building Energy Efficiency Interventions

92. Best Practice 1: Maximisation of stakeholder representation, particularly at local level.

- It has been observed across the various lessons learnt and recommendations from previous projects that energy efficiency in building sectors have diversified stakeholder at different levels within each of the interventions. Different stakeholders across the private sector, civil society groups, academic and research communities, public regulatory bodies and utilities, non-governmental organisations, multinational organisations and local people among others have different roles to perform in a coordinated manner if energy efficiency actions in the building sector are to succeed. However, while it is generally observed that the representativeness of these stakeholders is higher at the global level across the various projects; local representativeness is often very limited.
- In many project cities, citizens were not adequately engaged (See Table 3 stakeholders' participation and cooperation and responsiveness to human rights and gender equality), and this limits the effectiveness of policy and project action. Private sector engagement needs to transcend beyond global actors to include leveraging local private sectors within specific project communities, and ideally, these stakeholders should be involved right from the design phase of the project. This fosters a sense of ownership over projects and contributes to enhancing overall success and sustainability. At design, future projects should ensure that stakeholder representation is widened, and particularly deepened at the local levels beyond project global partners.

93. Best Practice 2: Revision of project stakeholder analysis presented at CEO approval and re-affirming roles and commitments before commencement of project implementation

- Beyond the identification of stakeholders and their roles within the project designs, anticipated roles and commitments should be thoroughly reviewed

after approval of projects. Where the risk of attrition of any stakeholder is observed, the project can quickly take action to mitigate such risks, and this will reduce the likelihood of project failure due to poor stakeholder risk mitigation at the latter stages of project implementation. It has been observed that in some previous projects, there had been substantive delays (2 to 3 years delay in the Jamaica, Caribbean and East Africa projects – See Table 2) and in many cases, failure to effectively implement project action due to non-fulfilment of anticipated commitments among certain relevant stakeholders. In future project design, all stakeholder commitments that are anticipated at project approval should be critically reviewed, and an effective mitigation plan should be included during the project preparation phase to ensure that such risks are minimised. Revisions and mitigation plans must be inspected and approved by the responsible body before commencement of project action.

94. Best Practice 3: Project activity scheduling in line with anticipated project timeline and budget:

- Lessons from previous projects suggest that in cases where project planning and activity scheduling was poor, such as in the Jamaica, the Caribbean and the East Africa projects, there were significant challenges in project effectiveness and efficiency (See Table 2 and Table 3). Regarding project effectiveness, future energy efficiency projects in buildings should be critically checked in line with the available project budget and planned project duration to ensure that planned actions are realistic, and not over-ambitious. Over-promising in projects when the project durations are often shorter (particularly for medium-size projects) leads to inability of planned project actions to be effectively completed on schedule.
- Efforts should be made to ensure that where projects are to be implemented in different countries, activities in one country are not over-reliant on activities in other countries, inter-dependency also extends to internal project activities, such that delays in one component ultimately delays the entire project. A thorough inspection of the realistic nature of planned actions, and proper mitigation measures against interdependencies should be done during project planning and approval to ensure that the risk of project failure is minimised across future energy efficiency in buildings projects.

95. Best Practice 4: Maximising gender sensitivity and responsiveness of projects to the needs of marginalised and vulnerable people in target project cities

- A common observation across the various projects that have been implemented is the limited sensitivity to the needs of diversified gender groups and needs of vulnerable and indigenous people in project communities. It has clearly been demonstrated across all the projects observed that in many instances, there are no specific targets set for gender

inclusivity, and even when the projects made attempts to collect gender diversified data, there is no basis for evaluating the effectiveness of gender action and strategies proposed at design. Given this, it is recommended that future energy efficiency in building plans have a clear gender plan that specifies targets that can be measured in terms of gender action to track progress along the project. Gender actions should further be extended beyond the collection of gender disaggregated data, to include specific strategies to encourage the participation of women in project leadership, and in project action, both on the project management teams, and in working groups across the cities. Beyond this, specific strategies to ensure that female heads of households are an active part of local action should be proposed at project design, and these should be thoroughly inspected before project approval. Again, energy efficiency action in buildings has significant impact on marginalised and vulnerable groups in project cities. Actions such as retrofits have cost implications, and if care is not taken to ensure that proposed building efficiency actions are sensitive to these needs, project actions can further deepen deprivation needs among these groups. Such sensitivities should be critically examined before future projects are approved.

96. Best Practice 5: Integrated approach to Building Efficiency actions and projects with other climate policy or infrastructure development actions.

- Evidence from previous projects suggests that in many cases, energy efficiency actions in the building sector are integrated with other climate policy or infrastructure development actions. Thus, in future projects, it is recommended that an integrated approach is adopted, such that the project design will be more comprehensive and integrated in overall infrastructure and climate emission reduction programmes of cities or national government. To transcend beyond specifically targeting promoting of accelerated adoption of energy efficiency in buildings implies that appropriate synergies would be created with other sectors, such as wastewater management and renewable energy technology adoption among others. This will ensure that resources use efficiency is maximised, and appropriate measures are taken to enhance the leveraging of existing relationships in cities from on-going city and national government efforts. Such integrated approaches to project scoping will also ensure that appropriate synergies between the various energy efficiency accelerator interventions are maximised. National governments are currently implementing holistic projects in this regard towards the pursuit of their Nationally Determined Contributions, and limited projects are not often given significant commitment action. This can be avoided if future projects are broader and more integrated in scope.

97. Best Practice 6: Future building energy efficiency projects should focus on innovative financing schemes, particularly maximising local resource mobilisation for the implementation of concrete action

- Given that in many cases, technical assistance interventions and capacity building programmes are not sufficient to insure direct economic and environmental effects such as energy or emission savings; future projects should have clear plans for the adoption of innovative finance schemes for the implementation of demonstration and pilot projects.
- It has not been clear over the last decade of implementing energy efficiency actions by UNEP, how much greenhouse gas emissions have been reduced by the series of interventions implemented. Often, the limited finance for concrete action and the over-dwelling on capacity building projects end up with estimations of potential GHG emissions saving, but often very difficult to tell how much emissions have actually been saved and tracked across these past projects. Thus, beyond the secured GEF fundings, project executing agencies should maximise the participation of local banks and private stakeholders in financing pilot projects, so that at latest, actual progress in emission reduction targets can be measured across the cities, and across energy efficiency interventions.

98. Best Practice 7: In future projects, there should be clear tracking of GHG emission reductions. Adequate strategies must be taken to develop simple tracking tools and methods for project cities.

- Beyond provision of finance for the implementation of concrete action, it has been observed that previous projects are largely limited in the tracking of emissions. This is a core GEF requirement, and a critical ambition of UNEP in all its strategic priority areas concerning climate change mitigation. In future projects, there should be clear tracking of emissions. Where local capacities are limited to do this, adequate strategies must be taken to either out-source experts, or to leverage advanced scientific research to develop very simple tracking tools and methods for project cities. This will help them to actually quantify and measure how much progress is being made in reducing emissions from the building sector in cities across the world.

99. Best Practice 8: Knowledge management is a critical component of project success and project sustainability, and should be an active component of all energy efficiency projects

- The duration of most of the projects that seek to accelerate energy efficiency action are often short (medium-sized projects). Given this, the outcome of project activities at the end of project implementation phase are often limited. It is best to ensure that all knowledge products that are generated during the project (materials, tools and other resources) are effectively harnessed, and stored, and made accessible to city official within and outside projects cities, during and beyond the implementation of the project. This will foster independence in progression in learning among city officials and other stakeholders and will make it easy for them to access

these resources on their own to continue to implement action in policy and project development beyond the projects' lifespans. While the development of knowledge materials is critical, the medium of storage is equally very relevant. Platforms for knowledge management should therefore be easily accessible to all relevant project stakeholders, and this can be integrated in communication and dissemination action to maximise efficiency.

100. Best Practice 9: Communication and awareness creation should be a core component of all energy efficiency in building actions, and this should be integrated in all project components

- Notable successes that have been made in the BEA I and II projects and the DES project suggest that there is a very strong relationship between communication and awareness creation, and behaviour change. In this regard, it is recommended that all future energy efficiency in building projects have integrated communication and awareness creation packages throughout the implementation span of the project. Where communication teams are engaged only for a specific duration of the project, effectiveness is limited. Thus, communication teams should be a core component of every project activity and should be engaged throughout the entire project duration to ensure that project actions and gains are effectively disseminated to maximise their impacts and stimulate scale up activities.

101. Best Practice 10: Cities and national governments must set clear policy and project priorities, and these priorities must be realistic within the scope of the project and in line with the project duration, such that fundings can easily be secured for the pursuit of such priorities

- Cases of success observed across cities in energy efficiency action such as in the BEA I and II projects have been largely due to the definition of clear priorities in policy and in demonstration projects. Where policy and project priorities are clear, it is easy to bring on board different stakeholders who could contribute in cash or in kind to the implementation of these targets, and this contributes significantly to project success. In future energy efficiency projects, cities and governments that would be engaged should be encouraged to set very realistic ambitions and choose demonstration projects that are feasible to accelerate actions towards removing the barriers of financing for the pursuit of these ambitions. Ultimately, policy and project priorities are largely a decision of these cities and national governments, and they can be guided better if they are encouraged to set clear ambitions under all projects that would be subsequently rolled out.

VI. CONCLUSION

102. The drive to reducing emissions from the building sector is critical in the pursuit of net zero ambitions and the attainment of Nationally Determined Contributions across countries. Given the building sector's relatively high demand for energy, and the emissions that accrue annually from the sector, the relevance of building energy efficiency projects cannot be over-stated. Previous actions and investments in the sector by UNEP have yielded significant results, but there is room for improvement. The recommendations specified in this portfolio brief are therefore not finite but are a significant consolidation of best practices for future projects which can contribute towards maximising effectiveness, efficiency and sustainability of all UNEP investments in building energy efficiency. Thus, a holistic adoption of these best practices in addition to others not contained in this document, and their integration in future projects can contribute towards accelerating gains in the climate change mitigation actions of UNEP globally.