Independent Evaluation Division
Office of Evaluation and Internal Oversight

Thematic Synthesis of

INDEPENDENT EVALUATIONS OF UNIDO RENEWABLE ENERGY PROJECTS FROM 2016-2020

UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

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Glossary of evaluation-related terms

Term	Definition
Baseline	The situation, prior to an intervention, against which progress can be assessed.
Effect	Intended or unintended change due directly or indirectly to an intervention.
Effectiveness	The extent to which the development intervention's objectives were achieved, or are expected to be achieved.
Efficiency	A measure of how economically resources/inputs (funds, expertise, time, etc.) are converted to results.
Impact	Positive and negative, intended and non-intended, directly and indirectly, long term effects produced by a development intervention.
Indicator	Quantitative or qualitative factors that provide a means to measure the changes caused by an intervention.
Lessons learned	Generalizations based on evaluation experiences that abstract from the specific circumstances to broader situations.
Logframe (logical framework approach)	Management tool used to facilitate the planning, implementation and evaluation of an intervention. It involves identifying strategic elements (activities, outputs, outcome, impact) and their causal relationships, indicators, and assumptions that may affect success or failure. Based on RBM (results-based management) principles.
Outcome	The likely or achieved (short-term and/or medium-term) effects of an intervention's outputs.
Outputs	The products, capital goods and services which result from an intervention; may also include changes resulting from the intervention which are relevant to the achievement of outcomes.
Relevance	The extent to which the objectives of an intervention are consistent with beneficiaries' requirements, country needs, global priorities and partners' and donor's policies.
Risks	Factors, normally outside the scope of an intervention, which may affect the achievement of an intervention's objectives.
Sustainability	The continuation of benefits from an intervention, after the development assistance has been completed.
Target groups	The specific individuals or organizations for whose benefit an intervention is undertaken.

Abbreviations and acronyms

Abbreviation	Meaning
EB	Executive Board
EIO/IED	Evaluation and Internal Oversight/Independent Evaluation Division
GEF	Global Environment Facility
GN-SEC	Global Network of Sustainable Energy Centres
MTR	Mid Term Review
OECD	Organization for Economic Co-operation and Development
IRPF	Integrated Results and Performance Framework
M&E	Monitoring and Evaluation
MW	Mega Watt
PPA	Power Purchase Agreements
PSP-TT	Poznan Strategic Programme for Technology Transfer
RE	Renewable energy
RRE	Renewable and Rural Energy
REA	Rural Electrification Agency
ToC	Theory of Change
SE for All	Sustainable Energy for All
SPWA-CC	Strategic Programme for West Africa - Climate Change
SSA	Sub-Saharan Africa
TNA	Technology Needs Assessment
TT	Technology Transfer
USD	United States Dollar
UNIDO	United Nations Industrial Development Programme

1. Introduction

Since 2010, the UNIDO evaluation function has consistently taken stock of past independent evaluations and has consolidated key findings and lessons into synthesis reports to promote learning at UNIDO and provide an independent and systematic aggregated overview of relevance, effectiveness, efficiency, sustainability, impact and other cross-cutting dimensions of UNIDO programmes and projects evaluated. Building on those past efforts to aggregate and provide synthesis learnings, this exercise aims to look at independent evaluations for informing UNIDO and to further contribute to improve the organization's programmatic performance and impact by identifying and capturing accumulated knowledge on UNIDO's work, in a more strategic or systemic manner. Synthesizing existing evaluation reports, together with latest research thinking allows evaluation evidence to feed into UNIDO's decision-making process in a more effective way.

For the last few years, UNIDO Member States and Senior Management have called for a greater emphasis on reporting and demonstrating the results and performance of UNIDO's Technical Cooperation activities at corporate level in a more systematic and aggregated manner. The *Strategic Guidance Document* on the future of UNIDO in 2013 asked the UNIDO Secretariat to "…provide consolidated reports at regular intervals …" to demonstrate development impact[1]. In 2015, the medium-term programme framework 2016-2019 introduced an innovative tool, the Integrated Results and Performance Framework (IRPF), to help UNIDO manage for results and demonstrate its results and performance at corporate level[2]. In 2017, the medium-term programme framework, 2018-2021 emphasized the importance for "… the Organization to monitor, respond to and demonstrate tangible results … and to analyse and report the progress in organizational performance at all levels of the Organization" based on the IRPF as the corporate long-term results framework[3]. This gap for results and performance at corporate level has also echoed the findings from a number of independent evaluations by the UNIDO Independent Evaluation Division (EIO/IED) in the last years. To contribute to these efforts, EIO/IED intends to undertake a series of meta -reviews of independent evaluations of UNIDO's various thematic clusters starting with the Renewable Energy thematic cluster. The resulting lessons, findings and key recommendations will enable EIO report the learnings to the UNIDO Executive Board (EB) and to management of the respective thematic area, and to strengthen evidence- based policy and decision-making.

[1] UNIDO 2013, Strategic Guidance Document: https://www.unido.org/sites/default/files/2013-06/idb41_24e_0.pdf
[2] UNIDO 2015, Medium-term programme framework, 2016-2019. https://www.unido.org/sites/default/files/2015-04/pbc31_9en_0.pdf
[3] UNIDO 2017, Medium-term programme framework 2018-2021 Proposal on "Strengthening knowledge and institutions". https://www.unido.org/sites/default/files/2017-05/IDB.45_8_Add.2_2__E_Medium-term_programme_framework_2018-2021_1703143E_20170522__0.pdf

2. Objectives, approach and scope of this synthesis

2.1 Objectives

The meta-review has the following objectives:

1. To review and synthesize the design, performance, lessons learnt and recommendations from twelve (12) Renewable Energy projects evaluated between 2016 and March 2020;
2. To identify key lessons, areas for improvement and systemic issues on RE thematic area. (e.g. monitoring and evaluation of Renewable Energy (RE) projects, UNIDO reporting needs (IRPF));
3. To generate consolidated learnings, recommendations and possible actions to help UNIDO senior management and the Energy department to further improve its performance and results.

2.2 Methodology

This synthesis follows a meta-evaluation approach using desk review of the independent evaluation reports. Tools such as Theory of Change (ToC) and analytical techniques such as content analysis and theme analysis are also employed.

The TOC for "renewable energy" as a programme is reconstructed considering the common objectives of the individual projects. This will allow to develop an overall programme logic for RE at UNIDO while recognizing the need for adjusting project approaches to the country and stakeholder context. The ToC also helps to align UNIDO RE projects´ coherence to GEF objectives as well as UNIDO's IRPF.

2.3 Scope

The scope of this exercise covers twelve independent project evaluations in the area of Renewable Energy conducted by UNIDO EIO/IED between 2016 and March 2020 (A list of these projects is included as Annex 1). In addition, Synthesis of UNIDO Independent Evaluations 2015-2018 and country evaluations undertaken during the period 2016-19 in any of the project countries will be also referred.

Eleven (11) projects evaluated were funded by the Global Environmental Facility (GEF) under its 4th replenishment cycle and one project was funded by the Government of Japan. Among the GEF funded projects, 6 were child projects of the Strategic Programme for West Africa – Climate Change (SPWA-CC) of the GEF 4 cycle. SPWA was introduced by GEF to be more inclusive and to provide opportunities for small countries especially African countries. UNIDO implemented 8 of the total 18 SPWA-CC child projects (USD 15 million out of total USD 46 million) in addition to a coordination project of USD 0.7 million. EIO/IED evaluated also two (2) child projects (Thailand and Cambodia) under the Poznan Strategic Programme for Technology Transfer (PSP-TT), also of GEF 4 Cycle. PSC-TT had 14 child projects (USD 36 m) out of which UNIDO implemented 4 projects (USD 10 m). It is worth noting that the main objective of three (3) projects evaluated were Technology transfer (TT) South-South & North-South. In addition, south-south TT was a major component of Tanzania GEF 4 project.

The total budget of the 12 projects was around USD 20.4 million, 11 of them funded by GEF-4 and one by the Government of Japan. The total co-financing figure at project design was above 96,5 million.

Table 1: Profile of projects evaluated

Project	Country	Technology	Category	Implementation Period	Evaluation Date	MTR/E
103023	Gambia	Wind/PV	SPWA-CC	2011-17	May-18	Oct-14
100261	Tanzania	SHP	SS TT	2012-18	Mar-19	Feb-15
100264	Thailand	Biofuels	Poznan TT	2012-18	Jul-19	Feb-15
100223	Cambodia	Biomass	Poznan TT	2011-18	Oct-19	Jun-15
100332	Cape Verde	Solar Th & PV	SPWA-CC	2012-19	Aug-19	N/A
100258	Thailand	Biomass	-	2013-19	Apr-19	N/A
120182	India	MHP	SS TT	2013-15	Nov-16	N/A
100186	Ivory Coast	PV	SPWA-CC	2012-16	Aug-16	N/A
100184	Chad	Solar	SPWA-CC	2012-15	May-16	Jan-15
100333	Pakistan	Biomass	-	2012-19	Mar-20	May-14
100328	Sierra Leone	SHP	SPWA-CC	2012-19		
100330	Liberia	SHP	SPWA-CC	2012-19		

Technology focus:

- Small/Micro hydro -4
- Bioenergy (Biofuels & Biomass) -4
- Solar/Wind - 4

Regional Focus:

- West Africa – 6
- East Africa – 1
- Asia – 5 (Thailand 2, Cambodia 1, India 1, Pakistan 1)

2.4 Limitations

The sample of projects is relatively small and includes 11 GEF projects, which were part of the GEF4 replenishment cycle. UNIDO implemented a total of 14 RE projects under GEF-4 cycle. The subsequent GEF cycles including the current GEF-7 cycle strategies are different from that of GEF-4. Therefore, lessons and recommendations from projects designed around 10 years ago need to be put into the current UNIDO context in order to be useful. The bias towards GEF projects represents a limitation as these projects are guided by the corresponding GEF strategies, which vary from cycle to cycle. The main source of data and information are the respective independent evaluation reports and few other strategic documents produced by UNIDO, which were subjected to desk review. No surveys, interviews or site visits conducted.

In terms of the new evaluation criteria of "coherence", it is worth noting that the reports analyzed were all issued before the criterion was established by OECD/DAC. Therefore, no rating was available within the evaluation reports. Furthermore, the external coherence criterion, i.e. the consistency of the portfolio with other actors´ interventions, was not considered due to lack of available information.

3. UNIDO Renewable Energy projects: Background

3.1 UNIDO Renewable Energy programme (ENE/RRE)

All projects reviewed started implementation during the period 2011-13 and managed by the then Renewable and Rural Energy Division (RRE). The division[4] was responsible for enhancing the use of renewable energy by industries and facilitating clean energy access by the rural poor to support productive activities for income and employment generation, thereby contributing to the mitigation of climate change in developing countries and countries with economies in transition.

This was to be achieved through (1) elaboration of coherent policies and regulatory frameworks; (2) Strengthening the capacities; (3) promoting the transfer of appropriate

[44] UNIDO_DGB_2016_01_UNIDO Secretariat Structure.

renewable energy technologies; (4) promoting innovative business models; (5) promoting global standards on renewable energy technologies, appliances and systems; (6) active participation in global fora and partnerships; (7) mobilizing funding from multi/bilateral, national and innovative financial mechanisms and funds including the GEF, GCF and carbon financing.

3.2 GEF 4 Replenishment Cycle

Relevant strategic objectives in the Climate Change focal area:

- To promote on-grid renewable Energy
- To promote the use of renewable energy for the provision of rural energy services (off-grid)

Relevant strategic programmes for mitigation under the Climate Change focal area:

- Promoting market approaches for renewable energy
- Promoting sustainable energy production from biomass

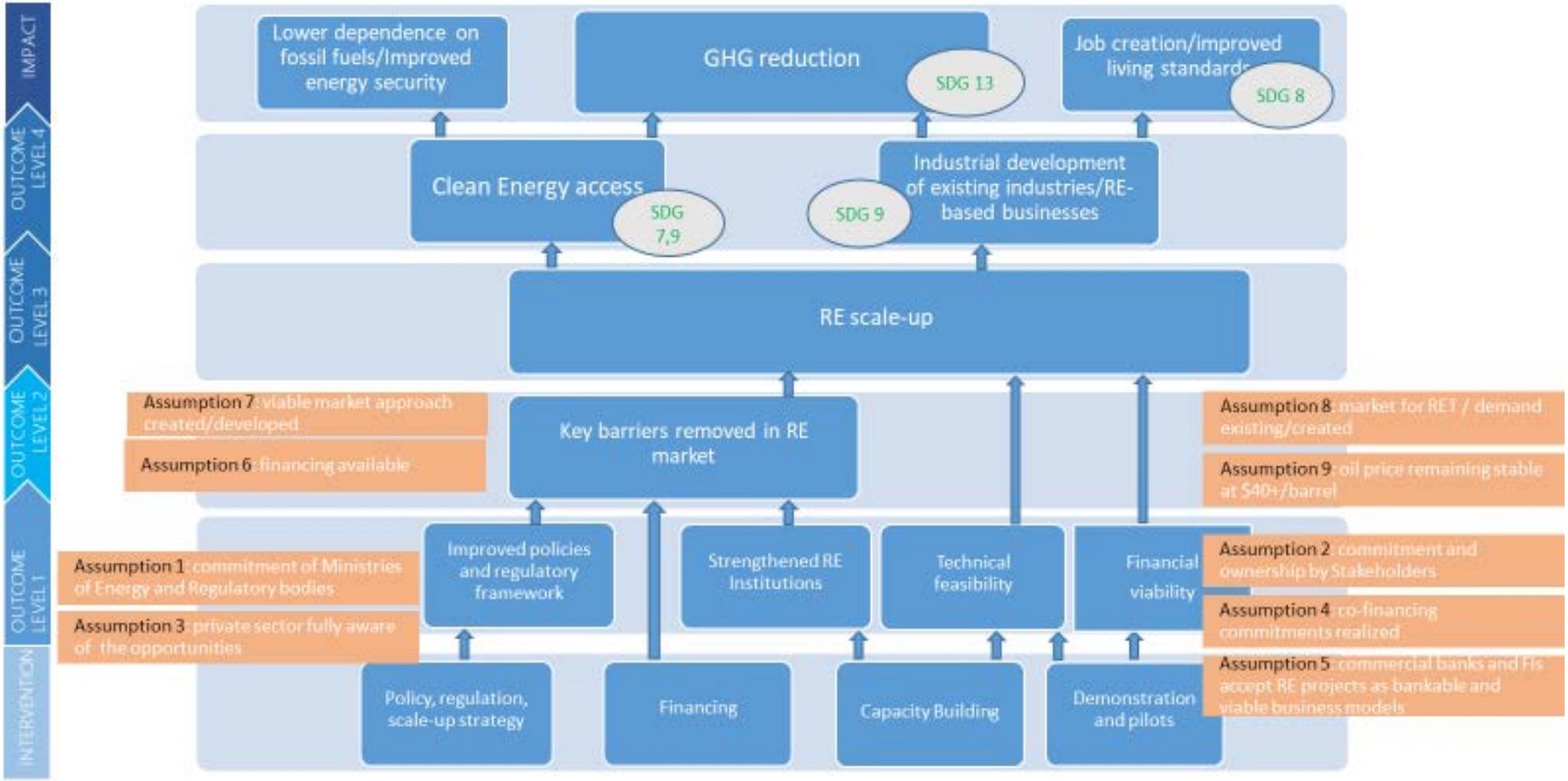
This was the time in 2011, UN Secretary General initiated Sustainable Energy for All (SE for All) and called for action around 3 objectives to be achieved by 2030: (1) to ensure universal access to modern energy services; (2) to double the rate of improvement of energy efficiency; (3) to double the share of renewable energy in the global energy mix. These three objectives became SDG 7 in 2015.

4. Theory of Change:

None of the project documents did have a TOC. However, a TOC was reconstructed for project 100264 during MTR. In addition, TE reports of projects 100261 and 100333 have TOCs reconstructed within the context of individual projects. In order to understand the results chain of UNIDO's RE programme vis-à-vis GEF strategic objectives and UNIDO's IRPF, a Theory of Change (ToC) for RE Cluster as a whole has been reconstructed here as shown below:

The ToC tries to capture the logic of the evaluated portfolio by reconstructing a roadmap of links and pathways to reach the ultimate intended outcomes and impacts. The logic of the ToC diagram in Figure 1 below flows bottom-up in a vertical direction from intervention-level activities and intermediate outcomes to long term desired impacts of the cluster. The TOC also identifies the critical assumptions (numbered A1 to A7) made at projects´ design or arising from the terminal evaluations conducted on the different projects. These assumptions are necessary to enable the change by creating and highlighting connections between the measurable effects, wider benefits and the longer-term goals.

RE thematic review: Theory of Change



Assumptions:

A1 commitment of Ministries of Energy and regulatory bodies (ex. 100332 100258 103023 120182)

A2 commitment and ownership by stakeholders (ex. 100332 103023 120182)

A3 private sector fully aware of the opportunities (ex. 100332 103023 120182)

A4 co-financing commitments realized (ex. 100332 103023 103333)

A5 commercial banks and FIs accept RE projects as bankable and viable business models (ex. 100264 100186 100223)

A6 financing available (ex. 100223 103023)

A7 viable market approach created/developed (ex. 100332 100186 100258 103023)

A8 Market for RETs/Demand existing/created (103023, 100264, 120182)

A9 Oil price remain stable at USD40+/barrel (100333, 100223, 100184, 120182)

5. Performance of the Thematic Cluster

5.1. Overall Performance

Overall performance, at the time of the project terminal evaluations, is determined by the evaluators based on the analysis and rating of project relevance, effectiveness, efficiency, sustainability and progress towards impact without specific weightage to any specific criteria. However, this is not an average of rating.

Seven (7) out of ten (10) projects, for which ratings were available, have overall performance rating in the satisfactory performance range. The ratings indicate that the relevance of the RE projects is very high. Similarly, effectiveness, efficiency and likelihood of sustainability are mostly rated high in the satisfactory range for 70% of the projects.

Table 2: Performance ratings

Rating	Relevance	Effectiveness	Efficiency	Sustainability	Overall Performance
Highly Satisfactory	*6*	1	0	2	1
Satisfactory	*3*	5	5	3	4
Moderately Satisfactory		2	2	2	2
Moderately Unsatisfactory	*1*	1	2	2	
Unsatisfactory			1		1
Highly Unsatisfactory		1			1
Unable to assess				1	1

5.2. Relevance

Nine (9) out of ten (10) projects were rated in the satisfactory range with six (6) projects as highly satisfactory and three (3) satisfactory against the criteria of relevance. This indicates that the projects objectives were consistent with country's policies and met their needs and targets. This also clearly shows that RE is high priority in the recipient countries as a means of achieving universal energy access both in urban (grid) and rural context (off grid). All the countries of intervention are in the lower ranks in terms of energy access. In 2013, the average national electrification rate in Sub-Saharan Africa (SSA) was 43% and rural electrification rate was 26%, while in Côte d'Ivoire 26% and 8 % respectively. Similarly, in Chad, the access rate was 14% while the Government had a target of 75% by 2030. On the other hand, in Cabo Verde, the electricity access was 90%, however produced from fossil fuel-based generators. In Tanzania, the project was in line with the national energy policy (2015) and rural electrification is at the heart of this policy. Rural Electrification Agency (REA) was created to implement the policy and REA was a major counterpart in the project. Therefore, there is sufficient evidence to show that UNIDO/GEF interventions were indeed demand driven and supported Government's priority of increasing access to energy. In line with UNIDO's priority of providing access to energy for productive uses, most of the projects emphasized and aligned the demonstration projects towards productive activities and energy services (ref: table 6, Section 5.5) making them relevant to UNIDO's strategic priorities. Projects are also relevant to GEF strategic priorities of rural electrification (mini grids and on grid) and CO2 emission reduction by replacing fossil fuel-based electricity generation.

5.3. Effectiveness

Effectiveness is defined as the extent to which the project planned objectives were achieved or expected to be achieved. Effectiveness of RE project can be measured at different levels. As can be seen in the RE programme TOC (Fig. 1), taking the typical components of UNIDO RE projects as outputs, the results can present themselves at 5 different levels of outcomes in order to finally contribute to the overall impact. These key results at the completion of projects can be classified as: (1) changes in policy, legal and regulatory regimes: (2) human capacity and institutional strengthening achieved; (3) new technologies introduced, transferred and adapted; (4) business models introduced and validated; and (5) Partnerships developed.

There are 3 key components in all the projects evaluated: (1) Policy, legal and regulations; (2) Capacity building; (3) Technology demonstration/transfer. Major portion of the funds were allocated to technology demonstration and limited allocation were given to both policy and capacity building components. Due to this reason, most of the resources in terms of money, time and human resources were allocated to technology demonstration component. As many as seven institutions were created to ensure sustainability of project activities. However, there are limited evidence of serious policy and regulatory work in most of the evaluated projects.

Seven out of ten projects assessed were at the satisfactory range at output level. The major component (output) of the RE projects evaluated was technology demonstration or piloting. This means majority of the project resources also allocated to demonstration component. The following table and the chart show the target capacity of demo projects and actual achievement by the time of closure of the projects.

All demonstration plants installed were of smaller capacities mostly less than 1 MW with the exception of Sierra Leone which is one project of 16 MW. The construction of the 16 MW plant is yet be started at the time of evaluation. Government of Sierra Leone and AfDB are responsible for execution of the site. There are 2 villages under threat of inundation and relocation of local people which Government has settled with the communities. This project is an example of UNIDO's role in facilitating or catalyzing partnerships for scaling up RE projects especially SHP while at the same time opportunity to assess UNIDO's own role and scope in involving in large scale interventions especially in the context of PCPs.

Overall, effectiveness at outcome or impact level is not reported at the time of terminal evaluations. Contribution to transformational change from RE projects remains to be assessed. Current approach for project evaluations at the end of project operations (terminal evaluations) does not allow to assess actual achievement of outcome or impact level.

Some evidence of contribution to transformational change can be drawn from the terminal evaluations, as presented in the sections below:

5.3.1 Changes in Policy, regulation and legal frameworks

Overall, the contribution to policy and regulatory framework is minimal. The only projects, which address policy issues were Gambia and Côte d´ Ivoire. Rest of the projects did not address any policy issues. Energy department may consider developing a standardized approach to RE policy and regulation related advisory to member states.

5.3.2 Human and Institutional capacity building:

Apart from few trainings and workshops, capacity building activities included participation in international workshops and study tours, as well as participation in international events by selected officials from counterpart ministries and GEF focal point office on ad hoc basis. There seems to be no systematic approach to long term capacity building.

As many as seven (7) **technology focused centers** were created as part of institution building/strengthening by five (5) RE projects. A list of these centres is provided as table in section 6.5. These centres act as focal point for country-based capacity building activities and some continue to provide technical trainings, information dissemination and awareness creation. They also act as key link between various stakeholders in the particular technology sector. These centres also established sustaining linkages with like-minded international technology centres (e.g, International center for Small Hydro power, Hangzhou) through paid internships and international trainings of their staff.

As part of creating long-term capacity building, a scholarship scheme for Master level students specializing in hydro power was established in Tanzania at the University of Dar es Salam.

Energy Department should continue to support and strengthen these technology centres by linking to umbrella programmes like Global Network of Sustainable Energy Centers (GN-SEC). Technology centers could not only provide technical support to the Regional Sustainable Energy Centers but also strengthen and ensure long-term sustainability of UNIDO interventions in respective countries.

Energy Department may also standardize some trainings and other tools that could be used for long term capacity building of national stakeholders through the Capacity Building component of RE projects in the future.

5.3.3 Viability of demonstration of technologies, technology transfer and local manufacturing

Demonstration projects were pioneering in establishing models in all the countries of intervention. Notably, small island state of Cabo Verde, the project brought electricity access to 6 of the 9 inhabited islands. In Gambia, local women association became RE project developer. Small scale private SHP developers in Tanzania demonstrated different business models.

Demonstration of RE technologies (SHP, Solar PV, bioenergy and wind) under many of these projects proved technical viability and highlighted the necessity for transferring such technologies and building local manufacturing capacities, in order to bring down the cost and removing financial barriers (extra cost of shipment, foreign exchange, import tax etc.). SHP/MHP projects in Tanzania and India, proved that technology transfer can stimulate local manufacturing and replication of MHP technologies in developing countries. Tanzania has produced several small turbines for local use as well as export to neighboring Uganda stimulating a local MHP business.

Table 3: RE capacity target and achievement

Project	**Country**	**KW**		
		Target	*Achieved*	*%*
103023	Gambia	1,300	1,060.70	82
100261	Tanzania	3,200	4,800	150
100264	Thailand			
100223	Cambodia			
100332	Cape Verde	1,600	1203	75
100258	Thailand	1,250	250	20
120182	India	10	10	100
100186	Ivory Coast	350	215	61
100333	Pakistan	2,300	5500	239
100184	Chad	250	121.7	49

Success of technology transfer projects highlighted that UNIDO has a crucial role to play in transferring relevant RE technologies and facilitating local manufacturing, thereby helping developing countries achieving SDG 7 and 9.

Another relevant question that arises from different sizes of demo projects is: what is the range of installed capacities UNIDO should facilitate. Reviewing these 10 evaluations, it was found

that the demo projects vary in capacities between below 100kW up to 16 MW, majority lies below 1 MW capacity. One exception, the 16 MW SHP plant in Sierra Leone, would meet considerable energy demand in the country once realized. However, by the size, it is also associated with issues related to large hydro projects including inundation of villages and relocation of local people. Therefore, it is important for ENE to articulate the scope of UNIDO involvement especially considering relevance of large-scale projects in the context of PCPs.

5.3.4 Business models introduced and proven

Different business models were developed in different projects. Models include public -private partnerships, private sector investments, community and charity based – mini grids, gird connected and captive operations providing specific energy services such as energy for irrigation, Solar water heating in hospitals etc. Some of the lessons learnt are as follows:

a) UNIDO/GEF interventions created awareness among government counterparts and private sector that RE projects can be viable options for providing energy access and achieving some of the SDG goals.
b) GEF grant/subsidy was very critical for successful implementation of demonstration projects;
c) Lack of financing is a real impediment in promoting RE projects in countries of intervention. Even with GEF support, commercial banks were not convinced of the viability of RE projects.
d) Existence of Power Purchase Agreements (PPA) either by electric utility or captive off taker is an important factor for private developers/investors decision making.

5.3.5 Investments mobilized/leveraged

Table 4: Co-financing mobilized

Project	**Country**	**Budget**	**Co-finance (USD)**	
		Mil USD	*Target*	*Achieved*
103023	Gambia	1.758	5,976,030	4,000,000
100261	Tanzania	3.35	9,778,500	
100264	Thailand	2.6	31,623,000	
100223	Cambodia	1.69	4,565,000	
100332	Cape Verde	1.758	6,856,421	60% of target
100258	Thailand	0.975	3,306,800	
120182	India	1 (€)	0	
100186	Ivory Coast	0.863	3,727,270	2,500,000
100333	Pakistan	1.82	5,400,000	5,000,000
100184	Chad	1.758	1,801,364	771,000

In GEF 4 cycle, the financing to be leveraged was 1:4. The co-financing commitments were obtained mainly from Government counterparts. However, co-financing was significantly below expectations. Though, some in-kind contributions were materialized, project monitoring frameworks lacked effective tracking of co-financing and therefore, there is no clear evidence of mobilization of co-financing in most of the projects reviewed. Future project design should incorporate robust monitoring tools to track co-financing by counterparts, partners and investors.

5.3.6. Partnerships developed

Some of the evaluations identified partnerships developed with entities external to UNIDO and partnership for execution with institutions in which UNIDO has links.

Notably, external partnerships developed during the implementation of the projects include that of UNIDO with EU Akwaba in Côte d` Ivoire, United Nations Capital Development Fund (UNCDF) and International Centre for Small Hydro Power (ICSHP) with private developers in Tanzania leading to financial closure of some of the demonstration projects in Tanzania, and partnership with AfDB in Sierra Leone leading to a potential scale up from 1 MW to 16 MW. These partnerships highlighted the catalytic role played by UNIDO in bringing together various players in each country which was instrumental in the successful completion of many demonstration projects.

On the other hand, some of projects execution was handled by Cleaner Production Center (CPC) in Cambodia and Eastern African Centre of Excellence for Renewable Energy and Efficiency (EACREEE) in Cabo Verde. Project Management Unit (PMU) were based in UNIDO office in Thailand, Tanzania, Project in India was directly managed from Vienna through project execution unit (PEU) at the site. There is no further evidence, expect for a reported case of the ITPO Japan involvement in a project in India, of partnership with UNIDO related institutions such as CPCs, ITPOs etc.

5.4. Efficiency

Efficiency indicates how economically inputs are converted into results, including quality and timeliness considerations. Six of the nine projects with a rating were assessed at satisfactory level and three as unsatisfactory. All projects evaluated suffered considerable delays (in the range of 10 to 50 months). All projects were extended at no cost indicating delays were due to implementation issues such as (1) delays in obtaining clearance from the host Government (e.g Thailand), (2) delays in or unable to mobilize co-financing and private sector investments for the demonstration component (e.g Tanzania), (3) lack of counterpart ownership due to change of Government or policies and regulation (e.g Thailand), (4) delays in procurement process and delays in delivery by contractors, (5) force majeure such as Ebola outbreaks (e.g Sierra Leone and Liberia). In general, there seems to be lack of firm co-financing commitments during project approvals and it seems the underlying project design assumption was that co-financing can be mobilized during the implementation phase which proven to be ineffective and contributed to considerable delays in almost all the projects reviewed.

Table 5: Project delays

	Planned Duration	Delay	Effective Duration
		(in Months)	
Gambia	36	39	75
Tanzania	48	46	94
Pakistan	48	36	84
Thailand	48	30	78
Cambodia	48	28	76
Cape Verde	48	36	84
Thailand	36	50	86
India	24	26	50
Côte d´ Ivoire	36	24	60
Chad	30	10	40
Sierra Leone	48	36	84
Liberia	48	36	84

All the projects where within the budget irrespective of the delays, caused due to lack of co-financing. Considerable portion of the funds were utilized for demonstration projects compromising GEF incremental principle (1:4 leveraging of co-financing).

5.5. Sustainability

Sustainability is defined as the continuation of benefits from a project, the probability of continued long-term benefits, and the resilience to risk of the net benefits over time beyond the project completion. Of the reviewed projects, seven (7) projects were rated in the satisfactory range with one project as highly likely. Remaining 2 were rated moderately unlikely and one as unable to assess.

Sustainability of reviewed UNIDO projects may depend on (1) sustainability of demonstration schemes, which in turn depend on the technical and financial viability, business model and management arrangement put in place; (2) sustainability of policy framework; and (3) sustainability of technical support.

Table 6: Productive activities

	Technology	Services & Productive activities
Tanzania	SHP	1. Replacement of diesel generated electricity in cut flower farm/industry; Hospital, Orphanage, Convent, Schools, Skills development work shop 2. Rural Household electricity access, electricity to micro enterprises 3. Sale to Utility (Grid connection)

	Technology	Services & Productive activities
Gambia	Wind +PV	1. Power to repeater stations & Rural health centers 2. Women skills development centre
Côte D´Ivoire	PV	1. Rural household electrification 2. Productive use and community services
Pakistan	Biomass	1. Replacement of fossil fuel-based energy in industry
Cabo Verde	Solar	1. Water pumping for irrigation 2. Ice factory 3. Hot water for Hospitals 4. Rural house hold electrification

It is worth noting that some of the projects have introduced sustainability measures like establishing technology specific centers which are managed and maintained by counterpart organizations. Such technical centers were strengthened to provide continued technical support to beneficiaries of demonstration projects and further capacity building and information dissemination of local stakeholders. Following table gives a list of such centers identified in the respective evaluation reports:

Table 7: List of Technical Centres established under projects

Project	Country	Institutions	Host
100261	Tanzania	SHP tech centre	UDSM, Dar es Salam
100264	Thailand	ASEAN Centre for Cassava R&D	KMUTT, Bangkok
		Training Center for bioethanol production	FIRI, Vietnam
100258	Thailand	Biomass Gassification Learning Centre	CMU, Chiangmai
100328	Sierra Leone	SHP tech centre	University of Sierra Leone
100330	Liberia	SHP tech centre	
100184	Chad	ADER (Chadian RE Development Agency)	Government

As per the terminal evaluation report of the Tanzania project, a notable development in this regard is that the SHP Technology Center in Tanzania had produced a 5-year strategic plan for sustainability and entered into an MoU with EACREEE to support its SHP promotion activities in East Africa.

5.6. Coherence

Coherence is the new criterion established by OECD/DAC to assess the compatibility of the intervention with other interventions in a country, sector or institution. Coherence can be analyzed both at internal and external level. Internal coherence addresses the synergies and interlinkages between the intervention and other interventions carried out by the same

institution/government, as well as the consistency of the intervention with the relevant international norms and standards to which that institution/government adheres. External coherence considers the consistency of the intervention with other actors' interventions in the same context.

There are some positive examples arising from the portfolio, in particular the Terminal Evaluation of project 103023 shows important synergies and collaborations between the project and other national actors within the country. Synergies among UNIDO projects have been positively highlighted in case of project 100332, while the same does not apply to 100223 and partially to 120181.

The above-mentioned examples show that the risk of a silo-approach should be avoided, and more needs to be done to ensure continuity among projects in the same country or area and avoid the risks of duplication and asymmetries.

5.7. Monitoring & Evaluation (M & E)

Even though seven (7) projects received ratings in the satisfactory range with one project receiving highly satisfactory for Monitoring and Evaluation (M&E), out of total ten (10) projects reviewed, only four (4) have specific component on monitoring and evaluation elaborated in the project document. As for the RBM, 7 projects were rated in the unsatisfactory range with 5 of them rated as "Unable to assess" indication of lack of strong monitoring framework and plan in the project documents as well as weak reporting which in a way contradicts the overall satisfactory rating on M&E, since M&E puts together the Monitoring with the Evaluation dimensions. The evaluation report of Côte d'Ivoire project noticed that the monitoring plan for long term changes or impact was not in place. The fact that evaluation took place towards the end of the project, there is no mechanisms in place for such long-term monitoring. Mid-term reviews were undertaken for 6 (FSP) projects.

Table 8: Rating of M & E and Gender

Rating	Design		Gender
	Overall Design	LogFrame	
Highly Satisfactory	3	1	
Satisfactory	1		2
Moderately Satisfactory	2	1	
Moderately Unsatisfactory	1	2	2
Unsatisfactory	2	1	1
Highly Unsatisfactory			
Unable to assess	1	5	5

5.8. Gender mainstreaming

Evaluations of ten (10) projects found that gender was not considered during project design, possibly due to fact that Gender was not in the GEF 4 project design framework. However, evaluators noted in most of the projects that project management was concerned about gender mainstreaming the projects and a number of activities were incorporated during implementation in all of the 10 projects, e.g. consultations with women's associations on women's perspectives on energy needs and particular attention in ensuring participation of women in trainings and CB activities in Cambodia, Chad, Cabo Verde, Gambia and India. This could be attributed to UNIDO policy on gender equality and the empowerment of women and its addendum issued in April 2009 and May 2010[5].

Evaluators of Tanzania and Côte d'Ivoire projects highlighted the benefits of renewable energy brought specifically to women, girls and children in terms of improved life conditions, opportunities for income generation as well as education and health.

In this regard, as shown in table 8 above, out of 5 rated projects, two (2) each were rated as satisfactory, and moderately unsatisfactory while 1 project was rated unsatisfactory. Gender mainstreaming aspects of remaining 5 projects were not rated.

6. Progress towards impact:

Referring to the recreated TOC for the thematic cluster, the contribution of individual projects towards three key intermediate outcomes (1) Strengthened RE institutions; (2) Improved policies and regulatory frameworks; as well as (3) Technical and financial viability can be identified. Following subsections discuss key level 1 intermediate outcomes:

6.1 **Strengthened RE institutions:** As part of the SPWA-CC projects and its coordination project, UNIDO facilitated the establishing of the ECOWAS Center for Renewable Energy and Energy Efficiency (ECREEE) in partnership with ECOWAS and ADA in Cabo Verde. This led to replication of 6 other such Regional Sustainable Energy Centers and the formation of the Global Network of Sustainable Energy Centers (GN-SEC) for coordination. These SECs are well regarded by donor community and channeling development resources on regional programmes. SECs are also instrumental in harmonization of regional energy policies and effective in creating regional strategies. ECREEE became executing agency for Cabo Verde Project (100332) and Gambia (103023). As mentioned above, also several projects contributed to the establishment of RE technical centres at the country level. The SHP technology Centre in Tanzania (100261) is supporting the EACREEE in SHP capacity building in East Africa.

6.2 **Improved policies and regulatory framework:** At country level, project 100186 in Côte d'Ivoire output "diagnostic study of the regulatory framework" had considerable impact on the national RE policy and Regulatory scene as it was instrumental in writing and legislating the regulations on renewable energy by Ministry of petroleum and energy and also establishing a special fund for promotion of RE in the country. These steps can lead to further replication and scaleup of RE in the country. In Chad (100184), the project facilitated drafting of the "Rural Electrification policy" and the draft "Law of

[5] UNIDO/DGB(M).110 and UNIDO/DGB(M).110/Add1.

Electrification" and submitted to ADER for validation and legislation. Similarly, in Gambia (103023), project developed Renewable energy law and supporting policy and action plan as well as standard power purchasing agreements for renewable energy projects.

6.3 **Technical and financial viability:** In countries, where strong policy and regulatory frameworks exist, such as Tanzania (100261) where renewable energy policy is adopted and Rural Electrification Agency is created for supporting energy access as well as feed in tariff is also instituted, the major hurdle faced by developers and private investors is lack of access to financing. GEF project has helped some of the demonstration sites to achieve financial closure with mobilizing funds from REA and UNCDF to augment private investments and GEF grant incentive. UNIDO/GEF intervention thus facilitated a level playing field for RE technologies.

Establishment of technology specific institutions (ref: table 7, section 5.5) managed by key counterpart agencies will ensure continued capacity building and information dissemination as well as possible monitoring of outcomes and impact. In addition, transfer of technology and adaptation as well as related capacity building (100261 and 100264) had removed certain technology barriers ensuring rapid progress towards their levels of outcomes and possibly impact.

As the analysis shows, several of the evaluations found contributions of UNIDO RE projects beyond outputs in all key outcome areas and levels.

7. Key conclusions:

1. Oil price can be a key external factor affecting the promotion of RE, especially biomass technologies in the industrial sector. This is a key aspect to be considered during planning and design stage as well as adaptive management of RE projects (100223: section IV, 100333: Section 3.4.2)
2. GEF/UNIDO renewable energy interventions were assessed as very relevant to the energy context of the countries of intervention. These interventions helped the countries to build foundations for achieving their RE policy commitments (100332: section 3.2& 5.1, 100184: section 3.1.1 &4.1).
3. Transfer of relevant and appropriate technologies can bring down the cost of RE technologies, help local manufacturing and create businesses and jobs in developing countries. UNIDO is in a good position to facilitate such technology transfer (100261, 100223).
4. Monitoring frameworks need to be strengthened to account for tracking of co-financing contributions and private sector investments mobilized by projects.
5. M & E frameworks and plans do not include long term impact monitoring and financial resources no longer available from project make Impact monitoring difficult (100186).
6. Design, RBM and the M & E frameworks of projects need attention and further improvements.

8. Major lessons learned:

There were 36 lessons learnt gathered from 12 RE projects evaluations. These lessons were reviewed and captured under four categories:

8.1 Project design

8.1.1 There is a need to make the design of projects robust by giving special attention to: (a) selection of partners and their roles with a view to avoid conflict of interest and ethical contradictions; (b) realistic estimate of scope of work and work plan and timeframe; (c) challenges of doing business in the target country; and (d) constraints in electricity networks and energy supply, demand and distribution scenarios.

8.2 Results

High level Government commitment and coordination among several ministries is essential for renewable and clean energy development in any country. This need to be considered at every stage of the project.

8.2.1 Outputs for policy improvements should be defined only in terms of delivery of recommendations or inputs supporting decision making process and limited to promoting changes only.

8.2.2 Outputs aimed at private sector participation should be based on viable business models and carefully formulated, considering real needs, expectations and business orientation.

8.2.3 For demo/pilot components, detailed analysis of policy and regulatory regimes and articulation of ownership is essential during design stage itself.

8.2.4 One should be realistic about a country's ability to commit cash and in-kind co-financing. Co-finance should be ensured and be available at the start of the project. When counterpart funding not forthcoming, private sector investment should be sought. It is important to make it a precondition for the project developer to either submit performance bond or deposit part of the co-finance prior to project commencement.

8.2.5 Monitoring mechanism should be incorporated for regular reporting of co-financing from partners. In that connection, in-kind co-finance should be clearly articulated in the Project Document with respective activities listed (for instance: office space, lending personnel etc.).

8.3 Efficiency

8.3.1 Major cause of delay in demo/pilot projects is due to difficulties in mobilizing co-financing. In addition, changes in Government also can cause changes in priorities and need extra efforts, which causes delays. Prolonged start up time (long project development and approval, delay in starting the project pending Government clearance etc.,) can also cause delays.

8.4 M & E

8.4.1 A Mid-term review is of utmost importance as a tool to steer the project in the right direction, especially if unexpected situations that ought to be corrected appear during project implementation (lack of major co-financing, Ebola etc.).

8.4.2 M&E and periodic reporting (against Project Log frame and a formal M&E plan) should have greater emphasis during implementation.

9. Areas for improvement

9.1 Quality assurance:

Thorough technical and methodological review of project document during the approval process to ensure quality of designs. Particular attention to be given to technology transfer projects to ensure that the project is designed and technology selected based on a Technology Needs Assessment (TNA).

9.2 M & E

Sufficient resources must be allocated for M & E activities including design of M & E plans, comprehensive monitoring as well as impact assessment. In addition, funds must be allocated for providing appropriate training to PMU team on RBM, M & E and outcome-oriented reporting.

9.3 Project management

- UNIDO and Project Developers need to ensure that the user manuals are provided in the local language and English as appropriate.
- UNIDO should streamline the equipment and service supply process to ensure elimination of project delays due to processes.
- A project exit strategy must be incorporated in the project document to deal with possible incomplete outputs and pending pilot projects.
- When using UNIDO partners or UNIDO established institutions for execution, insist that they follow the approved Prodoc and logframe as well as M & E plans as much as possible.

9.4 Co-financing

There is a need to establish reporting mechanism to capture co-financing from donors, counterparts and investors on a regular basis;

If co-financing from the developers or the Government is not materialized in reasonable time, other potential investors need to be identified without further delays. In the case of developing or least developed countries where it is difficult to find financing, seek donor support for funding demonstration of technologies.

9.5 Technology transfer

While designing technology transfer projects considerations should be given to (a) technology selection based on technology needs assessments in particular the identification of concrete and realistic productive uses; (b) identification of potential local manufacturers/adapters and service providers; and (c) possibilities of south-south transfer and collaboration potential as well as (d) adequate duration of projects to accommodate such time-consuming activities.

Follow up projects to support and replicate transferred and locally manufactured technologies need to be devised based on availability of funds.

9.6 Policy & regulations

Improve policy, legal and regulatory regime to foster contribution of small and medium RE solutions in supporting Governments energy sector goals.

Annex 1: Thematic review of UNIDO Independent Evaluations on renewable energy projects

Terms of Reference (Jan 2020)

Background

For the last few years, UNIDO Member States and Senior Management have called for a greater emphasis on reporting and demonstrating the results and performance of UNIDO's Technical Cooperation activities at corporate level in a more systematic and aggregated manner. The *Strategic Guidance Document* on the future of UNIDO in 2013 asked the UNIDO Secretariat to"… provide consolidated reports at regular intervals …" to demonstrate development impact[6]. In 2015, the medium-term programme framework, 2016-2019 introduced an innovative tool, the integrated results and performance framework (IRPF) to help UNIDO manage for results and demonstrate its results and performance at corporate level[7]. In 2017, the medium-term programme framework, 2018-2021 emphasized the importance for"… the Organization to monitor, respond to and demonstrate tangible results … and to analyse and report the progress in organizational performance at all levels of the Organization" based on the IRPF as the corporate long-term results framework[8]. This gap for results and performance at corporate level has also echoed the findings from a number of independent evaluations by the UNIDO Independent Evaluation Division (EIO/IED) in the last years. To contribute to the efforts, EIO/IED will prepare a thematic review from independent evaluations of UNIDO renewable energy projects. The resulting lessons, findings and key recommendations will enable EIO report the learnings to the UNIDO Executive Board (EB) and to management of the respective thematic area.

Some of such thematic clusters that could be reviewed may include renewable energy (RE), Clean Tech (GCIP), POPs, Mercury, Resource Efficient and Cleaner Production (RECP), Ozone-depleting Substances (ODS), National Quality Infrastructure (NQI), Fisheries, Leather to mention a few and subject to availability of reasonably sufficient number of project evaluation reports.

Since 2010, UNIDO evaluation function has consistently taken stock of past independent evaluations and has consolidated key findings and lessons into synthesis reports to promote learning at UNIDO and an independent and systematic aggregated overview of relevance, effectiveness, efficiency, sustainability, impact and other cross-cutting dimensions of UNIDO programmes and projects evaluated. Building on those past efforts to aggregate and provide

[6] UNIDO 2013, Strategic Guidance Document: https://www.unido.org/sites/default/files/2013-06/idb41_24e_0.pdf
[7] UNIDO 2015, Medium-term programme framework, 2016-2019. https://www.unido.org/sites/default/files/2015-04/pbc31_9en_0.pdf
[8] UNIDO 2017, Medium-term programme framework 2018-2021 Proposal on "Strengthening knowledge and institutions". https://www.unido.org/sites/default/files/2017-05/IDB.45_8_Add.2_2__E_Medium-term_programme_framework_2018-2021_1703143E_20170522__0.pdf

synthesis learnings, this exercise aims to look at independent evaluations with focus on specific **thematic clusters** for informing UNIDO and to further contribute to improve the organization's programmatic performance and impact by identifying and capturing accumulated knowledge on UNIDO's work, with a more strategic or systemic manner. Synthesizing existing evaluation reports, together with latest research thinking allows evaluation evidence to feed into UNIDO's decision-making process in a more effective way.

The output document of these reviews may substitute individual summary briefs of Independent Project Evaluation reports to EB since they will provide a strategic/corporate perspective.

Objectives, scope and key questions

The purpose of the study is to synthetize key findings, lessons learnt and recommendations from existing independent evaluations conducted in **the renewable energy** thematic cluster. The output document will facilitate learning and wider use of evaluation findings by identifying and capturing accumulated knowledge from independent evaluations.

The report has the following objectives:

- To review and synthetize the performance, lessons learnt and recommendations from eleven (11) RE projects evaluated between 2016 and 2019;
- To identify key lessons, areas for improvement and systemic issues on that thematic area. (e.g. monitoring and evaluation of RE projects, UNIDO reporting needs (IRPF));
- To generate recommendations and possible actions to help UNIDO senior management and the concerned substantive department(s) to further improve its performance and results.

The scope of the exercise will cover eleven independent project evaluations conducted by UNIDO EIO/IED between 2016 and 2019. The total budget of the 11 projects is around USD 20.6 million, nine of them funded by the Global Environment Facility (GEF), one by the EU and one by Japan (see the full list in Annex 1).

The primary audience of the report is the EB and the management of the Department of Energy (PTC/ENE).

The report will seek to answer the following questions:

1. Which are the reiterative areas that work well in terms of relevance, effectiveness, efficiency, sustainability, impact, design, M&E and gender mainstreaming? Which doesn't? why?
2. What have been the key features of RE projects related to results (output, outcome and impact)? The analysis includes, but is not limited to the following questions:
    i. Did the project utilize UNIDO's strategic assets and to what effect? (e.g., CPCs, ITPOs, Technology centers).

ii. Did the project contribute to long-term capacity building of the country and what systems put in place for that purpose?
iii. How did the projects ensure sustainability of results?
iv. Did the projects mobilize/leverage funds/investments as planned?
v. What is the contribution of the projects towards partnerships development?
vi. What is the contribution of the project towards policy development?
vii. What was the nature of UNIDO F/O and PMU arrangement/relationship?
viii. Any best practices on project ownership and stakeholder relations.

3. To what extent do the completed projects achieve their expected results? What are the systemic issues?
4. What are the external factors enabling or hindering progress towards impact?
5. What is the quality of project M&E[9]? To what extent did M&E of evaluated projects help the project management to manage for results? What good M&E practices are evident from UNIDO projects? What are the factors promoting or hindering a good M&E system at project level?
6. To what extent the thematic area aligned with UNIDO's mandate (ISID) and with SDGs?
7. What are the systemic opportunities, lessons, learning opportunities and issues emerging from the evaluations?

Approach and methodology
The study will be undertaken by means of a desk review of the Independent Evaluation reports of the renewable energy projects issued between 2016 and 2019.

Team composition
Under the overall guidance of the Chief of the Independent Evaluation Division (EIO/IED), an assigned Evaluation Officer will undertake this task. He/She will be supported by colleagues in EIO/IED as needed.

Work Plan
The synthesis review will take place from February to March 2020.
1. Desk review
2. Data analysis and draft output document preparation for review
3. Preparation and finalization of knowledge product and dissemination

Tentative timeline

Timelines	Tasks
End of January 2020	Draft ToR
1st Week February 2020	ToR cleared by Director, EIO
February 2020	Desk & literature review, Zero draft Output and peer reviews

[9] The emphasis will be on Monitoring, Reporting and Review by project management.

Timelines	Tasks
Mid-March 2020	Submit draft report to Chief, EIO/IED for review
End of March 2020	Send final draft to Chief, EIO/IED for submission to Director EIO for final review and clearance

Annex 2: List of RE projects evaluated 2016 and 2020

#	Project ID	Title of evaluation report	Year of publication	Country	Budget (USD)	Donor
1	103023	Independent terminal evaluation. Promoting renewable energy-based mini grids for productive uses in rural areas in the Gambia	May-18	Gambia	1,809,012	GEF/ SPWA
2	100261	Mini-grids based on small hydropower sources to augment rural electrification in Tanzania	Apr-19	Tanzania	3,381,385	GEF
3	100264	Overcoming policy, market and technological barriers to support technical innovation and south-south technology transfer: The pilot case of ethanol production from cassava	Aug-19	Thailand	2,640,981	GEF/ Poznan
4	100223	Climate change related technology transfer for Cambodia: Using agricultural residue biomass for sustainable energy solutions	Oct-19	Cambodia	1,690,000	GEF/ Poznan
5	100332	Promoting market-based development of small to medium-scale renewable energy systems in Cape Verde	Oct-19	Cape Verde	1,805,722	GEF/ SPWA
6	120182	Promoting Ultra low-head Micro Hydropower Technology to Increase Access to RE for Productive Uses in India	Nov-16	India	1,060,000	GOJ
7	100258	Promoting Small Biomass Power Plants in Rural Thailand for Sustainable Renewable	Apl-19	Thailand	994,198	GEF

#	Project ID	Title of evaluation report	Year of publication	Country	Budget (USD)	Donor
		Energy Management and Community Involvement				
8	100186	Promoting RE based grids in rural communities for productive uses in Côte d`Ivoire	Aug-16	Côte d` Ivoire	863,691	GEF/ SPWA
9	100184	Promoting RE based Mini-grids for rural electrification and productive use in Chad	May-16	Chad	1,758,182	GEF/ SPWA
10	100333	Promoting sustainable energy production and use from biomass	Mar-20	Pakistan	1,820,000	GEF
11	100328	Promoting Mini Grids Based on Small Hydro Power for Productive Uses in Sierra Leone		Sierra Leone	1,800,004	GEF/SPWA
12	100330	Installation of Multi-Purpose Mini-Hydro Infrastructure (for Energy and Irrigation)		Liberia	1,791,186	GEF/SPWA

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