Terminal Evaluation of the UNEP Project "Increasing Investments in District Energy Systems in Cities – a SE4ALL Energy Efficiency Accelerator" (GEF ID 9320)
(2017-2021)

Evaluation Office of the United Nations Environment Programme

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Increasing Investments in District Energy Systems in Cities – a SE4ALL Energy Efficiency Accelerator)
GEF ID: 9320
(Date 12/22)

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This Terminal Evaluation was prepared for UNEP by Noara Kebir, as an independent consultant, with assistance from two local consultants based in India, Mr Dinesh Aggarwal and Mr. Juned Khan. The evaluation team would like to express their gratitude to all persons met and who contributed to this evaluation, as listed in Annex II.

The evaluation team would further like to thank the project team and in particular, the evaluation manager, Mr Victor Beguerie for his contribution and collaboration throughout the evaluation process. Sincere appreciation is also expressed to the UNEP Climate Mitigation Unit and the Cities Unit, who took time to provide useful material and resources needed for the preparation of this report.

Special acknowledgements to all city officials from China, Chile, Serbia and India who participated in this exercise.

The evaluation consultant(s) hopes that the findings, conclusions and recommendations will contribute to the successful finalisation of the current project, formulation of a next phase and to the continuous improvement of similar projects in other countries and regions.

BRIEF BIOGRAPHY OF PRINCIPAL CONSULTANT

With her background as an energy and process engineer, Ms Kebir has accumulated more than twenty years of relevant interdisciplinary experience along the entire value chain of development cooperation projects and programmes, from project ideation and design, implementation to monitoring and evaluation using a diversity of qualitative and quantitative methods across more than 50 countries. She led the Terminal Evaluation of the UNEP/GEF (GEF Project ID 4139 – Market Transformation for Energy Efficient Lighting in Morocco), which granted her familiarity with the UN working principles, and the application of the Theory of Change methodology and other Terminal Evaluation exercises. Furthermore, she has been leading and involved in several monitoring and evaluation activities of EE and RE products, services, markets, projects, companies and business models (technical and financial due diligence). She is familiar with different approaches of socioeconomic and environmental impact evaluation and regularly requested as a jury member and evaluator of scientific papers, business plan competitions or tenders in the field of RE and EE.

Ms Kebir acquired 25+ years of expertise in energy efficiency standardisation, labelling and certification (household appliances, PV components, etc.). Her participation in the design, implementation, monitoring and evaluation of several energy-efficient building and housing programs in countries such as Armenia, Tadjikistan, Kyrgyzstan and Peru granted her adequate experience in evaluating energy efficiency within the building sector. She has served as an international team leader in a number of the aforementioned projects, and with her educational and professional background, she adequately understands the necessary principles of district energy and can appropriately apply them in assessing the extent to which the goals of projects within this domain are achieved. Ms Kebir was recently a lead consultant to the GIZ on the Nigerian Energy Support Programme.

BRIEF BIOGRAPHY OF LOCAL CONSULTANT IN CHARGE OF KEY INFORMANT INTERVIEWS

Dinesh has a master's in Engineering with overall more than 39 years of professional experience. Out of his overall experience of 39 years, about 20 years is in the area of Climate Change, Energy Efficiency, Renewable Energy, Disaster Risk Reduction and Sustainable Development. His work in the area of energy efficiency and climate change mitigation is in developing countries across the continents (including those in Asia and Africa).

The experience includes managing, implementing, and monitoring energy efficiency policies and programs across different sectors (including the building sector). Since more than last 20 years he is working as an international consultant across different countries. He has carried out mid-term reviews/ terminal evaluations for about 30 GEF supported development projects (including in the energy and building energy sector) in different countries.

His experience and expertise in the building sector includes building energy performance standards, technical aspects of EE in buildings (like insulation, building materials, building orientation), building design, building energy performance simulations (modelling), monitoring and verification of building energy performance, review/evaluations of GEF funded projects for energy efficiency in buildings.

BRIEF BIOGRAPHY OF LOCAL CONSULTANT IN CHARGE OF WEB ANALYTICS

Juned is business-savvy and academically astute with M.Tech. in Energy Management (Gold Medallist) and B.E. in Electrical & Electronics Engineering (First with Distinction), and having well-honed expertise and 16+ years of rich strategic consultancy and advisory experience in the field of Climate change, Carbon Advisory, GHG emissions, ESG, Energy (Renewable energy, Cleantech, and Energy Efficiency), Sustainability, Nature-Based Solutions, Sustainable Finance & Investment, Stakeholder engagement, capacity building, and Institutional strengthening.

He has worked with several clients such as Governments, Corporate, Industries, NGOs, Donors/DFIs/Multilateral/Bilateral International Agencies-the World Bank, UNDP, UNFCCC, UNIDO, UNEP, ADB, AfDB, USAID, FCDO, IFC, GCF, GEF, etc. across diverse sectors in Developing, Developed, Small Island and Land Locked Countries - India, Afghanistan, Bangladesh, Bhutan, Nepal, Pakistan, Philippines, Myanmar, Cambodia, Vietnam, Malaysia, Indonesia, Fiji, Nauru, Solomon Islands, Marshall Islands, Vanuatu, Uzbekistan, Grande Comoros, Ghana, Kenya, Sudan, Rwanda, Tanzania, Uganda, Honduras, Angola, Democratic republic of Congo, Guinea Bissau, Algeria, Jordan, Tunisia, Turkey, Kosovo, Canada, UK, UAE, KSA, USA, Switzerland, and Germany.

Evaluation team
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ABOUT THE EVALUATION

Joint Evaluation: No

Report Language(s): English

Evaluation Type: Terminal Evaluation

Brief Description: This report is a Terminal Evaluation of a UNEP "Increasing Investments in District Energy Systems in Cities – a SE4ALL Energy Efficiency Accelerator" (GEF ID 9320) project implemented between 2017 and 2021.The project's overall goal in the reconstructed Theory of Change was to reduce GHG emissions and local air pollution due to increased Energy Efficiency and Renewable Energy. The evaluation sought to assess project performance (in terms of relevance, effectiveness and efficiency), and determine outcomes and impacts (actual and potential) stemming from the project, including their sustainability. The evaluation has two primary purposes: (i) to provide evidence of results to meet accountability requirements, and (ii) to promote learning, feedback, and knowledge sharing through results and lessons learned among UNEP, and the relevant agencies of the project participating countries.

Key words: District Energy; United Nations Environment Programme; Building Codes; Energy Efficiency; Renewable Energy; Modern District Energy Systems; Terminal Evaluation; Climate Change; Greenhouse Gases; Emission Reduction; UNEP GEF; Climate Change; GEF Project

Primary data collection period:

April 2022- August 2022

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LIST OF ACRONYMS

C2E2	Copenhagen Centre on Energy Efficiency
CCM	Climate Change Mitigation
CHP	Combined Heat and Power
CTCN	Climate Technology Centre and Network (CTCN)
DES	District Energy Systems
DPWT	Deployable Project Working Team
DTU	Technical University of Denmark
EE	Energy efficiency
EOI	Expression of Interest
GEF	Global Environment Facility
GHG	Greenhouse gas
IA	Implementing Agency
IEA	International Energy Agency
IGO	Inter-Governmental Organisation
LIA	Likelihood of impact assessment
M&E	Monitoring and Evaluation
MTE	Mid Term Evaluation
MTS	Medium Term Strategy
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
PM	Project Manager
PMU	Project Management Unit
PoW	Programme of Work
PPP	Public Private Partnership
PRC	Project Review Committee (internal UNEP committee)
PRF	Project Results Framework
ProDoc	Project Document
RE	Renewable energy
SDG	Sustainable Development Goals
SMART	Specific, Measurable, Achievable, Relevant and Time-bound
TE	Terminal Evaluation
ToC	Theory of Change
ToR	Terms of Reference
UNEP	United Nations Environment Programme

PROJECT IDENTIFICATION

Table 1: Project Identification Table

GEF Project ID:	9320	**SB-007855**	
Implementing Agency:	UNEP, Economy Division, Energy & Climate Branch, Climate Mitigation Unit	**Executing Agency:**	UNEP, Economy Division, Energy & Climate Branch, Cities Unit
Relevant SDG(s) and indicator(s):	SDG 7- Ensure access to affordable, reliable, sustainable and modern energy for all. • **Target 7.1:** By 2030, ensure universal access to affordable, reliable and modern energy services • **Target 7.2:** By 2030, increase substantially the share of renewable energy in the global energy mix • **Target 7.3:** By 2030, double the global rate of improvement in energy efficiency SDG 11 - Make cities and human settlements inclusive, safe, resilient and sustainable • **Target 11.1:** By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums • **Target 11.6:** By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management • **Target 11.a:** Support positive economic, social and environmental links between urban, peri-urban and rural areas by strengthening national and regional development planning SDG 13 - Take urgent action to combat climate change and its impacts • **Target 13.2:** Integrate climate change measures into national policies, strategies and planning		
GEF Core Indicator Targets (identify these for projects approved prior to GEF-7)	1. Core Indicator 6.2 - Emissions avoided Outside AFOLU **End of Project Target**: Direct: 2,523,140 tCO2eq Indirect: 823,050 tCO2eq (20 years after project completion) 2. Core Indicator 6.3 - Energy Saved **End of Project Target**: 18,057,350,000 MJ (20 years after project completion)		
Sub-programme:	Climate Change	**Expected Accomplishment(s):**	PoW 2018-2019 b) Countries increasingly adopt and/or implement low greenhouse gas emission development strategies and invest in clean technologies
UNEP approval date:	May 3, 2017	**Programme of Work Output(s):**	PoW 2018-2019, Sub-programme 1 Climate Change PoW 2020-2021, Sub-programme 1 Climate Change
GEF approval date:	March 1, 2017	**Project type:**	Medium Size Project

GEF Operational Programme #:	GEF-6	**Focal Area(s):**	Climate Change Mitigation	
		GEF Strategic Priority:	CCM-1 Program 2: Develop and demonstrate innovative policy packages and market initiatives to foster a new range of mitigation actions	
***Expected* start date:**	May 1, 2017	**Actual start date:**	May 3, 2017	
***Planned* operational completion date:**	June 30, 2020	**Actual operational completion date:**	May 31, 2021	
***Planned* project budget at approval:**	USD 11,711,774	**Actual total expenditures reported as of June 30, 2021:**	USD 11,170,344	
GEF grant allocation:	USD 2,000,000	**GEF grant expenditures reported as of 31 December 2021:**	USD 1,942,371	
Project Preparation Grant - GEF financing:	USD 50,000	**Project Preparation Grant - co-financing:**	N/A	
***Expected* Medium-Size Project co-financing:**	USD 9,711,774	**Secured Medium-Size Project co-financing (as at June 30, 2021):**	USD 9,374,030[1]	
Date of first disbursement:	May 16, 2017	**Planned date of financial closure:**	May 31, 2022	
No. of formal project revisions:	4	**Date of last approved project revision:**	May 25, 2021	
No. of Steering Committee meetings:	3	**Date of last/next Steering Committee meeting:**	Last: July 13, 2021	Next: N/A
Mid-term Review/ Evaluation *(planned date):*	N/A	**Mid-term Review/ Evaluation (actual date):**	N/A	
Terminal Evaluation *(planned date):*	December 31, 2020	**Terminal Evaluation (actual date):**	January 2022 – October 2022	
Coverage - Country(ies):	**Pilot countries:** Chile, China, India, Serbia **Replication countries:** Argentina, Bosnia and Herzegovina, Colombia, Egypt, Malaysia, Mongolia, Morocco,	**Coverage - Region(s):**	Asia Pacific, Europe, Latin America and Caribbean, Africa	

[1] In addition to the co-finance secured, the project has managed to leverage a total of USD 2,914,000 of additional co-finance from new partners that had not committed contributions at the time of CEO endorsement (refer to the 2021 Co-finance Report).

	Russia, Tunisia, Ukraine		
Dates of previous project phases:	N/A	**Status of future project phases:**	N/A

EXECUTIVE SUMMARY

Project background

1. Global heating, cooling and hot water represent about 60% of energy demand in buildings. In the pursuit of global climate change adaptation and mitigation targets, it is critical to invest in strategies that will reduce the demand for heating and cooling. Modern District Energy Systems (DES) have been described as having the potential of reducing such primary energy consumption by up to 50% due to the numerous benefits that accompany their adoption, including their possible integration into municipal systems such as power, sanitation, sewage treatment, transport and waste. However, despite the awareness of the potential benefits of modern DES, there exist significant barriers in terms of local institutional capacity, holistic planning policies and harmonised incentives and regulations, data, finance and awareness among others.
2. Given this, the GEF ID 9320 project, "*Increasing Investments in District Energy Systems in Cities- a SE4All Energy Efficiency Accelerator*" was implemented by the United Nations Environment Programme (UNEP) to accelerate the scale-up of modern district energy systems globally. The project fell within the scope of the DES in Cities Initiative - a global initiative launched by the United Nations (UN) in 2014 as one of six energy efficiency accelerators under the Sustainable Energy of All (SEforAll). The UNEP, Economy Division, Energy & Climate Branch, Climate Mitigation Unit served as the Implementing Agency (IA), while the UNEP, Economy Division, Energy & Climate Branch, Cities Unit served as the Executing Agency (EA) for The Project. At CEO approval, The Project received a GEF grant allocation of 2,000,000 in cash, 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.
3. 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. 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 in 10 countries (Argentina, Bosnia and Herzegovina, Colombia, Egypt, Malaysia, Mongolia, Morocco, Russia, Tunisia, and Ukraine). At city-level, four cities were selected for pilot and demonstration work ("deep-dive"), with the city experiences successfully replicated in other cities within the replication countries. The city-level experiences were thus scaled-up nationally and regionally through awareness-raising, regional capacity building and wider support to multiple countries.

This evaluation

4. This Terminal Evaluation (TE) was initiated six months after the completion of project. The evaluation seeks to provide useful lessons on the project experience to the GEF, UNEP as both the Implementing Agency and Executing Agency, project country and city partners and all relevant stakeholders. The evaluation findings are intended to meet the needs of UNEP Climate Change Mitigation Unit, the UNEP Cities Unit, the project's global partners, public and private sectors in light touch and deep dive cities (both in pilot and replication countries), the academic community within the field of Energy Efficiency and any other relevant stakeholder.

Key findings

5. The evaluation found that the project attained all of its planned outputs under the four components, and evidence on these were duly in place. These outputs were achieved within the planned budget. A high commitment and country-ownership of the project was observed across the project stakeholders in China, Chile, Serbia and India. Some key findings on the project performance are noted below:

- District energy as a concept is still relatively new in India and Chile while district heating as a concept and business model is well established in China and Serbia. However, the DES has been successful in all the project cities when assessed based on planned outputs. At project exit, 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 using the medium-size GEF grant secured.
- The stakeholders that were involved in the design and implementation demonstrated a high level of acceptance for The Project. A close collaboration between the EA and the ministries of environment and energy in the pilot and replication countries, as well as the city and municipal governments, facilitated a realisation of planned outputs for the Project. However, the involvement of indigenous and local people in the project was limited in the various cities given the nature of the project design and the project's general focus on delivery of city-based support.
- The modern district energy systems model has been demonstrated as viable in more deep-dive cities than four deep-dive cities originally targeted at design (Rajkot, Hyderabad Pharmacity, Thane and Amaravati in India; Coyhaique and Temuco in Chile, Belgrade in Serbia and Xi'an Chanba in China) and integrated into city-wide plans in all the deep-dive cities. Pre-feasibility plans for investment have been prepared for the viable systems based on the assessments.
- The city-wide deep dive assessments enabled the identification of pilot demonstration projects in each city, and expressions of interest in investing in a number of these projects are underway. These cities have commenced works towards the development of planned district heating and district cooling systems, with advanced cities like Serbia going beyond planning for the construction of new projects to include the interconnection of existing systems and retrofitting of old systems.
- Monitoring and Verification Frameworks (including methodology of estimating impacts) have been developed for cities, but many city officials have not substantively demonstrated the ability to utilise these frameworks.
- Based on the results observed, The Project has created substantial momentum that resulted in the incorporation of District Energy Systems in national plans and policies across many countries and cities. The various Technical Assistance packages provided with the medium-sized GEF budget allocation of USD 2,000,000.00 to governments across 40 cities in 14 countries thus affirms the projects strong performance in replication of gains in other countries. The constitution of effective knowledge management systems by the Project team, which are hosted virtually on the project website, as well as other news items and publications towards awareness creation on modern District Energy Systems are geared towards facilitating replication. The global political desire by governments of various countries to mitigate climate change through accelerated investment in energy efficient and renewable energy technologies contributes towards increasing the likelihood of replication. Despite the project's significant

achievements, concerns still remain in terms of financing of DES projects, given their huge capital requirements.

Conclusions

6. Based on the findings from this evaluation, the project has been both effective and efficient when planned and actual action are compared in the pilot and replication countries. Considering the size of GEF funding secured for the project and project relatively short project duration, vis-à-vis the gains made in terms of contribution of the Project to the integration of Modern District Energy Systems policies and plans into national and city plans across 14 different countries, the project can be conclusively described as one that has been very successful.
7. The Project is thus a strong enabler to the levels of greenhouse gas emissions, and particularly in accelerating national and global efforts towards the attainment of Nationally Determined Contributions. Key achievements of the project were largely contributed to by the strong support from its partners, and the commitment of a wide diversity of national and global stakeholders towards the provision of cash and in-kind support. This implies that an increased investment and continuous partner support across national and city governments, profit and non-profit organisations, civil society groups, inter-governmental organisations, academic and research institutions and other relevant stakeholders into the deployment of modern DES can fast-track global progress towards Net-Zero and in keeping global temperatures under 1.5^{O}C.
8. A significant number of assumptions towards the realisation of project outcomes and impact are in place towards replicating of the project's experience in the 4 pilot countries to several other countries, with a significant amount of progress already made in several cities across the 10 replication countries. Thus, the project received an overall rating of **Highly Satisfactory** (See Table 10)".
9. However, there are some areas that the project could improve upon:
    - Participation of local stakeholders such as city residents who could in one way or the other be affected by the further development of DES projects identified in the various pilot cities and other marginalised and vulnerable groups was limited and often took the form of "passive reception of information", partly because they were not identified as priority stakeholders in the project design with no planned strategy for active engagement and eliciting of their views and opinions on Modern District Energy Systems.
    - The project's provisions for gender sensitivity were insufficient, and it was difficult to substantiate the gender-disaggregated impact of project outputs.
    - The most significant gap in project output relates to the ability of city officials to demonstrate understanding and capacity to develop and utilise Monitoring, Reporting and Verification frameworks for their local cities, thus threatening the sustainability of tracking emissions.

Lessons Learned

10. **Lesson Learned 1:** Comprehensive participation of partners and ownership of the project among local utilities is key to successful implementation of DES interventions
11. **Lesson Learned 2:** Private sector-led participation is key to accelerating the adoption of modern DES

12. **Lesson Learned 3**: Impact monitoring is critical, and an integrative approach to MRV frameworks with enhanced localising DES initiatives.
13. **Lesson Learned 4:** Planning officers and utilities are key to promoting the adoption of modern DES
14. **Lesson Learned 5:** Identification of local champions (institutions, organizations and/or local policymakers) that will advocate for district energy in the cities and countries is a first step in the project implementation and an essential pathway to drive change in the country
15. **Lesson Learned 6:** Stakeholders' coordination is a key element in the success of the project
16. **Lesson Learned 7:** Flexibility is important for the success of the project
17. **Lesson Learned 8:** Anticipation of needs is critical for a successful project implementation
18. **Lesson Learned 9:** Efforts on capacity building mainly for local government to allow the uptake of DES projects are crucial
19. **Lesson Learned 11:** Appreciation of stakeholders' engagement is critical to sustaining their interest in the project
20. **Lesson Learned 11:** Importance of building new partnerships
21. **Lesson Learned 12:** Importance of on the ground presence

Recommendations

22. **Recommendation 1:** The Executing Agency should adopt follow-up communication with city officials in pilot and replication cities to ensure that the scope and depth of active stakeholder participation during active implementation of selected project action for DES be widened beyond the DES team, global partners and city officials at municipal levels to enhance active inclusion of local stakeholders such as potential users of modern DES (city residents), marginalised and vulnerable groups.
23. **Recommendation 2:** 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 demonstrated high potential, and for the further development of each selected pilot projects into concrete projects for better demonstration of project results
24. **Recommendation 3:** The project team and its partners should encourage national governments and local city officials to ensure that the design of DES interventions and proposition of local action for each city or country based on lessons learnt from this project should be based on a thorough review of their local-specific needs (context-relevance responses and priorities)
25. **Recommendation 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.
26. **Recommendation 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 district energy

systems project are enhanced, particularly during the formulation of policies and the selection of District Energy projects in the various cities.

27. **Recommendation 6:** The project team should use follow-up conversations to encourage project partners in the pilot and replication cities, particularly city officials in charge of policy formulation and project identification, and local investors into the construction of modern DES based on the list of pilot projects identified to incorporate the needs and views of marginalised and under-represented groups in cities, such as the urban poor into further development of selected pilot DES projects

I. INTRODUCTION

28. This document is the final report of the Terminal Evaluation of the UN Environment Programme/Global Environment Facility (GEF) global project, "Increasing Investments in District Energy Systems in Cities- a SE4All Energy Efficiency Accelerator" (hereafter referred to as "The Project"). The Project was implemented under the District Energy in Cities Initiative, which is one of the six energy efficiency accelerator interventions of the Sustainable Energy for All (SEforALL) Global Energy Efficiency Accelerator Platform[2] launched by the UN in 2014, with support from the Global Environment Facility. The Project, which was global in coverage, sought to accelerate the uptake of modern district energy systems. The project was implemented by the UNEP, Economy Division, Energy & Climate Branch, Climate Change Mitigation Unit, located in Nairobi, Kenya, and hosted within the Cities Unit of the Energy and Climate Branch of the UNEP located in Paris, France as the Executing Agency (EA).

29. The EA coordinated the project implementation globally through three expert task forces: a. communication and outreach; b. capacity building; and c. technical task forces. A Project Advisory Committee made up of partners to the DES initiative at the global level provided guidance and approval of the overall strategy of the DES, regional and country focus, and the DES workplan. Internal progress and results along the course of implementation were facilitated by a Steering Committee, which was made up of UNEP (Economy Division and Climate Change Mitigation Unit), a representative from each "deep-dive" city and a nominated representative of the national project steering committees. A project governance structure was formed within each project country and city to facilitate the implementation of in-country activities.

30. The project was funded by the GEF and contributions from project partners (Danfoss, Copenhagen Centre for Energy Efficiency or ENGIE for instance). At CEO approval, a GEF grant allocation of USD 2,000,000 in cash was allocated for the project, 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.

31. Implemented from May 2017 to May 2021, the Project selected the four following countries as pilot countries: Chile, China, India and Serbia. In addition, Argentina, Bosnia and Herzegovina, Colombia, Egypt, Malaysia, Mongolia, Morocco, Russia, Tunisia and Ukraine were selected as replication countries for The Project.

32. The Project aligned with the climate change expected outcomes of the UNEP's Medium-Term Strategy (MTS) 2018-2021: particularly the Expected Outcome 2 of the "Climate Change" priority area: countries increasingly adopt and/or implement low greenhouse gas emission development strategies and invest in clean technologies. The project is further consistent with the UNEP proposed Programme of Work, Sub-Programme 1: Climate Change, for the period 2018-2019.

33. The project goals were consistent with regional GHG emission reduction priorities in the target countries reflected through their NDC targets and were of relevance

[2] The Sustainable Energy for All (SE4All) Global Energy Efficiency Accelerator Platform seeks to promote public-private partnerships to scale up energy efficiency policies, action and investment towards doubling the global rate of improvement in energy efficiency by 2030. The six interventions are: Building Efficiency Accelerator, Appliances and Equipment Accelerator, District Energy in Cities Initiative (under which The Project was implemented), Global Fuel Economy Initiative, Industrial Energy Accelerator and Efficient Lighting Accelerator.

to governments' climate action priorities in the implementing countries at the time of its implementation, as well as with the GEF funding priority for Climate Change Mitigation. In India, for example, the project aligned with the Atal Mission for Rejuvenation and Urban Transformation (AMRUT) under the Smart Cities Mission, which sought to build a clean and sustainable environment through climate-resilient urban infrastructure.

34. No Mid-Term performance assessment was triggered by the Task Manager during the implementation of this project.

35. This Terminal Evaluation is conducted in line with the UNEP Evaluation Policy[3] and the UNEP Programme Manual[4]. This Terminal Evaluation is thus conducted upon completion of The Project with two primary purposes: to provide evidence of results to meet accountability requirements, and to promote operational improvement, learning and knowledge sharing through results and lessons learned. The evaluation findings contained in this report thus targets the needs of the UNEP Climate Change Mitigation Unit, the UNEP Cities Unit, the project's global partners, public and private sectors in pilot and replication countries, the academic community within the field of EE and any other relevant stakeholder.

[3] https://www.unenvironment.org/about-un-environment/evaluation-office/policies-and-strategies
[4] https://wecollaborate.unep.org/

II. EVALUATION METHODS

A. Evaluation Approach and Methods

36. The Principal Evaluator and two support consultants was provided with a Terms of Reference (ToR) that guided the entire evaluation process (see Annex IX). The evaluation is thus consistent with the UNEP Evaluation Policy, the UNEP Programme Manual and the Guidelines for GEF Agencies in Conducting Terminal Evaluations. This TE has been carried out using a set of criteria that are grouped into nine categories: (A) Strategic Relevance; (B) Quality of Project Design; (C) Nature of External Context; (D) Effectiveness, which comprises assessments of the availability of outputs, achievement of outcomes and likelihood of impact; (E) Financial Management; (F) Efficiency; (G) Monitoring and Reporting; (H) Sustainability; and (I) Factors Affecting Project Performance. These criteria were rated on a six-point scale[5]. The consultant deemed the aforementioned criteria as comprehensive, hence did not include any other evaluation criteria. The ratings against each criterion are "weighted" to derive the Overall Project Performance Rating.

37. Consistent with the ToR, a set of Key Strategic Questions indicated in the Evaluation Framework is included in the Evaluation. These are questions that were deemed to be of interest to UNEP and to which the project is believed to be able to make a substantive contribution. Findings to these questions are appropriately presented in the Evaluation Findings.

38. Answers to the set of questions that are required for uploading in the GEF Portal are contained under the relevant evaluation criteria in the Evaluation Findings section of this report, and a summary of the findings is contained in Annex VII of the report. The key findings of relevance for this purpose are:

    - The performance at the project's completion against Core Indicator Targets
    - The progress, challenges, and outcomes regarding engagement of stakeholders in the project/program as evolved from the time of the MTR
    - The gender-responsive measures and gender result areas
    - Progress made in the implementation of the management measures against the Safeguards Plan submitted at CEO Approval
    - Challenges and outcomes regarding the project's completed Knowledge Management Approach

39. The evaluation was based on the principles of participation and shared learning between key stakeholders from the project teams, project beneficiaries and other relevant partners. Core to the evaluation is the utilisation of the Theory of Change (ToC) to identify expected project results, the causal pathways to each anticipated change and the drivers and assumptions to reaching each desired state of change. Even though a Theory of Change was presented in the Project Document, the Evaluator amended this ToC into a Reconstructed Theory of Change (RToC) at the inception of this Terminal Evaluation in line with the UNEP Evaluation Office's definitions of the following key concepts: project outputs, project outcomes, intermediate states, impact, assumptions and drivers.

[5] The rating scale used Is 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) downwards to Highly Unlikely (HU) and Nature of External Context is rated from Highly Favourable (HF) to Highly Unfavourable (HU).

40. The Evaluation Manager (EM) at UNEP Evaluation Office provided oversight responsibility over the entire Terminal Evaluation process. The reviews, recommendations and feedback from the EM ensured adherence to UNEP standards for Terminal Evaluations and also facilitated coherence within all communications between the Principal Evaluator and other project stakeholders, particularly the project team throughout the course of the evaluation.

B. Data Collection Process

41. The TE was conducted using evidence from relevant primary and secondary sources. Secondary evidence was gathered by the evaluator through a review of key project documents and web analysis, while primary evidence was gathered through interviews and focus group discussions with relevant project stakeholders. All qualitative evidence that was gathered was analysed in themes based on the evaluation criteria provided by UNEP for this assignment. Where necessary, quantitative analyses were limited to simple descriptive statistics using ratios and percentages.

42. Given the global focus of the project, primary data was collected through a combination of virtual (online) and physical engagements with participants in Serbia, China, Chile, and India. To enhance the understanding of actual project implementation processes and results, in-depth data has been collected in India[6] through two (2) local consultants who were engaged over a period of three (3) months- April, May, and June 2022. The Evaluator provided the local consultants with the necessary data collection tools (interview guides, survey questionnaire, and web analysis guide), and closely monitored the data collection process.

43. The Indian In-country Support Consultant responsible for Key Informant Interviews was responsible for conducting interviews with the relevant stakeholders identified in the sampling strategy through face-to-face and internet-call based media, in line with relevant evaluation questions developed from the Evaluation Framework. The second Indian In-country Support Consultant (Analyst) was responsible for all web analytics towards establishing evidence on the project's performance outside the scope of India, particularly relating to the extent of disseminating of The Project's activities and status of communication and dissemination materials. The analyst was further responsible for the design and implementation of online surveys with The Project's global stakeholders, the Implementing and Executing Agencies, and The Project's global partners. All data collection activities of the local consultants were done online.

44. Each local consultant was given the relevant project documents to enhance their understanding of the project context, planned project results and reported results based on the project final report. The Principal Evaluator held an online pre-data collection discussion session with the local consultants to review all the data collection tools. Each local consultant was briefed on the expectations and desired approach for the implementation of each data collection method. This ensured that the Principal Evaluator and local consultants had a common understanding of the purpose of the evaluation, and commonly applied a participatory learning approach in the data collection process.

[6] India was chosen for in-depth data collection during the Terminal Evaluation because of its high involvement in The Project (7 cities involved including 1 "deep-dive" city) as well as its participation in the parallel intervention, the GEF ID 9947 "The SEforALL Building Efficiency Accelerator (BEA): Expanding Local Action and Driving National Change" project (2 cities including 1 "deep-dive" city).

Key Informant Interviews (KIIs):

45. The Evaluation Team, through the local consultant in charge of Key informant interviews, engaged city officials from both deep-dive and light-touch cities, government agencies, non-governmental organisations and civil society groups, and private sector actors among others in India, in semi-structured interviews. The interactions with these stakeholders who were selected based on their knowledge and involvement in the project facilitated an understanding of the project results, the reconstruction of the Theory of Change, and lessons learnt from the project.

46. The interviews were guided with a guide that contained a list of questions developed from the Evaluation framework in line with relevant themes for each interviewee. The discussions were recorded by the local consultant, who organised the responses in line with the criteria for evaluation. Responses were then forwarded to the Principal Evaluator for review. Follow-up questions were sent to the interviewees after the review by the Principal Evaluator

47. In total, only 6 KIIs were conducted in India (5 men, 1 women) across project partners or beneficiaries in India (see detail in Annex II). In addition to the various interviews, the Principal Evaluator engaged the EA and the IA closely through series of communication through e-mails on data requests, and clarification of relevant issues throughout the evaluation process.

Focus Group Discussions (FGD):

48. The Principal Evaluator organised two (2) virtual focus group discussions for city officials and Key National Counterparts from the remaining project countries: Serbia, China, and Chile separately. The discussions were to understand project performance in their countries, similarities and differences in experience across The Project, and the lessons learnt from each context. Each FGD lasted for about 60 minutes for effectiveness and efficiency. Invitations to the FGD were sent to the various city officials and key national counterparts through the EA, but a number of officials did not acknowledge receipt of the emails, nor participate in the discussion through the links sent. This made it difficult to estimate the total number of successful invitations received by officials in non-pilot countries. In total, 10 people (8M/2F) from the 4 different pilot countries participated in the 2 virtual FGD.

49. To facilitate the discussions, the consultant kept the discussion points at 9 main areas of evaluation interest based on the nine-point evaluation criteria proposed by UNEP. Additional discussion points were developed based on the Key Strategic Questions proposed by UNEP Evaluation Office (see details in the Evaluation Framework in Annex VIII). Probing questions were used by the local consultant responsible for Key Informant Interviews in India to enable interviewees to throw more light on critical issues emanating from the submissions and to also sustain the interest of participants in the discussions. The global focus group discussions with Key National Counterparts which were led by the Principal Evaluator, were also based on relevant questions developed using the Evaluation Framework as a guide and based on reported project performance in the various project documents received, including the final project report.

Desk Reviews:

50. Available project documents (the full list of reviewed documents is presented in Annex III) were critically reviewed and evaluated by the Principal Evaluator to assess project background and design, progress along the course of

implementation, project financing, project results, project communication and reporting among others. This was complemented by a thorough web review of different websites to track the global outreach and dissemination of The Project[7], the catalytic effect of the project, and pointers for sustainability based on the attraction of partners and other stakeholders. The local consultant responsible for web analysis assisted the Principal Evaluator in this regard.

Online Surveys:

51. The Global Partners of The Project, the Implementing Agency (UNEP Climate Mitigation Unit), and the Executing Agency (UNEP Cities Unit) were surveyed using a set of semi-structures instruments to evaluate their experience with the project, and lessons learnt. The online surveys for these stakeholders were conducted from 13th June to 1st July 2022 and were in the form of semi-structured questions. It must be noted that even though the survey targeted these respective institutions, only a relevant representative from the institutions with adequate knowledge on the project was required to respond to the questions, in consultation with the entire team. Emphasis on the data was not on quantitative evidence across respondents, but rather on qualitative insights and views about the project performance across relevant aspects. In many cases, only the head of the institution (IA, EA and Project's Global Partners) were designated to provide responses to the survey items. Importantly, engagements with the EA and IA during the evaluation was facilitated by regular emails on specific data requests.

52. The validity of evidence obtained from the primary data was triangulated through secondary data sources such as magazines, conference reports, and websites of city and municipal administrations, relevant institutions and project partners. All instruments used for the online survey, Focus Group Discussions and Key Informant Interviews were first piloted in India and reviewed for reliability.

C. Ethics and Human Rights Issues

53. The Evaluators upheld fundamental ethical principles and applied the tenets of the Human Rights-Based Approach (HRBA) in engaging all stakeholders throughout the evaluation, particularly during the data collection and reporting processes[8]. In all cases, the Evaluator used emails to precede data collection, such that the intent of the data collection was explained to participants in line with the objectives of this evaluation. Participants who were not willing to participate in the exercises had the liberty to indicate their non-willingness. Respondents were thus made aware that participation in the exercises is voluntary, and their submissions reported with a high degree of anonymity.

54. All data collection tools were designed using a gender-neutral language. During the virtual Focus Group Discussions, all participants were given equal chances of

[7] The various websites visited were searched using a combination of relevant key words. Some key websites visited include the following among others:

- https://www.ctc-n.org/news/ctcn-serbia-identified-technologies-modernize-district-heating-system-belgrade
- https://www.business-standard.com/article/news-ani/des-a-viable-solution-to-india-s-ever-growing-energy-demand-118120100548_1.html
- https://unepccc.org/two-awards-for-chinese-district-energy-projects/
- http://www.districtenergyinitiative.org.

[8] The HRBA requires human rights principles (universality, indivisibility, equality and non-discrimination, participation, accountability) to guide development action, and focuses on developing the capacities of both 'duty-bearers' to meet their obligations, and 'rights-holders' to claim their rights. See https://unsdg.un.org/resources/human-rights-based-approach-development-cooperation-towards-common-understanding-among-un to access a description document on the HRBA

sharing their ideas and opinion on the issues. The Evaluator did this by ensuring that on each issue being discussed, every participant shared an opinion, with a conscious guide against domination by outspoken participants using intervening (re-directing) and probing questions where necessary. In cases where participants did not wish to share an opinion on an issue, the Evaluator explained that they were at liberty to do so with no consequences. Responses obtained from interviews, FGDs and online surveys quoted in this report are reported with pseudo-identifiers.

D. Gender representativeness and inclusion:

55. The Principal Evaluator in the sampling stage of the evaluation process ensured that participant selection created room for adequate representation of both men and women. Where possible, the Evaluator used the contact list that was provided by the project team to ensure that City officials, representatives of project partners, representatives from Key National Counterparts and other relevant stakeholders who were consulted included men and women, based on the gender-disaggregated proportions observed.

56. The project team had a balanced representation of both men and women. The Principal Evaluator factored this in the selection of respondents through the data collection process to achieve a balance. The actual distribution of participants selected for the data collection process, as well as the response rate after contacting each stakeholder category, is presented in Table 2 below.

Table 2: Sampling Strategy

Stakeholder Type	Description/Name	No. People involved (M/F)		No. People contacted (M/F)	No. People consulted (M/F)	Way of consultation	Response %
Project team	Implementing agency	8 (6F, 2M)		4 (3F, 1M)	4 (3F, 1M)	Online survey (And regular email communication)	100
	Executing agency	6 (4F, 2M)		4(3F, 1M)	4(3F, 1M)	Online survey (And regular email communication)	100
Stakeholder Type	**Description/Name**	**No. entities involved**	**No. entities/ cities contacted**	**No. People contacted (M/F)**	**No. People consulted (M/F)**	**Way of consultation**	**Response %**
Global Partners		26	8[9]	(2F, 6F)	(2F, 6F)	Online survey	100
Deep-dive cities	India	2 Cities (Rajkot and Thane)	2	16 (8F, 8M)	1	KIIs	6.25
	Serbia	1 City (Belgrade)	1	8 (4F, 4M)	0	Virtual FGD	0
	China	1 City (Chanba Ecological Area)	1	8 (4F, 4M)	0	Virtual FGD	0
	Chile	1 City (Temuco)	1	8 (4F, 4M)	0	Virtual FGD	0
Key National Counterparts [10]	India	NA		7 (1F, 6M)	2 (1F, 1M)	KIIs	29
	Serbia	NA		2 (1F, 1M)	1 (0F, 1M)	Virtual FGD	50
	China	NA		4 (1F, 3M)	4 (1F, 3M)	Virtual FGD	100
	Chile	NA		5 (1F, 4M)	5 (1F, 4M)	Virtual FGD	100
Light-touch cities		32	9[11]	18 (9F, 9M) 2/LT city	1 (0F, 1M)	KIIs and Virtual FGD	5.6
Other UNEP offices		5		5 (3F, 2M)	1	KII	20

[9] The 8 partners were selected based on the following: 1. Role in the project and absence of duplication, 2. Nature of involvement (at least, partner was directly involved in at least 2 major project components. The following partners were selected: Engie, Tabreed, International District Energy Agency, Carbon Trust, Thermax, ISHRAE, C40 South Asia, Director, and EuroHeat and Power

[10] Key National Counterparts were selected based on their roles in the project implementation. Efforts were made to prevent duplication, and also to ensure that participants with portfolios already represented in other sample categories were only included if necessary. The number of counterparts were obtained from a contact list that was made available to the Principal Evaluator by the Executing Agency through the Evaluation Manager.

[11] A total of 37 DES cities was obtained from further correspondence with project Implementing Agency at evaluation (see Table 6 for names of all deep dive and light touch cities). The list contained 5 Deep Dive cities, and 32 Light Touch cities. The 9 selected light touch cities selected were based on geographic representativeness, the nature of progress concerning DES action, and the availability of contacts of key stakeholders. The Cities are: Coyhaique (Chile), Independencia (Chile), Renca (Chile), Santiago (Chile), Xian (China), Zhengzhou (China), Bhopal (India), Coimbatore (India), and Pune (India).

E. Evaluation Limitations and Mitigation Strategy

57. The project was limited in its inclusion of indigenous people's views and gender issues. It was thus difficult for the evaluator to establish contact with indigenous people in each project city to the inclusion of their views and perceptions about District Energy Systems. To mitigate this, the principal evaluator based the evaluation findings on the sound judgement through triangulation of findings from city officials, including the use of internet searches to vary the existence of key evidence.

58. The low response rates and participation of relevant stakeholders in the KIIs and FGD, particularly in India was a significant limitation to the data coverage in this evaluation. It was very difficult to engage relevant stakeholders with India due to high turnover since the COVID-19 pandemic. It is important to note, that the Evaluation was to be based on an in-depth collection and analysis of data from India as per the Terms of Reference under which the Evaluator was contracted. However, it was during the data collection phase that the Evaluation Team encountered significant difficulties in reaching out to and receiving responses from relevant stakeholders. This limited the extent to which in-depth evidence could be presented on the project in the country that was supposed to be the focal point of this exercise. To mitigate this, the evaluator extended the scope of participation for the Global Focus Group discussions which were held virtually with city officials from other countries (China, Serbia and Chile).

59. Due to the global nature of the scope of the Project, it was difficult to verify the ground presence of key changes in policies and/or local projects that were implemented in the target and replication cities as a result of the Project. This was further compounded by the limited responsiveness of city officials and relevant project partners during the data collection process to verify a number of project results. To mitigate this, the evaluation team, through the local consultant responsible for Web analytics, dwelt on information from relevant websites to verify whether some projects and policy changes reported in the project's Final report were in place in the various cities.

III. THE PROJECT

A. Context

60. The Project under evaluation is implemented under the District Energy in Cities (DES) initiative- a global energy efficiency accelerator which aims to double the rate of energy efficiency improvements for heating and cooling in buildings by 2030. The DES initiative is one of six accelerators of the Sustainable Energy for All (SEforALL) Energy Efficiency Accelerator Platform and targets the provision of capacity building and technical assistance to local governments and their partners to enable them develop sound policies, address barriers, unlock investment and scale-up modern district energy in cities. The Project was conceived out of the need to find sustainable solutions to the global energy consumption challenges for heating, cooling, and hot water, particularly within the context of climate change. The three energy uses are described to account for about 60% of energy demand in buildings (ProDoc, pg. 2).

61. In the IEA report on tracking buildings 2021[12], it was reported that buildings and the building construction sector account for about one-third of total final energy consumption globally. The severity of the impact of the high energy demand on the environment and climate is reflected in the sector's estimated contribution to about 15% of global direct CO_2 emissions[13]. The Project Document (pg. 3) indicated that modern district energy systems have the potential of cutting down primary energy consumption for heating and cooling in urban buildings by up to 50%. It is within this scope that the UNEP/GEF project "Increasing Investments in District Energy Systems in Cities – a SE4All Energy Efficiency Accelerator" (GEF ID 9320) under evaluation is implemented by the initiative to facilitate the uptake of modern DES in selected countries.

Chile:

62. In the Latin American context, Chile is among the largest consumers of energy. The country is described as one that has been heavily dependent on energy imports from South American countries, particularly from Argentina, Brazil, Colombia, Ecuador, and Peru[14]. This heavy reliance on energy imports puts the country at risk of trends in the global energy market, including climate-induced events. The country's energy mix from both domestic generation and import is further dominated by fossil fuels, with very significant implications for greenhouse gas emissions.

63. It has been estimated that about 42% of the residential energy consumption in Chile is accounted for by wood fuel, which serves primarily as the main source of energy for residential heating and cooking[15,16]. Further, 96% of households in

[12] IEA (2021), Tracking Buildings 2021, IEA, Paris https://www.iea.org/reports/tracking-buildings-2021

[13] *ibid*

[14] See https://www.enerdata.net/estore/country-profiles/chile.html

[15] See details of Energy consumption in Chile's residential sector at Baca, J. C. (2014). Informe del inventario de emisiones de gases de efecto invernadero. Sector Energía, 8.

[16] CDT, C. (2010). Estudio de Usos Finales y Curva de Oferta de Conservación de la energía en el Sector Residencial de Chile. Corporación de Desarollo Tecnológico (CDT), Cámara Chilena de la Construcción (CChC), Santiago.

central and southern Chile which are the most densely populated regions within the country, rely predominantly on woodstoves for heating and cooking, thus contributing to a high vulnerability to air pollution problems due to PM 2.5 emissions from the wood fuel combustion. In 2013, it has been reported that PM 2.5 emissions from wood combustion caused pollution-related health emergencies in cities like Coyhaique, Chillán and Temuco (ProDoc, Pg. 15).

64. Even though actual consumption levels for Domestic Hot Water (DHW) are still limited in terms of accurate estimations, a national study on the residential sector's energy use revealed that 53% is used for heating and air conditioning (individual heaters, heating and air-conditioning), 53% is used for heating and air conditioning (individual heaters, central heating and A/C), with domestic hot water (shower, bathtub and dishwashing) alone accounting for about 20%[17]. This demand is expected to rise due to population growth and greater accessibility. The majority of households rely on individual gas boilers for heating. Due to the nature of the country's energy market, gas prices in Chile are among the highest in the South American continent, with the average monthly bill in winter reaching up to about 200 €/month.

65. Based on the foregoing environmental, economic and health threats posed by the behaviour of the country's energy landscape, the Government of Chile has prioritized a reformation of the energy sector to promote sustainability. A partnership with UNEP for the implementation of The Project in Chile was seen as a strong opportunity for the much-needed energy sector reforms, with the potential of serving as a key game changer in mitigating air pollution and meeting the growing thermal energy demand efficiently. The DES was thus identified as a technically feasible alternative to individual woodstoves as well as gas and water heating with benefits for communities and users.

66. The government, through the Ministry of Energy and the Ministry of Environment, together with the DES Initiative and the active private sector participation (private utility companies and real estate developers) has prioritized the identification of new business opportunities and potential pilot DES projects are being initiated. The main challenges to the adoption of modern DES in Chile were identified from preliminary assessments to be high investment costs, a lack of a regulatory framework, and a lack of a viable and replicable business model.

67. The Project in Chile targeted the aforementioned barriers through the following:

    - **The reduction of the financial barrier:** Under component 2 of the project activities, the DES targeted working with Chilean financial institutions such as Banco BICE, Banco del Estado de Chile and ABIF (Association of Banks and Financial Institutions), which were part of the National Steering Committee, to define a viable financial mechanism and make recommendations on financial support schemes and tariff settings that would ensure district heating is commercially viable where appropriate.
    - **To target the lack of regulatory framework:** The Project through its Deep-dive support (Component 2) implemented a local and national regulatory analysis, and also made urban planning recommendations to incentivize connections such as a building code that would require buildings over a certain size to implement centralized heating; land-use policies that would use 'connect-unless' policy (meaning new building developments would have to connect to

[17] CDT, C. (2010). Estudio de Usos Finales y Curva de Oferta de Conservación de la energía en el Sector Residencial de Chile. Corporación de Desarollo Tecnológico (CDT), Cámara Chilena de la Construcción (CChC), Santiago.

district heating unless is not technically or economically feasible), and zoning policies that promoted mixed-use and dense development. The interconnection of different building types (private and public) would, be encouraged by the implementation of a multi-stakeholder committee (component 2) to guide the project development process.

- **To target the lack of viable and replicable business models:** The Project through its component 2, targeted the assessment of a wide-range of business models with a focus on privately-owned models that can be scaled to multiple cities in the country such as the Temuco case. Using the business approach from DES Initiative's champion cities, such as London, and linking their experience to Chilean cities (under project component 4) such as Temuco, the initiative targeted facilitating long-term sharing of best practices in financing modern DES in Chile.

China

68. China, with a population above 1.4 billion as of 2020[18], is the world's largest consumer of energy. The country's primary energy consumption by fuel type is dominated by fossils, with coal, petroleum and natural gas being the most dominant[19]. It has been estimated that fossil fuels account for about 83% of the total primary energy consumption[20]. The country is, ranked as the highest emitter of CO_2, and in 2020, China's share of total global CO_2 emissions was estimated at 30.65%. The energy sector of China is the highest contributor to its emission rates[21], thus stimulating government action.

69. The government as part of the country's climate change mitigation strategies sought to peak greenhouse gas emissions by 2030 and to significantly reduce the dependence on fossil fuels. Efforts towards the attainment of this target centres around reducing the dependency on coal, increasing energy efficiency, and increasing renewable energy share in the energy mix. In China's 13th Five-Year Plan (FYP) spanning 2016 to 2020, the country aimed to reduce its energy and carbon intensities by 15% and 18% respectively by the end of the plan implementation period (ProDoc, P.g 18).

70. The attainment of such targets requires the development of alternative energy sources, particularly for district heating which is mainly done through the use of coal, Combined Heat and Power systems (CHP), and gas boilers, with coal, dominating. Most of the existing coal boilers are described to have a low boiler efficiency and often lack advanced pollution filter systems, thus coal boilers that are currently deployed in existing district heating networks are considered to contribute significantly to Fine particulate matter ($PM_{2.5}$) during usage.

71. The country's plan in this regard targeted the reduction of coal usage by about 50 million tonnes by the end of 2020 (ProDoc, Pg. 18). Thus, accelerating the deployment of modern DES is described as a key driver for the strict control of coal consumption, and the attainment of climate and health targets in the plan. A total

[18] See trend of China's population at https://data.worldbank.org/indicator/SP.POP.TOTL?locations=CN

[19] Guo, S., Yan, D., Hu, S., & Zhang, Y. (2021). Modelling building energy consumption in China under different future scenarios. Energy, 214, 119063.

[20] See https://www.eia.gov/international/analysis/country/CHN

[21] https://chineseclimatepolicy.energypolicy.columbia.edu/en/emissions-sector-and-source

of 150 DES projects were planned to be piloted across cities in northern China under the 5-year plan.

72. The government through the National Development and Reform Commission of China (NDRC) seeks to adopt the integration of other renewables and district cooling to achieve its policy objectives. However, the rapid acceleration of modern DES in China is hindered by the following barriers: split incentives at both supply and demand sides to facilitate the upscaling of low-grade temperature from excess heat, the absence of standardised approaches for the evaluation of how to optimize existing DES or study energy system costs and benefits from the interaction of excess heat, renewable energy resources and Combined Heat and Power (CHP) Systems (i.e. cost-benefit analysis of heat solutions) to help guide development and investment choices, and a lack of long-term energy planning and mapping which leads to district heating networks in cities often being isolated, not-optimized and inefficient.

73. The DES initiative in China targeted the aforementioned barriers through the following:

- **To eliminate the barriers of split incentives at both supply and demand sides of the DES market:** The DES targeted the demonstrating waste heat connection and testing the coordination frameworks and business models needed to deliver it under its Component 2, with upscaling action planned in Component 4.
- **To eradicate the barrier of a lack of standardised approaches for assessing the cost-and benefits of modern DES:** The methodologies and cost-benefit tools planned through component 2 of the project sought to allow the initiative to provide standardized approaches for decision making in Chinese cities.
- **To target the absence of long- term planning and mapping:** The rapid assessment methodology of project component 1, and monitoring and evaluation within project component 3, sought to support cities in being able to assess and report on DES potential. Improved energy planning as well as energy mapping planned under Component 2 targets allowing cities to identify and plan interconnections and transmission lines that enable connection of large-scale waste heat and renewables.

India

74. India ranks as the world's third-largest energy consumer of energy[22]. The country's energy sector is dominated by fossils, with 80% of demand accounted for by coal, oil and solid biomass (*ibid*). A significant challenge of the country's energy sector is the huge growth in demand for cooling energy. In many of the country's cities, up to about 40% of electricity demand and up to 60% of peak electricity demand is utilized for cooling[23]). Estimates suggested that India would require about 83GW of additional power capacity between 2016 and 2022 to overcome the cooling energy demand deficit[24].

[22] See https://www.eia.gov/international/overview/country/IND

[23] See details on increase in cooling demand in India at https://www.nrdc.org/experts/vijay-limaye/protecting-health-cooling-demand-skyrockets-india#:~:text=Cooling%20demand%20in%20India%20is,the%20country%20in%20the%20future

[24] See Joshi J, Magal A, Limaye VS, Madan P, Jaiswal A, Mavalankar D, Knowlton K. Climate change and 2030 cooling demand in Ahmedabad, India: opportunities for expansion of renewable energy and cool roofs. Mitig Adapt Strateg Glob Chang. 2022;27(7):44. doi: 10.1007/s11027-022-10019-4. Epub 2022 Aug 8. PMID: 35967931; PMCID: PMC9360156.

75. At present, coal is the most dominant source of energy for building sector cooling needs. The over-reliance on national electricity grid networks thus further creates gid instability challenges in times of peak demand. Again, the dominance of fossils significantly increases the CO2 emissions associated with energy use in buildings, with implications for environmental and health sustainability. Energy-efficient measures and the provision of alternative cleaner sources of energy to existing coal-based electricity are primed as key alternatives for mediating the challenge.

76. The government, through its Ministry of New and Renewable Energy, Ministry of Power, and Ministry of Urban Development, local governments and consultative dialogues with other stakeholders sought to prioritize efficient solutions to district cooling. Following this, the DES Initiative sought to engage Commissioners and Municipal Corporations of cities with the potential of adopting modern DES systems to pilot the implementation and provide a sound basis for scale-up action in the country's building sector.

77. Following a number of rapid assessments in selected cities, the DES initiative and its partners found limited evidence on the financial viability of district cooling projects as a key limitation to unlocking investment in modern DES in India. Thus, this was attributed to the following barriers: a general lack of experience with district cooling in India, thereby causing market stagnation; limited readiness of existing buildings to adopt district cooling (centralized cooling) due to the nature of urban planning and property development practices; absence of smart city proposals that include plans for district cooling; and a general lack of awareness on modern DES.

78. The DES initiative through its project activities sought to alleviate the barriers through the following:

    - **To remove the general lack of experience with district cooling in India**: A demonstration project was planned as a key output of the Component 2 activities, with lessons transferred to other cities through training and the Virtual Platform (Component 4) to be applied to projects identified through rapid assessments (Components 1 and 4).
    - **On the existing buildings not being district cooling ready (centralized cooling):** The DES through project Component 2 in India planned to make wide urban planning recommendations including policies that can ensure that buildings are district cooling ready, such as requiring centralized cooling for buildings over a certain size and also encouraging mixed-use and dense development.
    - **On addressing the absence of smart city proposals that include district cooling:** The DES Initiative planned to leverage pilot cities in India that have been shortlisted from the initial list of 100 'smart cities' under the Smart Cities Mission of India. Each smart city challenge was planned to include an area-based development plan which aims to transform an existing city area by demonstrating a 'smart city concept', creating an example for other areas in the city, or across the country, to follow. Cities can choose one of three approaches: retrofitting, redevelopment, or greenfield development. The DES Initiative through its Component 1 activities planned to work with the local governments to include the assessed high opportunity projects within the smart city area plans (directly linked to activities in project Component 2). Further, the DES Initiative planned to develop planning policies to be included through the smart city area-based development plan to ensure that the buildings are district cooling ready (e.g., building codes) in component 1 and

to integrate this into the larger city-wide district energy plan in the pilot city (in Component 2).

- **To address the barrier of a lack of awareness:** The DES initiative planned to implement stakeholder coordination frameworks, training and site analysis (Components 1 and 2), which would include significant consultation of building developers to create buy-in and long-term interest in the project. The activities of the Initiative were panned to thus ensure that multiple business model options are discussed with the cities.

Serbia

79. Serbia's energy sector is dominated by fossils (coal, natural gas, petroleum and other liquids). This has significant implications for environmental quality and human health. Serbia's final energy consumption is dominated by demand for heating and cooling[25]. Post-1945, Serbia's built environment infrastructure increased significantly. However, the majority of buildings in the country are described to have oversized heating systems and minimal insulation provisions, thereby resulting in high specific heating consumption levels[26]. It has been estimated that by 2020, heating and cooling will account for about 45.5% of the total final energy consumption of the country. The country has a significant presence in District Heating Systems, with such systems accounting for over 22% of heating needs in residential buildings[27]. Wood was reported as the most dominant energy source for residential buildings' heating needs.

80. The foregoing has significant implications on greenhouse gas emissions, air quality and consequently pollution-related health issues. In the projections of GHG emissions within the First Biennial Update Report of the country, it was reported that by 2030, the application of additional mitigation strategies to business-as-usual behaviour across key sectors of the country has the potential of reducing emissions by about 18% by 2020. The country targets an unconditional emission reduction target of 33.3% by the end of 2030 compared to 1990 levels, and 13.2% compared to 2010 levels.

81. Transformations in the energy sector of the economy have been primed as key contributors to the attainment of such emission reduction targets. In the country's energy policy, the government of Serbia targets accelerating the uptake of District Heating Systems that are based on Renewable Energy sources and Combined Heat and Power (CHP) systems to help attain its climate and environmental quality targets. The DH system in Belgrade is described as the largest in Serbia and also one of the largest in Europe with a total network length of 1,420 km (ProDoc pg. 23). The systems have a capacity of over 2,800 MW, which is about 50% of the total heating capacity of the country (*ibid*). What is missing is an integrated plan for heating that accounts for both building efficiency and district heating through harmonized strategy, policy and investments in the city.

[25] Šumarac, Dragoslav & Todorović, Maja & Đurović-Petrović, Maja & Trisovic, Natasa. (2010). Energy efficiency of residential buildings in Serbia. Thermal Science. 14. 10.2298/TSCI100430017S.

[26] See Loureiro, T., Rämä, M., Sterling, R., Cozzini, M., Vinyals, M., Descamps, M., ... & Geyer, P. (2018). District energy systems: A collaborative exchange of results on planning, operation and modelling for energy efficiency. Multidisciplinary Digital Publishing Institute Proceedings, 2(15), 1127 for challenges with heating in Serbia's buildings

[27] See Jovanović, M. P., Bakić, V. V., Vučićević, B. S., & Turanjanin, V. M. (2019). Analysis of different scenarios and sustain ability measurement in the district heating sector in Serbia. Thermal Science, 23(3 Part B), 2085-2096.

82. The rapid acceleration of the uptake of District Energy Systems in Serbia is reportedly curtailed by certain critical factors, dominant of which include: a lack of technical expertise regarding large-scale modern DES installations (e.g. solar thermal, integration of district heating with new district cooling development); misaligned programmes and policies relating to heat metering, district heating expansions, building efficiency measures and heat tariffs; lack of independent technical and financial review of district heating network in relation to long-term city objectives such as air pollution reduction; lack of capacity to assess new business models with private sector participation; and insufficient harmonized planning for network rehabilitation, network expansion and fuel-switching.

83. Through its project activities, the District Energy Systems initiative in Serbia seeks to overcome the common barriers in the following ways:

    - The rapid assessment (Component 1) will help to identify high-level options for rehabilitation, expansion and fuel switching. These options will then be prioritized in the deep-assessment and developed into a DES city-wide plan of policies and investments that are aligned with the city's strategy and priorities under project component 2. The development of a demonstration project procurement plan under project component 2, as well as international city tours and city-twinning activities in component 4, will help to technical experience in the utility of renewables due to the lack of demonstrations.
    - Under project component 2 activities, the DES is planned to analyse the various business model options in line with their long-term social and environmental objectives. This will facilitate high levels of investments toward the rehabilitation of existing networks, which have before the commencement of the initiative, attracted bids from at least two major international district energy operators and multilateral development banks. This would be complemented by capacity building and the development of city-wide plans.
    - Project successes from Belgrade in Serbia are primed to become models for the region, given that many cities in the region have similar heating and cooling needs similar to that of Belgrade. Lessons learned, methodologies, training and tools that are deemed to be regionally appropriate are planned to be expanded through activities in project component 4 to other cities in the region. The technical assistance can support the Republic of Serbia through analysis of national regulations and policies and assessments of Belgrade being made available to other cities in the country.

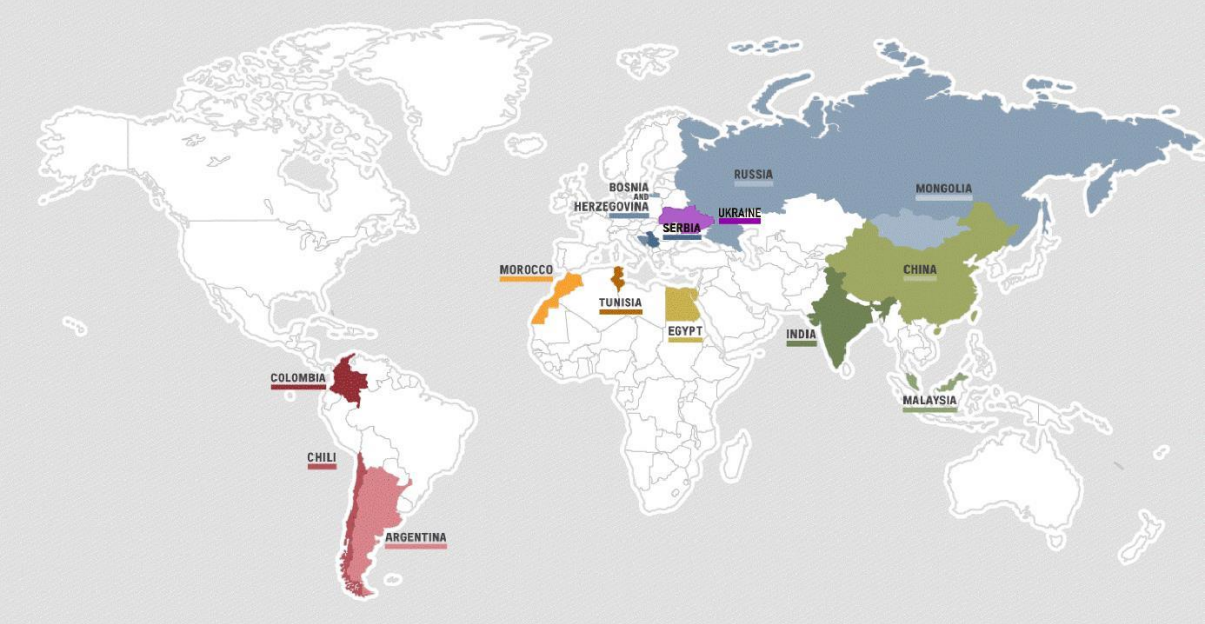


Figure 1: Countries with cities participating in the DES initiative[28]

B. Results Framework

84. 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 achievement of this ambition was planned to be measured through the number of city-wide plans (policy-investment roadmap) developed and integrated into the city-wide planning cycle, with 4 city-wide plans targeted at the end of the project. The project thus conceptualises two forms of countries: Pilot countries (including light touch and deep-dive countries), and replication countries[29].

85. The project objective was to be achieved under the following assumptions that:

- local decision-making is supportive and responsive to the implementation of project activities
- long-term DES potential exists
- bankable project will be identified and can be tendered within three years
- city planning cycle will match with project timelines.

86. The project was implemented in four (4) components, with two levels of engagement in its implementation: Light-Touch engagement level and Deep-Dive engagement levels for project cities.

Component 1: Assessments and technical assistance for DES actions in cities ("Light touch"): The Light-touch cities were supported with Rapid Assessments and stakeholder engagements towards the building of commitment for the implementation of modern DES. The following were the expected outputs of activities originally planned under component 1:

[28] https://www.districtenergyinitiative.org/cities

[29] The Pilot countries are: Chile, China, India, Serbia, and the Replication countries are: Argentina, Bosnia and Herzegovina, Colombia, Egypt, Malaysia, Mongolia, Morocco, Russia, Tunisia, Ukraine

- Output 1.1: 16 cities join the DES initiative through an extensive consultation process
- Output 1.2: 16 city DES rapid assessments completed, and fact sheets developed
- Output 1.3: 4 multi-national stakeholder workshops on DES undertaken to validate the selection of the "deep dive" pilot cities and to establish interest in other countries or each region
- Output 1.4: Partnerships with international mentor cities and partners established and training programs delivered

Component 2: District energy demonstrations and city-wide plans ("Deep dive"): The Deep Dive engagements went beyond rapid assessments and support 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. Activities under this component were originally expected to produce the following outputs:

- Output 2.1; Multi-stakeholder coordination structure is strengthened or established through which technical training programmes and planning support are delivered in the 4 "deep dive" cities
- Output 2.2; Deep DES Assessments including short and long-term technical and economic potential, including 2 financial project estimates per city, of DES are developed for the 4 "deep dive" cities
- Output 2.3; DES pilot demonstrations projects have been selected and investment is committed
- Output 2.4; DES City-wide plan (policy & investment) are developed with the 4 "deep dive" cities
- Output 2.5; Synthesis reports on policy recommendations for city and national officials are developed, including the "train the trainer" package to address barriers and accelerate the uptake of DES and delivered at regional validation workshops

Component 3: Monitoring Framework: This was geared towards assisting the pilot countries and Deep-Dive cities to implement monitoring provisions for tracking and validating GHG emission reductions and to track local benefits from the first and second project components. Activities under component 3 were originally expected to produce the following outputs:

- Output 3.1; Monitoring framework put in place in 4 "deep dive" cities embedded into existing frameworks and data collection structures
- Output 3.2; 4 national workshops providing training on monitoring delivered and national monitoring indicators developed.

Component 4: Outreach, tools and training on DES Initiative: This targeted scaling up and replication activities and involved collecting and disseminating best practices and project results to recruit new 'learning cities' into the DES Initiative to ensure that signed-up learning cities are sufficiently supported to develop DES. Component 4 activities were originally expected to produce the following outputs:

- Output 4.1: Awareness-raising campaigns delivered
- Output 4.2; DES Virtual Platform is enhanced and delivers outreach actions and training programs

- Output 4.3; Tailored training sessions are developed, and advice is delivered through 12 training webinars for 15 newly signed up cities including on cities including on the regionally tailored rapid assessment methodology
- Output 4.4; 6 fundraising and matchmaking sessions tailored and delivered for new signed-up cities (5 cities per session)

87. The expected project outcomes of each project component according to the Project Results Framework in the Project Design document are shown in Table 3.

Table 3: Project's Result Framework as shown in ProDoc

Project Objective	Objective level Indicators	Baseline	Targets and Monitoring Milestones	Means of Verification	Assumptions & Risks	UNEP MTS 2018-Reference
Assist developing countries and selected cities to accelerate their transition to lower-carbon and climate resilient societies through promoting modern District Energy Systems (DES)	**Indicator:** Number of citywide plans (policy investment roadmap) developed and integrated into city-wide planning cycle	Baseline: 0	End of project Target: 4	Through project monitoring and evaluation structure City plan approval letter	Local decision makers supportive and responsive to implementation of project activities Long-term DES potential exists Bankable project will be identified and can be tendered within three years City planning cycle will match with project timelines	Climate Change
Project Outcome	**Outcome Indicators**	**Baseline**	**Targets and Monitoring Milestones**	**Means of Verification**	**Assumptions & Risks**	**POW 2018-2019 Expected Accomplishment**
1. City officials have increased knowledge of the benefits of District Energy Systems (DES) to promote modern DES	Indicator 1: Number of DES rapid assessments completed Indicator 2: Number of cities with new actions, new projects, or new policies related to DES	Baseline 1: 0 Baseline 2:	End of project Target 1: 16 End of project Target 2:	Rapid assessments reports City commitment letters	Cities officials willing to participate in project activities, provide data and necessary information for rapid assessments. District energy is suitable in 13 cities	Expected Accomplishment (b)[30], Output 3[31],

[30] Expected Accomplishment (b): "Energy efficiency is improved, and the use of renewable energy is increased in partner countries to help reduce greenhouse gas emissions and other pollutants as part of their low emission development pathways".

[31] Output 3: "Tools and approaches designed and piloted in countries to develop mitigation plans, policies, measures, and low emission development strategies, and spur sector investment and innovation within and across selected sectors"

	drafted, planned, developed, or adopted	0	13		Limited short-term potential for DES at a scale that interests partners or financiers	
2. The viability of DES is demonstrated, and DES city-wide plans, policies and investments are integrated into the city planning cycle in 4 cities	Indicator 1: Number of 'Expressions of Interest' (EOI) for demonstration project investment issued by the city Indicator 2: Number of shortlists of investor bids approved by the cities	Baseline 1: 0 Baseline 2: 0	End of project Target 1: 4 End of project Target 2: 4	Project documents, city public records, press release City documents, planning documents Online Calls for Expression of Interest Letters expressing intention to invest from investors Letter of exchange with development bank(s) outlining investments in project feasibility studies	City officials willing to participate in project activities, provide data and necessary information for deep dives assessments Long-term DES potential exists Bankable project will be identified, and investment interest secured within three years Sufficient funds are mobilized for the implementation of the "pilot" projects	Expected Accomplishment (b), and Output 3.

3. Deep-dive cities and national governments can track and better understand the costs and benefits of modern DES laying the foundation for evidence based decision-making and policy action in the future.	Indicator 1: Number of cities agreeing to implement a monitoring protocol	Baseline 1: 0	End of project Target 1: 4	Data collected through the implementation of the monitoring protocol DES monitoring framework integrated into existing monitoring frameworks in the country	Data collection/exchange system is developed in the city Institutional capacities are built within the local government structure to ensure the monitoring framework is being implemented appropriately	Expected Accomplishment (b), and Output 3
4. DES in cities is scaled up and replicated nationally and internationally by cities and national governments signed up to the Initiative	Indicator 1: number of cities joining the initiative and committing to assess DES using the regionally tailored rapid assessment methodology and/or implementing a policy action Indicator 2: number of national and international counterparts hosting DES Initiative methodology, tools or publications.	Baseline 1: 0 Baseline 2: 0	End of project Target 1: 15 End of project Target 2: 5	Project monitoring and evaluation structure, documented outputs: campaign materials, virtual platform, meeting minutes and results from fundraising and match making sessions	Cities officials willing to participate in project activities in additional 15 cities Low public awareness of the environmental and financial benefits of the DES and its importance in meeting multiple energy policy objectives	Expected Accomplishment (b), and Output 3

C. Stakeholders

74. The project document identified a multi-stakeholder collaboration in the implementation of the project components. Essentially, the stakeholders at the project level (global) have been classified under the following 11 groups in the Project Document: Inter-Governmental Organisations (IGOs), Non-Governmental Organisations (NGOs), Finance institutions, National institutions, Private Sector Operators, Private Sector Technology Providers, International consultants, industry associations, academia and research, and champion cities. It must be noted that the project stakeholders can be analysed at two main levels: Global level stakeholders, and Country/National level stakeholders. The comprehensive analysis of the level of influence/interest of each stakeholder on The Project is presented in the Stakeholder Analysis in Annex V.

75. The composition of each stakeholder group that was engaged in the design and implementation of the various project components at the global level, including those that were retrospectively identified by the Principal Evaluator under each classification group is presented below:

Inter-Governmental Organisations: This category was made up of UNEP Economy Division, Energy & Climate Branch, Climate Mitigation Unit (Implementing Agency), UNEP Economy Division, Energy & Climate Branch, Cities Unit (Executing Agency), and the International Energy Agency (IEA)

Non-Governmental Organisations: This category was made up of ICLEI- Local Governments for Sustainability, C40, Copenhagen Centre on Energy Efficiency, World Resources Institute (WRI), and Climate Technology Center and Network (CTCN)

Finance Institutions: This category was made up of World Bank Group IFC, Regional development banks, commercial banks, Global Environmental Facility (GEF), KfW, and the European Bank for Reconstruction and Development (EBRD)

National Institutions: This category was made up of: The Danish Energy Agency and the Danish Embassy in Chile; Swedish and Danish Embassy in Serbia; The Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ); Department for Business, Energy & Industrial Strategy (UK BEIS); Korea District Heating Corporation (KDHC Korea); and all the national institutions in pilot countries supported.

Private Sector Operators: This category was made up of: Empower, Dalkia, Veolia, and ENGIE (Cofely, Climespace, CPCU); Adani Transmission Limited in India; National Central Cooling Company PJSC (Tabreed); and Singapore Power Limited.

Private Sector Technology Providers: This category was made up of Danfoss and Thermaflex, Thermax and Broad Group

International Consultants: Made up of Sustainability Solutions Group (SSG), Carbon Trust, GGLO, Devcco (CCO Holding AB) and King & Spalding LPP.

Industry Associations made up of International District Energy Association (IDEA), The American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), The Indian Society of Heating, Refrigerating and Air Conditioning Engineers (ISHRAE) and Euroheat & Power (EHP)

Academia and Research Institutions made up of Technical University of Denmark (DTU), The Polytechnic University of Milan (Polimi), Aalborg University, French Environment and Energy Management Agency (ADEME) and the 4DH Research Center

Champion Cities: This includes the 45 champion cities[32] from the development of a DES publication

88. The composition of country-level stakeholders engaged in the design and implementation of the various project components within each project country and city include the following:

Chile: Ministry and SEREMIS of Housing and Urban Development, Provincial Governments, Council of Ministries for Sustainability, Ministry and SEREMIS of Energy, Ministry and SEREMIS of Environment, National Energy Commission, Chilean Agency for Energy Efficiency, Production Development Corporation, National Chamber of Commerce, Financial Institutions and Banks ESCOs, Environmental Assessment Service, National Centre for Innovation and Promotion of Sustainable Energy, National Institute for Standardization, Power Utilities, and NGOs (ACESOL, ACHEOG, and ACERA)

China: Ministry of Housing and Urban-Rural Development, Ministry of Science and Technology, National Energy Commission, China Academy of Building Research, State Electricity Regulatory Commission, Ministry of Environmental Protection, National Energy Administration, Environmental Protection Bureaus (provincial level), All-China Federation of Industry and Commerce, State Development and Investment Corporation, China National Institute of Standardization, State Bureau of Quality and Technical Standards, Energy Research Institute, China District Heating Association and the Chinese Renewable Energy Industries Association.

India: Ministry of Urban Development, Indian Society of HVAC, Confederation of Indian Industries, Green Building Council, Ministry of Power, Ministry of Environment and Climate Change, Central Electricity Regulatory Commission, State Designated Energy Agencies, State Urban Development Departments, City Planning Authorities, NGOs, Chamber of Commerce, Financial institutions and Banks, Bureau of Indian Standards, Electricity Distribution Companies, Industrial Associations, Refrigeration and Air-Conditioning Manufacturers Association, and the Regional Pollution Control Boards.

Serbia: Ministry of Construction, Transport and Infrastructure, Ministry of Agriculture and Environmental Protection, Ministry of Mining and Energy, Energy Agency of the Republic of Serbia (ARES), Public Enterprise Elektromreza Srbije, Public Enterprise Srbijagas, Belgrade City Management, City Municipalities, National Association for Biomass of Serbia (SERBIO), Society of Thermal Engineers, Chamber of Commerce, Serbian Development Agency, Financial institutions and banks, Electricity Distribution Company "EPS Distribuicao", ESCO Belgrade, Serbian Environmental Protection Agency, Institute for Standardization of Serbia, Business Association "District Heating of Serbia", Association of Construction Industry and Utility Services, and Public Enterprise Elektroprivreda.

89. The principal evaluator noted that the project design was generally limited in sensitivity to marginalised and under-represented groups who are expected to be directly or indirectly affected by the implementation of modern DES. Gender considerations in the implementation of the project are discussed further in the evaluation findings.

D. Project implementation structure and partners

90. The Implementing Agency (IA) of the project was UNEP, Economy Division, Energy & Climate Branch, Climate Mitigation Unit, with UNEP Economy Division, Energy &

[32] These are called 'champion cities' by the DES Initiative and are made up of 45 cities around the world that use district energy systems. The names of these cities are published by UNEP in its publication: "District energy for cities – unlocking the potential of energy efficiency and renewable energy" available at: https://wedocs.unep.org/handle/20.500.11822/9317

Climate Branch, Cities Unit as the Executing Agency (EA). Throughout the implementation of the project, the Cities Unit led the coordination of the global activities which were grouped around three expert task forces: i) communications and outreach; ii) capacity building; and iii) technical task forces.

- The Technical Taskforce was responsible for advising and supporting the Secretariat of the DES initiative with the development of, and access to, technical information, tools, methodologies, and guidelines.
- The Capacity building taskforce provided advise and support for the development and delivery of appropriate training and capacity-building activities to cities and countries, including pilot cities.
- The Communications and Outreach taskforce was tasked with communicating the importance of modern district energy systems and the need to make political commitments at global, regional, and national levels to policy and decision-makers in the various project countries.

91. Other project execution arrangements to support national-level implementation comprised of the following:

- The establishment of a Global Project Advisory Committee, which comprised of partners to the DES Initiative (private sector, industry, city-networks, NGOs, and international organizations), UNEP, and SE4All to provide guidance and approval of the overarching strategy of the DES Initiative, its country and regional focuses and work plan.
- The establishment of a Project Steering Committee (PSC), which was made up of UNEP (Climate Mitigation Unit and Cities Unit of the Economy Division, Energy & Climate Branch), one city representative from each "deep-dive" city and one nominated representative of the national project steering committees that met to review project progress, approve annual work plans and budget and provide strategic guidance to the project. The PSC was further in charge of approving management decisions to ensure timely delivery of quality outputs.

92. Arrangements at the country-level that supported the implementation of Project in China, Chile, Serbia and India comprised of the following:

- In every pilot country, the initiative established a project governance structure to ensure that decision-making, management and implementation arrangements were appropriate and operated effectively. The country governance structure consisted of a National Project Steering Committee, a Country Office, a Project Deployable Working Team, and City-wide multi-stakeholder coordination governance reflected through a designated focal point, coordinator or coordinator structure.
- The National Project Steering Committees (NPSC) were to provide guidance and strategic directions and oversight to each Country Office, and were composed of: representatives of Government ministries, GEF operational Focal Points, Economy Division[33] and UNEP regional/country office. They were also responsible for the mobilisation of national stakeholders to support project implementation and the facilitation of synergies with other complementing initiatives and ongoing projects in various countries.

[33] Economy Division, formerly Division of Technology, Industry and Economics (DTIE)

- Each DES country office had a National Technical Expert, who was to oversee the execution of the project under the project objectives, activities, and budget, including the provision of technical input to national and city level assessments, training, methodologies, barrier analyses, policy, and regulatory recommendations. The technical experts coordinated the deployable project work team, ensured the technical quality of products, outputs and deliverables; and reported to the NPSC on project progress.
- The initiative worked through Deployable Project Working Teams (DPWT), which comprised co-financed district energy consultants, experts from DES Initiative partners and finance institutions. The DPWT were required to lead the consultation process and rapid assessments, complete city fact sheets, and provide expert advice to local governments on the next steps to developing DES in their cities.
- In each Deep-Dive city, the DES initiative had City-wide Multi-stakeholder coordination structures that facilitated collaboration, training and leveraging of experts in the local market for the design of effective strategies for the acceleration of modern district energy systems. They also supported the design and implementation of a long-term development plan and strategy for district energy in the pilot city and ensured the sustainability of the project.

93. The project arrangements towards establishing connections with national governments for the implementation of the DES initiative comprised of the establishment of country offices in each pilot country, through either state-owned or non-profit organisations that have strong connections with the national governments. In each pilot country, the following were utilised:

- Chile: Ministry of Energy of Chile.
- China: CECEP Consulting with support from UN Environment Programme's Beijing Office.
- India: Energy Efficiency Services Limited.
- Serbia: RES Foundation.

94. The evaluator observed that the roles of the various stakeholders are clearly defined in the implementation of the project. The implementation arrangements are illustrated in the organigram below:

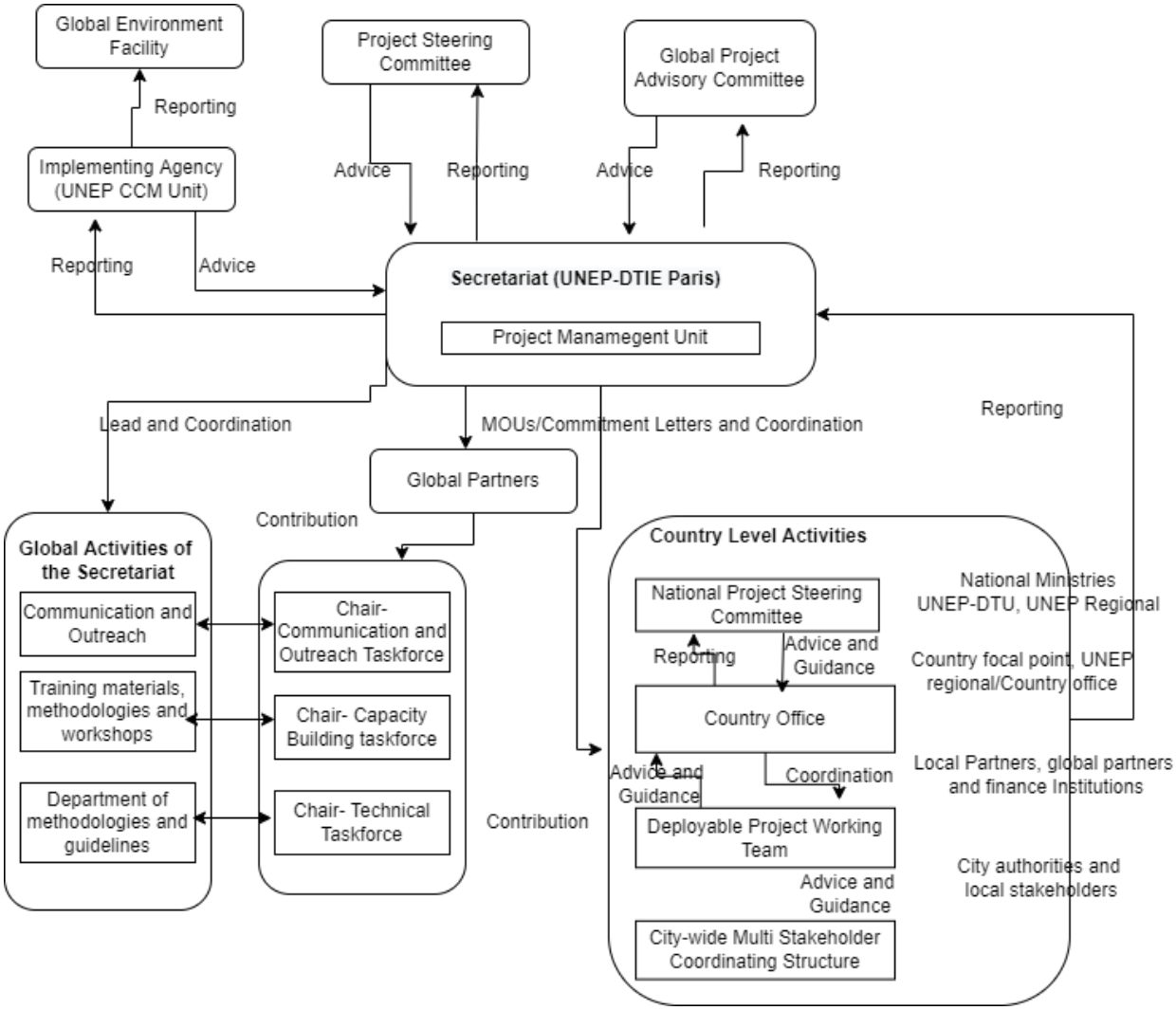


Figure 2: Organigram of the Project with key project key stakeholders

E. Changes in design during implementation

95. No significant change was made to the project design during the course of its implementation. The major change that occurred related to the extension of the project beyond the originally planned duration. The project was planned to have commenced on May 1, 2017 but was delayed for three days and commenced on May 03, 2017. The project was planned to have been completed on June 30, 2020. However, it ended on May 31, 2021, indicating an 11-month extension to provide for the implementation of late-stage project activities in India and China due to COVID 19 delays.

96. Major delays in the commencement of project activities were encountered in China. This was attributed to setbacks in signing the MoU between UNEP and the National Development and Reform Commission (NDRC), which was required from the side of the Chinese Government to proceed with project implementation and selection of both “light touch" and "deep dive" cities. Thus, the focal point of the project in China had to be changed from the NDRC to the China Energy Conservation and Environmental Protection Group (CECEP) based on mutual agreement between UNEP and the NRDC. It must be noted, however, that the NDRC pledged its support to the DES Initiative, including co-hosting the project kick-off

meeting with UNEP in September 2017 and the affirmation of its support through a commitment letter to join the Initiative.

97. Serbia was classified as a "refurbishment country", hence activities under component 1 were not implemented in Serbia, but were implemented only for China, Chile and India. Rapid Assessment was found not to be relevant for the identification of which city in the country had the most DES potential or was best suited for a demonstration project. Instead, the DES initiative focused on Deep-Dive Action in Serbia and leveraged on a collaboration with ongoing projects on district energy from Kreditanstalt für Wiederaufbau (KfW) and European Bank for Reconstruction and Development (EBRD) in parallel to the DES initiative.

98. The project was revised four times, with no significant change to the overall cost. The revisions were due to delays in project activities in some countries, as well as to fulfil budgetary re-allocation needs. The first revision in 2018 was to facilitate rephasing of unspent project budget in 2017. A similar reason was provided for the second review in 2019, which provided for revision of project workplan and reallocation of unspent previous budget. The third revision in 2020 was to facilitate completion of project activities that were delayed due to the pandemic, while the final budgetary review in 2021 was to facilitate budgetary allocation for project review and checking the quality of project deliverables.

99. No Mid-Term performance assessment was triggered by the Task Manager during the implementation of this project.

F. Project financing

100. The total project budget at approval in the CEO approval document dated 11th November 2016 was USD 11,711,774. This is broken down into two major financing components: a GEF grant of USD 2,000,000, and Co-financing of USD 9,711,774 as indicated in Table 4. At project evaluation, actual total expenditures for The Project amounted to USD 14,230,402. This is broken down into a GEF financing expenditure of USD 1,942,371, with a total Co-financing expenditure of USD 12,288,031.

101. The co-financing report at the end of the project indicates that the project leveraged an additional Co-financing of over USD 2.9 million in excess of the pledged amount at project approval. Further details on this are presented in section V.E. (Financial Management).

Table 4: Project Financing at approval

Project Components		Budget at Approval (in $)	
		GEF Project Financing	***Confirmed Co-financing***
1. Assessments and technical assistance for DES actions in cities ("Light touch")		349,240	2,432,942
2. District Energy Demonstrations and city-wide plans ("Deep dive")		925,740	4,503,574
3. Monitoring Framework		272,520	812,710
4. Outreach, tools and training on DES Initiative		212,500	1,481,498
Evaluation(s)		60,000	
Subtotal		1,820,000	9,230,724
Project Management Cost (PMC)		180,000	481,050
Total project costs		2,000,000	9,711,774
Breakdown of Co-financing			
Sources	**Name of Co-financier**	**Type of Cofinancing**	**Amount ($)**
Private sector	DANIDA – Danish Ministry of Foreign Affairs	Cash	850,531
Government	Italian Ministry of Environment, Land and Sea	Cash	229,383
International Organization	UNEP	In-kind	160,000
Private sector	Danfoss	In-kind	1,400,000
Private sector	Empower	In-kind	2,000,000
Private sector	Dalkia	In-kind	450,000
Private sector	DBDH	In-kind	502,500
International Organization	Cophenhagen Centre for Energy Efficiency	In-kind	1,750,000
Private sector	ENGIE	In-kind	500,000
International Organization	CTCN	In-kind	250,000
Private sector	Thermaflex	In-kind	184,000
Private sector	SSG	In-kind	45,360
Private sector	The Carbon Trust	In-kind	520,000
Private sector	Solar Turbines	In-kind	120,000
Private sector	King & Spalding LLP	In-kind	750,000
Total Co-financing			9,711,774

IV. THEORY OF CHANGE AT EVALUATION

102. A Theory of Change (ToC) that describes the causal linkages in the major components of The Project, particularly in terms of expected project results (outputs, outcomes, intermediate states, and impact) was presented in the ProDoc. The ToC serves as a road-map of the interrelated pathways between these major project components, with each pathway defined by a logical set of assumptions and drivers.

103. Assumptions within the ToC are conditions that are beyond the direct control of the project, whereas supporting actions or conditions over which the project has a measure of control and can make a meaningful influence are known as "drivers". The ToC at design was based on the expected project results at project approval. A set of assumptions under which the project activities would successfully be transformed into outputs and the drivers to these activities were also stated in the TOC at design.

104. However, the Principal Evaluator reconstructed the ToC for the following reasons:

- The focus of the ToC as in line with project evaluation guidelines by the UNEP is on project results and the causal relationship between each state of expected result, hence the ToC at design containing project activities needed some degree of reconstruction.
- Another rationale behind the reconstruction of project outputs and a number of project outcomes was to ensure that the results of resources allocated in The Project, adequately reflected the direct and indirect consequences of project activities on the project beneficiaries, since they were the target of the intervention. This is consistent with project results formulation expectations of the UNEP
- A number of the originally planned project outcomes were not very specific, and thus have consequences on appropriate specification of measurement and verification indicators during assessment, thereby requiring some improvements to be in line with the UNEP s definition of project outputs and outcomes
- A number of outputs in the original project results framework were similar, and had a degree of overlap that allowed for them to be combined to help reduce redundancy in expected project results
- Some of the assumptions and drivers in the ToC at design needed to be re-modified to be consistent with UNEP definition of assumptions and drivers to results in a ToC

105. The reconstructed Theory of Change in the Terminal Evaluation inception report guided the Terminal Evaluation. However, the reconstructed TOC in Figure 3 identifies assumptions needed to translate outputs into outcomes and shows revised drivers to project intermediate states and impacts. Thus, project components 1 and 2 were expected to contribute towards outcome 1, while component 3 activities were expected to contribute towards outcome 2, and component 4 activities were expected to contribute towards outcome 3 in the RToC.

Table 5: Comparison Table for Re-construction of Theory of Change

Original PRF formulation in ProDoc)	The formulation for Reconstructed ToC at Evaluation (RTOC)	Justification for Reformulation
LONG TERM IMPACT		
Reduced GHG emissions and local air pollution due to increased energy efficiency	Reduced GHG emissions and local air pollution due to increased energy efficiency and Renewable Energy	Reduced GHG emissions are also accounted for by increased use of Renewable Energy Technologies which are core in modern DES. Given that modern DES emphasises the integration of RE, the impact was revised to reflect this.
INTERMEDIATE STATES		
Cities commit to develop/improve DES in the city	Cities implement energy efficient district energy system (DES) policies and projects	The DES by cities must demonstrate behavioural change, which can be reflected in the implementation of institutional and policy reforms occurring after project outcomes
Learning cities join the initiative		
Cities' capacities to develop modern DES increased		
PROJECT OUTCOMES		
Outcome 1: City officials have increased knowledge of the District Energy Systems (DES) to promote modern DES	**Outcome 1:** National and sub-national governments in light touch cities have increased knowledge on modern DES and those in Deep Dive cities applied the knowledge to develop and/or adopt integrated policies, action plans and proposals for modern DES	Revised to enhance tangibility for the purposes of verification, to prevent overlaps, and to be consistent with UNEP's definitions. Original outcomes 1 and 2 are merged into revised outcome 1 because if city officials have increased knowledge of DES, original outcome 2 serves as the most objective way to show such increased in knowledge, and can be verified, hence revised outcome 1 becomes a more robust re-formulation of the two. Original outcome 3 is reformulated to enhance clarity and verification, given that in original outcome 1 was compounded.
Outcome 2: The viability of DES is demonstrated, and DES city-wide plans, policies and investments are integrated into the city planning cycle in 4 cities		
Outcome 3: Deep-dive cities and national governments can track and better understand the costs and benefits of modern DES laying the foundation for evidence-based decision-making and policy action in the future.	**Outcome 2:** Project cities have effective GHG emission systems to track local outcomes from DES projects	

Outcome 4: DES in cities is scaled up and replicated nationally and internationally by cities and national governments signed up to the initiative	**Outcome 3:** Learning cities adopt lessons learnt from DES project to develop their own integrated DES policies and action plans	
PROJECT OUTPUTS		
Component 1		
Output 1.1: 16 cities join the DES initiative through an extensive consultation process	**Output 1.1** 16 cities commit to DES initiative	All the outputs were stated as completed activities, and a number of them were not consistent with the UNEP Evaluation Office's definition of project outputs. The original formulations did not place emphasis on tangible changes that emphasises the targeted change on the beneficiaries of the various project activities. A number of outputs were also redundant (for example, original output 1.3 targets workshops on DES and establishment of interest, which is stated as a completed activity, and can be complemented by original output 1.4, hence a merger to enhance robustness of the two outputs in the revised output 1.3). Outputs were thus revised to reflect UNEPS's definition of outputs that are tangible and can be verified based on UNEP's criteria and to prevent duplication
Output 1.2: 16 city DES rapid assessments completed, and fact sheets developed	**Output 1.2** City officials in light touch cities gain knowledge on the Rapid Assessment process for DES projects	
Output 1.3: 4 multi-national stakeholder workshops on DES undertaken to validate the selection of the "deep dive" pilot cities and to establish interest in other countries or each region	**Output 1.3** Pilot cities gain support for DES action	
Output 1.4: Partnerships with international mentor cities and partners established and training programs delivered		
Component 2		
Output 2.1; Multi-stakeholder coordination structure is strengthened or established through which technical training programmes and planning support is delivered in the 4 "deep dive" cities	**Output 2.1** Deep-Dive cities have received technical training and planning support through a strengthened coordination structure	
Output 2.2; Deep DES Assessments including short and long-term technical and economic potential, including 2 financial project estimates per city, of DES are developed for the 4 "deep dive" cities	**Output 2.2** National and local governments of deep-dive cities create a conducive investment environment for both public and private sector investment towards the implementation of modern DES demonstration projects which have been agreed upon and investments are committed	
Output 2.3; DES pilot demonstrations projects have been selected and investment is committed		
Output 2.4; DES City-wide plan (policy & investment) are developed with the 4 "deep dive" cities	**Output 2.3** 4 deep dive city governments agree on policy and investment recommendations for DES	
Output 2.5; Synthesis reports on policy recommendations for city and national officials are developed, including the "train the trainer" package to address barriers and accelerate the uptake of DES and delivered at regional validation workshops	**Output 2.4** City and national officials and receive training from a dedicated national stakeholder and policy recommendations, and apply the lessons to address barriers and accelerate the uptake of DES	

Component 3		
Output 3.1; Monitoring framework put in place in 4 "deep dive" cities embedded into existing frameworks and data collection structures	**Output 3.1** 4 Deep Dive cities have integrated monitoring frameworks for DES into existing structures	
Output 3.2; 4 national workshops providing training on monitoring delivered and national monitoring indicators developed.	**Output 3.2** City officials and national governments receive training on monitoring tools and indicators	
Component 4		
Output 4.1; Awareness raising campaigns delivered	**Output 4.1**; Awareness levels on benefits of DES increased nationally and globally	
Output 4.2; DES Virtual Platform is enhanced and delivers outreach actions and training programs		
Output 4.3; Tailored training sessions are developed, and advice delivered through 12 training webinars for 15 newly signed up cities including on cities including on the regionally tailored rapid assessment methodology	**Output 4.2** Officials of newly signed up project cities receive training on rapid assessment methodology for DES	
Output 4.4; 6 fundraising and matchmaking sessions tailored and delivered for new signed up cities (5 cities per session)	**Output 4.3** New cities are connected to potential funding organisations	

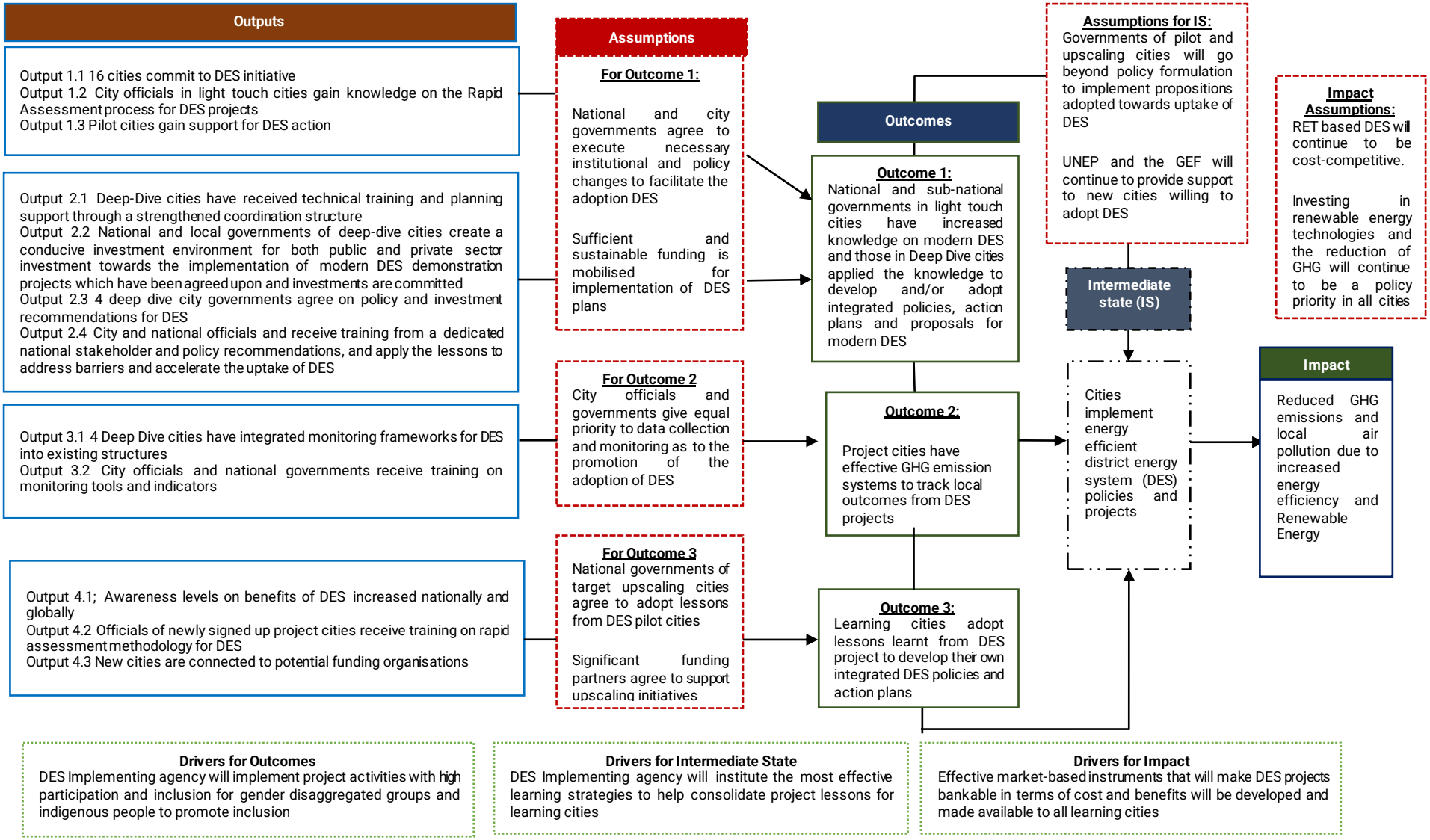


Figure 3: Reconstructed Theory of Change (RToC)

A. Causal Pathways from Project Outputs to Project Outcomes

106. Cities participating in the DES initiative are expected to be able to develop and integrate the DES plans into existing city-wide plans based on the lessons from the demonstration projects. Achieving this outcome will be possible only if national and local governments agree to implement the needed institutional and policy reforms to support such integration. This is a critical assumption for the realisation of project Outcome 1 since it is outside the control of the project. The extent to which governments in project cities implemented institutional reforms post-implementation, and how this has impacted the adoption of integrated DES policies and strategies is investigated in the evaluation.

107. Beyond the development of competencies and policies among districts, modern DES would only continue to be deployed if there was a sustainable funding source in project cities. Policies must therefore create sustainable market-based instruments that will enhance investment in DES, with enhanced private sector participation in this regard. This was therefore a critical assumption for the realisation of the upscaling and replication of DES projects within and beyond pilot cities. In addition, equal priority must be given to tracking the emissions from DES and other local impacts if GHG emission reduction levels are to be appropriately tracked in the pursuit of local and global climate goals. Even though the project intends to provide capacity and technical support to cities in this regard, the execution lies in the hands of the cities, hence the assumption is critical if project outcomes are to be achieved. If this assumption holds, monitoring systems that were proposed would then be effectively integrated into modern DES systems in cities.

108. The adoption of DES on the global scale further would depend on the extent to which other governments (learning cities) would adopt lessons from project countries and how much funding would be secured particularly through Public Private Partnership arrangements for such projects[34]. This is largely within the prerogative of national and city governments who in their country or city administration processes pursue their policy directions. Given that these conditions are necessary for the attainment of intended replication results but are outside the domain of control of The Project, they are critical success conditions.

109. A critical driver that will ensure that the proposed project outcomes are achieved is that the project's executing agency will plan and implement project activities with high participation and inclusion for gender disaggregated groups and indigenous people[35]. Participation and inclusion for all project beneficiaries must be active, and not limited to participation by information sharing only. It is observed across the project reports that such active participation approach was adopted in the implementation of the project. Continuous participation in the implementation of Energy Efficiency projects has been proven as critical to project success.

B. Causal Pathways from Project Outcomes to the Project's Intermediate States

110. The reconstructed TOC perceives that in the near to long term after the implementation of the project, the various project outcomes will result in cities

[34] Yang, W., Liu, W., Chung, C. Y., & Wen, F. (2019). Coordinated planning strategy for integrated energy systems in a district energy sector. IEEE Transactions on Sustainable Energy, 11(3), 1807–1819., Riahi, L. (2016). District Energy in Cities. District Energy in Cities. https://doi.org/10.18356/64a77df3-en

[35] Ferreira, M., & Almeida, M. (2015). Benefits from energy related building renovation beyond costs, energy and emissions. Energy Procedia, 78, 2397–2402. https://doi.org/10.1016/j.egypro.2015.11.199

continuing to commit significant resources into the deployment of DES, which can be assessed through their budgetary provisions and reforms in this regard. Again, learning cities would have evolved to be able to adopt commitments to join the DES, undertake assessments and implement systems. The project Intermediate States is thus identified as cities implementing energy efficient district energy system (DES) policies and projects.

111. For the Intermediate State's result to be achieved, two major assumptions were identified: a. that governments of the pilot and upscaling cities would go beyond policy formulation to actually implement propositions adopted towards enhancing the uptake of DES, and b. that UNEP and the GEF would continue to provide support to new cities willing to adopt DES. It must be indicated that the formulation and adoption of a policy remains a declaration of intent to act, until such policies are actually implemented. This again lies on the level of implementation commitment among city and national officials, which is outside the domain of control of the DES project. The expectation that the GEF will continue providing support to cities willing to take up modern DES also depends on the medium- and long-term strategic priorities of the organisations and is not within the control of the project. These critical assumptions would ensure that outcomes would be sustained, and replication activities would be accelerated in high-potential cities.

112. A key driver to the project's Intermediate State is that the DES executing agency will institute the most effective learning strategies to help consolidate project lessons for learning cities[36]. The type of knowledge consolidated and disseminated, as well as the methods adopted in the dissemination of such knowledge is within the control of the project, hence is seen as a critical driver for providing an accelerator platform for other cities to be able to easily implement any policy actions they would take in the sustainable adoption of modern DES globally.

C. Causal Pathways from Project Intermediate States to Project Impact

113. The overall project goal in the reconstructed TOC is "Reduced GHG emissions and local air pollution due to increased energy efficiency and Renewable Energy". Successful adoption and implementation of modern DES policies, projects and institutional changes among both project and learning cities will then lead to an increased energy efficiency and an increased uptake of local renewable energy sources, particularly in the building sector due to reduced energy requirements for heating and cooling. Again, this presents an opportunity for the utilisation of waste heat as heating sources, and wastewater as cooling sources, thereby increasing the circular economy of resource utilisation.

114. Since modern DES are dependent on renewable energy technologies which are known for their lower emission levels for GHG, the project assumes that such technologies will remain cost-competitive to other alternative energy sources for heating and cooling, specifically fossil energy. Economies of scale and the use of thermal energy presents an effective way of integrating renewables into the heating and cooling sector. This will sustain the viability in terms of cost-and benefit analysis

[36] Yang, W., Liu, W., Chung, C. Y., & Wen, F. (2019). Coordinated planning strategy for integrated energy systems in a district energy sector. IEEE Transactions on Sustainable Energy, 11(3), 1807–1819.

Dinçer, I., & Zamfirescu, C. (2011). District energy systems. In Sustainable Energy Systems and Applications (pp. 389–429). Springer.

Riahi, L. (2016). District Energy in Cities. District Energy in Cities. https://doi.org/10.18356/64a77df3-en

among all relevant stakeholders and sustain deployment of DE with associated reduced emission levels.

115. Another critical assumption is that investment in renewable energy technologies and the reduction of GHG will continue to be a policy priority in all cities with the potential of adopting DES. Even though countries across the globe have signed on to global net-zero emission targets[37] the competition for scarce resources leads to nationally differentiated budget priorities. Some economies also survive largely on fossil energy development, both for their domestic and international market[38] Prioritising renewable energy technologies investment beyond the project life is thus critical for the attainment of the desired project impact.

116. A critical driver within the control of the project is that countries and cities would have access to effective market-based instruments that will make DES projects bankable in terms of cost and benefits, which can then generally reduce perceived investment risk for modern DES and motivate the commitment of resources. Such instruments can be effectively developed and disseminated sustainably based on project lessons to contribute towards the attainment of cleaner environments and associated benefits due to increased energy efficiency.

[37] Birol, F. (2021). COP26 climate pledges could help limit global warming to 1.8 C, but implementing them will be the key.

[38] Mehrara, M. (2007). Energy consumption and economic growth: the case of oil exporting countries. Energy policy, 35(5), 2939-2945.

V. EVALUATION FINDINGS

A. Strategic Relevance

Alignment to UNEP MTS and POW

117. The Project was found to align with the UNEP's Medium-Term Strategy (MTS) 2018-2021[39]. The expected accomplishments in the MTS that are consistent with planned action and results of the DES relate to the targeted outcomes for the Climate Change component, which seeks to ensure that by 2030, countries are more resilient to the adverse impacts of climate change and greenhouse gas emissions are significantly reduced. The specific 2030 planned impact of the MTS of relevance relates to impact indicators for SDG 7, which targeted "reduced emissions consistent with a 1.5/2^{0}C stabilization pathway". Two specific indicators specified for the planned outcomes are: a. emission reductions of greenhouse gases and other pollutants from renewable energy and energy efficiency; and b. share of gross domestic product invested in energy efficiency and renewable energy.

118. UNEP in the MTS thus planned to support member states in the formulation and implementation of appropriate low greenhouse gas emission development strategies, particularly in energy efficiency and renewable energy technology deployment towards the pursuit of their commitments in the Paris Agreement. UNEP thus proposed engagements and partnerships that leverage climate finance and scale up the methods, tools, assessments, and pilots of UNEP. The project components are thus consistent with such planned climate actions in UNEP MTS.

119. The Project is consistent with UNEP proposed Programme of Work for the period 2018-2019[40]. One of the three expected accomplishments of Sub-Programme 1 (Climate Change) is directly aligned with the DES initiative: Countries increasingly adopt and/or implement low greenhouse gas emission development strategies and invest in clean technologies: to be measured by number of countries that have adopted or are implementing plans, strategies or policies on energy efficiency, renewable energy and/or cleaner technologies. The planned mitigation strategy by UNEP for the Programme of Work period towards this outcome is to continue strengthening partnerships such as the Sustainable Energy for All (SE4ALL) initiative which includes the District Energy in Cities initiative and other parallel initiatives such as the Global Fuel Economy Initiative, the Global Efficient Lighting Partnership Programme (en.lighten), the Global Efficient Appliances and Equipment Partnership, the United for Efficiency (U4E) initiative among others.

120. A key development strategy by UNEP is the Bali Strategic Plan (BSP)[41] , which aims to "strengthen the capacity of governments of developing countries through targeted capacity building within the mandate of UNEP, using and sustaining the capacity of technology obtained through training or other capacity building efforts, and developing national research, monitoring and assessment capacity that supports national institutions in data collection, analysis and monitoring of environmental trends and in establishing infrastructure for scientific development and

[39] The 2018-2021 MTS of the UNEP can be accessed at https://wedocs.unep.org/handle/20.500.11822/7621

[40] The approved UNEP Programme of work and budget for the biennium 2018–2019 Report of the Executive Director can be accessed at https://wedocs.unep.org/handle/20.500.11822/7707

[41] https://wedocs.unep.org/bitstream/handle/20.500.11822/26642/Annex%202%20to%20the%20briefing%20on%20South-South%20Cooperation.pdf?isAllowed=y&sequence=1

environmental management (that will ensure sustainability of capacity building efforts)". All actions of the DES initiative are found to be consistent with capacity building of governments, hence a strong alignment is observed between the DES and the BSP priorities of UNEP.

121. Rating for Alignment to UNEP's Medium-Term Strategy, Programme of Work and strategic priorities is *Highly Satisfactory*.

Alignment to UNEP/GEF/Donor Strategic Priorities

122. The DES initiative aligns with the funding priorities of the GEF Operational Programme and was approved during the GEF-6 programming directions (2016-2018). The programme's alignment with the Climate Change Mitigation focal area is reflected in the goal of the GEF-6 CCM strategy which sought to "support developing countries to make transformational shifts towards low emission, resilient development path". The various project components (Component 1 to 4) fall within the GEF 6 strategic priority, CCM-1 Program 2: Develop and demonstrate innovative policy packages and market initiatives to foster a new range of mitigation actions

123. It must be noted however, that even though the DES was approved under the GEF-6 operational phase, it remains very relevant to the GEF-7 programming directions (July 2018-June 2022), particularly the Focal Strategic Objective 1: "Objective 1: Promote innovation, technology transfer for sustainable energy breakthroughs"[42].

124. The alignment of the project to UNEP/GEF/Donor Strategic Priorities is thus rated *Highly Satisfactory.*

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

125. The DES initiative is of particular relevance to the Global Sustainable Development Goals (SDGs). The planned actions and outcomes are of particular relevance to key targets of SGD 7, 11 and 13 as below:

SDG 7- Ensure access to affordable, reliable, sustainable and modern energy for all.

- Target 7.1: By 2030, ensure universal access to affordable, reliable and modern energy services
- Target 7.2: By 2030, increase substantially the share of renewable energy in the global energy mix
- Target 7.3: By 2030, double the global rate of improvement in energy efficiency

SDG 11 - Make cities and human settlements inclusive, safe, resilient and sustainable

- Target 11.1: By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums
- Target 11.6: By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management

[42] https://www.thegef.org/sites/default/files/publications/GEF-7%20Programming%20Directions%20-%20GEF_R.7_19.pdf, see pg 37

- Target 11.a: Support positive economic, social and environmental links between urban, peri-urban and rural areas by strengthening national and regional development planning

SDG 13 - Take urgent action to combat climate change and its impacts

- Target 13.2: Integrate climate change measures into national policies, strategies and planning

126. The project goals were further consistent with regional GHG emission reduction priorities in the target countries reflected through their NDC targets and were of relevance to governments' climate action priorities in the implementing countries at the time of its implementation, as well as with the GEF funding priority for Climate Change Mitigation. Specific country-based alignments are presented in the following:

Chile

The DES initiative aligns with the following national priorities of Chile:

- *Alignment with the National Energy Strategy 2012-2030:* This is a policy document that has been adopted by Chile's National Energy Commission (CNE). The policy outlines the commitment of the commission to expand the sector's capacity by supporting the use of non-conventional renewable sources. The Strategy contains six main pillars, with the two most relevant pillars being: a. increase in the use of non-conventional renewable sources, and b. promotion of energy efficiency.
- *Alignment with key targets of Chile's Energy Policy (Energy 2050):* The Energy Policy defines a vision of Chile's energy sector by the year 2050 as reliable, inclusive, competitive and sustainable. The principally relevant energy targets for 2050 are:
  - The GHG emissions of Chile's energy sector are in line with the thresholds defined by international guidelines and with the corresponding national emissions reduction goal, making an important contribution to a low carbon economy,
  - Regional and local territorial planning and land-use instruments are in line with the guidelines of the Energy Policy,
  - At least 70% of the electricity generated in Chile will come from renewable energy sources (60% by 2035),
  - 100% of new buildings meet OECD standards for efficient construction, and are fitted with intelligent energy control and management systems,
  - Improvement of energy producers, distributors, consumers and users' behaviors.
- *Intended Nationally Determined Contribution:* Chile has submitted its Intended Nationally Determined Contribution (INDC) in 2014. The country set an unconditional target of a 30% reduction of GHG emissions-intensity of GDP below 2007 levels by 2030. The conditional target is a 35–45% reduction of GHG emissions-intensity of GDP compared to 2007 by 2030. The overall DES goal of reducing greenhouse gas emissions thus complements the attainment of the country's INDC.
- *National Climate Change Adaptation Plan*: The energy sector targets of Chile's National Climate Change Adaptation Plan is based on measures related to energy efficiency on the demand side and the use of non-conventional renewable energy on the generation side. Thus, the DES initiative was found to be highly consistent with energy efficiency targets under the plan.
- *UNDAF:* Chile's UNDAF programme for the period 2015-2018 includes cooperation on environmental sustainability and risk management; This area of cooperation comprises the promotion of renewable energy and energy efficiency measures and encourages

holistic urban planning to resolve urban climate challenges. The partnership with the DES Initiative for the implementation of the DES in Chile shows a significant alignment.

China

The DES aligns with the following national priorities of China:

- *Alignment with the13th Five Year Plan 2016-2020:* The DES initiative extends the government's commitments on energy and carbon intensity as set in the 12th Five Year Plan 2011-2015, specifically relating to:
    - A 15 % reduction in energy intensity by 2020 (energy demand per unit of GDP)
    - An 18 % reduction in carbon intensity by 2020 (carbon emissions per unit of GDP)
    - Increasing non-fossil energy to 15 % of total energy use.
    - Reducing emissions of PM2.5 by 25 %.
- *Alignment with the general environmental targets set in the 13th Five Year Plan 2016-2020:*
    - encouraging low-carbon production and "green" lifestyle
    - raising energy efficiency
    - reducing pollution
- *Alignment with climate mitigation targets of the National Action Plan on Climate Change (2014-2020):* The plan's targets include:
    - By 2020, to cut carbon emissions per unit of GDP by 40-45% from 2005 levels
    - To increase the percentage of non-fossil fuels in primary energy consumption to 15%.
- *Alignment with the Action Plan on Upgrading and Transforming the Energy Conservation and Emission Reduction of Coal-Fired Power (2014-2020):* The specifically relevant objective of the plan includes:
    - To promote innovative technologies of energy saving and emission reduction and upgrade existing power plants with these technologies.
    - To promote the cogeneration of industrial boilers and the construction of distributed clean coal-fired thermoelectric energy centers.
- *Reinforcing the Action Plan on Prevention and Control of Air Pollution*:
    - The government has adopted the Action Plan of Air Pollution Prevention and Control (in September 2013), specifying the strictest air pollution control measures for protecting public health and reducing pollution-related diseases. Air quality in key cities should achieve the ambient air quality standard for PM 2.5 (i.e., an annual limit of 35 µg/m3) by 2030. Based on 2012 emissions, SO2, NOX, PM2.5 and VOC emissions nationwide should be reduced by at least 52%, 65%, 57%, and 39%, respectively, by 2030, and NH3 should decrease slightly.

      The modern DES thus significantly drives the attainment of such targets. The plan further provides incentive policies for green buildings, with the DES having a great potential of contributing toward such environmentally friendly buildings.
- *Alignment with China's Energy Development Strategy Action Plan (2014-2020)*
    - The relevant targets include a cap on annual primary energy consumption set at 4.8bn tons of the standard coal equivalent until 2020, with a need to limit the annual growth rate of primary energy consumption to 3.5% for the next six years.

The share of renewable energy in the total primary energy mix is to rise from 9.8% in 2013 to 15% by 2020.

- *Alignment with China's UNDAF programme for the period 2016-2020:*
    - The plan includes the priority area of "Improved and Sustainable Environment". This area comprises among others the promotion of energy efficiency measures and the reduction of emissions to mitigate the effects of disasters and climate change and strengthen the country's overall resilience. This is reinforced by the objectives of the DES initiative.

India

- *Alignment with India's 12th Five Year Plan 2016-2020:*

India's current Five-Year Plan (2012-2017), which guides overall economic policy, includes goals to:

- Reduce emissions intensity in line with India's Copenhagen pledge (to reduce the emissions intensity of its GDP by 20-25 % in 2020 compared to 2005 levels)
- Add 300,000 MW of renewable energy capacity.

- *Alignment with the National Action Plan on Climate Change:*

India's first National Action Plan on Climate Change was produced in 2008 and set out existing and future policies and programs addressing climate mitigation and adaptation. The plan identifies eight core "national missions" running through 2017, that included:

- National Mission for Enhanced Energy Efficiency; this mission focuses on enhancing energy efficiency measures in the country through four initiatives: industry, appliances, DSM and fiscal instruments to promote energy efficiency
- National Mission on Strategic Knowledge of Climate Change
- National Mission on Sustainable Habitat: Focused on promoting energy efficiency as a core component of urban planning.

The National Action Plan on Climate Change recommends a minimum share of renewable energy in the national grid of 5% in 2010, subsequently to be increased by 1% every year to reach 15% by 2020. The primary dependence of modern DES on renewable energy thus complements these targets.

- *Developing climate resilient urban centers:* The government of India in recent times has launched several schemes for the transformation and rejuvenation of urban areas including the Smart Cities Mission, Atal Mission for Rejuvenation and Urban Transformation (AMRUT) and National Heritage City Development and Augmentation Yojana (HRIDAY):
- Under the Smart Cities Mission, 100 smart cities are planned with the objective to develop new generation cities, which will provide core infrastructure and a decent quality of life to its citizens by building a clean and sustainable environment. Smart solutions like recycling and reuse of waste, use of renewables, protection of sensitive natural environment will be incorporated to make these cities climate resilient.
- AMRUT, a new urban renewal mission has been launched by Government of India for 500 cities with focus on ensuring basic infrastructure services such as water supply, sewerage, storm water drains, transport and development of green spaces and parks by adopting climate resilient and energy efficient policies and regulations.
- *Advancing the attainment of the Intended Nationally Determined Contribution:* India's INDC in 2015 targets lowering the emissions intensity of GDP by 33% to 35% by 2030 below 2005 levels, to increase the share of non-fossil-based power generation capacity to 40%

of installed electric power capacity by 2030, and to create an additional (cumulative) carbon sink of 2.5–3 $GtCO_{2eq}$ through additional forest and tree cover by 2030. For 2020, India has earlier put forward a pledge to reduce the emissions intensity of GDP by 20% to 25% by 2020 below 2005 levels. This is advanced by the adoption of modern DES.

Serbia

- *Alignment with the Energy Development Strategy of the Republic of Serbia until 2025 with projections to 2030 (Official Gazette of Republic of Serbia, No. 101/2015):* The specific strategies that align with the DES include:
    - Establishment and application of a unique tariff system for heat production, distribution and supply
    - Continuous modernization and extension of existing DH systems including increased energy efficiency and increased use of sanitary hot water,
    - Fuel change (reducing the share of liquid fuel and coal, increasing use of biomass, use of municipal waste, CHP),
    - Capacity increase of local self-governments regarding market regulation.
- *National Renewable Energy Action Plan of the Republic of Serbia (Official Gazette of Republic of Serbia, No. 53/2013):*
    - The National Renewable Energy Action Plan (NREAP) seeks to achieve a 27.3% share, thus going beyond the binding 27% target for 2020. It envisages an increase of renewable energy shares in electricity to 36.6% from 28.7%, for heating and cooling to 30% from 28.7% and for the transport sector to 10% from 0% in 2009. Accelerating the deployment of modern DES based on renewables is thus relevant to this objective.
- *Alignment with the Energy Efficiency Action Plan of the Republic of Serbia:*
    - The plan has an indicative energy efficiency target of 3.5% of the final domestic energy consumption in 2008 (0.2952 Mtoe), such that from 2010 to 2015, the overall savings of 0.3975 Mtoe (4.7%) are achieved. Among the horizontal measures, the second EEAP foresees the billing based on the actual (measured) consumption of thermal energy to the consumers connected to the district heating system, which aligns with the planned actions of the DES project.
- *Alignment with Serbia's UNDAF programme for the period 2016-2020 includes as pillar IV the area of Environment, Climate Change and Resilient Communities*: This area comprises among others the provision of support for the implementation of the Strategy for Energy Development until 2025 and the Action Plan for Energy Efficiency.

127. The relevance of the project to global, regional, sub-regional and national environmental priorities is thus rated as *Highly Satisfactory.*

Complementarity with Existing Interventions/ Coherence

128. The project fell within the scope of the DES in Cities Initiative - a global initiative launched by the UN in 2014 as one of six energy efficiency accelerators under the SE4All. The Six Accelerator Initiatives are: 1. Building Efficiency Accelerator (BEA) 2. Appliances and Equipment Accelerator 3. District Energy in Cities Initiative 4. Global Fuel Economy Initiative 5. Industrial Energy Accelerator and 6. Efficient Lighting Accelerator. It was observed at evaluation that the project team created synergies between the Project and existing relevant interventions both under the national and city government priorities, as well as within the framework of the SE4All initiative in the project cities by coordinating with local energy and environment ministries.

129. Of particular alignment with the DES at the time of implementation is the Building Efficiency Accelerator (Phase II) which aimed "to reduce greenhouse gas 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". The BEA II generally focused on the delivery of city-level efficiency and complemented ongoing governmental efforts in these countries towards the pursuit of their NDCs, SDGs and UNDAF targets, which is consistent with the overall goal of the DES initiative.

130. The extent of complementarity of the Project with existing interventions is thus rated *Highly Satisfactory*

Rating for Strategic Relevance:	**Highly Satisfactory**

B. Quality of Project Design

131. The quality of the project design sought to analyse the project development processes, nature of stakeholder engagement in the design of the project, clarity of planned actions and targets, implementation structure and risk mitigation measures among others which are stated in the Evaluation Framework. Review of secondary data, virtual Focus Group Discussions and key informant interviews with local stakeholders was used to assess this criterion. Key issues analysed include the following:

- the extent to which the project provided a comprehensive stakeholder analysis that addresses the needs of all relevant stakeholders who are affected by or who could affect (positively or negatively) the project
- involvement of main stakeholders been involved in the design of the project, and their level of involvement
- responsiveness of project to the needs of relevant groups such as the vulnerable, indigenous people and comprehensiveness in addressing gender issues
- the extent to which roles and responsibilities of the key stakeholders facilitates project delivery and effectiveness
- adequacy of mediation measures for all risks

Findings on the strengths and weaknesses of the project design based on the aforementioned issues are presented in the following:

Project Design Strengths

132. A comprehensive case was made in the Project Document on the background (the problem) and relevance of the project. Existing business models for district energy systems were well described, their preconditions of successes were well-articulated, and their strengths and challenges were well highlighted, with specific emphasis on variations and similarities within the various contexts of the different countries. Even though a global methodology for collecting heating and cooling data for city-wide district energy plans and policies was well proposed in the project, the subsequent approach adopted in the implementation of the DES in the project made room for local adaptation of the DES business model in each country.

133. The planned methodology for the implementation of the various project components, as well as the management structure that was established at the global levels and country levels (including city levels) were based on sound logic

and a thorough identification of relevant partners. Preliminary assessments and light touch activities provided a learning foundation for the implementation of "deep dive" activities. The implementation of a monitoring framework then facilitated the tracking and understanding of the changes emanating from the DES, and then the results would be used to implement the outreach tools, and training component to facilitate national and international replication. Through all these phases, the roles of each of the major stakeholders identified from among the project management team, country level stakeholders were well developed.

134. The design spelled out SMART indicators of the expected project outputs, even though there were minor deviations from the UNEP's definitions for project results. The given sets of indicators for each output as specified in the logical framework would be adequate to measure the attainment of the objectives of each sub-component of the project. The project results framework provided a clear description of the planned outputs, outcomes and objective of the DES. There was clarity in the baselines provided for each target, which enabled the extent to which project performance could be adequately assessed. This was very useful in assessing how responsive the project was to the specific problems that it sought to mediate.

135. Given the size of the project, and the nature of planned activities for the USD2,000,000 allocated GEF funding, the Evaluator finds that the project activities were kept within realistic limits, and adequate strategies to leverage on support from other partners towards meeting the objective of assisting developing countries to accelerate their transition to low-carbon emissions through the adoption of modern DES were well developed.

136. The project design provided effective governance and supervision arrangements across all countries. The arrangements are similar in all the project countries, with major variations being the stakeholder groups and not the implementation structure. This provides for effective monitoring of project activities and creates room for leveraging local institutional capacities resources and skills effectively in the implementation of the project.

Project Design Weaknesses

137. The project design did not provide specific engagement strategies for local people such as property owners and property developers at sub-city level. While this can be argued to be due to the fact that it adopted the form of a capacity assistance intervention for cities, local people have a key role to play in the development of District heating and cooling systems, given that these systems benefit all citizens. The assumption that enhancing capacities of city officials and assisting in the development of policies at such engagement levels would be enough to achieve planned intermediate states and project impact as it appears from the project implementation methodology is highly risky. While the Annex N of the Project Document contained a completion of the Environmental and Social Safeguards checklist which appropriately recognised that DES projects have potential effects on property rights on resources such as land tenure, representations of indigenous groups in project cities were not majorly included in the stakeholder analysis of the project, with limited arrangements in the project design for their active participation in the various Technical Assistance programmes. In subsequent engagements with city officials from India for example at evaluation, there was a consensus on the limited responsiveness of the project design to participation of certain key local people, even in for example webinars.

138. Under project component 2 (District Energy Demonstrations and city-wide plans, "deep dive"), the project outputs (specifically output 2.2 and 2.3) suggested an actual committal of resources (investment) across pilot demonstration projects. However, the outcome 2 indicator 1, which aligned to the same outputs, was limited to measurement using the number of Expressions of Interest (EOI) for demonstration project investment issued by the city alone. The number of shortlisted investor bids approved by the cities was then specified as indicator 2 of outcome 2, with a limited definition of how this "commitment" would holistically translate into the attainment of the required outcome for project component 2. While this can be explained by the project's relatively shorter life span, vis-à-vis the quantum of change that the project intends to produce, the lack of comprehensive indicators threaten the likelihood of sustainability of results under this project component.

139. While the project contains a logical framework that links project outputs to outcomes and expected project impact, the causal relationship between these components were not sufficiently explained in the project's ToC at design. Again, almost all the project outputs as stated in the original formulation were in the form of completed activities, and not entirely in line with the definitions of UNEP for project results. This also includes the overall assumptions and drivers for the various intended project outputs, outcomes, and intermediate states. The presented descriptions of these results indicators vary slightly from the standards required by UNEP and were thus reviewed at Evaluation.

Rating for Project Design: Satisfactory

C. Nature of the External Context

140. Given that the project environment is an open system and is affected by stimuli from outside the control of the project, including natural, social and macro-economic variables among others, this criterion assessed the extent to which such factors affected the implementation of the DES, negatively or positively.

141. The political climate in all the project cities were found to be favourable for the implementation of the DES initiative. There was no significant impact of any macroeconomic variable in any of the participating project countries on the ability of the DES to implement its planned activities. Where slight delays were encountered (specifically in China) due to institutional factors and other executional arrangements beyond the control of the project, adequate mitigation strategies were employed, and solutions found such that project actions were successful.

142. The project implementation was met with the on-set of the COVID-19 pandemic. The major impact of this on the DES initiative was its limitation on international travels, and limitations and on face-to-face interactions. Due to this, the conferences, webinars and training workshops were carried out virtually.

143. No significant external risks thus affected the implementation of the project, except for the fact that the information on DES in general in India is not available in a concise manner. Thus, there is a possibility that some of the information regarding the initiatives of DES in India did not get captured in the National Level Report on DES in India prepared as an output of the project.

Rating for Nature of the external context: Favourable

D. Effectiveness

144. The outputs delivered by The Project[43], achievement of project direct outcomes and the likelihood of impact were assessed under this criterion. The project final report and primary data gathered from the various stakeholders are used to assess this. The assessments of project outcomes and likelihood of impact were done in line with the application of the Reconstructed Theory of Change.

Availability of Outputs

Availability of Outputs for Outcome 1: National and sub-national governments in light touch cities have increased knowledge on modern DES and those in Deep Dive cities applied the knowledge to develop and/or adopt integrated policies, action plans and proposals for modern DES

145. Output 1.1. 16 cities commit to DES initiative. By October 2021 (as per the official signed date of the DES Final report), the initial scoping of cities that were planned to be supported in Component 1 was carried out. 16 cities in pilot countries and additional 24 cities (as per Component 4) totalling 40 reportedly joined the DES. A National Project Steering Committee (PSC) was established in each pilot country, which had oversight responsibility of the project activities and its outputs in each of the 4 pilot countries, including final city selection, review of assessments, and national replication. An internal city section criteria was developed by the DES initiative to guide all city selections across the various countries.

146. In China, UNEP and NDRC co-hosted the inception meeting of the China Project of the District Energy Initiative in Yantai City, Shandong Province, on 15 September 2017. India's first meeting of the pilot team took place on August 6th, 2015, before the commencement of project actions, to define steps in developing the India Pilot including finalizing a methodology for the rapid assessment in the India context and identifying communication opportunities at COP21.

147. The following cities were selected in China: Hengqin New District, Yinchuan, Qianxi County, Boye County, Xi'an Chanba District, Boxing County, Yuncheng County, Jinzhong, Fengqiu County, Jinan, Beijing, Handan, Shijiazhuang, Huimin County, Zouping County and Shenmu. Commitment letters and strong willingness to participate in the initiative were obtained for each of these cities. However, the level of local government willingness to participate was described to be "passive" in the city selection report.

148. In India, the second pilot meeting saw the following cities recommended for rapid assessments: Bhopal, Coimbatore, Nagpur, Pune, and Thane. Further, Coimbatore, Nagpur, Pune and Rajkot are all part of the country's Smart Cities programme and Thane was at the time being tipped to eventually become the next smart city. Coimbatore, Nagpur and Rajkot in particular were found to be very good from a cooling demand perspective.

149. In Chile, the scoping activities went through two phases. These two phases were conducted with the support of the national level, Ministry of Environment and Energy, in which The Project raised the interest of 12 cities. Chile eventually selected the following cities, with evidence of the selection letters made available

[43] The outputs assessed were based on their re-formulation in the RToC.

during the Terminal Evaluation: Coronel, Coyhaique, Hualpen, Independencia, Recoleta, Renca, San Pedro de la Paz, Santiago and Talcahuano.

150. Output 1.2. City officials in light touch cities gain knowledge on the Rapid Assessment process for DES projects: 21 cities in the four pilot countries have completed their DES rapid assessments (10 in Chile, 5 in India, 5 in China and 1 in Serbia) and summary fact sheets have been prepared and published online. Four rapid assessment methodologies have been prepared and tailored to each country. All reported outputs in the form of fact sheets and Rapid Assessment (RA) methodologies were available at Evaluation.

151. In Chile, 10 fact sheets, the compilation of the 5 RA developed by Tractebel, the 3 RA developed by Aiguasol and the 2 RA developed by SSG[44]. The RA tools are made available in Excel format at the time of the Terminal Evaluation, with a reporting template made available to the various cities.

152. In China, 5 cities that were eventually selected for RA (Baotou, Ji Nan, Qian Xi, Xi An, and Yin Chuan) were provided with a methodology to help assess their district heating potential. These assessments also examined space heating´s current impacts, ongoing and planned city programmes through which district cooling could be promoted and the policy options available to each city. The methodology document was adapted from the global methodology to the Chinese context and applied. Facts sheets were published online for all cities that had Rapid Assessments conducted. Interviews for the Terminal Evaluation with Key National Counterparts indicated that it would be great to identify new pilots that would focus on District Cooling, since it would have a bigger potential. District heating is like a public service in China, hence has already been at the centre of government's actions in many cities. They suggested therefore that such an initiative should be demonstrated in non-traditional heating areas if it is to make a significant impact.

153. Given that in Serbia, Belgrade already had a District Heating System which was selected for the initiative, the DES Rapid Assessment focused on the identification of key priority areas for investment. There are three main areas in Belgrade identified to be having highest technical-economical potential for implementation:

- Interconnection of several DH networks in Belgrade
- Waste heat utilization from thermal power plant (TPP)
- Increase of share of renewables

154. The RA processes in each of the cities were effective, and officials demonstrated high degrees of satisfaction for the process, but in some cases, not entirely with the results. In India for example, the work was carried out in collaboration with the city officials. The main reservations of the city officials about the RA processes were on the findings regarding the commercial viability of DES for the identified potential applications. For some cities (Coimbatore, Pune) the results of the assessment were not very encouraging. The options of using waste for energy and waste heat from the industries for DES were also explored, but due to the location of the industries, the idea of using the waste heat at industries was not found to be feasible, thus discouraging city officials on feasibility of such options.

[44] Tractebell, Aiguasol and SSG are partner institutions that The Project engaged with for the provision of in-kind support under this project component

155. Output 1.3. Pilot cities gain awareness and partnership support for DES action: The final project report indicated that the activity has been implemented in Chile, China and India. Engagement reports with the various project cities were produced as evidence at evaluation. In Serbia, as Belgrade city was already selected the pilot initial meetings were held with relevant stakeholders and a launch workshop was organised. The consultation meeting for the forthcoming District Heating in Belgrade project (as part of the District Energy in Cities Initiative) was held before the launch of The Project on the 17th of February 2016, at the Belgrade City Hall, based on the minutes of the meeting.

156. In India, the project team visited 4 cities were visited: Pune, Maharashtra; Coimbatore, Tamil Nadu; Rajkot, Gujarat; and Thane, Maharashtra. In Thane for example, the project team actively engaged stakeholders from 25th July 2017 to 27th July 2017 (3 Days). Key engagement meetings included visits to Chatrapati Shivaji Memorial Hospital Kalwa and Kashinath Ghanekar Auditorium, meetings with the Indian Society of Heating, Refrigerating and Air Conditioning Engineers (ISHRAE)-Thane Chapter President and Vice President, meetings with the Commissioner of Thane Municipal Corporation, and meetings with the Hiranandani Developers among others. In China also, cities visited with visit reports obtained at evaluation included Baotou, Jinan, Qianxi, Xi An, and Yinchuan.

Figure 4: Engagement workshop with stakeholders from Thane, India (2018)

Source: Project Deliverables, DES Project Team

157. Other replication countries such as Tunisia, Egypt, Malaysia, Bosnia & Herzegovina, Ukraine and Mongolia have all shown interest following publicity of the rapid assessment results and communication of the project activities. These countries have gone on to be actively supported later under project component 4 activities.

158. In India, three events were held between 1-3 November 2017. A GEF launch event for the project was held with relevant stakeholders in New Delhi on 1/11/17. A dedicated national DES workshop was held the next day at New Delhi, where the initiative also announced the pilot city for the DES. A brainstorming session was

also held in Thane on 3/11/2017. All presentations, dates and letters confirm the occurrence of planned activities for Output 1.3 in the other countries. With the exception of Serbia (to which activities leading to this output were not applicable due to their advanced position in the District Energy Systems discourse), this output was reported to be achieved in all the remaining project cities. It must be noted, however, that the Evaluator found that not all project cities were connected to mentor cities. Others were connected to international organisations instead. Representatives from the four pilot cities however, attended training sessions sponsored by the Danish Board of District Heating (DBDH) and E-ON including a study tour to the city of Goteborg, Sweden, in June 2019.

- Partnerships established included:
- Temuco (Chile) and Barcelona (Spain)
- Thane (India) and Dubai, Empower, IFC, Carbon Trust
- Rajkot (India) and partners including Empower, Tabreed, Thermax, ICLEI
- Pune (India) and partners including APUEA, EESL
- Chennai (India) and partners including EESL, IFC, Tabreed
- Belgrade (Serbia) and partners including KfW, IFC, Enova, Optit,

159. Evidence of several partnership meetings that were held in each project city are available in the form of minutes and agreements on next steps that describes areas of collaboration. In India, for example, the National Institute of Urban Affairs and UNEP have agreed to provide cohort-based training. Similarly, the final report indicated that a joint centre in South China University of Technology (SCUT) was established for future training, academic research and engineering applications. Evidence of the status of the joint centre for district energy technical research and engineering applications was available in the form of partnership agreement on the District Energy in Cities Initiative website[45].

160. In Chile, learning cities participated in multiple workshops and matchmaking sessions with international and local partners, among them: the inception workshop held in Santiago June 2017, the International Heat Map and District Energy Seminar held in April 2018, the workshop on District Heating and Waste to Energy Experiences in June 2018 held in Copenhagen, matchmaking sessions with utilities in Santiago, and stakeholder coordination training.

161. In India, a stakeholder coordination training was organized in June 2018. The stakeholder coordination training in China was completed in 2019. Evidence of both meetings in the form of minutes and presentations are made available at Evaluation.

162. <u>Output 2.1. Deep-Dive cities have received technical training and planning support through a strengthened coordination structure:</u> two levels of training modules were implemented for this output and the modules that were developed to facilitate the trainings were made available at evaluation: Global level training modules (made up of six different training themes), and national level training modules (8 training themes for China, 5 training themes for Chile, 12 training materials for India, and 2 training modules for Serbia).

[45] See description of the joint center at https://www.districtenergyinitiative.org/joint-centre-research-and-engineering-established-china-accelerate-district-energy-implementation

163. The training modules addressed among other key issues, themes relating from fundamentals of District Energy Systems, Stakeholder Coordination processes, Energy mapping, investment strategy development, business models development and other key issues. The multi-level stakeholder coordination occurred as a continuous process through the implementation of the project, with some details of evidence reported earlier under output 1.4.

164. Output 2.2. National and local governments of deep-dive cities create a conducive investment environment for both public and private sector investment towards the implementation of modern DES demonstration projects which have been agreed upon and investments are committed: The project final report indicated that assessments performed in the four pilot cities have evaluated the short and long-term technical and economic potential of developing district energy. These assessments included the analyses and identification of suitable business models and procurement options for each project. They also included pre-feasibility studies of two planned projects in Temuco and Coyhaique, Chile. In china, two pre-feasibility reports containing results of the technical and financial analysis of pilot projects in Changdao and Dongyulanting in Chanba, Xi'an, respectively were obtained at evaluation. Both of these projects are recommended to use technologies of either renewable or clean heating sources, e.g. geothermal and waste water heat pumps, as to demonstrate the clean district heating in Chanba. Publications were prepared of the published materials (see example of some findings for Temuco city in Figure 5) and were made available at evaluation. It is not clear however, the extent to which the publications were made available to the public.

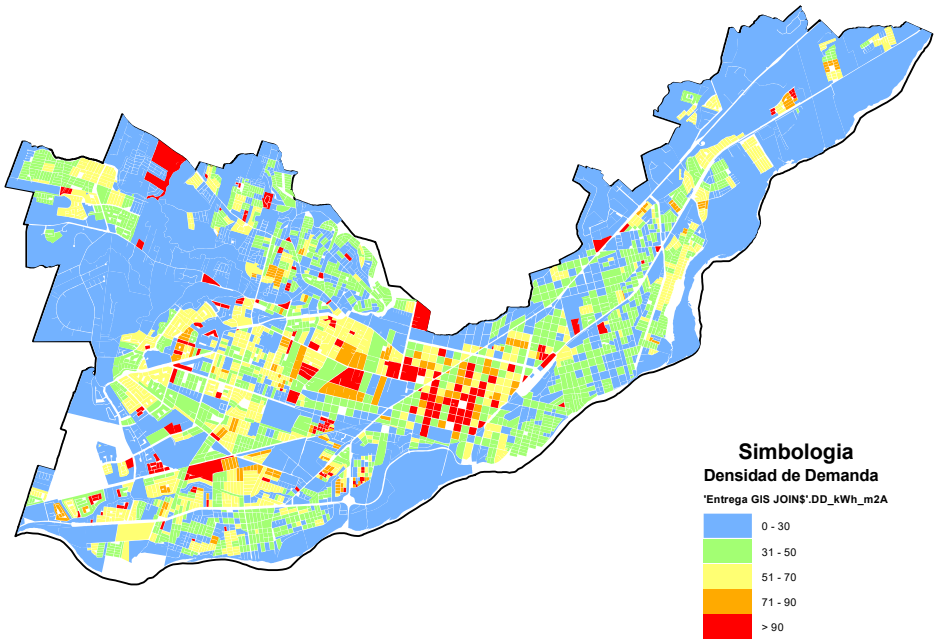


Figure 5: Temuco Territorial demand density

Source: City-wide Deep Assessment Report for Chile, A Deliverable by the Project Team

165. Beyond the planned assessment of 4 cities, two additional deep assessments have been performed in Chile due to extra solicited co-finance support from the

Ministry of Energy. These assessments were for the cities of Coyhaique and Puerto Williams. For this activity The Project engaged multiple local stakeholders including local utilities, authorities, real estate developers, and investors to identify suitable business models adapted to each project.

166. In Serbia, a deep assessment was performed of the whole city network including interconnection opportunities, metering strategies and opportunities for renewables and included energy mapping and led to adoption of a city plan on district energy. Thus, the effectiveness of the project got restricted to the creation of awareness regarding the concept as a means of meeting the heating and cooling requirements of the buildings. Evidence on the results of the assessment at Evaluation were obtained in the form of summary of the presentation of the findings, and an associated presentation document, including an implementation plan for solar Therman connections.

167. For the deep dive cities, pre-feasibility studies were carried out, however, the results of the Key Informant Interviews with city officials from India, and global virtual discussions with Key National Counterparts from other countries suggest that the information/data in the pre-feasibility studies are not sufficient to decide in favour of implementing DES, or to plan for investment. The Evaluator observed that in Chile, National building codes would restrict the construction of power units in urban areas. The Ministry of Energy and the Ministry of Housing and Urban Development were working towards allowing them.

168. The Evaluation Team found some significant dissatisfaction with the pre-feasibility process among officials, particularly in India. While the project successfully introduced the concept of DES in India and stimulated stakeholder interest in cities such as Coimbatore, the study did not demonstrate actual evidence on the commercial/financial viability of the DES concept. Also, the savings in energy (GHG mitigation assessment) was not detailed in the pre-feasibility study. The pre-feasibility study was also carried out for the two prospective locations in Thane (one green field project and one brownfield project) which demonstrated good financial feasibility. Thus, the DES project in India could not fully address the question of the commercial viability of the concept of DES under Indian conditions.

169. Evidence of the existence of this output (particularly on the commitment of investment) showed some significant variations. In the case of Chile, two projects, one in Temuco and another one in Coyhaique are reported in the final project report to be following the country's standard procedure process to procure infrastructure that falls under the category of "public interest". These two projects have been submitted for evaluation to the Ministry of Public Works.

170. In addition to these two projects, the regional government committed investment and issued a Request for Proposal for the detailed engineering of another project in the city of Coyhaique. The letter described the regional government's commitment to invest 1.900 million pesos (2.6 million USD) to develop a pilot district heating project in Escuela Araucanía. The project of Escuela Araucanía was identified and analysed in the rapid assessment developed by the District Energy Initiative. All other letters confirm EOIs and investment commitment in Chile.

171. In China, the ChangDao clean heating project has been selected as a demonstration project and its construction is planned for 2021. The Evaluator did not find evidence of the selection process nor the implementation plan. In Coyhaique (Chile) city officials interviewed for the TE explained that there are no private sector companies at the moment with the capacity to take up such

initiatives, so most projects have to depend on the public purse. The officials attempted to bring some private companies on board during and after the DES, but the initiatives failed due to some issues like change of management in those companies.

172. In Serbia, The Project supported the city to prepare the procurement plan for the demonstration project. Belgrade is taking forward assessed investment opportunities in interconnection through its publicly owned heat utility, bypassing the need for EOI. This investment has been specifically committed in the city's adopted district energy action plan. The utility is considering investment in the assessed solar thermal project with potential support from EBRD. A support letter (with no date) from the UN Environment to the EBRD towards joint support for scaling-up the District Energy in Cities activities in Belgrade, Serbia was accessed at evaluation. A comprehensive action plan for the upscaling for the period until 2025, with a possible extension to 2030 was also made available.

173. In India, Hyderabad Pharmacity (India) went through a Request For Proposals. The proposed investment project intends to adopt a Public Private Partnership model between Telangana State Industrial Infrastructure Corporation Limited (TSIIC)- a State Implementing Agency (SIA) and Hyderabad Pharma City Limited (HPCL)- a 100% subsidiary of Telangana State Industrial Infrastructure Corporation (TSIIC) incorporated for implementation of Hyderabad Pharma City Project. In the evidence obtained in form of the bid structure, the Hyderabad Pharma City project is to spread across 19,333 acres, located in Kanduku Yacharam and Kadthal mandals of Rangareddy District, Telangana State.

174. Output 2.3 4 deep dive city governments agree on policy and investment recommendations for DES Evidence on the city-wide plans and assessment reports for the 4 deep-dive cities were duly obtained at evaluation.

- In Chile, the following city-wide plans were available (all in Spanish): Temuco, Puerto Williams, and Coyhaique
- China: While a preliminary City-wide report is available, due to the data gaps in quality and quantity as well as the restrictions of COVID, it is necessary for the pilot city of Chanba, Xi'an to execute further analysis to address some solutions on the basis of the recommendations in the city-wide assessment report for a comprehensive and adequate city-wide plan.
- Serbia: City wide assessment report prepared by CERNER21, ENOVA, University of Belgrade, RES Foundation and OPTIT is available.

175. Output 2.4. City and national officials and receive training from a dedicated national stakeholder and policy recommendations and apply the lessons to address barriers and accelerate the uptake of DES: Synthesis reports on policy recommendations for local and national officials have been developed and so have trainings for in-country use. Notably, evidence on the city-wide report of India could not be sighted at the time of this evaluation.

- In Chile, a comprehensive synthesis report dated Julio de 2020, Santiago de Chile, stemmed out of part of the actions derived from the actions derived from the Master Plan
- The report on China outlines, among other things, recommendations on how other cities can adapt the project development methodologies of district energy, including rapid assessment reports towards the development of modern district energy systems can support cities to achieve their carbon neutral targets

- The report of Serbia presents comprehensive description of methods and lessons that can be learnt for upscaling of modern DES

176. The availability of outputs for outcome 1 is thus rated *Satisfactory*.

Availability of Outputs for Outcome 2: Project cities have effective GHG emission systems to track local outcomes from DES projects

177. Output 3.1. Deep Dive cities have integrated monitoring frameworks for DES into existing structures: 4 City-level monitoring frameworks have been developed in cities in India, Chile, China and Serbia. Specifically, Monitoring, Reporting and Verification plans for Belgrade, Chanba, Temuco and Thane are available.

178. Output 3.2. City officials and national governments receive training on monitoring tools and indicators: Joint training on MRV frameworks delivered to city and country officials in a global Meeting hosted in June 2019 and indicators have been prepared. A total of 76 participants from different cities in Malaysia, Serbia, Chile, Argentina, Mongolia, Morocco, Tunisia, Egypt, India, and China was obtained at evaluation. However, the participant list was not disaggregated on gender basis for an in-depth analysis of the gender representativeness of the engagement.

179. Key details of topics that were covered during the various MRV training workshops in June 2019 included:

- DES MRV and Development of a City-level of DES MRV Framework
- A Set of National-level Indicators to Monitor DES Development
- Designing and implementing monitoring plan at project level - barriers and possible solutions, examples
- Institutional setup for DES MRV and statistics
- DES MRV experience sharing and Discussions
- Wrap-up of the training and future work

180. A Guidance for an MRV Framework of District Energy Activities in Cities, dated September 2019, has been published[46] to provide useful reference and step-by-step assistance to cities on tracking the progress and the impact on city-wide district energy systems, including how to take stock of greenhouse gas emissions and sustainable development outcomes. This was complemented by a publication dated December 2019 on International Good Practices and Methodologies on the Monitoring and Evaluation of District Energy Systems at city level. It is not clear at the time of evaluation however, how the guide was used through the implementation of subsequent Project activities.

181. The availability of outputs for outcome 2 is thus rated *Satisfactory*.

Availability of Outputs for Outcome 3. Learning cities adopt lessons learnt from DES project to develop their own integrated DES policies and action plans

182. Output 4.1. Awareness levels on benefits of DES increased nationally and globally: The DES project team continuously worked on raising awareness about

[46] See https://www.districtenergyinitiative.org/sites/default/files/publications/guidance-des-mrv-frameworkfinal-11092019539.pdf

DES in every meeting, workshop and event that the team organized and attended. The team took part in total of 83 workshops and meetings, out of which 48 were organized by the Project (funded by GEF and other donors). These numbers refer to the total number of workshops the team has organized throughout The Project. During the implementation of the project (2017-2022), the project team has organized 23 workshops and meetings and participated at 10 conferences.

183. The Project results have further been communicated on different platforms globally and locally. All evidence on communication that were reported in the final project report are accessible at evaluation. For example, the European Energy Innovation Magazine, Winter 2018, is one platform where actions have been disseminated.

184. The project's awareness creation and communication model encouraged investment by partnering early in market development to prepare financially sound projects. In Banja Luka, a city in Bosnia and Herzegovina which is a replication country, this approach unlocked US$22 million in project finance to upgrade the city's 35-year-old network. Engaging relevant and diverse stakeholders from the beginning proved vital in turning uncertainty on the district heating network's future into an agreed financing plan and new business model and leading the project to market with a US$9.8 million investment loan from the EBRD.

185. A DES Virtual Platform is created to enhance and deliver outreach actions and training programs. This platform is available and hosts materials, trainings, webinars and news and is complemented by the Knowledge Management System on C2E2 website. The DES initiatives' project results have been communicated on different platforms including the Yearbook of Global Climate Action of 2018.

186. The District Energy in Cities initiative under which The Project was implemented has the twitter account as 'UN District Energy' @iDistrictEnergy which was leveraged to disseminate the activities of The Project, activities of the project partners at all levels (global, national, city and expert levels), as well as links to and retweets of useful publications on District Energy Systems. For example, on September 9, 2020, a Meeting of different stakeholder representatives from the Ministerio de Energía, Ministerio del Medio Ambiente de Chile, Agencia de Sostenibilidad Energética (AgenciaSE) and the UNEP to launch a new project that would further Chile's district energy ambitions was announced on the platform, with an appropriate zoom link for participants to join provided. Since its creation from November 2015 the page has total 915 tweet, 574 likes, 138 photos & videos, and 1253 followers till date. It shows that in 6 years and 6 months till May 2022, the global twitter page of the initiative that was used to disseminate the project's activities between 2017 to 2021 has room for improvement in outreach. There is need of proactive participation of the twitter page handler with daily tweets, interactions, invites, upload of news/articles/photos/videos etc. which should attract more stakeholders and spread the results of the initiatives for better scalability and replication.

187. The initiative leveraged on global actions such as COP 26[47] to accelerate outreach. The event was organized in the Nordic Pavilion as a side event organized by UNEP-DTU, German Agency, and the Danish Energy Agency. It addressed issues regarding the basics of city-level energy needs for DES, Heating/Cooling, and

[47] A recording of the event at COP 26, https://www.youtube.com/watch?v=7tLIsw2QZxc

Building Energy Systems among others. DES initiatives challenges were also discussed during the event.

188. While the project did not have a specific website, it leveraged on the website of the DES initiative to disseminate its actions, undertake knowledge management activities, and provide a platform for exchange of useful information among stakeholders. The relative simplicity in interface and its user-friendliness suggests that whoever wants to visit the site can easily refer to the website-specific link[48] and visit the site. The website is searchable and accessible only with the name 'District Energy Initiatives' and not with other similar keywords such as District Energy System, SE4ALL initiatives, UNEP DES initiative, and different keywords related to the project.

189. The project team can link such project-related keywords with the Search Engine Optimization (SEO) to make them easily searchable and accessible. The DES project website is user-friendly in terms of internal tabs and sub-tabs access with clarity. Summary of content hosted on the website and relatedness to promoting DES. The content hosed over the DES project website is relevant and in brief covers most of the relevant content such as indicators, cities, initiatives, Mode, Governance, Partnerships, News, etc. The Evaluation Team attempted to obtain statistics on accesses to the website for the time of implementation of The Project from the host (Project Team), but the data was not obtained at the time of preparation of this report.

190. The project's knowledge management system on the C2E2 website link has easy accessibility for the users, whoever wants to visit the site can easily refer to the website-specific link and visit the site and go to the Knowledge management system tab to access it. The website is searchable and accessible only with the name 'Copenhagen Centre on Energy Efficiency' and not with other similar keywords such as District Energy System, SE4ALL initiatives, UNEP DES initiative, and different project-related keywords related to the project.

191. The project team can link such project-related keywords with the Search Engine Optimization (SEO) to make them easily searchable and accessible. The C2E2 UNEP website is user-friendly in terms of internal tabs and sub-tabs access with clarity. The content hosed over the C2E2 website and under its knowledge management system tab are relevant and in brief covers most of the relevant content with filter searchable criteria such as knowledge objects, sector, country, and publishing year. One can easily access, filter, and search specific publications under the knowledge management system tab.

192. <u>Output 4.2. Officials of newly signed up project cities receive training on rapid assessment methodology for DES:</u> Trainings and workshops on regionally tailored rapid assessment methodology were delivered at different times across the different phases of the project. A total of 12 training webinars were planned at project approval. However, a total of 17 training webinars were reported to have been prepared and delivered in cooperation with the Copenhagen Centre on Energy Efficiency (C2E2).

193. It was observed at evaluation that training activities towards this output were linked with training activities under Output 1.3 described previously. Key deliverables that were made available at evaluation in assessing this output were summaries and extended versions of Rapid Assessment methodologies, and a

[48] See link to website at https://www.districtenergyinitiative.org/

compilation of frequently asked technical questions from building developers and end-users on District Cooling Systems. Details on participant list for the various training sessions (including gender-disaggregated information on participants) across the various countries however were not obtained during the evaluation.

194. National counterparts that have made their Rapid Assessment Methodology, reports and the dissemination material in Chile include the Ministry of Energy[49] and the Sustainable Energy Agency, Chile[50]. In India, the RA methodology was published on the 2nd of November 2017 at a national workshop entitled "District Energy in Cities Initiative in India" - launching the project activities in India and announcing the pilot city of Thane. Evidence on the publications were available at evaluation.

Output 4.3. New cities are connected to potential funding organisations At least 7 matchmaking sessions took place. Funds have been raised for 5 additional RAs in Chile that includes a pre-feasibility study with support of partner co-finance.

- Match-making session during the Malaysia District Energy Forum: Scaling up Investment for Low Carbon Cooling and Heating to raise funds for RA to be performed in Iskandar Region
- 2 match-making sessions in Bosnia and Herzegovina to raise funds for the feasibility study in Banja Luka.
- One in Tunisia, a replication country (funds raised by Italian Government)
- One in Egypt, a replication country (funded by K-CEP).
- One for the Hiranandani Estate project in Thane, India
- One with ESCOs for projects in Chile.

195. The availability of outputs towards outcome 3 is thus rated *Satisfactory*.

196. Overall, the availability of project outputs is rated *Satisfactory*.

Achievement of Project Outcomes

197. Following a revision of the various project outcomes in the Reconstructed Theory of Change (with appropriate justifications), the following three (3) outcomes were assessed:

- **Outcome 1:** National and sub-national governments in light touch cities have increased knowledge on modern DES and those in Deep Dive cities applied the knowledge to develop and/or adopt integrated policies, action plans and proposals for modern DES
- **Outcome 2:** Project cities have effective GHG emission systems to track local outcomes from DES projects
- **Outcome 3:** Learning cities adopt lessons learnt from DES project to develop their own integrated DES policies and action plans

198. Achievement of Project Outcome 1: National and sub-national governments in light touch cities have increased knowledge on modern DES and those in Deep Dive cities applied the knowledge to develop and/or adopt integrated policies, action

[49] Accessible at (https://energia.gob.cl/educacion/energia-distrital

[50] Available at https://www.agenciase.org/energia-distrital/

plans and proposals for modern DES: This is evaluated as function of activities under project components 1 and 2.

199. From the delivery of various project outputs, including the demonstration activities, city officials have demonstrated an increased knowledge in the benefits of modern DES, and have embarked on actions to translate the knowledge and competencies acquired for the development and/or integration of policies and action plans in their cities.

200. In Chile, a National District Energy Committee chaired by the Ministry of Energy and co-chaired by the Ministry of Environment and the Ministry of Housing has been created with support from UNEP. Also, a new department focused on district energy was established under the Ministry of Energy, and a National District Energy Office has been created at the Sustainable Energy Agency, with these actions reflecting a change in policy action towards attainment of revised outcome 1. The demonstration projects for which commitment has been issued for implementation is a further indication of drive towards the attainment of this outcome. This includes the various requests for proposals that have been made in deep dive project cities, particularly in Coyhaique.

201. Similarly in China, the UNEP DTU Partnership, together with the South China University of Technology has embarked on accelerated action through the replication of lessons learnt from the DES initiatives in the form of new projects or retrofitting of existing buildings. As of March 2021, investment offers for the private sector led Xi'an Chanba demonstration project and Thane Hiranandani project have already received investment offers.

202. India has similarly demonstrated progress towards the attainment of this outcome in the actions towards the Hyderabad Pharmacity project. As of February 2022, it has been reported that the Telangana State Industrial Infrastructure Corporation (TSIIC) has floated tender for the development of a District Cooling System (DSC) in the Zone-3 of Hyderabad Pharma City on PPP mode. This reflects a commitment to translate lessons learnt from the DES project outputs under component 1 into revised outcome 1. The Hyderabad Pharmacity (India) went through a Request for Proposals (RfP) in the third and fourth quarter of 2021 towards translating demonstrated results under component 2 into revised outcome 1.

203. Serbia with support from CTCN technical assistance and the Korean Government, KDHC and Yujin Energy have initiated policy and action drive towards accelerating proposals for solar thermal district heating projects. District Energy team in Belgrade is working with the city of Belgrade and Belgrade Utility Company on undertaking a study on interconnection potential, developing an interconnection model that demonstrates significant progress towards project outcome 1. Belgrade has out forward investment plans to interconnect its publicly owned heat utility, thus a significant drive achieved under project component 2 activities towards revised outcome 1.

204. The achievement of revised outcome 1 is thus rated ***Highly Satisfactory.***

205. Achievement of Outcome 2: Project cities have effective GHG emission systems to track local outcomes from DES projects: The process of quantifying cooling demand in a city for example, is described as one that is difficult, given that the data are often hidden within a building's total electricity costs, with no direct provisions for measuring cooling energy delivered. Similarly with heating, if a heating fuel or energy source has multiple uses, it becomes difficult to quantify proportions directly applicable to building heating. The generic MRV framework

developed by the DES initiative sought to introduce tools that will help to increase the reliability of data for such purposes.

206. However, while evidence of the development of various city-level monitoring frameworks in pilot cities for district energy has demonstrates incorporation of project outputs into local strategies- a drive towards realisation of revised project outcome 2-, there are significant gaps in the ability of cities to develop, and actually implement MRV frameworks post-the implementation of the DES.

207. India's government has adopted the incorporation of output experience from project component 3 activities into the country's Smart City Plans with UNEP support. This includes the monitoring and tracking of emissions in the proposed smart cities. However, there is insufficient evidence on the ability of the project cities to track their emissions and sustainable development outcomes of DES action.

208. In Serbia, the City Assembly adopted the District Energy Action Plan for Belgrade that specifies clear indicative targets, including emission reduction targets that would facilitate monitoring and tracking of progress. In China, the metering strategy includes guidelines on track emission reduction, and in Chile district heating is incorporated in local decontamination plans, with both plans specifying clear emission reduction targets to be measured and verified. Given the accompanied challenges, the DES initiative and its partners are continuing to work with the cities to adopt MRV requirements as late-stage project development actions, and often in collaboration with other city-wide emission tracking actions.

209. Add sentence on the extent to which the targets for outcome 2 were achieved, possibly add a table showing outcome targets, planned number and actual number and extent to which targets were achieved. This will increase help readers of this report.

210. The attainment of revised outcome 2 based on the evidence observed at evaluation is thus rated as *"Satisfactory".*

211. Achievement of Revised Outcome 3: Learning cities adopt lessons learnt from DES project to develop their own integrated DES policies and action plans:

212. A significant number of cities have made stakeholder commitments and have commenced actions to adopt DES and integrate it in their local plans due to the project activities, including continuous stakeholder engagement actions, dissemination of project actions, and provision of knowledge management resources by The Project.

213. At the end of the project, it was reported that 40 cities (including the pilot cities for this project) have joined the initiative due to the project activities, even though the complete names of the 40 cities was not attached to the report (See Final Project Report). At evaluation however, a total of 37 cities were identified in the city contact list that was made available, and are presented in Table 6 below:

Table 6: List of DES Cities obtained at Evaluation

SN	City	Country
	Deep-Dive Cities	
1.	Temuco	Chile
2.	Chanba Ecological Area (CBE)	China
3.	Rajkot	India
4.	Thane	India
5.	Belgrade	Serbia
	Light Touch Cities	

SN	City	Country
1.	General Alvear	Argentina
2.	Ubajay	Argentina
3.	Banja Luka	Bosnia & Herzegovina
4.	Coronel	Chile
5.	Coyhaique	Chile
6.	Hualpen	Chile
7.	Independencia	Chile
8.	Puerto Williams	Chile
9.	Recoleta	Chile
10.	Renca	Chile
11.	San Pedro de la Paz	Chile
12.	Santiago	Chile
13.	Talca	Chile
14.	Valdivia	Chile
15.	Jinan	China
16.	Qianxi	China
17.	Xian	China
18.	Zhengzhou	China
19.	Zhuhai/Hengqin	China
20.	Cairo	Egypt
21.	Amaravati	India
22.	Bhopal	India
23.	Coimbatore	India
24.	Hyderabad Pharma city	India
25.	Pune	India
26.	Iskandar	Malaysia
27.	Bayanchandmani	Mongolia
28.	Kharkhorin	Mongolia
29.	Khonkhor	Mongolia
30.	Marrakech	Morocco
31.	Tunis	Tunisia
32.	Khmelnytskyi	Ukraine

Source: Project Cities List obtained from EA at Evaluation

214. Evidence on the increasing number of cities committing to DES action due to the project actions was obtained at evaluation. In Morocco, which is a targeted replication country, a report on rapid assessment that was conducted in Marrakech, dated May 2018 was made available. The report presents a detailed assessment of the potential of district energy (heating and cooling), with details on city classification, cooling demand and requirements, investment options and partnership options among others for the uptake of DES. Evidence of commitment engagements in Municipalidad de Ubajay in Argentina, another replication country, was obtained in the form of commitment letters fully endorsed by the vice president of the municipality. An analysis of the Berges-du-Lac feasibility study in Tunisia, another replication country, including recommendations on the best technical solution, a suitable business model and procurement options was conducted with the report dated November 2019 made available at evaluation. In India, commitment letters from the following cities were duly available at evaluation: Amaravati, Bhopal, Bhubaneswar, Chennai, Coimbatore, GIFT City, Gujarat, Hyderabad PharmaCity, Maharashtra, Nagpur, Pune, Rajkot and Thane.

215. It was reported further that a pipeline of 33 pilot projects has been identified, reflecting an excess attainment of planned targets against the 4 initially targeted by the project. A number of these projects are highlighted in the report on the DES

Partners Call meeting held on the 5th of November 2020. A consolidated list of all the 33 pilot projects across all the project was not available.

216. Based on the evidence obtained at evaluation, the attainment of revised outcome 3 is rated as "*Satisfactory*"

217. Overall, achievement of project outcomes is rated "*Highly* Satisfactory".

Likelihood of Impact.

218. Assessing the likelihood of impact assessment is based primarily on the extent to which the drivers and assumptions made are in place to advance project results towards desired impacts. The following assessments are made in response to the re-constructed ToC drivers" and "assumptions" in Figure 3.

219. The overall project goal in the reconstructed TOC is "Reduced GHG emissions and local air pollution due to increased energy efficiency and Renewable Energy". As indicated in the description of the pathways to project impact in the RToC, adoption and implementation of modern DES policies, projects and institutional changes among both project and learning cities will then lead to an increased energy efficiency and an increased uptake of local renewable energy sources, in all the project cities, the Evaluator observed that actions which have been taken towards this are being embarked upon, and have substantively been described in the project outcomes in the preceding section. This is strongly in favour of increasing likelihood of the project's impact.

220. Again, in India for example, the Evaluator found that opportunity for the utilisation of waste heat as heating sources, and wastewater as cooling sources exist and are being explored toward driving this impact, thereby increasing the likelihood of the application of circular economy use of resource utilisation in the emission reduction plans. The project's assumption that renewable energy technologies will remain cost-competitive to other alternative energy sources for heating and cooling, specifically fossil energy is in place in all the project cities, given the increasing global context of rapid investment into RE technologies. Such renewable energy technologies are increasingly becoming more cost-competitive, from both economic and environmental analytical view-points, a continuity in market behaviour in this regard implies a higher likelihood of attaining the DES impact.

221. The critical assumption is that investment in renewable energy technologies and the reduction of GHG will continue to be a policy priority in all cities with the potential of adopting DES is assessed as holding. In all the project countries, efforts during the implementation of the DES, and post-implementation action being observed among city governments suggest that this assumption is strongly holding. Even though the energy economies of almost all the project countries (India, China, Chile and Serbia) are largely fossil dependent, current government priorities in the wake of climate change have shifted towards increasing renewable shares. This implies that the economies also survive largely on fossil energy development, both for their domestic and international market. Prioritising renewable energy technologies investment beyond the project life is thus critical for the attainment of the desired project impact.

222. The driver that countries and cities would have access to effective market-based instruments to make DES projects bankable in terms of cost and benefits are in place, but limited, with opportunities for improvement. In Banja Luka (Bosnia and Herzegovina), for example, the Initiative worked with the European Bank for Reconstruction and Development (EBRD) to ensure that plans and assessments

align with the requirement of finance providers. However, city officials indicated in interviews that limited presence of financial institutions with the capacity to finance such large-capital investments threatens the ability of this driver to hold, unless a new approach is adopted to integrate multilateral financial institutions in such initiatives from the start of the interventions.

223. The Likelihood of Impact is thus rated *Moderately Likely.*

Rating for Effectiveness: Satisfactory

E. Financial Management

Adherence to UNEP's Financial Policies and Procedures

224. The financial management of the project was done by UNEP, and no deviation from UNEP's financial policies and procedures was found. None of the partners and beneficiaries in the project cities (city officials, national and city governments) managed the funds of the project. All financial management actions were done by the Project team (the UNEP Cities Unit and the UNEP Climate Change Mitigation Unit) The financial management of the project was evaluated primarily from the set of documents made available by the project team.

225. A consultation with the UNEP Cities Unit and CCM Unit during evaluation helped clarify certain observations in financial reporting, including the fact that audits were not needed for projects that are internally implemented by the UNEP across its divisions. The level of adherence to UNEP's financial policies and reporting standards is thus rated *Highly Satisfactory.*

Completeness of Financial Information

226. The project financials were found to be consistent with UNEP's financial reporting standards. Key documents were made available to the Evaluator upon request. The following financial information was made available by the Executing Agency, with the exception of an audit report:

- Expenditure reports for all the years of Project implementation
- Co-financing reports (cash and in-kind);
- Budget revisions
- Proof of fund transfers
- All relevant Project legal agreements including PCA1, PCA2, amendments, and extension applications.

227. Given that the DES was an internally executed project by UNEP, proof of funds transfers between the UNEP Climate Mitigation Unit and the UNEP Cities Unit was made available in the form a snip of the Umoja ECC for internal financial management by UNEP.

228. Letters supporting the various co-finance partners (including newly leveraged partners) have been provided. Partner reports on their actual co-finance commitment were also provided. The only observed issue with financing relates to unclarity in the role of the IFC. A co-finance letter of IFC Participation in India through unquantified in-kind support is available, but IFC was not listed on the co-finance partners' list (both in CEO approval document and the final co-finance budget). The various co-finance partner reports also indicate no evidence of

support received from IFC. Thus, it was unclear what was the reason for their subsequent exclusion from the co-finance report. The completeness of financial information is thus rated as ***Highly Satisfactory.***

Financial Tables

229. A short paragraph summarizing the two tables below with key figures (differences between planned and actual figures for instance) could be presented.

Table 7: Expenditure by Component

Component *All figures as USD*	Estimated cost at design			Actual Cost/ expenditure			Expenditure Ratio (ER)- Actual/planned	
	GEF Financing	*Co-financing*	*Total*	*GEF Financing*	*Co-financing*	*Total*	*GEF ER*	*Co-finance ER*
Component 1	349,240	2,432,942.00	2,782,182.00	346,190	3,113,409	3,459,599	0.9912667507	1.279688953
Component 2	925,740	4,503,574.00	5,429,314.00	949,196	5,232,162	6,181,358	1.025337568	1.161779955
Component 3	272,520	812,710.00	1,085,230.00	254,166	817,892	1,072,058	0.9326508146	1.006376198
Component 4	212,500	1,481,498.00	1,693,998.00	212,819	2,466,894	2,679,713	1.001501176	1.665134884
Evaluations	60,000	-	60,000.00					
Project Management	180,000	481,050.00	661,050.00	180,000	657,674	837,674	1	1.367163497
Total	2,000,000	9,711,774.00	11,711,774.00	1,942,371	12,288,031	14,230,402	0.9711855	1.265271515

Table 8: Co-financing Table

Co-financing (Type/Source)	UNEP own Financing (US$)		DANIDA (US$)		Italian MELS (US$)		Other*1 (US$)		Total (US$)	
	Planned	**Actual**	**Planned**	**Actual**	**Planned**	**Actual**	**Planned**	**Actual**	**Planned**	**Actual**
Grants			850,531	228,995	229,383	217,137			1,079,914	446,132
Loans	-	-	-	-	-	-	-	-	-	-
Credits	-	-	-	-	-	-	-	-	-	-
Equity investments	-	-	-	-	-	-	-	-	-	-
In-kind support	160,000	590,000	-	-	-	-	8,471,860	8,337,898	8,631,860	8,927,898
Other (*)	-	-	-	-	-	-	-	2,914,000		2,914,000
Totals	160,000	590,000	850,531	228,995	229,383	217,137	8,471,860	11,251,898	9,711,774	12,288,030***

Other*1: This refers to contributions mobilized for the project from its partners which is made up of the following international organisations comprising of CSOs, private sector organisations, multilateral organisations (excluding the share of UNEP in the co-financing which is separately reported).

Other (*): This refers to the additionally leveraged co-finance from other organisations/partners which were not planned at project design, reported in the overall report of planned and actual co-finance (in us$) by co-finance partner at project completion

*** While the total co-financing by project component breakdown obtained from the Executing Agency in an email dated 25th April 2022 amounted to US$ 12,288,031, the summation of project co-financing based on type and partner contributions in this table, which is computed from the co-finance budget endorsed by the Project Manager on 1st October 2021 amounted to US$ 12,288,030. A difference of US$ 1 was observed, which is statistically insignificant.

Communication Between Finance and Project Management Staff

230. An effective communication of financial information was observed between the project team, notably between the fund management officer, the task manager and the project manager. All parties indicated a high degree of satisfaction with the project communication.

231. The task manager, Programme Officer and Fund Management Officer until August 2021 demonstrated a common understanding of all transactions and financial communications that occurred during the course of implementing the Project. The internal management of the project facilitated ease-in-communication, with clarity of all transactions among all relevant parties. The quality of financial communication is thus rated as *Highly Satisfactory.*

Table 9: Financial Management Table

Financial management components:		Rating	Evidence/ Comments
Adherence to UNEP's/GEF's policies and procedures:		**HS**	The financial practices in the project adhered to all standards and policies of the UNEP/GEF
Any evidence that indicates shortcomings in the project's adherence[51] to UNEP or donor policies, procedures, or rules		No	No evidence was observed to suggest a shortcoming in adherence to UNEP or donor policies and procedures throughout the evaluation.
Completeness of project financial information[52]:			
Provision of key documents to the evaluator (based on the responses to A-H below)		**S**	
A.	Co-financing and Project Cost's tables at design (by budget lines)	Yes	All project co-financing and cost tables at design were provided both at design, and upon project completion
B.	Revisions to the budget	Yes	The project budget was revised 4 times, and evidence of approval of the various budget revisions were presented
C.	All relevant project legal agreements (e.g. SSFA, PCA, ICA)	Yes	All relevant project legal agreements were found to be complete at evaluation.
D.	Proof of fund transfers	Yes	Proof of funds transfer was duly made available through the Umoja tool by the UNEP
E.	Proof of co-financing (cash and in-kind)	Yes	Letters supporting the various co-finance partners (including newly leveraged partners) have been provided. Partner reports on their actual co-finance commitment were also provided
F.	A summary report on the project's expenditures during the life of the project (by budget lines, project components and/or annual level)	Yes	A summary of project expenditure was reported half-yearly during the course of implementation of the project (from 2012 to 2021). Each annual expenditure was labelled with an S, thus for each spending year, there are S1 and S2 reports. S1 2017 to S2 2021 were all available

[51] If the evaluation raises concerns over adherence with policies or standard procedures, a recommendation maybe given to cover the topic in an upcoming audit, or similar financial oversight exercise.

[52] See also document 'Criterion Rating Description' for reference

			The expenditures were reported in the following categories: Personnel, training, equipment, and premises, and miscellaneous. Consultants, travel, and sub-contract expenditure were reported. Total budget, current year expenditure, cumulative expenditure from previous and reporting year were presented. The following reports were made available, covering the entire implementation span of the project:
G.	Copies of any completed audits and management responses *(where applicable)*	NA	There was no need for an audit, given that the project was implemented and executed within the UNEP.
H.	Any other financial information that was required for this project (list):	N/A	
Communication between finance and project management staff		**HS**	
Project Manager and/or Task Manager's level of awareness of the project's financial status.		HS	The project manager and task manager demonstrated a high level of awareness of the project's financial status
Fund Management Officer's knowledge of project progress/status when disbursements are done.		HS	The fund management officer had a full knowledge of all disbursements across the entire implementation of the project
Level of addressing and resolving financial management issues among Fund Management Officer and Project Manager/Task Manager.		HS	All financial issues during the project were addressed with timely and effective communication between the IA and the EA
Contact/communication between by Fund Management Officer, Project Manager/Task Manager during the preparation of financial and progress reports.		HS	There was an effective communication between the Fund Management Officer, the Project Manager and Task Manager during the preparation of all financial and progress reports.
Project Manager, Task Manager and Fund Management Officer responsiveness to financial requests during the evaluation process		S	The project manager, task manager and fund manager were very responsive to financial communication and information requests during the evaluation.
Overall rating		HS	The project demonstrated a Highly Satisfactory performance in terms of financial review and assessment

Rating for Financial Management: Highly Satisfactory

F. Efficiency

232. The Project, which spanned between 2017 and 2021, leveraged on the actions of the Global District Energy in Cities Initiative which was launched at the New York Climate Summit in September 2014. There was already an existing network of global stakeholders based on the combined efforts of the IDEA and the United Nations Environment Programme to promote the District Energy In Cities Initiative since it began in 2013, and these networks and global partners were effectively used in the implementation of the activities of The Project.

233. Other institutions such as the C40 Cities Climate Leadership Group, the IEA, Local Governments for Sustainability and the Copenhagen Centre on Energy Efficiency among others had structures and partner networks across different countries that the project built upon to ensure that it saved resources on stakeholder mobilisation, preparation of technical assistance packages and dissemination action. Research competencies and tools from the Fourth Generation District Heating (4DH) Research Center and the Aalborg University among others were sufficiently leveraged.

234. Existing communication platforms of the DES in Cities Initiative such as the twitter handle and websites were utilised to minimise resource expenditure on key project activities. A strong collaboration between the Project and other SE4All accelerators, particularly the Building Efficiency Accelerator, also ensured that partner mobilisation and resource use were efficient, given that both interventions aim at promoting energy efficiency in buildings, and thus had similar institutions in the various countries engaged concurrently in the implementation.

235. In July 2020, the project was extended for 11-months to cover delays in project implementation of late-stage activities in India and China due to the COVID-19 pandemic that closed local government offices and obstructed organization of trainings and workshops, as well as any remaining data gathering.

236. In total, the project had four revisions with no change to the overall cost of the project:

- July 2018: Budget revision to rephase unspent budget from year 2017 to following years
- August 2019: Budget and workplan revision to rephase unspent budget from year 2018 to following years and adjustments to the activities' timeline in the workplan
- July 2020: 11 month no-cost extension of the technical completion date from 30 June 2020 to 31 May 2021 to cover delays in project implementation of late-stage activities in India and China due to the COVID-19 pandemic.
- May 2021: Budgetary adjustment/revision to facilitate a consultancy contract for reviewing and performing a quality check of deliverables.

237. Given the low budget and the compact timelines for implementation of the project, the achievement of results of the project is deemed efficient and rated Highly Satisfactory.

Rating for Efficiency: Highly Satisfactory

G. Monitoring and Reporting

Monitoring Design and Budgeting

238. In line with the UNEP and GEF guidelines for the design and implementation of GEF projects, a detailed budgeted Monitoring and Evaluation (M&E) plan was described in the Project Document (page 87). The plan includes a number of M&E instruments are required as part of the reporting requirements of the UNEP. These included Progress and Financial Reports, Inception Reports, Progress Reports, Annual Project Reports (APR), PIR, Regional Advisory Review (TPR), Terminal Regional Advisory Review (TTR), Project Terminal Report, Final External Evaluation. The Project budget also made allowance for conducting a Terminal Evaluation. The M&E plan at design indicated that resources would be set aside for an optional Mid-Term Management Review (MTR). No mid-term evaluation Was triggered by

the Task Manager through the implementation period. Even though all UNEP projects with a planned and approved implementation period of four years or more are required to undertake a formal Mid-Term performance assessment, the Task Manager triggers this based on observations through the monitoring of the project's activities from the beginning, and thus such a mid-term review for this project was not deemed necessary by the Task Manager.

239. The GEF tracking tools prepared for the project are attached as Annex J in the CEO Endorsement document. These were to be updated at mid-term (thought there was no mid-term) and at the end of the project (which is currently under preparation) and would be made available to the GEF Secretariat along with the final project PIR report. The adequacy and appropriateness of the design budgeting informs the criteria's rating as *Satisfactory.*

Monitoring of Project Implementation

240. Project monitoring for the DES initiative was highly centralised and conducted by the Project Team, particularly the Cities Unit and Climate Mitigation Unit of UNEP, through the various project implementation progress reports. The project-level monitoring activities include quarterly updates on undertaken activities to the project partners, together with the scheduled calls to discuss project progress on global level. Country updates are shared with the partners through annual partner call meetings. The annual partner call held on the 5th of November 2020 for example created opportunities for stakeholders across Europe, Asia, the Americas and Africa to participate and be briefed on all on-going project activities. While a list of participants was collated and made available at evaluation, it is worth noting that the gender of the various participants was missing, hence it becomes difficult to analyse the gender sensitivity of monitoring activities in the Project.

241. On the level of the countries (both pilot and replication countries), some of the monitoring activities that were adopted in addition to the progress reporting and workshops included baseline data collection on the district energy in the country, as well as stakeholder analyses. This facilitated tracking of project activities across all the cities and enhanced the city and subsequent project selection in the various cities. Most of the project partners that were engaged in discussions at evaluation indicated they were not deeply involved in the Monitoring and Reporting activities but were regularly updated on project activities and next steps. Inputs regarding the progress of the activities were provided by the implementing partners and consultants to the Cities Unit from time to time.

242. Beyond the main centralised monitoring activities, national workshops for stakeholder consultations and selecting "deep dive" cities within each pilot country were considered part of national level monitoring activities. This includes submissions during kick-off/inception meetings. The project team has also been undertaking regular consultations with representatives of ministries of environment and energy in each pilot country and including them in the national project steering committees to help broaden the participation of stakeholders in the monitoring process. At city-level the monitoring activities include minutes from bilateral and stakeholder meetings, as well as peer reviews of the Rapid Assessments by the DPWT (in all the project countries but China).

243. Based on the various reports, the project can be described as one that was executed in line with originally planned schedule of activities, except for the extension request due to the delay in project activities as a result of an uncontrollable natural disaster, the COVID pandemic. Progress of the project's implementation was reported using a half-yearly progress report for each project

implementing year, and the quality of the monitoring reports were consistent with UNEP reporting standards. From 2017 to 2020, a report was made available each year, given a total of 4 progress reporting reports:

- July-Dec 2017 to Jul-Dec 2017
- 1 July 2018 to 31 December 2018
- 01 July 2019 to 31 December 2019
- 01 July 2020 To: 31 December 2020

244. Three Project Steering Committee meetings were held on the following dates: 24 May 2018 at the UN City, Copenhagen, 13 June 2019 for the second meeting, and 13 July 2021 for the final meeting. The last meeting was held virtually due to COVID-19 pandemic on MS Teams. Progress on project deliverables in pilot cities were discussed and all PSC members were given an opportunity to provide feedback and comments. Lessons learnt from the project were consolidated in the final PSC meeting. Thus, the monitoring of Project Implementation is rated as *Highly Satisfactory.*

Project Reporting

245. The Project's Implementation Reports (PIRs) were used to communicate progress on the project's implementation. These reports provided complete details of progress towards objectives, implementation progress, and risk management for the Project against the component indicators. All reports that were assessed at evaluation were complete and found to be consistent with expected reporting standards.

246. The first PIR was prepared for 1 July 2017 to 30 June 2018 when The Project completed its 1st year of implementation out of the three planned years. There was no significant threat to the attainment of any planned objective for the year, and all end-targets will be attained by the time the project reaches technical completion. As of June 2018, some project targets have already experienced partial achievement (i.e., Outcome 1, indicators 1 and 2) with others even at nearly full achievement (i.e., Outcome 4, indicator 1). The major challenge for the reporting year was the delay in start of the project in China

247. The second PIR was prepared for 1 July 2018 to 30 June 2019. It also showed a high progress towards objectives, and evidence that all end-targets would be attained by the time the project reaches technical completion (and some will even overachieve). The report suggested that all activities (including those planned for project Year 3) have already been initiated and no major obstacles were encountered or foreseen. By that time, the previously observed delay in China has been overcome. The overall progress towards meeting project objectives for that reporting year was rated "Highly Satisfactory".

248. The third PIR covered 1 July 2019 to 30 June 2020. While the report demonstrated again a significant progress towards attainment of project's objectives, certain delays were anticipated due to the prevailing COVID-19 pandemic. This risk was subsequently mitigated with extension of the technical completion of the project up to end of May 2021. Thus, a revised workplan was prepared, which re-organised the activities based on their implementation statuses. No further delays were expected in the project for the subsequent phase of activities. The implementation progress for the reporting year was rated as "Satisfactory".

249. The final PIR was prepared for 1 July 2020 to 30 June 2021. Again, the most significant risk reported at the time was that most cities in India and China have not been fully operational during the months-long lockdown. By the time, the project team requested an 11-month extension (until 31 May 2021) as described in the previous year's reporting for risk and mitigation measures this extension, hence the project was in its extension phase. Thus, by the end of the reporting period, major project activities in India and China have finally been finalized.

250. The final report was prepared by UNEP to cover all implementation activities from 3 May 2017 to 31 May 2021. The progress towards each project component was presented in the report, and the overall level of attainment of planned outputs and outcomes for each project component was contained therein. A breakdown of financial expenditure for the project was also contained in the report. Of the total GEF budgeted grant of US$ $2,000,000, total expenditures as of 31 May 2021 was reported to be $ 1,944,374. On the planned co-financing budget of $ 9,711,774 at inception, it was realised that total co-finance mobilised as of 31 May 2021 amounted to $ 12,288,030. The report was approved by the Head of Cities Unit at UNEP on the 1st of October 2021.

251. Given the quality of the project's reports and their completeness and timeliness, the project reporting is rated as *Highly Satisfactory.*

Rating for Monitoring and Reporting:	**Highly Satisfactory**

H. Sustainability

Socio-political Sustainability

252. The socio-political sustainability of the Project is primarily assessed against the 3 outcomes of the project in the RToC.

- Outcome 1: Deep-Dive city level governments have adopted integrated policies and action plans for modern DES: It is observed from the post-implementation actions in Chile, China, India and Serbia that national and city governments are committed to accelerating the deployment and upscaling of modern DES. The project has created enough interest amongst the stakeholders. There is a higher level of interest to explore the concept. The demonstration of such strong political commitments in India, for example, includes integration of DES action in existing government priorities such as the Smart City concept.

  The foregoing implies that local political structures and institutions are fostering ownership, and consequently a high level of political sustainability for DES interventions. Thus, the political sustainability of outcome 1 is assessed as *Highly Likely.*

- Outcome 2: Project cities have effective GHG emission systems to track local outcomes from DES projects: Climate emission reduction action has increased among governments in recent times. Owing to commitments such as the Paris Agreement and Nationally Determined Contributions of governments, there is the desire to track emissions based on key sectors of the economies. Partnership actions in countries such as Chile post-the implementation of the DES is a demonstration of political will to invest in tracking outcomes of energy efficiency initiatives such as the DES.

  However, key gaps remain in the availability of efficient and locally adaptable tracking systems, as well as local capacities to actually implement these systems to the specific needs of DES. This threatens the extent to which tracking DES will

remain a political priority in each country and city. Thus, the socio-political sustainability towards outcome 2 is described as *"Moderately Likely"*

Outcome 3: Learning cities adopt lessons learnt from DES project to develop their own integrated DES policies and action plans: The results of the project are being embedded in on-going initiatives in the countries for replication. Thus, at the policy level, there is a recognition of DES as one of the technology options for the provision of heating/cooling for buildings in urban areas in almost all the project cities.

The wide-scale adoption planned in Outcome 3 however require that all relevant planning and policy institutions collaborate, particularly in zoning actions and building codes for infrastructure development. Such collaborations and transformations are often not easy to accomplish and would require constant engagements and dissemination actions beyond project exit. Based on the observed adoption trend of DES action among different cities and countries, the socio-political sustainability of this outcome is rated "Highly Likely"

253. Overall, the socio-political sustainability of the DES is rated as *Likely.*

Financial Sustainability

254. The financial sustainability of the Project is also assessed against the 3 outcomes of the project in the RToC.

Outcome 1: Deep-Dive city level governments have adopted integrated policies and action plans for modern DES:

The DES projects are highly capital intensive, hence require large funding. A further push and promotion would be needed before DES becomes a reality in the cities. The preparation of a detailed feasibility study along with a bankable project report must be supported to create interest amongst the private sector players/investors.

Financial sustainability actions for DES are increasingly observed through the evaluation phase, even though there are still significant gaps. Based on the DES project, IFC Singapore, for example, has formed a joint venture with one of the private sector providers of DES to invest in DES projects in India. It is expected that over time other providers of finances would also come forward to take support the implementation of DES in the country.

The Global Environmental Facility (GEF), for instance, has approved the US$2.1 million project concept for Chile under a GEF7 project titled "Accelerating Investment in Efficient and Renewable District Energy Systems in Chile". The project is prepared by the District Energy in Cities initiative, with collaborations from the Ministry of Energy and the Ministry of Environment. However, such funding schemes are not enough to facilitate full-scale demonstration DES projects, hence often take the form of Technical Assistance interventions. "For example, as previously stated, the city of Rajkot under its "Smart City" planning, included a separate area marked for DES. However, this did not go further partly due to lack of interest by the private sector and change in the perspective after the change of the Municipal Commissioner due to limited funding options.

The financial sustainability towards outcome 1 is thus rated *Moderately Likely.*

Outcome 2: Project cities have effective GHG emission systems to track local outcomes from DES projects: Tracking emissions has been demonstrated as a significant priority of most of the city and national governments. The project successfully developed emission tracking systems for the various cities. However, it was realised at evaluation that the application of these emission tracking systems was very limited, if not absent in almost all the cities. The factors that relate to limited

application of the tracking frameworks was realised at evaluation to be largely capacity limitations, rather than financial limitations. For example, a Key National Expert from Temuco indicated that there is a national framework for monitoring and verifications of pollution levels which is applicable to their context. However, the complexity and limited ability of city officials to collect relevant data limits the use, and the academia is also doing their best to introduce some tools that would be much simpler to implement with close partnership with the ministries. A similar observation was made in all the other project cities.

Based on the commitment to track and allocation of resources by governments to emission reduction tracking, the financial sustainability towards outcome 2 is thus rated Likely.

Outcome 3: Learning cities adopt lessons learnt from DES project to develop their own integrated DES policies and action plans: The projects' communication and knowledge management systems are well in place to facilitate transfer of lessons from project cities to learning cities under cost-effective conditions. Some gaps remain in increasing awareness on how to access the consolidated knowledge on the virtual platforms among learning cities, with associated cost implications. At present, the platforms are in a good state, and could continue to be used to disseminate project actions and emergent results. Attainment of outcome 3 among learning cities without financial and further technical assistance will be difficult given that it is unclear how much they are able to draw on lessons on the project website and platforms without external help.

255. Although there is sufficient interest in the concept of DES, the replication in other cities at its own is unlikely, due to a lack of demonstration of commercial viability and business model, as well as limited multilateral investors. The financial sustainability of the DES is thus rated as *Moderately Likely.*

Institutional Sustainability

256. The institutional sustainability of the Project is also assessed against the 3 revised outcomes of the project in the RToC

Outcome 1: Deep-Dive city level governments have adopted integrated policies and action plans for modern DES: The adoption of integrated policies and action plans across all cities globally institutions in all countries will require sustained improvements in institutional capacities for the assessment, management, and monitoring of DES systems. If continuous investment is made available to these institutions as is evident in on-going efforts, then the institutional sustainability for the DES will be higher. Based on the observed rate at which local institutions are able to develop DES policies and action, the institutional sustainability of outcome 1 is rated *Highly Likely.*

Outcome 2: Project cities have effective GHG emission systems to track local outcomes from DES projects: Institutional capacities developed within the project are not sufficient to sustain the DES in terms of tracking of emissions, including the development of tools and their implementation. In the city of Renca for example, a Key National Expert indicated at evaluation that they developed an emission tracking for Renca generally, but from the municipality level, they do not have the capacity to implement it, so they rely on private sector partners and academia to do these tracking. Institutional sustainability of outcome 2 is thus *moderately likely*.

Outcome 3: Learning cities adopt lessons learnt from DES project to develop their own integrated DES policies and action plans: Cities across the target learning countries will need an accelerated support in terms of capacity and competency

development if they are to be able to replicate lessons from the intervention. the institutional sustainability at the global level is high in terms of willingness and capacity of partner institutions to continue investing in promoting DES, whereas that at the city levels is low and threatens realisation of outcome 3. The trend in adoption of lessons thus informs the rating of institutional sustainability towards outcome 3 as *Likely*.

257. The wide-scale adoption however require that all relevant planning and policy institutions collaborate, particularly in zoning actions and building codes for infrastructure development. While this requires relevant institutional capacities to implement and enforce such codes, it also requires the creation of new institutions and empowering them with resources in some cases. Such collaborations and transformations are often not easy to accomplish. Thus, the institutional sustainability of the DES is rated as *Moderately Likely.*

Rating for Sustainability: **Moderately Likely**

I. Factors Affecting Performance and Cross-Cutting Issues

Preparation and Readiness

258. There was a lack of technical capacity within a number of pilot cities. Considering that DES is a new concept in countries such as India, the availability of technical capacity within the country for delivering the pre-feasibility study, training, and capacity-building exercise was lacking. This was addressed by the project team by hiring technical experts/organizations/consultants from outside the country but affected local effectiveness of the project. It must be noted that the outsourcing of experts did not show any significant evidence on affecting the sustainability of the project, given that all knowledge was consolidated.

259. This criterion is rated *"Highly Satisfactory".*

Quality of Project Management and Supervision

260. The project management followed the standard fiduciary and monitoring requirements applied for any internally executed UNEP/GEF project, as outlined in the Internal Agreement established between the 2 units of the UNEP.

261. There was no major factor observed to have impacted the quality of project management and supervision negatively. The planned and executed monitoring and reporting strategies were effectively adhered to by the UNEP Cities Unit throughout the course of implementing the Project, which was supervised by the Climate Mitigation Unit. The nature of project activities made it easy for mitigation measures to be taken in this regard during the COVID 19 pandemic.

262. The Climate Mitigation Unit (IA) indicated during the evaluation that it did not experience any significant challenge in monitoring the progress of The Project, and was highly satisfied with the level of communication with the EA along the project life. Consequently, the division was observed to have provided timely feedback on all reports, budget revisions and communications that needed approval, with communication evidence in all monitoring reports containing clear feedbacks and suggestions on project issues. The quality of project monitoring and supervision by the IA is thus rated *Highly Satisfactory*

263. Similarly, the Cities Unit (EA) adhered to the standard provisions for reporting the progress of the project along the course of its implementation. All reports were submitted in time and presented in clear concise manner. Again, comments and

feedbacks from the IA were duly addressed in time through the project. As previously indicated, all partner communications on the progress of the project by the EA was done with flexibility, such that online links were provided for partners to participate virtually in cases where they could not join meetings physically. The Cities Unit also indicated during the evaluation that it was highly satisfied with the communication with the IA. The quality of project monitoring and supervision by the EA is thus rated *Highly Satisfactory*.

264. This informed the overall rating of the quality of project monitoring as *Highly Satisfactory*

Stakeholders Participation and Cooperation

265. The project team made efforts throughout the project to involve all critical stakeholders. The stakeholder analysis presented in Section III C and in Annex V showed all major stakeholders and their roles and levels of involvement in the implementation of the Project. However, there were certain design and implementation deficiencies observed in terms of local participation. There were no clear provisions in any of the project cities to actively engage indigenous groups in the cities, in areas such as creating opportunity for property owners to participate in webinar sessions on DES or eliciting the views of local people on modern DES identify key prospects and gaps at the end-user side and its policy and project implications among others. It was observed that indigenous people were more involved in Chile as compared to the other countries. This was facilitated by an on-going project on waste-to-energy, which had an active local people participation and thus the parallel implementation with the Project facilitated incorporation of such indigenous people.

266. During the Evaluation, the extent of involvement of local and indigenous people was discussed with the EA, who explained that since the nature of the project activities were more of capacity building and provision of technical support, it was limited in the execution of actual physical District Energy projects Thus, the EA acknowledged that these local people are very significant to the adoption of modern DES, and created opportunity for their engagement through local associations, and through active communication and dissemination of the Project activities. From the foregoing, it can be inferred that while participation of higher-level stakeholders (city officials, private sector organisations, national governments and their ministries, etc..) in the project's implementation was more active, that of the local or indigenous people (property owners, potential adopters and users of modern DES systems, vulnerable groups in cities, etc…) appeared to have leaned towards a more passive form.

267. It is important to note however, that for all the involved stakeholders, especially city officials in the various project, the level of cooperation through the implementation of the project was very high. All officials engaged during the evaluation indicated that the level of cooperation was very high. The relevant energy and environmental ministries in Chile, China, India and Serbia demonstrated ownership of the project, and committed to the implementation of planned activities in the project cities within the respective countries. The extent of commitment observed among ministries and city governments in replication countries such as

268. From the perspective of the project team, interviews with staff from the Climate Mitigation Unit indicated that the level of participation of the private sector in the implementation of the DES in the various project cities was perceived to be adequate based on the planned actions. However, during the discussions with Key

National Counterparts and the Key Informant Interviews in India, they indicated that there were significant gaps in the level of participation of the local private sector, especially financial institutions and local industry associations in the project. National counterparts from

269. Based on the project findings, this criterion was rated as *"Satisfactory".*

Responsiveness to Human Rights and Gender Equality

270. At design, the project was screened as not having any significant negative impact on human rights. According to the UN Common Understanding on the human rights-based approach (HRBA) and the UN Declaration on the Rights of Indigenous People:

- All programmes of development co-operation, policies and technical assistance should further the realisation of human rights as laid down in the Universal Declaration of Human Rights and other international human rights instruments.
- Human rights standards contained in, and principles derived from, the Universal Declaration of Human Rights and other international human rights instruments guide all development cooperation and programming in all sectors and in all phases of the programming process.
- Development cooperation contributes to the development of the capacities of 'duty-bearers' to meet their obligations and/or of 'rights-holders' to claim their rights.

Within this human rights context, the evaluation assessed the DES to be in compliance with provisions in the declaration because the project implementation of the project activities did not in any way have a negative effect on the human rights of any stakeholder group, but rather contributed to reinforcing the cooperation contribution and development of capacities towards the adoption of a sustainable development intervention, modern district energy systems, and their associated health and environmental benefits on people

271. However, it was noted that the implementation of modern DES projects could potentially require some minor resettlement of people (e.g., for construction of the new plant) in which case adequate measures would be undertaken to fully compensate the people affected with the implementation of the project. In the Environmental and Social Safeguards Checklist screening list in Annex N of the Project Document, the test item for assessing this: "*Does the project respect internationally proclaimed human rights including dignity, cultural property and uniqueness and rights of indigenous people?",* was answered with "Yes".

272. Gender dimensions are mandatory for climate projects now in Chile, and there are provisions for local actions plans. There is a good opportunity to leverage on participatory processes during the design of these interventions, implementation, and evaluation. An official interviewed for the TE indicated that there would be potential for enhancing gender sensitivity during the design of contracts between households and the DES initiative, for example, such that contracts could be signed with female heads of households.

273. Beyond this, no specific attention was given to gender minority groups in the implementation of District Energy Systems. The attendee list of participants that were taken for each workshop and partner meeting were not segregated on gender basis, hence it is difficult to estimate how much of gender minority groups have been empowered by the Project. As such, the rating for this Project's

responsiveness to human rights and gender equality based on current UNEP evaluation criteria would be "*Moderately Satisfactory*".

Environmental and Social Safeguards

274. In the Environmental and Social Safeguards checklist, appropriate potential negative impacts were identified, and mitigation measures proposed. Largely, the perceived impacts were more positive. The project was designed to contribute towards reducing CO2 emissions from energy use in pilot and replication countries. However, there were no identified or anticipated negative environmental footprints, hence the project activities document did not contain any proposed mechanisms for reducing negative environmental footprint. In Annex N of the Project Document, the Environmental and Social Safeguards Checklist indicated that the project passed the Environmental screening of the UNEP.

275. Given that the project environment was observed to be highly characterised by conscious efforts of governments at city and national levels to accelerate interventions that would contribute towards emission reduction, environmental risks were very minimal. At the screening of the project at CEO approval (see Page 66 of the ProDoc, Section A.5 Risk) it was observed that the project was given permission in all the pilot and target countries due to its environmental appropriateness. All risk reviews, provisions and ratings were consistent with UNEP standards, and were observed to be very low throughout the implementation of the project.

276. Overall, the Environmental and Social Safeguards quality criteria is *Satisfactory.*

Country Ownership and Driven-ness

277. City officials, national governments (including relevant ministries, departments and agencies), the private sector (those involved in the various project cities), the academia and other relevant national stakeholders who have been at the centre of the implementation of the project and have demonstrated a high acceptability for the DES project. The various ministries of environment and energy demonstrated their committed to transform the Project actions from outputs to outcomes, and then from outcomes to intermediate states and impacts, first through commitment letters, and then through actions in policy, and project initiation within the implementing period of the Project.

278. In India for example, following successful demonstration of the viability of DES, the quality of engagement between the project team, municipal corporations and the private sector led to joint efforts to proceed to commence tendering and bidding work for the construction of viable district cooling systems in cities like Rajkot. The estimated budget for the project was US$49 million, and the city prepared an action plan for the project. The project however got stalled partly due to lack of interest by the private sector and change in the perspective after the change of the Municipal Commissioner. In other replication countries such as Tunisia, the quality of engagement with both the public sector and academic institutions led to the development of policy and action plans for District Energy Systems- an effort geared towards The academic and research community was also very active in demonstrating ownership of the project, particularly through the continuous research and development actions by various universities in Rapid Assessments, Monitoring, Reporting and Verification for DES projects.

279. The demonstration of country-ownership in Chile is reflected in the country's incorporation of District Energy in the National Heat Strategy and Presidential Plan to tackle air pollution. On September 09, 2020, government representatives and

UNEP launched a country-focused initiative known as "Accelerating investment in efficient and renewable district energy systems in Chile" to scale-up investment in District Energy in Chile. The US$ 2 million project which was launched in Santiago and is planned to span for three (3) years, and to be executed by the Ministry of Energy through the Sustainable Energy Agency (Agencia de Sostenibilidad Energética). The city of Coyhaique through the Regional Office of the Ministry of Environment with UN Environment also set aside up to US$2.8 million for the construction and implementation. The foregoing reflects significant country driven-nes in upscaling investment in district energy in Chile.

280. In Serbia, the city of Belgrade developed a comprehensive Action Plan which is publicly available in 2020 for District Energy System Development for the Period until 2025, including projections up to 2040 to further complement on-going efforts and commitment to accelerate the deployment of modern DES. The commitment of the country and city-level governments to accelerating the deployment of modern DES is well reflected in the plan, which contains propositions for Construction of heat distribution pipeline Thermal Power Plant "Nikola Tesla A" (TENT-A) HP Novi Beograd the construction of a cogeneration plant at Vinca Waste Management Center, the construction of cogeneration facilities and interconnection of existing systems among others.

281. The level of ownership and driven-ness observed for the DES initiative from the interactions with stakeholders during the data collection project informed the criterion's rating as *Satisfactory.*

Communication and Public Awareness

282. The project maintained a very consistent and adequate set of provisions for communications and public awareness creation about District Energy Systems. All communication platforms that could help accelerate the dissemination of project information were exhaustively utilised in the project. The website is active, and constantly gets updated with relevant and timely information. During engagements with city officials at evaluation, it was not clear however, the extent to which they access the project website and make use of relevant information from there. However, the UNEP in its communications and awareness on modern DES has severally cross-referenced the project website for visitors to their page to be able to access useful content on modern district energy systems[53]. Again, Key National Partners from other countries indicated during the global discussions that they randomly access the website for useful materials, especially when they need content on DES or when they are led there by search for information on The Project. Project partners such as the Local Governments for Sustainability (ICLEI) also leverage on the website and reference to it to communicate their actions towards climate change adaptation and mitigation (See ICLEI website that cross-references information on the Project at https://iclei.org/des/).

283. Details on the project's performance in communication and public awareness are described under project findings of component 4. Thus, the design of the project in itself, enhanced this dimension of assessment as it was treated as a full project activity. The communication and public awareness of the DES is thus rated as *Highly Satisfactory.*

[53] See a UNEP news communication page that referenced useful information from the DES website at https://www.unep.org/news-and-stories/story/district-energy-secret-weapon-climate-action-and-human-health

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

VI. CONCLUSIONS AND RECOMMENDATIONS

A. Conclusions

284. The DES is a strategically relevant project for cities and governments of cities with the potential of adopting such systems based on their climatic and geographic conditions. The project's relevance to the strategic objectives of UNEP and the GEF is strong. In the context of climate change adaptation and given that governments of cities cross the world have pledged to reduce their emissions in their NDCs, accelerating the adoption of modern District Energy Systems that are based on Renewable Energy and Energy Efficiency will be relevant in attaining such objectives.

285. Findings on the Key Strategic Questions (KSQ) through the evaluation and review of evidence are therefore summarised herein:

KSQ1: *From the synergies or collaborations that the DES Initiative had with other complementary initiatives or projects during the project implementation (like the SE4All Building Efficiency Accelerator, the Global Alliance for Building and Construction or other initiatives relating to energy efficiency in cities), what lessons can be learned on the financing of bankable projects and on exiting or transitioning strategies?*

Interventions that seek to accelerate the deployment of energy efficient and renewable energy technologies, particularly in the building sector such as The Project and other parallel actions within the scope of the SE4All generally tend to have higher capital and investment requirements. Thus, leveraging on synergies and integrated action tend to have higher benefits, as was observed in Chile with the integration of the Project actions with a waste-to-heat project.

Given the limited resources of city and national governments, the private sector has a significant role to play in financing projects that are viable within these scopes. Given this, it is important to integrate multinational and other private financial institutions in these projects right from the beginning, such that even before projects will be found to be viable, there are partners ready to fund their implementation. By this, selected projects for investment will not be abandoned after exit of accelerator interventions such as this Project.

KSQ *2: To what extent did the project succeed in overcoming the common barriers of the development of DES presented in the CEO Endorsement Document?*

The implementing strategy adopted for the Project created room for overcoming the common barriers to the development of District Energy Systems as presented in the UNEP Project Document. The barriers are summarised below:

- Lack of awareness
- Lack of local and institutional capacity
- Lack of holistic planning policies, harmonized incentives and regulations
- Prohibitive finance costs
- Data/information

KSQ *3: How likely are the pilot cities to be replicated elsewhere? What are the key conditions for the replications to succeed?*

It is observed at evaluation that the knowledge management practices, communication and dissemination action adopted by the Project facilitates replication of project lessons in target and replication countries, with initial evidence severally demonstrated under the effectiveness and sustainability criteria of the evaluation findings. However, this will be further facilitated by a close collaboration

between public and private sector actors in the field of energy efficiency in buildings, including support from the research and academic communities. Partnership building should therefore continue in replication countries to increase the likelihood of upscaling of project achievements.

KSQ *4: To what extent did the involvement of the Private Sector contribute to the project accomplishments?*

It is observed that the construction of modern DES requires heavy financial commitment and technology. Thus, significant results are achieved where the private sector is actively involved in the implementation of the project. Such observations were made in India and in Serbia among others, where the involvement of private sector contributed significantly towards progress in local project identification and investment prioritisation. However, the engagement of the local private sector, particularly potential investors into modern DES projects is more effective when it is done from the beginning of the project, and not only after rapid assessments are completed and projects agreed upon before funding is requested.

KSQ *5: What lessons can be learned from the project about the common business models of the DES? Have any innovative approaches emerged from the pilot city works?*

It is observed at evaluation that private sector led delivery models are more effective for the development of modern DES. This is based on the observation of stalled projects due to absence of funds to proceed with constructions in the various cities. No significant evidence on an innovative finance model for modern DES was observed in any of the project cities. Existing models are often in the form of government-led financing, or private sector-led financing through Public Private Partnership agreements, following appropriate tendering and bidding processes, as observed in cities like Rajkot and Hyderabad PharmaCity in India. Thus, government-led financing increases the strain on government budgets and hinders project success. It is important to note however, that this varies from context to context, hence different countries should develop models that will suit their context to facilitate accelerated adoption.

KSQ *6: What changes were made to adapt to the effects of COVID-19 and how might any changes affect the project's performance?*

The key changes made due to the COVID-19 is the extension of project to cater for delayed engagements, and delivery of workshops through virtual platforms. These changes did not significantly affect the attainment of project results.

KSQ *7: To what extent were the local stakeholders at the country level and at the city level involved in project design and implementation?*

The stakeholder's involvement in project cities was high, especially concerning stakeholders that were identified at CEO approval. However, these were largely limited to public officials and other private sector and academic institutions at city, municipal and national levels. Local people and indigenous people were not sufficiently engaged in the project.

KSQ *8: To what extent are the project "beneficiaries" at the country level and at the city level satisfied with the quality and the relevance of the Technical Assistance provided?*

The project beneficiaries were largely city officials, who demonstrated a highly significant level of satisfaction with the project. Similarly, Key National Counterparts engaged during evaluation all indicated a significant satisfaction with the project in general. However, there was a general consensus among Key National Partners and city officials on the limited ability of cities to apply technical assistance packages

received alone to accelerate the deployment of modern DES if there is no funding, especially from the private sector for concrete projects.

286. In general, the District Energy Systems concept is new in countries like Chile and India but has been in existence in Serbia and China. Thus, the contextual needs of these countries in the use of District Energy Systems vary, and produced different results. Cities with existing systems such as Belgrade in Serbia made significant progress towards translation of technical assistance packages received into project development, while new cities in countries like India and Chile were limited in the extent to which they could translate the TA packages received into actual physical projects. Importantly, rapid assessments that have been the focus of light touch cities have been largely successful in assessing the potentials among cities. The demonstration of investment profitability and bankability of these systems in Deep Dive cities have also been largely successfully done.

287. However, there are significant gaps in the ability of cities to attract investment and funding for the building of such systems. It is expected that over time other providers of finances would also come forward to take support the implementation of DES in the country. There is a strong interest among the city-level officials to explore the possibility to go for DES, with bankability concerns being the most significantly observed gap. Other critical aspects relating to architectural and city planning issues have not been insufficiently addressed by the Project due to the limited involvement of such stakeholders in the local project cities. Again, the duration for the project is generally perceived as not sufficient for concrete actions in terms of community engagement, as well as for DES projects in the various cities to be planned, designed, and implemented. The sensitivity of the project to gender diversified needs and human rights in the various cities is also observed to be generally limited.

288. Beyond the implementation of the Project, cities are expected to be able to develop Monitoring, Verification and Reporting systems (MRV framework), and use them to track the impact of DES. However, the Evaluator finds that based on evidence [interviews and/or survey] obtained from this evaluation that huge capacity gaps remain in this aspect, despite the successful rolling out of planned project activities under component 3. This has implications on subsequent designs for similar interventions if the overall goals of reducing emissions and improving environmental and city sustainability.

B. Summary of project findings and ratings

289. The table below provides a summary of the ratings and finding discussed in Chapter V. Overall, the project demonstrates a rating of **"Highly Satisfactory"**.

Table 10. Summary of project findings and ratings

Criterion	Summary assessment	Rating
Strategic Relevance		**HS**
1. Alignment to UNEP MTS, POW and strategic priorities	Strong alignment with the UNEP's MTS, BSP and SSC was realised	HS
2. Alignment to UNEP/GEF/Donor strategic priorities	The project strongly aligns with the CW1 of GEF's climate mitigation priorities under the GEF 6 programming	HS
3. Relevance to global, regional, sub-regional and national environmental priorities	The DES is relevant to the climate change mitigation priorities and energy policies of all the countries (China, Chile, Serbia and India)	HS

Criterion	Summary assessment	Rating
4. Complementarity with existing interventions / Coherence	The DES aligns with the on-going accelerator interventions under the SEforALL initiative, specifically complementing the Building Efficiency Accelerator (BEA II)	HS
Quality of Project Design	The project design is well grounded in logic and efficiency but has limitations in adequacy of local stakeholder participation provisions.	**S**
Nature of External Context	No external pressures or shocks affected the implementation of the DES significantly.	**F**
Effectiveness		**HS**
1. Availability of outputs	All the major planned project outputs are delivered	S
2. Achievement of project outcomes	A number of cities have commenced action based on the project outputs, including moving forward with bids to develop assessed systems and initiating policy action.	HS
3. Likelihood of impact	Drivers to impact are in place with significant investments being made globally towards decarbonisation, but threatened by the limited evidence on likelihood of continued funding and investment attraction for accelerated deployment of modern DES in cities	ML
Financial Management		**HS**
1. Adherence to UNEP's financial policies and procedures	All financial management and reporting standards of the UNEP were adhered to	**HS**
2. Completeness of project financial information	All financial information that was needed was available, and were complete	HS
3. Communication between finance and project management staff	Project management team members within the UNEP cities and CCM units that handled the finances for the DES project demonstrated high degree of satisfaction and transparency in communications.	HS
Efficiency	The project was implemented within the planned budgetary allocation. The 11 months extension was a risk mitigation strategy, hence had no impact on the overall project cost.	**HS**
Monitoring and Reporting		**HS**
1. Monitoring design and budgeting	Monitoring design is consistent with UNEP and GEF guidelines	S
2. Monitoring of project implementation	The global nature made the monitoring highly centralised, but project-level monitoring activities were effective, and included quarterly updates on undertaken activities to the project partners, together with the scheduled bilateral calls	HS
3. Project reporting	Project Implementation was appropriately monitored with regular PIRs, Half-yearly progress reports, and consultative meetings among others	HS
Sustainability		**ML**
1. Socio-political sustainability	Participating countries and cities have demonstrated a high political transformation in policy and investment priorities towards sustaining the DES	L
2. Financial sustainability	The capital-intensive nature of DES projects and limited availability of multinational investors threatens the financial sustainability.	ML
3. Institutional sustainability	Institutional capacity for policy development is adequate, but capacities for continuous development and implementation of MRV systems is weak.	ML
Factors Affecting Performance		**HS**
1. Preparation and readiness	The project was implemented after adequate baseline assessments and preliminary preparatory actions to ensure that institutional structure for implementation was in place	HS

Criterion	Summary assessment	Rating
2. Quality of project management and supervision	The quality of project management and supervision both from IA and EA was very good.	HS
3. Stakeholders' participation and cooperation	Stakeholder participation and cooperation was high, but limited in comprehensiveness and inclusiveness	S
4. Responsiveness to human rights and gender equality	No impact on human rights were assessed due to the project design. Gender equality could not be assessed due to limited evidence on gender-disaggregated aspects of the project results	MS
5. Environmental and social economic safeguards	No significant environmental and socio-economic risks were anticipated at design, or experienced at implementation, except for the COVID-19 pandemic, and appropriate safeguard actions were implemented and monitored during the project.	S
6. Country ownership and driven-ness	Project countries and cities demonstrated a high degree of ownership for the project.	S
7. Communication and public awareness	The project maintained a very consistent and adequate set of provisions for communications and public awareness creation about District Energy Systems	HS
Overall Project Performance Rating	The design, implementation, and attainment of outputs are well achieved, and the project made efficient use of the allocated resources for the attainment of all major planned direct outputs. Gaps in project results within the scope of the Theory of Change relates to expected outcomes of Project Component 3 activities. Financial sustainability is a major concern, and leaves gap for more support towards accelerating the uptake of modern DES.	**HS**

C. Lessons learned

Lesson Learned #1:	Comprehensive participation of partners and utilities is key to successful implementation of DES interventions
Context/comment:	The successful implementation of any DES requires an active engagement of stakeholders who have diversified but re-enforcing interests. The project needs to engage the town and country planning departments at the state level so that provisions for DES can be made in the Town Planning process, including provisions for construction of distribution networks. City officials beyond municipal levels to state or local levels should be actively included given that they are in direct enforcement of building actions at the lowest levels. In the final project report, the project team highlighted instrumental role of partners, and the importance of utilities as key lessons learnt. The support of partners allows not only the expansion of the work to new cities and countries but also to Real Estate and industrial sector as well as national governments. Private sector engagement has proven to be key through the provision of expertise and point of view to attract investments. This partnership was a win-win collaboration as UNEP, with the DES Initiative oriented towards market preparation, contributed to opening doors for businesses. Regarding the importance of utilities, the project team noted that power and water utilities should take the ownership for implementation of DCS, along with real-estate companies. This should be supported by local

	authorities to make it successful along with adequate National level financing from the Government or Private financial institutions.

Lesson Learned #2:	Private sector-led participation is key to accelerating the adoption of modern DES
Context/comment:	It has been observed across all the projects that capital requirements for construction of DES interventions are huge. Thus, the difficulty in funding these projects limits success in number of construction activities. Private sector firms with significant funding capacity (including multinational banks and financial institutions) can provide much needed financial resource for the provision, operating and maintenance of the systems with government oversight.

Lesson Learned #3:	Impact monitoring is critical, and an integrative approach to MRV frameworks with enhanced localising
Context/comment:	The most under-developed capacity of officials observed through the evaluation among the project components is impact monitoring using MRV frameworks. This relates to weak local capacities even beyond the provisions in the current DES project, and poor localisation of assessment methodologies in cities. There are still gaps in the complexity of the impact monitoring processes itself when the focus is specifically on emission from building heating, or building cooling, given that in some cases, usages are multiple and not isolated. The gaps in the ability of cities to develop and utilise their own MRV frameworks in isolation for DES can be bridged if such systems are integrated with other MRV frameworks for tracking emission reduction in the renewable energy sector, as is being done in Chile in recent times. Such systems would ensure that more reliable data is collected for DES impact estimations

Lesson Learned #4:	Planning officers and utilities are key to promoting the adoption of modern DES
Context/comment:	District energy systems are tied to the utilities of cities; thus, electricity and water utilities could take the ownership for implementation of DES projects, along with real-estate companies. Planning officers will ensure that the constructions of such systems are well fitted in the local plans of cities themselves.

Lesson Learned #5:	Identification of local champions
Context/comment:	In the final project report, the project team highlighted the identification of institutions, organizations and/or local policymakers that will advocate for district energy in the cities and countries as a first step in the project implementation and as an essential pathway to drive change in the country. These local champions could be national institutions, like

	the Ministries of Environment and Energy in Chile, a utility, like EESL in India or Beogradske Elektrane in Serbia, or a local officer in a Municipality like the Head of Environmental Department in the city of Temuco. Local champions advocate for district energy from the inside, help mobilize other stakeholders and lead the internal transformational processes that will result in market creation.

Lesson Learned #6:	Stakeholders' coordination is a key element in the success of the project
Context/comment:	Stakeholders may have different constrains and interests and the project team noted that it is crucial to make them agree on the implementation structure of the project and its requirements. Relevant stakeholders for DES projects identified include city officials, national government, the utility, real estate developer, end users, etc. These stakeholders need to be consulted in each step of the project and need to provide their feedback on the studies and technical reports whenever possible. The team observed that keeping a regular communication with them is essential to guarantee the success of the project, regardless of any possible delays (sanitary crisis, elections) so that their interest in the project is not lost. Beyond their coordination, it is crucial to establish the best communication channel with all stakeholders so that we can make the most of all the meetings, for example, by requesting stakeholders to share their ideas ahead of the meetings.

Lesson Learned #7:	Flexibility is important for the success of the project
Context/comment:	The project team noted that making changes in the initially defined goals of the project should be made possible during implementation. Based on the project's performance in Serbia for example, it was realised that after a certain period of the project's implementation, new objectives for Serbia have proven to be important. A typical example of such modification cited is the individual heat metering in Belgrade. Although technically this can be feasible quite simply, a preliminary work is required. For instance, the project team observed that updating policy and regulatory documents to include individual heat metering in Belgrade Energy Strategy as one of energy improvement means is key. Another example reported by the project team to illustrate this need for flexibility is the case of step-by-step monitoring guidebook activity that was initially planned. This activity was revealed during implementation of The Project not to be relevant for all countries.

Lesson Learned #8:	Anticipation of needs is critical for a successful project implementation
Context/comment:	It was observed by the Executing Agency in their lessons learnt that in some cases, creating an Energy Map for a city for example, requires a monthly monitoring for heat consumption. In the DES project, this activity comes later in terms of the implementation's planning, while it should be prepared ahead of the Energy mapping phase. Another parameter to consider when planning project activities in each city is the potential change in local stakeholders, which can be driven by local elections or a change in the involved teams for example. Hence, the project team observed that planning of activities at city and national levels needs to

	integrate sufficient contingency time to allow for delayed responses and slower pace of progress.

Lesson Learned #9:	Efforts on capacity building mainly for local government to allow the uptake of DES projects are crucial
Context/comment:	In the final project report, the project team noted that the level of technical capacities varies from city to city and from country to country. For example, the Rapid assessment in India took over a year as compared to the project three months. This was linked to the capacities of local stakeholders in India. It is therefore important to algin the implementation period for capacity building activities to the specific capacity needs of each city. This challenge has been addressed during the course of the project implementation by increasing in-house expertise and strengthening of local support together with the UNEP Regional Offices. At the same time, this has resulted in increased institutional capacity in the country/city, broader stakeholder engagement and ultimately stronger and sustained market transformation in the various cities.

Lesson Learned #10:	Appreciation of stakeholders' engagement is critical to sustaining their interest in the project.
Context/comment:	Most of the stakeholders involved in the project were drawn from national/local government, academia, non-private and non-profit organizations. The Executing Agency in the final project report noted that it is important to value their contributions and efforts during the project, and also after completion of project activities. This will play a crucial role in mobilising their support towards the replication and scale up of project activities. Regularly meeting with these stakeholders was identified as an opportunity for such appreciations.

Lesson Learned #11:	Importance of building new partnerships
Context/comment:	The Executing Agency observed that there is an opportunity for the DES initiative to strengthen the work and its reach by building partnerships with other country, regional and global programmes on DES such as under GIZ, the EU, APUEA, CELSIUS etc. Within UNEP, the Initiative is building links with other Initiatives: • The Integrated Urban Systems Partnership for an integrated system approach in cities. District Energy Systems are key enablers of this integration at a local scale. • The Cool Coalition 3 providing a considerable support to increase awareness and knowledge on district cooling. • The Three Percent Club with the main focus on energy efficiency workstream of district energy, as accelerator of Sustainable Energy for All

Lesson Learned #12:	Importance of on the ground presence

Context/comment:	During the COVID-19 pandemic, the Executing Agency observed the importance of the presence on the ground with cities and local stakeholders. Webinars are found not to be strong enough to deliver the desired outcomes. The Initiative had benefitted from a valuable support from local coordinators and local UNEP offices. Strong on the ground support was also delivered by key partners such as Danfoss and Engie, who mobilized technical experts. However, in some situation, even this strong support was not enough to deliver properly on the objectives of the project. Indeed, in the case of China for example, the city-wide assessment required a set of GIS data. Given that these data are confidential, transferring them to the DES team to go deeper into the analysis was not possible, thus limiting the level of analysis.

D. Recommendations

Recommendation #1:	The Executing Agency should adopt follow-up communication with city officials in pilot and replication cities to 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.
Challenge/problem to be addressed by the recommendation:	Limited engagement of local stakeholders was observed to have resulted in passive commitment to the promotion of the adoption of modern DES. Evidence from the data collection process during the evaluation revealed that private sector organisations within the project cities (local private sector) were not adequately involved in some countries, as well as local architects, construction workers, local utilities in cities among others. This affected the number of people who directly benefited from technical assistance packages, including webinars for capacity building, and also had implications on limiting the discovery and attraction of local investors into modern DES. The terminal evaluation revealed therefore that many of these individual stakeholders did not participate in webinars for example. Participation by the officials at the state level was limited in many contexts, and this affected their commitment beyond the project's life-span. For the projects focused on the city level governance, it is important to involve the sub-national (state government officials) as well. This ensures that there is no resistance to the program at the state government level. Further, in some cases, the involvement of the state government can be leveraged to facilitate activities at the city level. It needs to be understood that urban development and building regulations are state subjects in many contexts such as in India, hence it is important to engage the state-level governments. Widening the scope of stakeholders broadens the awareness, enhances more capacities that can even contribute to effective rapid assessments, deepens local ownership of the projects and stimulated active interest in investors when they find that local people are actively involved and would be willing to adopt and pay for such systems if they are invested in.
Priority Level:	Critical
Type of Recommendation	Project Level

Responsibility:	UNEP Cities Unit (EA)
Proposed implementation time-frame:	Immediately

Recommendation #2:	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
Challenge/problem to be addressed by the recommendation:	The huge capital requirement for the development of DES and limited private sector funding threatens sustainability. Governments should enter into PPP arrangements under mutually beneficial terms to help address this challenge. Since it is an infrastructure intervention, government involvement is key. PPP arrangements can help to guarantee low operational cost, where government creates the enabling environment and private institutions take care of the provision, operation, and management. Subsidies are not effective but improving investment environment with low-tax rates and tariff rates for modern DES systems will really attract investment. Availability of such private financial institutions to support the implementation of these interventions is key and should be prioritised soon. By the time a project will be assessed and described as bankable, a bank should have already been involved at that stage. These high capital cost interventions will succeed if the financial institutions are brought in along the design value chain. This should be a rule.
Priority Level:	Critical
Type of Recommendation	Partner Level
Responsibility:	Deep Dive City governments in Chile, China, India and Serbia
Proposed implementation time-frame:	Immediately

Recommendation #3:	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)
Challenge/problem to be addressed by the recommendation:	Heating and cooling require different systems. In countries such as India, assessments of integrative approaches for utilizing waste heat (using vapor 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. This is the same for Chile. China for example already has district heating as a public service, implying that the need to re-organise the focus of the DES initiative in terms of local priorities is critical.
Priority Level:	Critical
Type of Recommendation	Partner Level

Responsibility:	UNEP Cities Unit and Deep Dive City governments in Chile, China, India and Serbia
Proposed implementation time-frame:	Immediately

Recommendation #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.
Challenge/problem to be addressed by the recommendation:	A critical goal of accelerating the deployment of modern DES is to contribute towards emission reduction and improvement in air quality. However, current behaviour and capacities are too low among city officials in terms of the development and utilisation of MRV frameworks that were included within the DES initiative. This is a critical gap that can be complemented by active scientific research action in each project country, particularly if the project is intended to be further developed. The results of the scientific research on international best practices in the use of MRV frameworks that are applicable to modern DES in the various countries can be consolidated and used to re-design project component 3 activities, such that local officials will be able to actually develop and use these systems to facilitate tracking of emissions.
Priority Level:	Critical
Type of Recommendation	Project Level
Responsibility:	UNEP Project Team (EA and IA)
Proposed implementation time-frame:	Immediately

Recommendation #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 district energy systems project are enhanced, particularly during the formulation of policies and the selection of District Energy projects in the various cities.
Challenge/problem to be addressed by the recommendation:	The current level of gender sensitivity in the project was observed to be generally low. In various training workshops, it is unclear what strategies are adopted to ensure that both men and women benefit equally from the various technical assistance packages. Again, policies and projects for modern DES would have effects on infrastructure development in the various cities. Given that these infrastructures are owned by local people, it is important that their needs and concerns be factored in when taking plans for the development of such projects. In emerging development activities, gender sensitivity is key, and respect for human rights based on the Rights Based Approach is critical. Thus, it is important that subsequent project efforts adopt innovative approaches to enhance the gender sensitivity and responsiveness to human rights needs. Such approaches could include the institution of mandatory legal requirements, conscious efforts to enhance women participation in workshops and trainings towards the deployment of modern DES, gender-

	preferences in selection of heads of working groups in cities among others
Priority Level:	Critical
Type of Recommendation	Partner Level
Responsibility:	UNEP Cities Unit (EA) and Climate Mitigation Unit (IA), National and City governments
Proposed implementation time-frame:	Immediately

Recommendation #6:	The project team should use follow-up conversations to encourage project partners in the pilot and replication cities, particularly city officials in charge of policy formulation and project identification, and local investors into the construction of modern DES based on the list of pilot projects identified to incorporate the needs and views of marginalised and under-represented groups in cities, such as the urban poor into further development of selected pilot DES projects
Challenge/problem to be addressed by the recommendation:	The current level of sensitivity of the project to marginalised and under-represented groups such as the urban poor in the Project is limited, even though the selection and construction of modern DES projects could directly or indirectly affect these people. Where policy and project development are limited in this regard, it can result in worsening the conditions of these marginalised groups, through displacement costs for example. Beyond this, their inclusion is a matter of fundamental human rights, in line with the Rights-Based Approach to development. Thus, follow-ups with city officials and relevant partners in project cities in charge of the formulation of policies and the selection of either new projects, retrofitting projects, or interconnection of existing systems should endeavour to identify these groups, and through opinion surveys for example, include these people in the project development and implementation process within the various cities.
Priority Level:	Critical
Type of Recommendation	Partner Level
Responsibility:	UNEP Cities Unit
Proposed implementation time-frame:	Immediately

ANNEX I. RESPONSE TO STAKEHOLDER COMMENTS

Table 11. Response to stakeholder comments received but not (fully) accepted by the reviewers, where appropriate

Page Ref	Stakeholder comment	Evaluator(s) Response
13	Para 5: Working with indigenous communities would be quite difficult to achieve given this is a city based project and no opportunities were identified for this. Local people were engaged significantly through workshops and awareness raising (news articles) and also meetings with building owners and residents for pilot projects	This is well noted. However, based on the discussions with the various officials spoken to during the Evaluation, it was revealed that workshops and webinars were largely attended by city officials and other project partners in the various cities, with limited participation of local people in project cities. The evaluator also notes that the project team encouraged local participation through news articles among others. While this effort is significant, it tends to limit participation to "Information reception" rather than active contribution of views an opinions to the project.
13	Para 5: Regarding MRV this is a wider issue than the project could handle – while recommendations are given it is up to the cities to use them – in reality many projects do not adopt MRV effectively which is an issue of institutional capacity and central government requirements which is beyond the project's scope to be able to address.	This is well noted, and the observation regarding the general challenge in the use of MRV frameworks due to limited capacities noted by the DES team is well in line with insights received by participating officials in the Virtual Focus Group Discussions during the evaluation. The limited ability to use the MRV frameworks is thus a significant observation, and one that leaves room for the appropriate recommendation on the adoption of integrated approaches to contribute towards reducing this gap.
14	Para: It is difficult to ensure that the construction of pilot cases can occur during the life of a 3-4 year project. Also, with only 2 million USD of grant, providing such assistance in 4 different countries would be very challenging.	The evaluator takes notice of the performance of the project given the GEF grant allocation and the project duration. The initial proposition of construction of physical pilot cases was to create room for further recommendation regarding the need tor provision of more funding for projects such as the DES, and rallying of partner support to ensure that actions are taken a step further at minimum to facilitate appropriate demonstration of the feasibility of modern DES, and actual contribution to emission reduction. The lesson has been revised and reflected in this version of the report to inform recommendations as appropriate
15	Recommendations: Are these recommendations for what could have been done better? We were aware of the importance of all of these and designed activities in countries as such	While the evaluator acknowledges that the Project team is aware of these and designed the project based on these principles, these recommendations were based on the observed gaps in the project cities, and were drawn from suggestions and submissions from the various stakeholders engaged during the evaluation process regarding their views on what could have helped improved the performance of the project better.
98	Strategic question 4: Private sector has been involved in the project implementation from the beginning. Engie co-funded additional rapid assessments in Chile, in India, EESL was also involved from the beginning. Private sector partners have been informed and engage in project implementation through numerous workshops and events	The comment is well noted. However, this is a critical comment that was raised by the national partners during the Virtual Focus Group Discussions, and they indicated that potential investor companies were largely brought on after rapid assessments and calls for EOIs for selected projects. While the evaluator notes the effort of the project to engage such private sector investors from the beginning through workshops, the concerns raised by partners suggest that there is a gap in such aspect which can still be subsequently improved upon.

ANNEX II. PEOPLE CONSULTED DURING THE EVALUATION

Table 12. People consulted during the Evaluation

Organization or Location	Name	Position	Gender
UNEP CCMU (IA)	Ruth Coutto	Task Manager	F
UNEP CCMU (IA)	Julien Lheureux	Programme Officer	M
UNEP CCMU (IA)	Leena Darlington	Fund Management Officer (until August 2021)	F
UNEP Cities Unit (EA)	Lily Riahi	Project Manager	F
UNEP Cities Unit (EA)	Benjamin Hickman	Coordinator Eastern Europe and Asia	M
UNEP Cities Unit (EA)	Celia Martinez	Coordinator Latin America and Africa	F
UNEP	Peter Mwanzia Musau	Finance Assistant, UNEP	M
International District Energy Agency (IDEA)	Mr.Rob Thornton	President & CEO, IDEA	M
University of Belgrade, Serbia	Prof. Dejan Ivezić	Consultant, Ministry of Energy, Development and Environmental Protection, Serbia	M
Ministry of Energy, Chile	Felipe Mellado Andías	Professional, Geothermal and District Energy Unit, Ministry of Energy	M
The Ministry of Environment, Chile	Carla Germani	Environmental Engineer, Ministry of Environment	F
Copenhagen Centre on Energy Efficiency	Dr. Zhuolun Chen	Senior Advisor, UNEP Copenhagen Climate Center	M
Danfoss - DBDH	Atli Benonysson	Vice President, Application and Technology	M
TNB ENgineering Corporation Sdn Bhd	Ahmad Firdaus Mansor	Head of Asset Management	M
Universidad Tecnológica de Chile INACAP	Ingrid Rebolledo Mejías	Director of Innovation and Environmental Outreach	F
Pune Municipal Corporation	Mr. Aniruddha Shahpure	Chief Knowledge officer, Smart city,	M
Rajkot	Mr Sunil Pote	Ex Deputy Chief Engineer	M
India	Sudheer Perla	India Manager, Tabreed, National Central Cooling Company PJSC	M
ICLEI South Asia	Ms. Soumya Chaturvedula	CSO Rep	F
Alliance for an Energy Efficient Economy	Tarun Garg	CSO Rep	M
UNEP India Office	Mr. Rahul Agnihotri	Country Official	M
Temuco (Chile)	Patricio Figueroa	Municipality of Temuco	M
Coyhaique (Chile)	Nicolás Smith	Regional Secretary Ministry of Environment in Aysén	M
China	Mr. Alfred Wei Che	Rep from Danfoss China	M
Serbia	Mr. Vladica Bozic	CTCN Focal Point Ministry of Environmental Protection	M
Chile	Rodrigo Espinoza	Ministry of Environment Representative	M
Chile	Alejandra Millan	Environment Office Rep from Renca	M

ANNEX III. KEY DOCUMENTS CONSULTED

Project planning and reporting documents

- Project Document (CEO Approval Document)
- PRC Submission documents (2016.10.24 and 2016.11.03)
- PIF (dated 03.11.2015)
- GEFSEC Review documents
- PIRs from July 2017 to June 2021
- Half-Yearly reports
- Final Project Report

Project outputs – Overall

- Project Document
- PIRs from July 2017 to June 2021
- Final Project Report
- List of Deliverables provided by Executing Agency
- District Energy in Cities Initiative – Summary Report (2022)
- DES initiative website and knowledge management platform
- Other external relevant websites
- Detailed project budget and co-finance budgets
- Project expenditure sheets

ANNEX IV. BRIEF CV OF THE EVALUATOR

Name	**Noara Zohra Kebir**
Profession	Engineer, Lead Senior Consultant, Managing Director.
Nationality	Algerian / German
Country experience	• Europe: Germany, France • Africa: South Africa, Nigeria, Kenya, Ghana, DRC, Morocco, Senegal, Tanzania, Mali, Ethiopia, Uganda, Madagascar, Ruanda, Ivory Coast, Algeria, Tunisia, Burkina Faso, Lesotho, Cap Verde, Mozambique, Niger, Zimbabwe, • Americas: USA, Canada, Peru, Colombia, Mexico, Haiti, Bolivia, Jamaica, Trinidad and Tobago, Grenada, • Asia: India, Indonesia, China, Philippines, Singapore, Pakistan, Sri Lanka, Viet Nam, Cambodia, Saudi Arabia, Afghanistan, Bangladesh, Nepal, Uzbekistan, Yemen, Armenia, Jordan, Kirgizstan, Oman, Tadjikistan.
Education	• Technician for Machines and Systems (German vocational training) and Master in Energy and Process Engineering

Short biography

With her background as an energy and process engineer, Ms Kebir has accumulated more than twenty years of relevant interdisciplinary experience along the entire value chain of development cooperation projects and programmes, from project ideation and design, implementation to monitoring and evaluation using a diversity of qualitative and quantitative methods across more than 50 countries. She led the Terminal Evaluation of the UNEP/GEF (GEF Project ID 4139 – Market Transformation for Energy Efficient Lighting in Morocco), which granted her familiarity with the UN working principles, and the application of the Theory of Change methodology and other Terminal Evaluation exercises. Furthermore, she has been leading and involved in several monitoring and evaluation activities of EE and RE products, services, markets, projects, companies and business models (technical and financial due diligence). She is familiar with different approaches of socioeconomic and environmental impact evaluation and regularly requested as a jury member and evaluator of scientific papers, business plan competitions or tenders in the field of RE and EE.

Ms Kebir acquired 25+ years of expertise in energy efficiency standardisation, labelling and certification (household appliances, PV components, etc.). Her participation in the design, implementation, monitoring and evaluation of several energy-efficient building and housing programs in countries such as Armenia, Tadjikistan, Kyrgyzstan and Peru granted her adequate experience in evaluating energy efficiency within the building sector. She has served as an international team leader in a number of the aforementioned projects, and with her educational and professional background, she adequately understands the necessary principles of district energy and can appropriately apply them in assessing the extent to which the goals of projects within this domain are achieved. Her recent role as the lead consultant for the GIZ in the ongoing Nigerian Energy Support Programme under current COVID-19 conditions affirms her ability to lead projects successfully from home through remote arrangements.

Key specialties and capabilities cover:

- Renewable energies and energy efficiency, green and circular economy, sustainable battery management and recycling.
- Project management and leadership, communication.

Selected assignments and experiences

- Provision of Assessment of Microfinance Institutions in Yemen (UNOPS, 2018 - 2019)
- Managing the Africa Renewable Energy Scale-Up Facility (Proparco, 2017-2019)
- Developing an enabling framework for off-grid electricity investment together with a package of bankable projects in Ethiopia (EU Technical Assistance Facility, 2018)

Independent evaluations:

- Terminal Evaluation of the UNEP/GEF Project "Market Transformation for Energy Efficiency Lighting in Morroco (GEF 4139)
- Terminal Evaluation of the UNEP/GEF Project "The SEforALL Building Efficiency Accelerator (BEA): Expanding Local Action and Driving National Change (GEF 9947)"

ANNEX V. STAKEHOLDER ANALYSIS FOR THE PROJECT

Type of Stakeholder	Agency/organization	Category	Project Role	Participation in Project Design	Changes in their behaviour expected through the implementation of the project
Global Level					
IGO	UNEP Economy Division, Energy & Climate Branch, Climate Mitigation Unit (IA)	**Type A: High power / high interest = Key player**	• Provided administrative supervision for the implementation of the project.	Yes	Enhanced commitment to Climate change adaptation targets globally
	UNEP Economy Division, Energy & Climate Branch, Cities Unit (EA).	**Type A: High power / high interest = Key player**	• Provide expertise for ground for the work of the DES Initiative's Secretariat • Lead the coordination of global activities in the implementation of the DES • Contributed to all project components (1 to 4).	Yes	Enhanced capacity for the implementation of DES at a global level (upscaling)
	IEA	**Type C: Low power / high interest over the project = Show consideration**	• Provided analytical support, modelling tools and data • Support for the technical task force and activities within China • Contributed to Components 1, 2 and 4	Yes	Enhanced capacity in energy and climate data analysis (modelling) and increased commitment towards the promotion of DES in developing countries
NGO	ICLEI- Local Governments for Sustainability	**Type C: Low power / high interest over the project = Show consideration**	• Supported with technical assistance and capacity building activities with local government and stakeholders • Contributed to components 1, 2 and 4	Yes	Enhanced competency in the provision of technical assistance and capacity building at different levels of government, particularly in the implementation of DES projects
	C40	**Type C: Low power / high interest over the project = Show consideration**	• C40 Provided webinars and training on local planning policies and best practice technologies and support dissemination activities • C40 supported outreach events and conferences • C40 Contributed to component 4.	Yes	Deepened collaboration for the dissemination of information on DES and outreach for stimulating wider stakeholder uptake

Type of Stakeholder	Agency/organization	Category	Project Role	Participation in Project Design	Changes in their behaviour expected through the implementation of the project
	Copenhagen Centre on Energy Efficiency	**Type A: High power / high interest = Key player**	• C2E2 Supported institutional engagement with city governments and provide analysis of the technical and economic rationale for city energy-efficiency engagements • They engaged in selected feasibility studies, plus contribute to the ToR and the contracting of consultants • Provide analysis of experiences, best practice engagement and compile or develop guidance material based on a wide range of city experiences. • Supported the development of concrete project ideas and linkages to sources of finance. • C2E2 Contributed to all components.	Yes	Increased scientific research competency on DES, and accelerated capacity for institutional engagement and the implementation of techno-economic analysis based on experiences from the project implementation
	World Resources Institute (WRI)	**Type C: Low power / high interest over the project = Show consideration**	• Provide direction for the development of the deep-dive city together • Jointly assess the role of district energy and building efficiency in the city and make holistic policy recommendations. • The WRI will therefore contribute to component 2.	Yes	Increased access to quality data for planning towards sustainable resource consumption, particularly in the context of building efficiency in diverse contexts across the globe
	Climate Technology Center and Network (CTCN)	**Type C: Low power / high interest over the project = Show consideration**	• The DES Initiative was the implementing partner for a CTCN funded pre-feasibility of the district heating system in Banja Luka, Bosnia & Herzegovina. • This is helping to leverage finance for the refurbishment and modernization of the DH system in Banja Luka.	Yes	Enhanced competency in the implementation of DES, including in the conduction of feasibility analysis and the design of systems in diverse locations
Finance	World Bank Group IFC	**Type B: High power / low interest over the project = Meet their needs**	• Will be involved in the business development activities • Contributed to components 2 and 4.	Yes	Enhanced competency and contribution to climate change adaptation through the effective allocation of resources for emission reduction

Type of Stakeholder	Agency/organization	Category	Project Role	Participation in Project Design	Changes in their behaviour expected through the implementation of the project
	Regional development banks, commercial banks	**Type B: High power / low interest over the project = Meet their needs**	• Provided quality control and funding to support policy development and demonstration project implementation in the cities.		Increased commitment towards climate change financing
	Global Environment Facility (GEF)	**Type A: High power / high interest = Key player**	• Provided financial support • Provided quality control and funding to support policy development and demonstration project implementation in the cities.	Yes	Increased commitment towards climate change financing and enhanced acceleration towards the attainment of strategic climate change goals of the GEF
	KfW	**Type B: High power / low interest over the project = Meet their needs**	• Provided quality control and funding to support policy development and demonstration project implementation in the cities. • Will finance feasibility studies in the Indian market proposed by the DES Initiative.	Yes	Enhanced capacities in the provision of funding to support climate interventions, particularly in enhancing energy efficiency
	European Bank for Reconstruction and Development (EBRD)	**Type B: High power / low interest over the project = Meet their needs**	• Will help to realize an investment in the district heating system. • Provided technical input to the DES Initiatives activities.		Increased commitment towards climate change financing, particularly in the provision of modern energy systems
National	Danish Energy Agency	**Type C: Low power / high interest over the project = Show consideration**	• Provided a shared experience for introducing district heating in China.		Enhanced experience in the development and deployment of DES for future use in related environments
	DK Embassy	**Type D: Low power / low interest over the project= Least important**	• Supported and leveraged communication and promotion work of the DES Initiative (component 4).		Enhanced awareness of DES, and increased capacity in disseminating information within sustainable energy use and climate change adaptation
Private Sector Operators	Empower	**Type B: High power / low interest over the project = Meet their needs**	• Provided a model for financial analysis of district cooling project to DES Initiative to be adapted to local contexts and made public. • Provided experts to a 'new' district cooling market to carry out rapid assessments and	Yes	Discovery of new and efficient models and tools for analysis of DES projects and also for the undertaking of assessments regarding energy-efficient systems

Type of Stakeholder	Agency/organization	Category	Project Role	Participation in Project Design	Changes in their behaviour expected through the implementation of the project
			support deep assessments (Components 1, 2 and 4)		
	Dalkia	**Type B: High power / low interest over the project = Meet their needs**	• Provided experts to rapid assessments (Component 1) and deep assessments (Component 2) in Eastern Europe and China	Yes	Enhanced capacities of experts in conducting Deep Assessments for DES projects
	Veolia	**Type B: High power / low interest over the project = Meet their needs**	• Provided training and capacity building and will invite 'deep-dive' city stakeholders (Component 2) to Veolia training camps. • Supported the development of policy and governance best practices in the pilot countries.	Yes	Increased commitment towards the development of materials and tools for the deployment of DES
	ENGIE (Cofely, Climespace, CPCU)	**Type B: High power / low interest over the project = Meet their needs**	• Will review assessment methodologies, provide specific technical guidance and give feedback on the adaptation of models and tools in country contexts (Components 1 and 2). • Will develop policy guidance and participate as a speaker in international conferences and workshops on district energy (at least three times a year) (Component 4) • Engaged city actors of at least one city per country of interest to site visits of district energy networks operated by ENGIE. • Provided co-brand /co-develop tools, communication material, animation videos, represent the work of the Initiative at global events and provide public relations support. • Functions as co-chair of the working group on district cooling as part of the ASEAN Plan of Action for Energy	Yes	Will deepen its commitment towards the provision of policy assistance and the development of relevant assessment and communication tools for the deployment of energy-efficient technologies such as the DES

Type of Stakeholder	Agency/organization	Category	Project Role	Participation in Project Design	Changes in their behaviour expected through the implementation of the project
			Cooperation 2016-2025. • Supports 2 projects a year for a total of 6 projects for the period.		
Private Sector Technology Providers	Danfoss	**Type A: High power / high interest = Key player**	• Provide experts and metering technologies to undertake heating/cooling demand mapping and district energy potential studies in deep-dive cities • designs and delivers training in deep-dive cities on heating/cooling strategies, master planning and energy mapping.	Yes	The capacities of its expertise in the development of training materials and technologies in the field of energy will increase
	Thermaflex	**Type A: High power / high interest = Key player**	• Global level: development and adaptation of district energy simulation models and tools, support of conferences and workshops, support of the promotion of district energy in cities (Component 4) • Country level: Provide support from the feasibility stage on, the development of pilot city activities, and improving stakeholder awareness. (Components 1 and 2)	Yes	Deepened competency in the development of local-oriented models and tools for DES deployment acceleration. The capacity to conduct feasibility and work with a wide range of stakeholders at the city level towards project implementation will increase
International Consultants	Sustainability Solutions Group (SSG) and GGLO	**Type D: Low power / low interest over the project= Least important**	• Global level: Providing a district energy model for the Initiative's Virtual Platform establishing a direct link between SSG and the cities for technical queries, training material, online webinars, and the support of the global promotion of the Initiative on high-level events (Component 4) • Country level: Light-touch and long-term partnership for 6 cities, deep-dive mapping,	Yes	Enhanced competency in the development of models and partner engagement in the deployment of DESs. This will be reflected in an increased commitment towards the provision of support for the deployment of such systems in other jurisdictions

Type of Stakeholder	Agency/organization	Category	Project Role	Participation in Project Design	Changes in their behaviour expected through the implementation of the project
			and planning for 2 cities (Components 1 and 2)		
	King & Spadling LPP	**Type D: Low power / low interest over the project= Least important**	Global level: to provide templates, risk matrices, term sheets and other material, deliver workshops and webinars, provide best practice case studies, and others. Country-level: To support deep-dive cities to bring projects to tender, training for city officials, review draft rapid assessments (Components 1 and 2).	Yes	Increased commitment towards the provision of materials and tools necessary for upscaling DES and other EE systems
Industry Associations	IDEA	**Type C: Low power / high interest over the project = Show consideration**	• Global level: to host a "train the trainer" global workshop, design and deliver at least two webinars per year, mobilize new partners and liaise with actors to publish DES tools/guidance, enhance global awareness-raising campaign by developing co-branded tools and by supporting the project's communication strategy on international media, liaise with U.S Universities, engage students to contribute with their technical expertise in the form of master thesis, final projects (Component 4) • Country level: To organize one country-based workshop annually in at least one country (India or China), to draft/review rapid assessments and develop a citywide mapping of heating/cooling demand, waste, heat, and renewables, support deep-dive cities with the development of their master-planning for district energy, provide policy recommendations and support on	Yes	Enhanced competency in knowledge management and exploitation of project results within the DES project scope, and other areas of Climate Investment Interventions

Type of Stakeholder	Agency/organization	Category	Project Role	Participation in Project Design	Changes in their behaviour expected through the implementation of the project
			defining suitable business models (Components 1 and 2)		
	EHP	**Type C: Low power / high interest over the project = Show consideration**	• Dissemination activities and matchmaking with private sector partners for training, webinars and financing sessions (Component 4)	yes	Enhanced commitment towards knowledge dissemination and the facilitation of investor relation formations
Academia and Research	Aalborg University, 4DH Research Center	**Type C: Low power / high interest over the project = Show consideration**	• Provided existing data and modelling tools, support the development of assessment indicators, and support the development of proxies for energy consumption of different building types (Components 1, 2 and 3)	Yes	Increased research output in the domain of Energy Efficiency in buildings, including the potentials, technical design, tools and models of assessment, etc. for such systems
Champion Cities	45 champion cities from the development of DES publication	**Type C: Low power / high interest over the project = Show consideration**	• To support learning cities through study tours, participation at workshops, provision of data, case studies and models and as part of city-to-city exchanges, as part of the Virtual Platform.	Not clear	Increased uptake of DES among target cities, and continuous provision of support by model cities to emerging ones in the adoption of DES
Country Level					
Chile	Ministry and SEREMIS of Housing and Urban Development	**Type A: High power / high interest = Key player**	To provide policy and data support in Chile and collaborate with the project implementing body for the implementation of the DES at both National and City levels	No	• Increased commitment in terms of policy, institutional and regulatory reforms towards energy efficiency and climate change adaptation in cities, particularly in the adoption of DES in cities • Increased investment and
	Provincial Governments	**Type A: High power / high interest = Key player**		No	
	Council of Ministries for Sustainability	**Type C: Low power / high interest over**		No	

Type of Stakeholder	Agency/organization	Category	Project Role	Participation in Project Design	Changes in their behaviour expected through the implementation of the project
		the project = Show consideration			demonstration of commitment towards providing financial support for the deployment of District Energy Systems in cities • Enhanced competency in the deployment of DES and its operation within the national electricity grid (most suitable models for overall energy management in project cities) • Increased commitment in activities towards accelerating the deployment of DES (outreach, assessment assistance, communication, and dissemination, and fostering investor relations) • Increased commitment in terms of policy and regulation provisions for environmental management and the reduction in air pollution
	Ministry and SEREMIS of Energy	**Type A: High power / high interest = Key player**		No	
	Ministry and SEREMIS of Environment	**Type A: High power / high interest = Key player**		No	
	National Energy Commission	**Type C: Low power / high interest over the project = Show consideration**		No	
	Chilean Agency for Energy Efficiency	**Type C: Low power / high interest over the project = Show consideration**		No	
	Production Development Corporation	**Type C: Low power / high interest over the project = Show consideration**		No	
	National Chamber of Commerce	**Type D: Low power / low interest over the project= Least important**		No	
	Financial Institutions and Banks ESCOs	**Type B: High power / low interest over the project = Meet their needs**		No	
	Environmental Assessment Service	**Type C: Low power / high interest over the project = Show consideration**		No	

Type of Stakeholder	Agency/organization	Category	Project Role	Participation in Project Design	Changes in their behaviour expected through the implementation of the project
	National Centre for Innovation and Promotion of Sustainable Energy	**Type C: Low power / high interest over the project = Show consideration**		No	
	National Institute for Standardization	**Type B: High power / low interest over the project = Meet their needs**		No	
	Power Utilities	**Type A: High power / high interest = Key player**		No	
	ACESOL, ACHEOG, ACERA (NGOs)	**Type C: Low power / high interest over the project = Show consideration**		No	
China	Ministry of Housing and Urban-Rural Development	**Type A: High power / high interest = Key player**	To provide policy and data support in China and collaborate with the project implementing body for the implementation of the DES at both National and City levels	No	
	Ministry of Science and Technology	**Type A: High power / high interest = Key player**		No	
	National Energy Commission	**Type C: Low power / high interest over the project = Show consideration**		No	
	China Academy of Building Research	**Type C: Low power / high interest over the project = Show consideration**		No	
	State Electricity Regulatory Commission	**Type A: High power / high interest = Key player**		No	

Type of Stakeholder	Agency/organization	Category	Project Role	Participation in Project Design	Changes in their behaviour expected through the implementation of the project
	Ministry of Environmental Protection	**Type A: High power / high interest = Key player**		No	
	National Energy Administration	**Type C: Low power / high interest over the project = Show consideration**		No	
	Environmental Protection Bureaus (provincial level)	**Type A: High power / high interest = Key player**		No	
	All-China Federation of Industry and Commerce	**Type D: Low power / low interest over the project= Least important**		No	
	State Development and Investment Corporation	**Type A: High power / high interest = Key player**		No	
	China National Institute of Standardization	**Type D: Low power / low interest over the project= Least important**		No	
	State Bureau of Quality and Technical Standards	**Type B: High power / low interest over the project = Meet their needs**		No	
	Energy Research Institute	**Type C: Low power / high interest over the project = Show consideration**		No	
	China District Heating Association	**Type C: Low power / high interest over the project = Show consideration**		No	

Type of Stakeholder	Agency/organization	Category	Project Role	Participation in Project Design	Changes in their behaviour expected through the implementation of the project
	Chinese Renewable Energy Industries Association	**Type C: Low power / high interest over the project = Show consideration**		No	
India	Ministry of Urban Development	**Type A: High power / high interest = Key player**	To provide policy and data support in India and collaborate with the project implementing body for the implementation of the DES at both National and City levels	No	
	Indian Society of HVAC	**Type C: Low power / high interest over the project = Show consideration**		No	
	Confederation of Indian Industries	**Type D: Low power / low interest over the project= Least important**		No	
	Green Building Council	**Type C: Low power / high interest over the project = Show consideration**		No	
	Ministry of Power	**Type A: High power / high interest = Key player**		No	
	Ministry of Environment and Climate Change	**Type A: High power / high interest = Key player**		No	
	Central Electricity Regulatory Commission	**Type C: Low power / high interest over the project = Show consideration**		No	
	State Designated Energy Agencies	**Type C: Low power / high interest over the project = Show consideration**		No	

Type of Stakeholder	Agency/organization	Category	Project Role	Participation in Project Design	Changes in their behaviour expected through the implementation of the project
	State Urban Development Departments	**Type A: High power / high interest = Key player**		No	
	City Planning Authorities	**Type A: High power / high interest = Key player**		No	
	NGOs	**Type C: Low power / high interest over the project = Show consideration**		No	
	Chamber of Commerce	**Type D: Low power / low interest over the project= Least important**		No	
	Financial institutions and Banks	**Type B: High power / low interest over the project = Meet their needs**		No	
	Bureau of Indian Standards	**Type B: High power / low interest over the project = Meet their needs**		No	
	Electricity Distribution Companies	**Type B: High power / low interest over the project = Meet their needs**		No	
	Industrial Associations	**Type D: Low power / low interest over the project= Least important**		No	
	Refrigeration and Air-Conditioning Manufacturers Association	**Type D: Low power / low interest over the project= Least important**		No	

Type of Stakeholder	Agency/organization	Category	Project Role	Participation in Project Design	Changes in their behaviour expected through the implementation of the project
	Regional Pollution Control Boards	**Type C: Low power / high interest over the project = Show consideration**		No	
Serbia	Ministry of Construction, Transport and Infrastructure	**Type B: High power / low interest over the project = Meet their needs**	To provide policy and data support in Serbia and collaborate with the project implementing body for the implementation of the DES at both National and City levels	No	
	Ministry of Agriculture and Environmental Protection	**Type C: Low power / high interest over the project = Show consideration**		No	
	Ministry of Mining and Energy	**Type C: Low power / high interest over the project = Show consideration**		No	
	Energy Agency of the Republic of Serbia (ARES)	**Type C: Low power / high interest over the project = Show consideration**		No	
	Public Enterprise Elektromreza Srbije	**Type B: High power / low interest over the project = Meet their needs**		No	
	Public Enterprise Srbijagas	**Type B: High power / low interest over the project = Meet their needs**		No	
	Belgrade City Management	**Type C: Low power / high interest over the project = Show consideration**		No	

Type of Stakeholder	Agency/organization	Category	Project Role	Participation in Project Design	Changes in their behaviour expected through the implementation of the project
	City Municipalities	**Type A: High power / high interest = Key player**		No	
	National Association for Biomass of Serbia (SERBIO)	**Type D: Low power / low interest over the project= Least important**		No	
	Society of Thermal Engineers	**Type D: Low power / low interest over the project= Least important**		No	
	Chamber of Commerce	**Type D: Low power / low interest over the project= Least important**		No	
	Serbian Development Agency	**Type C: Low power / high interest over the project = Show consideration**		No	
	Financial institutions and banks	**Type B: High power / low interest over the project = Meet their needs**		No	
	Electricity Distribution Company "EPS Distribuicao"	**Type C: Low power / high interest over the project = Show consideration**		No	
	ESCO Belgrade	**Type C: Low power / high interest over the project = Show consideration**		No	
	Serbian Environmental Protection Agency	**Type C: Low power / high interest over**		No	

Type of Stakeholder	Agency/organization	Category	Project Role	Participation in Project Design	Changes in their behaviour expected through the implementation of the project
		the project = Show consideration			
	Institute for Standardization of Serbia	**Type D: Low power / low interest over the project= Least important**		No	
	Business Association "District Heating of Serbia"	**Type C: Low power / high interest over the project = Show consideration**		No	
	Association of Construction Industry and Utility Services	**Type C: Low power / high interest over the project = Show consideration**		No	
	Public Enterprise Elektroprivreda	**Type B: High power / low interest over the project = Meet their needs**		No	

ANNEX VI. GUIDE FOR GLOBAL DISCUSSIONS

Draft Guide for Global Focus Group Discussions- DES

1. How did the partnership with the international mentor cities benefit your city and help in the implementation of the District Energy action?
2. How can local champions be effectively mobilised to advocate for district energy systems at different levels of policy influence in the various cities?
3. Did the approach adopted by the UNEP Cities Unit in implementing the DES project create opportunities for maximising the benefits for indigenous people in your cities?
4. What is your experience with the financial viability of modern DES in your city? Do you anticipate significant challenges in ensuring the cost-competitiveness of the systems within your cities?
5. What is the status of investor commitment to the development of District Energy Systems in your city? Probe the status of EOIs in the various cities toward modern DES
6. Was the assistance package you received, well-tailored to the needs of your city for District Energy? How contextually relevant was the specific intervention received?
7. How did your city engage the private sector (during the BEA Phase II and after the receipt of the TA packages) in implementing Energy Efficiency in buildings?
8. How effective are the city-level monitoring frameworks developed for tracking emission reduction in your cities? Is there the capacity to implement the Measuring, Reporting and Verification (MRV) framework in your city?
9. What has been the experience of your city in raising the awareness of its people for modern DES?
10. What local policy actions and changes have occurred in your city towards accelerating the deployment of modern DES? Are there any significant areas of capacity concern in the development of modern DES that you envisage?
11. How satisfied are you with the quality and relevance of the achievements of the DES initiative in your cities?
12. How can gender sensitivity be enhanced in the implementation of projects such as the DES?

13. **For light-touch cities,** how did the rapid assessments prepare you for the uptake of modern district energy systems? Is the rapid assessment methodology effective and efficient from your experience?
14. **For Deep Dive cities**, has engagement with banks, funds and the private sector led to ensuring that DES projects are bankable projects in your cities and what lessons can be extracted on financing bankable projects in your city?
15. What strategies do you anticipate enhancing the collaboration with Multilateral Development Banks or Financial Institutions towards the development of modern DES?

For Relevant Partners

1. How were you involved in the various city-level engagements? Were there adequate strategies for private sector engagement towards the development of modern DES?
2. What is your comment on the effectiveness of the approach adopted in partner engagement? What other strategies and roles do you anticipate that partners can take up to attract investment into modern DES?
3. What recommendations do you have for accelerating the development and uptake of modern district energy systems in the various cities?
4. What models can be adopted to enhance the collaboration with Multilateral Development Banks or Financial Institutions towards the development of modern DES?
5. From your experience, what strategies can be adopted to enhance the replication of the assessment actions and enhancement of the financial viability of DES in other non-project cities with the potential of taking up modern DES?

ANNEX VII. RESPONSES TO QUESTIONS FOR GEF PORTAL INPUT

(a) ***Question:*** What was the performance at the project's completion against Core Indicator Targets? (For projects approved prior to GEF-7[54], these indicators will be identified retrospectively and comments on performance provided[55]).
Response: *Even though a set of GEF 7 core indicators were defined at the inception of the Terminal Evaluation, the emissions saved could not be estimated (GEF 7 core indicator 1 at Inception of evaluation). The project actions were largely in the form of capacity building. At the time of the Terminal Evaluation, the performance of the project in terms of emissions that have been saved as a results actual development of DES initiatives could not be ascertained given that no project has been completed yet as an output of the DES action.* Regarding indicator 2: Number of direct beneficiaries disaggregated by gender as co-benefit of GEF Investment, it was not possible to estimate this given that comprehensive data on all city officials that received technical assistance packages in the forms of training and capacity building in activities such as the use of MRVs could not be obtained.
(b) ***Question:*** What were the progress, challenges, and outcomes regarding engagement of stakeholders in the project/program as evolved from the time of the MTR? (This should be based on the description included in the Stakeholder Engagement Plan or equivalent documentation submitted at CEO Endorsement/Approval)
Response: *It must be stated that there was no Mid Term Review for the DES project. At inception, the DES Initiative intended to assess and recommend a tailored structure for multi-stakeholder coordination that delivers the coordination of stakeholders needed for successful delivery of specific projects and to support the design and implementation of a long-term development plan and strategy for district energy in the pilot city. The structure, which was to be led by a local stakeholder and/or city staff, intended to formalize stakeholder engagement and provide a platform and focal point for collaboration, training and for leveraging the most knowledgeable experts in the local market to help design effective strategies for the acceleration of district energy. At the evaluation of this project, no evidence on such a structure was obtained in the pilot cities.*
(c) **Question:** What were the completed gender-responsive measures and, if applicable, actual gender result areas? (This should be based on the documentation at CEO Endorsement/Approval, including gender-sensitive indicators contained in the project results framework or gender action plan or equivalent)
Response: *At CEO approval, the provision for gender relates largely to the collection of gender disaggregated data across the project actions, as well as increasing the awareness of people on gender issues. At evaluation, it was not clear the detail the existence of gender disaggregated data for the estimation of the extent to which level of awareness of project beneficiaries have been increased on gender issues. Thus, no specific gender actions were prioritised during the implementation of the project across Chile, China, India and Serbia. The project's sensitivity to gender issues at evaluation was thus rated as moderately satisfactory.*
(d) ***Question:*** What was the progress made in the implementation of the management measures against the Safeguards Plan submitted at CEO Approval? The risk classifications reported in the latest PIR report should be verified and the findings of the effectiveness of any measures or lessons learned taken to address identified risks assessed. (Any supporting documents gathered by the Consultant during this review should be shared with the Task Manager for uploading in the GEF Portal)

[54] The GEF is currently operating under the seventh replenishment period of the GEF Trust Fund covering the period July 1, 2018 to June 30, 2022. The GEF Portal Reporting Guide for FY20 Reporting Process indicates that GEF-6 projects that have yet to map existing indicators to GEF-7 Core Indicators need to do so at MTR stage or (if already there) at the time of the TE. (i.e. not GEF projects approved before GEF-6)

[55] This is not applicable for Enabling Activities

Response: *No significant risks on the successful implementation of the DES was planned for or encountered along the course of implementation of the intervention. In the various risk classifications, no risk was anticipated at approval to have a significant implication on the implementation of project actions. Consequently, the only risk mitigation measure that was implemented during the project was the application for an 11-month extension of the project due to the prevalence of the COVID 29 pandemic, which had no impact on the overall project cost. Evidence on the request for extension is presented in the project budget revision for July 2020.*
(e) ***Question:*** What were the challenges and outcomes regarding the project's completed Knowledge Management Approach, including: Knowledge and Learning Deliverables (e.g. website/platform development); Knowledge Products/Events; Communication Strategy; Lessons Learned and Good Practice; Adaptive Management Actions? *(This should be based on the documentation approved at CEO Endorsement/Approval)*
Response: *There were no significant challenges observed in the knowledge management approach of the DES, in including Knowledge projects and learning deliverables. The project has an up-to-date website, which is constantly updated with timely information about the DES. Thus overall, effective strategies for dissemination of evaluation actions and findings have been put in place.*

ANNEX VIII. EVALUATION FRAMEWORK

Topic	Evaluation Questions	Indicators	Data Sources
Quality of Project Design The TE will review the overall quality of the project design, including its comprehensive inclusion of all relevant stakeholders			
Related to stakeholders in the Quality of Project Design	In the review of Project design quality review, the following will be addressed: 1. Is the project design having a comprehensive stakeholder analysis that addresses the needs of all relevant **stakeholders** who are affected by or who could affect (positively or negatively)? 2. Have the main stakeholders been involved in the design of the project, and what has been their level of involvement? 3. Have the needs of relevant groups such as the vulnerable, indigenous people and gender issues been comprehensively addressed in the project design? 4. Have the specific roles and responsibilities of the key stakeholders been documented in relation to project delivery and effectiveness? 5. At the country level of implementation of the DES, have specific roles of each stakeholder been identified? Are the stakeholders organized under a lead country partner? Have the country level stakeholders been involved in the project design? 6. Does the project design make adequate mediation measures for all risks associated	• Stakeholder analysis framework • Evidence of deliberate effort to involve stakeholders in project design and implementation. • Evidence of consultative interviews with stakeholders • Minutes of consultative dialogues with stakeholders • Documentation of project partners and stakeholders. • Documentation of project partners	Desk review of main project document (ProDoc) Evaluation inception report Progress reports Key Informant Interviews with project implementing team Relevant Stakeholder consultations

Topic	Evaluation Questions	Indicators	Data Sources
	with partner involvement or discontinued involvement in the project?		
Within the Theory of Change The TE will assess the logic in the project activities, outputs, outcomes, and impact. It will assess the adequacy of provisions and causal linkages between the key parts of the TOC, and the overall effect of the project on the target beneficiaries. The contribution of the project for replication and upscaling will be further assessed.			
Related to stakeholders in the Achievement of Outputs and of Direct Outcomes	1. Are all relevant project stakeholders aware of the intended outputs of the project? 2. Were project outputs appropriately communicated and made accessible to all relevant stakeholders? 3. Have desired outcomes and impacts occurred amongst all stakeholder groups (and if not, consider why this might be)? 4. Have there been any unanticipated outcomes or impacts with reference to indigenous groups? 5. Did the project outcomes have an overall positive effect on the behaviour of all stakeholders prior to their involvement in the DES project?	• Evidence on stakeholder satisfaction level with project • Evidence on the impact of the project on all stakeholders • Evidence that the expected results of the DES (following consultations, and review of project log frame) at the end of the project are achieved particularly in India • Evidence that unintended or unanticipated impacts were experienced by the indigenous groups particularly in India	ProDoc Logical framework TOC and Reconstructed ToC Discussion with relevant project stakeholders Interviews
Catalytic effect (Within the Theory of Change)	<u>Catalytic effect:</u> Where the project expects to play a catalytic role the Theory of Change can be used to explore the extent to which the project has:	• Records on follow up initiatives by country-level stakeholders, national and municipal organizations, or individuals to replicate results and lessons from the DES project	ProDoc Project Logical framework

Topic	Evaluation Questions	Indicators	Data Sources
	Catalyzed behavioural changes in terms of use and application, by the relevant stakeholders, of capacities, developed a. Has the DES project provided any *incentives* (social, economic, market-based, competencies etc.) that can contribute towards catalyzing changes in stakeholder behaviour? b. Has the DES project made any contribution to *institutional changes*? for instance, institutional uptake of the proposed DES project and its tools? c. Has the project made any contribution to energy, the environment of building *policy changes?* (On paper and in implementation of policy within any of the countries?) d. Has the project contributed to sustained follow-on financing (*catalytic financing*) from Governments, the private sector, donors etc. (with a particular focus on India)? e. Has the project created opportunities for individuals or institutions ("*champions*") to catalyze change (without which the project would not have achieved all of its results)?	• New or amended legislation and policies on DES in the project countries • Number of newly established institutions to promote DES • Evidence of increased knowledge, awareness, and commitment to DES beyond the project • Number of follow up initiatives by the national level stakeholders to replicate results and lessons in other cities	Key informant interviews with project implementors and other Key stakeholders PIR and other progress reports Web Analytics
Replication and Scaling Up *(Within the Theory of Change)*	<u>Replication:</u> 1. What specific activities were undertaken to promote the replication effects of the DES? 2. To what extent has actual replication occurred, or is likely to occur in the near	• New legislation to promote DES • Level of new calls for support by learning cities • Number of new countries committing to implementing DES	Web analytics Key informant interviews

Topic	Evaluation Questions	Indicators	Data Sources
	future? (Consider ongoing projects within and outside the domain of UNEP and the GEF 3. What are the factors that may influence replication and scale-up of DES project experiences and lessons? 4. What is the level of investor commitment towards providing support for the replication phase of the project? 5. How motivated are the key stakeholders to upscale the project based on their experience from the Deep Dive cities?	• Number of emerging partners to support the implementation of DES • Emerging scientific research evidence on the design and implementation of DES, as well as their potential benefits and techno-economic assessments	Project reports
Safeguards *(Within the Theory of Change)*	1. Are there any significant negative changes anticipated with the adoption of DES? 2. How severe are the anticipated negative consequences of the adoption of DES (if any)? 3. Was the safeguard management instrument completed and were UN Environment Environmental, Social and Economic Safeguarding requirements complied with? 4. Has the project adequately considered environmental, social and economic risks and established whether they were vigilantly monitored?	• Evidence on risk planning in the project design • Existence of a mitigation plan in cases where significant negative outcomes are anticipated • Stakeholder perceptions on the negative consequences associated with the project implementation	Project document Project report Stakeholder Interviews Project budget document
Financial Management			
	Evaluation of financial planning requires assessment of the quality and effectiveness of financial planning and control of financial resources throughout the project's lifetime. The assessment will look at actual project costs by activities compared to budget (variances),	1. Budget quality evaluation report 2. Verification of the standards used in the financial preparation for the project 3. Verification of procurement documents	Project document Project progress reports Project budget at design

Topic	Evaluation Questions	Indicators	Data Sources
	financial management (including disbursement issues), and co-financing. The evaluation will: a. Have proper budgeting standards been applied in the budget for the DES (clarity, transparency, audit etc.)? b. Were the stipulated timelines of financial planning, management and reporting sufficient and enough to provide timely financial resources to the project and its partners? c. Were the various administrative processes such as recruitment of staff, procurement of goods and services (including consultants), preparation and negotiation of cooperation agreements contribute appropriately towards enhancing the project performance? d. Was the project co-financed? And if yes, has the co-financing arrangements materialized as expected at project approval? e. What is the breakdown of final actual costs and co-financing for the different project components? f. Were the resources leveraged originally for the project adequate in contributing towards the realization of the project objectives? g. Were any additional resources mobilized beyond the original pool in pursuit of the project objectives?	4. Verification of contracting documents (including administrative expenses) 5. Project financial performance report 6. Level of stakeholder satisfaction with resource utilization on the project	Project revised budget at completion Project procurement invoices and receipts verification Co-financing Reports M&E reports

Topic	Evaluation Questions	Indicators	Data Sources
	h. Were there any observed irregularities in procurement, use of financial resources and human resource management, and if there were any, how did they affect the project performance? i. What measures were taken (consistent with the UNEP provisions) to guard against misappropriation in the project? Were they adequate?		
1. *Completeness of Financial Information* 2. *Communication Between the Finance and Project Management Staff* 3. *Compliance with UN Environment Standards and Procedures*	1. Were there any inconsistencies in the financial report of the project? 2. How were the project financial performances communicated among all relevant stakeholders? 3. Were the project financiers satisfied with the financial performances of the project?	Verification of accountability information reports Evidence on perceptions of project financiers on the financial performance of the project	Accountability reports and communication documents between stakeholders Key informant interviews
Efficiency			
4.	1. Was the project implemented within the secured funding? 2. Did the project secure/receive any extra funding within its implementation? 3. Was the project objectives successfully implemented within the time-frame planned? Were there any adjustments in time? Did that come with any extra costs? How was that financed if any?	Financial performance Partner satisfaction Overall Project Efficiency rating	Project Budget Key Informant Interviews Project Reports

Topic	Evaluation Questions	Indicators	Data Sources
	4. Does the project make use of/build upon pre-existing institutions, agreements and partnerships, data sources, synergies and complementarities with other initiatives, programmes and projects etc. to increase project efficiency? 4. Does the project create strategies for value for money in its implementation (ie increasing economy, efficiency and/or cost-effectiveness)?		
Monitoring and Reporting The TE will undertake a comprehensive assessment of the quality, application and effectiveness of project monitoring and evaluation plans and tools, including an assessment of risk management based on the assumptions and risks identified in the project document. The evaluation will assess how monitoring results and feedback were used to improve the project along with its implementation			
1. Monitoring Design and Budgeting	a. Did the project have a sound M&E plan to monitor results and track progress towards achieving project objectives? Have the responsibilities for M&E activities been clearly defined? Were the data sources and data collection instruments appropriate? Was the time frame for various M&E activities specified? Was the frequency of various monitoring activities specified and adequate? b. How well was the project logical framework (original and possible updates) designed as a planning and monitoring instrument?	• The causal linkage between project objectives, outcomes, and anticipated outputs • The causal linkage between project objectives, outcomes, outputs, and indicators. • Ability to assess project implementation based on performance indicators • Linkages between baseline information, performance indicators and stakeholder country situation. • Evidence of stakeholder involvement/collaboration in identifying and contributing to	Project document PIF Project Manager Project log frame ToC PIR Half-yearly reports Minutes of meetings Monitoring budget Reports on workshops reports – particularly those which specifically included stakeholders

Topic	Evaluation Questions	Indicators	Data Sources
	c. SMART-ness of indicators: Are there specific indicators in the log frame for each of the project objectives? Are the indicators measurable, attainable (realistic) and relevant to the objectives? Are the indicators time-bound? d. Adequacy of baseline information: To what extent has baseline information on performance indicators been collected and presented clearly? Was the methodology for the baseline data collection explicit and reliable? For instance, was there adequate baseline information on pre-existing accessible information on global and regional environmental status and trends, and the costs and benefits of different policy options for the different target audiences? Was there sufficient information about the assessment capacity of collaborating institutions and experts etc. to determine their training and technical support needs? e. To what extent did the project engage key stakeholders in the design and implementation of monitoring? Which stakeholders (from groups identified in the inception report) were involved? If any stakeholders were excluded,	project baseline information/situation. • Establishment of clear protocols for M&E; • Identification of stakeholder roles and responsibilities in the M&E process, and expected outcomes. • Identification of specific mid-term and end of project targets for individual project outcomes and outputs, and linkage with performance indicators • Number of indicators measured or monitored successfully by the project's M&E efforts • Evidence of legal or other binding arrangements between project partners to collaborate in evaluations • Funds allocated for undertaking the MTE and TE exercise • Adequacy of resources for undertaking the above. • Timeliness in the submission of reports to UNEP. • Revision, ground-truthing and acceptance of reports submitted to the UN Environment.	in addressing M&E issues PRC document

Topic	Evaluation Questions	Indicators	Data Sources
	what was the reason for this? Was sufficient information collected on specific indicators to measure progress on HR and GE (including sex-disaggregated data)? f. Did the project appropriately plan to monitor risks associated with Environmental Economic and Social Safeguards? g. Arrangements for evaluation: Have specific targets been specified for project outputs? Has the desired level of achievement been specified for all indicators of objectives and outcomes? Were there adequate provisions in the legal instruments binding project partners to fully collaborate in evaluations? h. Budgeting and funding for M&E activities: Determine whether support for M&E was budgeted adequately and was funded in a timely fashion during implementation.		
2. *Monitoring of Project Implementation*	a. Was the M&E system operational and did it facilitate timely tracking of results and progress towards projects objectives throughout the project implementation period? b. Were PIR reports prepared (the realism of the Task Manager's assessments will be reviewed)	• Inception Reports indicating M&E approved • PIR adequately identify M&E systems established and operational • Risks assessment adequately documented • MTE undertaken	Project document Progress and financial report. PIR Mid Term Report Half-yearly reports Results Framework

Topic	Evaluation Questions	Indicators	Data Sources
	c. Were half-yearly Progress & Financial Reports complete and accurate? d. Was there a risk monitoring (including safeguard issues)? And was this regularly documented? e. Were the information provided by the M&E system used during the project to improve project performance and to adapt to changing needs?		Meetings and workshops reports – particularly those which specifically included stakeholders in addressing M&E issues
3.	What was the performance at the project's completion against Core Indicator Targets? (For projects approved prior to GEF-7, these indicators will be identified retrospectively and comments on performance provided).	Performance Assessment	Project Documents Key Informant interviews Online Surveys Web Analytics
3. Project Reporting	1. Was sufficient information collected on specific indicators to measure progress on Human Rights and Gender Equality (including sex-disaggregated data)? 2. How was that data collected?	The extent to which both UN Environment and donor reporting commitments have been fulfilled.	Project document Key Informant Interviews Samples of data collection tools during rapid assessment and deep-dive PIR Half-yearly reports
Under Sustainability			

Topic	Evaluation Questions	Indicators	Data Sources
Socio-political Sustainability	1. Are there any significant social or political factors that may influence positively or negatively the sustenance of the DES project results and progress towards impacts? 2. Is the level of ownership by the main stakeholders sufficient to allow for the project results to be sustained? 3. Are there sufficient government and other key stakeholder awareness, interests, commitment and incentives towards the promotion of the adoption of DES? 4. Did the project conduct 'succession planning' and implement this during the life of the project? 5. Was capacity building conducted for key stakeholders? 6. Did the project demonstrate evidence of adaptation to other contexts beyond the scope of its implementation? (China, Chile, India and Serbia?)	• Level of political stability during project implementation • Influence of existing country policies and regulations on the project (compatibility with existing provisions) • The commitment level of country-level stakeholders towards the DES initiative • Level of commitment of local and national governments towards the promotion of DES beyond the scope of the current project	Project Document Log frame Project Managers Progress Reports Discussion with stakeholders Web analytics Key informant interviews with the project team on sustainability plans and upscaling projects
Financial Sustainability	1. To what extent are the continuation of project results and the eventual impact of the project dependent on financial resources? 2. Could the project generate revenue to cover the cost of building DES in each city? 3. What is the likelihood that adequate financial resources will be or will become available to use capacities built by the project? 4. Are there any financial risks that may jeopardize the sustainability of project results and the onward progress towards impact? 5. Is there evidence of the willingness of organizations outside the scope of this	• Evidence on government budgets and policy priorities in project countries • Investment viability reports • Evidence on suitable market-based instruments that will enhance adoption of DES beyond the scope of this project	Project Document Log frame Project Managers Progress Reports Discussion with stakeholders (both country level and global level)

Topic	Evaluation Questions	Indicators	Data Sources
	project to take up the project in other contexts?		
Institutional Sustainability	1. To what extent is the sustainability of the results and the onward progress towards impact dependent on issues relating to institutional frameworks and governance? 2. How robust are the institutional achievements such as governance structures and processes, policies, sub-regional agreements, legal and accountability frameworks etc. required to sustain project results and to lead those to impact on human behaviour and environmental resources, goods or services? 3. Are the existing institutions in the project countries adequate to implement DES?	• Evidence on the existing capacities of institutions in the project countries to sustain the DES initiative • Evidence of changes in government's behaviour in the project countries towards institutional reformation and organizational restructuring, in pursuit of the DES initiative	Project Document Log frame Project Managers Progress Reports Post-Project institutional transformation assessment through key informant interviews
Environmental Sustainability	1. Are there any environmental factors, positive or negative, that can influence the future flow of project benefits? 2. Are there any project outputs or higher-level results that are likely to affect the environment, which, in turn, might affect the sustainability of project benefits? 3. Are there any foreseeable negative environmental impacts that may occur as the project results are being upscaled? (Include the positive potentials of the DES on GHG emission reduction)	• Environmental Impact Evidence for DES • Evidence on the consistency of project goals with exiting environmental and energy policies • Post-implementation plans to promote awareness of the environmental benefits of DES • The direction of research evidence among global level research partners on the environmental impact of DES	Project Document Log frame Project Managers Progress Reports TOC Discussion with stakeholders Web analytics

Topic	Evaluation Questions	Indicators	Data Sources
Factors Affecting Performance This criterion focuses on the quality of project design and preparation, and how this influences the realization of project objectives			
Preparation and Preparedness	1. Were project stakeholders adequately identified and were they sufficiently involved in project development and ground-truthing e.g., of proposed timeframe and budget? 2. Were the project's objectives and components clear, practicable and feasible within its timeframe? 3. Are potentially negative environmental, economic, and social impacts of projects identified? 4. Were the capacities of executing agencies properly considered when the project was designed? 5. Was the project document clear and realistic to enable effective and efficient implementation? 6. Were the partnership arrangements properly identified and the roles and responsibilities negotiated prior to project implementation? 7. Were counterpart resources (funding, staff, and facilities) and enabling legislation assured? 8. Were adequate project management arrangements in place? 9. Were lessons from other relevant projects properly incorporated in the project design? 10. What factors influenced the quality-at-entry of the project design, choice of partners, allocation of financial resources etc.? 11. Were any design weaknesses mentioned in the Project Review Committee minutes at the	• Capacity needs assessment evidence • Report on the Capacity of the main implementing partners of the DES • Stakeholder capacity assessment evidence • Level of the ease with which project partners and other relevant stakeholders understood the project and bought into its idea • Ease (or otherwise) in the adoption of proposed plans for the DES across all stakeholders (including ease of training) • Evidence of documents/ communications outlining and confirming commitment to provide counterpart resources and support enabling legislation. • Evidence of incorporation of management experience from similar projects and projects partners. • Evidence, during project design, of assessments of and incorporation of experiences of other similar regional projects and lessons learned. • Evidence of communication with stakeholders to identify	ProDoc PIF Progress reports MoUs and other legally binding documents between supporting projects and implementing countries Inception report Project Manager PIR Key informant interviews

Topic	Evaluation Questions	Indicators	Data Sources
	time of project approval adequately addressed?	experiences that have relevance to the DES project. • Evidence of alignment of objectives, outcomes and outputs with the similar projects that were either ongoing or recently completed (including alignment of DES with BEA). • (Documentation of) Situational analysis and experiences of partnering agencies. • Agreement by GEF to support/fund project following assessment of its goals and objectives	
	What was the progress made in the implementation of the management measures against the Safeguards Plan submitted at CEO Approval? The risk classifications reported in the latest PIR report should be verified and the findings of the effectiveness of any measures or lessons learned taken to address identified risks assessed. (Any supporting documents gathered by the Consultant during this review should be shared with the Task Manager for uploading in the GEF Porta	• Project design aligned with GEF environmental and social safeguards. • Risk Assessment/Compliance	Project Documents (CEO Endorsement Document) Key Informant interviews
Factors affecting Performance: Quality of Project Management and Supervision This includes an analysis of implementation approaches used by the project, its management framework, the project's adaptation to changing conditions and responses to changing risks including safeguard issues (adaptive management), the performance of the implementation arrangements and partnerships, the relevance of changes in project design, and overall performance of project management.			

Topic	Evaluation Questions	Indicators	Data Sources
Management:	a. To what extent were the project implementation mechanisms outlined in the project document followed and were they effective in delivering project milestones, outputs and outcomes? Were pertinent adaptations made to the approaches originally proposed? b. How effective and efficient was the project management and how well has the management been able to adapt to changes during the life of the project.? c. What were the role and performance of the teams and working groups established and the project execution arrangements at all levels? To what extent did the project management respond to direction and guidance provided by the UN Environment Task Manager and project steering bodies? d. What were the main operational and political/institutional problems and constraints that influenced the effective implementation of the project, and how did the project try to overcome these problems?	• Evidence of results-based/results-driven project management. • The causal linkage between PIR rating and the project realities and risks. • Evidence of adaptive management. • Evidence of effective communication, coordination and leadership for project management and supervision	ProDoc Project Manager Focal points Progress reports MoUs and other legally binding documents between supporting projects and implementing countries PIR
Supervision	The purpose of supervision is to verify the quality and timeliness of project execution in terms of finances, administration and achievement of outputs and outcomes, to identify and recommend ways to deal with problems that arise during project execution. Such problems may be related	• Evidence of project supervision plans prepared • Evidence on acceptance of project reports by the UNEP • Evidence on the robustness and accuracy of the proposed project	ProDoc Project Manager Progress reports

Topic	Evaluation Questions	Indicators	Data Sources
	to project management but may also involve technical/institutional substantive issues in which UN Environment has a major contribution to make. The evaluation will therefore assess the effectiveness of supervision, guidance and technical support provided by the different supervising/supporting bodies including: a. How adequate were the project supervision plans, inputs and processes? The realism and candour of project reporting and the emphasis is given to outcome monitoring (results-based project management); b. How well did the different guidance and backstopping bodies play their role and how well did the guidance and backstopping mechanisms work? What were the strengths in guidance and backstopping and what were the limiting factors?	outputs/activities, and the implemented outputs/activities • Evidence of oversight reports from UNEP • Evidence of acceptance of progress and financial reports from stakeholder countries and coordination team. • Evidence of ongoing communication between UN Environment and stakeholders on financial and administrative matters. • Evidence that deliverables were achieved within anticipated times and budgets • Evidence that the project paid attention to human rights, gender issues and needs of the indigenous people • Evidence of equitable opportunities for all districts and cities to benefit from the training provided.	MoUs and other legally binding documents between supporting projects and implementing countries PIR Key informant interviews with relevant stakeholders
Factors affecting performance: Stakeholders Participation and Cooperation The Evaluation will assess the effectiveness of mechanisms for information sharing and cooperation with other UN Environment projects and programs, external stakeholders and partners. The term stakeholder should be considered in the broadest sense, encompassing both project partners and target users of project products. The TOC and stakeholder analysis should assist the evaluators in identifying the key stakeholders and their respective roles, capabilities and motivations in each step of the causal pathways from activities to the achievement of outputs, outcomes and intermediate states towards impact.			
	a. information dissemination to and between stakeholders,	• Evidence of deliberate effort to involve stakeholders in project design and implementation.	Project document (ProDoc)

Topic	Evaluation Questions	Indicators	Data Sources
	b. consultation with and between stakeholders, and c. active engagement of stakeholders in project decision making and activities. The evaluation will specifically assess: 1. the approach(es) and mechanisms used to identify and engage stakeholders (within and outside UN Environment) in project design and at critical stages of project implementation. What were the strengths and weaknesses of these approaches with respect to the project's objectives and the stakeholders' motivations and capacities? 2. How was the overall collaboration between different functional units of UN Environment involved in the project? What coordination mechanisms were in place? Were the incentives for internal collaboration in UN Environment adequate? 3. Was the level of involvement of the Regional, Liaison and Out-posted Offices in project design, planning, decision-making, and implementation of activities appropriate? 4. Has the project made full use of opportunities for collaboration with other projects and programs including opportunities not mentioned in the Project Document? Have complementarities been sought, synergies been optimized, and duplications avoided? 5. What was the achieved degree and effectiveness of collaboration and	• Evidence of involvement of/collaboration between funding agencies, coordination team, stakeholder countries and partners in project design. • Evidence of linkages between assignment of individual tasks for project design, and expertise/capacity of individual partners. • Documentation of project partners and stakeholders. • Evidence of attempts at public outreach, via e.g., different media, consultations etc. • Evidence of stakeholder involvement • Evidence that project outcomes were achieved as anticipated in project log frame and according to that stipulated in ToC; • Evidence that the expected results (following consultations, and review of project log frame) at the end of the project are achieved;	Log frame Project Manager Project inception report Progress reports Public education and outreach program reports Training Workshop Reports

Topic	Evaluation Questions	Indicators	Data Sources
	interactions between the various project partners and stakeholders during the design and implementation of the project? This should be disaggregated for the main stakeholder groups identified in the inception report. 6. To what extent has the project been able to take up opportunities for joint activities, pooling of resources and mutual learning with other organizations and networks? In particular, how useful are partnership mechanisms and initiatives such as [insert relevant examples] to build stronger coherence and collaboration between participating organizations? 7. How did the relationship between the project and the collaborating partners (institutions and individual experts) develop? 8. Which benefits stemmed from their involvement for project performance, for UN Environment and the stakeholders and partners themselves? 9. Do the results of the project (strategic programs and plans, monitoring and management systems, sub-regional agreements etc.) promote the participation of stakeholders, including users, in environmental decision making?		
	What were the progress, challenges and outcomes regarding engagement of stakeholders in the project/program as evolved from the time of the MTR? (This should be based on the description included in the Stakeholder Engagement Plan or	Adherence/ deviations from stakeholder engagement plan Changes in the behaviour of stakeholders along with project implementation	CEO Approval Document Project report

Topic	Evaluation Questions	Indicators	Data Sources
	equivalent documentation submitted at CEO Endorsement/Approval)		Key Informant Interviews with project stakeholders
Responsiveness to Human Rights and Gender Equality	1. To what degree did participating institutions/organizations change their policies or practices thereby leading to the fulfilment of Human Rights and Gender Equality principles (e.g., new services, greater responsiveness, resource re-allocation, etc.) 2. Assess the extent to which Human Rights and Gender Equality were integrated into the Theory of Change and results framework of the intervention 3. Did the intervention activities aim to promote (and did they promote) positive sustainable changes in attitudes, behaviours and power relations between the different stakeholders? To what extent has the integration of Human Rights and Gender Equality led to an increase in the likelihood of sustainability of project results? 4. To what extent were Human Rights and Gender Equality allocated specific and adequate budget in relation to the results achieved?	• Evidence that the project sought to address human rights and gender equality • Evidence of equitable opportunities for vulnerable groups to benefit from the training provided. • Evidence of equitable distribution of resources to participating districts and cities	ProDoc Log frame Progress reports Workshop and meeting reports UN Environment BSP strategy document
	What were the completed gender-responsive measures and, if applicable, actual gender result areas? (This should be based on the documentation at CEO Endorsement/Approval, including gender-sensitive indicators contained in the project results framework or gender action plan or equivalent)	Gender Performance Assessment	CEO Approval Document Project report Key Informant Interviews with project stakeholders

Topic	Evaluation Questions	Indicators	Data Sources
Country Ownership and Driven ness	1. Assess the degree and effectiveness of involvement of government / public sector agencies in the project those involved in project execution and those participating in *[insert whatever is relevant e.g., project Steering Committee, partnership arrangements]*: 2. How and how well did the project stimulate country ownership of project outputs and outcomes? 3. To what extent have Governments of the participating countries (Chile, China, India and Serbia) assumed responsibility for the project and did they provide adequate support to project execution, including the degree of cooperation received from the various public institutions involved in the project?	• The signing of relevant agreements/documents with GEF/UN Environment. • Efficiency in the provision of in-kind contributions. • Establishment of in-country focal points and assignment of committed project staff. • Enactment of policies for local adaptation of DES in project countries • Consistent provision of committed national representation in project steering mechanisms	Progress reports Key informant interviews with project partners
Communication and Public Awareness	1. Assess the effectiveness of any public awareness activities that were undertaken during the implementation of the project to communicate the project's objective, progress, outcomes and lessons. 2. The effects of public awareness and communications activities should be considered on a disaggregated basis by stakeholder groups. 3. Did the project identify and make use of existing communication channels and networks used by key stakeholders? 4. Did the project provide feedback channels? 5. What were the challenges and outcomes regarding the project's completed Knowledge Management Approach, including Knowledge and Learning	• Evidence of attempts at public outreach, via e.g. different media, consultations etc.; for the dissemination of information about the DES • Levels of public awareness and participation • Verification of the project virtual platform for information management and learning communication	ProDoc (CEO Endorsement Document) Progress reports Webpage Public and Educational Project Manager Awareness materials Workshop and meeting reports Web analytics of all internet-based

Topic	Evaluation Questions	Indicators	Data Sources
	Deliverables (e.g. website/platform development); Knowledge Products/Events; Communication Strategy; Lessons Learned and Good Practice; Adaptive Management Actions? (This should be based on the documentation approved at CEO Endorsement/Approval)		platforms of the project and other open-source websites
	Key Strategic Questions		
	Q1: From the synergies or collaborations that the DES Initiative had with other complementary initiatives or projects during the project implementation (like the SE4All Building Efficiency Accelerator, the Global Alliance for Building and Construction or other initiatives relating to energy efficiency in cities), what lessons can be learned on combined strategies, policies and business models for built environment decarbonization through building-level efficiency measures and district energy systems? Q2: To what extent did the project succeed in overcoming the common barriers of the development of DES presented in the CEO Endorsement Document? Q3: How likely are the pilot cities to be replicated elsewhere? What are the key conditions for the replications to succeed? Q4: To what extent did the involvement of the Private Sector contribute to the project accomplishments? Q5: What lessons can be learned from the project about the common business models of the DES? Have any innovative approaches emerged from the pilot city works?	Evidence on successful practices based on pilot projects Evidence on the number and extent of Private Sector involvement in the project, particularly at the city level Evidence of successful internal replication in deep-dive countries Impact pathway evidence and analysis based on stakeholder profile Feedback on project implementation challenges within the covid Evidence on the ability of the project to comply with the proposed schedule Project performance assessment	Interview with Project stakeholders Beneficiary views obtained through Key Informant interviews and online surveys Project Progress Reports Market Analysis (Including Web-based analysis) Project Information Document Project reports

Topic	Evaluation Questions	Indicators	Data Sources
	Q6: What changes were made to adapt to the effects of COVID-19 and how might any changes affect the project's performance? Q7: To what extent were the local stakeholders at the country level and the city level involved in project design and implementation? Q8: To what extent are the project "beneficiaries" at the country level and the city level satisfied with the quality and the relevance of the Technical Assistance provided? Q9: To what extent has engagement with banks, funds and the private sector-led to bankable projects in cities and what lessons can be extracted on financing bankable projects and on collaboration models with Multilateral Development Banks or Financial Institutions?		

ANNEX IX. EVALUATION TORS (WITHOUT ANNEXES)

TERMS OF REFERENCE

Terminal Evaluation of the UNEP/GEF project

"Increasing Investments in District Energy Systems in Cities – a SE4All Energy Efficiency Accelerator" (GEF ID 9320)

Section 1: PROJECT BACKGROUND AND OVERVIEW

1. Project General Information

Table 1. Project summary

GEF Project ID:	9320	**SB-007855**	
Implementing Agency:	UNEP, Economy Division, Energy & Climate Branch, Climate Mitigation Unit	**Executing Agency:**	UNEP, Economy Division, Energy & Climate Branch, Cities Unit[56]
Relevant SDG(s) and indicator(s):	SDG 7- Ensure access to affordable, reliable, sustainable and modern energy for all. - **Target 7.1:** By 2030, ensure universal access to affordable, reliable and modern energy services - **Target 7.2:** By 2030, increase substantially the share of renewable energy in the global energy mix - **Target 7.3:** By 2030, double the global rate of improvement in energy efficiency SDG 11 - Make cities and human settlements inclusive, safe, resilient and sustainable - **Target 11.1:** By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums - **Target 11.6:** By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management - **Target 11.a:** Support positive economic, social and environmental links between urban, peri-urban and rural areas by strengthening national and regional development planning SDG 13 - Take urgent action to combat climate change and its impacts - **Target 13.2:** Integrate climate change measures into national policies, strategies and planning		
GEF Core Indicator Targets (identify these for projects approved prior to GEF-7[57])	1. Core Indicator 6.2 - Emissions avoided Outside AFOLU **End of Project Target**: Direct: 2,523,140 tCO2eq Indirect: 823,050 tCO2eq (20 years after project completion) 2. Core Indicator 6.3 - Energy Saved **End of Project Target**: 18,057,350,000 MJ (20 years after project completion)		

[56] Previously the Policy Unit
[57] This does not apply for Enabling Activities

Sub-programme:	Climate Change	**Expected Accomplishment(s):**	PoW 2018-2019 b) Countries increasingly adopt and/or implement low greenhouse gas emission development strategies and invest in clean technologies
UNEP approval date:	May 3, 2017	**Programme of Work Output(s):**	PoW 2018-2019, Sub-programme 1 Climate Change PoW 2020-2021, Subprogramme 1 Climate Change
GEF approval date:	March 1, 2017	**Project type:**	Medium Size Project
GEF Operational Programme #:	GEF-6	**Focal Area(s):**	Climate Change Mitigation
		GEF Strategic Priority:	CCM-1 Program 2: Develop and demonstrate innovative policy packages and market initiatives to foster a new range of mitigation actions
***Expected* start date:**	May 1, 2017	**Actual start date:**	May 3, 2017
***Planned* operational completion date:**	June 30, 2020	**Actual operational completion date:**	May 31, 2021
***Planned* project budget at approval:**	USD 11,711,774	**Actual total expenditures reported as of December 31, 2020:**	USD 10,466,845
GEF grant allocation:	USD 2,000,000	**GEF grant expenditures reported as December 31, 2020:**	USD 1,636,776
Project Preparation Grant - GEF financing:	USD 50,000	**Project Preparation Grant - co-financing:**	N/A
***Expected* Medium-Size Project co-financing:**	USD 9,711,774	**Secured Medium-Size Project co-financing (as at June 30, 2020):**	USD 8,830,069
Date of first disbursement:	May 16, 2017	**Planned date of financial closure:**	May 31, 2022
No. of formal project revisions:	4	**Date of last approved project revision:**	May 25, 2021
No. of Steering Committee meetings:	3	**Date of last/next Steering Committee meeting:**	Last: July 13, 2021 / Next: N/A
Mid-term Review/ Evaluation *(planned date):*	N/A	**Mid-term Review/ Evaluation (actual date):**	N/A

Terminal Evaluation ***(planned date):***	November 30,2021	**Terminal Evaluation (actual date):**	October 2021 – June 2022
Coverage - Country(ies):	**Pilot countries:** Chile, China, India, Serbia **Replication countries:** Argentina, Bosnia and Herzegovina, Colombia, Egypt, Malaysia, Mongolia, Morocco, Russia, Tunisia, Ukraine	**Coverage - Region(s):**	Asia Pacific, Europe, Latin America and Caribbean, Africa
Dates of previous project phases:	N/A	**Status of future project phases:**	N/A

2. Project Rationale

1. Globally, heating, cooling and hot water represent 60% of the energy demand in buildings. Measures to reduce demand and shift to supply sources and means that are consistent with our global climate and energy ambitions are urgently required. Reducing the energy demand of heating and cooling through building and appliance efficiency improvements are crucial to achieving decarbonisation. However, even with demand side reductions in buildings, cities still have significant demands for heating and cooling from the buildings sector and other sectors which need to be supplied from low-carbon and efficient sources.

2. Modern district energy systems (DES) can reduce primary energy consumption for heating and cooling of urban buildings by up to 50%. Such systems create synergies between the production and supply of heat, cooling, domestic hot water and electricity and can be integrated with municipal systems such as power, sanitation, sewage treatment, transport and waste, and this means heating and cooling can be low-carbon and efficient and maximise "free", renewable resources. Modern DES provide the only means to use of low-quality thermal energy (waste heat) to provide heating, cooling and hot water services in buildings. Modern DES allow for high levels of affordable renewable energy supply through economies of scale, diversity of supply, and balancing and storage making modern DES a key measure for cities/countries that aim to achieve 100% renewable energy or carbon neutral targets. If DES is compared with competitive technologies on an even playing field, it is frequently more cost effective – by up to 50% - than individual heat or cool production if the energy demand density of a neighborhood is sufficient.

3. Although shares of DES are expanding and several national and local governments aware of their important role are setting policies and targets that establish a favourable policy and regulatory framework for the development of successful business models, there are still long-standing barriers to greater deployment of modern DES, some of which stem from a misperception of the benefits and opportunities of DES and lack of regulatory frameworks for the implementation of the technology . Project activities have been structured to ensure barriers common to all market types are addressed as well as country-specific barriers. These common barriers are:

- **Lack of awareness**. The specific opportunities and benefits of improving efficiency in the building sector through district energy, including its diverse technology applications and savings are not well-known;
- **Lack of local and institutional capacity**. The integrated approach offered by district energy is the very opportunity it presents to accelerate the energy transition, but it is also the key challenge because it requires significant local capacity for planning and implementing projects and coordination at multiple levels of governance and across multiple city systems;
- **Lack of holistic planning policies, harmonized incentives and regulations**. Cities are not considering the potential benefits of DES in urban planning and therefore not integrating infrastructure planning and land-use planning to match heating/cooling supply with demand;

- **Prohibitive finance costs**. In many markets where the commercial viability of modern DES has not been proven, rates on debt can be prohibitively high, reducing the viability of projects;
- **Data/information**. Political decision makers may not know the energy demand for heating (which can be mixed with hot water, power and cooking) or cooling from air conditioning and electric chillers (which is hidden in a building's total electricity bill). This may lead policymakers to underestimate the potential role of district heating or cooling in achieving objectives such as energy access, affordability or reliability, and to overlook the need to regulate, or support it.

4. In 2014, the UN Environment Programme (UNEP) launched the District Energy in Cities Initiative[58] (DES Initiative) to accelerate the scale-up of modern district energy globally. This DES Initiative, led by UNEP, was launched as a public-private partnership including international organisations, private sector, academics, NGOs, cities and countries. The DES Initiative was one of six energy efficiency accelerators under the Sustainable Energy for All initiative (SE4All).[59] As an accelerator of the SE4All Energy Efficiency Accelerator Platform, the DES Initiative supported market transformation efforts to shift the heating and cooling sector to low-carbon, energy efficient solutions that include DES with an aim to double the rate of energy efficiency improvements for heating and cooling in buildings by 2030 and quantify the corresponding decrease in greenhouse gas emissions.

5. Before the implementation of the project under evaluation, the DES Initiative already started global activities designed to: raise awareness of DES and the DES Initiative, establish global methodologies, and deliver technical training.

6. The GEF ID 9320 project, "Increasing Investments in District Energy Systems in Cities – a SE4All Energy Efficiency Accelerator" was hosted by the DES Initiative within the Cities Unit of the Energy and Climate Branch of UNEP's Economy Division, formerly Division of Technology, Industry and Economics (DTIE).

7. How did the project approach address the problem described?

8. The DES Initiative selected four countries for pilot city work with a high degree of variation in geography and technical scope between countries in order to maximise global replication. As district energy is a local technology application, new tools, methodologies and best practice had to be demonstrated at the city level within particular countries and then scaled-up nationally and regionally through awareness raising, regional capacity building and wider support to multiple countries. From the broader list of countries, China, India, Chile, and Serbia were selected.

In these four countries, one city was selected for pilot and demonstration work ("deep-dive") as follows:

- Chile: Temuco;
- China: Xi'an Chamba[60];
- India: Rajkot[61];
- Serbia: Belgrade.

Numerous other cities in the pilot countries were supported through co-finance.

9. In addition to these four countries for pilot city work, 10 countries referred as "Replication countries" in the project documents were also supported: Argentina, Bosnia and Herzegovina, Colombia, Egypt, Malaysia, Mongolia, Morocco, Russia, Tunisia and Ukraine.

3. Project Results Framework

[58] The DES Initiative is also one of the initiating organizations of a new global Alliance on Buildings and Construction. The Alliance was announced in Paris at COP-21 and is a coordinating platform for activities within the buildings sector. The DES Initiative and the Building Efficiency Accelerator (BEA) are the complementary SE4ALL entry points to the Alliance for countries and cities to look at energy efficiency in the building sector through both heating/cooling supply and demand.

[59] Building Efficiency Accelerator, Appliances and Equipment Accelerator, District Energy in Cities Initiative, Global Fuel Economy Initiative, Industrial Energy Accelerator and Efficient Lighting Accelerator.

[60] The city of Yunchan was initially selected, but it was changed due to political commitment issues.

[61] The city of Thane was initially selected, but it was changed due to political commitment issues.

10. The project objective was to assist developing countries and selected cities to accelerate their transition to lower-carbon and climate resilient societies through promoting modern DES. The CEO Endorsement Document set out four components through which the project objective was to be achieved, these were:

- Component 1: Assessments and technical assistance for DES actions in cities ("Light touch")
- Component 2: District Energy Demonstrations and city-wide plans ("Deep-dive")
- Component 3: Monitoring Framework
- Component 4: Outreach, tools and training on DES Initiative

11. A summarized version of the project's logical framework is presented in Table 2 below.

Table 2. Summary of project components, outcomes and outputs

Component	Expected Outcomes	Outputs
Component 1: Assessments and technical assistance for DES actions in cities ("Light touch")	1. City officials have increased knowledge of the benefits of District Energy Systems (DES) to promote modern DES	Output 1.1: 16 cities join the DES Initiative through an extensive consultation process Output 1.2: 16 city DES rapid assessments completed and fact sheets developed Output 1.3: 4 multi-stakeholder workshops on DES undertaken to validate the selection of the "deep-dive" pilot cities and to establish interest in other countries in each region Output 1.4: Partnerships with international mentor cities established and training programs delivered
Component 2: District Energy Demonstrations and city-wide plans ("Deep-dive")	2. The viability of DES is demonstrated and DES city-wide plans, policies and investments are integrated into the city planning cycle in 4 cities	Output 2.1: Multi-stakeholder coordination structure is strengthened or established through which technical training programs and planning support is delivered in the 4 "deep-dive" cities Output 2.2: Deep DES Assessments including short and long-term technical and economic potential, including 2 financial project estimates per city, of DES are developed for the 4 "deep-dive" cities Output 2.3: DES pilot demonstrations projects have been selected and investment is committed Output 2.4: DES City-wide plans (policy & investment) are developed with the 4 "deep-dive" cities Output 2.5: Synthesis reports on policy recommendations for city

		and national officials are developed, including "train the trainer" package, to address barriers and accelerate the uptake of DES and delivered at regional validation workshops
Component 3: Monitoring Framework	3. Deep-dive cities and national governments can track and better understand the costs and benefits of modern DES laying the foundation for evidence based decision-making and policy action in the future.	Output 3.1: Monitoring framework put in place in 4 "deep-dive" cities embedded into existing frameworks and data collection structures Output 3.2: 4 national workshops providing training on implementing a monitoring and national monitoring indicators developed
Component 4: Outreach, tools and training on DES Initiative	4. DES in cities is scaled up and replicated nationally and internationally by cities and national governments signed up to the Initiative	Output 4.1: Awareness raising campaigns delivered Output 4.2: DES Virtual Platform is enhanced and delivers outreach actions and training programs Output 4.3: Tailored training sessions are developed and advice delivered through 12 training webinars for 15 newly signed up cities including on the regionally tailored rapid assessment methodology Output 4.4: 6 fundraising and matchmaking sessions tailored and delivered for new signed up cities (5 cities per session)

12. A theory of change was included in the CEO Endorsement Document. It mentioned three Intermediate States and one long-lasting Impact as presented in Table 3 below.

Table 3. Intermediate States and Impact

Intermediate States	Impact
Cities commit to develop/improve DES in the city.	Reduced GHG emissions and local air pollution due to increased energy efficiency
Learning cities join the Initiative	
Cities' capacities to develop modern DES increased	

4. Executing Arrangements

13. The Implementing Agency of the project was UNEP, Economy Division, Energy & Climate Branch, Climate Change Mitigation Unit, located in Nairobi, Kenya was responsible for providing administrative supervision in the implementation of the project.

14. The project's Executing Agency was the Cities Unit through the Secretariat of the DES Initiative, hosted within the Energy and Climate Branch of UNEP's Economy Division in Paris, France. Throughout the duration of the project, the Executing Agency led the coordination of the global activities which were

grouped around three expert task forces: i) communications and outreach; ii) capacity building; and iii) technical task forces.

- The Technical Taskforce advised and supported the Secretariat with the development of, and access to, technical information, tools, methodologies and guidelines;
- The Capacity building taskforce advised and supported the Secretariat to develop and deliver appropriate training and capacity building activities to cities and countries, including pilot cities;
- The Communications and Outreach taskforce brought to the attention of decision-makers the importance of modern district energy systems and the need to make political commitments at global, regional and national levels.

15. At the global level, a *Global Project Advisory Committee* comprised of partners to the DES Initiative (private sector, industry, city-networks, NGOs, and international organizations), UNEP, and SE4All was formed to provide guidance and approval of the overarching strategy of the DES Initiative, its country and regional focuses and work plan.

16. A project *Steering Committee* comprising of UNEP (Economy Division and Climate Change Mitigation Unit), one city representative from each "deep-dive" city and one nominated representative of the national project steering committees would meet to review project progress, approve annual workplans and budget and provide strategic guidance to the project, and approve management decisions to ensure timely delivery of quality outputs.

17. At the country level, for every pilot country, a project governance structure was put in place to ensure that decision-making, management and implementation arrangements were appropriate and operated effectively. The country governance structure consisted of a National Project Steering Committee, a Country Office, a Project Deployable Working Team and a City-wide multi-stakeholder coordination governance reflected through a designated focal point, coordinator or coordinator structure.

- The National Project Steering Committees (NPSC) included representatives of Government ministries, GEF operational Focal Points, UNEP-DTIE and UNEP regional/country office. They provided guidance and strategic directions and oversight to each Country Office. It also mobilized national stakeholders to support project implementation (e.g. data sampling and analysis), as well as provide synergies with other complementing initiatives and ongoing projects;
- The Country Offices consisted of a National Technical Expert. They took responsibility for the execution of the project in accordance with the project objectives, activities and budget. They provided technical input to national and city level assessments, trainings, methodologies, barrier analyses, policy and regulatory recommendations. It also coordinated the deployable project work team, ensured technical quality of products, outputs and deliverables; and reported to the NPSC on project progress;
- The Project Deployable Working Teams (DPWT) consisted of co-financed district energy consultants, experts from DES Initiative partners and finance institutions. The DPWT performed consultation process, rapid assessments, complete city fact sheets, provided expert advice to local governments on next steps to developing DES in their cities;
- The City-wide Multi-stakeholder coordination structures represented the focal point in each "deep-dive" city for collaboration, training and for leveraging the most knowledgeable experts in the local market to help design effective strategies for the acceleration of district energy. They supported the design and implementation of a long-term development plan and strategy for district energy in the pilot city; and ensured the sustainability of the project. This took the shape of a focal point, coordinator, or a new coordination governance integrated within an existing unit or structure in the city.

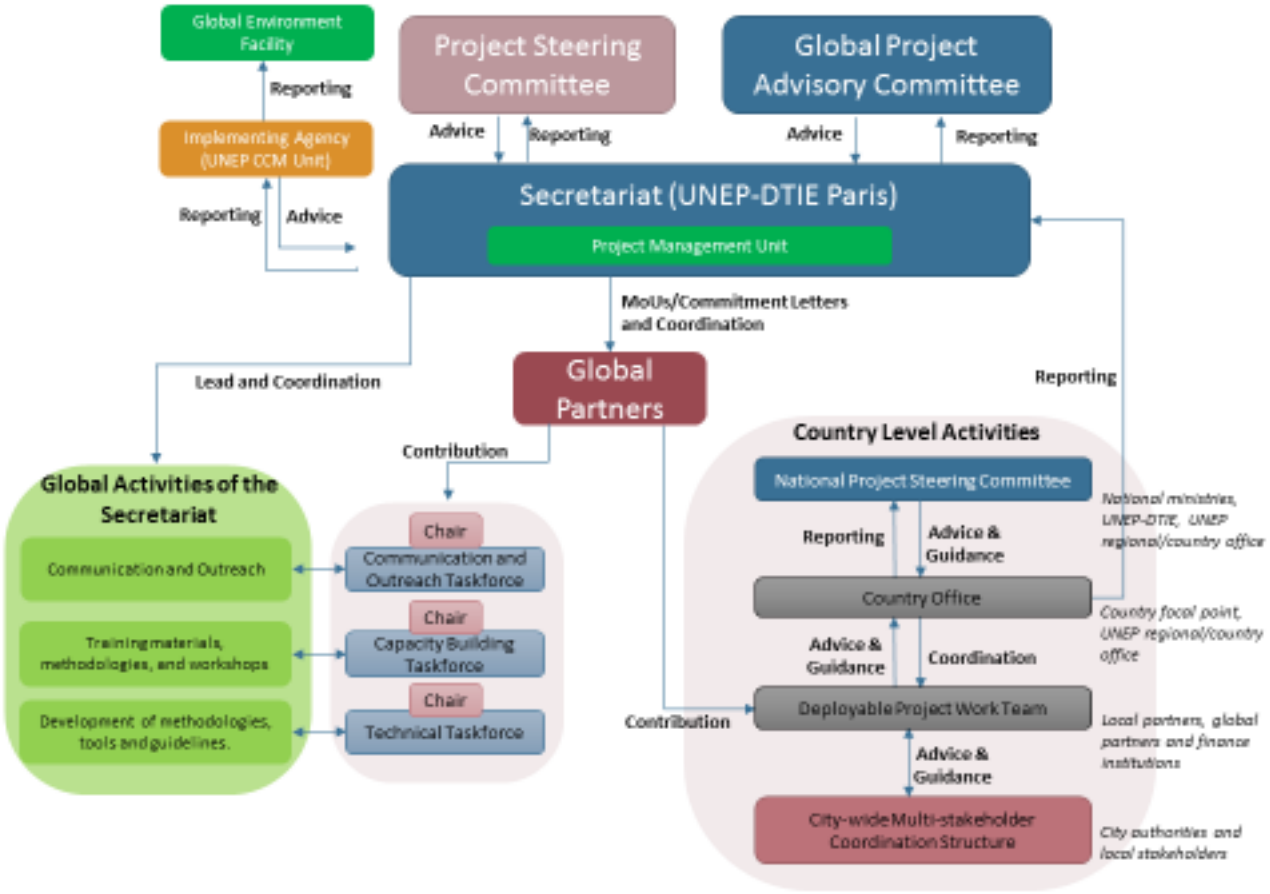
18. The country offices were established for the pilot countries in state-owned or non-profit organisations with strong connections to national governments as follows:

- Chile: Ministry of Energy of Chile;
- China: CECEP Consulting with support from UN Environment's Beijing Office;

- India: Energy Efficiency Services Limited;
- Serbia: RES Foundation.

19. The governance structure at the country level is shown within the global governance structure in Figure 1 below.

Figure 1. Governance structure



5. Project Cost and Financing

20. The total budget of the project was USD 11,711,774 of which USD 2,000,000 was GEF financing and the balance was co-financing, as detailed in Table 4 below.

Table 4. Planned project budget (as presented in the CEO Endorsement Document)

Sources of funds		**Type of financing**	**Amount (USD)**
GEF Trust Fund		Cash	2,000,000
Sources of Co-financing	**Name of Co-financier**		
Government	DANIDA – Danish Ministry of Foreign Affairs	Cash	850,531
Government	Italian Ministry of Environment, Land and Sea	Cash	229,383
International Organization	UNEP	In-kind	160,000
International Organization	Copenhagen Centre for Energy Efficiency	In-kind	1,750,000

International Organization	CTCN (Climate Technology Centre and Network)	In-kind	250,000
Private sector	Danfoss	In-kind	1,400,000
Private sector	Empower	In-kind	2,000,000
Private sector	Dalkia	In-kind	450,000
Private sector	DBDH (Danish Board of District Heating)	In-kind	502,500
Private sector	ENGIE	In-kind	500,000
Private sector	Thermaflex	In-kind	184,000
Private sector	SSG (Sustainability Solutions Group)	In-kind	45,360
Private sector	The Carbon Trust	In-kind	520,000
Private sector	Solar Turbines	In-kind	120,000
Private sector	King & Spalding LLP	In-kind	750,000
Total Co-financing			9,711,774
Total budget			**11,711,774**

21. The budget breakdown by component is presented in Table 5 below.

Table 5. Planned project budget by component (as presented in the CEO Endorsement Document)

Project Component	GEF Project Financing (USD)	Co-financing (USD)
Component 1: Assessments and technical assistance for DES actions in cities ("Light touch")	349,240	2,432,942
Component 2: District Energy Demonstrations and city-wide plans ("Deep-dive")	925,740	4,503,574
Component 3: Monitoring and Framework	272,520	812,710
Component 4: Outreach, tools and training on DES Initiative	212,500	1,481,498
Subtotal (including Evaluation Budget)	1,820,000	9,230,724
Project Management Cost	180,000	481,050
Total budget	**2,000,000**	**9,711,774**

6. Implementation Issues

22. The project experienced delays at the onset of the project in China because of institutional issues that delayed the signing of legal agreements with the selected entity to officiate as the Country Office. In July 2020, a 11 month extension was accepted to cover delays in project implementation of late stage activities in India and China due to the COVID-19 pandemic that closed local government offices and obstructed organization of trainings and workshops, as well as any remaining data gathering.

23. In total, the project had four revisions with no change to the overall cost of the project:

- July 2018: Budget revision to rephase unspent budget from year 2017 to following years;
- August 2019: Budget and workplan revision to rephase unspent budget from year 2018 to following years and adjustments to the activities' timeline in the workplan;

- July 2020: 11 month no-cost extension of the technical completion date from 30 June 2020 to 31 May 2021 to cover delays in project implementation of late stage activities in India and China due to COVID-19 pandemic.
- May 2021: Budgetary adjustment/revision to facilitate a consultancy contract for reviewing and performing quality checking of deliverables.

24. No major risks were identified throughout project implementation, the Overall risk ratings were "Low" in every Project Implementation Report. The PIR 2021 identified an additional risk, rated "Low" as well. This risk was linked to the slowdown of the Real Estate sector, as a consequence of the economic context. Changing master plans means that DES projects could sometimes be oversized or not adequately planned. The project team helped cities to overcome this by for instance resizing district cooling system and proposing phased approach to avoid stranded assets.

25. No Mid-Term Evaluation was carried out during the project implementation[62].

Section 2. OBJECTIVE AND SCOPE OF THE EVALUATION

7. Objective of the Evaluation

26. In line with the UNEP Evaluation Policy[63] and the UNEP Programme Manual[64], the Terminal Evaluation is undertaken at operational completion of the project to assess project performance (in terms of relevance, effectiveness and efficiency), and determine outcomes and impacts (actual and potential) stemming from the project, including their sustainability. The Evaluation has two primary purposes: (i) to provide evidence of results to meet accountability requirements, and (ii) to promote operational improvement, learning and knowledge sharing through results and lessons learned among UNEP, the partnered cities ("light touch" and "deep-dive") and all the DES Initiative partners (like Copenhagen Centre for Energy Efficiency, Danfoss, ENGIE, EESL, Tabreed, IDEA, Empower, DANIDA). Therefore, the Evaluation will identify lessons of operational relevance for future project formulation and implementation. Recommendations relevant to the whole house may also be identified during the evaluation process.

8. Key Evaluation Principles

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

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

29. **Attribution, Contribution and Credible Association:** In order to *attribute* any outcomes and impacts to a project intervention, one needs to consider the difference between what has happened with, and what would have happened without, the project (i.e. take account of changes over time and between contexts in order to isolate the effects of an intervention). This requires appropriate baseline data and the identification of a relevant counterfactual, both of which are frequently not available for

[62] As per GEF policy, for MSP projects that are less than 4 years of implementation, Mid Term Evaluations are optional. They can however be triggered by the Task Manager in case the project is in a difficult situation (cf PART II, section C of the CEO Endorsement Document). Since this project was not facing any challenges, no MTE was triggered.

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

[64] https://wecollaborate.unep.org

evaluations. Establishing the *contribution* made by a project in a complex change process relies heavily on prior intentionality (e.g. approved project design documentation, logical framework) and the articulation of causality (e.g. narrative and/or illustration of the Theory of Change). Robust evidence that a project was delivered as designed and that the expected causal pathways developed supports claims of contribution and this is strengthened where an alternative theory of change can be excluded. A *credible association* between the implementation of a project and observed positive effects can be made where a strong causal narrative, although not explicitly articulated, can be inferred by the chronological sequence of events, active involvement of key actors and engagement in critical processes.

30. **Communicating evaluation results.** A key aim of the Evaluation is to encourage reflection and learning by UNEP staff and key project stakeholders. The consultants should consider how reflection and learning can be promoted, both through the evaluation process and in the communication of evaluation findings and key lessons. Clear and concise writing is required on all evaluation deliverables. Draft and final versions of the Main Evaluation Report will be shared with key stakeholders by the Evaluation Manager. There may, however, be several intended audiences, each with different interests and needs regarding the report. The consultants will plan with the Evaluation Manager which audiences to target and the easiest and clearest way to communicate the key evaluation findings and lessons to them. This may include some, or all, of the following; a webinar, conference calls with relevant stakeholders, the preparation of an Evaluation Brief or interactive presentation.

9. Key Strategic Questions

31. In addition to the evaluation criteria outlined in Section 10 below, the Evaluation will address the **strategic questions** listed below. These are questions of interest to UNEP and to which the project is believed to be able to make a substantive contribution. Also included are five questions that are required when reporting in the GEF Portal and these must be addressed in the TE.

Q1: From the synergies or collaborations that the DES Initiative had with other complementary initiatives or projects during the project implementation (like the SE4All Building Efficiency Accelerator, the Global Alliance for Building and Construction or other initiatives relating to energy efficiency in cities), what lessons can be learned on combined strategies, policies and business models for built environment decarbonization through building-level efficiency measures and district energy systems?

Q2: To what extent did the project succeed in overcoming the common barriers of the development of DES presented in the CEO Endorsement Document?

Q3: How likely are the pilot cities to be replicated elsewhere? What are the key conditions for the replications to succeed?

Q4: To what extent did the involvement of the Private Sector contribute to the project accomplishments?

Q5: What lessons can be learned from the project about the common business models of the DES? Have any innovative approaches emerged from the pilot city works?

Q6: What changes were made to adapt to the effects of COVID-19 and how might any changes affect the project's performance?

Q7: To what extent were the local stakeholders at the country level and at the city level involved in project design and implementation?

Q8: To what extent are the project "beneficiaries" at the country level and at the city level satisfied with the quality and the relevance of the Technical Assistance provided?

Q9: To what extent has engagement with banks, funds and private sector led to bankable projects in cities and what lessons can be extracted on financing bankable projects and on collaboration models with Multilateral Development Banks or Financial Institutions?

Address the questions required for the GEF Portal in the appropriate parts of the report and provide a **summary of the findings in the Conclusions section of the report**:

(f) Under Monitoring and Reporting/Monitoring of Project Implementation:

What was the performance at the project's completion against Core Indicator Targets? (For projects approved prior to GEF-7, these indicators will be identified retrospectively and comments on performance provided[65]).

(g) Under Factors Affecting Performance/Stakeholder Participation and Cooperation:

What were the progress, challenges and outcomes regarding engagement of stakeholders in the project/program as evolved from the time of the MTR? *(This should be based on the description included in the Stakeholder Engagement Plan or equivalent documentation submitted at CEO Endorsement/Approval)*

(h) Under Factors Affecting Performance/Responsiveness to Human Rights and Gender Equality:

What were the completed gender-responsive measures and, if applicable, actual gender result areas? *(This should be based on the documentation at CEO Endorsement/Approval, including gender-sensitive indicators contained in the project results framework or gender action plan or equivalent)*

(i) Under Factors Affecting Performance/Environmental and Social Safeguards:

What was the progress made in the implementation of the management measures against the Safeguards Plan submitted at CEO Approval? The risk classifications reported in the latest PIR report should be verified and the findings of the effectiveness of any measures or lessons learned taken to address identified risks assessed. *(Any supporting documents gathered by the Consultant during this review should be shared with the Task Manager for uploading in the GEF Portal)*

(j) Under Factors Affecting Performance/Communication and Public Awareness:

What were the challenges and outcomes regarding the project's completed Knowledge Management Approach, including: Knowledge and Learning Deliverables (e.g. website/platform development); Knowledge Products/Events; Communication Strategy; Lessons Learned and Good Practice; Adaptive Management Actions? *(This should be based on the documentation approved at CEO Endorsement/Approval)*

10. Evaluation Criteria

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

A. Strategic Relevance

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

i. Alignment to the UNEP Medium Term Strategy[66] (MTS), Programme of Work (POW) and Strategic Priorities

34. The Evaluation should assess the project's alignment with the MTS and POW under which the project was approved and include, in its narrative, reflections on the scale and scope of any contributions made to the planned results reflected in the relevant MTS and POW. UNEP strategic

[65] This is not applicable for Enabling Activities

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

priorities include the Bali Strategic Plan for Technology Support and Capacity Building[67] (BSP) and South-South Cooperation (S-SC). The BSP relates to the capacity of governments to: comply with international agreements and obligations at the national level; promote, facilitate and finance environmentally sound technologies and to strengthen frameworks for developing coherent international environmental policies. S-SC is regarded as the exchange of resources, technology and knowledge between developing countries.

ii. Alignment to Donor/GEF/Partner Strategic Priorities

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

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

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

iv. Complementarity with Relevant Existing Interventions/Coherence[68]

37. An assessment will be made of how well the project, either at design stage or during the project inception or mobilization[69], took account of ongoing and planned initiatives (under the same sub-programme, other UNEP sub-programmes, or being implemented by other agencies within the same country, sector or institution) that address similar needs of the same target groups. The Evaluation will consider if the project team, in collaboration with Regional Offices and Sub-Programme Coordinators, made efforts to ensure their own intervention was complementary to other interventions, optimized any synergies and avoided duplication of effort. Examples may include UNDAFs or One UN programming. Linkages with other interventions should be described and instances where UNEP's comparative advantage has been particularly well applied should be highlighted.

Factors affecting this criterion may include:

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

B. Quality of Project Design

The quality of project design is assessed using an agreed template during the evaluation inception phase, ratings are attributed to identified criteria and an overall Project Design Quality rating is established. The complete Project Design Quality template should be annexed in the Evaluation Inception Report. Later, the overall Project Design Quality rating[70] should be entered in the final evaluation ratings table (as item B) in the Main Evaluation Report and a summary of the project's strengths and weaknesses at design stage should be included within the body of the report.

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

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

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

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

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

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

C. Nature of External Context

38. At evaluation inception stage a rating is established for the project's external operating context (considering the prevalence of conflict, natural disasters and political upheaval[71]). This rating is entered in the final evaluation ratings table as item C. Where a project has been rated as facing either an Unfavourable or Highly Unfavourable external operating context, and/or a negative external event has occurred during project implementation, the ratings for Effectiveness, Efficiency and/or Sustainability may be increased at the discretion of the Evaluation Consultant and Evaluation Manager together. A justification for such an increase must be given.

D. Effectiveness

i. Availability of Outputs[72]

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

Factors affecting this criterion may include:

- Preparation and readiness
- Quality of project management and supervision[73]

ii. Achievement of Project Outcomes[74]

40. The achievement of project outcomes is assessed as performance against the project outcomes as defined in the reconstructed[75] Theory of Change. These are outcomes that are intended to be achieved by the end of the project timeframe and within the project's resource envelope. Emphasis is placed on the achievement of project outcomes that are most important for attaining intermediate states. As with outputs, a table can be used where substantive amendments to the formulation of project outcomes is necessary to allow for an assessment of performance. The Evaluation should report evidence of attribution between UNEP's intervention and the project outcomes. In cases of normative work or where several actors are collaborating to achieve common outcomes, evidence of the nature and magnitude of UNEP's 'substantive contribution' should be

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

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

[73] In some cases 'project management and supervision' will refer to the supervision and guidance provided by UNEP to implementing partners and national governments while in others, specifically for GEF funded projects, it will refer to the project management performance of the executing agency and the technical backstopping provided by UNEP.

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

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

included and/or 'credible association' established between project efforts and the project outcomes realised.

Factors affecting this criterion may include:

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

iii. Likelihood of Impact

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

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

43. The Evaluation will consider the extent to which the project has played a catalytic role[76] or has promoted scaling up and/or replication as part of its Theory of Change (either explicitly as in a project with a demonstration component or implicitly as expressed in the drivers required to move to outcome levels) and as factors that are likely to contribute to greater or long-lasting impact.

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

Factors affecting this criterion may include:

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

E. Financial Management

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

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

Factors affecting this criterion may include:

- Preparation and readiness
- Quality of project management and supervision

F. Efficiency

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

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

48. The Evaluation will give special attention to efforts made by the project teams during project implementation to make use of/build upon pre-existing institutions, agreements and partnerships, data sources, synergies and complementarities[77] with other initiatives, programmes and projects etc. to increase project efficiency.

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

Factors affecting this criterion may include:

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

G. Monitoring and Reporting

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

i. Monitoring Design and Budgeting

51. Each project should be supported by a sound monitoring plan that is designed to track progress against SMART[78] results towards the provision of the project's outputs and achievement of project outcomes, including at a level disaggregated by gender, marginalisation or vulnerability, including those living with disabilities.. In particular, the Evaluation will assess the relevance and appropriateness of

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

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

the project indicators as well as the methods used for tracking progress against them as part of conscious results-based management. The Evaluation will assess the quality of the design of the monitoring plan as well as the funds allocated for its implementation. The adequacy of resources for Mid-Term and Terminal Evaluation/Review should be discussed if applicable.

ii. Monitoring of Project Implementation

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

53. The performance at project completion against Core Indicator Targets should be reviewed. For projects approved prior to GEF-7, these indicators will be identified retrospectively and comments on performance provided.

iii. Project Reporting

54. UNEP has a centralised project information management system (Anubis) in which project managers upload six-monthly progress reports against agreed project milestones. This information will be provided to the Evaluation Consultants by the Evaluation Manager. Some projects have additional requirements to report regularly to funding partners, which will be supplied by the project team (e.g. the Project Implementation Reviews and Tracking Tool for GEF-funded projects). The Evaluation will assess the extent to which both UNEP and donor reporting commitments have been fulfilled. Consideration will be given as to whether reporting has been carried out with respect to the effects of the initiative on disaggregated groups.

Factors affecting this criterion may include:

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

H. Sustainability

55. Sustainability[79] is understood as the probability of the benefits derived from the achievement of project outcomes being maintained and developed after the close of the intervention. The Evaluation will identify and assess the key conditions or factors that are likely to undermine or contribute to the endurance of achieved project outcomes (i.e. 'assumptions' and 'drivers'). Some factors of sustainability may be embedded in the project design and implementation approaches while others may be contextual circumstances or conditions that evolve over the life of the intervention. Where applicable an assessment of bio-physical factors that may affect the sustainability of project outcomes may also be included.

i. Socio-political Sustainability

56. The Evaluation will assess the extent to which social or political factors support the continuation and further development of the benefits derived from project outcomes. It will consider the level of ownership, interest and commitment among government and other stakeholders to take the project achievements forwards. In particular the Evaluation will consider whether individual capacity development efforts are likely to be sustained.

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

ii. Financial Sustainability

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

iii. Institutional Sustainability

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

Factors affecting this criterion may include:

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

I. Factors Affecting Project Performance and Cross-Cutting Issues

(These factors are rated in the ratings table but are discussed within the Main Evaluation Report as cross-cutting themes as appropriate under the other evaluation criteria, above. If these issues have not been addressed under the evaluation criteria above, then independent summaries of their status within the evaluated project should be given.)

i. Preparation and Readiness

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

ii. Quality of Project Management and Supervision

60. In some cases 'project management and supervision' may refer to the supervision and guidance provided by UNEP to implementing partners and national governments while in others, specifically for GEF funded projects[80], it may refer to the project management performance of the executing agency and the technical backstopping and supervision provided by UNEP. The performance of parties playing different roles should be discussed and a rating provided for both types of supervision (UNEP/Partner/Executing Agency) and the overall rating for this sub-category established as a simple average of the two.

[80] For GEF funded projects, a rating will be provided for the Project Management and Supervision of each of the Implementing and Executing Agencies. The two ratings will be aggregated to provided an overall rating for Quality of Project Management and Supervision

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

iii. Stakeholder Participation and Cooperation

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

63. The progress, challenges and outcomes regarding engagement of stakeholders in the project/program occurring since the MTR should be reviewed. *(This should be based on the description included in the Stakeholder Engagement Plan or equivalent documentation submitted at CEO Endorsement/Approval).*

iv. Responsiveness to Human Rights and Gender Equality

64. The Evaluation will ascertain to what extent the project has applied the UN Common Understanding on the human rights-based approach (HRBA) and the UN Declaration on the Rights of Indigenous People. Within this human rights context the Evaluation will assess to what extent the intervention adheres to UNEP's Policy and Strategy for Gender Equality and the Environment[81].

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

66. The completed gender-responsive measures and, if applicable, actual gender result areas should be reviewed. *(This should be based on the documentation at CEO Endorsement/Approval, including gender-sensitive indicators contained in the project results framework or gender action plan or equivalent).*

v. Environmental and Social Safeguards

67. UNEP projects address environmental and social safeguards primarily through the process of environmental and social screening at the project approval stage, risk assessment and management (avoidance, minimization, mitigation or, in exceptional cases, offsetting) of potential environmental and social risks and impacts associated with project and programme activities. The Evaluation will confirm whether UNEP requirements[82] were met to: *review* risk ratings on a regular basis; *monitor* project implementation for possible safeguard issues; *respond* (where relevant) to safeguard issues through risk avoidance, minimization, mitigation or offsetting and r*eport* on the implementation of safeguard management measures taken. UNEP requirements for proposed projects to be screened for any safeguarding issues; for sound environmental and social risk assessments to be conducted and initial risk ratings to be assigned are evaluated above under Quality of Project Design).

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

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

68. The Evaluation will also consider the extent to which the management of the project minimised UNEP's environmental footprint.

69. Implementation of the management measures against the Safeguards Plan submitted at CEO Approval should be reviewed, the risk classifications verified and the findings of the effectiveness of any measures or lessons learned taken to address identified risks assessed. Any supporting documents gathered by the Consultant should be shared with the Task Manager.

vi. Country Ownership and Driven-ness

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

vii. Communication and Public Awareness

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

72. The project's completed Knowledge Management Approach, including: Knowledge and Learning Deliverables (e.g. website/platform development); Knowledge Products/Events; Communication Strategy; Lessons Learned and Good Practice; Adaptive Management Actions should be reviewed. This should be based on the documentation approved at CEO Endorsement/Approval.

Section 3. EVALUATION APPROACH, METHODS AND DELIVERABLES

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

74. The findings of the Evaluation will be based on the following:

(a) A **desk review** of:

- Relevant background documentation;
- Project design documents (including minutes of the project design review meeting at approval); Annual Work Plans and Budgets or equivalent, revisions to the project (Project Document Supplement), the logical framework and its budget;
- Project reports such as six-monthly progress and financial reports, progress reports from collaborating partners, meeting minutes, relevant correspondence and including the Project Implementation Reviews and Tracking Tool etc.;
- Project deliverables;

- Evaluations/reviews of similar projects.

(b) **Interviews** (individual or in group) with:

- UNEP Task Manager (TM);
- Project management team, including the Project Manager within the Executing Agency, where appropriate, the Expert task forces, the Global Project Advisory Committee, the Project Steering Committee, the National Project Steering Committees, the Country Offices, the Project Deployable Working Team and the lead coordinators and focal points in pilot cities;
- UNEP Fund Management Officer (FMO);
- Portfolio Manager and Sub-Programme Coordinator, where appropriate;
- Project partners, including: Copenhagen Centre for Energy Efficiency, Danfoss, Tabreed, EESL, ENGIE, IDEA, Empower, ICLEI SAS, Carbon Trust, Broad Group, EuroHeat and Power, DBDH DANIDA and other relevant partners of the DES Initiative, pilot countries and "deep-dive" cities stakeholders;
- Relevant resource persons;
- Representatives from civil society and specialist groups (such as engineers, urban planners or architect associations etc).

(c) **Surveys:** online surveys with relevant stakeholders of the "light touch" cities, as well as with international counterparts hosting DES Initiative methodology, tools or publications

(d) **Field visits:** depending on the COVID-19 situation, field visits in one pilot country (India), its "deep-dive" city and some of its "light-touch" cities should be led by an In-country Support Consultant

(e) Other data collection tools

11. Evaluation Deliverables and Review Procedures

75. The Evaluation Team will prepare:

- **Inception Report:** (see Annex 1 for a list of all templates, tables and guidance notes) containing an assessment of project design quality, a draft reconstructed Theory of Change of the project, project stakeholder analysis, evaluation framework and a tentative evaluation schedule.
- **Preliminary Findings Note:** typically in the form of a PowerPoint presentation, the sharing of preliminary findings is intended to support the participation of the project team, act as a means to ensure all information sources have been accessed and provide an opportunity to verify emerging findings. In the case of highly strategic project/portfolio evaluations or evaluations with an Evaluation Reference Group, the preliminary findings may be presented as a word document for review and comment.
- **Draft and Final Evaluation Report:** containing an executive summary that can act as a stand-alone document; detailed analysis of the evaluation findings organised by evaluation criteria and supported with evidence; lessons learned and recommendations and an annotated ratings table.
- **A Draft and Final Portfolio Brief on Energy Efficiency in Buildings**: summarizing the findings of selected recent Terminal Evaluations of UNEP/GEF projects on Energy Efficiency in Buildings.

76. **Review of the Draft Evaluation Report**. The Evaluation Consultants will submit a draft report to the Evaluation Manager and revise the draft in response to their comments and suggestions. Once a draft of adequate quality has been peer-reviewed and accepted, the Evaluation Manager will share the cleared draft report with the Task Manager and Project Manager, who will alert the Evaluation Manager in case the report contains any blatant factual errors. The Evaluation Manager will then forward the revised draft report (corrected by the Evaluation Consultants where necessary) to other project stakeholders, for their review and comments. Stakeholders may provide feedback on any errors of fact and may highlight the significance of such errors in any conclusions as well as providing feedback on the proposed recommendations and lessons. Any comments or responses to draft reports will be sent to the Evaluation Manager for consolidation. The Evaluation Manager will provide all comments to the

Evaluation Consultants for consideration in preparing the final report, along with guidance on areas of contradiction or issues requiring an institutional response.

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

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

79. **Preparation of a portfolio brief on Energy Efficiency in Buildings**. The Evaluation Consultants will submit a Draft and Final Portfolio Brief on Energy Efficiency in Buildings (between 20 to 30 pages) based on the Terminal Evaluations of the six following projects.

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

By bringing together and synthesizing the similarities, the evaluation findings, the lessons learned and the recommendations of these different projects, this portfolio brief will assess what worked and what did not and will identify best practices for the implementation of future Energy Efficiency in Buildings projects. The Draft Portfolio Brief should be delivered shortly after the submission of the Draft Evaluation Report. It will be reviewed by the Evaluation Manager and shared with the Task Managers of the different projects as well as with the Heads of the relevant UNEP branches and units and other relevant stakeholders for comments.

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

12. The Evaluation Team

81. For this Evaluation, the Evaluation Team will consist of a Principal Evaluator and an Evaluation Specialist supported by one In-country Support Consultant (for India)[83], who will work under the overall responsibility of the Evaluation Office represented by an Evaluation Manager, Victor Béguerie, in consultation with the UNEP Task Manager, Ruth Do Coutto and Julien Lheureux, Climate & Energy Branch Fund Management Officer (Amanda Lees), Climate Change Mitigation Unit Fund Management Officer (Leena Darlington/Fatma Twahir), Head of Energy & Climate Branch (Mark Radka), and the

[83] India was chosen for the evaluation field mission because of its high involvement in this project (7 cities involved including 1 "deep-dive" city) as well as its participation in the GEF ID 9947 "The SEforALL Building Efficiency Accelerator (BEA): Expanding Local Action and Driving National Change" project (2 cities including 1 "deep-dive" city).

Coordinator of UNEP Sub-programme on Climate Change (Niklas Hagelberg). The consultants will liaise with the Evaluation Manager on any procedural and methodological matters related to the Evaluation, including travel. It is, however, each consultant's individual responsibility (where applicable) to arrange for their visas and immunizations as well as to plan meetings with stakeholders, organize online surveys, obtain documentary evidence and any other logistical matters related to the assignment. The UNEP Task Manager and project team will, where possible, provide logistical support (introductions, meetings etc.) allowing the consultants to conduct the Evaluation as efficiently and independently as possible.

82. **The Principal Evaluator** will be hired over a period of nine months from October 2021 to June 2022; and should have the following: a university degree in environmental sciences, international development or other relevant political or social sciences area is required and an advanced degree in the same areas is desirable; a minimum of 6 years of technical / evaluation experience are required, preferably including evaluating large, regional or global programmes and using a Theory of Change approach; and a good/broad understanding of District Energy and Energy Efficiency in Buildings is desired. Experiences working with cities and private sector engagement would be an added advantage. English and French are the working languages of the United Nations Secretariat. For this consultancy, fluency in oral and written English is a requirement. Working knowledge of the UN system and specifically the work of UNEP is an added advantage. The work will be home-based.

83. **The Evaluation Specialist** will be hired over a period of nine months from October 2021 to June 2022; and should have the following: an university degree in environmental sciences, international development or other relevant political or social sciences area is required; a minimum of 3 years of technical /evaluation experience is required, preferably including evaluating large, regional or global programmes and using a Theory of Change approach; and a broad understanding of District Energy and Energy Efficiency in Buildings is desired. Experiences working with cities and private sector engagement would be an added advantage. English and French are the working languages of the United Nations Secretariat. For this consultancy fluency in oral and written English is a requirement. Working knowledge of the UN system and specifically the work of UNEP is an added advantage. The work will be home-based.

84. **The In-country Support Consultant (India)** will be hired over a period of five months from December 2021 to April 2022; and should have the following: a university degree in environmental sciences, international development or other relevant political or social sciences area is required. A minimum of 2 years of technical/evaluation experience and a broad understanding of Energy Efficiency are required. A good understanding of participatory data collection tools is desirable. English and French are the working languages of the United Nations Secretariat. For this consultancy fluency in oral and written English is a requirement. Working knowledge of the UN system and specifically the work of UNEP is an added advantage. The In-Country Support Consultant should be based in India. The work will be home-based with possible field visits.

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

86. Specifically, Evaluation Team members will undertake the following:

Specific Responsibilities for Principal Evaluator and Evaluation Specialist:

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

Inception phase of the evaluation, including:

- preliminary desk review and introductory interviews with project staff;
- draft the reconstructed Theory of Change of the project;
- prepare the evaluation framework;

- develop the desk review and interview protocols;
- draft the survey protocols (if relevant);
- draft the interview guide for the In-country Support Consultant;
- draft the template of the In-country Support Consultant evaluation mission reports;
- plan the evaluation schedule;
- prepare the Inception Report, incorporating comments until approved by the Evaluation Manager

Data collection and analysis phase of the evaluation, including:

- conduct further desk review and in-depth interviews with project implementing and executing agencies, project partners and project stakeholders. Ensure independence of the evaluation and confidentiality of evaluation interviews;
- regularly report back to the Evaluation Manager on progress and inform of any possible problems or issues encountered; and
- keep the Task Manager informed of the evaluation progress.

Reporting phase, including:

- draft the Main Evaluation Report, ensuring that the evaluation report is complete, coherent and consistent with the Evaluation Manager guidelines both in substance and style;
- liaise with the Evaluation Manager on comments received and finalize the Main Evaluation Report, ensuring that comments are taken into account until approved by the Evaluation Manager;
- prepare a Response to Comments annex for the main report, listing those comments not accepted by the evaluation consultants and indicating the reason for the rejection; and
- prepare a draft portfolio brief on Energy Efficiency in Buildings;
- liaise with the Evaluation Manager on comments received and finalize the portfolio brief on Energy Efficiency, ensuring that comments are taken into account until approved by the Evaluation Manager;

Managing relations, including:

- maintain a positive relationship with evaluation stakeholders, ensuring that the evaluation process is as participatory as possible but at the same time maintains its independence;

communicate in a timely manner with the Evaluation Manager on any issues requiring its attention and intervention.

Specific Responsibilities for the In-country Support Consultant:

88. The In-country Support Consultant will make substantive and high-quality contributions to the evaluation process and outputs. Together with the Principal Evaluator and the Evaluation Specialist, the In-country Support Consultant will ensure that all evaluation criteria and questions are adequately covered. More specifically:

Data collection and analysis phase of the evaluation, including:

- in consultation with the Principal Evaluator, the Evaluation Specialist and the Country Office, prepare detailed travel itinerary or data collection plan (with stakeholders to meet, contact details, etc.);
- based on the interview guides provided by the Principal Evaluator and the Evaluation Specialist, organize/conduct field visits to interview key stakeholders and validate/confirm the preliminary findings already identified by the Principal Evaluator and the Evaluation Specialist;
- ensure independence of the evaluation and confidentiality of data collected as part of the evaluation; and

- regularly report back to the Evaluation Manager, Principal Evaluator and Evaluation Specialist on progress and inform of any possible problems, issues or information gaps encountered.

Reporting phase, including:

- participate in online meetings with the Evaluation Manager, Principal Evaluator and Evaluation Specialist to reflect on the available evidence and preliminary findings;
- Draft National Evaluation Report (with direct inputs to the draft evaluation report, in the agreed template with the Principal Evaluator and the Evaluation Specialist);
- liaise with the Evaluation Manager, Principal Evaluator and Evaluation Specialist on comments received and address any follow up questions to the submitted inputs.

Managing relations, including:

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

89. The In-country Support Consultant will submit:

Before field visit/interviews:

- Detailed in-country data collection plan, with names of stakeholders to interview and sites to visit.

After field visits interviews:

- Draft National Evaluation Report (with inputs to the draft evaluation report, in agreed template with the Principal Evaluator and Evaluation Specialist).

13. Schedule of the Evaluation

90. The table below presents the tentative schedule for the Evaluation.

Table 6. Tentative schedule for the Evaluation

Milestone	Tentative Dates
Evaluation Initiation Meeting	October 2021
Draft Inception Report	December 2021
Approved Inception Report	December 2021
In-depth data collection and analysis, interviews and surveys	January – February 2022
Field Mission	January – February 2022
Draft National Evaluation Report	March 2022
PowerPoint/presentation on preliminary findings and recommendations	March 2022
Draft report to Evaluation Manager (and Peer Reviewer)	April 2022
Draft Report shared with UNEP Project Manager and team	April 2022
Draft Report shared with wider group of stakeholders	May 2022
Draft Portfolio Brief	May 2022
Final Report	June 2022
Final Report shared with all respondents	June 2022
Final Portfolio Brief	June 2022

14. Contractual Arrangements

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

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

Schedule of Payment for the Principal Evaluator:

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

Schedule of Payment for the Evaluation Specialist:

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

Schedule of Payment for the Evaluation Specialist:

Deliverable	Percentage Payment
Approved In-country Data Collection Plan	25%
Draft National Evaluation Report (with approved inputs to the main draft evaluation report, in a template agreed with the Principal Evaluator)	75%

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

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

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

96. If the consultants fail to submit a satisfactory final product to UNEP in a timely manner, i.e. before the end date of their contract, the Evaluation Office reserves the right to employ additional

human resources to finalize the report, and to reduce the consultants' fees by an amount equal to the additional costs borne by the Evaluation Office to bring the report up to standard.

ANNEX X. QUALITY ASSESSMENT OF THE EVALUATION REPORT

All UNEP evaluations are subject to a quality assessment by the Evaluation Office. This is an assessment of the quality of the evaluation product (i.e. evaluation report) and is dependent on more than just the consultant's efforts and skills.

	UNEP Evaluation Office Comments	Final Report Rating
Substantive Report Quality Criteria		
Quality of the Executive Summary: The Summary should be able to stand alone as an accurate summary of the main evaluation product. It should include a concise overview of the evaluation object; clear summary of the evaluation objectives and scope; overall evaluation rating of the project and key features of performance (strengths and weaknesses) against exceptional criteria (plus reference to where the evaluation ratings table can be found within the report); summary of the main findings of the exercise, including a synthesis of main conclusions (which include a summary response to key strategic evaluation questions), lessons learned and recommendations.	Final report: Responses to the strategic questions are missing, but the Executive Summary is globally satisfactory.	**5**
I. Introduction A brief introduction should be given identifying, where possible and relevant, the following: institutional context of the project (sub-programme, Division, regions/countries where implemented) and coverage of the evaluation; date of PRC approval and project document signature); results frameworks to which it contributes (e.g. Expected Accomplishment in POW); project duration and start/end dates; number of project phases (where appropriate); implementing partners; total secured budget and whether the project has been evaluated in the past (e.g. mid-term, part of a synthesis evaluation, evaluated by another agency etc.) Consider the extent to which the introduction includes a concise statement of the purpose of the evaluation and the key intended audience for the findings?	Final report: All the required elements are presented.	**6**
II. Evaluation Methods A data collection section should include: a description of evaluation methods and information sources used, including the number and type of respondents; justification for methods used (e.g. qualitative/ quantitative; electronic/face-to-face); any selection criteria used to identify respondents, case studies or sites/countries visited; strategies used to increase stakeholder engagement and consultation; details of how data were verified (e.g. triangulation, review by stakeholders etc.). Methods to ensure that potentially excluded groups (excluded by gender, vulnerability or marginalisation) are reached and their experiences captured effectively, should be made explicit in this section. The methods used to analyse data (e.g. scoring; coding; thematic analysis etc.) should be described. It should also address evaluation limitations such as: low or imbalanced response rates across different groups; gaps in documentation; extent to which findings can be either generalised to wider evaluation questions or constraints on aggregation/disaggregation; any potential or apparent biases; language barriers and ways they were overcome. Ethics and human rights issues should be highlighted including: how anonymity and confidentiality were protected and strategies used to	Final report: Detailed section covering all the necessary aspects of the evaluation methods.	**5**

include the views of marginalised or potentially disadvantaged groups and/or divergent views. Is there an ethics statement?		
III. The Project This section should include: • *Context:* Overview of the main issue that the project is trying to address, its root causes and consequences on the environment and human well-being (i.e. synopsis of the problem and situational analyses). • *Results framework*: Summary of the project's results hierarchy as stated in the ProDoc (or as officially revised) • *Stakeholders:* Description of groups of targeted stakeholders organised according to relevant common characteristics • *Project implementation structure and partners:* A description of the implementation structure with diagram and a list of key project partners • *Changes in design during implementation:* Any key events that affected the project's scope or parameters should be described in brief in chronological order • *Project financing:* Completed tables of: (a) budget at design and expenditure by components (b) planned and actual sources of funding/co-financing	Final report: The project is well presented with enough details.	**6**
IV. Theory of Change The *TOC at Evaluation* should be presented clearly in both diagrammatic and narrative forms. Clear articulation of each major causal pathway is expected, (starting from outputs to long term impact), including explanations of all drivers and assumptions as well as the expected roles of key actors. This section should include a description of how the *TOC at Evaluation*[84] was designed (who was involved etc.) and applied to the context of the project? Where the project results as stated in the project design documents (or formal revisions of the project design) are not an accurate reflection of the project's intentions or do not follow UNEP's definitions of different results levels, project results may need to be re-phrased or reformulated. In such cases, a summary of the project's results hierarchy should be presented for: a) the results as stated in the approved/revised Prodoc logframe/TOC and b) as formulated in the *TOC at Evaluation*. *The two results hierarchies should be presented as a two-column table to show clearly that, although wording and placement may have changed, the results 'goal posts' have not been 'moved'.* Check that the project's effect on equality (i.e. promoting human rights, gender equality and inclusion of those living with disabilities and/or belonging to marginalised/vulnerable groups) has been included within the TOC as a general driver or assumption where there was no dedicated result within the results framework. If an explicit commitment on this topic was made within the project document then the driver/assumption should also be specific to the described intentions.	Final report: Satisfactory section, the diagram is visually good.	**5**

[84] During the Inception Phase of the evaluation process a *TOC at Evaluation Inception* is created based on the information contained in the approved project documents (these may include either logical framework or a TOC or narrative descriptions), formal revisions and annual reports etc. During the evaluation process this TOC is revised based on changes made during project intervention and becomes the *TOC at Evaluation*.

V. Key Findings **A. Strategic relevance:** This section should include an assessment of the project's relevance in relation to UNEP's mandate and its alignment with UNEP's policies and strategies at the time of project approval. An assessment of the complementarity of the project at design (or during inception/mobilisation[85]), with other interventions addressing the needs of the same target groups should be included. Consider the extent to which all four elements have been addressed: i. Alignment to the UNEP Medium Term Strategy (MTS) and Programme of Work (POW) ii. Alignment to Donor/GEF Strategic Priorities iii. Relevance to Regional, Sub-regional and National Environmental Priorities iv. Complementarity with Existing Interventions	Final report: This criterion is well discussed. Evidence on the Complementarity with Existing Interventions is limited.	**5**
B. Quality of Project Design To what extent are the strength and weaknesses of the project design effectively summarized?	Final report: The strengths and weaknesses are well described.	**5**
C. Nature of the External Context For projects where this is appropriate, key external features of the project's implementing context that limited the project's performance (e.g. conflict, natural disaster, political upheaval[86]), and how they affected performance, should be described.	Final report: Satisfactory section.	5
D. Effectiveness **(i) Outputs and Project Outcomes:** How well does the report present a well-reasoned, complete and evidence-based assessment of the a) availability of outputs, and b) achievement of project outcomes? How convincing is the discussion of attribution and contribution, as well as the constraints to attributing effects to the intervention. The effects of the intervention on differentiated groups, including those with specific needs due to gender, vulnerability or marginalisation, should be discussed explicitly.	Final report: Good section.	**5**
(ii) Likelihood of Impact: How well does the report present an integrated analysis, guided by the causal pathways represented by the TOC, of all evidence relating to likelihood of impact? How well are change processes explained and the roles of key actors, as well as drivers and assumptions, explicitly discussed? Any unintended negative effects of the project should be discussed under Effectiveness, especially negative effects on disadvantaged groups.	Final report: The drivers and assumptions are well assessed.	5
E. Financial Management	Final report:	**5**

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

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

This section should contain an integrated analysis of all dimensions evaluated under financial management and include a completed 'financial management' table. Consider how well the report addresses the following: • *Adherence* to UNEP's financial policies and procedures • *completeness* of financial information, including the actual project costs (total and per activity) and actual co-financing used • *communication* between financial and project management staff	Good section.	
F. Efficiency To what extent, and how well, does the report present a well-reasoned, complete and evidence-based assessment of efficiency under the primary categories of cost-effectiveness and timeliness including: • Implications of delays and no cost extensions • Time-saving measures put in place to maximise results within the secured budget and agreed project timeframe • Discussion of making use during project implementation of/building on pre-existing institutions, agreements and partnerships, data sources, synergies and complementarities with other initiatives, programmes and projects etc. • The extent to which the management of the project minimised UNEP's environmental footprint.	Final report: More evidence could have been presented and detailed about the collaboration of the project with other existing initiatives.	**4**
G. Monitoring and Reporting How well does the report assess: • Monitoring design and budgeting *(including SMART results with measurable indicators, resources for MTE/R etc.)* • Monitoring of project implementation *(including use of monitoring data for adaptive management)* • Project reporting *(e.g. PIMS and donor reports)*	Final report: Satisfactory section, it was not necessary to detail the content of the PIRs. Their completeness and quality were relevant here.	**5**
H. Sustainability How well does the evaluation identify and assess the key conditions or factors that are likely to undermine or contribute to the persistence of achieved project outcomes including: • Socio-political Sustainability • Financial Sustainability • Institutional Sustainability	Final report: The different sub-criteria are well understood, and each outcome is assessed.	**5**
I. Factors Affecting Performance These factors are <u>not</u> discussed in stand-alone sections but are **integrated in criteria A-H as appropriate**. Note that these are described in the Evaluation Criteria Ratings Matrix. To what extent, and how well, does the evaluation report cover the following cross-cutting themes: • Preparation and readiness • Quality of project management and supervision[87] • Stakeholder participation and co-operation	Final report: Appropriate discussions.	5

[87] In some cases 'project management and supervision' will refer to the supervision and guidance provided by UNEP to implementing partners and national governments while in others, specifically for GEF funded projects, it will refer to the project management performance of the executing agency and the technical backstopping provided by UNEP.

• Responsiveness to human rights and gender equity • Environmental and social safeguards • Country ownership and driven-ness • Communication and public awareness		
VI. Conclusions and Recommendations **i. Quality of the conclusions:** The key strategic questions should be clearly and succinctly addressed within the conclusions section. It is expected that the conclusions will highlight the main strengths and weaknesses of the project and connect them in a compelling story line. Human rights and gender dimensions of the intervention (e.g. how these dimensions were considered, addressed or impacted on) should be discussed explicitly. Conclusions, as well as lessons and recommendations, should be consistent with the evidence presented in the main body of the report.	Final report: The strategic questions but one are answered. Human rights and gender dimensions of the intervention is not discussed explicitly.	**5**
ii) Quality and utility of the lessons: Both positive and negative lessons are expected and duplication with recommendations should be avoided. Based on explicit evaluation findings, lessons should be rooted in real project experiences or derived from problems encountered and mistakes made that should be avoided in the future. Lessons are intended to be adopted any time they are deemed to be relevant in the future and must have the potential for wider application (replication and generalization) and use and should briefly describe the context from which they are derived and those contexts in which they may be useful.	Final report: Good.	**5**
iii) Quality and utility of the recommendations: To what extent are the recommendations proposals for specific action to be taken by identified people/position-holders to resolve concrete problems affecting the project or the sustainability of its results? They should be feasible to implement within the timeframe and resources available (including local capacities) and specific in terms of who would do what and when. At least one recommendation relating to strengthening the human rights and gender dimensions of UNEP interventions, should be given. Recommendations should represent a measurable performance target in order that the Evaluation Office can monitor and assess compliance with the recommendations. In cases where the recommendation is addressed to a third party, compliance can only be monitored and assessed where a contractual/legal agreement remains in place. Without such an agreement, the recommendation should be formulated to say that UNEP project staff should pass on the recommendation to the relevant third party in an effective or substantive manner. The effective transmission by UNEP of the recommendation will then be monitored for compliance. Where a new project phase is already under discussion or in preparation with the same third party, a recommendation can be made to address the issue in the next phase.	Final report: Efforts were made to make the recommendations actionable.	**5**
VII. Report Structure and Presentation Quality		
i) Structure and completeness of the report: To what extent does the report follow the Evaluation Office guidelines? Are all requested Annexes included and complete?	Final report: Guidelines were well followed. All annexes are included	**6**

ii) **Quality of writing and formatting:** Consider whether the report is well written (clear English language and grammar) with language that is adequate in quality and tone for an official document? Do visual aids, such as maps and graphs convey key information? Does the report follow Evaluation Office formatting guidelines?	Final report: The report is well written, with an adequate tone. The formatting guidelines are followed.	6
OVERALL REPORT QUALITY RATING		**5.15**

A number rating 1-6 is used for each criterion: Highly Satisfactory = 6, Satisfactory = 5, Moderately Satisfactory = 4, Moderately Unsatisfactory = 3, Unsatisfactory = 2, Highly Unsatisfactory = 1. The overall quality of the evaluation report is calculated by taking the mean score of all rated quality criteria.

At the end of the evaluation, compliance of the evaluation process against the agreed standard procedures is assessed, based on the table below. *All questions with negative compliance must be explained further in the table below.*

Evaluation Process Quality Criteria	**Compliance**	
	Yes	**No**
Independence:		
1. Were the Terms of Reference drafted and finalised by the Evaluation Office?	**X**	
2. Were possible conflicts of interest of proposed Evaluation Consultant(s) appraised and addressed in the final selection?	**X**	
3. Was the final selection of the Evaluation Consultant(s) made by the Evaluation Office?	**X**	
4. Was the evaluator contracted directly by the Evaluation Office?	**X**	
5. Was the Evaluation Consultant given direct access to identified external stakeholders in order to adequately present and discuss the findings, as appropriate?	**X**	
6. Did the Evaluation Consultant raise any concerns about being unable to work freely and without interference or undue pressure from project staff or the Evaluation Office?		**X**
7. If Yes to Q6: Were these concerns resolved to the mutual satisfaction of both the Evaluation Consultant and the Evaluation Manager?		
Financial Management:		
8. Was the evaluation budget approved at project design available for the evaluation?	**X**	
9. Was the final evaluation budget agreed and approved by the Evaluation Office?	**X**	
10. Were the agreed evaluation funds readily available to support the payment of the evaluation contract throughout the payment process?	**X**	
Timeliness:		
11. If a Terminal Evaluation: Was the evaluation initiated within the period of six months before or after project operational completion? Or, if a Mid Term Evaluation: Was the evaluation initiated within a six-month period prior to the project's mid-point?		**X**
12. Were all deadlines set in the Terms of Reference respected, as far as unforeseen circumstances allowed?		**X**
13. Was the inception report delivered and reviewed/approved prior to commencing any travel?	**X**	
Project's engagement and support:		
14. Did the project team, Sub-Programme Coordinator and identified project stakeholders provide comments on the evaluation Terms of Reference?	**X**	
15. Did the project make available all required/requested documents?	**X**	
16. Did the project make all financial information (and audit reports if applicable) available in a timely manner and to an acceptable level of completeness?	**X**	
17. Was adequate support provided by the project to the evaluator(s) in planning and conducting evaluation missions?		**X**
18. Was close communication between the Evaluation Consultant, Evaluation Office and project team maintained throughout the evaluation?	**X**	
19. Were evaluation findings, lessons and recommendations adequately discussed with the project team for ownership to be established?	X	
20. Did the project team, Sub-Programme Coordinator and any identified project stakeholders provide comments on the draft evaluation report?	**X**	
Quality assurance:		

21. Were the evaluation Terms of Reference, including the key evaluation questions, peer-reviewed?	**X**	
22. Was the TOC in the inception report peer-reviewed?	**X**	
23. Was the quality of the draft/cleared report checked by the Evaluation Manager and Peer Reviewer prior to dissemination to stakeholders for comments?	**X**	
24. Did the Evaluation Office complete an assessment of the quality of both the draft and final reports?	**X**	
Transparency:		
25. Was the draft evaluation report sent directly by the Evaluation Consultant to the Evaluation Office?	**X**	
26. Did the Evaluation Manager disseminate (or authorize dissemination) of the cleared draft report to the project team, Sub-Programme Coordinator and other key internal personnel (including the Reference Group where appropriate) to solicit formal comments?	**X**	
27. Did the Evaluation Manager disseminate (or authorize dissemination) appropriate drafts of the report to identified external stakeholders, including key partners and funders, to solicit formal comments?	**X**	
28. Were all stakeholder comments to the draft evaluation report sent directly to the Evaluation Office	**X**	
29. Did the Evaluation Consultant(s) respond adequately to all factual corrections and comments?	**X**	
30. Did the Evaluation Office share substantive comments and Evaluation Consultant responses with those who commented, as appropriate?	**X**	

Provide comments / explanations / mitigating circumstances below for any non-compliant process issues.

Process Criterion Number	**Evaluation Office Comments**
11	The consultant's contract was issued 7 months after the project technical completion.
12	The consultant's contract was extended due to difficulties in data collection. It took time for the EA to give support to the data collection.
17	It took time for the EA to give support to the data collection.