United Nations Development Programme

Implementing Partner:
Office of the Minister of Electricity and Water Affairs

Terminal Evaluation of UNDP Project: Sustainable Energy Unit Project (SEU Project)

(ATLAS ID No. 00089268)

Final Report

Mission Members:
Mr. Roland Wong, International Evaluator

August 2022

SYNOPSIS

Title of UNDP project: Sustainable Energy Unit (SEU) Project

ATLAS ID: 00089268

Evaluation time frame: November 2014 to 30 June 2022

Project implementation start date: November 2014

Project end date: 31 July 2022

Date of evaluation report: 28 July 2022

Region and Countries included in the project: Bahrain

Implementing partner: Office of the Minister of Electricity and Water Affairs

Evaluation team members: Mr. Roland Wong, International Evaluator

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ABBREVIATIONS

Acronym	Meaning
AC	Air conditioner
APR	Annual Progress Report
AWS	Amazon Web Services
BBK	Bank of Bahrain and Kuwait
BOOM	“Build, own, operate, and manage”
CCM	Climate change mitigation
CDR	Combined Delivery Report
CO	Country Office
COP	Conference of Parties
EE	Energy efficiency
ESCOs	Energy service companies
EV	Electric vehicle
EWA	Electricity and Water Authority
GBC	Green Building Code
GBRS	Green Building Rating Scheme
GDP	Gross domestic product
GEF	Global Environment Facility
GHG	Greenhouse gas
GoB	Government of Bahrain
GPP	Green Public Procurement
IFC	Implementation and Follow-Up Committee
iSEE	International Sustainable Energy Event
LED	Light emitting diode
M&E	Monitoring and Evaluation
MEPS	Minimum Energy Performance Standards
MEWA	Ministry of Electricity and Water Affairs
MoICT	Ministry of Industry, Commerce & Tourism
MJ	Megajoule
MoE	Ministry of Energy
MW	Megawatt
NBB	National Bank of Bahrain
NDC	Nationally Determined Contributions
NEEAP	National Energy Efficiency Action Plan
NGO	Non-Government Organization
NIM	National Implementation Modality
NREAP	National Renewable Energy Action Plan
PIF	Project Identification Form
PMU	Project Management Unit
POPP	Program and Operations Policies and Procedures
PPA	Power purchase agreement
ProDoc	UNDP Project Document
PV	Photo-Voltaic
RE	Renewable Energy
RECs	Renewable energy certificates
RRF	Results and Resources Framework
SDG	Sustainable Development Goal
SEA	Sustainable Energy Authority

Acronym	Meaning
SEC	Sustainable Energy Center
SESP	Social and Environmental Screening Procedure
SEU	Sustainable Energy Unit
SMART	Specific, Measurable, Attainable, Relevant and Time-bound
TE	Terminal Evaluation
ToC	Theory of Change
ToR	Terms of Reference
UNDAF	United Nations Development Assistance Framework
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
WTE	Waste-to-Energy

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EXECUTIVE SUMMARY

E-1. This report summarizes the findings of the Terminal Evaluation (TE) conducted during the May-July 2022 period for the UNDP project: "*Sustainable Energy Unit in Bahrain*" (hereby referred to as SEU, SEU Project or the Project). This TE was prepared to provide a comprehensive and systematic account of the performance of the completed project by evaluating its design, process of implementation and achievements vis-à-vis its objectives, and any agreed changes during implementation of the SEU Project. Key issues addressed on this TE include:

- that the TE is independent of SEU Project management to ensure independent quality assurance;
- the application of UNDP norms and standards for evaluations;
- assessment of achievements of outputs and outcomes, likelihood of the sustainability of outcomes, and if the Project met the minimum M&E requirements; and
- reporting basic data of the evaluation and the Project, as well as provide lessons from the Project on broader applicability.

E-2. Data and information for this TE was sourced from:

- a review of Project documentation including quarterly progress reports to establish information pertaining to Bahrain's perceptions of capacity building activities of the Project;
- interviewing selected stakeholders including the team members and technical advisors to triangulate information on key issues in capacity building to the SEU Project team. With the International Evaluator unable to travel to Bahrain due to the COVID-19 pandemic, information on the Evaluation was collected on interviews conducted on the Zoom platform by the International Evaluator;
- Project evaluation was based on evaluability analysis consisting of formal (clear outputs, indicators, baselines, data) and substantive (identification of problem addressed, theory of change, results framework) inputs.

Project Summary Table

Project Details		Project Milestones	
Project Title	Sustainable Energy Unit (SEU Project)	PIF Approval Date:	9 November 2014
UNDP Atlas ID:	00089268	Date Project Manager hired:	January 2015
Country/Countries:	Bahrain	Inception Workshop Date:	N/A
Region:	Middle East	Mid-Term Review Completion Date:	N/A
Focal Area:	Climate Change	Terminal Evaluation Completion date:	28 July 2022
Planned Operational Closure Date:	31 July 2022		
Implementing Partner:	Office of the Minister of Electricity and Water Affairs (MEWA)		
NGOs/CBOs involvement:	N/A		
Private sector involvement:	N/A		

Financial Information		
Project	**At Approval (US$)**	**At TE (US$)**
[1] UNDP contribution:	**0**	**0**
[2] Government:	**6,700,000**	**6,286,112**
[3] Other multi-/bi-laterals:	**0**	**0**
[4] Private Sector:	**0**	**0**
[5] NGOs:	**0**	**0**
[7] Total Project funding:	**6,700,000**	**6,286,112**

Project Description

E-3. Despite its wealth generated from oil for 90 years, the Kingdom of Bahrain has promised to meet its Paris commitments with pledges of renewable energy and energy efficiency. In December 2013, the Minister of Electricity got approval for the creation of a Sustainable Energy Centre, which was approved but with a lack of domestic capacity to operate such an institution. UNDP became involved in November 2014 to establish and operate this institution known as the Sustainable Energy Unit (SEU).

E-4. The Kingdom of Bahrain remains highly reliant upon the petroleum and gas sector despite successful Government initiatives to diversify the economy towards finance, tourism and industry. While reserves in the country are limited, Bahrain's energy demand has been growing at 7% annually, a serious problem for sustainability. SEU supported the Sustainable Energy Authority (SEA) which has been merged with the Ministry of Electricity and Water Affairs of the Kingdom of Bahrain (MEWA) in early 2022 which is the entity mandated to lead and promote energy efficiency practices, transfer and diffuse renewable energy technologies and draft related policies and regulatory frameworks in close coordination with stakeholders and partners in the Kingdom of Bahrain.

E-5. SEU was implementing projects considered under the 2017 National Energy Efficiency Energy Action Plan (NEEAP) and the 2017 National Renewable Energy Action Plan (NREAP) in close coordination with the MEWA. A key objective of SEU was to "develop a cohesive and sustainable energy policy and to promote Renewable Energy, Energy Efficiency and Conservation in the Kingdom of Bahrain". The Unit was also to work towards bridging the legal, institutional, and capacity gaps for the Bahrain energy sector to meet the future challenges (Paras 15-18).

Project Results

E-6. The SEU Project had managed to establish the Sustainable Energy Authority (SEA) in October 2019, a significant achievement. SEA was later merged with MEWA in 2022. In terms of promoting gender parity in hiring and training while staffing Bahrain Unit for Sustainable Energy, the Government has not had any issues with the hiring of women in the SEA. While the numbers of women are still low in MEWA and other Bahraini government institutions, women interviewees said there were opportunities for women in the administration and technical management in government and private entities without gender discrimination. Time will be required to get the proportion of women in the work force to significant levels of 33% or higher. The actual outcome and outputs of the SEU Project are summarized in Table A in comparison with intended outcome and outputs.

Table A: Comparison of Intended Project Outcome and Outputs from the Inception Report to Actual Outcome and Outputs

Intended Outcome and Outputs in Results and Resources Framework of November 2014 (see Appendix E)	Actual Outcomes as of June 2022
Project intended Outcome 3: Enhanced environment for equitable, job creating and sustainable economic growth	**Actual achievement toward Outcome 3**: The Sustainable Energy Authority was established in 2019 and merged in 2022 with MEWA to form the national entity to further Bahrain's ambitions of renewable energy and energy efficiency in country, enhancing the environment for equitable, job creating and sustainable economic growth.
Output 1: Bahrain Unit for Sustainable Energy established	**Actual Output 1**: Extensive stakeholder discussions led to SEU and MEWA to function as a national entity to further RE and EE objectives in Bahrain
Output 2: Institutional capacity of Bahrain Sustainable Energy Unit built.	**Actual Output 2**: Extensive capacity building has been conducted for the Sustainable Energy Unit and its stakeholders.
Output 3: National energy policy paper, and a framework for National Energy Strategy produced	**Actual Output 3**: The NREAP and NEEAP were prepared after undergoing successful consultations.
Output 4: Expanded use of Energy Efficiency (EE) solutions mainly through development of the NEEAP	**Actual Output 4**: Four EE policies were undertaken including the Green Building Code (GBC) that is ready to be approved and activated, district cooling regulations that is ready for approval and activation, and a National EV Strategy.
Output 5: Expanded use of Renewable Energy (RE) solutions mainly through development of the NREAP	**Actual Output 5**: More than 15 RE initiatives mainly in solar have been completed or are underway now in Bahrain. This includes an RE Mandate for new buildings incorporated into the GBC (although not yet mandatory), and a Renewable Energy Certificate platform ready for launch in pilot mode (using blockchain technology for traceability and non-repudiation).

Summary of Findings, Conclusions, Recommendations and Lessons

E-7. The SEU Project was very successful in securing government commitments in RE investments and EE policies and regulations and promoting public awareness. The 2021 Glasgow Climate Change conference strengthened the GoB's resolve to work towards a net-zero emissions by 2060 declaration with more ambitious targets. Though the SEU Project laid the foundation for these commitments, the former SEA still is under the Ministry of Electricity and Water Affairs (MEWA) limiting its ability to do more (Para 114).

E-8. Five issues have emerged in a post-SEU Project scenario:

- The RE and EE market still needs to be taught that more money paid today will result in long-term benefits;
- There is a shortfall of solar PV certified installers who have experience with specialized solar resources;
- Many of the solar installations need to be regularly cleaned to generate the design power;

- Stronger efforts need to be made to encourage wind power as it operates with higher efficiency than solar PV power;
- There are indicators of the low usage of the public transportation system in Bahrain, impacting vehicle use efficiencies (Para 115).

Project ratings are provided in Table B.

Table B: Evaluation Ratings Table

1. Monitoring & Evaluation (M&E)	Rating[1]
M&E design at entry	**5**
M&E Plan Implementation	**5**
Overall Quality of M&E	**5**
2. Implementing Agency (IA) Implementation & Executing Agency (EA) Execution	
Quality of UNDP Implementation/Oversight	**6**
Quality of Implementing Partner Execution	**n/a**
Overall quality of Implementation/Execution	**6**
3. Assessment of Outcomes	
Relevance	**2**[2]
Effectiveness	**6**
Efficiency	**5**
Overall Project Outcome Rating	**6**
4. Sustainability	Rating[3]
Financial sustainability	**3**
Socio-political sustainability	**3**
Institutional framework and governance sustainability	**3**
Environmental sustainability	**3**
Overall Likelihood of Sustainability	**3**

E-9. UNDP's involvement with the SEU Project, however, has had a very positive impact on promoting sustainable energy generation in Bahrain:

[1] Evaluation rating indices: 6=*Highly Satisfactory (HS)*: The project has no shortcomings in the achievement of its objectives; 5=*Satisfactory (S)*: The project has minor shortcomings in the achievement of its objectives; 4=*Moderately Satisfactory (MS)*: The project has moderate shortcomings in the achievement of its objectives; 3=*Moderately Unsatisfactory (MU):* The project has significant shortcomings in the achievement of its objectives; 2=*Unsatisfactory (U)* The project has major shortcomings in the achievement of its objectives; 1=*Highly Unsatisfactory (HU):* The project has severe shortcomings in the achievement of its objectives.

[2] Relevance ratings: 1=Not relevant; 2=Relevant

[3] *4 = Likely (L):* negligible risks to sustainability;
3 = Moderately Likely (ML): moderate risks to sustainability;
2 = Moderately Unlikely (MU): significant risks to sustainability;
1 = Unlikely (U): severe risks to sustainability; and
U/A = unable to assess.

- UNDP has been able to attract excellent technical assistance to assist policy-makers in Bahrain towards the formulation of sustainable energy policies, and catalyzing investment into RE and EE measures across a wide-spectra of stakeholders;
- UNDP is only interested in giving sound technical advice without the financial interest tagged on. Hence, UNDP has been able to attract excellent technical assistance at a fraction of the cost of normal consulting practices (Para 116).

E-10. The conclusion drawn from this Evaluation is that the former SEA entity now merged under MEWA has a limited mandate with a need to improve management of regulations and incentives to encourage investments in RE and EE. The potential is present in the entity to be a more powerful agency in promoting RE and EE in Bahrain with a stronger governance hierarchy to wield more power.

E-11. Recommendation #1 (to the Government of Bahrain): Give the entity under MEWA a stronger mandate to continue work in Bahrain on the promotion of sustainable energy (Para 120).

E-12. Recommendation #2 (to the Government of Bahrain and UNDP): Provide effective messages on long-term benefits of RE and EE (Para 121).

E-13. Recommendation #3 (to the Government of Bahrain and UNDP): Support capacity building in areas such as development of RE standards, best practices for network regulation, and identifying how RE can work with other assets in the grid (Para 122).

E-14. Recommendation #4 (to the Government of Bahrain and UNDP): Understand how to optimize RE generation under local environmental conditions (Para 123).

E-15. Recommendation #5 (to UNDP and the Government of Bahrain): Continue to promote waste-to-energy (Para 124).

E-16. Recommendation #6 (to UNDP and the Government of Bahrain): Continue the promotion of electric vehicle integration into power grids (Para 125).

E-17. Recommendation 7 (to the Government of Bahrain and UNDP): Promote more climate action plans that includes sea level rise being a real threat to the Kingdom (Para 126).

E-18. Recommendation 8 (to the Government of Bahrain and UNDP): Continue strong promotion of gender equity in work force of government entities (Para 127).

E-19. Lesson #1: If there is willingness of government stakeholders to have frequent interaction with MEWA staff, MEWA will be more able to deliver outcomes regarding institutional and regulatory reform (Para 128).

E-20. Lesson #2: A project that focuses on a single RE or EE measure will more likely succeed in its objectives of market transformation (Para 129).

1. INTRODUCTION

1. The Terminal Evaluation (TE) for the Project entitled "Sustainable Energy Unit in Bahrain" Otherwise referred to as "SEU", "the SEU Project" or "the Project", was conducted for UNDP Bahrain Country Office as an impartial assessment of SEU activities, mainly comprised of capacity building, technical assistance and investment facilitative activities. The Project objective is to "develop a cohesive and sustainable energy policy and to promote Renewable Energy, Energy Efficiency and Conservation in the Kingdom of Bahrain".

1.1 Evaluation Purpose

2. In accordance with UNDP M&E policies and procedures, all UNDP supported projects are required to undergo a TE upon completion of implementation of a project to *provide a comprehensive and systematic account of the performance of the completed project by evaluating its design, process of implementation and achievements vis-à-vis its objectives, and any agreed changes during project implementation.* As such, the TE for the SEU Project serves to:

- promote accountability and transparency, and to assess and disclose levels of accomplishments of the Project in the context of providing technical assistance to the Kingdom of Bahrain to develop a cohesive and sustainable energy policy and to promote the use of renewable energy (RE), measures in energy efficiency (EE) and conservation;
- evaluate the Project's outputs against the Results and Resources Framework (RRF) in the Project Document signed in November 2014;
- synthesize lessons that may help improve the selection, design and implementation of future activities in this sector;
- provide feedback on issues that are recurrent across the RE and EE portfolio in Bahrain that require attention, and on improvements regarding scaled-up promotion of RE and EE in Bahrain; and
- contribute to the UNDP Evaluation Office databases for aggregation, analysis and reporting on effectiveness of UNDP operations in achieving global environmental benefits and on the quality of monitoring and evaluation across the UNDP system.

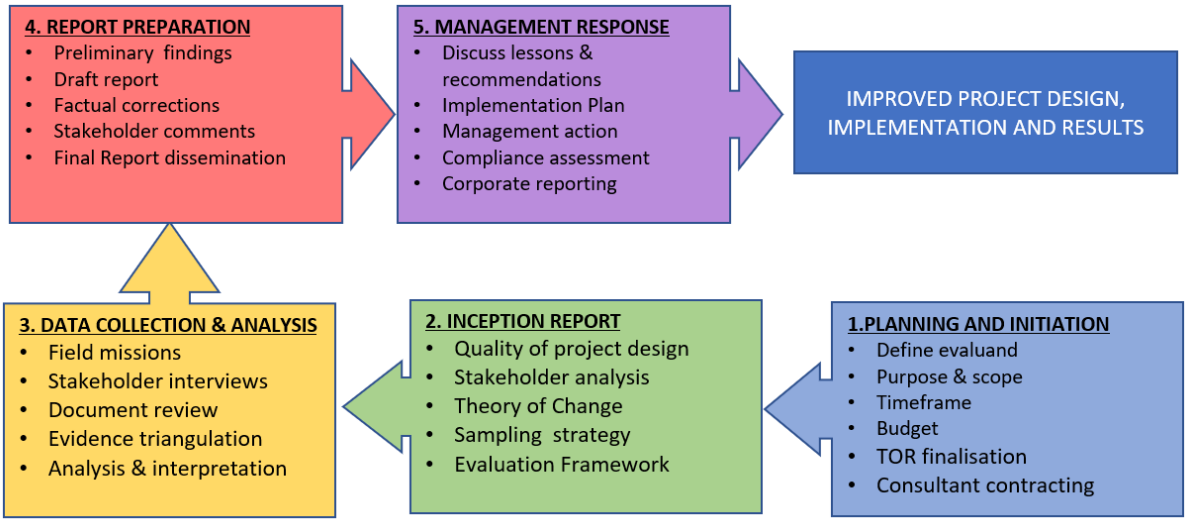
1.2 Approach and Scope

3. The TE approach is to ensure that the evaluation serves as an important learning and accountability tool, providing the Kingdom of Bahrain, UNDP, and its national stakeholders and partners with an impartial assessment of the results and outcomes achieved by the project. As such, the scope of this TE was to evaluate all activities funded by the Government of Bahrain. The Terms of Reference (ToRs) for the TE are contained in Appendix A. The UNDP Evaluation process is illustrated on Figure 1. Key issues addressed on this TE include:

- that the TE is independent of SEU Project management to ensure independent quality assurance;
- the application of UNDP norms and standards for evaluations[4];

[4] This TE was conducted to closely adhere to GEF guidelines for evaluations. The Table of Contents of this report reflects these GEF guidelines that were accepted by UNDP in the Evaluator's Inception Report from 8 June 2022.

Figure 1: UNDP Evaluation Process



- assessment of achievements of outputs and outcomes, likelihood of the sustainability of outcomes, and if the Project met the minimum M&E requirements; and
- reporting basic data of the evaluation and the Project, as well as provide lessons from the Project on broader applicability. This would include an outlook and guidance in charting future directions by UNDP and their future support for a possible follow-up phase to the SEU Project.

4. With this scope, the entire country of Bahrain and its population is covered under this TE. The following issues were identified for further discussion in this TE:

- the role of SEU in adaptively managing the Project;
- the role of SEU on conducting awareness raising workshops and training for technicians. There was a lot of effort placed into this;
- the role of the various Ministries in the SEU initiatives;
- the financial position of the Project and what has been achieved;
- the work being done by SEU to institutionalize monitoring and evaluation of SEU energy use and development of a benchmarking system;
- an assessment of SEU Project management, monitoring and evaluation and stakeholder outreach that will be discussed with the Project Management Unit (PMU).

1.3 Methodology

5. The methodology of this TE essentially assesses the Project's performance from January 2015 to June 2022 in addressing the capacity gaps in managing SEU affairs, through the lens of UNDP evaluation criteria of **relevance, effectiveness, efficiency, sustainability**, **impact** and **cross-cutting issues** for one outcome and 5 expected outputs that were achieved through activities contained within the SEU Project:

- *Relevance* – the extent to which the outcome and outputs are suited to local and national development priorities and organizational policies, including changes over time;
- *Effectiveness* – the extent to which an outcome and outputs were achieved or how likely it is to be achieved. This would include the effectiveness of the SEU Project to assist implementation and facilitate capacity building (through technical assistance of the Project), and the quality of SEU Project management (including M&E performance);
- *Efficiency* – the extent to which results were delivered with the least costly resources possible. This would include the pace of capacity building based on the baseline capacities of the institutions and potential beneficiaries;
- *Sustainability* - the likely ability of an intervention to continue to deliver benefits for an extended period of time after completion. This would include the sustained acceptance of SEU methodologies for capacity building at the national level; and
- *Impact* – the positive and negative, foreseen and unforeseen changes to and effects produced by a development intervention. This may include the extent of uptake by the national implementation team to the SEU methodologies, and their resulting ability to confidently formulate and facilitate financing solutions;
- *Cross cutting issues* – the contributions of the Project to gender equality, disability, vulnerability and social inclusion. This would include the use of disaggregated data and analysis methods that integrate gender considerations, and outreach to diverse stakeholder groups to empower women and strive towards gender balance both within the Project itself and further afield.

6. The TE is supposed to achieve the assessment of Project performance by:

   - collecting credible, useful, and evidence-based information of the Project;
   - interviewing selected stakeholders to triangulate information to bring up key issues in capacity building to the SEU Project team; and
   - bringing up these key issues in strengthening capacity building within the SEU team and its stakeholders.

   The evaluation of the Project is based on evaluability analysis consisting of formal (clear outputs, indicators, baselines, data) and substantive (identification of problem addressed, theory of change, results framework) inputs. Considering the information to be provided into this TE (which is mainly whether or not the technical assistance of the Project was effective to the Kingdom of Bahrain and its stakeholders), the implication of the proposed methodology is that it should be effective in the evaluation process, and should inform stakeholders and the SEU Project team as it possibly transitions into a second phase.

7. This TE also evaluates the progress and quality of implementation against the indicators of the outcome and output in the RRF as provided in Appendix F. The TE process was conducted in a spirit of collaboration with SEU Project personnel with the intention of providing constructive inputs that can inform activities of a potential follow-up phase and future SEU programming**.**

1.4 Structure of the Evaluation

8. This evaluation report is presented as follows:

- An overview of Project activities from commencement of operations in January 2015 to the present activities of the SEU Project;
- A review of all relevant sources of information including the Project Document, project progress reports, and any other materials that the team considers useful for this evidence-based evaluation;
- A participatory and consultative approach to ensure close engagement with the Project Team, government counterparts, implementing partners, the UNDP Country Office (CO), and other stakeholders. Stakeholder involvement includes interviews with stakeholders (with a target of at least 25% women) who have Project responsibilities;
- An assessment of results based on Project objectives and outcomes through relevance, effectiveness and efficiency criteria;
- Assessment of sustainability of Project outcomes;
- Assessment of monitoring and evaluation systems;
- Assessment of progress that affected Project outcomes and sustainability; and
- Conclusions, recommendations and lessons learned.

9. Though the SEU Project is not a GEF-financed project, the SEU Terminal Evaluation report has been designed to meet UNDP-GEF's "Guidelines for Conducting Terminal Evaluations of UNDP-Supported, GEF Financed Projects" of 2020[5] in the absence of specific guidelines for UNDP projects financed by other sources. The TE also abides by UNDP guidelines "Evaluation during COVID-19" (updated to June 2021)[6].

1.5 Data Collection and Analysis

10. Data and information for this TE was sourced from:

- Review of Project documentation including quarterly progress reports (QPRs). This was important in establishing information pertaining to Bahrain's perceptions of capacity building activities of the Project. This was done primarily at the International Evaluator's home base. A full listing of data and information sources is provided in Appendix D;
- Questionnaires were provided to stakeholders for their detailed response. Some of the respondents did not have a follow-up interview with the International Evaluator. Questionnaires provided to stakeholders are provided in Appendix E;
- Follow-up interviews were conducted with respondents consisting of key Project personnel, technical advisors, consultants, and equipment installers and suppliers. Discussions were undertaken by e-mail and Zoom calls from the International Evaluator's home base. A listing of activities for stakeholder contact for the TE is provided in Appendix B.

[5] Available at: http://web.undp.org/evaluation/guideline/documents/GEF/TE_GuidanceforUNDP-supportedGEF-financedProjects.pdf

[6] Available at: http://web.undp.org/evaluation/guideline/documents/covid19/update/June2021/UNDP%20DE%20Guidance%20Planning%20and%20Implementation%20during%20COVID19%203%20June%202021.pdf

11. Different key Project personnel who were consulted about the Project included:

- The Project Management team. This involved interviews with the SEU's PMU. The purpose of contact with the PMU were the "rich" issues of implementation and execution;
- National Executing partners. This involved Government personnel who operated the SEU (Project initiator, former President of SEA, former Head of SEU);
- Project partners. This involved entities who worked in close collaboration with the national executing partners including consultants, contractors and suppliers. This included exhaustive information from these stakeholders on how policies were formulated, how RE and EE measures were implemented, and how equipment and civil works were procured and installed;
- Beneficiaries. This involved ministries and public agencies responsible for demonstration buildings and the general public using the buildings. Information from the beneficiaries was supposed to account for the impacts of the demonstration buildings and their implications on energy savings for the building and residential sector. Persons for interviews were to be targeted or random (as would be the case for the general public).

Appendix C presents a summary of persons consulted during the SEU TE.

1.6 Ethics

12. This Terminal Evaluation has been undertaken as an independent, impartial and rigorous process, with personal and professional integrity and is conducted in accordance with the principles outlined in the UNEG Ethical Guidelines for Evaluations, and the UNDP M&E policies, specifically the August 2020 UNDP "Guidance for Conducting Terminal Evaluations of UNDP-supported, GEF-financed Projects".

1.7 Limitations

13. There were limitations to this TE process, mainly due to the COVID-19 pandemic and the inability of the International Evaluator to travel to Bahrain to conduct face-to-face meetings with stakeholders and the PMU. The information was collected by the International Evaluator. However, the International Evaluator was not able to take the opportunity to get to know the stakeholders better. Actual visits to the offices of the stakeholders and the PMU by the International Evaluator are usually an opportunity for the stakeholders and the PMU to make a 2-3 hour presentations followed by question-and-answer period. This has many intangible benefits including the collection of information not documented. With the virtual visits on Zoom, the opportunity to make these 2-3 hour presentations and conduct a question-and-answer period is limited. By this limitation to the International Evaluator, he has limited exposure to the stakeholder teams, and as such, the Terminal Evaluation to a large extent is dependent on the information collected by the International Evaluator on Zoom calls and the documentation from progress reports and other reports. This also limits the Terminal Evaluation in terms of findings.

2. PROJECT DESCRIPTION AND DEVELOPMENT CONTEXT

2.1 Project Start and Duration

14. The SEU Project commenced as of January 2015. The Project was being implemented by UNDP up to the time of writing of this report (as of July 2022). The Project closed as of 31 July 2022.

2.2 Development Context

15. Despite its wealth generated from oil for 90 years, the Kingdom of Bahrain has promised to meet its Paris commitments with pledges of renewable energy and energy efficiency. In December 2013, the Minister of Energy sent a memo to Cabinet seeking approval for the creation of a Sustainable Energy Centre, which was approved. With Cabinet having approved the concept with limited capacity to operate such an institution, UNDP became involved with the signing of a Project document in November 2014 to establish and operate Bahrain's SEU.

16. The Kingdom of Bahrain remains highly reliant upon the petroleum and gas sector despite successful Government initiatives to diversify the economy towards finance, tourism and industry. While reserves in the country are limited, Bahrain's energy demand has been growing at 7% annually with the country facing the prospect of importing energy from neighbouring countries as feedstock for its expanding industries. In 2019, energy intensity for Bahrain was 9 MJ/$ GDP, higher than the world average of 3.43 MJ/ $ GDP[7].

17. With considerable potential for undertaking energy efficiency and renewable energy initiatives in Bahrain, the Government has strategically sought to enable long-term planning and implementation to extend the lifetime of the oil and gas reserves. The SEU Project attempts to remove barriers to implement energy efficiency and renewable energy initiatives such as the lack of reliable data and lack of technical capacity. This effort was strongly linked with:

- the launched the UN Sustainable Development Cooperation Framework (UNSDCF) 2021 – 2022 for Bahrain[8];
- UNDP's support for the Kingdom of Bahrain to achieve its national and international commitments to the Agenda 2030 and the SDGs through active engagement with the Government of Bahrain, civil society, academia, and the private sector[9] (Para 93).

2.3 Problems that the SEU Project sought to address

18. Following the approval of Cabinet, Bahrain's Sustainable Energy Unit (SEU) was established in November 2014 by way of a formal agreement between the Minister of Energy and the UNDP. The key objective of the Unit was to enable the SEU to "develop a cohesive and sustainable energy policy

[7] Bahrain Energy intensity, 1960-2021 - knoema.com

[8] The Minister of Foreign Affairs, H.E. Dr. Al-Zayani, expressed his belief that the UNSDCF constitutes a valuable tool for the Kingdom's development that responds to the policy and programming priorities of national development strategies, including the Economic Vision 2030 and the Government Action Plan 2019-2022 (Foreign Minister launches the UN Sustainable Development Cooperation Framework (UNSDCF) 2021 – 2022 | United Nations in Bahrain).

[9] The Strategic and Sustainable Development Cooperation Framework (2021-2022), signed with the Government and guided by Bahrain's Economic Vision 2030 and the UN's Agenda 2030, is a comprehensive partnership strategy that forms the basis for the achievement of the SDGs in the Kingdom of Bahrain (Sustainable Development Goals | United Nations in Bahrain).

and to promote Renewable Energy, Energy Efficiency and Conservation in the Kingdom of Bahrain". The Unit was also to work towards bridging the legal, institutional, and capacity gaps for the Bahrain energy sector to meet the future challenges. This includes lobbying for the creation of a government entity to continue the work of the Project going forward.

2.4 Development Objective of SEU Project

19. This Project is in direct response to the development objective of "developing a cohesive and sustainable energy policy and to promote Renewable Energy, Energy Efficiency and Conservation in the Kingdom of Bahrain" as contained in the SEU's RRF in Appendix F. The beneficiaries of the SEU Project were intended to be the Government of Bahrain, its national stakeholders and partners as well as vulnerable groups such as women's associations and youth groups.

2.5 Description of the Project's Theory of Change

20. No Theory of Change (ToC) was provided for this Project.

2.6 Expected Results

21. The intended outcome of the SEU Project coincides with Outcome 3 of the Country Programme Results and Resources Framework: "Enhanced environment for equitable, job creating and sustainable economic growth". Outcome indicators include "establishing a national identity in Bahrain for energy planning and energy efficiency" and "promoting gender parity in hiring and training while staffing Bahrain Unit for Sustainable Energy". To achieve this outcome and outcome indicators, the following outputs were expected to be achieved:

- Output 1: Bahrain unit for Sustainable Energy established;
- Output 2: Institutional capacity of Bahrain Unit for Sustainable Energy;
- Output 3: National energy policy paper and a framework for National Energy Strategy produced;
- Output 4: Expanded use of Energy Efficiency solutions; and
- Output 5: Expanded use of Renewable Energy solutions.

2.7 Total Resources for SEU Project

22. The total resources allocated to this Project at time of the original ProDoc signature is provided in Table 1. The actual budget for the Project as per received funds is US$ 6,286,112.

Table 1: Total Resources for SEU Project

Component	Government of Bahrain Resources (US$)
Output 1	$5,214,105
Output 2	$309,800
Output 3	$374,400
Output 4	$286,400
Output 5	$286,400
Audit and Evaluation	$30,000
3% GMS	$195,176
Total	**$6,700,000**

2.8 Key Partners involved with the SEU Project

23. Key partners on the SEU project are listed in Table 2. More details on these stakeholders are provided in Sections 3.1.4. and 3.2.2.

Table 2: Main Stakeholders on SEU Project

Stakeholder Type	Name
Government	First Deputy Prime Minister Office
	The Sustainable Energy Authority
	The Electricity & Water Authority
	The Ministry of Oil
	The Ministry of Transportation & Telecommunications
	The Ministry of Housing
	The Ministry of Finance and National Economy
	The Supreme Council of Environment
	The Ministry of Commerce, Industry & Tourism
	The Ministry of Works, Municipalities Affairs & Urban Planning
	The Economic Development Board

2.9 Context of other ongoing and previous evaluations

24. There are no other ongoing or previous evaluations of the SEU Project.

3. FINDINGS

3.1 Project Design and Formulation

25. In December 2013, there was a lot of work being done on renewable energy and energy efficiency on a small-scale by various entities within government and privately that had a lack of direction with skills that could not be replicated. The Minister of Energy for Bahrain (who oversaw the Oil & Gas and the Water and Electricity Authorities) wanted to consolidate this work and prepared a memo to Cabinet to have an entity that would oversee renewable energy and energy efficiency at a national level. Through consolidation, these efforts would eliminate any competing strategies and programmes.

26. The memo was approved by Cabinet for the setup of a Sustainable Energy Center. However, the Minister was told by the Ministry of Finance that the setting up of such a Center would be complex, requiring a lot of highly qualified senior personnel. UNDP was engaged as a more viable option by the Minister to provide the technical assistance to setup the Center, given UNDP's track record of supporting governments around the world in the setup of government institutions, especially in the field of energy. An agreement was brokered in November 2014 to formalize this arrangement with the SEU Project setup to be implemented by UNDP and funded by the Government of Bahrain.

3.1.1 Analysis of Results and Resources Framework for SEU Project

27. The Project was designed based on a RRF that includes intended outputs with indicators that do not meet SMART criteria with "output targets" for each Project output. These indicators and their targets are listed in the RRF shown in Appendix F. The RRF setup, however, is sufficient to monitor and evaluate the Project's activities.

3.1.2 Assumptions and Risks

28. There were no assumptions or risks mentioned in the SEU RRF.

3.1.3 Lessons from Other Relevant Projects Incorporated into SEU Project Design

29. There were no lessons learned from other projects in the region.

3.1.4 Planned Stakeholder Participation

30. The SEU ProDoc does not detail planned stakeholder participation. However, the ProDoc does imply that stakeholder participation will be realized through empowering line ministries and local municipalities to sustainably manage and use energy, and to ensure effective management of their energy resources. It also endeavors to strengthen government capacity to manage maintain and conserve energy according to the goals of the Economic Vision 2030 in Bahrain as well as SDG 7 (affordable & clean energy), SDG 13 (climate action) and SGD 5 (Gender Equality).

3.1.5 Linkages between the SEU Project and other interventions in the sector

31. The SEU Project had no linkages with other projects.

3.1.6 Gender responsiveness of Project design

32. The SEU Project's gender strategy is to promote a gender-differentiated approach with a focus on schools and health centers. Global lessons would be available for adoption in Bahrain such as rolling out social and economic protection programs combined with the provision of sustainable energy services.

3.1.7 Social and Environmental Safeguards

33. No SESP was available for this Project. However, the ProDoc was to have a focus on social sector institutions such as schools and health centers. Again, similar to what was mentioned in Para 32, global lessons would be available for adoption in Bahrain such as rolling out social and economic protection programs combined with the provision of sustainable energy services.

3.2 Project Implementation

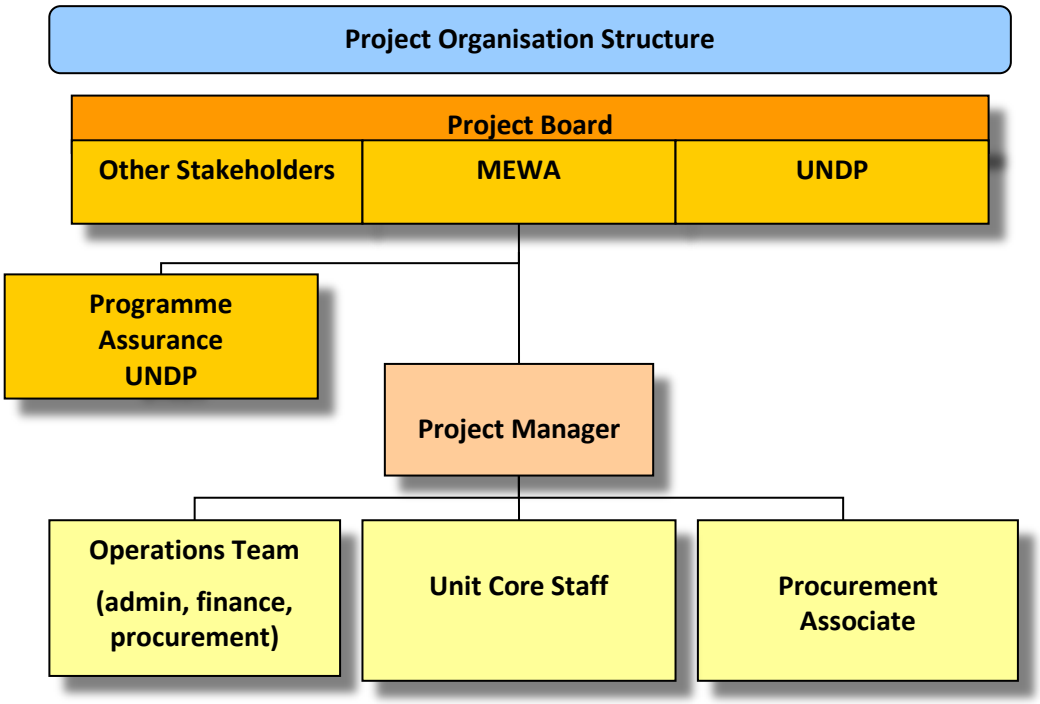
34. Overall, the SEU Project management arrangements and strategies were well-conceived and efficient in delivering the Project. The SEU Project has supported 3 entities at various times due to changing Implementing Partners from the government side, namely the Ministry of Energy (MoE), Ministry of Electricity and Water Affairs (MEWA) and the Sustainable Energy Authority (SEA) of the Kingdom of Bahrain. These were the entities mandated to lead and promote energy efficiency practices, transfer and diffuse renewable energy technologies and draft related policies and regulatory frameworks in close coordination with stakeholders and partners in the Kingdom of Bahrain. After the ProDoc was signed by UNDP in November 2014, the Project was implemented in the National Implementation Modality (NIM) starting in January 2015 to October 2019. The Sustainable Energy Unit (SEU) as it was known then, had no head, structure or budget, and was driven by the UNDP SEU Project.

35. After October 2019, the Government raised the status of the SEU to an Authority, appointing a president of the SEA. The SEU Project has been implementing projects and programmes under the National Energy Efficiency Action Plan (NEEAP) of 2017 and the National Renewable Energy Action Plan (NREAP) of 2017, with the SEU prior to October 2019, and SEA from October 2019 up to 2022 when SEA was merged with MEWA. The last SEU Project Manager started in June 2018. Without much change since October 2019, the SEU Project was implemented according to the management arrangements as elaborated in Figure 1. The Project was strategically positioned towards Bahrain's sustainable energy development that included strengthened capacities, and support to government, private industrial and commercial businesses, and the progressive scale-up of renewable energy and energy efficiency projects.

3.2.1 Adaptive Management

36. Adaptive management is discussed in UNDP evaluations to gauge performance of project personnel to adapt to changing regulatory and environmental conditions and unexpected situations encountered during the course of implementation, both common occurrences that afflict the majority of UNDP projects. Without adaptive management, donor investments into UNDP projects would not be effective in achieving their intended outcomes, outputs and targets. Much of the early adaptive management by SEU staff came in the form of:

Figure 1: SEU Project Organization Structure



- facilitating cooperation between the Project and other stakeholders. For example, studies and documents would be completed by UNDP or UNDP-appointed consultants and then with the assistance of the Head of SEA, be sent through to Government for approval;
- facilitating cooperation and synergies between grid operators and the government to come up with a suitable tariff arrangement;
- decision processes were time-consuming, especially for MEWA in renewable energy policies and distributed generation. However, the development of the RE market reduced the time for decision-making by MEWA and other government entities.

37. In conclusion, UNDP's efforts to adaptively manage this Project were sincere and ***highly satisfactory*** especially after 2017 when the NREAP and the NEEAP were operational. This is in consideration that the Implementing Partner was very knowledgeable about government. Their ability to get legislation activated by targeting the appropriate agencies to get through all the various stages of approval towards Project outputs proved to be a large asset for the SEU Project. There were unintended results of the SEU Project as detailed in Para 103.

3.2.2 Actual Stakeholder Participation Partnership Arrangements

38. The key to successful stakeholder participation arrangements for the SEU Project was the close involvement and consultations between key ministries during Project implementation to collect information on their key baseline activities, and to secure their collaboration during the Project. There are numerous examples of this as outlined in Section 3.4. During Project implementation, this translated into useful Project activities, much of which was facilitated by MEWA and later on the SEA, and harnessed into useful activities such as the net metering policy, and the formulation of Minimum Energy Performance Standards (MEPS).

39. Overall efforts by the SEU team to forge effective partnership arrangements with various stakeholders have been ***highly satisfactory***.

3.2.3 Project Finance

40. The total Government of Bahrain budget allocation for the SEU Project was originally US$6,700,000 (actual funds allocated to the Project are US$ 6,286,112) that was to be disbursed over a 48-month period, managed by a UNDP-PMU under the direction of the Implementing Partner (either the Minister of MEWA or the President of the SEA). Table 3 depicts disbursement levels up to 30 June 2022, 1 months prior to the actual terminal date of the SEU Project of 31 July 2022, revealing the following:

- the budget for Output 5 (Expanded use of Renewable Energy solutions) was overspent by 443%. This was not unexpected since support for renewable energy was in demand from several stakeholders. This prompted the recruitment of several consultants to assist in the policies, design, tendering, implementation, monitoring and evaluation of primarily solar PV projects;
- the budget for Output 1 (Bahrain Unit for Sustainable Energy) established was underspent by 40%. This was also not unexpected since much of the work to establish the SEU was undertaken by the Government with policy and regulatory studies to establish SEU were budgeted under Outputs 3, 4 and 5;
- the budget for Output 2 (Institutional capacity of Bahrain Unit for Sustainable Energy Unit) was overspent by nearly 400%. This was not unexpected since capacities needed to strengthened not only for government but for design engineers, technicians and skilled workers;
- roughly 63% of the funds were spent on short-term international and local consultants as well as individual service contracts;
- the remainder of the funds were spent mainly on DSAs, travel, construction services, media and office operations.

41. The Project has also demonstrated that appropriate financial controls are in place, notably through:

- Combined Delivery Reports (CDRs) and Project Budget Balance Report which shows the expenditure and commitments in the current year up to date (both as generated by Atlas);
- manual monitoring of Project expenditures against budget lines to attain an in-depth understanding of the financial progress and the pending commitments.

42. Overall, the cost effectiveness of the SEU Project has been **highly satisfactory** in consideration of the excellent results achieved in the facilitation of EE and RE initiatives taken and the capacity building of the stakeholders involved, and the lower costs associated with UNDP works.

3.2.4 Monitoring and Evaluation (M&E) Design at Entry and Implementation

43. The Project Document does provide for an M&E design on page 17 in the ProDoc. The design is presented in a fairly generic manner, similar to other M&E designs from other UNDP projects, and with preparations for a detailed M&E plan left to the implementation phase of the Project. Moreover, there was no budget for M&E activities implying that the M&E activities would be done jointly by SEA and the UNDP SEU Project. As such, the M&E design is rated as ***satisfactory***.

Table 3: Government of Bahrain Project Budget and Expenditures for SEU Project (in USD as of 30 June 2022)

Outputs	Resource Allocation (from ProDoc)	2015	2016	2017	2018	2019	2020	2021	2022[22]	Total Disbursed
Output 1: Bahrain Unit for Sustainable Energy established	5,214,105	72,350	30,726	129,554	581,516	604,248	785,439	656,438	213,209	3,073,017
Output 2: Institutional capacity of Bahrain Unit for Sustainable Energy Unit	309,800	23,777	202,249	-	177,634	284,842	247,661	247,752	66,955	1,235,984
Output 3: National energy policy paper, and framework for National Energy Strategy produced	374,400	2,639	39,788	3,120	-	24,714	-	41,777	-	112,039
Output 4: Expanded use of Energy Efficiency solutions	286,400	417	22,095	51,252	133,367	85,330	60,696	53	-	353,210
Output 5: Expanded use of Renewable Energy solutions	286,400	417	84,002	275,787	236,567	230,997	147,733	262,560	28,037	1,266,099
Audit and Evaluation	30,000									0
GMS	198,895									0
Total (Actual)	**6,700,000**	**99,600**	**378,860**	**581,992**	**1,129,083**	**1,230,131**	**1,241,529**	**1,208,579**	**308,201[23]**	**6,177,975[24]**

[22] Up to 15 August 2022

[23] Amount is not final as the Project it not yet financially closed with some commitments to be paid once invoices are received from vendors.

[24] By the time the Project is financially closed, actual resources received under the SEU Project will be US$6,286,112.

Table 4: Expenditures by ATLAS Code of the SEU Project (to 30 June 2022)

ATLAS Code	Expenditure Description	US$
61205	Salaries GS Staff	55,525
62210	Contrib to Jt Staff Pens Fd-GS	10,919
62215	Contrib. to Medical, social In	2,166
62240	Annual Leave Expense GS	5,010
63360	Medical Exams(incl Pre-empl)	1,207
63530	Contribution to EOS Benefits	2,082
63535	Contribution to Security	2,330
63540	Contribution to Training	207
63545	Contribution to ICT	833
63550	Contributions to MAIP	41
63555	Contribution to UN JFA	1,730
63560	Contributions to Appendix D	139
64210	Separatations GS Staff	1,111
64315	Detail Assignments IP Staff	7,076
65115	Contributions to ASHI Reserve	5,461
65135	Payroll Mgt Cost Recovery ATLA	381
71205	Intl Consultants-Sht Term-Tech	963,498
71210	Intl Consultants-Sht Term-Supp	3,900
71211	Intl Consult Security Charge	10,598
71305	Local Consult.-Sht Term-Tech	845,115
71360	Local Consult-Security	12,721
71405	Service Contracts-Individuals	2,110,216
71410	MAIP Premium SC	1,255
71415	Contribution to Security SC	77,460
71470	Natl Personnel Srvcs Agreement	163,578
71605	Travel Tickets-International	48,260
71610	Travel Tickets-Local	531
71615	Daily Subsistence Allow-Intl	49,950
71620	Daily Subsistence Allow-Local	33,614
71630	Shipment	719
71635	Travel Other	16,410
72105	Svc Co-Construction & Engineer	309,395
72115	Svc Co-Natural Resources & Env	11,957
72120	Svc Co-Trade and Business Serv	3,979
72130	Svc Co-Transportation Services	862
72135	Svc Co-Communications Service	18,569
72140	Svc Co-Information Technology	1,702
72145	Svc Co-Training and Educ Serv	5,947
72175	Svc Co-Urban, Rural & Regional	10,600
72205	Office Machinery	464
72220	Furniture	29,775
72310	Minerals,Mining & Metal Prdcts	2,387
72311	Fuel, petroleum and other oils	1,435
72335	Pharmaceutical Products	175
72399	Other Materials and Goods	1,589
72402	Building Maintenance	5,144
72405	Acquisition of Communic Equip	19,947
72415	Courier Charges	792
72420	Land Telephone Charges	1,359
72425	Mobile Telephone Charges	8,297
72440	Connectivity Charges	2,776
72445	Common Services-Communications	5,330
72505	Stationery & other Office Supp	17,048
72510	Publications	1,985
72515	Print Media	80,092
72520	Electronic Media	48
72705	Hospitality-Special Events	687
72715	Hospitality Catering	41,576
72805	Acquis of Computer Hardware	2,501
72815	Inform Technology Supplies	3,925
73107	Rent Meeting Rooms	32,565
73110	Custodial & Cleaning Services	89,059
73115	Moving Expenses	6,797
73120	Utilities	8,644
73125	Common Services-Premises	53,417
73205	Premises Alternations	1,059
73310	Maint & Licencing of Software	3,600
73405	Rental & Maint-Other Office Eq	952
73406	Maintenance of Equipment	159
73410	Maint, Oper of Transport Equip	46
74110	Audit Fees	29,037
74115	Legal Fees	7,627
74205	Audio Visual Productions	17,055
74210	Printing and Publications	75,300
74220	Translation Costs	1,928
74225	Other Media Costs	94,440
74510	Bank Charges	114
74520	Storage	78,660
74525	Sundry	6,745
74530	Staff Welfare	414
75105	Facilities & Admin Implement	174,031
75705	Learning costs	233,347
75709	Learning training of counter	63,460
75711	TrnWrkshp&Conf Stipends	217
76125	Realized Loss	59
76135	Realized Gain	-120
Total:		**6,002,998**

44. In terms of M&E plan implementation, the Evaluator only had access to progress reports for 2018, 2019, 2020, and 2021 which were informative in terms of the progress made on various initiatives studies and actions taken by the Project; the progress reports, however, did not report on the targets to be achieved.

45. As such, M&E plan implementation is rated as ***satisfactory***. Ratings according to the GEF Monitoring and Evaluation system[13] are as follows:

- *M&E design at entry – 5;*
- *M&E plan implementation – 5;*
- *Overall quality of M&E – 5.*

3.2.5 Performance of Implementing Agency

46. The performance of UNDP (the Implementing Agency) can be characterized as follows:

- During the early stages before the SEU became an Authority, UNDP was the main driver behind the Project involved in engaging stakeholders and consultants in Project activities and to provide management arrangements that follow global UNDP POPP guidelines. This involvement helped the SEU gain stature and reduced the cost of services;
- UNDP increased its cooperation with government, training organizations and private stakeholders after it became an Authority. Their collaboration with the GoB produced important synergies that prolonged and extended the impact of the Project-sponsored training activities and collaborations with other government entities;
- Overall performance of UNDP on the SEU Project can be assessed as being **highly satisfactory**.

3.3 Project Results and Impacts

47. This section provides an overview of the overall results of the SEU Project and an assessment of the relevance, effectiveness and efficiency, country ownership, mainstreaming, sustainability, and impact of the SEU Project. For Table 5, the "status of target achieved" is color-coded according to the following color-coding scheme:

Green: Completed, indicator shows successful achievements	Yellow: Indicator shows expected completion by the EOP	Red: Indicator shows poor achievement – unlikely to be completed by Project closure

[13] 6 = HS or Highly Satisfactory: There were no shortcomings;
5 = S or Satisfactory: There were minor shortcomings,
4 = MS or Moderately Satisfactory: There were moderate shortcomings;
3 = MU or Moderately Unsatisfactory: There were significant shortcomings;
2 = U or Unsatisfactory: There were major shortcomings;
1 = HU or Highly Unsatisfactory
U/A = Unable to assess
N/A = Not applicable.

Table 5: Project-level achievements against SEU Objectives

Project Strategy	Performance Indicator	Baseline	Target	Status of Target Achieved	Evaluation Comments	Rating[14]
Project intended Outcome 3: ***Enhanced environment for equitable, job creating and sustainable economic growth***	Establishing a national entity in Bahrain for energy planning and energy efficiency	n/a	n/a	The Sustainable Energy Authority has been established in 2019 as the national entity to further Bahrain's ambitions of renewable energy and energy efficiency in country.	See Para 49	5
	Promoting gender parity in hiring and training while staffing Bahrain Unit for Sustainable Energy	n/a	n/a	Government very supportive of gender equity in the energy profession.	See Para 50	5
Output 1: Bahrain Unit for Sustainable Energy established	1.1. Conduct stakeholder's consultation 1.2. Recruit Project Manager and Chief Technical Advisor 1.3. Design and facilitate enactment of law establishing Bahrain Unit for Sustainable Energy and defining its mandate and structure 1.4. Develop policies, bylaws and operational guidelines of the Energy Unit 1.5. Recruit core staff 1.6 allocate adequate office space for the Unit 1.7 procure and install basic equipment in designated office space 1.8 recruit staff for Bahrain Unit for Sustainable Energy – 28 people to lead all activities under Outputs of the project below 1.9. Communication and outreach activities for the International Decade of Sustainable Energy for all (2014 to 2024) including posting international sustainable energy conferences in Bahrain and participating in UN sustainable energy conferences globally	n/a	1.1 Core staff of the energy unit in place (year 1) 1.2 Procurement and installation of basic equipment (year 1) 1.3 Develop policies, bylaws and operational guidelines of the energy unit (year 1) 1.4 Awareness of sustainable energy goals raised (years 1 and 2) 1.5 Bahrain Unit for Sustainable Energy fully staffed (year 3)	• Conducted extensive stakeholder discussions to enable SEU and SEA to function as a national entity to further RE and EE objectives in Bahrain • Recruited Project Managers and Chief Technical Advisors to allow SEU/SEA to function as a facilitative and advisory body for promoting and implementing RE and EE in Bahrain	See Paras 52 to 57	5
Output 2: Institutional capacity of Bahrain Sustainable Energy Unit built	2.1. Identify training opportunities locally and internationally 2.2. Conduct international and local training programs on energy planning, energy efficiency and renewable energy technologies 2.3. Conduct south-south exchanges with energy centres in China, India, Saudi Arabia etc. and study tours to other energy planning centres and energy conservation centres – California Energy commission, Department of energy USA and energy conservation Centre Japan etc. 2.4. Undertake training needs for the fully staffed unit	n/a	2.1. Self South exchanges and study tours organized (years 1 and 2 2.2. Two national training programs for staff (year 2) 2.3. Core staff attend 2 relevant international training programs (year 2) 2.4. Training needs assessment including potential training opportunities (year 3)	• Training opportunities identified • Training programmes conducted locally but with international expertise • Training needs are actively being assessed	See Paras 58 and 59	6

[14] Ibid 17

Project Strategy	Performance Indicator	Baseline	Target	Status of Target Achieved	Evaluation Comments	Rating[14]
Output 3: National energy policy paper, and a framework for National Energy Strategy produced	3.1. Prepare MO you between CIO and the Unit for Sustainable Energy on energy data collection and management 3.2. Work with CIO to understand the data availability, identifying gaps, requesting additional data 3.3. Perform data analysis and design initials State of Energy Report 3.4 hold stakeholder consultations including the legislative body, women machineries, environmental entities and youth organizations 3.5. Assessment of energy supplied trends and options 3.6. Analysis of energy demands trends and scenarios 3.7. Preparing energy balance 3.8. Drafting of a national energy forecast and scenario policy brief 3.9. Drafting of National Sustainable Energy Strategy core umbrella framework including indicators systems with energy efficiency and renewable energy sections developed under outputs 4 and 5 below	n/a	3.1. Design a national information management system (year 1) 3.2. Design and launch State of Energy Report with trends and scenarios to 2030 (years 1 and 2) 3.3. MO you with CIO on energy data collection and management signed (year 2) 3.4. Data collection (year 2 onwards) 3.5. Energy balance produced (year 2 onwards) 3.6. Analysis of energy supply options (year 2 onwards) 3.7 analysis of energy demand (year 2 onwards) 3.8. National Energy Forecasting policy brief (year 3) 3.9. Framework for National Sustainable Energy strategy developed (years 2 to 3)	The NREAP and NEEAP were prepared after undergoing successful consultations.	See Paras 60 to 63	6
Output 4: Expanded use of Energy Efficiency (EE) solutions mainly through development of the NEEAP	4.1. Assess policy, institutional and market barriers of improving energy efficiency 4.2. Identifying potential for energy efficiency improvements in key sectors such as oil/gas, buildings, aluminum, air conditioning, etc. 4.3. Identifying national/sectoral energy efficiency targets or specific sectors for 2030 4.4. Assess policies and measures to overcome policy, institutional and market barriers in key sectors 4.5. Implement early actions likely to be identified in the strategy, particularly decentralized solutions like energy efficient air conditioning as well as broader sectoral approaches 4.6. Implement measures to scale up EE measures identified in the National SE Strategy, particularly decentralized solutions like energy efficient air conditioning as well as broader sectoral approaches 4.7. Communication and outreach activities	n/a	4.1. Energy efficiency components to the CAP national Sustainable Energy Strategy (years 2 to 3) 4.2. Projects and partnerships for scaling up energy efficiency solutions including decentralized solutions such as energy efficient air conditioning (years 1 to 2 for pilots and years 4 to 5 for implementation of EE solutions identified under National Strategy)	Several EE policies were undertaken including the GBC, MEPS and energy labeling that will encourage the stakeholders to comply.	See Paras 64 to 75	6
Output 5: Expanded use of Renewable Energy (RE) solutions mainly through	5.1. Develop energy efficiency component for integration in National Sustainable Energy Strategy in Output 3 above 5.2. Assess policy, institutional and market barriers for expanding use of RE 5.3. Identify are the targets for 2030	n/a	5.1 Renewable energy components for the National Renewable Energy Strategy (years 2-3) 5.2. Projects and partnerships for scaling-up renewable energy	Several RE initiatives mainly in solar have been completed or are underway now in Bahrain	See Paras 76 to 92	6

Project Strategy	Performance Indicator	Baseline	Target	Status of Target Achieved	Evaluation Comments	Rating[14]
development of the NREAP	5.4. Develop renewable energy components to the CAP national Sustainable Energy Strategy in Output 3 above 5.5. Implement early actions likely to be identified in the strategy, particularly decentralized off grid solutions like rooftop solar and solar water heating 5.6. Implement measures to scale up re: measures identified in the CAP national SE strategy, particularly decentralized solutions like energy efficient air conditioning as well as broader sectoral approaches 5.7. Communication and outreach activities		solutions like roof top solar and solar water heating (Years 102 for pilots and years 4-5 for implementation of RE solutions identified under National Strategy)			

3.3.1 Progress towards intended outcomes

48. With the overall objective of this Project being to "develop a cohesive and sustainable energy policy and to promote Renewable Energy, Energy Efficiency and Conservation in the Kingdom of Bahrain", a summary of achievements of the SEU Project at the objective level is provided with evaluation ratings on Table 5.

49. With respect to the performance indicator of "establishing a national entity in Bahrain for energy planning and energy efficiency", the SEU has been established after November 2014 to September 2019 of being known as the UNDP SEU Project with no head, structure or budget, and then the raising of the status of the SEU to an Authority, appointing a President of SEA in October 2019. This was a significant achievement. SEA was later merged with MEWA in 2022.

50. With regards to "promoting gender parity in hiring and training while staffing Bahrain Unit for Sustainable Energy ", the Government has not had any issues with the hiring of women in the SEA. The SEU Project had a 50-50 split in gender in technical and administrative positions (not counting drivers and other support staff), a much better gender balance than the general workforce. While the numbers of women are still low in MEWA and other Bahraini government institutions, women interviewees said there were opportunities for women in the administration and technical management of the Authority as well as with other government and private entities without gender discrimination. Time will be required to get the proportion of women in the work force to significant levels of 33% or higher. In the 1stQ 2019 and 4thQ 2021, awareness raising sessions for sustainable energy were conducted with the Supreme Council of Women.

51. Overall, the work by the SEU Project to assist Bahrain in enhancing the environment for equitable, job creating and sustainable economic growth, establishing a national entity for energy planning and energy efficiency, and promoting gender parity for staffing Bahrain Unit for Sustainable Energy, is rated as **satisfactory**. The Project has made a significant contribution to SDG 7 (Affordable & Clean Energy), SDG 13 (Climate Action) and SGD 5 (Gender Equality).

3.3.2 Progress towards Output 1: Bahrain Unit for Sustainable Energy established

52. In achieving Output 1, Project resources would be used to establish the Sustainable Energy Unit for Bahrain. In 2007 to 2010, ministers within the GoB were concerned over the exclusive use of oil and gas to meet their energy needs. A movement amongst ministers was made in an effort to search for opportunities to conserve these resources. Sub-committees were formed on renewable energy and energy efficiency in search of these opportunities. For one minister, this gave the rationale for the need for a dedicated agency to oversee the numerous opportunities in sustainable energy. A visit to the UNDP's Energy Conservation Center in Damascus, Syria[27] was a catalyst for a similar model for Bahrain. The Minister studied the establishment of a similar Center for Bahrain in 2010; the outcome of the study was positive, receiving widespread support.

53. The Sustainable Energy Unit came into existence in 2014 with the help of UNDP. There was a Steering Committee with the Minister for Oil and Gas (who was then appointed the Minister of MEWA in 2012), a few other ministers and UNDP who started work on establishing the SEU as a separate entity

[27] UNDP's Energy Conservation Center in Damascus oversaw energy conservation plans for Syria looking after standards for buildings and other energy consuming activities.

in charge of sustainable energy in Bahrain. The stature of SEU grew with the MEWA Minister who established an Implementation and Follow-Up Committee (IFC) following a Cabinet decision in 2017 when the NEEAP and NREAP were approved, consisting of senior officials from all line ministries and other stakeholders (from the Prime Minister's office all the way to Director-Generals and Secretary-level persons).

54. The IFC meet 4-6 times a year to follow-up on the SEU establishment and its plans for promoting renewable energy and energy conservation up to 2030. In 2013, a gap analysis was undertaken to identify the energy demands and identify the framework and governance for an SEU. Inputs related to environment and climate change concerns in sustainable energy and how to mainstream those concerns were to be drafted in the NREAP and NEEAP documents. Recruitment of SEU staff has continued from 2015 until today. A formal agreement was signed in November 2014 for UNDP to technically assist GoB in promoting sustainable energy generation in Bahrain. The official start of the SEU Project was in January 2015. Staff was added to SEU including the current Project Manager, a solar engineer, energy efficiency specialists, RE research assistant, RE specialists, communication staff, and administrative staff in early 2018.

55. The Sustainable Energy Centre (SEC) was announced by Royal Decree in March 2019, the first time the GoB had formally established an independent and specific entity to oversee the renewable and efficiency sectors in the Kingdom at a national level. The SEC was upgraded to an Authority under the MEWA in the 4thQ 2019 by Royal Decree. The Head of the Sustainable Energy Authority (SEA) was at the rank of a Minister with only SEA to report directly to Cabinet, enabling it to continue its mandate with minimal interference.

56. However, in February 2022, the President of SEA retired and SEA's budget, staff, responsibilities and authorities were transferred to MEWA with underlying issues with this arrangement:

- there were responsibilities of the Sustainable Energy Authority (SEA) to report to MEWA on its activities making SEA less independent to undertake its own initiatives, which sometimes challenges the very entity that it reports to. This leads to some uncertainty surrounding the future of RE and EE;
- there is an Electricity and Water Authority (EWA) under MEWA with their own RE/EE initiatives such as solar PV roofs and EE streetlighting;
- there is also a Ministry of Sustainable Development formed in mid-2022 under which an entity such as SEU can operate;
- the EWA administration of RE projects resulted in long delays in the approval of RE projects, possibly due to SEA's lack of power to acquire information, and the lack of a mandatory reporting system of energy consumption and production.

57. However, the overall work by the Project in Output 1 to establish the Bahrain SEU can be rated as **satisfactory**. This is primarily due to the work establishing the SEU prior to UNDP's involvement on the SEU Project. Notwithstanding SEU's lack of independence, there is an outcome that the establishment of SEU has led to a critical mass of support for RE and EE initiatives as there are a large number of RE and EE projects in the pipeline and policy changes are being implemented to further promote RE and EE.

3.3.3 Progress towards Output 2: Institutional capacity of Bahrain Sustainable Energy Unit built

58. In achieving Output 2, Project resources were used to:

- provide training for market actors whereby in 2021 there were over 434 engineers, technicians and consultants trained in solar PV. This included the certification programme beginning in 2018 to end-2020. An estimated 300 passed and joined solar PV companies;
- provide training for energy audits to audit to ISO 50001 standard starting in the 3rd Q 2018 with an international consultant leading the audit survey of the 1st batch of 532 government buildings, and a workshop delivered on energy management in energy auditing to enable companies to carry out audits and surveys. In one session, on-the-job training for 7 companies was conducted with audit practice with a shipbuilding company. The shipbuilding company was so impressed with the audit that they went on to implement recommendations that resulted in investments approvals of over US$1.4 million and training opportunities for local energy efficiency consultants;
- explore opportunities to link with local academia. This included:
  - signing an MoU in 2ndQ 2019 with the Bahrain Centre for Strategic International and Energy Studies for joint cooperation in an accelerator platform to develop a program for sustainable energy capacity building training and public awareness events for Bahraini students in sustainable energy;
  - supporting SEA in discussions with local universities beginning in 1stQ 2020 to develop a local training academy for energy efficiency and reviewing an MSc. RE engineering syllabus;
  - supporting the establishment of renewable energy labs at the University of Bahrain in 2ndQ 2019. The labs provide reliable reports of weather and solar data to both researchers inside and outside Bahrain. The labs also offered outdoor testing for commercial solar panels, allowing the companies to test different solar systems under local weather conditions;
  - exploring the development of a local training academy for EE as late as the 4thQ 2020;
- prepare standards, regulations and policies such as “Energy Efficiency Standards/Technical Regulations and Conformity Assessment Procedures for low voltage electrical appliances” and “Standards and Technical Regulations for Electric Cars” (a Paper in the International Sustainable Energy Event (iSEE) 2021 conference);
- provide dissemination sessions at various levels of Government (such as MEWA, Ministries of Works and Municipalities) and other stakeholder interest groups for legislative support for laws such as Green Building Code (Law 214, 2019);
- promote sustainability at international conferences attended by a large number of organizations, Government entities and the general public. Enthusiasm for RE and EE was extended to public and private sector and their willingness to use their own funds to implement and promote RE and EE;
- support a Project-sponsored national subcommittee for the Gulf Cooperation Council (GCC) standardization for renewable energy technologies and storage systems to ensure that the local market follows the international standards and best practices, and to inform and provide feedback for any issues indicated in a national standard or guideline. This was done in 2019 for 38 persons;
- established the iSEE in cooperation with the Bahrain Society of Engineers to have an annual conference and exhibition to promote the RE and EE sectors to the general public and allow business-to-business networking opportunities. The event has been carried out only twice, in 2019 (physical) and 2021 (virtual) due to COVID, making it effectively a bi-annual event;

- provided continuous support to companies, new and old, local, regional and international, who wanted to better understand the local RE and EE sectors and the legislation surrounding it and how to enter the market.

59. In conclusion, the work by the Project in Output 2 to build the institutional capacity of the SEU and other stakeholders is rated as **highly satisfactory** based on the institutional capacities developed by the Project, and the number of Government and private stakeholders involved with RE and EE investments. This output was a key to sustainable energy development in Bahrain through capacity building of all stakeholders, and the support provided to government entities as well as private commercial and industrial businesses to progressively scale-up renewable energy and energy efficiency projects in Bahrain.

3.3.4 Progress towards Output 3: National energy policy paper, and a framework for National Energy Strategy produced

60. In achieving Output 3, Project resources would be used to prepare 2 important documents in 2016, the NEEAP and NREAP with targets setup in 2017. Preparations consisted of providing examples of energy planning and RE and EE programs from other countries for Bahraini personnel to replicate these experiences. After work was done to identify gaps and request for additional data, data analysis was performed with conclusions and findings of energy demand trends and balances discussed with stakeholders including government ministries and the general public. After these consultations, the work of preparing these documents proceeded.

61. The IFCs for the NEEAP and NREAP were comprised of the First Deputy Prime Minister Office, the SEA, the EWA, Ministry of Oil, Ministry of Transportation & Telecommunications, Ministry of Housing, Ministry of Finance and National Economy, Supreme Council of Environment, Ministry of Industry, Commerce & Tourism (MoICT), Ministry of Works, Municipalities Affairs & Urban Planning, and the Economic Development Board. Initially, there was resistance from various entities who felt targets could not be achieved. However, the following targets became part of the Paris Agreement as NDCs in January 2017:

- EE target of 6% by 2025, and
- RE targets of 5% and 10% by 2025 (250 MW) and 2035 (710 MW) respectively.

62. NDC commitments were upped again by the HRH Kingdom of Bahrain's Crown Prince and Prime Minister at COP26 in Glasgow in November 2021:

- RE targets of 5% and 20% by 2025 (250 MW) and 2035 (1,420 MW) respectively;
- Net-zero carbon emissions by 2060.

63. To date, Bahrain has achieved, gained approval, or is building 80% of the 2025 national targets for renewable energy (250 MW) and energy efficiency (6% improvement). In conclusion, the work by the Project in Output 3 to prepare the NREAP and NEEAP as national energy policy papers was **highly satisfactory** due to the use of these documents for successful consultations with stakeholders to operationalize the Action Plans, and successful implementation of these Action Plans (including the regular reporting of NEEAP and NREAP to the Deputy Prime Minister) that have led to Bahrain almost meeting its RE and EE targets for 2025.

3.3.5 Progress towards Output 4: Expanded use of Energy Efficiency (EE) solutions mainly through development of the NEEAP

64. In achieving Output 4, significant efforts were undertaken by the SEU in bringing EE to a necessary sharp focus. The NEEAP sets out 22 important initiatives covering all aspects of energy efficiency in buildings, lighting, the grid, vehicles, and appliance efficiency, and other aspects. The Green Building Code (GBC) and Green Building Rating Scheme (GBRS) covers building initiatives covering 7 out of the 22 initiatives. The creation of the GBC and the accompanying GBRS form a very important part of the overall delivery of the NEEAP. A number of these EE initiatives in support of NEEAP are described in the following paragraphs.

65. The GBC and GBRS for Bahrain was launched in January 2019 and is run by the Municipality. The SEA, MEWA and the SEU Project all took steps to get Government to launch the code. This was an important accomplishment for the Project since buildings are the largest consumer of energy. The established building sector in Bahrain resisted change and the inclusion of RE into building designs was a difficult barrier to hurdle. However, with the policy changes put in place by the SEU Project and SEA, the EE/RE initiatives have grown, developing new building energy models designed to shift this type of investment in the market from those who take the short-term view of initial costs only and not the long-term impact of costs and benefits. While this approach of long-term impact has started already, it is anticipated that this type of investment should start competitions amongst building owners thereby strengthening compliance to the Code.

66. The Project was involved in:

- leading the development of the GBC in cooperation with international consultants and the Ministry of Works, Municipal Affairs and Urban Planning in 3rdQ 2019;
- the recruitment of managers of several schools and Government buildings to ensure implementation of the GBC and GBRS on these buildings. This was done to show how easily the code can be applied and energy efficiency as a valid and mostly easily achieved target for improved comfort and lower operating costs;
- the design of the new Bahrain National Assembly building that was the first building to comply with the GBC and GBRS in 2021. The building scored a “Diamond Rating”, the highest level of reward, and demonstrated the benefits of the GBC and GBRS policies of sustainable energy to strengthen legislation and regulatory reforms for building energy efficiency in Bahrain.

67. MEPS were also encouraged and actively supported by SEU who were members of various technical working groups. The MEPS were being done in collaboration with the MoICT in 2017 (under which there is a Standards Committee and the technical backup of EWA) for:

- lighting where all government buildings are mandated to use LEDs;
- ACs with a labeling being a star system. This was also an important achievement of the Project since ACs can take up to 60% of electrical load. Currently, there is a standard for small ACs. Standards for large ACs are being developed now by MoICT from the 3rdQ 2020;
- white appliances for which there is also a labeling system.

The MEPS for these appliances currently has been passed, but is not mandatory.

68. The Project also developed a "Green Public Procurement (GPP) Document" that was drafted and given to government-appointed consultants to be finalized in 2022. It included several items such as air conditioners (ACs), lighting, office IT equipment, pumping systems, light vehicles, buses. The GPP document, or manual, has been part of the priorities within the EE strategy of the Kingdom (and therefore part of the SEU Project). Two GPP Trainings for public procurement officers were scheduled for 2022; however, continuous delays in the process of selecting an external service provider have been experienced to the point where the trainings will be conducted without Project support.

69. The Project encouraged the conversion of streetlighting to LEDs and solar power. EWA is running a replacement program to change the older high pressure sodium lamps to LEDs and requesting municipalities and the Ministry of Works (MoW) to use LED lighting in their new developments going forward. The replacements are ongoing.

70. The Project facilitated an effort to make district cooling the preferred solution for building cooling as it is 50% more efficient than individual ACs. A regulatory framework was developed and driven by the Project, the IFC and the MoW, in establishing clear roles, responsibilities and rights for developers, investors, providers, Government and customers. The Project assisted this initiative by conducting online awareness raising campaigns, conducting stakeholder consultations, undertaking legal reviews of the regulatory framework and pushing the legislation all the way to Cabinet for approval after having gained approval for the concept of a District Cooling Regulator via the Deputy Prime Minister's Infrastructure Committee and the Civil Service Bureau. The regulator role will sit within the SEA. However, just before Cabinet approval of SEA as the regulator for District Cooling in early 2022, the change of SEA to now be under MEWA caused the legislation to be withdrawn from Cabinet for "reassessment". After the Cabinet changes in June 2022, the legislation is now going back to Cabinet for approval, but this time without SEU Project support.

71. The Project facilitated an Industrial Energy Efficiency programme in 2019. This programme arose due to the gradual removal of subsidies from electricity, fuel and water, leaving many industrial stakeholders searching for ways to become more energy efficient as it was negatively impacting their bottom line. Industrial entities that are directly driven by gas come under the purview of Ministry of Oil, and those that were not on gas would come under the purview of MoICT. The Project has engaged several industrial entities in discussions about how to offset their carbon footprint through energy efficiency measures or by installing renewables such as solar PV or both.

72. The Project supported an initiative to make electricity supply more efficient. This was done with Project support for MEWA to replace power stations with more efficient equipment and converting transmission from 220 kV to 400 kV due to less losses. The Project designed a scheme to encourage industries to do a power factor correction or incur a penalty. This proposed policy and programme should facilitate a move towards making industry more efficient.

73. The Project facilitated a programme for vehicle standards and labeling that has existed since June 2019:

    - improve vehicle standards from EUR 4 to EUR 5 or 6. With the gradual removal of fuel subsidies, behaviour changes in people's driving habits should make them more efficient. The only barrier at this time is waiting for the refinery to produce appropriate fuel;

- electric vehicle (EV) standards by the MoICT where EVs can be bought in Bahrain against the standard. This standard was active in June 2021. A national government EV committee are currently looking at local pilots for vehicle charging infrastructure needed to mainstream EVs. SEA is taking the lead on development of a comprehensive EV strategy by working with industry experts and the SEU Project to develop an international consultancy;
- there are indicators of the low usage of the public transportation system in Bahrain. These somewhat impact vehicle use efficiencies to the extent that public transport no longer offsets the use of private vehicles.

74. Smart metering has been encouraged by the Project since 2017. There are now an estimated 300,000 smart meters in use in Bahrain.

75. In conclusion, the work by the Project in Output 4 to expand the use of energy efficiency solutions as a part of NEEAP was **highly satisfactory** due to the SEU having done excellent work in persuading the policymakers to implement initiatives such as the GBC, MEPS, and vehicle labelling, to help generate awareness and affect changes to these areas of EE. While the Kingdom has adapted to these policies in a short space of time, the impacts of these policies are starting to manifest themselves. A deficiency at this time is a lack of any mandatory EE reporting scheme to the SEU from an industry, facility or utility. This EE reporting will come with time.

3.3.6 Progress towards Output 5: Expanded use of Renewable Energy (RE) solutions mainly through the development of the NREAP

76. In achieving Output 5, significant efforts were undertaken by the SEU in trying to implement several RE initiatives in support of NREAP. These are described in the following Paras.

77. A review of NREAP and development of a net metering scheme was conducted with SEU in 2016 and 2017 by an independent international consultant hired by the SEU Project. The net metering standards and market capacity building for distributed solar PV plants connected with the electricity distribution network was fully funded and developed by the Project in close coordination with EWA. This resulted in the net metering being launched in January 2018 enabling prosumers to generate their own power from renewables for self-consumption and feed the excess to the National Grid for energy credits. EWA supports RE projects, particularly solar, as they are the sole electricity grid operator and operate the net metering scheme. Subsequent to this in 2020, there has been technical sub-committees meeting on renewable energy and technical storage standards, enabling international participation in IEC/TC 82 & 88 with UNDP experts. The standards for distributed solar PV plants connected with the distribution network were prepared by an international consulting firm hired and managed by the SEU Project[28].

78. There were efforts by the Project along with SEA to undertake facilitative measures and source financing for solar PV projects as well as other RE and EE measures:

[28] CESI were the consultants who developed the Net Metering standards for Bahrain. They have done the same work for Dubai and Oman, allowing for strong alignment between the regulations of these 3 countries, enabling the market to think and operate more regionally and hence reduce costs for a larger solar market.

- the Project started discussions with the Bahrain Central Bank, individual commercial banks and the banking institute from 2018 to encourage them to view RE and EE as viable market segments with huge upside potential for financial services support;
- the Project supported SEA in several meetings with national and international financial service providers to review funding mechanisms for RE and EE projects starting in 2ndQ 2020. This also included discussions with the Economic Development Board of Bahrain to assess sustainable energy services and products by international companies against local needs, and the Bahrain credit and financing company for support for the development of financing products for residential solar projects;
- from 2018 to 2020, there were discussions with Tamkeen, a local labour market fund, for their financing products for RE technologies;
- commencing in 3rdQ 2020, technical support was provided to over 10 ministries on industrial facilities and private sector companies in the financing of RETs;
- in 2ndQ 2021, technical support was provided to SEA for their meetings with ESCOs and the Dubai Green Fund to explore methods of it providing RE financing to projects in Bahrain.
- in 3rdQ 2021, the Project supported SEA in the approval for a separate commercial registration for RE contractors under which SEA was designated for the regulatory role for commercial registration.

79. This resulted in the GoB, with the assistance of the SEU Project, starting a programme for tender-based feed-in tariffs for 532 government building rooftops for solar PV and other renewables in 2018. With Bahrain not having much land, government building rooftops and carparks are suitable locations to place solar PV installations. This programme was able to attract private investors to develop renewable energy projects. Part of the Project assistance enabled the Government to determine a reasonable price for power generated by the RE project operators. The Government launched a few pilot RE projects to obtain prices which informed the pricing authorities of the tariff available, ratifying a wide range of prices received previously from the market. Grid operators typically have problems (real or imagined) with net metering, FiTs and other RE injections into the traditional grid. Recent issues with solar panel pricing and shipping problems have also affected the pricing downward curve. This is an ongoing effort.

80. The first rooftop solar PV project was with Ministry of Education for 3 MW started in 2018. A total of 8 schools were tendered through UNDP and then through the national tender board to obtain different pricing from several companies. Levelized tariffs were coming in at 19 to 21 fils/kWh whereas national grid sells at 29 fils/kWh. The tenders were for PPAs on a "build, own, operate, and manage" (BOOM) basis for a solar powerplant for 20 years. Clauses were made to accommodate changing technologies[29] and a re-location clause[30]. The SEU Project is monitoring payments from Ministry of Finance to ensure the system is working properly. This arrangement has catalyzed interest by a host of entities into renewables, particularly solar PV[31]. Other solar PV initiatives followed:

[29] Clause placed in contract that government and developer would sit down every 5 yrs to review technology refreshment options with the cost borne by the developer.

[30] Costs to be borne by the developer for first move. Costs for the second relocation would be split 50-50. Costs for the third relocation would be borne by government.

[31] This includes Ministry of Youth & Sport Affairs, Ministry of Labour & Social Development ,Ministry of Foreign Affairs, H.R.H. Prime Minister's Court, Ministry of Education, Ministry of Health, Ministry of Information Affairs, Ministry of Industry Commerce and Tourism, Ministry of Justice & Islamic Affairs, Ministry of Works, Municipalities, Urban Planning, Agriculture & Fisheries

- in 4thQ 2018, there was the inauguration of the Al Jaffariya Directorate, the first government building reliant on the energy solar PV on a tender-based feed in tariff
- in 1stQ 2019, the Project assisted the Ministry of Housing to review existing social housing designs and evaluate energy saving opportunities including RE;
- In 2ndQ 2019, SEA through the Project supported:
  - MOICT to explore ESCO opportunities for tenants in an industrial park and in the evaluation of the new private sector solar panel manufacturing facility;
  - the Pavilion project for RE solutions in water desalination;
  - development of a proposal for RE integration into national infrastructure including a bridge project by engaging international consultants;
- in 3rdQ 2019, the Project supported SEA in support of a pilot study for water treatment technology using RE;
- in 1st Q 2020, the Project facilitated cooperation with the national equestrian horseracing facility in procurement processes for a pilot solar plant and integrating energy efficiency best practices in the design of proposed new buildings in cooperation with the Ministry of Works;
- in 2ndQ 2020, the Project supported:
  - SEA in developing standardized PPAs for government rooftop renewable projects for 3 MW;
  - the Ministry of Agriculture in the feasibility study of RE in greenhouses;
- in 3rdQ 2020, the Project supported the Ministry of Education and the Ministry of Finance in the public tender process for solar roof tops for government buildings;
- in 4thQ 2020, the Project supported:
  - efforts by SEA and the Ministry of Works to sign 3 PPAs with the private sector to develop 3 MW of solar rooftop PV projects in 8 schools;
  - efforts by SEA to engage a consultant to develop land evaluation criteria for the allocation of land for RE projects and to conduct site assessments and stakeholder consultations to facilitate RE projects;
- in 1stQ 2021, the Project supported SEA in developing and obtaining preliminary approval solar energy system installations on 1,300 rooftops on villas at Durrat Al Bahrain under the BOOM model;
- in 2ndQ 2021, the Project supported:
  - SEA in its collaboration with the Bahrain International Circuit Formula 1 to meet a target of net-zero omissions for the race weekend. An initial proposal was put in for a 3.5 MW plant following by a 14 MW plant;
  - SEA's second phase of the Ministry of Education solar rooftop project for 20 schools with the potential capacity of 10 MW;
  - SEA's evaluation of bids and oversight of implementation and the commissioning from the Ministry of Finance for solar PV projects on the Prime Minister's Office, the Ministry of Foreign Affairs, and the Ministry of Labour and Social Development;
  - SEA development of proposals for solar insulations on greenhouses under which solar developers would build a greenhouse, install solar panels and provide solar energy to the farmers without the farmers incurring any capital expenditures whilst reducing their electricity costs;
- in 3rdQ 2021, the Project supported:

Directorate, Animal Control & Health Directorate, Roads Planning & Design Directorate (MOW,M,UP), Ministry of Interior, Ministry of Housing, Supreme Council for Environment, Southern Governorate, Ministry of Finance and National Economy, Rashid Equestrian & Horseracing Club, Bahrain Tourism and Exhibition Authority, New Sports City, Gulf Aviation Academy, Awqaf (Islamic Affairs).

  - Project and SEA resulted in BBK and NBB announcing financial support for solar installations and investments by providing seven-year loans at preferential interest rates;
  - the approach by the Bahrain Authority for Culture and Antiquities for implementing solar projects.
- in the 4thQ 2021, the Project supported:
  - SEA on the request by the Chairman for the Organization for Sports to study solar energy installations and EE measures on their facilities;
  - SEA efforts to complete solar feasibility studies for the Seef Mall Properties and other properties with the solar feasibility study ongoing at the Bahrain Airport company;
  - SEA in its discussions with the Singapore government regarding a floating solar PV project;
  - SEA discussions with the University of Bahrain for a 50 MW solar projects;
  - SEA discussions supported technical and HR support with Etihad for partnering with SEA and introducing a super ESCO to Bahrain;
  - tender support for a 6 MW solar project for the Arabian Gulf University;
  - tender support for a 7.5 MW solar project for the Ministry of Labour and Ministry of Education.

81. The Government with SEU Project assistance made a renewable energy mandate for new buildings, requiring them and other real estate developments to integrate renewable energy in building design as per the GBC. This is being carried out by a Ministry of Housing project "Solar Systems for New Town Development & Housing" where a total of 10 buildings have been completed as per GBC but paid for by an oil company as a pilot scheme. This mandate is still voluntary right now.

82. Further to solar energy, large-scale solar farms were in demand from large industrial clients. For example, Amazon Web Services (AWS) wanted 50 MW sourced from green energy to power their data centers. With no means of tracking how much green power they were using, the SEU Project created renewable energy certificates (RECs), a system administered by SEA to award RECs to RE producers who can then sell it to consumers who wish to invest in clean energy. In 2ndQ 2019, the Cabinet assigned SEC to develop the national REC program, an effort led by the SEU Project and the UNDP Fintech Center of Excellence who hired Sun Pulse, a Japanese company, who was hired and paid at an NGO rate of US$20,000[32]. In 3rdQ 2019, SEU began review of existing solar plants for inclusion into the REC program to improve the viability of RE projects. The REC system developed an electronic blockchain platform to allow SEA to verify renewable energy generated, award RECs to registered plants, and manage the trade or use of RECs. First trade is pending with AWS.

83. SEU Project resources were also used to encourage renewables in infrastructure projects and public works including causeways and the airport. Amongst several other initiatives, Project expertise, assistance and resources were used by SEA to:

- design of a solar walkway between 2 islands (1 MW) that is now getting ready for tender, and a new causeway with solar on the bridge and wind power nearby with the Ministry of Works and Ministry of Telecommunication and Transport;
- a successful water desalination treatment plant pilot powered by solar panels and wind turbines with the Prime Minister's Office;
- a 3.48 MWp solar installation in Bahrain International Circuit in 2022 that came with robotic cleaning of the panels and 8 EV charging stations at the Bahrain International Circuit. This was

[32] The normal consultancy rate was in excess of US$200,000.

done through the COVID-19 pandemic and turned on 3 days prior to the race. It is the first F1 circuit that has installed solar power, and the first that will be able to offset its race weekend in 2023;
- enter in discussions with Durrat Al Bahrain management on the BOOM approach to developing solar PV to over 1,000 villas;
- process EOIs from 4 companies for floating solar projects.

84. The SEU Project has been trying to get Waste-to-Energy (WTE) projects started. This involved Government commissioned municipalities to conduct a waste strategy under which there is a WTE component. In the 1stQ 2020, the Project supported SEA in study for a pilot program for waste heat recovery case for 2 industrial and 2 commercial establishments that would involve local academics in an independent review of pilots; this would develop local capacity and increase knowledge. In the 4thQ 2020, partnerships were established to implement pilot activities for waste heat recovery pilot projects. This effort still is in progress.

85. There is the "Industrial Renewable Energy Initiatives", a sister initiative to the "Industrial Energy Efficiency programme" in 2019 where some industries have installed pilot solar PV as a means to become more financially efficient with the gradual removal of electricity subsidies. Many of these industries are in favor of adding more solar PV.

86. The SEU Project created a national wind atlas for potential wind farms in Bahrain in early 2018. The main viable sites are offshore at 100 m height where productive wind speeds of 6-7 m/s exist. The SEA now has to promote wind farms as the next wave of RE investments in Bahrain. In the 2nd quarter 2020, supported SEA in the selection of consultants for the National wind resource assessments.

87. In the 4thQ 2020, partnerships were established to move forward with clean hydrogen production.

88. Solar factories were built in Bahrain with guidance and support from the Project. The first solar panel assembly factory was opened in Bahrain in January 2017 with the second completed in March 2021 capable of producing 80,000 panels per year. An Expression of Interest has been received from a company wanting to build an inverter factory in Bahrain.

89. In the 4th quarter 2021, the SEU Project, the UNDP CO Bahrain in coordination with the SEA has announced the launch of the Award for the best Renewable Energy project. The Project established a committee to develop prize structure and conditions including the prize categories, get nominations of the evaluation committee and jury, and securing speakers from 26 countries and the local professional Society of Engineers for more prestige. The Award heightens the awareness about the merits of renewable energy and its importance in the national and international context, encourages investment in RE projects, and contributes to achieving Bahrain's target of net-zero emissions by 2060.

90. The exploding solar PV market has attracted many solar PV service providers to the market. This has led to easy qualification of becoming a licensed solar electrical contractor for EWA. Demand of the market is for certified installers who have experience with specialized solar resources. Far too many companies were able to easily qualify as a solar contractor without having any deep experience in solar PV installations. This focus on quantity over (specialization) quality potentially has negative

impacts on the market especially those companies who have invested heavily into solar PV installations. In response, the Project supported the SEC and SEA in developing a specific commercial registration for both solar installers and solar consultants to improve organization of the market. These are both on the verge of being approved and implemented, but will do so without Project support.

91. There is also an issue emerging in the operation of solar PV and the risks of not optimizing energy generation. Dust, humidity and heat are all factors in generating less than optimal renewable energy from solar PV, notably for thin solar panels. There is a need for an improved understanding of managing for the environment under which the solar PV are operating in.

92. In conclusion, the results of Outcome 5 in the expanded use of renewable energy in support of the NREAP can be rated **highly satisfactory** in light of the broad range of projects brought on by the SEU Project. The interventions of the SEU Project have significantly contributed to the implementation of renewable energy in line with NREAP policies, national targets, and national action plans in the Kingdom of Bahrain.

3.3.7 Relevance

93. The SEU Project is **relevant** to the development priorities, namely:

- the Bahrain's Vision 2030 which acknowledges the need for assessing alternative energy resources with the availability of energy efficiency directives. However, there is no national strategy to drive or coordinate policy and decision-making in the energy sector;
- Bahrain's Second National Communication of February 2012 that discusses sustainable energy initiatives including energy efficiency and renewable energy as being increasingly understood but not yet under significant implementation;
- Bahrain's Third National Communication of July 2020 that discusses the launching of NREAP and NEEAP; and
- SDG 7 (affordable & clean energy) and SDG 13 (climate action) in its actions through solar PV and energy efficiency measures to make energy more affordable and reduce GHG emissions;
- UNSDCF 2021 – 2022 for Bahrain (see Para 17).

94. To a large extent, the activities, outputs and lessons learned from the SEU Project are relevant to other countries that may be considering similar projects that may be designed and operated by UNDP.

3.3.8 Effectiveness

95. The effectiveness of the SEU Project has been ***highly satisfactory***, in consideration of the clear Project outputs that were achievable within its time frame, the highly successful technical assistance provided, the policies and regulatory frameworks that have promoted energy efficiency and renewable energy, and the resources leveraged by the Project to implement EE and RE projects. The Project contributes to Bahrain's Vision 2030 by implementing energy-efficiency regulations (such as for buildings and electrical appliances) and by directing investments to technologies that reduce carbon emissions, minimize pollution and promote the sourcing of more sustainable energy, all done to protect Bahrain's natural environment for long term benefit.

96. The SEU Project is also contributing to SDG 7 (affordable & clean energy) and SDG 13 (climate action) by providing assistance through SEA in reducing long-term energy costs with solar PV and energy efficiency measures to make energy more affordable, and by reducing GHG emissions from the electricity generation plants. The most significant achievement of the Project may be the catalyzing of the solar PV market where rooftop solar PV is now in demand from several stakeholders (Para 80).

97. In a sampling of participating SEU stakeholders and participants, the Evaluation found that the SEU had developed excellent relationships with all stakeholders, who all valued the technical assistance provided by the SEU Project. The goodwill generated by these stakeholders has been impressive, strongly influenced by the SEU's outreach. All persons interviewed by the Evaluators had glowing reviews about the SEU process and approach to technical assistance with team members being highly motivated and very knowledgeable.

98. The Project has catalyzed the market for RE and EE investments. While the number of Project-induced investments is small in proportion to Bahrain's energy market, they are growing in terms of quantity indicating that the RE and EE policies are manifesting themselves. However, the environmental conditions under which solar PV and other renewables operate needs to be better understood to optimize the energy generated.

3.3.9 Efficiency

99. The efficiency of the SEU Project has been rated as ***satisfactory*** in consideration of the majority of works did not occur until after 2017 when the NREAP and NEEAP were activated. Competent experts helped shape the NEEAP and NREAP documents in 2015 and 2016. These experts were highly motivated and very knowledgeable, and work tasks got done efficiently followed by high-level meetings with the energy minister and MEWA management to explain benefits of RE and EE deployment. Project implementation and execution were efficient and cost-effective at this stage of the Project.

100. During the early stages of implementing NREAP and NEEAP, there was some resistance to some of the measures. By 2020, RE and EE measures were becoming more popular with all public and private stakeholders. Project implementation and execution became more efficient and cost-effective during the 2020-2022 period. SEU was a learning hub for new technical recruits of the SEA as they built personal capabilities.

3.3.10 Mainstreaming

101. Opinions of RE and EE are rapidly changing in the Kingdom of Bahrain. The EE regulations for appliances will efficiently mainstream EE in the marketplace in Bahrain, especially with the GBC and GBRS. While the RE market in Bahrain is still developing, RE is seen as both an alternative energy source and a disrupter, especially for those who benefit from subsidized electricity prices. With the gradual removal of these subsidies, the opinions of RE and EE are trending more positively. However, more plants are required to showcase long term benefits of capital investments in EE and RE. This is especially true for the operation of solar PV and the risks of not optimizing energy generation due to humidity and heat and a lack of cleaning the panels from dust[33].

[33] Cleaning of the panels is done with robots in larger systems.

3.3.11 Overall Project Outcome

102. The intended Project outcomes have been ***satisfactory***, namely for the "enhanced environment for equitable, job creating and sustainable economic growth". The SEU Project has been able to

- establish the SEA as a national entity in Bahrain for energy planning and energy efficiency;
- use SEA to increasing awareness on RE and EE and mainstream it even further; and
- leverage funding of RE and EE measures through its policies.

103. Unintended outcomes of the SEU Project are:

- only EWA was available to manage the solar PV implementation at the start of net metering in 2018, as the SEU was just a project with no legal rights to hold a commercial register of contractors and consultants. Hence, the start of the solar PV programme was not under the control of subject matter experts who could have guided things better. This situation improved in 2019 with SEA as the government agency that has since been merged with MEWA in early-2022;
- an SEA that has since been merged with MEWA with limited decision-making to undertake initiatives under its own resources;
- an entity under MEWA that still is mainly under the conventional business model of EWA;
- the risks of not optimizing energy generation from solar PV due to dust, humidity and heat; and
- a persistent lack of knowledge and awareness of other government stakeholders at lower levels of management than those found at the IFC.

3.3.12 Sustainability of Project Outcomes

104. In assessing sustainability of the SEU Project, the Evaluator asked "how likely will the Project outcomes be sustained beyond Project termination?" Sustainability of SEU's outcomes was evaluated in the dimensions of financial resources, socio-political risks, institutional framework and governance, and environmental factors, using a simple ranking scheme:

- *4 = Likely (L):* negligible risks to sustainability;
- *3 = Moderately Likely (ML):* moderate risks to sustainability;
- *2 = Moderately Unlikely (MU):* significant risks to sustainability; and
- *1 = Unlikely (U):* severe risks to sustainability; and
- *U/A = unable to assess*.

The overall rating given is equivalent to the lowest sustainability ranking score of the 4 dimensions. Details of sustainability ratings for SEU Project are provided on Table 8.

105. *The overall SEU Project sustainability rating is moderately likely (ML).* This is primarily due to:

- the entity under MEWA is constrained in the initiatives it can undertake;
- training is still required for junior to mid-level officers in MEWA;
- risks of looming shortages of skilled labour and goods for EE and RE measures;
- risks of not optimizing energy generation from RE sources unless there is an improved understanding of the environment that they are operating in;

Table 8: Assessment of Sustainability of Outcomes

Actual Outcomes (as of June 2022)	Assessment of Sustainability	Dimensions of Sustainability
Actual Output 1: Bahrain Sustainable Energy Unit was established in 2014, and upgraded to the Sustainable Energy Authority in 2019.	• *Financial Resources:* Financing is confirmed for the foreseeable future in SEA operations; • *Socio-Political Risks*: No socio-political risks; • *Institutional Framework and Governance:* SEA is under the auspices of MEWA meaning it has to seek approval of MEWA before undertaking its own initiatives. This somewhat constrains the initiatives SEA can undertake; • *Environmental Factors:* No risk. ***Overall Rating***	4 4 3 4 **3**
Actual Output 2: Institutional capacity of the Sustainable Energy Unit has been strengthened.	• *Financial Resources:* Financing for training and building institutional capacity is confirmed for the foreseeable future of SEA training; • *Socio-Political Risks*: No socio-political risks; • *Institutional Framework and Governance:* Training is still required for junior to mid-level officers in SEA; • *Environmental Factors:* No risk. ***Overall Rating***	4 4 3 4 **3**
Actual Output 3: The NREAP and NEEAP have been produced as a part of a national energy strategy	• *Financial Resources:* Financing for updating the NREAP and NEEAP is confirmed for the foreseeable future of SEA operations; • *Socio-Political Risks*: No socio-political risks; • *Institutional Framework and Governance:* Training is still required for junior to mid-level officers in SEA; • *Environmental Factors:* No risk. ***Overall Rating***	4 4 3 4 **3**
Actual Output 4: There has been expanded use of energy efficiency solutions through EE policies setup by SEA and the SEU Project	• *Financial Resources:* There are some financing shortages to implement EE measures to comply with the policies of NEEAP. This, however, is not a long-term funding shortage; • *Socio-Political Risks*: There are looming shortages of skilled labor and goods for EE measures that may manifest themselves in the near future; • *Institutional Framework and Governance:* There is a lack of attention to the EE sectors by key decision makers by government decision makers. There are also changing personnel within the government, who have no prior interaction nor experience in the work of the Project or the SEA, but who now have oversight and strategy roles going forward; • *Environmental Factors:* No risk. ***Overall Rating***	3 3 3 4 3
Actual Outcome 5: There has been expanded use of energy efficiency	• *Financial Resources:* Sources of funds for RE projects plentiful;	4

Table 8: Assessment of Sustainability of Outcomes

Actual Outcomes (as of June 2022)	Assessment of Sustainability	Dimensions of Sustainability
solutions through RE investments and RE policies setup by SEA and the SEU Project.	• *Socio-Political Risks*: There are looming shortages of skilled labour and goods for EE measures that may manifest themselves in the near future;	3
	• *Institutional Framework and Governance*: There is a lack of attention to the EE sectors by key decision makers in government. There are also changing personnel within the government, who have no prior interaction nor experience in the work of the Project or the SEA, but who now have oversight and strategy roles going forward;	3
	• *Environmental Factors*: There are risks of not optimizing energy generation from RE sources such as solar PV unless there is an improved understanding of the environment that they operating in.	3
	Overall Rating	**3**
	Overall Rating of Project Sustainability:	**3**

- a lack of attention to RE and EE sectors by key decision makers by government decision makers;
- changing personnel within the government, who have no prior interaction nor experience in the work of the Project or the SEA, but who now have oversight and strategy roles going forward.

3.3.13 Country Ownership

106. The SEU Project approaches to government-backed RE and EE policies has created strong government ownership and drive to apply SEU methodologies from studies to government policies.

3.3.14 Gender equality and women's empowerment

107. Though the perspectives of men and women are not known in influencing outcomes and contributing information to the attainment of results, the Project has been "quietly" contributing to gender equality and the empowerment of women. It has done so through providing equal opportunities for employment within the Government structure. One interviewee said "I don't think we have an issue with gender balance in Bahrain, particularly in business related to EE or RE. If there is an interest from females to enter such market, the government and SEU will support and provide guidance if needed".

3.3.15 Cross cutting issues

108. The SEU Project in addition to SDGs 5, 7 and 13, also contributes to SDG 9 (Industry, Innovation and Infrastructure), SDG 11 (Sustainable Cities and Communities), and SDG 12 (Responsible Consumption and Production). Other cross-cutting issues of the SEU Project are gender equality mentioned in Section 3.3.14, and the South-South Cooperation on the Project with many of the services providers for renewable energy coming from developing countries such as Sri Lanka.

3.3.16 Catalytic/Replication Effect

109. Catalytic and replication effects are mainly found in the rooftop solar PV programme in Output 5. The first rooftop solar PV project was with Ministry of Education for 3 MW in 2018, which has catalyzed interest by a host of entities (Para 80). Replication effects of the Project have also been realized with the demand for green power from industrial clients, catalyzing the creation of RECs (Para 82).

110. To a large extent, the EE (and RE) policies have catalyzed RE and EE investments. While the policies, regulations and standards are not mandatory, they have generated a wave of interest in compliance to the GBC, MEPS and net metering policies to the extent of investment in EE and RE measures. While the EE policies, regulations and standards are catalytic in nature (spurring the interest of all stakeholders), the replication effect of these policies is just beginning.

3.3.17 Progress to impact

111. Before SEU, there was no clear vision or set targets on how to deal with RE and EE and how to go forward. After the formation of SEU in 2011 to the SEA in 2019, there were many barriers that would impact the progress of strategies detailed in the NREAP and NEEAP, the primary barrier being the lack of a government agency dedicated to the development of sustainable energy. With the establishment of SEU and subsequently, the SEA, the Project has made an impact on the RE and EE

marketplace with currently many attempting to replicate what has been achieved in rooftop solar PV. Table 9 shows the actual energy demand of Bahrain versus the demand if there was a 6% business-as-usual growth in energy demand.

Table 9: Impact on Peak Loads for Bahrain

Year	Actual Peak Load MW	With 6% increase Peak Load MW
2017	3,527	
2018	3,437	3,786
2019	3,443	4,013
2020	3,662	4,253

112. However, the RE and EE market is still developing. The challenge in Bahrain is still the disconnect between subsidized tariffs and the real cost of energy. Low energy prices do not provide any incentives for RE or EE measures. While the ordinary citizen cannot see the benefits, some industry stakeholders see the challenge coming and have adopted on and off-grid solutions.

113. Despite the successes of the Project, the impact of the SEU Project is also the limited involvement of different government departments in creating awareness of the issues. The justification for proper RE and EE solutions and its importance to the Kingdom is not widely understood. The result is still a low level of awareness concerning RE and EE solutions in public and private sectors.

4. MAIN FINDINGS, CONCLUSIONS, RECOMMENDATIONS AND LESSONS

4.1 Main Findings

114. The SEU Project was very successful in securing government commitments in RE investments and EE policies and regulations and promoting public awareness. Since the declaration of the Paris Agreement in 2015, the Government of Bahrain has started to investigate and implement RE investments through the establishment of the SEU that was later upgraded to the SEA. The 2021 Glascow Climate Change conference strengthened the GoB's resolve to work towards a net-zero emission declaration with more ambitious targets. Though the SEU Project laid the foundation for these commitments, the former SEA still is under MEWA limiting its ability to do more.

115. The RE sector was boosted by the NREAP, especially with the net metering policy and Phase I of the Government Rooftop Project, resulting in most visible RE efforts into solar PV, leading to the development of streamlined approval of solar PV projects being efficient without minimal bureaucracy or red tape. The policies of the NEEAP also catalysed EE as well as RE investments in industry, residential buildings and public infrastructure. However, 5 issues have emerged:

- The RE and EE market still needs to be taught that more money paid today will result in long-term benefits. While there are a good proportion of government and private stakeholders who consider long-term investments, there are still many stakeholders who make decisions based on immediate costs without consideration of long-term benefits;
- While anyone can become a licensed solar electrical contractor for EWA, the primary shortfall for the solar PV market is the number of certified installers who have experience with specialized solar resources. Far too many companies were able to easily qualify as a solar contractor without having any experience in solar PV installations. This focus on quantity over (specialization) quality potentially has negative impacts on those companies who have invested correctly into the solar PV sector and installations;
- Many of the solar installations need to be regularly cleaned to generate the design power;
- Stronger efforts need to be made to encourage wind power as it operates with higher efficiency than solar PV power;
- There are indicators of the low usage of the public transportation system in Bahrain, impacting vehicle use efficiencies.

116. Lastly, and on a more positive note, UNDP's involvement with the SEU Project has had a very positive impact on promoting sustainable energy generation in Bahrain:

- UNDP has been able to attract excellent technical assistance to assist policy-makers in Bahrain towards the formulation of sustainable energy policies such as Net Metering, the GBC, MEPS and a labeling system for white appliances, and to facilitate RE and EE investments in Bahrain. This has catalyzed investment into RE and EE measures across a wide-spectra of stakeholders;
- UNDP is only interested in giving sound technical advice without the financial interest tagged on. Hence, UNDP has been able to attract excellent technical assistance at a fraction of the cost of that most commercially driven consultancies are known for.

4.2 Conclusions

117. The former SEA now merged under MEWA has the potential to be a more powerful agency in promoting RE and EE in Bahrain with a stronger governance hierarchy to wield more power. At this time, it has a limited mandate with a need to improve management of regulations and incentives to encourage investments in RE and EE. This would include the lack of availability of the technical programmes that would build national capacities in RE and EE, and support the growth of RE and EE markets. This change to a more powerful agency needs to be revised by Decree, and to come out from under MEWA and be an entity on its own to encourage and support stakeholders to do more for EE and RE.

118. The barriers post-project to overcome to further mainstream RE and EE in Bahrain are:

- weak awareness of decision makers at the government level on impact of EE on achieving the country's medium and long-term strategy;
- overall entity's limited mandate with a need to improve management of regulations and incentives; and
- the lack of available national capabilities and proper understanding of RE and EE impacts on energy conservation and consumption and impact to the overall 2030 and 2060 government targets;
- time required to get the proportion of women in the work force to significant levels of 33% or higher. While the numbers of women are still low in MEWA and other Bahraini government institutions, women interviewees said there were opportunities for women in the administration and technical management in government and private entities without gender discrimination.

4.3 Recommendations

119. The recommendations made in this Evaluation are made in the spirit of improving ongoing future delivery of SEU projects, and on the basis of the lessons learned during implementation of the SEU Project.

120. *Recommendation 1 (to the Government of Bahrain): Give the entity under MEWA a stronger mandate to continue work in Bahrain on the promotion of sustainable energy*. This entity needs its own legislative mandate, powers and information reporting systems including awareness and implementation programs to formulate regulations. The MEWA entity should be separate from energy production utilities and have its own system of regulation. It is equally important that the deployment of renewables and energy efficiency measures continue to be supported and enforced by leadership and the government. The entity needs more technical assistance to transition its energy market from generation to distribution with the setup of RE and EE frameworks for the private and public sectors. This entity needs to become an agency that conducts activities such as:

- quality reviews;
- implementing M&V protocols;
- implementing the GBC and GBRS through operational help. Otherwise, the GBC and GBRS are at risk of being ignored or pushed to the background;
- facilitating ESCO contracts that would provide a structure to incentivize stakeholder investments into RE and EE;
- ensuring district cooling regulations are approved and come into force via a regulator; and

- implementing mandatory reporting schemes for RE and EE.

Bahrain needs support in learning from other country experiences, like most other countries with similar energy markets. This will only help to promote RE and EE and accelerate the energy transition to protect Bahrain's natural resources.

121. *Recommendation 2 (to the Government of Bahrain and UNDP): Provide effective messages on long-term benefits of RE and EE*. The Government of Bahrain needs to change the perception around sustainability, capital costs, and operational costs to create a simple message that higher costs now lead to long-term benefits and to always use "the total cost of ownership" metrics when investing. While there are a good proportion of government and private stakeholders who consider the benefits of long-term investments, there are still many stakeholders who make decisions based on immediate costs without consideration of long-term benefits. These are stakeholders with whom future project personnel should engage with more in-depth training, project management and details of financing such projects.

122. *Recommendation 3 (to the Government of Bahrain and UNDP): Support capacity building in areas such as development of RE standards, best practices for network regulation, and identifying how RE can work with other assets in the grid*. For energy assessments in public and private buildings, facilities and industry, there is still a large demand for more technical assistance services. While the numbers of energy specialists (auditors, consultants, design companies) has increased, technical assistance for local capacity building is definitely needed and could be supported through UNDP and the Government.

123. *Recommendation 4 (to the Government of Bahrain and UNDP): Understand how to optimize RE generation under local environmental conditions.* It has been reported that there are instances where solar panels do not generate optimal amounts of energy due to the collection of dust and sand on the panels, decreasing their effectiveness. While there should be the means of solving this problem through maintenance or some mechanism to clean the panels, there is also a combination of sun, heat and humidity that affects some thin solar PV panels. With data from the first 5 MW plant in 2014 used by the SEU Project in developing some of the policies and in advising about the viability of the certain projects, data from other solar fields should be made available to the Government so that their performance can be assessed for upgraded solar PV standards. Possibly, this gives rise to the promotion of wind power which is a better power producer.

124. *Recommendation 5 (to UNDP and the Government of Bahrain): Continue to promote waste-to-energy (WTE)*. This is a renewable source of energy that would work towards many SDGs (such as 5, 7, 9, 11 and 13) and reduce Bahrain's need for landfills. The process can be through anaerobic digestion, pyrolysis and gasification, and the Fischer-Tropsch process for reducing its plastic waste.

125. *Recommendation 6 (to UNDP and the Government of Bahrain): Continue the promotion of electric vehicle integration into power grids*. This would include investigations into the scale-up of charging infrastructure, the use of renewables such as solar PV on charging infrastructure, its impact and proper integration on the power grid.

126. *Recommendation 7 (to the Government of Bahrain and UNDP): Promote more climate action plans that includes sea level rise being a real threat to the Kingdom*. In addition to accelerating RE and EE programmes, studies should be conducted now to assess the risk and the potential resilience of the

country to sea level rise. Climate action plans would involve elimination of outdated technologies, reduce infrastructural barriers for installation of new technologies, and stronger involvement of line ministries.

127. *Recommendation 8 (to the Government of Bahrain and UNDP): Continue strong promotion of gender equity in work force of government entities*. While the numbers of women are still low in MEWA and other Bahraini government institutions, the Government must make efforts to encourage women into the Government and private work force without gender discrimination. To reach a goal of a minimum 33% women in the work force, time will be required to generate interest from females and to enter the work force notably in the administrative and technical aspects of the sustainable energy directorate and other government entities.

4.4 Lessons learned

128. *Lesson #1: If there is willingness of government stakeholders to have frequent fruitful interaction with MEWA staff, MEWA staff with improved capacities will be more able to deliver outcomes regarding institutional and regulatory reform*. This Project has fostered such a relationship and has generated benefits of efficient delivery of the studies (in implementing steps under the GBC or the Net Metering policy). Quick adoption of these studies, and accompanying rules and regulations were developed to help the Government design or reform economic instruments related to environmentally harmful projects and to provide incentives for both reducing pollution and introducing greener products. By comparison, there are countries where relevant government officials were not available to often meet (or meet at all) with project staff causing delays, and in some cases, non-delivery of outcomes involving institutional and regulatory reform work.

129. *Lesson #2: A project that focuses on a single RE or EE measure will more likely succeed in its objectives of market transformation*. In the case of SEU, Government of Bahrain resources were mainly focused on the development of one renewable energy source, solar PV installations. Once momentum was achieved on the solar PV installations, the focus has shifted towards wind energy, MEPS, WTE and electric vehicles and charging infrastructure. Once momentum has been achieved on one of these areas, focus can be applied elsewhere to address other renewable energies or energy efficiency measures.

APPENDIX A - MISSION TERMS OF REFERENCE FOR SEU PROJECT TERMINAL EVALUATION

TOR for Project Evaluation Consultant under Reimbursable Loan Agreement (RLA)/IC to conduct Final Evaluation of the Bahrain Unit of Sustainable Energy (aka Sustainable Energy Unit – SEA)

BACKGROUND

1. BACKGROUND AND CONTEXT

Following the approval of Cabinet, Bahrain's Sustainable Energy Unit (SEU) was established in November 2014 by way of a formal agreement between the Minister of Energy, Kingdom of Bahrain and the UNDP Country Office in the Kingdom. The key objectives of the unit are to develop a cohesive and sustainable energy policy and to promote Renewable Energy, Energy Efficiency and Conservation in the Kingdom of Bahrain. The unit will also work towards bridging the legal, institutional, and capacity gaps in order for the Bahrain energy sector to meet the future challenges.

The SEU has supported three entities at various times due to changing Implementing Partners from the government side, namely the Ministry of Energy, Ministry of Electricity and Water Affairs and the Sustainable Energy Authority of the Kingdom of Bahrain (SEA). These were the entities mandated to lead and promote energy efficiency practices, transfer and diffuse renewable energy technologies and draft related policies and regulatory frameworks in close coordination with stakeholders and partners in the Kingdom of Bahrain. SEU is currently implementing projects/programmes considered under the National Energy Efficiency Energy Action Plan (NEEAP) 2017 and the National Renewable Energy Action Plan (NREAP) 2017 in close coordination with the Ministry of Electricity and Water Affairs.

In accordance with UNDP policies and procedures, the project is required to undergo Final Project Evaluation upon completion of implementation. Therefore, the UNDP CO in Bahrain is seeking a qualified international consultant to undertake the final evaluation of the mentioned project and respective activities undertaken between 2015-2022 and prepare and present the Final Evaluation Report.

The Final Evaluation Report will be conducted according to the guidance, rules and procedures established by UNDP as reflected in the UNDP Evaluation Guidance (please refer to annexes of this TORs).

2. EVALUATION PURPOSE, SCOPE AND OBJECTIVES

Purpose

With an anticipated SEU project end date of June 30th, 2022, UNDP intends to commission a final project evaluation to assess the project's contribution towards country's sustainable energy development achieved through the policies, programme, national targets, national action plans, initiatives, capacity building and projects.

This evaluation shall serve as an important learning and accountability tool, providing the Kingdom of Bahrain, UNDP, and its national stakeholders/ partners with an impartial assessment of the results and outcomes achieved by the project.

PROJECT/ OUTCOME INFORMATION		
Project/outcome title	Final Evaluation of the Sustainable Energy Unit (SEU) project.	
Atlas ID	00089268	
Corporate outcome and output	SDG 7 (affordable & clean energy) & SDG 13 (climate action)	
Country	Bahrain	
Region	Arab States	
Date project document signed	Nov 2014	
Project dates	**Start**	**Planned end**
	Jan 01, 2015	Jun 30, 2022
Project budget	$ 6,700,000 actual received $ 6,286,112	
Project expenditure at the time of evaluation		
Funding source	Office of Minister of Energy (Electricity and Water Affairs) Government of Bahrain (Ministry of Finance)	
Implementing party[1]	Office of Minister of Energy (Electricity and Water Affairs)	

Objectives:

The specific objectives of the evaluation are to:

- Assess the relevance and strategic positioning of the project towards the country's sustainable energy development including but not limited to capacity addition, mitigation energy crisis/ demand, support to private/ commercial/ industrial sectors to progressively scale-up renewable energy & energy efficiency projects, products and services in the country.
- Analyse the extent to which the project enhanced the application of SDG 7 (affordable & clean energy) & SDG 13 (climate action) and SGD 5 (Gender Equality).
- Assess a) the progress made towards project results and whether there were any unintended results and b) what can be captured in terms of lessons learned for ongoing and future sustainable energy initiatives in Kingdom of Bahrain.
- Assess whether the project management arrangements, tools, approaches and strategies were well-conceived and efficient in delivering the project.
- Assesses the internal and external factors affecting the project's outcomes.
- Assess the project's relevance, effectiveness, efficiency and sustainability.
- Identify and document lessons learned; and provide recommendations to inform key stakeholders.
- Make recommendations for further work that would support the results generated so far.

Scope:

The specific scope of the evaluation is to:

- Assess the project (SEU) conceptualization, design, implementation, monitoring, reporting and appraisal of results;

- Assess the SEU's interventions, contribution and implementation of sustainable energy policies, programme, national targets, national action plans, initiatives, capacity building and projects in the Kingdom of Bahrain from the project's inception Jan 2015 to Jun 2022;
- Assess the SEU's intervention towards the establishment of sustainable energy-related legislation and regulatory reforms in the country;
- Assess the SEU's contribution towards improvement of sustainable energy (renewable energy & energy efficiency) in the country, mitigation of anticipated energy demand/ crisis;
- Assess the SEU's contribution towards the energy investment in the country and the assistance provided to the private/ commercial/ industrial sector's growth;
- Assess the relevance, effectiveness, efficiency and sustainability of the project (SEU);
- Assess the key factors that have contributed to the achievement or non-achievement of planned results including the impact of COVID-19 pandemic;
- Assess the crosscutting issues, bottlenecks and challenges of the project (SEU);
- Define lessons learned in the design and execution of the project for consideration in designing other similar projects in the future.

3. EVALUATION CRITERIA AND KEY GUIDING QUESTIONS

The final key guiding questions to be used in the evaluation should be clearly outlined in the inception report and fully discussed and agreed between UNDP, key stakeholders and the evaluators. Some suggested questions that may be useful to guide the evaluation are listed below:

Relevance/ Coherence

- To what extent was the project in line with national development priorities, UNDP Strategic Plan, country programme outputs and outcomes?
- To what extent was the project in line with the SDG 7 (affordable & clean energy) & SDG 13 (climate action)?
- To what extent have project management and implementation partner contributed towards achievement of the project objectives?
- To what extent are methodologies, plans, outcomes and lessons learned in this project relevant to other similar projects that may be designed for other countries/ regions the UNDP operates in?
- To what extent were perspectives of men and women who could affect the outcomes, and those who could contribute information or other resources to the attainment of stated results, taken into account during project design processes?
- To what extent does the project contribute to gender equality, the empowerment of women and the human rights-based approach?
- To what extent has the project been appropriately responsive to political, legal, economic, institutional, etc., changes in the country?

Effectiveness

- Are the project objectives and outputs clear, practical and feasible within its frame?
- To what extent did the project contribute to the national development priorities, UNDP Strategic Plan, country programme outputs and outcomes?
- To what extent did the project contribute to the SDG 7 (affordable & clean energy) & SDG 13 (climate action) and SGD 5 (Gender Equality)?
- In which areas does the project have the greatest achievements? Why and what have been the supporting factors? How can the project build on or expand these achievements?

- In which areas does the project have the fewest achievements? What have been the constraining factors and why? How can or could they be overcome?
- What factors contributed towards the project effectiveness or ineffectiveness?

Efficiency

- To what extent was the project management structure as outlined in the project document efficient in generating the expected results?
- To what extent have project funds and activities been delivered in a timely manner?
- To what extent have the UNDP project implementation strategy and execution been efficient and cost-effective?
- To what extent do the monitoring and evaluation (M&E) systems utilized by UNDP ensure effective and efficient project management?

Sustainability

- Are there any risks that may jeopardize the sustainability of project outputs going forward?
- To what extent will financial and economic resources be available to sustain the benefits achieved by the project?
- Are there any risks that may jeopardize sustainability of project outputs and the project contributions to country programme outputs and outcomes?
- Do the legal frameworks, policies and governance structures and processes within which the project operated pose risks that may jeopardize sustainability of project benefits?
- To what extent do stakeholders support the project's long-term objectives?
- What factors contributed towards the project sustainability?
- What could be done to strengthen exit strategies and sustainability in order to support female and male project beneficiaries as well as marginalized groups?

Cross-cutting issues

- To what extent has the project promoted and contributed towards the other SDG's (excluding 5, 7 & 13)?
- To what extent did the project and its outcomes contribute to women's empowerment and gender balance both within the Project itself and further afield?

4. METHODOLOGY

The evaluator is expected to follow a participatory and consultative approach. The evaluation must provide evidence-based information that is credible, reliable, and useful. The evaluation will provide quantitative and qualitative data through but not limited to the following methods.

- **Document review.** Review of the following documentation.
  - Project document (contribution agreement).
  - Theory of change and results framework.
  - Programme and project quality assurance reports.
  - Annual workplans.
  - Quarterly and annual reports.
  - Procurement plan and implementation.
  - Contracting and implementation of consultancy services (UNDP LTA/ IC).
  - Technical and financial monitoring reports.

- **Interviews and meetings** with key stakeholders (men and women) such as key government counterparts, donor, UNDP country team and implementing partners:
  - **Semi-structured interviews,** based on questions designed for different stakeholders based on evaluation questions around relevance, coherence, effectiveness, efficiency, and sustainability.
  - Key informant and **focus group discussions** with beneficiaries and stakeholders.
  - All interviews with beneficiaries and stakeholders should be undertaken in full confidence and anonymity. The final evaluation report should not assign specific comments to individuals.
- **Surveys and questionnaires** including male and female participants in development programmes, UNDP members and/or surveys and questionnaires to other stakeholders at strategic and programmatic levels.
- **Field visits** and on-site validation of key tangible outputs and interventions (where required).
- **Other methods** such as outcome mapping, observational visits, group discussions, etc.
- **Data review and analysis** of monitoring, financial and other data sources and methods. To ensure maximum validity, reliability of data (quality) and promote use, the evaluation team will ensure triangulation of the various data sources.
- **Gender Balance**. Review of evidence of gender balance within the project and its outcomes.

Data collection and analysis methods should integrate gender considerations, use of disaggregated data and outreach to diverse stakeholder groups.

The final methodological approach including interview schedule, field visits and data to be used in the evaluation should be clearly outlined in the inception report and fully discussed and agreed between UNDP, key stakeholders, implementing partner and the evaluators.

5. EVALUATION DELIVERABLES

The consultancy is expected to take a period of 30 working days. The Evaluator is expected to deliver the following outputs:

Evaluation inception report (10-15 pages) Based on the preliminary discussions with UNDP and desk review an inception report (including the evaluation matrix) to be produced to UNDP evaluation starts *(before any formal evaluation interviews, survey distribution or field visits and prior to the country visit in the case of international evaluators)*	1st April 2022
Evaluation debriefings Presentation of initial findings and recommendations.	20th April 2022
Draft evaluation report (40-60 pages) A full draft evaluation report, including executive summary, findings, recommendation and with relevant annexes. The report should address the required quality criteria as outlined in the UNDP evaluation guidelines	25th April 2022
Evaluation report audit trail Comments and changes provided by the UNDP in response to the draft evaluation report should be retained by the evaluator to show how they have addressed comments	1st May 2022
Final evaluation report Submission of final evaluation report with sufficient detail and quality and including on board comments, with annexes and working papers as required.	4th May 2022

Evaluation team composition and required competencies

The consultancy will be undertaken by one qualified international consultant. The consultant must meet the following:

Education	Advanced university degree in environmental science, energy studies, development studies, social sciences and/ or other related fields.
Work Experience and Other Qualifications	• Minimum of 5 years of supporting project evaluation and implementation experience in the result-based management framework, adaptive management • Minimum of 5 years of experience in the field of governmental, inter-governmental projects, including technical advice at senior level, capacity building, monitoring, and evaluation. • Sound knowledge of results-based management (especially results-oriented monitoring and evaluation). • Previous work experience working in governmental development and capacity building is desirable. • Gender expertise and knowledge and/or experience of disability inclusion is preferable. • Experience in similar monitoring and evaluation assignments for UNDP or a UN organization is a plus.
Technical competencies	• Strong interpersonal and communication skills. • Ability to work in a team. • Ability to work under pressure and in stressful situations. • Strong analytical, reporting and writing abilities. • Strong administrative skills - well-organized, methodical, ability to set priorities and pay attention to detail. • Ability to produce high quality outputs in a timely manner while understanding and anticipating the evolving client needs. • Strong organizational skills. • Ability to conduct evaluation, data analysis and report writing. • Ability to work independently, produce high quality outputs. • Sound judgment, strategic thinking, and the ability to manage competing priorities. • Excellent communication (in writing and oral) and presentation skills • Ability to undertake gender analysis and evaluation. • Proven ability to work with a variety of high-ranking stakeholders/ partners.
Technical knowledge and experience	• knowledge in the sustainable energy (technology, principle & application). • knowledge in energy policy and programme implementation. • knowledge in sustainable energy business and market. Previous experience in the Arab league states is an advantage. • Experience in the evaluating of climatic change/ sustainability/ energy projects. • Experience in country-level project evaluation. • experience in other cross-cutting areas such equality, disability issues, rights-based approach, and capacity development.

	• Demonstrates integrity by modelling the UN's values and ethical standards • Promotes the vision, mission, and strategic goals of UNDP • Displays cultural, gender, religion, race, nationality and age sensitivity and adaptability
Language skills required	• Fluency in written and spoken English is required. • Fluency in written and spoken Arabic is desired.

As per the evaluation guidelines, evaluators should not have worked or contributed to the project, programme, outcome or UNDAF/ UNSDCF under evaluation, at any time, in any way.

Evaluation ethics

This evaluation will be conducted in accordance with the principles outlined in the UNEG ''Ethical Guidelines for Evaluation'.[2] The consultant must safeguard the rights and confidentiality of information providers, interviewees, and stakeholders through measures to ensure compliance with legal and other relevant codes governing collection of data and reporting on data. The consultant must also ensure security of collected information before and after the evaluation and protocols to ensure anonymity and confidentiality of sources of information where that is expected. The information knowledge and data gathered in the evaluation process must also be solely used for the evaluation and not for other uses with the express authorization of UNDP and partners.

6. IMPLEMENTATION ARRANGEMENTS

Project organizational structure:

Project Board is comprised of the UNDP Resident Representative and the Implementation Partner (the Minister of Electricity and Water Affairs). The purpose of the Project Board is to review and commit to carry out the activities of this Project; approve Work Plans; review/ endorse substantive revisions to the Project and work plan; and receive the final Evaluation report that will be produced by the Evaluator.

UNDP is the project managing agency responsible for the administration of funds and procurement of services and goods. In this project, staff were also recruited to carry out the technical aspects of the project deliverables as per the Project Document. UNDP is responsible for the preparation of financial reports and undertaking financial audit as per UN rules and regulations.

The SEU's Project Manager has prepared quarterly progress reports and submitted them for review and acceptance to the Implementing Partner. All financial reports and Combined Delivery Reports under the Project have been prepared as per UNDP's procedures. The evaluation manager will work closely with the Evaluator to facilitate the delivery of the final report as per the below evaluation implementation arrangements.

Evaluation implementation arrangements:
UNDP will designate an evaluation manager/ focal point. The evaluation manager will be responsible for the oversight of the whole evaluation process and will provide technical guidance and ensure the independence of the evaluation process, and that the evaluation policy is followed. The Project staff will assist in facilitating the process (e.g., providing relevant documentation, arranging visits/ interviews with key stakeholders, informants, reviewing evaluations deliverables).

The evaluation manager will convene an evaluation reference group. This reference group will review the inception report and the draft evaluation report to provide detailed comments related to the quality of methodology, evidence collected, analysis and reporting. The reference group will also advise on the conformity of processes to the UNDP and UNEG standards. Comments and changes by the evaluator in response to the draft evaluation report should be retained by the evaluator to show how they have addressed comments.

The consultant will report directly to the designated evaluation manager/ focal point and work closely with the project team. The consultancy will be conducted virtually and remotely. The methodology should be detailed in the Inception Report and agreed with the Evaluation Reference Group and the Evaluation Manager

The consultant will take responsibility, with assistance from the project team, for setting up meetings with the agreed people, subject to advanced approval of the methodology submitted in the inception report. Project staff will not participate in meetings between consultant and evaluation participants. An updated stakeholder list with contact details (phone and email) will need to be provided by the evaluation manager to the consultant. The final report will be approved by the evaluation commissioner.

UNDP with support of relevant stakeholders will develop the management response to the evaluation within 2 weeks of report finalization.

- Evaluator's main tasks: Fulfil the contractual arrangements under the TOR
- Develop the evaluation inception report, including an evaluation matrix and a gender-responsive methodology, in line with the TOR, UNEG norms and standards and ethical guidelines
- Conduct data collection according to the TOR and inception report
- Produce draft reports adhering to UNDP evaluation templates, and brief the evaluation manager, programme/ project managers and stakeholders on the progress and key findings and recommendations
- Consider gender equality and women's empowerment and other cross-cutting issues, check if all and respective evaluation questions are answered, and relevant data, disaggregated by sex, is presented, analysed and interpreted
- Finalize the evaluation report, incorporating comments and questions from the feedback/ audit trail.
- Record own feedback in the audit trail

The duties and responsibilities of the Evaluator include:

- To assess and evaluate the progress made by the project towards an attainment of the results as specified in the project documents/ strategy framework / resource framework / Annual work plan.
- To measure the contributions made by the project in country's sustainable energy development.
- To assess the relevance, sustainability, effectiveness, and efficiency of the project interventions.
- To identify challenges to project implementation and make recommendations on possible ways forward.
- To examine the cost efficiency and effectiveness of the project.
- To document main lessons learned, best practices and propose recommendations that will integrate Project Final Report.

APPENDIX B - MISSION ITINERARY (FOR MAY-JULY 2022)

#	Activity	Stakeholder involved	Place
30 May 2022 (Monday)			
1	SEU Kick-Off meeting	UNDP	Zoom
17 June 2022 (Friday)			
2	SEU meeting	UNDP	Zoom
11 July 2022 (Monday)			
3	Meeting with Dr. Abdul Hussain Mirza, Project initiator and President of SEA	Government of Bahrain	Zoom
13 July 2022 (Wednesday)			
4	Questionnaire from Mr. Ebrahim Radhi, M.Phil (Cam), LEED GA, MCIM, MIMechE, Co-Founder & Board Member	Senior advisor to SEU Project	Questionnaire
5	Meeting with Mr. Jayantha Jayamanna	Service provider to project	Zoom
6	Meeting with Ms. Suzan AlAjjawi	Senior advisor to SEU Project	Zoom and questionnaire
15 July 2022 (Friday)			
7	Questionnaire from Mr. Kristian Patrick	Advisor to SEU Project	Questionnaire
16 July 2022 (Saturday)			
8	Questionnaire from Mr. Fuad Alshaikh Abdulla	Advisor to SEU Project	Questionnaire
17 July 2022 (Sunday)			
9	Meeting with Mr. Rachid Abu Hassan	Senior advisor to SEU Project	Zoom
10	Questionnaire from Mr. Ian Roos, CEO, Pavilon Group	Senior advisor to SEU Project	Questionnaire
11	Questionnaire from Mr. Ali Alhayki, Chief Of Standards Development & Metrology, Chairman of GSO Mechanical Technical Committee Testing & Metrology Directorate	Government of Bahrain	Questionnaire
12	Questionnaire from Mr. Seena Dashty, Managing Director, Tarsheed Energy	Service provider to project	Questionnaire
13	Questionnaire from Dr. Hanan M. Albuflasa Chairperson, Dept. of Physics, College of Science, University of Bahrain	Senior advisor to SEU Project	Questionnaire
18 July 2022 (Monday)			
14	Meeting with Mr. Dominic McPolin	Office of the Ministry of Works and Government Regulator for District Cooling	Zoom and questionnaire
15	Questionnaire from Mr. Pat Shiel	Advisor to SEU Project	Questionnaire
16	Questionnaire from Mr. Graeme Dennis, Principal, Adarite Consulting, Adarite Legal	Advisor to SEU Project	Questionnaire

#	Activity	Stakeholder involved	Place
17	Questionnaire from Mr. Arshad Abdullah, Managing Director, Intergreen Technologies W.L.L.	Advisor to SEU Project	Questionnaire
19 July 2022 (Tuesday)			
18	Questionnaire from Mr. Andreas Karner, Team Leader Energy & Environment, Partner	Advisor to SEU Project	Questionnaire
19	Questionnaire from Mr. Roger Saallent, TTA	Advisor to SEU Project	Questionnaire
20	Questionnaire from Mr. Khalid Alghareeb	Advisor to SEU Project	Questionnaire
20 July 2022 (Wednesday)			
21	Meeting with Mr. Jassim Al Shirawi	Former head of SEU	Zoom

Total number of meetings conducted: 21

APPENDIX C - LIST OF PERSONS CONTACTED

This is a listing of persons contacted in the SEU Project (unless otherwise noted) during the Terminal Evaluation Period only. The Evaluators regrets any omissions to this list.

1. Mr. Alexander Al-Samahiji, Project Manager, SEU Project
2. Dr. Abdul Hussain Mirza, Project initiator and President of SEA;
3. Mr. Jassim Al Shirawi, Former Head of SEU;
4. Mr. Ebrahim Radhi, M.Phil (Cam), LEED GA, MCIM, MIMechE, Co-Founder & Board Member
5. Mr. Jayantha Jayamanna, Service provider to project
6. Ms. Suzan AlAjjawi, Senior Advisor to SEU Project;
7. Mr. Kristian Patrick, Advisor to SEU Project;
8. Mr. Fuad Alshaikh Abdulla, Advisor to SEU Project;
9. Mr. Rachid Abu Hassan, Senior advisor to SEU Project;
10. Mr. Ian Roos, CEO, Pavilon Group;
11. Mr. Ali Alhayki, Chief Of Standards Development & Metrology, Chairman OF GSO Mechanical Technical Committee Testing & Metrology Directorate, Government of Bahrain;
12. Mr. Seena Dashty, Managing Director, Tarsheed Energy;
13. Dr. Hanan M. Albuflasa, Chairperson, Dept. of Physics, College of Science, University of Bahrain
14. Mr. Dominic McPolin, Office of the Ministry of Works and Government Regulator for District Cooling;
15. Mr. Pat Shiel, Advisor to SEU Project;
16. Mr. Graeme Dennis, Principal, Adarite Consulting, Adarite Legal;
17. Mr. Arshad Abdullah, Managing Director, Intergreen Technologies W.L.L.;
18. Mr. Andreas Karner, Team Leader Energy & Environment, Partner;
19. Mr. Roger Sallent, TTA;
20. Mr. Khalid Al Ghareeb, Advisor to SEU Project.

APPENDIX D - LIST OF DOCUMENTS REVIEWED

1. UNDP Project Document for “Bahrain Unit for Sustainable Energy”;
2. UNDP-SEU Agreement for a One-Year Extension;
3. UNDP-SEU signed CSA and PD amendment for 2022;
4. The Kingdom of Bahrain, National Energy Efficiency Action Plan (NEEAP), January 2017;
5. The Kingdom of Bahrain, National Renewable Energy Action Plan (NREAP), January 2017;
6. SEU Quarterly Progress Report from 1Q 2018 to 4Q 2021;
7. UNDP-BDO Audit Report for Bahrain Unit for Sustainable Energy;
8. UNDP -BDO Management letter on matters arising from audit of Bahrain Unit for Sustainable Energy administered by UNDP Bahrain;
9. Bahrain’s Vision 2030.

APPENDIX E – GENERAL QUESTIONNAIRE PROVIDED TO STAKEHOLDERS

Stakeholder Questions and Discussion for Regulators and Consultants

1. What was your involvement on the project?
2. Did you prepare any energy papers and/or frameworks for any national sustainable energy policies? If so, what were they?
3. What contributions, if any, did you make in the National Energy Efficiency Action Plan? (Design/ approval/ implementation of the NEEAP)
4. What contributions, if any, did you make in the National Renewable Energy Action Plan? (Design/ approval/ implementation of the NREAP)
5. Overall, how do you perceive the efforts of the SEU Project in shaping and influencing the setting of the strategy of the RE sector in the Kingdom?
6. Overall, how do you perceive any barriers to the SEU Project's impact in shaping and influencing the strategy of the RE sectors in the Kingdom?
7. Overall, how do you perceive the impacts of the SEU Project in developing the RE marketplace in the Kingdom?
8. Overall, what do you perceive were the barriers to the SEU Project's impact in developing the RE market in the Kingdom?
9. Overall, how do you perceive the efforts of the SEU Project in shaping and influencing the setting of the strategy of the EE sector in the Kingdom?
10. Overall, what do you perceive were the barriers to the SEU Project's impact in shaping and influencing the strategy of the EE sectors in the Kingdom?
11. Overall, how do you perceive the impact of the SEU Project in developing the EE marketplace in the Kingdom?
12. Overall, what do you perceive were the barriers to the SEU Project's impact in developing the EE market in the Kingdom?
13. Please comment on the technical capabilities which were made available via the SEU Project in regard to team members/consultants / technical advisors etc. (positive/negative or other observations)
14. What actions, if any, did you or your organization take to promote RE in the Kingdom?
15. What actions, if any, did you or your organization take to promote EE in the Kingdom?
16. Were there any issues promoting RE within the Kingdom?
17. Were there any issues promoting EE within the Kingdom?
18. Did you have sufficient staff to promote and enforce national RE mandates?
19. Did you have sufficient staff to promote and enforce national EE mandates?
20. Describe your efforts, if any, to reach out to and encourage other public sector stakeholders to implement RE and EE initiatives, policies and projects, if any.
21. Following from the above question, were there any initiatives that required special attention (e.g. District Cooling, Green Building Code, installing renewables on government property etc.) and if so, please describe what your organization had to do to make those initiatives work?
22. Describe your efforts, if any, to reach out to and encourage other private sector stakeholders to implement RE projects. Were there any special initiatives that required your attention, such as solar PV for buildings?

23. Describe your efforts, if any, to reach out to and encourage other private sector stakeholders to implement EE projects. Were there any special initiatives that required your attention, such as or energy efficiency within buildings?
24. Describe your efforts, if any, on promoting RE in association with the SEU
25. Describe your efforts, if any, on promoting EE in association with the SEU
26. What impact, if any, has the SEU Project had on gender balance within the RE and EE initiatives and/or projects that your organization has been involved in? (For example, were there any efforts made to focus on RE and EE initiatives with female entrepreneurs, or female RE/EE workers? If so, provide details.)
27. What are the opportunities you would identify for future similar programme wherein the UNDP may support the government of Bahrain in the strategic governance of the Energy Transition?
28. Were there any issues or problems which occurred during the SEU project that you would like to mention?
29. Do you have any other comments or suggestions that you would like to make regarding the SEU Project?

Stakeholder Questions and Discussion for Installation Personnel and Project Beneficiaries

1. What was your involvement with the SEU Project?
2. Overall, how do you perceive the efforts of the SEU Project in shaping and influencing the setting of the strategy of the RE sector in the Kingdom?
3. Overall, what do you perceive were the barriers to the SEU Project's impact in shaping and influencing the strategy of the RE sectors in the Kingdom?
4. Overall, how do you perceive the impacts of the SEU Project in developing the RE marketplace in the Kingdom?
5. Overall, what do you perceive were the barriers to the SEU Project's impact in developing the RE market in the Kingdom?
6. Overall, how do you perceive the efforts of the SEU Project in shaping and influencing the setting of the strategy of the EE sector in the Kingdom?
7. Overall, what do you perceive were the barriers to the SEU Project's impact in shaping and influencing the strategy of the EE sectors in the Kingdom?
8. Overall, how do you perceive the impact of the SEU Project in developing the EE marketplace in the Kingdom?
9. Overall, what do you perceive were the barriers to the SEU Project's impact in developing the EE market in the Kingdom?
10. Please comment on the technical capabilities which were made available via the SEU Project in regard to team members/consultants / technical advisors etc. (positive/negative or other observations)
11. What was the incentive for your entity's involvement in a RE project?
12. What was the incentive for your entity's involvement in an EE project?
13. How were your projects financed?
14. Was there any training provided by the SEU Project? Did the training involve technical details of RE and/or EE or was the training focused on procurement and installation?
15. What were the issues faced with the installation of the RE or EE projects/initiatives? e.g. issues finding certified installers?

16. What were the results of the RE/EE projects/initiatives? What energy was saved or reduced? What GHG emissions have been reduced?
17. Have you disseminated the positive information on RE and EE projects/initiatives to other stakeholders? If so, please describe the efforts?
18. Were there any efforts made by the SEU Project to encourage gender equality in the RE and EE initiatives and projects? If so, please provide details?
19. Were there any efforts by you or your company to encourage gender equality in your RE and EE initiatives and projects (with female entrepreneurs or female installation workers)? If so, provide details?
20. Do you want to continue to work in the RE sector?
21. Do you want to continue to work in the EE sector?
22. Are you setup to continue to work with sustainable energy projects?
23. Is financing in place for your projects?
24. What are the opportunities you would identify for future similar programmes wherein the UNDP may support the government of Bahrain in the strategic governance of the Energy Transition?
25. Were there any issues or problems which occurred during the SEU Project that you would like to mention?
26. Do you have any other comments or suggestions that you would like to make regarding the SEU Project?

APPENDIX F – RESULTS AND RESOURCES FRAMEWORK FOR SEU PROJECT

Intended Outcome as stated in the Country Programme Results and Resources Framework: Outcome 3 – Enhanced environment for equitable, job creating and sustainable economic growth
Outcome indicators as stated in the Country Programme Results and Resources Framework including baseline and targets: Establishing a national identity and Bahrain for energy planning and energy efficiency Promoting gender parity in hiring and training while staffing Bahrain Unit for Sustainable Energy
Applicable Key Result Area (from 2012 to 2016 Strategy Planned): Inclusive development and sustainable development
Partnership Strategy: UNDP and the Office of the Minister of Electricity and Water Affairs will be working together towards the achievements of the objectives of the project
Project title and ID (Atlas award ID): Promotion of integrated energy planning: energy efficiency and renewable energy and establishment of the Bahrain Unit for Sustainable Energy
Outcome: National energy planning improved

Intended Outputs	Output targets for (years)	Indicative Activities	Responsible Parties	Input
Output 1: Bahrain Unit for Sustainable Energy established	1.1 Core staff of the energy unit in place (year 1) 1.2 Procurement and installation of basic equipment (year 1) 1.3 Develop policies, bylaws and operational guidelines of the energy unit (year 1) 1.4 Awareness of sustainable energy goals raised (years 1 and 2) 1.5 Bahrain Unit for Sustainable Energy fully staffed (year 3)	1.1. Conduct stakeholder's consultation 1.2. Recruit Project Manager and Chief Technical Advisor 1.3. Design and facilitate enactment of law establishing Bahrain Unit for Sustainable Energy and defining its mandate and structure 1.4. Develop policies, bylaws and operational guidelines of the Energy Unit 1.5. Recruit core staff 1.6 allocate adequate office space for the Unit 1.7 procure and install basic equipment in designated office space 1.8 recruit staff for Bahrain Unit for Sustainable Energy – 28 people to lead all activities under Outputs of the project below 1.9. Communication and outreach activities for the International Decade of Sustainable Energy for all (2014 to 2024) including posting international sustainable energy conferences in Bahrain and participating in UN sustainable energy conferences globally	UNDP, EWA, UNEP	2 annual steering committee and stakeholder meetings Project Manager and CTA Project staff salaries Rental and equipment (rent for first 3 years and one time equipment cost and maintenance cost) International expert on institutional development (1.3 and 1.4) (6 months were over a period of one year, 2 missions) Bahrain Unit for Sustainable Energy fully staffed people to constitute teams for energy information, management, energy efficiency and renewable energy (years 3 to 5) Travel and workshop costs Consultation and communication activities **Total: $5,214,105**

Intended Outputs	Output targets for (years)	Indicative Activities	Responsible Parties	Input
Output 2: Institutional capacity of Bahrain Sustainable Energy Unit built	2.1. Self South exchanges and study tours organized (years 1 and 2 2.2. Two national training programs for staff (year 2) 2.3. Core staff attend 2 relevant international training programs (year 2) 2.4. Training needs assessment including potential training opportunities (year 3)	2.1. Identify training opportunities locally and internationally 2.2. Conduct international and local training programs on energy planning, energy efficiency and renewable energy technologies 2.3. Conduct south-south exchanges with energy centres in China, India, Saudi Arabia etc. and study tours to other energy planning centres and energy conservation centres – California Energy commission, Department of energy USA and energy conservation Centre Japan etc. 2.4. Undertake training needs for the fully staffed unit	UNDP, EWA, UNEP	Senior International consultant on energy training (training needs assessment) (1 month) ST consultant on energy modelling (2.2) (one month for training) ST consultant on energy economics (2.2) (1 month for training Training and travel cost for 5 years **Total: $309,800**
Output 3: National energy policy paper, and a framework for National Energy Strategy produced	3.1. Design a national information management system (year 1) 3.2. Design and launch State of Energy Report with trends and scenarios to 2030 (years 1 and 2) 3.3. MO you with CIO on energy data collection and management signed (year 2) 3.4. Data collection (year 2 onwards) 3.5. Energy balance produced (year 2 onwards) 3.6. Analysis of energy supply options (year 2 onwards) 3.7 analysis of energy demand (year 2 onwards) 3.8. National Energy Forecasting policy brief (year 3) 3.9. Framework for National Sustainable Energy strategy developed (years 2 to 3)	3.1. Prepare MO you between CIO and the Unit for Sustainable Energy on energy data collection and management 3.2. Work with CIO to understand the data availability, identifying gaps, requesting additional data 3.3. Perform data analysis and design initials State of Energy Report 3.4 hold stakeholder consultations including the legislative body, women machineries, environmental entities and youth organizations 3.5. Assessment of energy supplied trends and options 3.6. Analysis of energy demands trends and scenarios 3.7. Preparing energy balance 3.8. Drafting of a national energy forecast and scenario policy brief 3.9. Drafting of National Sustainable Energy Strategy core umbrella framework including indicators systems with energy efficiency and renewable energy sections developed under outputs 4 and 5 below	Bahrain Unit for Sustainable Energy, UNDP, EWA, UNEP	International consultant on energy modelling (8 months over 2 years and 2 missions) International consultant on energy economics (2.2) (8 months over 2 years and 2 missions) Consultants to develop State of Energy Report Communication activities **Total: $374,400**
Output 4: Expanded use of Energy Efficiency (EE) solutions mainly through development of the NEEAP	4.1. Energy efficiency components to the CAP national Sustainable Energy Strategy (years 2 to 3) 4.2. Projects and partnerships for scaling up energy efficiency solutions including decentralized solutions such as energy efficient air conditioning (years 1 to 2 for	4.1. Assess policy, institutional and market barriers of improving energy efficiency 4.2. Identifying potential for energy efficiency improvements in key sectors such as oil/gas, buildings, aluminum, air conditioning, etc. 4.3. Identifying national/sectoral energy efficiency targets or specific sectors for 2030 4.4. Assess policies and measures to overcome policy, institutional and market barriers in key sectors	Bahrain Unit for Sustainable Energy, UNDP, EWA, UNEP	Senior EE international expert (1 year over 2 years and 4 missions) Consultation and communication activities **Total: $286,400**

Intended Outputs	Output targets for (years)	Indicative Activities	Responsible Parties	Input
	pilots and years 4 to 5 for implementation of EE solutions identified under National Strategy)	4.5. Implement early actions likely to be identified in the strategy, particularly decentralized solutions like energy efficient air conditioning as well as broader sectoral approaches 4.6. Implement measures to scale up EE measures identified in the National SE Strategy, particularly decentralized solutions like energy efficient air conditioning as well as broader sectoral approaches 4.7. Communication and outreach activities		
Output 5: Expanded use of Renewable Energy (RE) solutions mainly through development of the NREAP	5.1 Renewable energy components for the National Renewable Energy Strategy (years 2-3) 5.2. Projects and partnerships for scaling-up renewable energy solutions like roof top solar and solar water heating (Years 102 for pilots and years 4-5 for implementation of RE solutions identified under National Strategy)	5.1. Develop energy efficiency component for integration in National Sustainable Energy Strategy in Output 3 above 5.2. Assess policy, institutional and market barriers for expanding use of RE 5.3. Identify are the targets for 2030 5.4. Develop renewable energy components to the CAP national Sustainable Energy Strategy in Output 3 above 5.5. Implement early actions likely to be identified in the strategy, particularly decentralized off grid solutions like rooftop solar and solar water heating 5.6. Implement measures to scale up re: measures identified in the CAP national SE strategy, particularly decentralized solutions like energy efficient air conditioning as well as broader sectoral approaches 5.7. Communication and outreach activities	Bahrain Unit for Sustainable Energy, UNDP, EWA, UNEP	Senior renewable energy international expert (1 year over 2-year period and 4 missions) Consultation and communication activities **Total: $286,400**

APPENDIX G – EVALUATION MATRIX

Evaluative Questions	Indicators	Data Sources/Methods	Methods for Data Analysis
Project relevance: To what extent is the project strategy relevant to country priorities, country ownership, and the best route towards expected results?			
• To what extent was the project in line with national development priorities, UNDP Strategic Plan, country programme outputs and outcomes? • To what extent was the project in line with the SDG 7 (affordable & clean energy) & SDG 13 (climate action)? • To what extent have project management and implementation partner contributed towards achievement of the project objectives? • To what extent are methodologies, plans, outcomes and lessons learned in this project relevant to other similar projects that may be designed for other countries/ regions the UNDP operates in? • To what extent were perspectives of men and women who could affect the outcomes, and those who could contribute information or other resources to the attainment of stated results, taken into account during project design processes? • To what extent does the project contribute to gender equality, the empowerment of women and the human rights-based approach? • To what extent has the project been appropriately responsive to political, legal, economic, institutional, etc., changes in the country?	- Alignment with National developmental policies and plans - Alignment with global development and environmental agenda - Alignment with needs of the target communities especially women and vulnerable groups	• Review of documents including secondary sources • Key informant interviews • Focus group discussion	Qualitative methods - Triangulation - Validations - Interpretations - Abstractions
Effectiveness: To what extent have the expected outcomes and objectives of the project been achieved thus far?			
• Are the project objectives and outputs clear, practical and feasible within its frame? • To what extent did the project contribute to the national development priorities, UNDP Strategic Plan, country programme outputs and outcomes? • To what extent did the project contribute to the SDG 7 (affordable & clean energy) & SDG 13 (climate action) and SGD 5 (Gender Equality)? • In which areas does the project have the greatest achievements? Why and what have been the supporting factors? How can the project build on or expand these achievements?	- Objective, Outcome level indicators from the project results and resources framework	• Review of documents • Key informant interviews • Focus group discussion	Qualitative methods - Triangulation - Validations - Interpretations - Abstractions Quantitative methods - Progress and trend analysis

Evaluative Questions	Indicators	Data Sources/Methods	Methods for Data Analysis
• In which areas does the project have the fewest achievements? What have been the constraining factors and why? How can or could they be overcome? • What factors contributed towards the project effectiveness or ineffectiveness?			
Efficiency: Has the project been implemented efficiently, cost-effectively, and been able to adapt to any changing conditions thus far?			
• To what extent was the project management structure as outlined in the project document efficient in generating the expected results? • To what extent have project funds and activities been delivered in a timely manner? • To what extent have the UNDP project implementation strategy and execution been efficient and cost-effective? • To what extent do the monitoring and evaluation (M&E) systems utilized by UNDP ensure effective and efficient project management?	- Changes made in the resource framework or project design, if any - Level of stakeholder involvement and coordination mechanisms - Availability of work plans and M&E system - Availability and effectiveness of communication mechanisms - Efficient and timely use of financial resources	• Review of documents including financial statements • Key informant interviews • Focus group discussion	Qualitative methods - Triangulation - Validations Quantitative methods - Progress and trend analysis
Sustainability: To what extent are there financial, institutional, socio-economic, and/or environmental risks to sustaining long-term project results?			
• Are there any risks that may jeopardize the sustainability of project outputs going forward? • To what extent will financial and economic resources be available to sustain the benefits achieved by the project? • Are there any risks that may jeopardize sustainability of project outputs and the project contributions to country programme outputs and outcomes? • Do the legal frameworks, policies and governance structures and processes within which the project operated pose risks that may jeopardize sustainability of project benefits? • To what extent do stakeholders support the project's long-term objectives? • What factors contributed towards the project sustainability?	- Financial, Social, Institutional and Environmental risks to sustainability of interventions and benefits	• Review of documents • Key informant interviews • Focus group discussion	Qualitative methods - Triangulation - Validations - Interpretations - Abstractions

Evaluative Questions	Indicators	Data Sources/Methods	Methods for Data Analysis
• What could be done to strengthen exit strategies and sustainability in order to support female and male project beneficiaries as well as marginalized groups?			
Cross-cutting issues: To what extent are cross-cutting issues contributing to long-term project results?			
• To what extent has the project promoted and contributed towards the other SDG's (excluding 5, 7 & 13)? • To what extent did the project and its outcomes contribute to women's empowerment and gender balance both within the Project itself and further afield?	- Achievement of SDG objectives - Level of women's recruitment in SEU and other government institutions and private entities	• Review of documents • Key informant interviews • Focus group discussion	Qualitative methods - Triangulation - Validations - Interpretations - Abstractions

APPENDIX H – RESPONSES TO COMMENTS RECEIVED ON DRAFT TE REPORT

To the comments received on 26 July 2022 for the Terminal Evaluation of the SEU Project

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 #/ Comment location	Comment/Feedback on draft TE report	TE response and actions taken
Alexander Al-Samahiji	*1*	*Table A, Outcomes 4 and 5.*	*Wordy for purpose of explanation, can be condensed.*	*Wording adopted.*
Alexander Al-Samahiji	*2*	*Para 61*	*This increase was not part of the announcement in COP26 - it is an internal suggestion but not yet approved or adopted. Hence we can't use it as a statement. The 5% was kept, but the 2035 target was doubled from 10% to 20%*	*Adopted*
Alexander Al-Samahiji	*3*	Para 65, 2nd bullet	*Am not sure they recruited any managers yet. But their operational management has started viewing energy efficiency as a valid and mostly easily achieved target for improved comfort and lower OPEX.*	*Adopted*
Alexander Al-Samahiji	*4*	*Para 68*	*We are told that the LED replacement program is ongoing and travelling around the Kingdom it is clear that the replacements are happening.*	*Adopted*
Alexander Al-Samahiji	*5*	*Para 76*	*CESI are the consultants who developed the Et Metering standards for Bahrain. They have done the same work for Dubai and Oman, so there is strong alignment between the regulations of these three countries, enabling the market to think and operate more regionally and hence reduce costs for solar overall (larger market, lower costs).*	*Information placed in Footnote 23*
Alexander Al-Samahiji	*6*	*Para 99*	*I am not sure what this means? All technical members of the SEU were subject matter experts. Rephrase required? On the contrary, the SEU provided a learning hub for the new technical recruits of the SEA.*	*Para reworded to reflect new information.*
Alexander Al-Samahiji	*7*	*Para 100*	*NOTE: All equipment being deployed now is designed for the conditions. There are so-called Desert Solar panels now, designed for excessive heat and resistant to power drops due to dust. Cleaning is the main issue remaining to be dealt with, and is dealt with by robotic cleaning in larger systems.*	*New information adopted.*

Author	#	Para #/ Comment location	Comment/Feedback on draft TE report	TE response and actions taken
Alexander Al-Samahiji	*8*	*Para 112*	*This is a touchy subject.* *The country's leadership don't always view press releases positively, leaving the route to awareness to more rigid structures such as conferences and specific radio and TV programs and highly unstructured and generally ungoverned social media where the message can be drowned out by miss-information or bad actors.* *May be worth putting this as a challenge to the outreach?*	*New information noted. Re-wording of the issue has been done.*
Alexander Al-Samahiji	*9*	*Para 114, 2nd bullet*	*Perhaps an unintended consequence of trying to quickly build the solar sector.* *At the start of Net Metering in 2018, only EWA was available to manage the process as the SEU was just a project with no legal rights to hold a commercial register of contractors and consultants. So, the start was not under the control of subject matter experts who could have guided things better. Now we are in market correction territory, but can do so since there is a government agency that can drive the changes.*	*This new information was added to Para 102 under unintended consequences*
Alexander Al-Samahiji	*10*	*Para 114, 3rd bullet*	*We have not seen that at the SEU Project when reaching out to the market (which we do on a continuous basis, formally and informally) .* *The biggest issue faced is cleaning, predictably. Power generation of installed plant has generally matched the simulations done at design stage.*	*New information noted. Re-wording of the issue has been done.*
Alexander Al-Samahiji	*11*	*Para 116*	*This may be construed rather negatively written like this, so a re-phase is recommended.* *Are you saying that the structure can be improved?* *Decision making improved?* *Management improved?* *Perhaps be more specific so it is an actionable point?*	*New information noted. Re-wording of the issue has been done.*
Alexander Al-Samahiji	*12*	*Para 123*	*He government initiated the first 5MW plant in 2014 and data from this has been used by the SEU Project in developing some of the policies and in advising about the viability of the certain projects.*	*New information noted. Re-wording of the issue has been done.*
Alexander Al-Samahiji	*13*	*Para 124*	*Our data indicates true pyrolysis to be the best solution in-country.*	*Pyrolysis and gasification go hand in hand*
Firas Gharaibeh	*14*	*Table A*	*The Sustainable Energy Authority was later on merged with the Ministry of Electricity and Water*	*Text placed to reflect the change: "The Sustainable Energy Authority*

Author	#	Para #/ Comment location	Comment/Feedback on draft TE report	TE response and actions taken
				was established in 2019 and merged in 2022 with MEWA to form the national entity to further Bahrain's ambitions……".
Firas Gharaibeh	*15*	*Para E-6*	*Very strong statement. Consider revision*	*Used the word limiting instead of constraining.*
Firas Gharaibeh	*16*	*Para E-16*	*Expand more*	*Done*
Firas Gharaibeh	*17*	*Para E-17*	*The project is completed and there are no more "project staff". Consider rewording. Utilize Capacities developed under the project.*	*Reworded.*
Firas Gharaibeh	*18*	*Para E-18*	*Not clear!*	*Should be clear now.*
Firas Gharaibeh	*19*	*Para 9*	*Not a GEF project.*	*Still applies in the absence of general UNDP guidelines*
Firas Gharaibeh	*20*	*Para 14*	*Reword to "limited capacities"*	*Done*
Firas Gharaibeh	*21*	*Table 1*	*See page iii. Please note that budget was reduced to 6,286,112*	*As noted. This Table notes the budget at the signing of the ProDoc.*
Firas Gharaibeh	*22*	*Para 25*	*Reconsider including in the report.*	*Text left in report since it was a key rationale for UNDP involvement.*
Firas Gharaibeh	*23*	*Para 27*	*Maybe later on in the annual progress reporting?*	*Not even on the quarterly progress reports…..*
Firas Gharaibeh	*24*	*Para 31*	*Are they relevant to Bahrain development context?*	*Yes*
Firas Gharaibeh	*25*	*Para 34*	*Is this fully accurate or SEU became part of newly established Authority*	*That is the information I received from Alex*
Firas Gharaibeh	*26*	*Para 39, 1st bullet*	*Is this needed to mention?*	*This is information from Alex*
Firas Gharaibeh	*27*	*Para 48*	*Was SEU promoted as an Authority or it became the core for the new Authority?*	*Yes it was but later you said it was merged with MEWA. The text is changed to reflect this.*
Firas Gharaibeh	*28*	*Para 55, 3rd bullet*	*Mid-2022. I don't think this is under the new ministry mandate*	*As noted.*
Firas Gharaibeh	*29*	*Para 88*	*It was launched!*	*Reworded to reflect the circumstances.*
Firas Gharaibeh	*30*	*Para 92*	*Are there any other relevant national strategies such as environment, energy, etc… that can be mentioned.*	*This is all the information that I could get*
Firas Gharaibeh	*31*	*Para 93*	*What about implementation of the UNSCF*	*There is no Google information on UNSCF and Bahrain*
Firas Gharaibeh	*32*	*Para 102*	*Consider rewarding.*	*Reworded to reflect changing circumstances*

Author	#	Para #/ Comment location	Comment/Feedback on draft TE report	TE response and actions taken
Firas Gharaibeh	*33*	*Section 3.3.15*	*Include south-south cooperation*	*Included a Sri Lankan connection*
Firas Gharaibeh	*34*	*Para 116*	*Consider rewording to have support from MOEWA*	*Reworded*
Firas Gharaibeh	*35*	*Para 119*	*It is already part of MOEWA*	*Reworded*
Firas Gharaibeh	*36*	*Para 121*	*Include under 119*	*Done*
UNDP Bahrain	*37*	*Para E-5*	*Kindly the achievements table is labelled (May 2021), should it be May 2022 please can you fix the year if this is a typo.*	*Done*
UNDP Bahrain	*38*	*title*	*Please add the word "findings"*	*Done*
UNDP Bahrain		*Paragraph E.8*	*Kindly seems there are some missing words in this sentence, please can you check and fix (UNDP's involvement with the SEU Project, however, has had a very positive impact on promoting sustainable energy generation in Bahrain)* *Please can you clarify further bullet point number 2:* *(UNDP is only interested in giving sound technical advice without the financial interest tagged on. Hence, UNDP has been able to attract excellent technical assistance at a fraction of the cost of normal consulting practices)*	*No words added. This is an Exec Summary and the reader is referred to Para 115 for additional information*
UNDP Bahrain	*39*	*Before the recommendations*	*Please can you add a short narrative on the key findings and key conclusions in relations to each evaluation criteria.*	*Done*
UNDP Bahrain	*40*		*Please add:* • *A few lines about the key aspects of the evaluation approach and methods used* • *Explain the purpose and objectives of the evaluation, including the audience for the evaluation and the intended uses.*	*Done*
UNDP Bahrain	*41*	*Page 1*	• *Please can you add an objective related to gender equality/ women empowerment?* • *Please can you add the primary users of the evaluation*	*Done*
UNDP Bahrain	*42*	*Page 1*	• *Scope and methodology need to be in 2 separate sections. Please can you fix.* • *For the scope, please can you mention the target population and geographic coverage/ if covering all Bahrain please can you mention* • *Please include the outcomes and outputs covered in this evaluation.*	*Done – outputs covered under Section 2.6.*

Author	#	Para #/ Comment location	Comment/Feedback on draft TE report	TE response and actions taken
			• *On methodology: please can you add a chart to further explain the methodology by showing the evaluation stages and what each stage included* • *The report should specify how gender equality, disability, vulnerability and social inclusion were addressed in the methodology, including how data collection and analysis methods integrated gender considerations, use of disaggregated data and outreach to diverse stakeholder groups* • *On interviews and stakeholders' participation, can you please indicate the level of women and men involvement.* • *Data analysis is very short. The report should describe the procedures used to analyse the data collected to answer the evaluation questions. It should detail the various steps and stages of analysis that were carried out, including the steps to confirm the accuracy of data and the results for different stakeholder groups (men and women, different social groups, etc.). The report should also discuss the appropriateness of the analyses to the evaluation questions* • *The Evaluation matrix is missing, please can you add to the Annexes and refer to it. it is important to include it.*	
UNDP Bahrain	*43*	*Paragraph 9, page 3*	*(GEF Financed Projects): kindly it might be confusing to the reader that this is a GEF project while it is not (I had to go to atlas to check!). Please can you review this paragraph and re-phrase indicating that **it is not a GEF project**, but the evaluator is using GEF evaluation template for xxxxxx reason (as per your reason please).*	*Done*
UNDP Bahrain	*44*	*Page 6, paragraph 14*	*(UNDP became involved): UNDP's role is not clear please can you clarify.*	*Done*
UNDP Bahrain	*45*	*Page 6, paragraph 14-16*	*Please can you link to UNSDCF, CPD and the SDGs.*	*Done*
UNDP Bahrain	*46*	*Page 6*	*please can you mention project beneficiaries and include if there are any vulnerable groups are especially benefiting from the project*	*Done*
UNDP Bahrain	*47*	*Page 7*	*Any implementation constraints*	*None*
UNDP Bahrain	*48*	*Page 8, paragraph 25*	*("However, the Minister was told by the Ministry of Finance that the setting up of such a Centre would be costly, requiring a lot of highly*	*Done*

Author	#	Para #/ Comment location	Comment/Feedback on draft TE report	TE response and actions taken
			qualified senior personnel. UNDP was engaged as a less costly option by the Minister to provide the technical assistance to setup the Centre"): is this level of information important? the information about the cost might mistakenly give the reader negative perspective on UNDP's value. Please can you review and highlight UNDP's real comparative advantage/ added value.	
UNDP Bahrain	*49*	*Page 29*	*Please also link with UNSDCF and UNDP CPD*	*See Para 93.*
UNDP Bahrain	*50*	*Page 37*	*Please can you add a conclusion on gender and women empowerment*	*Done*
UNDP Bahrain	*51*	*Page 37*	*Please can you add a recommendation on gender and women empowerment*	*Done*
UNDP Bahrain	*52*		*Please add the evaluation matrix*	*Done*

APPENDIX I - EVALUATION CONSULTANT AGREEMENT FORM

Evaluators:

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, minimize 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 wrongdoing 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 imitations, findings and recommendations.
7. Should reflect sound accounting procedures and be prudent in using the resources of the evaluation.

Evaluation Consultant Agreement Form[34]

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

Name of Consultant: __Roland Wong_____

Name of Consultancy Organization (where relevant)**:** _____

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

Signed at *Surrey, BC, Canada* on *August 18, 2022*

[34]www.unevaluation.org/unegcodeofconduct