Monitoring & Evaluation (M&E) Plan and Impact Statement Form

Objective of the M&E Plan and Impact Statement:

- The M&E Plan and Impact Statement must be designed based on the Technical Assistance Response Plan and must enable the Implementer to complete the Closure Report at the end of the assistance.

Process for filling in the form:

- The Implementer must identify relevant quantitative and qualitative indicators as specified in the Closure Report. A sub-set of indicators to monitor and assess must be chosen among these.
- The Implementer may also identify other specific, measurable, achievable, relevant, and time-bound indicators suitable to monitor Activities, Outputs and anticipated Outcomes from the technical assistance and add to the M&E Plan and Impact Statement.
- During implementation of the TA or FTA, the Implementer must collect all relevant data as described in the Monitoring & Evaluation Plan. Aggregated data on selected indicators as well as an updated version of the Impact Statement will be presented in the Closure Report at the end of the assistance.

Basic Information	
Title of response plan	**The Bahamas power system stability study for the implementation of a higher renewable energy penetration level**
Technical assistance reference number	**2017000019**
Country	**The Bahamas**
NDE focal point and organisation	**Dr. Rhianna Neely** **Environment Officer Ministry of the Environment and Housing** **Phone: 1-242-3226005** **rneelybest@gmail.com** **Dr. Rochelle Newbold**
Sector addressed	**Energy**
Technologies supported	**Renewable energies**
Implementation period and total duration	**18 months**
Total budget for implementation	**USD 369,715**
Designer of the response plan	**CTCN**

Implementer of response plan	**Energynautics GmbH**

(A) Outputs and Activities as described in the Response Plan	(B) Indicator	(C) Expected results	(D) Method and frequency for data collection	(F) Comments (Assumptions)
Output 4.2 Country programmes, concept notes, including on adaptation, developed that implement high-impact priorities identified in INDCs and other national strategies or plans				
4.2.1. Activity 1 - Data collection and analysis	Number of Data Collection and Analysis Reports	▪ 1 Data Collection and Analysis Report incl. a set of reliable data and current power models	▪ GCF project interim report (every 6 months) ▪ Report on data and power model provided to UNIDO/CTCN ▪ Meeting minutes provided to UNIDO/CTCN	▪ The utility company is engaged and willing to share the available data and models; the utility company is involved in the data validation process. ▪ The in-house knowledge is adequate to provide relevant information.
4.2.2 Activity 2 - Determine critical scenarios for stability study	Number of Critical Scenarios for Stability Study Reports Number of Meetings minutes	▪ 1 Critical Scenarios for Stability Study Report ▪ min. 3 Meetings Minutes	▪ GCF project interim report (every 6 months) ▪ Qualitative study of the system provided to UNIDO/CTCN ▪ Minutes of meetings with BPL/Ministry of Environment and other stakeholders provided to UNIDO/CTCN	▪ The utility company is engage in the development of the critical scenarios. ▪ The in-house knowledge is adequate to provide relevant feedback on the scenarios. ▪ Relevant stakeholders provide feedback on the studies and reports prepared by the implementer.
4.2.3. Activity 3 - Dynamic model development	Number of Dynamic Models of The Bahamas grids for the year 2030 (ETAP) Number of Operations' manuals for the models including detailed descriptions Number of Reports on the training	▪ Dynamic models of the 15 Bahamas grids including the case of 30% RE penetration by 2030 ▪ 1 Operations manual for the models including detailed descriptions ▪ 1 Demonstration training and report on the power flow models for the utility's future use, including M&E system.	▪ GCF project interim report (every 6 months) ▪ Report on the dynamic models and the operational manual provided to UNIDO/CTCN ▪ Workshop report provided to UNIDO/CTCN ▪ Minutes of meetings with BPL and other stakeholders provided to UNIDO/CTCN	▪ The utility company is engage in the development of the dynamic model. ▪ Relevant stakeholders participate and provide feedback on the studies and reports prepared by the implementer. ▪ The in-house knowledge is adequate to achieve good results in the trainings.
4.2.4. Activity 4 - Dynamic stability analysis	Number of Technical reports on the comprehensive methodology for grid stability assessment of The Bahamas Number of Recommendations of technical options stability and RE integration	▪ 1 Technical report approved by the NDE and NDA on the comprehensive methodology for grid stability assessment of The Bahamas ▪ 1 Report including recommendations of technological options for grid stability and RE integration.	▪ GCF project interim report (every 6 months) ▪ Technical report on the methodology for grid stability provided to UNIDO/CTCN ▪ Report on recommendations of technological options for grid stability provided to UNIDO/CTCN ▪ Minutes of meetings with BPL and other stakeholders provided to UNIDO/CTCN	▪ The utility company is engage in the dynamic stability analysis. ▪ The in-house knowledge is adequate to provide relevant feedback on the stability analysis. ▪ Relevant stakeholders participate and provide feedback on the studies and reports prepared by the implementer. ▪ NDE and NDA are engaged in the activity.
4.2.5. Activity 5 - Monitoring of the	Number of Outcome and impact descriptions	▪ 1 Outcome and impact description	▪ GCF interim and final project reports	▪ The monitoring and evaluation plan is

Readiness proposal	Number of Monitoring and Evaluation Plans Number of Closure and Data Collection reports	▪ 1 Monitoring and evaluation plan ▪ 1 Closure and data collection report ▪ 1 Project's audit report	▪ Outcome and impact description provided to UNIDO/CTCN ▪ M&E Plan provided to UNIDO/CTCN ▪ Closure and data collection report provided to UNIDO/CTCN ▪ Project's audit report conducted by an independent auditor and provided to UNIDO/CTCN	implemented throughout all the project length.

Note: The Response Plan may contain information useful for the section below. The information in the table below will be used by the CTCN for public communication of the achieved and expected results of the Technical Assistance through the CTCN website www.ctc-n.org and other communication channels. See for example: https://www.ctc-n.org/sites/www.ctc-n.org/files/benin_a_ag_forestry.final_.pdf

Impact Statement	
Challenge	*In its INDC submitted to the UNFCCC, The Bahamas committed to achieve a minimum of 30% renewables in the energy mix by 2030 and will allow for a 10% Residential Energy Self Generation Programme but has challenges in increasing the penetration of renewable energy (RE) systems.*
CTCN assistance	▪ *Provide the Country with better understanding of the levels of renewable energy (RE) integration without affecting the power quality* ▪ *Develop capacity in the Country to conduct grid stability assessment* ▪ *Develop a comprehensive methodology for the grid stability assessment* ▪ *Provide technological options for grid stability and RE integration*
Anticipated impact	▪ *Energy security and climate change mitigation are allies. RE alternatives could improve the country's energy security by diversifying its power generation choices and help offset the trade deficit caused by the reliance on fossil fuel imports.* ▪ *The medium-term impact is an increase in the supply side by accommodating a high penetration of renewable energy (mainly solar PV) that will reduce greenhouse gas emissions, enabling The Bahamas to meet its Nationally Determined Contribution of a minimum reduction of 30% by 2030.* ▪ *The long-term impact is a self-sustainable microgrid during tropical cyclones.*
Anticipated co-benefits from the TA	▪ *Energy security* ▪ *Improved system reliability and power quality* ▪ *Energy sustainability and efficiency* ▪ *Renewable energy portfolio*
Gender aspects of the TA	
Anticipated contribution to NDC	*Preparatory work to comply with commitment to achieve:* ▪ *a minimum of 30% renewables in the energy mix by 2030 and will allow for* ▪ *a 10% Residential Energy Self Generation Programme*
The narrative story	*The vulnerability of The Bahamas to the impacts of climate change is well known given its geographical vulnerabilities (limited land mass, low-relief and dispersion of islands, i.e., environmental vulnerabilities (high temperatures, storm surges, sea level rise, flooding, tropical cyclones and non-tropical processes), the concentration of socioeconomic activities and critical infrastructure in narrow coastal zones, its heavy dependence on tourism as a revenue source, and the limited human and institutional capacity. The impacts of climate change are already being felt throughout the country. Passage of two major hurricanes within a year (October, 2015 to October, 2016) through*

	The Bahamian archipelago, both with severe destruction, has grossly inhibited the ability of the Government and consumers to cope with the associated costs. Responding to Climate Change has increased the County's national debt and created high cost of living. *In its INDC submitted to the UNFCCC, The Bahamas committed to achieve a minimum of 30% renewables in the energy mix by 2030 and will allow for a 10% Residential Energy Self Generation Programme but has challenges in increasing the penetration of renewable energy (RE) systems.* *The addition of significant amounts of renewable energy will require upgrades to the electric grid, and a reliable electricity network with adequate distribution capacity is vital, with adequate network infrastructure and grid stability.*
Contribution to SDGs	*SDG 7 – Affordable and Clean Energy* *Incorporation of 30% of RE in the energy mix of the country* *SDG 11 – Sustainable Cities and Communities* *Increase reliable, uninterrupted, and sufficient energy production* *SDG 13 – Climate Action* *Promote cleaner technologies for energy generation*
Reference to knowledge products	*1. Feasibility Study of a Hybrid Solar and Wind Power System for an Island Community in The Bahamas* *www.ijrer.org/ijrer/index.php/ijrer/article/download/4006/pdf* *2. A Feasibility Study of Offshore Wind Farms in The Bahamas* *www.esru.strath.ac.uk/Documents/MSc_2015/Cassar.pdf·* *3. Caribbean Sustainable Energy Roadmap (C-SERMS), Phase 1 Summary and Recommendations for Policymakers* *www.worldwatch.org/system/files/nPhase 1 C-SERMS Summary for policy makers* *4. Islands: Lighthouses for Renewable Energy Deployment* *www.irena.org/EventDocs/Day1-Session2-SIDSLHI-GREIN.pdf* *5. The Bahamas National Energy Policy* *www.bahamas.gov.bs/.../energypolicy.pdf?MOD=AJPERES* *6. Bahamas INDC*