



## **Terminal Evaluation Report:**

### **“Small Decentralized Renewable Energy Generation (DREG)” Project, Lebanon**

**(PIMS 4695; GEF 4749)**

**Report Submitted to  
UNDP, Lebanon**

**Terminal Evaluation Duration: August – October 2018**

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### **Disclaimer**

*The analysis and recommendations of this report do not necessarily reflect the views of the United Nations Development Programme, its Executive Board or the United Nations Member States. This publication reflects the views of its author.*

### **Acknowledgements**

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## LIST OF ACRONYMS

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BdL	Central Bank of Lebanon
BoT	Build, Operate and Transfer
BMU	German Federal Environment
CEDRO	Country Energy Efficiency and Renewable Energy Demonstration Project for the Recovery of Lebanon
CO	UNDP Country Office
CO <sub>2</sub>	Carbon Dioxide
CoM	Council of Ministers
CSP	Concentrating Solar Power
EdL	Electricité du Liban (publicly-owned utility state utility for electricity in Lebanon)
EE	Energy Efficiency
EENS	Expected Energy Not Supplied
EU	European Union
GDP	Gross Domestic Product
GEF	Global Environment Facility
GHG	Green House Gas
HQ	UNDP Headquarters
IEA	International Energy Agency
ICT	Information and Communication Technology
LECB	Low Emission Capacity Building
LCEC	Lebanese Centre for Energy Conservation
LGBC	Lebanese Green Building Council
LOLE	Loss of Load Expectation
M&E	Monitoring and Evaluation
MoEW	Ministry of Energy and Water
MRV	Monitoring, Reporting and Verification
MTR	Mid-Term Review
NAMA	Nationally Appropriate Mitigation Action
NEEREA	National Energy Efficiency and Renewable Energy Action
NGO	Non-Governmental Organisation
NIM	National Implementation Modality
ODS	Ozone Depleting Substance
O&M	Operation & Maintenance
PIR	Project Implementation Review
PMU	Project Management Unit
PPG	Project Preparation Grant
PPP	Purchasing Power Parity
PSC	Project Steering Committee
PV	Photovoltaic
QPR	Quarterly Progress Report
RCU	UNDP Regional Coordination Unit
RE	Renewable Energy
RET	Renewable Energy Technology
RTA	Regional Technical Advisor
SWH	Solar Water Heater
TE	Terminal Evaluation
TPR	Tripartite Review
TTR	Terminal Tripartite Review
TWh	Terawatt hour

WB	World Bank
UNDAF	United Nations Development Assistance Framework
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change

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## EXECUTIVE SUMMARY

### Project summary table

**Table 1: Project Summary**

Project Title:	Small Decentralized Renewable Energy Power Generation			
			<i>at endorsement (USD Million)</i>	<i>Realized at completion (USD million)</i>
GEF Project ID:	4749	GEF financing:	1.45	1.45
UNDP Project ID:	4695	IA/EA own:	5.209802	5.862
Country:	Lebanon	Government:	3.592750	5.420
Region:	Arab States	Others:	0.334	0.334
Focal Area:	Climate Change	Total co-financing:	9.136552	11.616
FA Objectives, (OP/SP):	CCM-3	Total Project Cost:	10.586552	10.066
Executing Agency:	Ministry of Energy and Water	GEF endorsement:	Feb 2012	
		ProDoc Signature (date project began):	11 February 2014	
Other Partners involved:	Council for Development and Reconstruction	(Operational) Closing Date:	Proposed 30 Sep 2018	Actual 30 Sep 2018

### Introduction and brief description of the project

The project, “Small Decentralized Renewable Energy Generation (DREG)” in Lebanon, was implemented to reduce the emissions of GHGs while simultaneously addressing the problem of shortage of electricity in the country. The objective of the project was to catalyse the development of the small, decentralized, grid-connected renewable energy power generation market in Lebanon. This was to be achieved by removal of the barriers. The project was also to lead to reduction in GHG emissions as a result of implementation of the renewable energy based electricity generation projects/systems.

The objective of the project was to be achieved by removing the barriers. RE technologies face a range of barriers to achieve wide-scale deployment and maturity of the market. The most common barrier however is the cost of the technology followed by the absence of lack of “RE-friendly” grid codes and power purchasing arrangements. Furthermore, in many countries, policy makers, potential investors and the general public are not yet sufficiently aware of the current costs and opportunities provided by RE technologies. Therefore, as in the case of the DREG project, complementary marketing and public awareness-raising activities are typically included in RE promotion activities. Accordingly, the project was structured to deliver the following three outcomes;

**Outcome 1:** Investments in decentralized renewable energy power generation increased

**Outcome 2:** A supportive policy and regulatory environment enforced for attracting investments for privately-owned, grid-connected renewable energy power generation

**Outcome 3:** Monitoring and quality control of RE-based decentralized power generation introduced and sustained

The project has been designed as a full-sized GEF project with the planned funding as follows:

- Regular UNDP (TRAC), USD 125,000
- Other UNDP, USD 6,257,000
- GEF financing of USD 1,450,000
- In-kind contribution by government USD 500,000
- Other Cash contribution USD 4,734,000

The project document was signed in February 2014. However, actual implementation of the project could only be started much later in September 2014<sup>1</sup>. The inception meeting of the project happened in April 2015. As a result of the inception, the project objective-level indicators were revised. A few other small changes in the results framework (particularly the approach for the implementation of Outcome 1) were also carried out at the project inception stage. These changes in the result framework were presented and adopted during the Project Inception Workshop. The implementation of the project was to be carried out within 4 years. Accordingly, the scheduled project end date (as per the Project Document) was December 2017. An extension of 9 months in the project implementation timeline was provided to compensate for the delayed start of the project implementation. Accordingly, the project's end date was set for 30<sup>th</sup> September 2018. The Mid-Term Review of the project was completed in February 2017.

The project has been nationally executed by the Ministry of Energy and Water along with the Lebanese Centre for Energy Conservation using the Support to National Implementation Modality (NIM) where UNDP is fully responsible for the financial and technical implementation of the project. Table 2 provides the results framework of the project along with its planned outputs.

**Table 2: Results Framework of the project (As updated at the time of Project Inception)**

Outcome	Indicator	Baseline	Targets	Outputs
<b>Project Objective</b>  Reducing greenhouse gas emissions by the removal of barriers to widespread application of decentralized renewable energy based power generation.	Amount of reduced CO <sub>2</sub> emissions by the investments facilitated by the project  Cumulative renewable energy capacity installed and operational (MWp)  Cumulative renewable energy generation (MWh/year)	0  0 MW  0 MWh/Yr.	Direct: 35,500 tonnes of CO <sub>2</sub> (eq.) over the 20-year default lifetime of the investments made during project implementation.  1.75 MW  3.285 MWh/Yr.	
<b>Outcome 1:</b>  Investments in decentralized renewable energy (RE) power	Volume of investments mobilized	0	US\$ 8.75 million	1.1: Approved and operational financing scheme tailored to support small, decentralized RE investments for power generation by building on the already-operational National Energy Efficiency and Renewable Energy Account (NEEREA), with completed

<sup>1</sup> The delay in initiation was mainly because of delays by the Council of Ministers to approve the project given that there was no government at the time.



Outcome	Indicator	Baseline	Targets	Outputs
generation increased				implementation of selected pilot and demonstration projects. 1.2: Developed complementary funding scheme that can continue to facilitate RE investments after the project ends, leveraging funding through climate finance (NAMAs, voluntary carbon market) and other sources.
<b>Outcome 2:</b>  An enforced supportive policy and regulatory environment for attracting investments for privately owned, grid-connected power generation by RE sources	Extent to which RE policies and regulations are adopted and enforced	Regulations for feed-in tariffs and net metering under consideration	Net metering effectively implemented and complemented with other required regulations and/or guidance, including updated technical guidelines for grid connection as well as adopted standards and procedures for performance testing and quality control. Mechanism and guidelines for the implementation of feed-in- tariffs developed.	2.1: Completed analysis of possible technical constraints associated with connecting new decentralized RE power generation units onto the grid. 2.2: Updated and harmonized technical guidelines for connecting small decentralized RE plants onto the grid and for ensuring their problem-free operation. 2.3: Finalized proposal and draft legal/regulatory package to complement the already-initiated amendments to Law #462, which besides net-metering would allow small decentralized RE producers to sell any excess electricity to the grid, addressing issues such as required licenses, purchase obligations of the utility, mechanisms for administering and setting national feed-in tariffs and other possible financial and/or fiscal support mechanisms. 2.4: Enhanced knowledge of the cost efficiency of different RE and EE measures at the macroeconomic and final consumer level. 2.5: Amended construction and building management norms to promote increased application of different solar energy technologies in buildings' energy supply.
<b>Outcome 3:</b>  Monitoring and quality control for RE-based decentralized power generation established and operational	Availability of annual market data; Verified customer satisfaction with the RE technologies in use	No adequate market monitoring and quality control mechanisms in place	Availability of annual market data for new sales, total installed capacity and net production of all main RE applications sold in Lebanon by March/April each year. Over 70% customers satisfaction on the RE installations made.	3.1: Completed public awareness-raising campaigns, seminars, published and disseminated stakeholder group-specific technical guides, handbooks and other related training materials on the design, evaluation, financing, installation, operation and maintenance of the targeted RE technologies. 3.2: Adopted and operational quality control scheme with related market surveillance and enforcement mechanisms for both the targeted RE products and installations. 3.3: Completed complementary training and other capacity development programmes for professional groups that are directly affected by the proposed quality control schemes. 3.4: Agreed methodology and institutional arrangements for market monitoring. 3.5: Annual market monitoring reports on the installed capacity and electricity produced by renewable energy and the institutional

Outcome	Indicator	Baseline	Targets	Outputs
				and financial arrangements in place to continue the market monitoring after the project. 3.6: Regularly updated project website and interactive online training tool that can continue to operate after the project.

With the project coming to an end, a ‘Terminal Evaluation’ of the project has been carried out. This document provides the findings of the ‘Terminal Evaluation’ of the project. This terminal evaluation report is structured around the five UNDP/GEF evaluation criteria: Relevance, Effectiveness, Efficiency, Results/Impacts and Sustainability.

Summary of assessment regarding attainment of the results and objectives of different components of the project and the project at an aggregate level is given in Table 3.

**Table 3: Summary of Attainment of Outcomes and the Project Objectives**

Project Objective / Outcome	Rating
<b>Project Objective:</b> Reducing greenhouse gas emissions by the removal of barriers to widespread application of decentralized renewable energy based power generation	S
<b>Outcome 1:</b> Investments in decentralized renewable energy (RE) power generation increased	S
<b>Outcome 2:</b> An enforced supportive policy and regulatory environment for attracting investments for privately owned, grid-connected power generation by RE sources	S
<b>Outcome 3:</b> Monitoring and quality control for RE-based decentralized power generation established and operational	S

## Evaluation Ratings

As per the requirements of the TOR for Terminal Evaluations, Table 4 provides the ratings for relevance, effectiveness, efficiency, sustainability, and impacts of the project. The Table also provides the ratings for Monitoring and Evaluation (M&E), Implementing Agency (IA) & Executing Agency (EA) Execution, and Assessment of Outcomes. Ratings have been provided using the obligatory GEF rating scale.

**Table 4: Terminal Evaluation Ratings**

1. Monitoring and Evaluation	Rating <sup>2</sup>	2. Implementing Agency (IA) & Executing Agency (EA) Execution	Rating
M&E design at entry	S	Quality of UNDP Implementation	S
M&E Plan Implementation	S	Quality of Execution - Executing Agency	S
Overall quality of M&E	S	Overall quality of Implementation / Execution	S
3. Assessment of Outcomes	Rating <sup>3</sup>	4. Sustainability	Rating <sup>4</sup>
Relevance	R	Financial resources	L
Effectiveness	S	Socio-political	L
Efficiency	S	Institutional framework and governance	L
Overall Project Outcome Rating	S	Environmental	L
		Overall likelihood of sustainability	L

<sup>2</sup> Ratings for Outcomes, Effectiveness, Efficiency, M&E, I&E Execution: Highly Satisfactory (HS): no shortcomings; Satisfactory (S): minor shortcomings; Moderately Satisfactory (MS) 3. Moderately Unsatisfactory (MU): significant shortcomings; Unsatisfactory (U): major problems; Highly Unsatisfactory (HU): severe problems

<sup>3</sup> Ratings for Relevance; Relevant (R)

<sup>4</sup> Ratings for Sustainability: Likely (L): negligible risks to sustainability; Moderately Likely (ML): moderates risks; Moderately Unlikely (MU): significant risks; Unlikely (U): severe risks

## Summary of Conclusions

At the time of design of the DREG project, the CEDRO project, which focused on the demonstration of RE in Lebanon, was already underway. While the pilot demonstration projects (solar PV) under CEDRO (phase I to Phase III) were financed with 100% grant, with public buildings as beneficiaries, the DREG project was targeted to promote RE technology in the private sector with minimal grant and soft loan from NEEREA. One of the significant achievements of the DREG project has been that it has led to a situation where the private sector enterprises have started considering solar PV technology as one of the main sources for meeting their electricity requirements to the extent possible (given the load curve of the enterprise and the intermittent nature of solar PV electricity generation). Thanks to the reduction in the capital cost of solar PV, coupled with promotional and demonstration activities undertaken by the DREG project, the private sector enterprises in Lebanon are now ready to put up solar PV-based electricity generation systems without any subsidy or grant on the capital cost, however, some technical assistance and subsidised loans would still be required.

The stated objective of the project was, “Reducing greenhouse gas emissions by removal of barriers to widespread application of decentralized renewable energy based power generation”. However, the project design, right from the beginning, was biased towards solar PV technology. This is quite evident from the PIF, PPG grant and the project document. Due to this reason, the project failed to demonstrate and promote other (other than solar PV) DREG technologies.

One of the specific achievements of the project is the introduction of a curriculum regarding solar PV technology in the technical education system which will ensure the availability of skilled human resources to ensure widespread application of solar PV technology in the country. One of the other achievements of the project along with the other RE projects (which were implemented during the same time period and followed a collaborative approach) is the establishment of the ‘net metering’ policy for the grid-connected solar PV-based decentralised power generation. One of the issues where the project has fallen short of achieving the success is the establishment of a policy for ‘feed-in-tariff’ for RE-based decentralised power generation. The issue of ‘feed-in-tariff’ was addressed both at the time of the project inception and the MTR, wherein it was pointed out that given the current situation in the country, it would not be possible to get the policy on ‘Feed-in-tariff’ approved. The DREG project has been able to address the barriers as far as decentralised grid-connected solar PV power projects are concerned. The project has led to significant (exceeding the target) reduction in direct GHG emissions.

The project design was well thought of and targeted towards different barriers to DREG projects in Lebanon. However, the project design suffered due to the fact that while the project was meant to support all the RE sources, emphasis remained on solar PV.

## Recommendations

**Recommendation 1:** The project design as presented in the ‘Project Document’ did specify the expected set of Outputs for each of the Outcome of the project. However, the expected outputs did not find their required place in the log-frame of the project. Indicators were provided at the outcome level, whereas the work planning of the project was done at the Output level. The monitoring (PIRs) of the progress of the project was done as per the results framework of the project. As all the activities / Outputs did not get covered in the results framework, some of the important activities (as provided in the Outputs) gets missed out in the monitoring / PIRs. It is recommended that for the future project design, the Indicators in the results framework be fixed at both the Outcome level and the Output level.

**Recommendation 2:** The three indicators for the project objective (GHG emission reduction, Capacity of RE, and RE generation) were very closely interrelated. Thus, the additional indicators did not serve any purpose. Considering that the objective of the project on the one hand was “Reducing greenhouse gas emissions” while on the other it was, “removal of barriers to widespread application of decentralized renewable energy based power generation”, an indicator which indicates the removal of barriers or widespread application of DREG

would have been more appropriate (instead of capacity of RE). Having said that, it is appreciated that having an appropriate indicator to indicate removal of barrier or wide spreading of DREG in itself is a big challenge. It is recommended that to the extent possible, the indicators of the 'Project Objective' should be independent of each other.

**Recommendation 3:** The project has not been able to support other DREG technologies (other than solar PV). As a result, it is a missed opportunity to showcase/promote different RE technologies. It is recommended that in case of involvement of multiple technologies/sectors, the project design should specify different technologies/sectors to be demonstrated (by pilots), and should have provisions for a different set of efforts which would be required to promote/demonstrate such technologies. Different types and levels of technical support are required for promotions/demonstration of different type of RE technologies. Any future project design for the promotion/demonstration of DREG should either be technology specific or should clearly state the technologies to be used for different pilot projects.

**Recommendation 4:** The project design had provisions like technical support, grants and soft loans for supporting the implementation of the DREG pilot projects. The kind and extent of support was uniform all across the RE technologies. It is recommended that the project design should also have technology-specific provisions for supporting the kind of RE technology to be demonstrated by way of pilots. For example, for the technologies which are not presently demonstrated in the country, there can be a provision to have a study tour of the prospective beneficiaries to the countries where such technologies are already in use. In addition, for the pilot projects based on RE technologies where sufficient technical expertise may not be available within the country, it would help to take on board 'International Technical Experts'.

**Recommendation 5:** There are some very good case studies from the DREG project to demonstrate financial feasibility of solar PV technology (particularly considering the reduction in the capital cost of solar PV). This may be used to achieve replication of the solar PV on a larger scale.

**Recommendation 6:** The project has prepared quality standards for a number of solar PV equipment which are already with the government for approval by way of a decree. Efforts may be continued to achieve this.

**Recommendation 7:** Whenever, an opportunity for a new RE project in Lebanon arises, the project design may support formulation of regulations and establishment of the electricity regulatory authority. This will not only help decentralised renewable energy generation, but will also help the establishment of Independent Power Producers (including those for RE).

**Recommendation 8:** Soft loans from the central bank are a very effective fiscal instrument for the promotion of RE technologies. However, it takes a considerable amount of time for approval of the soft loans, thereby delaying the projects. There is a need to optimise the process at the level of the central bank so that the overall time taken is reduced. The government counterpart may explore the possibilities to optimise the process at the level of the central bank.

# 1. INTRODUCTION

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## 1.1 Context, purpose of the terminal evaluation and objectives

The project, “Decentralised Renewable Energy Power Generation Project” (DREG Project) in Lebanon was aimed at catalysing the development of the small, decentralized, grid-connected renewable energy power generation market in Lebanon.

The project was to support the required background analysis, consultations, awareness-raising and capacity building of the key stakeholders to allow the drafting of the new regulations and facilitate their effective adoption and implementation. The project was also to build on and improve the initial analysis done in the framework of the CEDRO project. The project was also to address typical technical, legal, and regulatory barriers to successful development of the small decentralized RE-based power generation.

The ‘Decentralised Renewable Energy Power Generation Project’ (DREG) was initiated in the year 2014. The duration of the project was four years. Based on the the recommendations at the time of the Mid-Term Review, the timelines for the project were extended up to September 2018. The project has been implemented with funding from the Global Environment Facility (GEF) and the United Nations Development Programme (UNDP). With the project approaching its end, a terminal evaluation of the project has been carried out. This is as per the standard practice for all UNDP-GEF projects. The UNDP CO invited an independent international consultant to carry out the Terminal Evaluation of the project as per the scope and terms of reference given in **Annex A**. The broader defined objectives of the terminal evaluation were as follows:

- To compare planned outputs of the project to actual outputs.
- Identify (if applicable) the causes and issues which contributed to non-achievement of the targets of the project.
- Draw lessons that can both improve the sustainability of benefits from the project, and aid in the overall enhancement of UNDP programming.

The consultant, Dinesh Aggarwal (India), was selected and contracted by the UNDP, Lebanon country office (CO) to carry out the terminal evaluation.

## 1.2 Scope and methodology of the terminal evaluation

The evaluation has been carried out in accordance with the UNDP-GEF Guidance for Conducting Terminal Evaluations of UNDP-supported Projects, as provided in the ‘Handbook on Planning, Monitoring and Evaluating for Development Results’. Prior to the start of the Terminal Evaluation, an inception report was prepared and shared with the UNDP CO in Lebanon and the project team. The inception report provided the outlines of the approach and methodology to be followed while carrying out the evaluation. It also provided the proposed timelines for the evaluation. The inception report included a table providing the criteria for the evaluation and the list of main evaluation questions. The table of terminal evaluation criteria and the questions is given in **Annex B**. Accordingly, the methodology for carrying out the Terminal Evaluation was comprised of following activities:

- **Review of Documents:** Review of ‘Project Design Document’ and all relevant sources of information including documents prepared during the preparation phase. This included the review of information about the project on UNDP’s website. The review of documents included a review of financial data, the mid-term evaluation report, a sample of back-to-office reports, samples of project communication material etc. **Annex C** provides the list of documents reviewed.
- **Mission to Lebanon, interviews with stakeholders and site visits.** A mission to Lebanon was undertaken from the 17<sup>th</sup> of September 2018 until the 21<sup>st</sup> of September 2018. The mission started with

a briefing by the UNDP CO and the project team. The mission concluded with a presentation regarding the initial findings. During the mission, interviews with different stakeholders and project participants were carried out. The mission included site visits to the solar PV pilot projects supported by the DREG project. **Annex D** provides the overall schedule of the missions and the stakeholders interviewed during the mission. The mission also served the purpose of collecting the missing documents to be reviewed.

The assessment of project performance has been carried out based upon the expectations set out in the Project Logical Framework/Results Framework which provides performance and impact indicators for project implementation along with their corresponding means of verification. While doing so, the modified set of indicators, as suggested at the Inception of the DREG project, have also been taken into account. While carrying out the evaluation, emphasis has been placed on evidence-based information that is credible, reliable and useful.

The review of documents provides the basic information regarding the activities carried out to attain the desired outcomes and outputs and the actual achievements. However, the mission was needed to verify the information, get missing data and to learn the opinion of stakeholders and project participants to interpret the information. During the mission, the interviews with the key stakeholders'/project participants were based on an open discussion to allow respondents to express what they feel are the main issues. This was followed by more specific questions on the issues mentioned. During the interviews, the evaluation criteria and the questions (Please see **Annex B**) were used as the check list to raise relevant questions and issues.

The evaluation has been conducted in accordance with the principles outlined in the United Nations Evaluation Group 'Ethical Guidelines for Evaluation' as given in **Annex E**.

### 1.3 Structure of the Terminal Evaluation Report

The structure of the report is as per the format suggested in the Terms of Reference for the terminal evaluation. However, the contents of the chapter on findings has been split into three chapters due to the size of the text.

The report starts with a chapter providing an introduction which is followed by the chapters of project description, findings. The last chapter of the report provides the conclusions and the recommendations. Additional information is provided in the Annexes to the report. While the Executive Summary of the report is provided in the beginning of the report, the rest of the report is organised as follows:

- Chapter 1: Introduction to the project
- Chapter 2: Project description and development context
- Chapter 3: Findings: Project design and formulation
- Chapter 4: Findings: Project implementation
- Chapter 5: Findings: Project results
- Chapter 6: Conclusions, recommendations and lessons

As has been stipulated before, the Findings have been organised in three chapters (instead of one single chapter as suggested in the TOR) due to the size of the text. **Annex B** shows where the main criteria and questions of the Terminal Evaluation can be located in different sections of the report.



## **2. PROJECT DESCRIPTION AND DEVELOPMENT CONTEXT**

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### **2.1 Project start and duration**

The project, “Decentralised Renewable Energy Power Generation Project” (DREG Project) in Lebanon was aimed at removing the barriers towards larger use of renewable energy for decentralised generation of power. The objective of the project was to catalyse the development of the small, decentralized, grid-connected renewable energy power generation market in Lebanon. This was to be achieved by the removal of barriers. The project was also to lead to reduction in GHG emissions as a result of implementation of the pilot projects for renewable energy-based electricity generation. The objective of the project was to be achieved by removing the barriers. RE technologies face a range of barriers to achieve wide-scale deployment and maturity of the market. The most common barrier however is the cost of the technology followed by the absence of lack of “RE-friendly” grid codes and power purchasing arrangements. Furthermore, in many countries, policy makers, potential investors and the general public are not yet, sufficiently aware of the current costs and opportunities provided by the RE technologies. Therefore, as in the case of DREG project, complementary marketing and public awareness-raising activities are typically included in RE promotion activities.

The DREG project was initiated in the year 2014. The duration of the project was four years. The project document was signed in February 2014. However, actual implementation of the project could only be started much later in September 2014<sup>5</sup>. The inception meeting of the project happened in April 2015.

The project was implemented with funding from GEF and UNDP. The project has been nationally executed by the Ministry of Energy and Water of Lebanon and implemented by UNDP through ‘Support to National Implementation (NIM)’ modality. The project has been designed as a full-sized GEF project with the planned funding as follows:

- Regular UNDP (TRAC), USD 125,000
- Other UNDP, USD 6,257,000
- GEF financing of USD 1,450,000
- In-kind contribution by government USD 500,000
- Other Cash contribution USD 4,734,000 ((NEEREA USD 4,600,000 and Transenergie USD 134,000)

### **2.2 Problems that the project sought to address**

The project, while addressing the issue of high GHG emissions from the power sector in Lebanon, was targeted to address the issue to shortage of electricity in the country. The DREG project also addressed the problem of local level pollution due to self generation of electricity by the enterprises using heavy oil as the fuel.

The energy supply of Lebanon relies on imported oil (barring small hydro power generation) leading to comparatively higher emission of GHG for every unit of electricity produced. The electricity supply in the country is suffering from technical problems. Due to frequent power cuts, the users are forced to rely on diesel generators-based back up power. The problems in the electricity have technical and financial impacts on customers, the Government and the economy of the country.

### **2.3 Immediate and development objectives of the project**

The project, “Small Decentralized Renewable Energy Power Generation (DREG)” in Lebanon, was implemented to reduce the emissions of GHGs while simultaneously addressing the problem of shortage of electricity in the country. The co-benefits of the project include reduced local pollution, strengthened national

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<sup>5</sup> The delay in initiation was mainly because of delays by the Council of Ministers to approve the project given the fact that there was no government at that time.

energy security due to reduced dependency on imported fuels and socio-economic development due to increased availability of energy.

The socioeconomic benefits of the project stem from improving the electricity supply. Further, meeting the project market development objective will create new jobs in sales, installation and maintenance of RE systems. RE market development will also provide work opportunities for women.

## **2.4 Baseline and expected results**

In the baseline, the active parties for promoting RE in Lebanon were CEDRO and the MEW/LCEC. In the baseline, several demonstrations and pilot projects have been implemented, making use of the funding made available (from UNDP, Government of Spain through the Lebanon Recovery Fund). However, in the baseline the RE market was still in its early stages of development. In the baseline, the environment (policy and regulatory frame-work and the fiscal incentives) needed to accelerate the penetration of RE into the market was absent. In the baseline situation, there were a number of companies in Lebanon providing the RE services, but most of them were inexperienced and lacked the required technical skills. In the baseline situation, the financial mechanisms such as NEEREA (providing low-interest soft loans) for supporting RE and EE investments were present, but their full capacity was still to be exploited. In a nutshell, the baseline situation and the expected results of the projects were as follows:

- In the baseline, the solar PV market in Lebanon was largely triggered by projects developed through the CEDRO project. The pilot projects (for solar PV) implemented under CEDRO were financed on a 100%-grant basis. The project planned to use the grants (up to 25% of the capital cost) and soft loans available to leverage private sector investment in DREG pilot projects.
- In the baseline, the installed RE-based generation capacity was limited. The installed solar PV capacity was around 700 kWp. Wind turbines for home applications were installed by individuals, but the installed capacity was less than 100kW. The largest single wind turbine installed in Lebanon was a refurbished model with a capacity of 300kW, but it has not been operational for a number of years. There was no micro-hydro installations in Lebanon. Biomass initiatives were limited to a few projects for private use. The DREG project expected to establish a number of pilot demonstration projects and targeted to catalyse the development of small, decentralized, grid-connected renewable energy power generation market due to successful demonstration.
- In the baseline situation, due to the absence of standards, the market had low-quality products competing with high-quality ones without adequate quality control. The project targeted to address this through the development of standards for different RE technology equipment and components.
- In the baseline, many citizens and institutions supported the development of RE, however, many of them were doing so without having adequate awareness and education about the characteristics of RE technologies. The project targeted to correct this situation by carrying out awareness creation and capacity building activities.
- In the baseline, the technicians and engineers dealing with RE and EE products needed training to improve their skills. The project has provided for technicians and engineers to improve their skill sets and to ensure continued availability of skilled human resources.

While the above paragraphs has provided the outlines of the baseline situation and the expected results of the project, analysis of project Outputs, Outcomes and Objectives is presented in Chapter 4 which compares the target values of the indicators at the end of the project with the values at the baseline.

Analysis of the attainment of project Outputs, Outcomes and Objectives is presented in Section 5.1 (Project Results and Impacts), which compares the values of the indicators at the end of the project with the values at the baseline and targets. An assessment of the strengths and weaknesses of the log-frame is included in Section 3.1 (Assessment of Project Design Logic, Strategic approach and Scope)



## 2.5 Main stakeholders

The list of the stakeholders which has been compiled from the project document is presented in **Table 5**. The table also provides an overview of the main stakeholders:

**Table 5: List of main stakeholders involved in the DREG project**

Stakeholder	Description
Ministry of Energy and Water (MoEW)	It is the Government body responsible for the energy sector development in Lebanon. It consists of 9 General Directorates, among which “Electricité du Liban” (EdL), the Directorate of Investment, the Directorate of Hydraulic & Electric Resources, and the Directorate of Oil which are considered to be the main directorates in the energy sector.
Lebanese Centre for Energy Conservation (LCEC)	LCEC was established as a result of the LCECP GEF project and supported by UNDP and has become a focal point for energy efficiency and renewable energy related initiatives in the country. Affiliated to the Lebanese Ministry of Energy and Water, the LCEC is an NGO that is directly supporting the Government of Lebanon to develop and implement national strategies that promote the development of efficient and rational uses of energy and the use of renewables. The LCEC has also been nominated by the Government (in November 2011) to be the national energy agency of Lebanon. It serves as the technical support unit for the implementation of NEEREA. It is the Executive Secretariat of Lebanon’s National Steering Committee for the Mediterranean Solar Plan. The LCEC has been implementing and coordinating several projects funded by both the national budget as well as bilateral donors.
Ministry of Environment (MoE)	MoE was established after the 1992 Rio Earth Summit and its mandate and organizational structure were amended after the 2002 Johannesburg Summit to also include coordination of sustainable development issues in Lebanon.
Ministry of Finance	MoF has a stake in elaborating any possible financial or fiscal incentives and funding schemes supported by the Government of Lebanon.
Directorate General of Urban Planning	The Directorate General of Urban Planning within the Ministry of Public Works and Transport is the responsible Government body for execution of the Building Law and for granting construction permits in Lebanon. In 2005, the Directorate General of Urban Planning, with the collaboration of UNDP in Lebanon, developed new Thermal Standards for Buildings.
Lebanese Standards Institute (LIBNOR)	LIBNOR is a public organization responsible for the development of national standards in Lebanon and the issuance of the Lebanese Conformity Mark “Normes Libanaise” (NL). LIBNOR was expected to participate in and contribute to the development of quality control schemes (including the standards for RE equipment and components).
Industrial Research Institute (IRI)	The is a semi-public institute responsible for quality control, equipment and goods compliance with the adopted norms, testing and certifications for all manufactured and imported goods. IRI has an essential role to regulate the Lebanese market for all imported energy efficiency and RE equipment in close collaboration with MEW/LCEC.

<b>Stakeholder</b>	<b>Description</b>
Order of Engineers and Architects (OEA)	The OEA is responsible for organizing architectural and engineering works in Lebanon and for building permits. In the past OEA partnered with UNDP to collaborate in the promotion of solar water heaters.
Lebanese Solar Energy Society (LSES)	LSES is an NGO that includes renewable energy experts (consultants, manufacturers, traders, academics, etc.) with the main objective of promoting solar systems in Lebanon through collaboration with other stakeholders. LSES had in the past acquired a truck demonstration facility with a small wind turbine, SWH and PV systems, which is used for demonstration purposes at schools.
Association Libanaise pour la Maitrise de l'Energie (ALME)	ALME is an NGO with experts in renewable energy (consultants, contractors, traders, academics, etc.). ALME has a principal objective of promoting renewable energy in Lebanon. In the past, ALME has been involved in several SWH projects as well as studies and research.
Universities in Lebanon	Universities can play an important role in promoting small RE applications by developing and hosting RE training courses as well as supporting research by engineers to gain theoretical experience in RE. The American University of Beirut has an active energy centre, a graduate programme in energy studies and advanced energy labs which can be developed to become testing labs for certification purposes.
Local suppliers in PV, wind and SWH technologies	There are a number of local suppliers of RE technology (mainly solar PV) in Lebanon.
Private sector participants	Private sector commercial enterprises in Lebanon were the targeted beneficiaries of the project. These enterprises were to host the pilot demonstration DREG projects.

### 3. FINDINGS: PROJECT DESIGN AND FORMULATION

The main questions for terminal evaluation are; (please see Annex B)

- Were the project's objectives and components clear, practicable and feasible within its time frame?
- Were the capacities of the executing institution(s) and its counterparts properly considered when the project was designed?
- Were lessons from other relevant projects properly incorporated in the project design?
- Were the partnership arrangements properly identified and roles and responsibilities negotiated prior to project approval?
- Were counterpart resources (funding, staff, and facilities), enabling legislation, and adequate project management arrangements in place at project entry?
- Were the project assumptions and risks well articulated in the PIF and project document?
- Whether the planned outcomes were "Smart"?

#### 3.1 Analysis of LFA/Results Framework

The log-frame of the project providing the objectives, the expected outcomes and results along with corresponding indicators is presented as Table 6. During the inception of the project, there were minor adjustments in the indicators of the project. The Table below provides the revised set of indicators. Also given in the Table is the set of Outputs for each of the three Outcomes of the project.

**Table 6: Results Framework of the project (As updated at the time of Project Inception)**

Outcome	Indicator	Baseline	Targets	Outputs
Project Objective	Amount of reduced CO <sub>2</sub> emissions by the investments facilitated by the project	0	Direct: 35,500 tonnes of CO <sub>2</sub> (eq.) over the 20-year default lifetime of the investments made during project implementation.	
Reducing greenhouse gas emissions by the removal of barriers to widespread application of decentralized renewable energy based power generation.	Cumulative renewable energy capacity installed and operational (MWp)	0 MW	1.75 MW	
	Cumulative renewable energy generation (MWh/year)	0 MWh/ Yr.	3.285 MWh/ Yr.	
Outcome 1: Investments in decentralized renewable energy (RE) power generation increased	Volume of investments mobilized	0	US\$ 8.75 million	1.1: Approved and operational financing scheme tailored to support small, decentralized RE investments for power generation by building on the already-operational National Energy Efficiency and Renewable Energy Account (NEEREA), with completed implementation of selected pilot and demonstration projects. 1.2: Developed complementary funding scheme that can continue to facilitate RE investments after the project ends,

Outcome	Indicator	Baseline	Targets	Outputs
				leveraging funding through climate finance (NAMAs, voluntary carbon market) and other sources.
<p>Outcome 2:</p> <p>An enforced supportive policy and regulatory environment for attracting investments for privately owned, grid-connected power generation by RE sources</p>	Extent to which RE policies and regulations are adopted and enforced	Regulations for feed-in tariffs and net metering under consideration	Net metering effectively implemented and complemented with other required regulations and/or guidance, including updated technical guidelines for grid connection as well as adopted standards and procedures for performance testing and quality control. Mechanism and guidelines for the implementation of feed-in-tariffs developed.	<p>2.1: Completed analysis of possible technical constraints associated with connecting new decentralized RE power generation units onto the grid.</p> <p>2.2: Updated and harmonized technical guidelines for connecting small decentralized RE plants onto the grid and for ensuring their problem-free operation.</p> <p>2.3: Finalized proposal and draft legal/regulatory package to complement the already-initiated amendments to Law #462, which besides net-metering would allow small decentralized RE producers to sell any excess electricity to the grid, addressing issues such as required licenses, purchase obligations of the utility, mechanisms for administering and setting national feed-in tariffs and other possible financial and/or fiscal support mechanisms.</p> <p>2.4: Enhanced knowledge of the cost efficiency of different RE and EE measures at the macroeconomic and final consumer level.</p> <p>2.5: Amended construction and building management norms to promote increased application of different solar energy technologies in buildings' energy supply.</p>
<p>Outcome 3:</p> <p>Monitoring and quality control for RE-based decentralized power generation established and operational</p>	Availability of annual market data; Verified customer satisfaction with the RE technologies in use	No adequate market monitoring and quality control mechanisms in place	Availability of annual market data for new sales, total installed capacity and net production of all main RE applications sold in Lebanon by March/April each year. Over 70% customers satisfaction on the RE installations made.	<p>3.1: Completed public awareness-raising campaigns, seminars, published and disseminated stakeholder group-specific technical guides, handbooks and other related training materials on the design, evaluation, financing, installation, operation and maintenance of the targeted RE technologies.</p> <p>3.2: Adopted and operational quality control scheme with related market surveillance and enforcement mechanisms for both the targeted RE products and installations.</p> <p>3.3: Completed complementary training and other capacity development programmes for professional groups that are directly affected by the proposed quality control schemes.</p> <p>3.4: Agreed methodology and institutional arrangements for market monitoring.</p> <p>3.5: Annual market monitoring reports on the installed capacity and electricity produced by renewable energy and the institutional and financial arrangements in place to continue the market monitoring after the project.</p>

Outcome	Indicator	Baseline	Targets	Outputs
				3.6: Regularly updated project website and interactive online training tool that can continue to operate after the project.

The Outputs for different Outcomes of the project as given in the table above were not part of the results framework of the project, but were provided separately in the project document. The planned outcomes and the corresponding set of indicators are ‘SMART’ enough, except for some minor issues which are discussed in the following paragraphs. The project objectives and the three Outcomes were clear, predictable and feasible within the implementation timeframe of the project. The Outcomes were predictable meaning that at the time of project design, the activities and the corresponding Outputs specified in the ‘Project Design’ were leading to the desired Outcomes of the project. Some of the issues with the project design are as follows;

- The project design as presented in the ‘Project Document’ did specify the expected set of Outputs for each of the Outcome of the project. However, the expected outputs did not find their required place in the log-frame of the project. Indicators were provided at the outcome level, whereas the work planning of the project was done at the Output level. The monitoring (PIRs) of the progress of the project were done as per the results framework of the project. As all the activities/Outputs do not get covered in the results framework, some of the important activities (as provided in the Outputs) are missing in the monitoring/PIRs. (Please see Recommendation 1 as well)
- The three indicators for the project objective (GHG emission reduction, Capacity of RE, and RE generation) are very closely interrelated. Thus, the additional indicators are not serving any purpose. Considering that the objective of the project on the one hand was “Reducing greenhouse gas emissions” while on the other it was “removal of barriers to widespread application of decentralized renewable energy based power generation”, an indicator which indicates the removal of barriers or widespread application of DREG would have been more appropriate (instead of capacity of RE). Having said that, it is appreciated that having an appropriate indicator to indicate removal of barrier or wide spreading of DREG in itself is a big challenge. (please see Recommendation 2 as well)
- The Indicators of Project Objective and the indicator for Outcome 1 (investment mobilized) are closely interrelated. This kind of situation needs to be avoided. For example, if one of the Outcomes of the project can meet the project objective, then what is the need for other Outcomes of the project?
- The project design is targeted at the removal of barriers towards larger uptake of DREG in Lebanon. However, the project design is biased towards solar PV technology right from the project conceptualisation stage. This is quite evident from the PIF, PPG and later from the project document. The so-called “best value for money<sup>6</sup>” approach as provided in the project document for selecting the beneficiaries for the pilot projects favours the RE technologies where there is comparatively a higher level of confidence amongst the prospective beneficiaries. The idea of pilot projects is to create a demonstration of the technologies whose use is not that prevalent in the given geographical region, so that the confidence level of the potential investors increases and baseline data gets generated. As is evident, the RE technologies which are not demonstrated would require more support and grants to make someone go for it. Grants of 25% on capital costs, as provided in the project design, may be good for solar PV, but may not be sufficient for other RE technologies for DREG.
- Not all RE technologies may be equally suitable for decentralised power generation. For example, The project design has provided for small and micro hydro as one of the RE technology options for DREG, which, given the limitation of third party use of distribution grid, is not feasible. Project design has also provided for use of biomass-based DREG which don’t suit the situation of Lebanon. The project design also did not capture the fact that the use of biogas as DREG has to be restricted to the situations where bio-degradable substrate is available and where ambient temperatures are suitable for producing the gas.

<sup>6</sup> The best value for money in this case has been defined as an approach in which the pilot projects requesting the smallest grant contribution per kWh to be generated are to be prioritized for support

## 3.2 Assumptions and Risks

During the project development stage, possible risks towards smooth implementation of the project were identified and the risk mitigation measures were proposed. Different risks that were identified during the project formulation and the recommended mitigation measures are provided in Table 7.

**Table 7: Risk Analysis of DREG Project (as per Project Document)**

#	Description	Countermeasures
1	Government failure to adopt the required legal and regulatory changes, such as the required amendments to the Law 462, tariff adjustments, grid code and financial /fiscal incentives, to provide a basis for the proposed market promotion activities.	The fragile political situation in Lebanon will remain as a risk to expediently passing the required legal and regulatory changes. On the other hand, the necessity of continuing electricity sector reform and moving the renewable and energy efficiency markets forward has been broadly recognized by Lebanese politicians of all parties, hence the prominent inclusion of RE in the widely-accepted “Policy Paper for Electricity Sector Development in Lebanon”. The recent Government adoption of the National Energy Efficiency Action Plan (NEEAP, November 2011) reaffirms the Government’s commitment to the 12% renewable energy target by 2020. Together with the continuing and strong commitment of the current Minister of Energy and Water, the political risk is considered to be acceptable
2	Technical failures leading to the loss of trust by targeted customers on the performance of small, decentralized RE applications.	Small decentralized RE power generation systems such as PV, micro-wind and mini/micro-hydro can already be considered to be technically mature technologies, so the risk of their technical failure due to the early stage of their technical development is considered as low. This does not detract, however, from the importance of adequate quality control of both products and installations at all stages of market development.  The quality control aspects are addressed under Outcome 3, with one sub-component focusing on the development of a “quality control scheme with related market surveillance and enforcement mechanisms” and another component focusing on training to ensure that the equipment is correctly installed and maintained.
3.	Government and/or other donors will not provide support and funds for new financing instruments.	Comprehensive economic and financial analysis and early discussions with the Ministry of Finance, with the support of other relevant line ministries, will emphasize the macroeconomic benefits of the proposed financial and fiscal incentives, and will point to favorable experiences in – for example – Egypt, Tunisia and Jordan.  For international donors, the demonstrable commitment of the Government of Lebanon to establish and effectively manage similar funding mechanisms, most notably NEEREA, will serve as evidence of the Government’s commitment to the decentralized RE sector.  The project will serve to ‘prime’ alternative sources of funding that are either not tied to donors (e.g. carbon market) or are only indirectly tied to donors (e.g. through the development of a NAMA as a conduit for international financing).
4	Climate risk	According to the vulnerability assessment undertaken for Lebanon’s Second National Communication, climate change is not expected to dramatically alter the output from solar and wind installations. For hydro power plants, the uncertainties and risks are higher, which need to be taken into account in the design of the projects.  In the design and installation of RE systems, adequate emphasis also needs to be placed on the systems’ ability to survive extreme weather conditions (such as storms) at a level that may have not been typically observed before. Such thinking will be incorporated into all stages of project design and implementation.
5	Lack of adequate and reliable market data to facilitate the monitoring of project impacts and planning of further policy measures.	Close cooperation with the local RE technology dealers and the local utility to obtain the required data will be emphasized.  Cross-checking of the reliability of the data by comparing the results from different sources (including other on-going projects) and approaches (e.g. top-down and bottom-up) will be undertaken.



#	Description	Countermeasures
		Monitoring methodologies can include a survey of retail stores and importers, a review of import and customs statistics, meter readings of EdL (after introduction of two- way metering), etc.
6	Inadequate and/or non-capacitated human resources to successfully implement the project and support the mainstreaming of its results.	The project will be implemented within the management structure of the Lebanese Centre for Energy Conservation, which has a proven track record of successfully managing similar initiatives.
7	Drop in oil prices and failure to adjust electricity tariff will create a negative context in which to promote renewables	The fragile political situation in Lebanon will remain a risk to expediently passing the required legal and regulatory changes. However, the huge investments recently made by the Government to secure additional power supply will lead to an inevitable correction of electricity tariffs, which is expected to happen in the coming few years.

Some of the risks identified at the time of project design such as failure (by the government) to adopt the required legal and regulatory changes became true. This made it difficult to establish a basis for the proposed market promotion activities. The project supported and published the ‘De-risking Renewable Energy Report for Lebanon’, which has highlighted all the regulatory, legal, and technical aspects contributing towards the risk of investing in renewable energy in Lebanon, and accordingly, presented the policy and financial de-risking instruments. However, it is important to note that the De-risking Study has targeted utility-scale projects and not decentralized ones. As far as the impacts of the risks coming true on the results of the DREG project is concerned, they have not been that severe. However, going forward, the broader objective of the DREG project (catalysing the growth of DREG) would get realised when these policy and regulatory aspects materialise.

Some of the assumptions made during project design were as follows:

- Adoption of a supportive regulatory framework for adequate feed-in tariffs, net metering, grid code and related financial incentives.
- The proposed legal and regulatory improvements passing swiftly through the Government approval process.
- Agreement reached with the key market players to regularly and timely submit the required data.
- Adequate quality control and certification scheme in place supported by the required institutional arrangements and legal provisions.

The project assumptions at the project design were reasonable. However, some of the assumptions like the establishment of the regulatory frame-work and feed-in-tariffs did not materialize, but they did not adversely impact the results of the project.

### 3.3 Lessons from other relevant projects

At the time of project design and prior to that, a number of renewable energy projects were implemented in Lebanon. The project design has incorporated the lessons from these projects. Some of the notable RE projects in Lebanon in this regard are as follows:

- LECB project at the Ministry of Environment, implemented by UNDP with funding from EU and BMU.
- ‘Parliamentary Action on Renewable Energy’ (PARE) project, implemented by UNDP in collaboration with the NGO Climate Parliament.
- CEDRO project, implemented by the Ministry of Energy and Water and managed by UNDP. The CEDRO project is funded by the Lebanon Recovery Fund by means of a donation from Spain.

- EU-funded, UNDP-implemented ‘MED-SOLAR’ project, in the framework of the EU ENPI programme (Cross-Border Co-operation in the Mediterranean), to promote implementation of innovative technologies and transfer of know-how in the field of solar energy.
- EU-funded project, ‘Paving the Way to the Mediterranean Solar Plan’ (PWMSP) regional project assisting Mediterranean Partner Countries to contribute to a significant increase in the deployment of sustainable energy systems based on renewable energy sources.
- The World Bank implemented project to upgrade the environmental performance of the Lebanese Building Code.

### **3.4 Planned stakeholder participation**

In section 2.5, a list of main stakeholders to the project was provided. The project was designed in a manner which required close coordination and consultation of the relevant stakeholders in each of the project component. The activities included those aimed at enhancing the local technical capacity to improve understanding and implementation of all aspects of DREG designs, financing, installations and operations; building effective awareness programs targeted to optimize technology diffusion and facilitate implementation of the policies and regulations for DREG pilot projects implementation.

### **3.5 Replication approach**

Replication was an integral component of project design. During the project preparation phase, DREG pilot projects, which were to be implemented as demonstrations, were identified. The project design envisaged that replication of the demonstrations units will take place once such replication is supported by the enabling activities.

The project design has provided for co-operation between different stakeholder groups at the national and international level by organizing seminars, workshops and other public events, thereby bringing project proponents, policy makers and potential investors/other donors together. This will help to disseminate the project results and lead to replication of the DREG projects within the country and also facilitate such programs in other countries.

### **3.6 UNDP comparative advantage**

UNDP is one of the agencies of GEF which is responsible for creating project proposals and for managing GEF projects. UNDP’s partnership with GEF reinforces its efforts to mainstream or incorporate global environment concerns into its internal policies, programs and projects.

UNDP’s comparative advantage for the GEF lies in its global network of country offices, its experience in integrated policy development, human resources development, institutional strengthening, and non-governmental and community participation. UNDP assists countries in promoting, designing and implementing activities consistent with both the GEF mandate and national sustainable development plans. UNDP also has extensive inter-country programming experience.

In Lebanon, the UNDP Country Office manages a programme portfolio covering the thematic areas of Governance, Social and Local Development, Conflict Prevention and Recovery and Energy and Environment. The Environment and Energy (E&E) Programme of UNDP CO in Lebanon works closely with the Government of Lebanon to provide policy support for more effective environment and energy management. The programme also works with local communities and civil sector organisations to improve livelihoods through improved natural resource management. The aim is to move Lebanon towards achieving the Sustainable Development Goals (SDGs). These programmes are funded by several donors and also collaborates with the private sector. UNDP’s energy projects and climate change projects are coordinated by UNDP to ensure integration of energy policies in all sectors and between the different ministries involved. The



programme works with different ministries on issues related to climate change. In the past, UNDP has supported the implementation of a number of programs and projects in the area of energy, environment and climate change (please see section 3.3)

UNDP is working for a sustainable environment and development policy, which integrates climate change concerns and at the same time provides poverty reduction and human development. UNDP carried with it a rich experience of implementing GEF projects for the promotion of RE and EE projects and programs in many countries.

### **3.7 Linkages between project and other interventions within the sector**

As was mentioned in Section 3.3 at the time of project design there were a number of projects in the area of RE which were being implemented in Lebanon. Also, there were baseline projects which were either implemented or were being implemented at the time of project design. The DREG project drew linkages with many of these projects.

The two baseline projects for supporting the development of RE in the country are the CEDRO project and NEEREA. The UNDP CEDRO project being implemented in partnership with the Ministry of Energy and Water (is working since October 2007 and has supported implementation of a number of small decentralised solar PV project (mainly the government owned facilities as 100% grant basis and in the private sector with lesser level of grants). The CEDRO project has also supported the finalization of a wind atlas for Lebanon. The CEDRO project has also been instrumental in the December 2011 decision by the Government to allow net-metering in Lebanon. The DRELCG project has drawn linkages with the CEDRO project and has avoided many activities which were either carried out (or were planned to be carried out) under the CERDO project.

The National Energy Efficiency and Renewable Energy Account (NEEREA) being administered by BdL with technical support from MEW/LCEC was established, with the support from UNDP and EU, to provide soft loans for implementation of RE and EE projects. The project design has used this to leverage private sector investment for the DREG pilot projects.

The DREG project has also drawn linkages with the EU-funded, UNDP-implemented ‘MED-SOLAR’ project. The targeted results of the MED-SOLAR project included characterization of the weaknesses of the electrical grids; analysis of the legal and regulatory frameworks; technical development of an energy management system; pilot projects in small and medium-size industries and public facilities; tests and dissemination of results; and creation of a cross-border network of stakeholders. As can be seen, although, the MED SOALR project was specific to solar PV technology, there is quite an overlap between the MED-SOALR project and the DREG project.

### **3.8 Management arrangements**

The project has been nationally executed by the ‘Ministry of Energy and Water’ and implemented by UNDP through “Support to the NIM” modality. UNDP was responsible for the disbursement of funds and the achievement of the project goals.

The implementation of the project was overseen by the ‘Project Board’ constituted for all the ongoing projects in the domain of Energy. The board is chaired by the UNDP and includes the National Focal Points from the Ministry of Energy and Water, the Council for Development and Reconstruction (CDR) and representatives from the main stakeholders, e.g. industry representatives. The project manager for the DREG project also participated in the board meetings and was responsible for compiling a summary report of the discussions and conclusions of each meeting of the board.

Day-to-day management of the project was carried out by a Project Management Unit (PMU) under the overall guidance of the ‘Project Board’. The PMU was established within the Ministry of Energy and Water and

coordinated its work with the Lebanese Centre for Energy Conservation (LCEC). For that purpose, the Director of the MEW/LCEC acted as the technical focal point while the Director of Tutelage at the Ministry of Energy and Water acted as the financial and administrative focal point. The Project Manager reported to UNDP and the 'Project Board'. The project manager was supported by international and national experts taking the lead in the implementation of specific technical assistance components of the project. The UNDP country office provided general oversight and management services for the activities of the project which included; general oversight and monitoring, including participation in project reviews; briefing and de-briefing of project staff and consultants; resource management and reporting; thematic and technical backstopping.

## 4. FINDINGS: PROJECT IMPLEMENTATION

### 4.1 Adaptive management and Feedback from M&E used for adaptive management

The main questions for terminal evaluation are; (please see B)

- Did the project undergo significant changes as a result of recommendations from the mid-term review? Or as a result of other review procedures? Explain the process and implications.
- If the changes were extensive, did they materially change the expected project outcomes?
- Were the project changes articulated in writing and then considered and approved by the project steering committee?
- Whether feedback from M&E activities was used for adaptive management?
- Whether changes were made to project implementation as a result of the MTR recommendations?

Table 8 provides the details of the recommendations at the time of MTR and the corresponding management response. Also given in the Table is the status at the time of TE.

**Table 8: Recommendations at MTR and the Management Response**

#	Recommendation	Management Response	Comments at TE
1	The project team should formulate additional indicators to better monitor and reflect the performance of the project on capacity building but also on gender and development issues. The project team should identify as soon as possible new indicators that will be discussed with the UNDP RTA and proposed to the next PSC meeting so that they can be included in the Results framework and documented.	Draft indicator formulated and awaiting approval at the next PSC meeting before it can be included in the Results Framework. New Indicator: Number of capacity building and awareness raising activities organized and/or participated in.	New set of indicators could not be incorporated in the results framework of the project.
2	The project team must take the necessary steps to request an 8 months' extension of the project duration at no additional cost. The revised completion date for the project will be 31 August 2018 instead of 31 December 2017. Given the delay which occurred at the start of the project, this extension will make it possible to complete all planned activities and disbursements and meet the initial 48-month project duration in accordance with the project document.	The extension request justification is ready and the process will be initiated in July 2017 during PIR implementation	The project got the required no-cost extension
3	The two national focal points should facilitate further the approval process for the project's outputs on the one hand and, on the other hand, push as much as possible for the passing of the awaited laws and decrees. In addition, the project's implementation is often slowed down due mainly to administrative bottlenecks at the level of the BdL for instance. Continue with the regular meetings between the project and the NFPs to ensure that outputs are relayed and pushed for to the extent possible.	Minutes of meeting of regular meetings between project and NFPs to be kept on record including results of national processes/impediments (political or other)	This was a general recommendation. No specific action on part of the project team was envisaged.

#	Recommendation	Management Response	Comments at TE
4	<p>The project team must concentrate its efforts towards supporting the stakeholders and ensuring their correct use of the knowledge and tools provided by the DREG project to enable them to bring about the desired changes. The DREG project has so far provided technical assistance, produced guidelines and recommendations, and trained people. The second part of project's implementation should be dedicated to enforce the ownership of this knowledge and of the tools and to be at hand when the beneficiaries put them to use and make sure that they do not lose sight of the project's goals.</p> <ul style="list-style-type: none"> <li>• Knowledge and tools ownership enforcement through a ministerial technical committee (Public Sector)</li> <li>• Knowledge ownership enforcement through a ministerial technical committee (Private Sector)</li> </ul>	<p>Knowledge and tools ownership strengthened through the Minister's selected technical committee which includes UNDP Project Managers, Ministry advisors, and Électricité du Liban (EDL) representatives. The committee will ensure the Solar PV and Wind Grid Codes are adapted and used by EDL when connecting renewable energy projects to the grid.</p> <p>Knowledge ownership strengthened through the information exchange taking place during DREG's demonstration projects design and implementation phases. All the issues observed, their proposed solutions, and the resulting lessons learnt will be compiled in a report for dissemination to all Lebanese companies working in the sector.</p>	<p>The project team carried out the capacity building, dissemination and training activities to take care of this.</p> <p>Once the project is closed, the knowledge products will be owned by the Ministry of Energy and Water/LCEC, thereby ensuring its availability to the stakeholders at all points of time</p>
5	<p>The Project Steering Committee needs to start discussing the project's exit strategy. In addition to ensuring that the dynamics put in place by the DREG project are upheld, the PSC needs to start discussing, in particular, the issue of the way in which the knowledge and expertise acquired by the project team can be maintained at the disposal of the Lebanese Government.</p>	<p>During the last year of the project, the sustainability plan and exit strategy will be developed in coordination with the Ministry of Energy and Water.</p>	<p>As stated above the</p>

As can be seen, there is no significant change in the project as a result of recommendations at the time of MTR. Feedback from M&E activities was used successfully for the adaptive management. Considering that there was a lack of interest amongst the stakeholders in the DREG technologies other than solar PV, the project team did not pursue the efforts to bring on board the pilot projects with different RE technologies.

One of the examples of the adaptive management is the new modality for the disbursement of the grant component of the capital cost of the pilot projects to the beneficiaries, wherein the entire amount of the grant for all the pilot projects was transferred to BDL which will, in turn, couple it with the soft loans and disburse it to the beneficiaries.

## 4.2 Partnership arrangements

The main questions for terminal evaluation are; (please see Annex B)

- Were there adequate provisions in the project design for consultation with stakeholder?
- Whether effective partnerships arrangements were established for implementation of the project with relevant stakeholders involved in the country/region, including the formation of a Project Board?

The Ministry of Energy and Water/LCEC was one of the 'implementing partners' for the project. The Project Board having representation from a number of government ministries and departments was established. At the design stage of the project, it was recognised that the partnership with the private sector and the assistance of different government and non-governmental agencies would be required to meet the objectives of the project.

Table 5 provided the list of important stakeholders to the project. Most of the stakeholders were designed to be the partners in the project.

Provisions were made in the project design to partner with the Central Bank of Lebanon and private commercial banks to facilitate financing for the demonstration units. Particularly, the Central Bank was to provide soft loan (100 percent of the capital cost with 1% interest rate and long repayment period) for the pilot projects. The soft loan was intended to promote private sector investment in the RE technologies.

Throughout the project lifetime, different technological solutions were to be facilitated through the project. The project design provided for partnership with engineering schools for developing and implementing ‘specialized RE technology design and application courses’.

### 4.3 Project Finance

The main questions for terminal evaluation are; (please see Annex B)

- Whether there was sufficient clarity in the reported co-financing to substantiate in-kind and cash co-financing from all listed sources?
- What are the reasons for differences in the level of expected and actual co-financing?
- To what extent project components supported by external funders were well integrated into the overall project?
- What is the effect on project outcomes and/or sustainability from the extent of materialization of co-financing?
- Whether there is evidence of additional, leveraged resources that have been committed as a result of the project?

The planned expenditure for the project and its distribution amongst different components of the project is given in Table 9.

**Table 9: Project Cost (as per project document) (figures in USD)**

	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Total
<b>GEF</b>	180,911	442,561	419,814	406,714	1,450,000
<b>NEEREA</b>		1,500,000	1,600,000	1,500,000	4,600,000
<b>Ministry of Energy and Water (in-kind + Transenergie)</b>	158,500	158,500	158,500	158,500	634,000
<b>UNDP (CEDRO, MED-SOLAR, LECB, TRAC)</b>	1,882,000	1,500,000	1,500,000	1,500,000	6,382,000
<b>TOTAL</b>	<b>2,221,411</b>	<b>3,601,061</b>	<b>3,678,314</b>	<b>3,565,214</b>	<b>13,066,000</b>

Table 10 and Table 11 provides the details of the co-financing committed by different agencies at the project design and co-financing actually realised respectively

**Table 10: Co-financing committed at the time of project design (figures in USD)**

	Outcome 1		Outcome 2		Outcome 3		Project Management		Total	
	Cash	In-kind	Cash	In-kind	Cash	In-kind	Cash	In-kind	Cash	In-kind
MEW		150,000		150,000		150,000		50,000		500,000
UNDP TRAC					35,000		90,000		125,000	
UNDP MED SOLAR	1,145,000		100,000		137,000		155,000		1,537,000	
UNDP CEDRO	2,800,000		770,000		285,000		345,000		4,200,000	
LECB	50,000		110,000		120,000		40,000		320,000	
NEEREA	4,600,000								4,600,000	
Climate Change Coord. Unit (CCCU)	80,000		50,000		50,000		20,000		200,000	
Transenergie					134,000				134,000	
<b>Subtotal</b>	<b>8,675,000</b>	<b>150,000</b>	<b>1,030,000</b>	<b>150,000</b>	<b>761,000</b>	<b>150,000</b>	<b>650,000</b>	<b>50,000</b>	<b>11,116,000</b>	<b>500,000</b>
<b>TOTAL</b>	<b>8,825,000</b>		<b>1,180,000</b>		<b>911,000</b>		<b>700,000</b>		<b>11,616,000</b>	

**Table 11: Actual Co-financing at the project end (figures in USD)**

	Outcome 1		Outcome 2		Outcome 3		Project Management		Total	
	Cash	In-kind	Cash	In-kind	Cash	In-kind	Cash	In-kind	Cash	In-kind
MEW		143,745		143,745		143,745		47,931		479,166
UNDP TRAC	3,581		1,254		7,192		106,077		118,104	
UNDP MED SOLAR (1)	1,145,000		100,000		137,000		155,000		1,537,000	
UNDP CEDRO (1)	2,604,698		500,000		200,000		250,000		3,554,698	
LECB	50,000		110,000		120,000		40,000		320,000	
NEEREA	2,793,584								464,669	
Climate Change Coord. Unit (CCCU)	80,000		50,000		50,000		20,000		200,000	
Transenergie					134,000				134,000	
<b>Subtotal</b>	<b>4,347,948</b>	<b>143,745</b>	<b>761,254</b>	<b>143,745</b>	<b>648,192</b>	<b>143,745</b>	<b>571,077</b>	<b>47,931</b>	<b>6,328,471</b>	<b>479,166</b>
<b>TOTAL</b>	<b>4,491,693</b>		<b>904,999</b>		<b>791,937</b>		<b>619,008</b>		<b>6,807,637</b>	
<b>Note:</b> (1) The difference in the original amounts and the updated amounts is firstly due to reduction in the capital cost of solar PV and secondly due to the fact that the MED SOLAR and CEDRO budgets were in Euros and there is a variation in the exchange rates.										

Based on the funding by GEF and co-financing (planned and actual) by different agencies, the project expenditure is as given in Table 12.

**Table 12: Planned and actual project expenditure (figures in USD)**

Co-financing (type/source)	UNDP own financing		Government		Partner Agencies		Total	
	Planned	Actual	Planned	Actual	Planned	Actual	Planned	Actual
Grants	5,209,802	5,862,000	3,113,584	4,920,000	334,000	334,000	8,657,386	11,116,000
Loans / Concessions								
In kind Support			479,166	500,000			479,166	500,000
Other								
<b>Total</b>	<b>5,209,802</b>	<b>5,862,000</b>	<b>3,592,750</b>	<b>5,420,000</b>	<b>334,000</b>	<b>334,000</b>	<b>9,136,552</b>	<b>11,616,000</b>

#### 4.4 Monitoring and evaluation: design at entry

The main questions for terminal evaluation are; (please see Annex B)

- Is the M&E plan well conceived at the design stage?
- Is M&E plan articulated sufficient to monitor results and track progress toward achieving objectives?
- Was the M&E plan sufficiently budgeted and funded during project preparation and implementation?
- How effective are the monitoring indicators from the project document for measuring progress and performance?

A monitoring and evaluation plan was put in place at the time of project design. There was a provision to review the plan at the time of project inception. As per the plan, the project was to be monitored through the periodic quarterly and annual monitoring. There were provisions for preparation of PPR/PIR. The APR/PIR combines both UNDP and GEF reporting requirements. Apart from this, provisions were made for periodic site visits by UNDP CO and the UNDP RCU. Provisions were also made in the project design for an independent Mid-Term Review and the Terminal Evaluation. GEF Focal Area Tracking Tools were also to be prepared before the MTR and at the TE. As per the plan stipulated in the project document, the project team was to prepare a Project Terminal Report to summarize the results achieved (objectives, outcomes, outputs), lessons learnt, problems met and areas where results may not have been achieved. The set of indicators to be monitored and the corresponding targets were provided in the log-frame of the project. The results of the monitoring and evaluations were to be provided to the project board.

As is evident, the M&E plan at the design stage was well conceived. The plan was well articulated and was sufficient to monitor results and track the progress toward achieving the objectives, except for some issues with the indicators used (please see section 3.1). Adequate provisions were made in the budget for monitoring and evaluation activities. **The M&E design at entry has been rated as Satisfactory.**

## 4.5 Monitoring and evaluation: implementation

The main questions for terminal evaluation are; (please see Annex B)

- Whether the logical framework was used during implementation as a management and M&E tool?
- What has been the level of compliance with the progress and financial reporting requirements/ schedule, including quality and timeliness of reports?
- What has been the effectiveness of the monitoring reports and evidence that these were discussed with stakeholders and project staff?
- What is the extent to which follow-up actions, and/ or adaptive management, were taken in response to monitoring reports (APR/PIRs)?
- Whether APR/PIR self-evaluation ratings were consistent with the MTR. If not, were these discrepancies identified by the project steering committee and addressed?

The quarterly monitoring reports were produced regularly. Annual PIRs were produced using the set of indicators provided in the log-frame.

The PB did not meet as often as was needed to provide the project with the necessary oversight and direction. The Board could manage to meet only three times (once every year) during the entire duration of the project implementation. This includes the board meeting at the time of inception of the project. However, meetings between the project team and the focal points at the ministry were held on a bimonthly basis for quick decision making and to efficiently solve any difficulties or delays.

The project management accepted the recommendations of the MTR, and most of the recommendations were implemented (please see section 4.1). However, the recommendation to introduce additional indicators to better monitor and reflect the performance of the project on capacity building could not be approved by the project board/RTA. This is largely due to the fact that UNDP/GEF procedures doesn't allow change of indicators during the course of project implementation.

The PIR self-evaluation ratings for the year 2018 was Highly Satisfactory. The rating at the time of MTR was Satisfactory. The MTR and the TE were conducted within the specified time period according to GEF guidance on MTR and TE.

**M&E Plan Implementation has been rated as Satisfactory. Overall quality of M&E is rated as Satisfactory**

## 4.6 UNDP and Implementing Partner implementation / execution coordination, and operational issues

The main questions for terminal evaluation are; (please see Annex B)

- Whether there was an appropriate focus on results?
- Was there adequate UNDP support to the Implementing Partner and project team?
- Quality and timeliness of technical support to the Executing Agency and project team
- Were the management inputs and processes, including budgeting and procurement adequate?

The Ministry of Energy and Water was the executing partner of the project. UNDP implemented the project on behalf of the Government through "Support to the NIM" modality. UNDP was responsible for the disbursement of funds and achievement of the project goals.

Technical support for the pilot projects was provided by UNDP. UNDP provided the support to the project on behalf of GEF and took the role of the Senior Supplier. UNDP's Project Board for Energy, served as the Project Board for the project. It had members comprising of representatives from MEW/LCEC, UNDP, Ministry of Energy and Water and other stakeholders. The main function of the Board was to strategically guide the course of the project towards achieving its objective.



UNDP provided helpful and important support to the Project. However, UNDP could have usefully applied itself in its capacity as a knowledge management broker to an even greater extent to facilitate broader range of RE technologies for implementation of the DREG pilots. For example, UNDP could have done more sharing of lessons learned from other RE (bio-gas, biomass, small wind etc.) barrier removal projects at the stage of project design. **Quality of UNDP Implementation is rated as Satisfactory.**

The Support to the NIM modality for this project was good and MEW/LCEC was the appropriate institution within the government institutions to act as the implementation partner. MEW/LCEC provided the support for implementation of the pilot DREG projects very effectively. Project management and administration has been satisfactory. **The quality of Execution by Executing Agency has been rated as Satisfactory.**



## 5. FINDINGS: PROJECT RESULTS

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### 5.1 Overall results

The main questions for terminal evaluation are; (please see Annex B)

- What has been the achievements of the objectives against the end of the project values of the log-frame indicators, with indicators for outcomes/outputs, indicating baseline situation and target levels, as well as position at the close of the project?
- What is the achievements /Results in terms of contribution to sustainable development benefits, as well as global environmental benefits (direct and indirect GHG emission reduction)?
- How does the GEF Tracking Tool at the Baseline and the one completed right before the Midterm Review compare with that, prepared at the time of Terminal Evaluation?
- What are the possible issues with employing DREG systems?

A summary of the attainment of the overall project objectives is presented in this section of the report. Achievement of results against different Outcomes of the projects (and different Outputs of the Outcomes) has been presented first, which is followed by the presentation regarding the achievement of the project goals and the project objectives. This is because the achievements of the project goals and the objectives has been assessed both, in terms of the indicators (for project goals and objectives as given in the log-frame) and in terms of the achievement of result for different Outcomes.

As per the requirements, the evaluation regarding attainment of the results has been carried out for the three individual outcomes of the project as well. The attainment of results has been carried out in terms of the indicators of the log-frame. Wherever relevant, the reasons for non-attainment of the target values of the indicators have also been provided.

The mandatory ratings for the attainment of overall results has also been provided. Although rating is not mandatory for achievement against each indicator, the rating has been provided. This has been done to facilitate the ratings for the individual Outcome and the project at an aggregate level. The evaluation of the attainment of overall results has been carried out keeping in mind the main questions for terminal evaluation, as given in the Box at the beginning of this section.

#### 5.1.1 Attainment of results– Outcome 1

##### **Outcome 1: Investments in decentralized renewable energy (RE) power generation increased**

The Outcome 1 of the project, was focused on supporting actual investments in the pilots for DREG and sustaining market growth. The pilot projects were aimed to demonstrate the application of different RE technologies (PV, wind, small hydro and/or biogas and a combination) for decentralized power generation. The first targeted investors included private businesses and industrial complexes, universities, tourist resorts, bakeries, etc., all of which depend on continuous and reliable electricity supply.

The project was to provide financial support for the implementation of the pilots through direct capital grants and soft loans (loan up to the extent of 100% of the total capital cost, with a 1% interest rate and long repayment period of 10 years). The soft loans were to be provided under NEEREA (administered by BdL). The soft loans were to be administered by the commercial banks with technical support from MEW/LCEC. Capital grants of up to 25% of the total cost (maximum USD 150,000 per pilot project) were to be provided by the DREG project. Using the demonstration due to the pilot projects, Outcome 1 of the was also to support the development of a longer-term financing mechanism which can sustain market growth after the DREG project. This was to be done by approaching new financing sources (e.g. NAMA). Accordingly, the two Outputs of the Outcome 1 of the project were as follows:

Output 1.1: Approved and operational financing scheme tailored to support small, decentralized RE investments for power generation by building on the already-operational National Energy Efficiency and Renewable Energy Account (NEEREA), with completed implementation of selected pilot and demonstration projects.

Output 1.2: Developed complementary funding scheme that can continue to facilitate RE investments after the project ends, leveraging funding through climate finance (NAMAs, voluntary carbon market) and other sources.

Given below is the activities carried out for achieving the two Outputs for Outcome 1

### **Output 1.1**

In Lebanon, the scheme for providing the soft loan (NEEREA) for the RE project was already operational (administered by BDL) in the baseline. In order to facilitate provision of capital grants for the DREG pilots to be supported by the project, the funds allocated for the provision of the grants were transferred to BDL so that they can be coupled with the NEEREA loans while disbursing the loan to the beneficiaries (pilot projects).

The project team issued a call for an Expression of Interest (EOI) for the RE vendors in order to pre-qualify them in terms of technical competency. The EOI was for two lots; lot 1 for PV DREG systems and lot 2 for other RE DREG systems. About 32 EOI were received from Lebanon-based vendors for lot 1, but no EOI was received for lot 2 (barring one from India for biomass based systems). The possible reasons for not receiving the EOI for lot 2 seems to be firstly the fact that the EOI was meant for national companies (there was hardly any company dealing with RE systems other than PV) and secondly the stringent evaluation criteria for the EOI (please see Annex E for the criteria) which was not favourable for the companies dealing with other (other than PV) RE technologies (the market for RE technologies except for solar PV is not that developed in Lebanon). The EOI received from the vendors were evaluated. 18 vendors for solar PV were pre-qualified. As explained before, although, the call for EOI was open for all the RE technologies, the EOI received were only for solar PV technology. For non-solar PV based technology, only one vendor (Ankur Scientific from India) was pre-qualified for biomass technology.

Pre-qualification of vendors was followed by a call for applications, wherein the prospective beneficiaries were asked to tie up with one of the pre-approved vendors to jointly submit a proposal. Only the proposals with the capital cost of USD 1,500 per kWp or less for solar PV were eligible to apply. The proposals were ranked, using scores, based on a number of parameters, one such parameter being the extent of grant asked, wherein the preference was given to the proposals asking for smaller grants than the USD 150,000 maximum per project. No proposals were received for the DREG pilots for the technologies other than PV. This is clearly due to two reasons: firstly because no vendor for RE technology other than PV (except for Ankur Scientific for biomass based RE) was pre-qualified and secondly the limit put on the capital cost (the technologies which lacks demonstration, initially has comparatively higher capital cost). The idea of the DREG project was the removal of barriers (one such barrier was the financial barrier) for the the RE technologies.

Nine proposals for the pilot projects were finally selected for support under the DREG project. However, one proposal got dropped out and eight demonstration projects got established (please see the list in Table 14). The proposal by Highland – Beit Misk, a residential complex, cancelled the MoU with UNDP and abandoned the project due to financial difficulties at the developer company. The DREG project provided the technical and project management support to the selected beneficiaries and the renewable energy companies they partnered with in order to receive the financing for the project and implement it.

### **Output 1.2**

The project team has carried out the viability analysis of the DREG projects and considering the drop in the capital cost of RE technologies over a period of time, is of the view that the ongoing scheme of soft loans through NEEREA would be sufficient to attract private sector investment for RE in future.

The current thinking within the national counterparts (government agencies) within Lebanon also favours private sector investment for RE. For example, MEW/LCEC has released Lebanon's National Renewable Energy Action Plan (NREAP) which outlines a vision for a tangible RE target by the year 2030. The NREAP envisages utility-scale RE projects to be financed exclusively through private investments. Lebanon's Intended Nationally Determined Contribution (INDC), submitted by the Government as part of its commitment under the Paris Agreement, stipulates a 15% RE target (power and heat demand) by 2030, which can reach 20% with proper support. The policy and financial instruments proposed to be used to facilitate private sector financing for RE are;

- Fostering financial sector reform towards green infrastructure investment
- Strengthening financial sector's familiarity with renewable energy and project finance
- Concessional public loans to IPPs

The DREG project supported the preparation of the report "Lebanon: De-risking Renewable Energy Investment". The report addressed the key question of how can the government of Lebanon most cost-efficiently attract private sector finance to meet its investment targets in renewable energy.

The project initiated the preparation of a supported NAMA for financing the future RE investments, but did not pursue it, as it was felt that there is no more need to have an additional (over and above the ongoing NEEREA) financing scheme.

While the details of the achievements of the different outputs for Outcome 1 were discussed above, **Table 13** provides the details of the level of attainment of the indicators (as per results framework) for Outcome 1. The values of the indicators at TE of the project are more or less as per PIR for the year 2018. For reference, the baseline values of the indicators and those at the time of MTR and those self assessed in PIR for the terminal year (2018) are also provided in the table.

**Table 13: Attainment of results – Outcome 1: Investments in decentralized renewable energy (RE) power generation increased**

Indicator	Baseline	End of project Target	Rating and Status at MTR	Status as per PIR 2018 <sup>7</sup>	TE Rating
Volume of investments mobilized	0	US\$ 8.75 million	<b>S</b> On the way towards achievement	The volume of investments mobilized reached USD 3.109 million (it reached the USD 3.493 at the time of TE)	<b>S</b> (Please see the description provided after the Table)

Although the capacity for DREG got established to the desired level, the end-of-project target of USD 8.75 million in investments has not been achieved due to the reduction in the capital costs of the solar PV technology. One of the other reason for the shortfall in the reduction in the total investment is the withdrawal of one of the selected beneficiaries (nine beneficiaries were finally selected to be supported by the project, one of the beneficiary withdrew on a later date due to financial problems). The project document has considered the capital cost of DREG as USD 5,000/ kWp. The capital cost of solar PV was USD 7,186 / kWp in the year 2011 and it dropped to an average of USD 1,872/kWp by the year 2016. There was further reduction in the capital cost to an average of USD 1,545/kWp by the year 2017. The drop in the capital costs resulted in far lesser investments being required to commission the same capacity set as a target by the project. Table 14 provides the details of the investments mobilized for different DREG pilot project.

<sup>7</sup> Self assessment by the project team

**Table 14: Pilot Projects Supported by the DREG project**

Facility	Company	City/Town	Capacity (kWp)	Total Cost (USD)
Al Taghzia	ASACO	Debbieh	691.2	790,900
Liban Cables	Hawa Akkar	Nahr Ibrahim	601.02	742,500
Raidy Printing Group	EcoSys	Fayadieh	288.6	682,000
Big Mills of the South	Alternative Energy Inc & Ghaddar	Wadi El Zaini	261.44	382,486
ABC Dbayeh	ME Green	Dbayeh	229.32	327,800
Perla	Salem International	Bkemra	164.22	221,749
Al Kazzi	Smart Age	Hsoun	162.98	239,999
Reva	AlBina	Zouk Mosbeh	64.26	106,150
<b>Total</b>			<b>2,463</b>	<b>3,493,584</b>

Considering the achievements against different outputs for **Outcome 1** and the achievement towards the creation of capacity for DREG, the achievement for Outcome 1 is rated as **Satisfactory**.

### 5.1.2 Attainment of results – Outcome 2

**Outcome 2: An enforced supportive policy and regulatory environment for attracting investments for privately owned, grid-connected power generation by RE sources**

Outcome 2 of the project was to support the establishment of an enabling legal and regulatory framework to attract investment for privately-owned, grid-connected power generation by renewable energy sources. The project was to support the required background analysis, consultations, awareness-raising and capacity building of the key stakeholders to allow the drafting of the new regulations and facilitate their effective adoption and implementation. The DREG project was to build on and improve upon the analysis available due to the baseline projects for promotion of RE in Lebanon.

The DREG project, in collaboration with other ongoing RE projects, worked on various technical guidelines and regulations to build a favourable environment for renewable energy generation in Lebanon. The project focused on different outputs for Outcome 2 as detailed in Table 15 below.

**Table 15: Outputs for Outcome 2 and the Achievements**

Output	Achievements
Output 2.1: Completed analysis of possible technical constraints associated with connecting new decentralized RE power generation units onto the grid.	<ul style="list-style-type: none"> <li>Based on the project's experience in installing and supervising decentralized PV systems, a report was published on best-practices entitled "On-grid and PV-diesel Hybrid Systems Technical Guidelines Report". This report was disseminated to local PV companies in a technical workshop, attended by over 40 companies. The report aimed to establish a common and general procedure to ensure safe and technically-sound implementation of PV plants. The report is targeted at engineers and individuals working in the field of solar PV.</li> </ul>
Output 2.2: Updated and harmonized technical guidelines for connecting small decentralized RE plants onto the grid and for ensuring their problem-free operation.	<ul style="list-style-type: none"> <li>The project, in collaboration with other ongoing projects, facilitated the development of the grid code for solar PV and wind based power generation.</li> <li>The Solar PV Grid Code was completed and adopted by EDL and MoEW as the official Technical Specifications and Guidelines for connecting with the grid in the Request for Proposals for the Implementation of 180 MW of Solar PV Farms in Lebanon released in May 2017. The Solar PV Grid Code provides a set of guidelines and recommendations mainly in relation to the connection of large-scale PV plants in Lebanon where critical frequency and voltage deviations are common and hence, must be clearly and sensitively dealt with as per the grid code.</li> </ul>

Output	Achievements
	<ul style="list-style-type: none"> <li>The Wind Energy Grid Code was completed and adopted by EDL and MoEW as the official Technical Specifications and Guidelines for connecting with the grid for the signed Power Purchase Agreements (200 MW) in January 2018. The Wind Energy Grid Code provides a set of guidelines and recommendations mainly in relation to the connection of wind farms in Lebanon.</li> </ul>
Output 2.3: Finalized proposal and draft legal/regulatory package to complement the already-initiated amendments to Law #462, which besides net-metering would allow small decentralized RE producers to sell any excess electricity to the grid, addressing issues such as required licenses, purchase obligations of the utility, mechanisms for administering and setting national feed-in tariffs and other possible financial and/or fiscal support mechanisms.	<ul style="list-style-type: none"> <li>The net-metering Guidelines Report was prepared in partnership with the UNDP CEDRO project and adopted by Ministry of Energy and Water (MoEW) and the national utility, (EDL). The report is a practical manual for installers and evaluators of embedded PV plants designed for self-generation and to feed the surplus generation of electricity to the grid, under the net-metering scheme with the EDL. Besides technical considerations on grid integration and the connection point, the guidelines focus on appropriate meters and suppliers, as well as administration aspects and billing options.</li> <li>Feed-in-tariff scheme could not be tackled due to political issues that have impeded the change of the law that structures the sale of electricity from renewable energy to the state-run utility.</li> </ul>
Output 2.4: Enhanced knowledge of the cost efficiency of different RE and EE measures at the macroeconomic and final consumer level.	<ul style="list-style-type: none"> <li>A flyer detailing the cost-efficiency and actual monetary savings achieved by DREG beneficiaries was designed and printed and was to be disseminated to Lebanese Industrialists in Q2 and Q3 of 2018 (as the event got cancelled by the host ministers, it will now be disseminated at the first such available opportunity). The data presented is the result of monitoring electricity generation from the PV systems, pricing the resulting savings based on each facility's blended energy cost, and producing a cash flow analysis which details the monthly savings in comparison with the monthly soft loan payments. The data summarized in this flyer will prove crucial to further incentivize the private sector to invest in solar PV technologies.</li> </ul>
Output 2.5: Amended construction and building management norms to promote increased application of different solar energy technologies in buildings' energy supply.	<ul style="list-style-type: none"> <li>No specific action was taken towards achieving this Output. It was realised by the project team that there is already provisions in the 'Green Rating' systems for the building to provide additional score for the buildings having provision of use of solar energy. Thermal standards for the buildings are already in place in Lebanon</li> <li>It was realised that the measures being carried out for promotion of the DREG are applicable for the buildings as well.</li> <li>It was realised by the project team that an action beyond the general promotional measures (like the green rating system) towards use of solar energy in buildings would require policy and regulatory measures and incorporation of specific building by-laws, building codes etc., which was much beyond the scope of the DREG project.</li> </ul>

Apart from the specific activities given in the Table above, the DREG project, along with other ongoing UNDP projects for promotion of RE in Lebanon, supported the De-risking Renewable Energy Investment Study. The study was also endorsed by the Ministry of Energy and Water, the Ministry of Environment, and the Ministry of Finance. The objective of the De-risking study was to analyse the cost-effective public de-risking measures to promote private sector investment in large-scale wind energy and solar PV in Lebanon. The study has set out the results from a quantitative investment-risk-informed modelling analysis. **Table 16** provides the details of the level of attainment of the indicators for Outcome 2.

**Table 16: Attainment of results – Outcome 2: An enforced supportive policy and regulatory environment for attracting investments for privately owned, grid-connected power generation by RE sources**

Indicator	Baseline	End of project Target	Rating and Status at MTR	Status as per PIR 2018	TE Rating
Extent to which RE policies and regulations are adopted and enforced	Regulations for feed-in tariffs and net metering under consideration	<ul style="list-style-type: none"> <li>• Net metering effectively implemented and complemented with other required regulations and/or guidance, including updated technical guidelines for grid connection as well as adopted standards and procedures for performance testing and quality control.</li> <li>• Mechanism and guidelines for the implementation of feed-in- tariffs developed.</li> </ul>	<b>S</b> On the way towards achievement	Achieved	<b>S</b>  (Please see the description provided after the Table)

The project has been able to achieve most of its Outputs for Outcome 2. At level the attainment for **Outcome 2 is rated as Satisfactory**.

### 5.1.3 Attainment of results – Outcome 3

#### **Outcome 3: Monitoring and quality control for RE-based decentralized power generation established and operational**

Outcome 3 of the DREG project was directed at enabling activities like creation of awareness; quality control systems; monitoring to track the the development of markets. Different Outputs for achieving Outcome 3 of the project along with the achievement for results for each of the Output is given in Table 17.

**Table 17: Outputs for Outcome 3 and the Achievements**

Output	Achievements
Outcome 3.1: Completed public awareness-raising campaigns, seminars, published and disseminated stakeholder group-specific technical guides, handbooks and other related training materials on the design, evaluation, financing, installation, operation and maintenance of the targeted RE technologies.	<ul style="list-style-type: none"> <li>• A NEEREA Tutorial workshop for RE projects took place on 10 September 2015 mainly targeting the local RE companies (82 participants).</li> <li>• On 4 December 2015, a workshop on NEEREA and the DREG project for the banks gathered about 58 participants.</li> <li>• A 2-day technical workshop on Earthing and Lightning protection for PV systems took place on 30-31 May 2016. It targeted 40 installers/integrators, among the largest in the Lebanese market.</li> <li>• A 2-day workshop on solar PV overview and design took place on 5-6 December 2016 for the Engineering Department of the Lebanese Army. This workshop will be replicated for the Lebanese Internal Security Forces in 2017.</li> <li>• A net-metering workshop took place jointly with CEDRO on 10 January 2017.</li> <li>• Presentation on “Financial return of Solar PV Projects in the Lebanese Industrial Sector”. Presentation done on March 2018 to the industrialists.</li> <li>• A 1-day workshop on “Best-Practices Guidelines and Lessons Learnt for on-grid and PV-diesel hybrid systems” took place in</li> </ul>



Output	Achievements
	March 2018 gathered 63 participants from local solar PV companies.
Outcome 3.2: Adopted and operational quality control scheme with related market surveillance and enforcement mechanisms for both the targeted RE products and installations.	<ul style="list-style-type: none"> <li>33 international PV equipment quality standards, which ensure durability and reliability, were adopted and approved by the Lebanese Standards Institution affiliated with the Ministry of Industry. These standards were endorsed by the Ministry of Energy and Water and the project assisted in drafting the decree so that the standards become officially mandatory. The draft decree has been submitted to the Council of Ministers (CoM) for ratification and once the CoM approves it, the Industrial Research Institute (IRI) will become the official authorized party to inspect and test PV equipment according to the ratified standards and accordingly instruct Customs to accept or deny their entry into the country. The project provided technical assistance and capacity building to the IRI regarding the testing of PV equipment and procured and donated PV lab testing equipment to the IRI so that they are well-equipped to conduct all the tests needed (delivery is expected by October 2018 (Phase 1) and December 2018 (Phase 2)).</li> </ul>
Outcome 3.3: Completed complementary training and other capacity development programmes for professional groups that are directly affected by the proposed quality control schemes.	<ul style="list-style-type: none"> <li>PV course (60-hour) translated and officially integrated into the vocational schools' electro-technical curriculum (BT level). This initiative will enable the students to graduate with ample knowledge and hands-on experience in solar PV and thereby allow them to competitively join the job market and easily secure employment especially that Lebanon will soon start building and operating solar PV farms. The project also organized a train-the-trainers workshop for the vocational teachers teaching this course to better prepare them and procured and donated PV equipment to the vocational schools so that they are used by the students during their learning experience.</li> </ul>
Outcome 3.4: Agreed methodology and institutional arrangements for market monitoring.	<ul style="list-style-type: none"> <li>The market monitoring activities were carried out in collaboration with other ongoing RE projects, the MoEW and the MEW/LCEC.</li> </ul>
Outcome 3.5: Annual market monitoring reports on the installed capacity and electricity produced by renewable energy and the institutional and financial arrangements in place to continue the market monitoring after the project.	<ul style="list-style-type: none"> <li>This outcome has been met systematically through the publishing of the solar PV status report for Lebanon by the project in coordination with the Ministry of Energy and Water. The first one was published covering data for 2015 (baseline report), a second one for 2016 was published at the end of 2017 and the next one covering 2017 was published in September 2018.</li> </ul>
Outcome 3.6: Regularly updated project website and interactive online training tool that can continue to operate after the project.	<ul style="list-style-type: none"> <li>Due to budget constraints, in particular, it was decided that a specific project website would not be created. All documents produced by the project are posted on the DREG' page which is part of the UNDP Lebanon website and on the MEW/LCEC's website. All the knowledge products and training tools will be passed on to the MEW/LCEC and the CEDRO project who will continue to operate after the project.</li> </ul>

**Table 18** provides the details of the the level of attainment of the indicators for Outcome 3. For reference, the baseline values of the indicators, those at the time of MTR and those self assessed in PIR for the terminal year (2018) are also included in the table.

**Table 18: Attainment of results – Outcome 3: Monitoring and quality control for RE-based decentralized power generation established and operational**

Indicator	Baseline	End of project Target	Rating and Status at MTR	Status as per PIR 2018	TE Rating
<ul style="list-style-type: none"> <li>• Availability of annual market data;</li> <li>• Verified customer satisfaction with the RE technologies in use</li> </ul>	<ul style="list-style-type: none"> <li>• No adequate market monitoring</li> <li>• No quality control mechanisms in place</li> </ul>	<ul style="list-style-type: none"> <li>• Availability of annual market data for new sales, total installed capacity and net production of all main RE applications sold in Lebanon by March/April each year.</li> <li>• Over 70% customers satisfaction on the RE installations made.</li> </ul>	<b>S</b> On the way towards achievement	Achieved	<b>S</b>  (Please see the description provided after the Table)

In terms of the performance of the first indicator for Outcome 3, the project regularly produced the reports on an annual basis. Although, the contents were mainly for solar PV. This is largely due to the fact that the level of market development of solar PV in Lebanon is far ahead than the other RE technologies. The project introduced the required quality control measures for all the pilot projects. The beneficiaries showed satisfaction with the PV systems' operation and performance.

**The attainment of results for Outcome 3 is rated as Satisfactory.**

#### *5.1.4 Attainment of project goals, project objectives*

**Project Objective: Reducing greenhouse gas emissions by the removal of barriers to widespread application of decentralized renewable energy based power generation**

Attainment of the project goals and the project objectives has been assessed based on the assessment of the attainment of goals and objectives of the individual Outcomes of the project, which was presented in the earlier paragraphs and the evaluation of the attainment against the indicators for project objectives.

The objective of the project was to be achieved by the end of the project. The project was to facilitate the establishment of on-grid DREG systems for environmentally-sustainable electricity supply (replacing the electricity generated using diesel generators). **Table 19** provides the indicators for assessing the achievement against the project objective.

Also given in the table are the values of the indicators at the start of the project, the target values at the end of the project, the achievement as assessed by the project management in the PIR for terminal year (year ending June 2018) and the achievements as assessed during the terminal evaluation.



**Table 19: Attainment of project objectives: Reducing greenhouse gas emissions by the removal of barriers to widespread application of decentralized renewable energy based power generation**

Indicator	Baseline	End of project Target	Rating and Status at MTR	Status as per PIR 2018	TE Rating
<u>Indicator 1</u> Amount of reduced CO <sub>2</sub> emissions by the investments facilitated by the project	0	Direct: 35,500 tonnes of CO <sub>2</sub> (eq.) over the 20-year default lifetime of the investments made during project implementation.	With the Solar PV systems installed in the 9 demonstration projects which will be completed by the end of 2017 it is expected to achieve the reduction of between 38,000 35,500 tonnes of CO <sub>2</sub> (eq.)	21,797 tonnes of CO <sub>2</sub> (eq.) in 2018. Two PV sites are still under construction; once completed the expected CO <sub>2</sub> saving from all the systems installed is expected to reach 37,600 tons CO <sub>2</sub> (eq.)	<b>S</b>  (Please see the description provided after the Table)
<u>Indicator 2</u> Cumulative renewable energy capacity installed and operational (MWp)	0 MW	1.75 MW	Expected capacity installed by December 2017 is estimated at 2.6 MWp.	1.419 MWp. Three other systems with a capacity of 1.044 MWp are under construction and therefore, by the end of the project, total capacity will reach 2.463 MWp.	
<u>Indicator 3</u> Cumulative renewable energy generation (MWh/year)	0 MWh/ Yr.	3.285 MWh/ Yr.	Expected 70,206 MWh over 20 years (based on a yearly degradation factor of - 0.8%)	2,165 MWh/Yr. By the end of the project, when eight systems will be operational, the cumulative renewable energy generation per year will reach 3,706 MWh per year.	

As was mentioned earlier (Section 3.1), the three indicators for the Project Objective are very closely related, wherein achievement of one of the three indicator ensures achievement of the other two indicators as well. However, the following paragraphs provides an account regarding achievements for the three indicators.

The projected reduction in GHG emissions depends upon the extent of RE power generated and the emission factor (emission or GHG per unit of electricity produced in the baseline situation). In the project design, the baseline considered is the supply of electricity from the grid. Thus, it is considered that the electricity which will now be generated using the RE resources would have been supplied by the grid. However, in many cases the electricity which will be generated in the demonstration projects would have been generated by the beneficiaries themselves using diesel generators. Based on the GHG emission factor for the electricity grid of Lebanon, the project design had used the emission factor of 0.541 t CO<sub>2</sub>/MWh of electricity generated. Considering that the emission factor for the electricity generated using small diesel generators is much higher, the GHG emission reduction due to the project as estimated in the project document is on the conservative side.

Table 14 provided the list of pilot projects which were supported by the DREG project. As can be seen the total capacity of the DREG pilot projects is 2.463 MWp. The emission factor considered in the project design is 0.541 t CO<sub>2</sub>/MWh. At the time of project ending, the grid emission factor for Lebanon is 0.67 t CO<sub>2</sub>/MWh. The emission factor is expected to remain at this level till the year 2022, after which the emission factor is projected to drop due to fuel switch from heavy oil and diesel to gas for power generation in Lebanon. Generation of electricity in the solar PV facilities supported by the DREG project, over a period of time, will depend upon the capacity of the solar panels, the capacity utilisation factor and the capacity degradation (of the solar panels) due to ageing. Table 20 provided the details of the expected RE power generation, the grid emission factor and the consequent GHG emission reduction due to the pilot project.

**Table 20: Projected generation of Electricity from the Pilot projects and GHG emission reductions**

Year	Grid Emission Factor (t/MWh)	Yearly Energy Generation (MWh)	CO2 Savings (t)
2017	0.690	3,714	2,563
2018	0.670	3,695	2,476
2019	0.670	3,677	2,464
2020	0.670	3,659	2,451
2021	0.670	3,641	2,439
2022	0.440	3,622	1,594
2023	0.445	3,604	1,604
2024	0.405	3,587	1,453
2025	0.441	3,569	1,574
2026	0.445	3,551	1,580
2027	0.416	3,533	1,470
2028	0.422	3,516	1,484
2029	0.423	3,498	1,480
2030	0.425	3,481	1,479
2031	0.425	3,463	1,472
2032	0.425	3,446	1,465
2033	0.425	3,429	1,457
2034	0.425	3,412	1,450
2035	0.425	3,395	1,443
2036	0.425	3,378	1,436
2037	0.425	3,361	1,429
2038	0.425	3,345	1,421
<b>Total</b>		<b>77,576</b>	<b>37,682</b>
<i>Notes:</i> 1. Grid emission factor has been projected by the project team based on the expected fuel mix for generation of power 2. Generation of electricity for the first years given above works out to the capacity utilisation factor of about 17.5% 3. Generation of electricity for the subsequent years has been determined considering a capacity degradation factor of 0.5% per year			

The DERG project has exceeded the target value for all the three indicators to monitor the progress and achievement of the results for the project objective. The only issue is that the project could not take on board other (other than solar PV) RE technologies for DREG. The achievement for the three Outcomes of the project has also been satisfactory. In view of this, the **attainment of the project objectives is rated as Satisfactory**.

#### 5.1.5 Global environmental benefits

The global environmental benefits of the project are the reduction in the emission of greenhouse gases (GHG) to help the global community address climate change. The project document stipulates the project objective as ‘Reducing greenhouse gas emissions by the removal of barriers to widespread application of decentralized renewable energy based power generation’. The target values for direct GHG emission reduction was 35,000 tons of CO<sub>2</sub> equivalent over the lifetime of 20 years of the demonstration projects. Details of the projected GHG emissions and the corresponding set of assumptions were provided in Table 20.

The projected GHG emission reductions as given in Table 20 are on the conservative side due to two reasons. Firstly, due to the fact that the emission factor considered is that for the grid, whereas in actual practice the pilot projects would be replacing the small diesel generator-based power generated by the beneficiaries and secondly due to use of a dynamic baseline emission factor, which reduces over a period of time.

Indirect GHG emission reductions due to the DREG project will happen over a period of time as result of sustained market growth due to: enabling conditions created by the project for continued investments in small decentralized RE generation capacity. There will also be indirect GHG reduction impact due to utility-scale RE development.

## 5.2 Relevance

The main questions for terminal evaluation are; (please see Annex B)

- To what extent is the activity suited to local and national development priorities and organizational policies, including changes over time?
- To what extent is the project in line with UNDP Operational Programs or the strategic priorities under which the project has been funded?

The DREG project and the activities planned within the project are highly relevant to the development needs of Lebanon. This is considering that the project addresses the issue of availability of sustainable energy to all at one end, while on the other hand, it addresses the issue of pressure on the economy due to the subsidies provided to the energy sector. The project is in line with the UNDP operational programs for Lebanon. This is explained further in the following paragraphs.

To respond to the problem of shortage of electricity in the country, MoEW developed a comprehensive energy policy in 2009-2010 and secured the approval for this from the Council of Ministers (CoM). The policy was an unprecedented effort in Lebanon to present a well-elaborated strategy and implementation programme to address the current power sector problems with concrete and quantified targets to be achieved in the short, medium and long term. The policy envisaged an increasing role of renewable energy, with a target to have RE contribution of 12% in the total electricity generation in Lebanon by the year 2020. This reflected the commitment made by the Government of Lebanon in 2009 in Copenhagen. The Policy Paper envisaged 40 MW supplemental hydro-power in addition to the existing 290 MW (in 2012- 2015), as well as new wind power (60-100 MW in 2011-2013) and waste to energy (15-25 MW in 2013- 2014).

Other proposed measures in the Policy Paper that relate, in particular, to efforts to increase the role of renewable energy include the establishment of a smart grid and the creation of the National Energy Efficiency and Renewable Energy Account (NEEREA) as a financing mechanism to support energy efficiency and renewable energy investments. The Policy Paper also encouraged private sector involvement and the promotion of green buildings. The National Energy Efficiency Action Plan (NEEAP) which was approved by the CoM in February 2012, has the provision for promoting decentralized PV and wind applications in the residential and commercial sectors; Electricity generation from wind power; Electricity generation from solar energy (PV); Financing mechanisms and incentives; and Awareness and capacity building. At the time of project design, a legislation was under consideration to introduce feed-in tariffs (FiTs) for renewable energy supplied to the grid.

Through the recently published National Renewable Energy Action Plan (2016-2020), the Ministry of Energy and Water has provided clear sets of technology target mix for the renewable energy sector in Lebanon for the short-term and with indicative targets for the year 2030. The 2030 targets are in line with Lebanon's Nationally Determined Contribution, made under the Paris Agreement for climate change mitigation. Apart for the development and economic benefits, the project also sought to facilitate reduction in the emissions of GHG.

UNDP's assistance in Lebanon is implemented by national entities, including line ministries and the Ministry of Environment and the Ministry of Energy and Water. The UN Country programme document for Lebanon (2017-2020) mentions that to halt the environmental degradation that has been exacerbated by the crisis (due to Syrian refugee influx) and negatively influenced Lebanon's chances of securing long-term sustainable development is a mix of policy-oriented actions and scalable local interventions that are guided by the frameworks provided by the Paris Agreement on climate change, and Sustainable Development Goals (SDGs). The UNDP approach in Lebanon is aligned with the UN Strategic Framework. UNDP priorities for the cycle 2017-2020 include improving environmental governance, including low-emission, climate resilient actions,

and environmental management programmes that protect national resources and steer the country towards a green economy. UNDP is uniquely placed to play a seminal role in contributing significantly to this priority areas.

The DREG project is coming to an end at the time when the government has set targets for renewable energy and wind power and the country has experience with independent power producers (IPPs) in the RE sector. Thus, the conducive atmosphere created by the project will be of great help to the country in realising its targets and the objectives of the National Renewable Energy Action Plan.

**The relevance of the DREG project has been rated as Relevant.**

### 5.3 Effectiveness & Efficiency

The main questions for terminal evaluation are; (please see Annex B)

- To what extent the objectives have been achieved?
- To what extent the results have been delivered with the least costly resources possible?
- What are the positive and negative, foreseen and unforeseen changes to and effects produced by a development intervention?

The goal of the DREG project was the reduction of the GHG emissions from the power sector in Lebanon by promoting DREG in commercial enterprises and buildings of the private sector. The stated strategy, as per the Project Document of the project, was the facilitation of demonstration DREG systems by providing the grants as part of the capital cost and by providing technical support towards implementation of the demonstration projects. This was to lead to replication due to the creation of conducive policy and regulatory environment for RE in the country. The replication was to be supported by dissemination of the results and the case studies of the pilot projects.

The DREG project successfully delivered when it comes to the establishment of demonstration DREG projects and the establishment of further DREG projects as replication projects at the end of the DREG project. However, the project could not promote the RE technologies other than solar PV. **The Effectiveness of the project is rated as Satisfactory.**

The contribution of the DREG project in terms of direct GHG emission reductions is expected to be 37,682 tons of CO<sub>2</sub> equivalent. Considering the total GEF support provided to the project as USD 1.45 million, the cost of GHG mitigation works out to about USD 38 per ton of CO<sub>2</sub>, which is on a higher side. However, the project did will also lead to indirect GHG emissions as was originally envisaged in the project. Thus, **efficiency of the project is rated as Satisfactory.**

### 5.4 Country ownership

The main questions for terminal evaluation are; (please see Annex B)

- Was the project concept in line with development priorities and plans of Lebanon?
- Were the relevant country representatives from government and civil society involved in project implementation, including as part of the project steering committee?
- Was an inter-governmental committee given responsibility to liaise with the project team, recognizing that more than one ministry should be involved?
- Have the government(s), enacted legislation, and/or developed policies and regulations in line with the project's objectives?

The DREG project was in line with the development priorities and plans in Lebanon. Particularly, the project targeted to address two important development priorities: first the availability of commercial energy for the businesses and the second, meeting the energy needs in a sustainable manner.

The project design and the implementations were carried out in close coordination and consultation with

different government agencies. The MEW/LCEC provided the required technical support to the project. The Central Bank of Lebanon not only provided the soft loans but also administered the grants (on behalf of UNDP/GEF) to the beneficiaries of the pilot DREG projects. The UNDP was to execute the project on behalf of the Government of Lebanon under the National Implementation Modality (NIM). The assisted NIM implementation modality for this project was good as it gave the required flexibility to the project team to take decisions in a timely manner.

Outcome 2 of the project was targeted at providing policy and institutional support for the promotion of RE projects. Under this Outcome, fiscal, regulatory and policy measures for the promotion of RE technologies were to be developed and approved by the concerned authorities. One such policy matter was the approval of feed-in tariff for RE projects. In the baseline, the regulations for feed-in tariffs and net metering were under consideration by the government. Due to political reasons, the project could not achieve the establishment of the regulatory body and the policy for feed-in tariff for the RE projects.

## 5.5 Mainstreaming

The main questions for terminal evaluation are; (please see Annex B)

- How is the project successfully mainstreaming other UNDP priorities, including poverty alleviation, improved governance, the prevention and recovery from natural disasters, and women's empowerment?
- Whether it is possible to identify and define positive or negative effects of the project on local populations (e.g. income generation/job creation, improved natural resource management arrangements with local groups, improvement in policy frameworks for resource allocation and distribution, regeneration of natural resources for long term sustainability).
- If the project objectives conform to agreed priorities in the UNDP country programme document (CPD) and country programme action plan (CPAP).
- Whether there is evidence that the project outcomes have contributed to better preparations to cope with disasters.
- Whether gender issues have been taken into account in project design and implementation and in what way has the project contributed to greater consideration of gender aspects, (i.e. project team composition, gender-related aspects of pollution impacts, stakeholder outreach to women's groups, etc.)

While examining the issue of the extent to which the DREG project has helped in mainstreaming renewable energy in Lebanon, it is important to consider that the Government of Lebanon has supported the project aimed at removing the barriers towards larger use of RE for power generation. Support for the promotion of DREG is part of the efforts from the government's side to promote all forms of renewable sources of energy. The government understands the importance of promoting all forms of renewable energy. The success of this project will help the government to mainstream other forms of renewable energy as part of its ongoing policy. This approach will help in making renewable energy technologies an integral part of the initiatives in the energy sector.

At the level of UNDP, although there is no direct contribution of this project towards mainstreaming its other priority areas of work like poverty alleviation, improved governance, prevention and recovery from disasters, gender equality, it has no negative impact on any of the other priority areas of the UNDP.

## 5.6 Sustainability

The main questions for terminal evaluation are; (please see Annex B)

- Are there financial risks that may jeopardize the sustainability of project outcomes?
- What is the likelihood of financial and economic resources not being available once GEF grant assistance ends?
- Are there social or political risks that may threaten the sustainability of project outcomes?
- What is the risk for instance that the level of stakeholder ownership (including ownership by governments and other key stakeholders) will be insufficient to allow for the project outcomes/benefits to be sustained?
- Do the various key stakeholders see that it is in their interest that project benefits continue to flow?
- Is there sufficient public/stakeholder awareness in support of the project's long-term objectives?
- Do the legal frameworks, policies, and governance structures and processes within which the project operates pose risks that may jeopardize sustainability of project benefits?
- Are requisite systems for accountability and transparency, and required technical knowhow, in place?
- Are there ongoing activities that may pose an environmental threat to the sustainability of project outcomes?

The project strategy was to remove barriers and create an enabling atmosphere for DREG. The project has successfully established the demonstration project for DREG, however, all of them are based on solar PV technology. The project could not demonstrate the use of other RE technologies for decentralised power generation.

From the social and political view point, there is not much threat to the sustainability of the results and outcomes of the project. From the view point of policy and regulations, one of the issues is that the DREG project was unable to get a feed-in-tariff policy for RE projects approved.. Even in the absence of a policy for the feed in tariff, some of the upcoming wind power projects were able to sign PPAs (Power Purchase Agreements) with EdL on a business-to-business case basis based on the approval by the Council of Ministers. Absence of a policy regarding feed-in-tariff and the absence of a regulatory body are the two issues which may impact the sustainability of the outcomes of the DREG project.

There are practically no negative environmental impacts of the project. Thus, from the viewpoint of institutional framework and environmental sustainability, the outcomes of the project are likely to sustain.

**The overall sustainability of project results is Likely. The outcomes and results of the DREG project are Likely to Sustain.**

## **5.7 Impact**

The main questions for terminal evaluation are; (please see Annex B)

- Whether, the project has demonstrated verifiable improvements in ecological status?
- Whether, the project has demonstrated verifiable reductions in stress on ecological systems through specified process indicators, that progress is being made towards achievement of stress reduction and/or ecological improvement?

The most direct impact of the project, in terms of GEF objectives, is the reduction in GHG emissions. The outcomes of the DREG project would lead to GHG emission reductions from the power sector in Lebanon on a long term basis. This will have the environmental and ecological co-benefits in terms of reduction in the emissions of particulate matter; lead, mercury and other heavy metals; acid gases like NO<sub>x</sub> and SO<sub>x</sub>.



## 6. CONCLUSIONS, RECOMMENDATIONS & LESSONS

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The main questions for terminal evaluation are; (please see Annex B)

- Did the project provide cost-effective solutions in order to address barriers?
- Are these solutions provided in an efficient way?
- What are the best and worst practices in addressing issues relating to relevance, performance and success?
- Corrective actions for the design, implementation, monitoring and evaluation of the project
- Actions to follow up or reinforce initial benefits from the project
- Proposals for future directions underlining main objectives

At the time of design of the DREG project, the CEDRO project, which focused on the demonstration of RE in Lebanon, was already underway. While the pilot demonstration projects (solar PV) under CEDRO (phase I to Phase III) were financed with 100% grant, with public buildings as beneficiaries, the DREG project was targeted to promote RE technology in the private sector with minimal grant and soft loan from NEEREA. One of the significant achievements of the DREG project has been that it has led to a situation where the private sector enterprises have started considering solar PV technology as one of the main sources for meeting their electricity requirements to the extent possible (given the load curve of the enterprise and the intermittent nature of solar PV electricity generation). Thanks to the reduction in the capital cost of solar PV, coupled with promotional and demonstration activities undertaken by the DREG project, the private sector enterprises in Lebanon are now ready to put up solar PV-based electricity generation systems without any subsidy or grant on the capital cost, however, some technical assistance and subsidised loans would still be required.

The stated objective of the project was, “Reducing greenhouse gas emissions by removal of barriers to widespread application of decentralized renewable energy based power generation”. However, the project design, right from the beginning, was biased towards solar PV technology. This is quite evident from the PIF, PPG grant and the project document. Due to this reason, the project failed to demonstrate and promote other (other than solar PV) DREG technologies.

One of the specific achievements of the project is the introduction of a curriculum regarding solar PV technology in the technical education system which will ensure the availability of skilled human resources to ensure widespread application of solar PV technology in the country. One of the other achievements of the project along with the other RE projects (which were implemented during the same time period and followed a collaborative approach) is the establishment of the ‘net metering’ policy for the grid-connected solar PV-based decentralised power generation. One of the issues where the project has fallen short of achieving the success is the establishment of a policy for ‘feed-in-tariff’ for RE-based decentralised power generation. The issue of ‘feed-in-tariff’ was addressed both at the time of the project inception and the MTR, wherein it was pointed out that given the current situation in the country, it would not be possible to get the policy on ‘Feed-in-tariff’ approved. The DREG project has been able to address the barriers as far as decentralised grid-connected solar PV power projects are concerned. The project has led to significant (exceeding the target) reduction in direct GHG emissions.

### 6.1 Corrective actions for the design, implementation, monitoring and evaluation of the project

The project design was well thought of and targeted towards different barriers to DREG projects in Lebanon. However, the project design suffered due to the fact that while the project was meant to support all the RE sources, emphasis remained on solar PV.

**Recommendation 1:** The project design as presented in the ‘Project Document’ did specify the expected set of Outputs for each of the Outcome of the project. However, the expected outputs did not find their required



place in the log-frame of the project. Indicators were provided at the outcome level, whereas the work planning of the project was done at the Output level. The monitoring (PIRs) of the progress of the project was done as per the results framework of the project. As all the activities / Outputs did not get covered in the results framework, some of the important activities (as provided in the Outputs) gets missed out in the monitoring / PIRs. It is recommended that for the future project design, the Indicators in the results framework be fixed at both the Outcome level and the Output level

**Recommendation 2:** The three indicators for the project objective (GHG emission reduction, Capacity of RE, and RE generation) were very closely interrelated. Thus, the additional indicators did not serve any purpose. Considering that the objective of the project on the one hand was “Reducing greenhouse gas emissions” while on the other it was, “removal of barriers to widespread application of decentralized renewable energy based power generation”, an indicator which indicates the removal of barriers or widespread application of DREG would have been more appropriate (instead of capacity of RE). Having said that, it is appreciated that having an appropriate indicator to indicate removal of barrier or wide spreading of DREG in itself is a big challenge. It is recommended that to the extent possible, the indicators of the ‘Project Objective’ should be independent of each other.

**Recommendation 3:** The project has not been able to support other DREG technologies (other than solar PV). As a result, it is a missed opportunity to showcase/promote different RE technologies. It is recommended that in case of involvement of multiple technologies/sectors, the project design should specify different technologies/sectors to be demonstrated (by pilots), and should have provisions for a different set of efforts which would be required to promote/demonstrate such technologies. Different types and levels of technical support are required for promotions/demonstration of different type of RE technologies. Any future project design for the promotion/demonstration of DREG should either be technology specific or should clearly state the technologies to be used for different pilot projects.

**Recommendation 4:** The project design had provisions like technical support, grants and soft loans for supporting the implementation of the DREG pilot projects. The kind and extent of support was uniform all across the RE technologies. It is recommended that the project design should also have technology-specific provisions for supporting the kind of RE technology to be demonstrated by way of pilots. For example, for the technologies which are not presently demonstrated in the country, there can be a provision to have a study tour of the prospective beneficiaries to the countries where such technologies are already in use. In addition, for the pilot projects based on RE technologies where sufficient technical expertise may not be available within the country, it would help to take on board ‘International Technical Experts’.

## 6.2 Proposals for future directions underlining main objectives

**Recommendation 5:** There are some very good case studies from the DREG project to demonstrate financial feasibility of solar PV technology (particularly considering the reduction in the capital cost of solar PV). This may be used to achieve replication of the solar PV on a larger scale.

**Recommendation 6:** The project has prepared quality standards for a number of solar PV equipment which are already with the government for approval by way of a decree. Efforts may be continued to achieve this.

**Recommendation 7:** Whenever, an opportunity for a new RE project in Lebanon arises, the project design may support formulation of regulations and establishment of the electricity regulatory authority. This will not only help decentralised renewable energy generation, but will also help the establishment of Independent Power Producers (including those for RE).

### 6.3 Best/worst practices in addressing issues relating to relevance, performance and success

**Recommendation 8:** Soft loans from the central bank are a very effective fiscal instrument for the promotion of RE technologies. However, it takes a considerable amount of time for approval of the soft loans, thereby delaying the projects. There is a need to optimise the process at the level of the central bank so that the overall time taken is reduced. The government counterpart may explore the possibilities to optimise the process at the level of the central bank.

## ANNEX A: TERMS OF REFERENCE

### INTRODUCTION

In accordance with UNDP and GEF M&E policies and procedures, all full and medium-sized UNDP support GEF financed projects are required to undergo a terminal evaluation upon completion of implementation. These terms of reference (TOR) sets out the expectations for a Terminal Evaluation (TE) of the *Small Decentralized Renewable Energy Generation Project* (PIMS # 4695).

The essentials of the project to be evaluated are as follows:

### PROJECT SUMMARY TABLE

Project Title:		Small Decentralized Renewable Energy Power Generation		
			<i>at endorsement (USD Million)</i>	<i>Realized at completion (USD million)</i>
GEF Project ID:	4749	GEF financing:	1.45	
UNDP Project ID:	4695	IA/EA own:	0.125	
Country:	Lebanon	Government:	0.5	
Region:	Arab States	Others:	10.991	
Focal Area:	Climate Change	Total co-financing:	11.616	
FA Objectives, (OP/SP):	CCM-3	Total Project Cost:	1.575	
Executing Agency:	Ministry of Energy and Water	GEF endorsement:	Feb 2012	
		ProDoc Signature (date project began):		11 February 2014
Other Partners involved:	Centre for Development and Reconstruction	(Operational) Closing Date:	Proposed 30 Sep 2018	Actual 30 Sep 2018

### OBJECTIVE AND SCOPE

The project was designed to catalyse and remove barriers to the widespread application of decentralized renewable energy-based power generation in Lebanon, with a target to facilitate the installation of at least 1.75 MW of new, decentralized renewable energy power generation capacity during the implementation of the project. In addition, the project has a yearly target of 3,285 MWh/year as renewable energy generation, a total target of 35,500 tonnes of CO<sub>2</sub>eq savings over the 20-year default lifetime of the investments made during project implementation, and a total volume of investments mobilized equal to \$8.75 million.

The project's key outcomes are:

1. Investments in decentralized renewable energy power generation increased
2. Supportive policy and regulatory environment enforced for attracting investments for privately-owned, grid-connected renewable energy power generation
3. Monitoring and quality control of RE-based decentralized power generation introduced and sustained

The project spans over four years and is being executed in Lebanon with a total budget of \$1.575m from the Global Environment Facility (GEF) and the UNDP. The co-financing for the project will come from the Central Banks' NEEREA loans (\$4.6 M), the Ministry's in-kind donation (\$500,000), Transenergie (\$134,000), and

the UNDP CEDRO, MED-SOLAR, and LECB Projects (\$6.257M).

The project is to be nationally executed by the Ministry of Energy and Water of the Government of Lebanon and implemented by UNDP through the “Support to the NIM” modality. UNDP accordingly manages and implements the project activities in line with the project document. The procurement and financial management follows UNDP policies and guidelines. The Ministry has assigned two senior officers as a National Focal Points to coordinate the project activities with activities of other Government entities and certify the expenditures are in line with approved budgets and work-plans.

The TE will be conducted according to the guidance, rules and procedures established by UNDP and GEF as reflected in the UNDP Evaluation Guidance for GEF Financed Projects.

The objectives of the evaluation are to assess the achievement of project results, and to draw lessons that can both improve the sustainability of benefits from this project, and aid in the overall enhancement of UNDP programming. The recommendations will feed into new project design approaches.

## EVALUATION APPROACH AND METHOD

An overall approach and method for conducting project terminal evaluations of UNDP supported GEF financed projects has developed over time. The evaluator is expected to frame the evaluation effort using the criteria of **relevance, effectiveness, efficiency, sustainability, and impact**, as defined and explained in the UNDP Guidance for Conducting Terminal Evaluations of UNDP-supported, GEF-financed Projects. A set of questions covering each of these criteria have been drafted and are included with this TOR. The evaluator is expected to amend, complete and submit this matrix as part of an evaluation inception report, and shall include it as an annex to the final report.

The evaluation must provide evidence-based information that is credible, reliable and useful. The evaluator is expected to follow a participatory and consultative approach ensuring close engagement with government counterparts, in particular the GEF operational focal point, UNDP Country Office, project team, UNDP GEF Technical Adviser based in the region and key stakeholders.

The evaluator is expected to conduct a field mission to Beirut, Lebanon, and site visits will be organized to one or more of the project beneficiary sites that are located in different areas in the country. Interviews will be held with the following organizations and individuals at a minimum: UNDP Lebanon Energy and Environment Programme team, Project Managers of other donor-funded projects that are relevant, including but not limited to climate change and other renewable energy projects, the Ministry of Energy and Water (various individuals), the Central Bank of Lebanon (BDL), etc.. The Project Team will be responsible for organising these interviews and will support the consultant in the logistics of these meeting. Approximately 5 – 10 meetings/interviews will be undertaken.

The evaluator will review all relevant sources of information, such as the project document, project reports – including Annual APR/PIR, project budget revisions, midterm review, progress reports, GEF focal area tracking tools, project files, national strategic and legal documents, and any other materials that the evaluator considers useful for this evidence-based assessment. A list of documents that the project team will provide to the evaluator for review is included in [Annex B](#) of this Terms of Reference.

## EVALUATION CRITERIA & RATINGS

An assessment of project performance will be carried out, based against expectations set out in the Project Logical Framework/Results Framework (see [Annex A](#)), which provides performance and impact indicators for project implementation along with their corresponding means of verification. The evaluation will at a minimum cover the criteria of: **relevance, effectiveness, efficiency, sustainability and impact**. Ratings must be provided on the following performance criteria. The completed table must be included in the evaluation

executive summary. The obligatory rating scales are included in [Annex D](#).

<b>Evaluation Ratings:</b>			
<b>1. Monitoring and Evaluation</b>	<b>Rating</b>	<b>2. IA &amp; EA Execution</b>	<b>Rating</b>
M&E design at entry		Quality of UNDP Implementation	
M&E Plan Implementation		Quality of Execution - Executing Agency	
Overall quality of M&E		Overall quality of Implementation / Execution	
<b>3. Assessment of Outcomes</b>	<b>Rating</b>	<b>4. Sustainability</b>	<b>Rating</b>
Relevance		Financial resources:	
Effectiveness		Socio-political:	
Efficiency		Institutional framework and governance:	
Overall Project Outcome Rating		Environmental :	
		Overall likelihood of sustainability:	

## PROJECT FINANCE / COFINANCE

The evaluation will assess the key financial aspects of the project, including the extent of co-financing planned and realized. Project cost and funding data will be required, including annual expenditures. Variances between planned and actual expenditures will need to be assessed and explained. Results from recent financial audits, as available, should be taken into consideration. The evaluator will receive assistance from the Country Office (CO) and Project Team to obtain financial data in order to complete the co-financing table below, which will be included in the terminal evaluation report.

Co-financing (type/source)	UNDP own financing (mill. US\$)		Government (mill. US\$)		Partner Agency (mill. US\$)		Total (mill. US\$)	
	Planned	Actual	Planned	Actual	Planned	Actual	Actual	Actual
Grants								
Loans/Concessions								
• In-kind support								
• Other								
Totals								

## MAINSTREAMING

UNDP supported GEF financed projects are key components in UNDP country programming, as well as regional and global programmes. The evaluation will assess the extent to which the project was successfully mainstreamed with other UNDP priorities, including poverty alleviation, improved governance, the prevention and recovery from natural disasters, and gender. The evaluator can use the following tools, inter alia: (i) Integrating Human Rights and Gender Equality in Evaluation - Towards UNEG Guidance.

## IMPACT

The evaluator will assess the extent to which the project is achieving impacts or progressing towards the achievement of impacts. Key findings that should be brought out in the evaluations include whether the project has demonstrated: a) verifiable improvements in ecological status, b) verifiable reductions in stress on ecological systems, and/or c) demonstrated progress towards these impact achievements.

## CONCLUSIONS, RECOMMENDATIONS & LESSONS

The evaluation report must include a chapter providing a set of **conclusions, recommendations** and **lessons**.

## IMPLEMENTATION ARRANGEMENTS

The principal responsibility for managing this evaluation resides with the UNDP CO in *Lebanon*. The UNDP CO will contract the evaluator and ensure the timely provision of per diems and travel arrangements within the country. The Project Team will be responsible for liaising with the Evaluator to set up stakeholder interviews, arrange field visits, coordinate with the Government etc.

## EVALUATION TIMEFRAME

The total duration of the evaluation will be 20 days according to the following plan spread over a period of 11 calendar weeks (but no later than 15 September 2018):

Activity	Timing	Completion Date
<b>Preparation</b>	5 days	16 July 2018
<b>Evaluation Mission</b>	5 days	31 July 2018
<b>Draft Evaluation Report</b>	8 days	21 August 2018
<b>Final Report</b>	2 days	15 September 2018

The evaluation mission is tentatively scheduled to mid-end of July 2018.

## EVALUATION DELIVERABLES

The evaluator is expected to deliver the following:

Deliverable	Content	Timing	Responsibilities
<b>Inception Report</b>	Evaluator provides clarifications on timing and method	No later than 2 weeks before the evaluation mission.	Evaluator submits to UNDP CO
<b>Presentation</b>	Initial Findings	End of evaluation mission	To project management, UNDP CO
<b>Draft Final Report</b>	Full report, (per annexed template) with annexes	Within 3 weeks of the evaluation mission	Sent to CO, reviewed by RTA, PCU, GEF OFPs
<b>Final Report*</b>	Revised report	Within 1 week of receiving UNDP comments on draft	Sent to CO for uploading to UNDP ERC.

\*When submitting the final evaluation report, the evaluator is required also to provide an 'audit trail', detailing how all received comments have (and have not) been addressed in the final evaluation report.

## EVALUATOR QUALIFICATION

The consultant shall have prior experience in evaluating similar projects. Experience with GEF financed projects is an advantage. The evaluator selected should not have participated in the project preparation and/or implementation and should not have conflict of interest with project related activities.

The consultant must present the following qualifications:

- Higher degree in energy, electrical engineering, renewables or closely related field

- Minimum 10 years of relevant professional experience
- Knowledge of the renewable energy and energy efficiency sectors
- Previous experience with results-based monitoring and evaluation methodologies;
- Experience working with the GEF or GEF-evaluations is preferable;
- Experience working in Arab States is preferable;

## EVALUATOR ETHICS

Evaluation consultant will be held to the highest ethical standards and are required to sign a Code of Conduct (Annex E) upon acceptance of the assignment. UNDP evaluations are conducted in accordance with the principles outlined in the [UNEG 'Ethical Guidelines for Evaluations'](#).

## PAYMENT MODALITIES AND SPECIFICATIONS

%	Milestone
10%	Upon approval of the final TE Inception Report
30%	Upon submission of the draft TE report
60%	Upon finalization of the TE report

## APPLICATION PROCESS

UNDP applies a fair and transparent selection process that will take into account the competencies/skills of the applicants as well as their financial proposals. Qualified women and members of social minorities are encouraged to apply.

The award of the contract should be made to the Individual Consultant whose offer has received the highest score out of the following criteria: Technical Criteria weight: 70% Financial Criteria weight: 30% . Only candidates obtaining a minimum technical score of 70 points would be considered for the financial evaluation.

Criteria	Weight	Max. Point
Technical Competence	70%	100
Academic Qualifications (relevant) Master's degree: (10 points) PhD: (12 points) Relevant trainings/certificates: +3 Points		25
Years of Relevant Experience 10 Years: (10 points) Above 10 years (20 points)		30
Relevant Experience in renewable energy and/or energy efficiency (10 points) Previous experience with results-based monitoring and evaluation methodologies (10 points) Experience in undertaking GEF evaluations (10 points) Regional knowledge and experience; (5 points) Knowledge of energy economics; (5 points) Experience with UN or international donor project(s) (5 points)		45
Financial (Lower Offer/Offer*100)	30%	100
<b>Total Score</b>	<b>Technical Score * 0.7 + Financial Score * 0.3</b>	



## ***ANNEX B: TERMINAL EVALUATION CRITERIA AND THE QUESTIONS***

Before undertaking the Terminal Evaluation, an Inception Report was presented, including the proposed tasks, activities and deliverables, as well as a table of main evaluation questions that need to be answered to determine and assess project results. The evaluation/review criteria and questions is presented in the Table below.

<b>Contents</b>	<b>Main questions and Terminal Evaluation Scope</b>
<b>3. Findings: Project design and formulation</b>	
1.1 Analysis of LFA/Results Framework	<ul style="list-style-type: none"> <li>• Were the project's objectives and components clear, practicable and feasible within its time frame?</li> </ul>
1.2 Assumptions and Risks	<ul style="list-style-type: none"> <li>• Were the capacities of the executing institution(s) and its counterparts properly considered when the project was designed?</li> </ul>
1.3 Lessons from other relevant projects	<ul style="list-style-type: none"> <li>• Were lessons from other relevant projects properly incorporated in the project design?</li> </ul>
1.4 Planned stakeholder participation	<ul style="list-style-type: none"> <li>• Were the partnership arrangements properly identified and roles and responsibilities negotiated prior to project approval?</li> </ul>
1.5 Replication approach	<ul style="list-style-type: none"> <li>• Were counterpart resources (funding, staff, and facilities), enabling legislation, and adequate project management arrangements in place at project entry?</li> </ul>
1.6 UNDP comparative advantage	<ul style="list-style-type: none"> <li>• Were the project assumptions and risks well articulated in the PIF and project document?</li> </ul>
1.7 Linkages between project and other interventions within the sector	<ul style="list-style-type: none"> <li>• Whether the planned outcomes were "SMART"?</li> </ul>
1.8 Management arrangements	
<b>4. Findings: Project Implementation</b>	
4.1 Adaptive management Feedback from M&E activities used for adaptive management	<ul style="list-style-type: none"> <li>• Did the project undergo significant changes as a result of recommendations from the mid-term review? Or as a result of other review procedures? Explain the process and implications.</li> <li>• If the changes were extensive, did they materially change the expected project outcomes?</li> <li>• Were the project changes articulated in writing and then considered and approved by the project steering committee?</li> <li>• Whether feedback from M&amp;E activities was used for adaptive management?</li> <li>• Whether changes were made to project implementation as a result of MTR recommendations?</li> </ul>
4.2 Partnership arrangements	<ul style="list-style-type: none"> <li>• Were there adequate provisions in the project design for consultation with stakeholder?</li> <li>• Whether effective partnerships arrangements were established for implementation of the project with relevant stakeholders involved in the country/region, including the formation of a Project Board?</li> </ul>
4.3 Project Finance	<ul style="list-style-type: none"> <li>• Whether there was sufficient clarity in the reported co-financing to substantiate in-kind and cash co-financing from all listed sources.</li> <li>• What are the reasons for differences in the level of expected and actual co-financing?</li> <li>• To what extent project components supported by external funders were well integrated into the overall project?</li> <li>• What is the effect on project outcomes and/or sustainability from the extent of materialization of co-financing?</li> <li>• Whether there is evidence of additional, leveraged resources that have been committed as a result of the project?</li> </ul>
4.4 Monitoring and evaluation:	<ul style="list-style-type: none"> <li>• Is the M&amp;E plan well conceived at the design stage?</li> </ul>

Contents	Main questions and Terminal Evaluation Scope
design	<ul style="list-style-type: none"> <li>Is M&amp;E plan articulated sufficient to monitor results and track progress toward achieving objectives?</li> <li>Was the M&amp;E plan sufficiently budgeted and funded during project preparation and implementation?</li> <li>How effective are the monitoring indicators from the project document for measuring progress and performance?</li> </ul>
<b>4.5</b> Monitoring and evaluation: implementation	<ul style="list-style-type: none"> <li>Whether the logical framework was used during implementation as a management and M&amp;E tool?</li> <li>What has been the level of compliance with the progress and financial reporting requirements/ schedule, including quality and timeliness of reports?</li> <li>What has been effectiveness of the monitoring reports and evidence that these were discussed with stakeholders and project staff?</li> <li>What is the extent to which follow-up actions, and/ or adaptive management, were taken in response to monitoring reports (APR/PIRs)?</li> <li>Whether APR/PIR self-evaluation ratings were consistent with the MTR and TE findings. If not, were these discrepancies identified by the project steering committee and addressed?</li> </ul>
<b>4.6</b> UNDP and Implementing Partner implementation / execution coordination, and operational issues	<ul style="list-style-type: none"> <li>Whether there was an appropriate focus on results</li> <li>Was there adequate UNDP support to the Implementing Partner and project team?</li> <li>Quality and timeliness of technical support to the Executing Agency and project team</li> <li>Were the management inputs and processes, including budgeting and procurement adequate?</li> </ul>
<b>5. Findings: Project Results</b>	
1.1 Overall results	<ul style="list-style-type: none"> <li>What has been the achievement of the objectives against the end of the project values of the log-frame indicators for outcomes/outputs, indicating baseline situation and target levels, as well as position at the close of the project?</li> <li>What is the achievements /Results in terms of contribution to sustainable development benefits, as well as global environmental benefits (direct and indirect GHG emission reduction)?</li> <li>How does GEF the Tracking Tool at the Baseline and the one completed right before the Midterm Review with that Prepared at the time of Terminal Evaluation compare?</li> <li>What are the possible issues with employing DREG systems?</li> </ul>
1.2 Relevance	<ul style="list-style-type: none"> <li>To what extent the activity is suited to local and national development priorities and organizational policies, including changes over time?</li> <li>To what extent the project is in line with UNDP Operational Programs or the strategic priorities under which the project was funded?</li> </ul>
1.3 Effectiveness & Efficiency	<ul style="list-style-type: none"> <li>To what extent the objectives has been achieved?</li> <li>To what extent the results have been delivered with the least costly resources possible?</li> <li>What are the positive and negative, foreseen and unforeseen changes to and effects produced by a development intervention?</li> </ul>
1.4 Country ownership	<ul style="list-style-type: none"> <li>Was the project concept in line with development priorities and plans of the country?</li> <li>Were the relevant country representatives from government and civil society involved in project implementation, including as part of the</li> </ul>

Contents	Main questions and Terminal Evaluation Scope
1.5 Mainstreaming	<p>project steering committee?</p> <ul style="list-style-type: none"> <li>• Was an intergovernmental committee given responsibility to liaise with the project team, recognizing that more than one ministry should be involved?</li> <li>• Have the government(s), enacted legislation, and/or developed policies and regulations in line with the project's objectives?</li> <li>• How the project is successfully mainstreaming other UNDP priorities, including poverty alleviation, improved governance, the prevention and recovery from natural disasters, and women's empowerment.</li> <li>• Whether it is possible to identify and define positive or negative effects of the project on local populations (e.g. income generation/job creation, improved natural resource management arrangements with local groups, improvement in policy frameworks for resource allocation and distribution, regeneration of natural resources for long term sustainability).</li> <li>• If the project objectives conform to agreed priorities in the UNDP country programme document (CPD) and country programme action plan (CPAP).</li> <li>• Whether there is evidence that the project outcomes have contributed to better preparations to cope with natural disasters.</li> <li>• Whether gender issues had been taken into account in project design and implementation and in what way has the project contributed to greater consideration of gender aspects, (i.e. project team composition, gender-related aspects of pollution impacts, stakeholder outreach to women's groups, etc.)</li> </ul>
1.6 Sustainability	<p><b><u>Financial risks:</u></b></p> <ul style="list-style-type: none"> <li>• Are there financial risks that may jeopardize the sustainability of project outcomes?</li> <li>• What is the likelihood of financial and economic resources not being available once GEF grant assistance ends?</li> </ul> <p><b><u>Socio-economic risks:</u></b></p> <ul style="list-style-type: none"> <li>• Are there social or political risks that may threaten the sustainability of project outcomes?</li> <li>• What is the risk for instance that the level of stakeholder ownership (including ownership by governments and other key stakeholders) will be insufficient to allow for the project outcomes/benefits to be sustained?</li> <li>• Do the various key stakeholders see that it is in their interest that project benefits continue to flow?</li> <li>• Is there sufficient public/stakeholder awareness in support of the project's long-term objectives?</li> </ul> <p><b><u>Institutional framework and governance risks:</u></b></p> <ul style="list-style-type: none"> <li>• Do the legal frameworks, policies, and governance structures and processes within which the project operates pose risks that may jeopardize sustainability of project benefits?</li> <li>• Are requisite systems for accountability and transparency, and required technical knowhow, in place?</li> </ul> <p><b><u>Environmental risks:</u></b></p> <ul style="list-style-type: none"> <li>• Are there ongoing activities that may pose an environmental threat to the sustainability of project outcomes?</li> </ul>
1.7 Impacts	<ul style="list-style-type: none"> <li>• Whether, the project has demonstrated verifiable improvements in ecological status?</li> <li>• Whether, the project has demonstrated verifiable reductions in stress on ecological systems through specified process indicators, that progress is</li> </ul>

Contents	Main questions and Terminal Evaluation Scope
	being made towards achievement of stress reduction and/or ecological improvement?
<b>6. Findings: Conclusions, Recommendations &amp; Lessons</b>	
6.1 Corrective actions for the design, implementation, monitoring and evaluation of the project 6.2 Actions to follow up or reinforce initial benefits from the project 6.3 Proposals for future directions underlining main objectives 6.4 Best and worst practices in addressing issues relating to relevance, performance and success	<p><u><b>CONCLUSIONS</b></u></p> <ul style="list-style-type: none"> <li>• Did the project provide cost-effective solutions in order to address barriers?</li> <li>• Are these solutions provided in an efficient way?</li> <li>• What are the best and worst practices in addressing issues relating to relevance, performance and success?</li> </ul> <p><u><b>RECOMENDATIONS</b></u></p> <ul style="list-style-type: none"> <li>• Corrective actions for the design, implementation, monitoring and evaluation of the project</li> <li>• Actions to follow up or reinforce initial benefits from the project</li> <li>• Proposals for future directions underlining main objectives</li> </ul>

## ANNEX C: DOCUMENTS REVIEWED

Project Documents	
	PIF
	PPG IP final
	Project Document
	Inception Report
	Midterm Review
	Management Response to MTR
	Project Extension
	Budget Revision Letter
	Letter of extension
Outcome 1 related	
	Beneficiary Application Form
	Expression of Interest
	Liban Cables Energy Prediagnosis
	NAMA Support for the National Renewable Energy Action Plan for Lebanon
	DREG EOI Evaluation Sheets - Lot 1
	LoA BdL UNDP DREG
	DREG Demonstration Projects Comparative Evaluation
	DREG's Summary of Selected Demonstration Projects
	Results of 23-8-2017's site visit
	Site visit 2-6-2017
	Site visit 12-05-2017
	Site visit 15-06-2017
	Site visit and meeting at Al Kazzi
	Site visit
	Site Visits Reports and Emails
	28-04-2017 site visit
	Al Kazzi weekly report
	Al Taghziya's final site visit results
	Monday 5th June site visit
	Monday 22nd site visit and meeting
	Planned site visits for this week
	RE data sheets for cables
	RE electrical single line diagram
	RE Kickoff meeting
	RE ME GREEN Weekly report Mid August 2017
	RE Perla Weekly Report
	RE RPG - Combiner Boxes
	RE SLD comments
	RE SPD Drawing
	RE String test and 24-07-2017 site visit
	RE Testing of ABC's PV system and snag list
	RE Voc Clarification
Publications / Articles	
	Sun Power Article
	DREG Presentation - ALI Event - 26 Mar
	Actual Cash Flow Analysis

	Solar PV Report 2017
Others	
	Climate-Change-GHG-Scenarios
	Emissions Factor Projections
	Co-Financing Table

## ANNEX D: FIELD VISITS AND LIST OF PEOPLE INTERVIEWED

Time	Description	Persons	Location
Day 1	17 September 2018		
1000 – 1100	Detailed Discussion of Project and Mission	- Jihan Seoud: UNDP Energy and Environment Programme Analyst - Jil Amine: UNDP DREG Project Manager	Pickup from Hotel to UNDP Country Office - Jihan's Office  <i>Driver: Ahmad Hassan (Toyota Prado, Plate: 463550 B)</i>
1130-1300	DREG Project Meeting Project Staff Meeting Project Outputs and Status	- Jil Amine, DREG Project Manager - Sandra Rizk, DREG Finance & Administrative Assistant - Eric El Obeid, DREG Project Engineer	Ministry of Energy and Water Corniche du Fleuve, Beirut  <i>Driver: Ahmad Hassan (Toyota Prado, Plate: 463550 B)</i>
1300 - 1400	Ministry of Energy and Water Focal Points Meeting	- Jil Amine, DREG Project Manager - Sandra Rizk, DREG Finance & Administrative Assistant - Eric El Obeid, DREG Project Engineer - Pierre Khoury, Lebanese Centre for Energy Conservation (LCEC): General Director and DREG National Focal Point - Mahmoud Baroud, Director of Tutelage, Ministry of Energy and Water and DREG National Focal Point	Ministry of Energy and Water Corniche du Fleuve, Beirut
1400 – 1500	Lunch		Ministry of Energy and Water
Day 2	18 September 2018		
0900 – 1000	Ecole des Arts et des Métiers DREG Collaboration Meeting (Quality control of installations through certified PV installers, Solar PV course injection into the curriculum of vocational schools, Solar PV train-the-trainers workshops,...)	- Jil Amine, DREG Project Manager - Sandra Rizk, DREG Finance & Administrative Assistant - Antoinette Khanfour, Ecole des Arts et des Métiers Director	Pickup from Hotel to Dekweneh, Beirut  <i>Driver: Ahmad Hassan (Toyota Prado, Plate: 463550 B)</i>
1100 – 1200	Banque du Liban DREG Collaboration Meeting (Grant Disbursement Mechanism, Letter of Agreement, Financial Reporting, Capacity Building Workshop(s),...)	- Jil Amine, DREG Project Manager - Sandra Rizk, DREG Finance & Administrative Assistant - Mazen Halawi, Head of Subsidized Loans and Financing Programs Divisions (NEEREA), BdL - Mario El Khoury, Head of Section, Financing Unit, BdL	Banque du Liban HQ Hamra, Beirut  <i>Driver: Ahmad Hassan (Toyota Prado, Plate: 463550 B)</i>



1230 – 1330	Lunch Break		Ministry of Energy and Water
1330 – 1430	Meeting with EcoSYS – PV Contractor for the Raidy Demonstration Project (288 kWp) Meeting with EcoSYS’s team involved with the demonstration project	- Jil Amine, DREG Project Manager - Eric El Obeid, DREG Project Engineer - Elie Maalouf, Unit Manager, EcoSYS	EcoSYS, Corniche du Fleuve, Beirut  <i>Driver: Ahmad Hassan (Toyota Prado, Plate: 463550 B)</i>
Day 3	19 September 2018		
1000 – 1200	Site Visit to Al Kazzi Facility (164 kWp Project) Meeting with Al Kazzi team involved with the demonstration project	- Jil Amine, DREG Project Manager - Eric El Obeid, DREG Project Engineer - Sandra Rizk, DREG Finance & Administrative Assistant - Mohamad Said, VP, Al Kazzi + Team	Pickup from Hotel to Al Kazzi, Hsoun, Byblos  <i>Driver: Ahmad Hassan (Toyota Prado, Plate: 463550 B)</i>
1230 – 1430	Site Visit to Liban Cables Facility (601 kWp Project) Meeting with Liban Cables’ team involved with the demonstration project	- Jil Amine, DREG Project Manager - Eric El Obeid, DREG Project Engineer - Sandra Rizk, DREG Finance & Administrative Assistant - Cynthia Korkomaz, HR Manager, Liban Cables - Yasser Hachim, Plant Manager, Liban Cables	Liban Cables, Nahr Ibrahim, Mount Lebanon  <i>Driver: Ahmad Hassan (Toyota Prado, Plate: 463550 B)</i>
1530	Lunch and/or Return to Hotel		Ministry of Energy and Water
Day 4	20 September 2018		
1000 – 1100	Meeting with Arina Energy – Contractor for the Liban Cables Demonstration Project (601 kWp) Meeting with Arina’s team involved with the demonstration project	- Jil Amine, DREG Project Manager - Eric El Obeid, DREG Project Engineer - Albert Khoury, Chairman, Arina Energy + Team	Arina, Horsh Tabet, Beirut  <i>Driver: Ahmad Hassan (Toyota Prado, Plate: 463550 B)</i>
Day 5	21 September 2018		
1000 – 1100	Skype Call with RTA	- Saliou Toure, Regional Technical Advisor, UNDP GEF	Pickup from Hotel to UNDP CO  <i>Driver: Ahmad Hassan (Toyota Land Cruiser Prado, Plate: 463550 B)</i>
1100 – 1200	Mission Debrief	- Jihan Seoud: UNDP Energy and Environment Programme Analyst - Jil Amine, DREG Project Manager	UNDP CO
1200 – 1300	Lunch		UNDP CO

# ANNEX E: EVALUATION CRITERIA FOR THE EOI RECEIVED FROM RE VENDORS

No.	Criteria	Range	Points	Remarks/additional information
<b>1.</b>	<b>Background</b>			<b>(max. 20 points)</b>
1.1	Year Established	> 10 5 – 10 < 5	3 2 1	
1.2	Size of Firm/JV (i.e. No of employees)	> 50 25 – 50 < 25	4 3 1	Please add values of each JV member
1.3	Annual Turnover (million USD)	> 10 5 – 10 < 5	4 3 1	Please add values of each JV member and attach financial statements for the past 3 years for each JV member (as per Attachment 1).
1.4	Turnover of Renewable Energy systems as percentage of total annual turnover	> 80% 40-80% < 40%	5 4 2	Solar PV: .....% Wind: .....% Biomass/biogas: ....% Hydro: .....% TOTAL: ..... %
1.5	Classified/Certified Firm (ISO 9001 Certification or other official certifications)	Fully certified In Process Not Certified	4 2 0	Certification(s): ....
<b>2.</b>	<b>General Consulting Capacity</b>			<b>(max. 15 points)</b>
2.1	Organization of bidder or consortium (organizational chart required)	Excellent Average Poor	5	Please attach related documents
2.2	Relevance of CVs of key engineers, experts, technicians (local and international)	Excellent Average Poor	7 5 2	
2.3	Local presence or ability to quickly mobilize locally	High Average Poor	3 2 1	
<b>3.</b>	<b>Relevant Sector Experience</b>			<b>(max. 35 points)</b>
3.1	Experience in Renewable Energy projects and related discipline(s) (No. of projects) (Please specify years of experience in design (D), Supply (S), and installation (I))	> 5 2 – 5 < 2	10 7 2	Please attach related documents D: ..... years S: ..... years I: ..... years

3.2	Largest/most important project designed and implemented (Technology (PV, Wind, Hydro, Biogas,...), system (on-grid, off-grid), cost (USD), capacity (kW), savings (USD, CO <sub>2eq</sub> ), starting date (DD-MM-YYYY), construction duration (# of days), owner's contact details)		12	Please attach required project information
3.3	Experience in Lebanese market (No. and types of projects)	> 5 2 – 5 < 2	10 7 2	Please attach related documents  Type and number of projects: - - - -
3.4	Experience in construction management and supervision and related disciplines (No. of projects)	> 10 5 – 10 < 5	3 2 1	
<b>4.</b>	<b>Equipment &amp; Services Specifications</b>			<b>(max. 30 points)</b>
4.1	Renewable Energy equipment design and performance in accordance to international Standards (IEC, CE, ISO, or relevant)  <b>Note:</b> RE Companies which will be qualified by this EoI must ensure that their future designs submitted for this project adhere to the standards listed here. Deviating from these standards will cause disqualification.	<b>FOR LOT 1:</b> <b>PV Panels:</b> At least IEC 61215 edition 2 and IEC 61730  <b>Inverters:</b> At least Harmonic Current (IEC 61000-3-2 and / or IEC61000-3-4), IEC 62109-1/2  <b>Equipment for other RE systems are to be in line with their respective standards.</b>	15	Please attach related third-party certificates or declarations of conformity
4.2	Other equipment design and performance in accordance to international Standards (IEC, CE, ISO, or relevant)		10	Please list standards and attach related third-party certificates or declarations of conformity (as per Attachment 1)

4.3	Level of Warranty of equipment, and availability of both consumable and spare parts		5	
<b>Total</b>			100	

## ***ANNEX F: SIGNED UNEG CODE OF CONDUCT FORMS***

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### **Evaluators/reviewers:**


1. Must present information that is complete and fair in its assessment of strengths and weaknesses so that decisions or actions taken are well founded
2. Must disclose the full set of evaluation findings along with information on their limitations and have this accessible to all affected by the evaluation with expressed legal rights to receive results.
3. Should protect the anonymity and confidentiality of individual informants. They should provide maximum notice, minimise demands on time, and respect people's right not to engage. Evaluators must respect people's right to provide information in confidence, and must ensure that sensitive information cannot be traced to its source. Evaluators are not expected to evaluate individuals, and must balance an evaluation of management functions with this general principle.
4. Sometimes uncover evidence of wrong doing while conducting evaluations. Such cases must be reported discreetly to the appropriate investigative body. Evaluators should consult with other relevant oversight entities when there is any doubt about if and how issues should be reported.
5. Should be sensitive to beliefs, manners and customs and act with integrity and honesty in their relations with all stakeholders. In line with the UN Universal Declaration of Human Rights, evaluators must be sensitive to and address issues of discrimination and gender equality. They should avoid offending the dignity and self-respect of those persons with whom they come in contact in the course of the evaluation. Knowing that evaluation might negatively affect the interests of some stakeholders, evaluators should conduct the evaluation and communicate its purpose and results in a way that clearly respects the stakeholders' dignity and self-worth.
6. Are responsible for their performance and their product(s). They are responsible for the clear, accurate and fair written and/or oral presentation of study limitations, findings and recommendations.
7. Should reflect sound accounting procedures and be prudent in using the resources of the evaluation.

### **Evaluation/reviewer Consultant Agreement Form**

Agreement to abide by the Code of Conduct for Evaluation in the UN System

Name of Consultant: Dinesh Aggarwal

I confirm that I have received and understood and will abide by the United Nations Code of Conduct for Evaluation.



(Dinesh Aggarwal)

14<sup>th</sup> November 2018

## ***ANNEX G: TE REPORT AUDIT TRAIL***

To the comments were received on 31<sup>st</sup> October 2018 on the draft report on ‘Terminal Evaluation’ of “Small Decentralized Renewable Energy Generation Project”, Lebanon

The following comments were provided in track changes to the draft Terminal Evaluation Report; they are referenced by institution (“Author” column) and track change comment number (“#” column):

#	Author	Para No./ comment location	Comment/Feedback on the draft TE report	TE team response and actions taken
1	UNDP CO	Executive Summary, Summary of Conclusions, On the statement “While the pilot demonstration projects (solar PV) under CEDRO were financed with 100% grant, with public buildings as beneficiaries, the DREG project was targeted to promote RE technology in the private sector with minimal grant and soft loan from NEEREA”	I think it would be better to specify that this is related to the CEDRO phases 1 – 3 projects because CEDRO IV targets private sector industries not at 100% grant but at 75% and 50% grant which is similar to DREG and was initiated before the DREG project	Corresponding changes carried out.
2	UNDP CO	Executive Summary, Summary of Conclusions, On the statement “Thanks to the reduction in the capital cost of solar PV, coupled with promotional and demonstration activities undertaken by the DREG project, the private sector enterprises in Lebanon are now ready to put up solar PV-based electricity generation systems without any subsidy or grant on the capital cost”	I think this statement is not very accurate because actually indicators show that the market still needs some form of subsidy or grants at least in the form of technical assistance and subsidised loans (as seen by new investments from IFIs recently)	Additional text provided to clarify this
3	UNDP CO	Executive Summary, Summary of Conclusions, On the statement “One of the other achievements of the project is the establishment of the ‘net metering’ policy for the grid-connected solar PV-based decentralised power generation”	Here we have to also give credit to other projects so maybe it can be mentioned that DREG contributed to the net metering policy etc.	Agreed, additional text provided
4	UNDP CO	Executive Summary, Summary of Conclusions, On the statement “One of the issues where the project has fallen short of achieving the success is the establishment of a policy for ‘feed-in-tariff’ for RE-based decentralised power generation”	This was addressed in the inception and midterm reports and it was changed accordingly given the context so it would be appreciated if this can be clarified.	Agreed, additional text provided
5	UNDP CO	Executive Summary Recommendation 1	I think this should be framed in a way for future learning purposes or as a shortcoming in the design because at this stage we cannot go back and change the indicators	Agreed, additional text provided
6	UNDP CO	Executive Summary Recommendation 3	I do not believe this is the reason that the PV technology was chosen. In the	Agreed, text modified to take care of this

#	Author	Para No./ comment location	Comment/Feedback on the draft TE report	TE team response and actions taken
		On the statement “If left to the forces to select, the path of least resistance gets selected. In this case the path of least resistance was the solar PV technology. This is considering that solar PV technology was already demonstrated in the country and also there was adequate level of infrastructure (technology/capital equipment suppliers, skilled human resources availability etc.”	inception report, a clear justification of market readiness towards PV was presented and that said, the output was general and did not require the project to implement all types of technologies. Indeed maybe this was a shortcoming in the design but I do not believe the project should be judged in that it took the “path of least resistance”	
7	UNDP CO	Executive Summary Recommendation 7	Can we frame this recommendation in a way to not hold the UNDP Lebanon accountable to the establishment of the IPP because otherwise the management responses would remain pending until this is achieved and UNDP does not have control over this	Agreed, text modified to take care of this
8	UNDP CO  UNDP Project team	Executive Summary Recommendation 8 (earlier recommendation which has now been deleted) On the statement “In Lebanon, the scheme for providing the soft loan (NEEREA) for RE projects was already operational (administered by BDL) in the baseline. In order to facilitate the provision of capital grants for the DREG pilots to be supported by the project, the funds allocated for the provision of the grants were transferred to BDL, so that it can be coupled with the NEEREA loans while disbursing the loan to be beneficiaries (pilot projects). Procedurally this approach lead to a situation where the budget allocated for the provision of the grants got used even before the pilot projects got established. It is recommended that this approach should be avoided as the funds spent need to correspond to the achievement of the required results.	More information is required here to explain the difference in UNDP’s budgets and expenditure accounts regarding grants and advancements.	This recommendation has been deleted
9	UNDP CO	Executive Summary Recommendation 8 (earlier recommendation 9)	Again if possible to replace this to be more consistent with future activities given that UNDP cannot be accountable to optimising the process at the central bank level.	Agreed, text modified accordingly
10	UNDP CO	Section 2.4 On the statement “In the baseline situation, the competition did not work properly, the market had low-quality products competing with high-quality ones without adequate quality control.	I do not see the relevant of this with the quality of the market in terms of products?	Clarified as follows: The context here is the absence of standards in the baseline. Text modified to highlight it.
11	UNDP CO	Section 3.1 On the bullet point “The so-called “best value for money ” approach as provided in the project document for selecting the beneficiaries for the pilot projects	I would like to recommend to add an analysis of the need to also meet the MW target with the limited financing which geared the project to naturally selecting the cheaper technologies that would meet the RE target (best value for	Clarified as follows:  The project document includes the details of the cost of different RE technologies (same for all



#	Author	Para No./ comment location	Comment/Feedback on the draft TE report	TE team response and actions taken
		favours the RE technologies where there is comparatively a higher level of confidence amongst the prospective beneficiaries”	money) as a justification or shortcoming. Because if the project is only about piloting various technologies and removing their barriers, then targets for MW RE should not have been so high while during the design phase, the GEF required as high MW targets	the technologies) and based on the capital cost allocated the budget and the corresponding capacity in MW.  No action is being taken against this comment
12	UNDP Project Team	Section 3.2 On the statement “As far as the impacts of the risks coming true on the results of the DREG project is concerned, they have not been that severe”	It must be noted here that the De-risking Study targeted utility-scale projects and not decentralized ones since the decentralized methodology was not yet completed by UNDP New York.	Additional information provided has been included in the text
13	UNDP Project Team	Section 3.7 On the statement “The UNDP CEDRO project being implemented in partnership with the Ministry of Energy and Water (is working since October 2007 and has supported implementation of a number of small decentralised solar PV project (mainly the government owned facilities as 100% grant basis”	In the private sector too just as DREG. Please rewrite the sentence to include that	Additional text provided to clarify this
14	UNDP CO	Section 4.2 On the statement “LCEC was taken on board to carry out the evaluation of the pilot projects to be supported”	I’m not sure where this statement is coming from – is in the project document because I do not believe this was the reason or the reason why LCEC was on board	Based on the comment this statement is deleted
15	UNDP Project Team	Section 4.5 On the statement “The PB did not meet as often as was needed to provide the project with the necessary oversight and direction. The Board could manage to meet only three times (once every year) during the entire duration of the project implementation. This includes the board meeting at the time of inception of the project”	True but meetings between the project team and the focal points at the ministry where the project was located were held on a bimonthly basis for quick decision making and to efficiently solve any difficulties or delays. That should be mentioned and noted as well. Please add.	Additional text provided to clarify this
16	UNDP CO	Section 4.5 On the statement However, the recommendation to introduce additional indicators to better monitor and reflect the performance of the project on capacity building could not be approved by the project board/RTA”	Plus the issue of the additional indicators had nothing to do with the project board but was an issue with UNDP/GEF as the indicators could not be changed at midterm	Agreed, additional text provided
17	UNDP CO  UNDP Project Team	Section 4.5 On the statement “However, the recommendation to introduce additional indicators to better monitor and reflect the performance of the project on capacity building could not be approved by the project board/RTA. This is largely due to the lesser number of meetings of the project board	Don’t agree with that statement at all	Statement modified to reflect the true situation more clearly
18	UNDP CO	Section 4.6 On the statement	I do not agree as MEW/LCEC were not involved in the implementation of the pilot projects.	Agreed, statement modified

#	Author	Para No./ comment location	Comment/Feedback on the draft TE report	TE team response and actions taken
		“Technical support for the pilot projects was provided by UNDP as well as by LCEC as implementation partner for the project”		
19	UNDP CO		Please for the execution of the project, it should be referred to as MEW/LCEC or just MEW because LCEC is not a national government entity yet so it is preferable to change the reference.	Agreed, change made throughout the report
20	UNDP Project Team  UNDP CO	Section 5.1.1, Outcome 1, Output 1.1 On the statement “In Lebanon, the scheme for providing the soft loan (NEEREA) for RE projects was already operational (administered by BDL) in the baseline. In order to facilitate the provision of capital grants for the DREG pilots to be supported by the project, the funds allocated for the provision of the grants were transferred to BDL, so that it can be coupled with the NEEREA loans while disbursing the loan to be beneficiaries (pilot projects). Procedurally this approach lead to a situation where the budget allocated for the provision of the grants got used even before the pilot projects got established. It is recommended that this approach should be avoided as the funds spent need to correspond to the achievement of the required results	The UNDP financial system flagged this transfer of funds to BdL as an advance payment  the issue of the upfront transfer of the grant to the Central Bank caused an internal issue within UNDP but it does not mean that the grants were transferred to the beneficiaries in advance or prior to completion of the projects as stated here. The mechanism agreed to with the central bank was to transfer the grant upon satisfactory completion of each project and inspection from the DREG project so this analysis is not accurate and we recommend to revisit it.	The statement has been modified to take care of this.
21	UNDP Project Team	Section 5.1.1, Outcome 1, Output 1.1 On the statement “No proposals were received for the DREG pilots for the technologies other than PV. This is clearly due to two reasons: firstly because no vendor for RE technology other than PV was pre-qualified”	That’s not accurate. Ankur Scientific from India was pre-qualified. Please update this statement accordingly	Agreed, statement modified accordingly
22	UNDP Project Team	Section 5.1.1, Outcome 1, Output 1.1 On the statement “This is clearly due to two reasons: firstly because no vendor for RE technology other than PV was pre-qualified and secondly the limit put on the capital cost (the technologies which lacks demonstration, initially has comparatively higher capital cost)	Not accurate. The limit of \$1,500/kWp was only placed on Solar PV proposals and not on other RE technologies. Please update this sentence accordingly.	Clarified as follows;  The call for beneficiaries applications has not make any distinction between solar PV and other RE technologies. Following text is from the call for beneficiaries applications:  “the turnkey unit price per kWp which the project will accept under this application must be \$1,500/kWp or less (VAT included) for each project. Turnkey unit prices below \$1,500/kWp will score higher as per the best value for money approach adopted”



## ANNEX H: EVALUATION REPORT CLEARANCE FORM

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Evaluation Report Reviewed and Cleared by

UNDP Country Office

Name: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

UNDP GEF RTA

Name: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_