

# **Detailed Workplan Report**

## **Consultancy for Technical and Economic Feasibility of Solar Units and Water Storage on Public Building in Dominica**

**Contract # UNEP/2022/322 (Umoja #4700023842)**

**Prepared for:**  
**UN Climate Technology Centre & Network (CTCN)**



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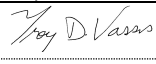

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Any questions concerning the information, or its interpretation should be directed to Nick St-Georges.

## Document Revision History

Rev No.	Rev Description	Author	Reviewer	Approver	Rev Date
A	Issued as a Draft	Nick St-Georges	Troy Vassos	Stuart Torr	Feb. 17, 2023
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## 1 INTRODUCTION

The Government of Dominica is focusing on developing its natural resources (specifically geothermal, wind and solar) through a series of actions and encourages partnerships with investors who are desirous of investing in these renewable energy areas. Energy is critical to the functioning and growth of any society. Access to affordable and reliable energy is necessary for all sectors of the economy; this includes health, education, food, tourism, manufacturing, water security, and communication services. As a result, the living standards, and the level of development and competitiveness of the country are all directly linked to its access to energy.

The United Nations Environment Programme (UNEP), represented by its Division of Science and having its office at Nairobi, Kenya has an operational arm; the Climate Technology Centre and Network (CTCN) of the United Nations Framework Convention on Climate Change (UNFCCC) Technology Mechanism. The CTCN is co-hosted by the United Nations Environment (UN Environment) in collaboration with the United Nations Industrial Development Organization (UNIDO) and supported by 11 partner institutions with expertise in climate technologies.

The CTCN have selected Integrated Sustainability to develop a technical and economic feasibility report focusing on solar units and water storage on public buildings in Dominica.

This Detailed Work Plan Report confirms the activities and associated methodologies, as well as the deliverables and project schedule for this assignment (as outlined in Appendix 1).

## 2 OBJECTIVES AND APPROACH

### 2.1 Objectives

The overall project objective is to increase climate resilience in Dominica and reduce greenhouse gas (GHG) emissions from fossil fuel dependence, by assessing the viability of installing solar units and water storage units in public buildings. This Technical Assistance (TA) will be implemented along the following expected outputs, as illustrated below:

1. Development of a detailed work plan and related communication documents;
2. Identify relevant stakeholders for the project involved in the management of public buildings;
3. Review of solar generation units and water capture/storage units for buildings already present in Dominica and similar SIDS;
4. Analysis of current electricity and water consumption patterns in public buildings, and selection of appropriate climate technical options;
5. Financial feasibility analysis and modelling scenarios of electricity generation and water capture/storage, costs, and savings;
6. Analysis of impacts on climate change mitigation goals in the energy sector, public buildings resilience, and other co-benefits of the project;
7. Revision and analysis of the current technical, policy and regulatory, organization capacity, and financial barriers; and
8. Capacity building and dissemination of results.

## 2.2 Approach

The overall approach to this 10-month assignment will be to integrate the input from the CTCN, as well as various local Dominican Stakeholders with that of our team from the onset of the project. Our team consists of local experts, both in Dominica and throughout the Caribbean, complimented by some international specialists in Canada. By keeping the team integrated, it is our intention to capture some of the best and brightest concepts for this project.

Our approach will include one Team Leader (TL), Mr. Troy Vassos, as well as a Project Manager (PM), Nick St-Georges, based out of Barbados, who will oversee the entire project. The TL/PM will be the focal point of contact between the CTCN's project team leader, as well as Stakeholders.

Throughout the course of the 10-month project, our team will work closely with Stakeholders to develop the eight (8) outputs discussed above. The result of these efforts is to produce a useful and forward-looking deliverables/reports on solar/water usage, accessibility and storage needs in Dominica.

## 3 CONSULTANCY SERVICES

### 3.1 Output #1 - Development of a Detailed Work Plan

#### 3.1.1 Attend a Project Kick-Off Meeting

The key to ensuring successful completion of projects like this is the proper start-up and a total agreement of the scope of work outlined to meet the project objectives. For this project, it was proposed that a virtual meeting with the TL/PM to meet with the CTCN project leader, Mr. Ramiro Salinas Revollo, to kick-off the project on December 15<sup>th</sup>, 2022 (see Appendix 2 for minutes of this meeting) to review the proposed scope of work, schedule, and lines of communication. For a project of this size, we proposed hosting teleconference progress meeting on an as-needed basis throughout the project to provide an update on any challenges that need to be discussed and addressed.

However, upon the conclusion of the project kick-off meeting, our team did not commence works until we received approval to proceed from the Honorable Minister responsible for Water Resource Management, plus approval from Cabinet. Integrated Sustainability was informed on February 6<sup>th</sup>, 2023, by Mr. Michael Savarin, that both the Minister and Cabinet approved the commencement of this project. As such, the data collection process commenced immediately as well as performing a gap analysis that may identify further information that is needed.

#### 3.1.2 Develop of a Detailed Work Plan

This Detailed Work Plan focuses on the methodology to prepare the various deliverables, and proposed schedule for implementing this project.

### 3.1.3 Monitoring and Evaluation Plan

Our team will work together with the CRCN to develop the monitoring and evaluation plan that follows the CTCN template.

**Output #1 Deliverable:** A Detailed Work Plan and Monitoring & Evaluation Plan

## 3.2 Output #2 – Identify Relevant Stakeholders for the Project Involved in the Management of Public Buildings

We will identify key stakeholders involved in the management of public buildings and relevance to the project like technology providers, installation services and maintenance companies. The list of key stakeholders will also include various government ministries (Permanent Secretaries and other appropriate heads of departments) such as, but not limited to:

- Ministry of Finance and Investment
- Ministry of Youth Development and Empowerment, Youth at Risk, Gender Affairs, Seniors' Security and Dominicans with Disabilities
- Ministry of Environment, Rural Modernization and Kalinago Upliftment (listed as focal point in RFP)
- Ministry of Public Works, and Digital Economy
- Ministry of Economic Affairs, Planning, Resilience and Sustainable Development
- Independent Regulatory Commission (IRC)
- Dominica Water and Sewerage Company Limited (DOWASCO)
- Climate Resilience Execution Agency of Dominica (CREAD)
- Dominica Electricity Services Limited (DOMLEC)

An initial meeting to introduce this project's scope of work to the Stakeholders will be scheduled during the onset of the project. We will use this meeting to also request assistance from the Stakeholders to identify the 10 buildings that will need to be assessed as part of Output #3.

We will analyze the involvement and influence of the national electricity provider (DOMLEC) and potentially also private sector stakeholders. The final groups of relevant stakeholders will be presented in a report in which each stakeholder will be linked to their sector of expertise, contact person, contact details and gender. Identify gaps and provide recommendations to overcome such gaps.

**Output #2 Deliverable:** A brief Stakeholder report, with classification by type and sector, and potential participation in a solar energy/water capture market.

## 3.3 Output #3 - Review of Solar and Water Capture/Storage Units for Public Buildings in Dominica

### 3.3.1 Field Investigation

This activity will involve a significant field programme where our team will visit a maximum of 10 public buildings (as identified by the CTCN) and collect data on both the water and solar potential for each building.

For solar units, our team will review information such as; location/type of generator units, capacity, size, working regime, working status (on duty, off-duty, damaged, etc.), efficiency, yield (compared to building's consumption), and maintenance needs. Other useful data that we will

consider collecting includes information on generator's year of installation, voltage, phase power, connection to national grid and maintenance requirements. We will analyze the units' endurance against climate events (preventive measures, protection systems, storage possibilities, etc.). We will also analyze the financing schemes/strategies (if any) that enable the installation of such generator units in Dominica. Indicate if these schemes were connected to international cooperation programs or governmental initiatives (national or regional). In all aspects of this project, we will endeavour to identify gender considerations in the solar units already present in Dominica.

In relation to water capture systems, our team will collect data related to the location of water capture/storage units, type of system, capacity, size, operation, maintenance needs, water usage, water treatment and water quality monitoring. We will also analyze potential health risks (water quality issues, and mosquito proliferation) of capture/storage units, and the units' endurance against climate events (preventive measures, protection systems, and storage possibilities). We will examine the financing schemes/strategies (if any) that enable the installation of such capture/storage units in Dominica and indicate if these schemes were connected to international cooperation programs or governmental initiatives (national or regional).

It is intended that both water and solar unit information gathering programmes will be run simultaneously in the field.

Upon completing the field data collection programme, we will prepare a summary of the available solutions, related to solar and water storage, in similar islands including: type of technology, capacity, operation, efficiency, connection to the grid (for the case of energy generation systems), maintenance, health risks and water quality monitoring (for water units). We will conduct a review of international case studies and lessons learned on implementation of small solar generation units and buildings water capture/storage in other similar islands, enabling factors such as regulatory framework, incentives, financing opportunities.

**Output #3 Deliverable:** No deliverable is associated with this output, although the information will be used to develop the subsequent reports.

### **3.4 Output #4 – Analysis of Current Electricity and Water Consumption Patterns in Public Buildings in Dominica**

#### **3.4.1 Further Data Collection**

Our team will collect further information by using online survey platforms and secondary information sources about public buildings such as: type of building (school, hospital, administrative building, etc.) location, electricity, and water consumption (if possible disaggregated by usage), and consumption patterns. Analyze building's potential to host solar power and water capture/storage solutions by assessing available roof or ground area, roof orientation, roof structure type and general condition, obstructions on roof or from nearby buildings, location and type of electrical services for solar equipment tie-in. Where possible, we will also engage and hold calls with the buildings' owners/managers to collect the necessary information that is available in the most promising facilities for using solar systems and water capture/storage units.

### 3.4.2 Data Analysis

Based on the collected data, we will identify the most suitable technological options for solar power generation and water capture/storage. This includes modular options for easy scalability. Once the technologies that seem the most suitable for public buildings in Dominica have been chosen, we will provide high-level design recommendations for the different components of the systems including:

- Analysis of the electricity grid and Independent Regulatory Commission (IRC) regulations to check compatibility of solar system components and allowable system sizes;
- Recommendations on the application of the best possible design practices for photovoltaic solar systems, following international regulations and best practice guidelines for designing and installing resilient solar PV systems that are less susceptible to catastrophic failure during extreme weather events;
- Design of recommendations to ensure that photovoltaic solar units and water capture/storage systems are designed to operate under typical climatological conditions of the island and during extreme weather events, such as: storms, strong winds and lightning;
- General specifications of a monitoring system to follow the operation of the solar units and water capture/storage systems and their possible novelties; and
- Include gender considerations in the technical solution.

**Output #4 Deliverable:** A report that describes the adequate technology solutions for solar units and water capture/storage systems including design recommendations.

### 3.5 Output #5 – Financial Feasibility Analysis of Electricity and Water Units

We will examine different scenarios for electricity and water supply and analyze the feasibility of these scenarios considering the buildings capacity of hosting solar generation and water storage units. The team will then examine the financial viability of the recommended technological solutions. The analysis will consider energy, water and cost savings, maintenance and repair costs, capital investment, and investment return. We will then analyze the financial viability in the case of revenues from selling electricity surplus to the grid.

Recommendations will be provided on financing options that could be implemented to foster the installation of solar generation and water capture units like national programs, and international donors.

**Output #5 Deliverable:** A report on the financial feasibility of the climate technology solutions, recommendation on good practices for the solar and water capture/storage systems implementation, financing schemes and business models.

### 3.6 Output #6 - Impact Analysis on how Climate Change Mitigation Goals in the Energy Sector will Effect Public Building Resilience, and Other Co-Benefits of the Project

We will prepare an estimate on the contribution of the project results to the national priorities set for the energy sector and mitigation goals in Dominica's Nationally Determined Contributions (NDC). This will include preparing estimations and conclusions of the impact of the stand-alone solar units and water capture/storage systems on mitigation and resilience objectives to climate

change, and other co-benefits. We will also estimate the benefits of having autonomous energy generation and water capture systems in terms of an economic impact.

**Output #6 Deliverable:** No deliverable will be delivered at the end of this phase in the project. Instead, the findings of Output #6 will be combined with Output #7 & 8 to produce a final report.

### 3.7 Output #7 – Revision and Analysis of the Current Technical, Policy and Regulatory, Organization Capacity, and Financial Barriers

We will analyze the current legal/regulatory, technological, and financial framework for solar generation and water capture systems in Dominica, identify barriers for the implementation of these systems and provide recommendations to overcome them. Analyze the specific framework and barriers for energy surplus sale to the grid and provide recommendations to manage these barriers. Often these barriers are related to inadequate, or non-existent policies and regulations. Efforts will be made to examine other regional policies related to the water storage and solar power sector and provide recommendations for Dominica.

**Output #7 Deliverable:** No deliverable will be delivered at the end of this phase in the project. Instead, the findings of Output #7 will be combined with Output 8 to produce a final report.

### 3.8 Output #8 – Capacity Building and Dissemination of Results

#### 3.8.1 Final Report

We will consolidate the information gathered from Output 6 and 7 into a draft report and issue this report for review to the CTCN and Stakeholders including the NDE. Once the draft report is out for review, we will organize a meeting to present the project results and gather final input from everyone to finalize the report. We will endeavour to include a balanced participation of women and men to this event, and ensure that gender and age, gender and ability, gender and ethnicity are also reflected in the composition. Special attention to engage the Kalinago community would also be considered.

#### 3.8.2 CTCN Project Reports

Our team will work with the CTCN to complete the Impact Statement as well as the Technical Assistance Closure and Data Collection Reports, following the CTCN templates.

**Combined Output #6, 7 & 8 Deliverable:** A final report on adaptive capacity of public buildings in case of extreme climate change events. The report will also discuss the findings of the existing legal, technical, and financial framework and barriers for incorporating standalone solar units and water capture/storage systems, including the case of energy surplus sale to the grid. This report will cover all the key findings of the project and include a list of all the meetings that were attended by various Stakeholders throughout the project disaggregated by gender.

We will also finalize the CTCN project reports following the CTCN templates.

## 4 PROJECT ASSUMPTIONS

The following assumptions were included in developing this report:

- All deliverables will be electronic. We will provide a Word copy including all tracked changes of previous comments/suggestions from Stakeholders, one "clean" Word copy

that removes all comments and tracked changes, plus one pdf final draft. No hardcopies will be delivered. Comments between submitting a draft report is expected to be 2-weeks. All comments are to be amalgamated into one document and submitted to the Consultant.

- If an on-site presentation occurs, the CTCN will be responsible for:
  - Assisting us in securing a suitable location for the session (we propose a boardroom within a hotel or the DOWASCO headquarters). The CTCN will also be responsible for any related payments required for the venue;
  - Assisting with the necessary invitations to Stakeholders/attendees;
  - Assisting us in arranging refreshments as appropriate (including paying for any refreshments ordered);
  - Assisting us in the provision of audio-visual equipment (projector, screen, speakers, flip charts, marker pens, sticky note pads, etc.)
- We assume that during the presentation, everyone in attendance will support by bringing in their own laptop computers or tablets and we will share an electronic copy of the PowerPoint presentation for everyone to add comments to and return to us after the presentation.
- Assume that the CTCN and government of Dominica will make available all relevant documents to project team and the data will be provided in a readily, machine-readable digital format, MS Excel or similar in the case of climate data. We will assume data will have been quality assured to an appropriate standard by the relevant agencies prior to being made available to the project team.
- No structural analysis, other than visual inspections, of existing building roofs or any other structure is required in this project.
- We assume the CTCN will identify a maximum of 10 public buildings that need to be assessed in this project.
- Assume that the CTCN and the Govt of Dominica will ensure that project team members have access to appropriate buildings and records of water and electricity consumption. We also assume that some building information including design as-built drawings will be available.
- The financial analysis will not be conducted at a building-by-building level, but rather at a higher project level, and look at the analysis holistically.

## 5 SCHEDULE

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The proposed detailed Gantt schedule is included within Appendix 1.

## 6 CLOSURE

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Integrated Sustainability would like to thank the CTCN for the opportunity to work on this project and for your support. We trust that this report meets your needs and expectations. If you have any questions, please contact the undersigned at any time.

Sincerely,



Nick St-Georges, P.Eng.,  
Project Manager, Integrated Sustainability

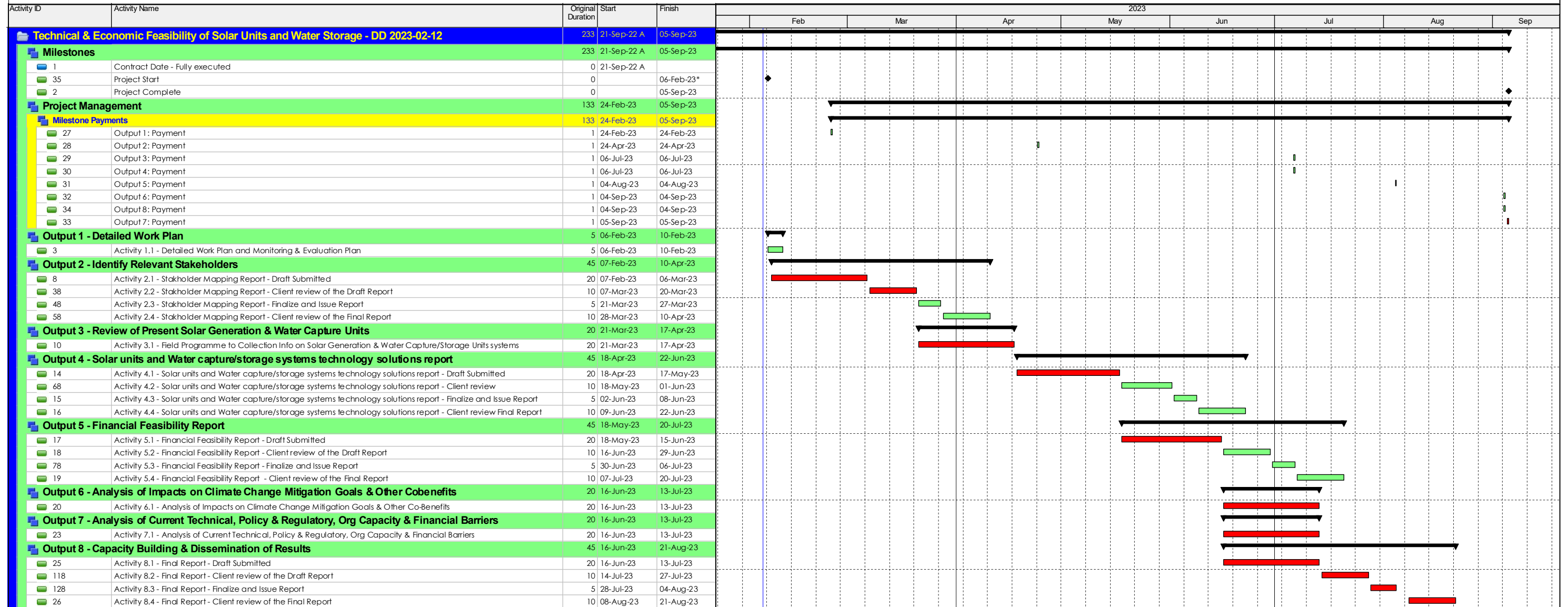


## Appendix 1 – Proposed Project Schedule

# Climate Resilience Dominicana

DD: 05-Feb-23

## Technical & Economic Feasibility of Solar Unit and Water Storage on Public Building in Dominicana



15-Feb-23  
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Date	Revision	Checked	Approved
24-Jun-20	Proposal Schedule 2020-06-24	JK	NSG



## Appendix 2 – Project Kick-Off Meeting Minutes

Meeting Agenda     Meeting Minutes

<b>Meeting Date &amp; Time</b>	Dec. 15, 2022	<b>Project #</b>	BP22-UNN-01-00
<b>Required Attendees:</b>	Ramiro Salinas (RS) – United Nations/CTCN Michael Savarin (MS) – Dominica Government Dr. Edgar Hunter (EH) – Dominica Government Nick St-Georges (NS) – Integrated Sustainability Troy Vassos (TV) – Integrated Sustainability Gregory Hinkson (GH) – ATOM Solutions Fidel Neverson (FN) - RMI Leisa Perch (LP) – SAEDI Consulting David Lee (DL) – Caribbean Ecosystems Mellissa Elwin (ME) – Sorell Consulting		
<b>cc:</b>			
<b>Meeting Called by:</b>	Ramiro Salinas	<b>Recorded by:</b>	Nick St-Georges
<b>Meeting Subject:</b>	Kick-Off Meeting		
<b>Meeting Objective:</b>	To discuss the project workplan, schedule and any questions		
<b>Meeting Location</b>	Teams Teleconference		

### Action Items

#	Action	Action Owner	Action Due	Status
1)	Waiting on MS & EH to indicate with the new Minister has approved the project to commence.	MS/EH	Late January	Incomplete
2)				

### Discussion Items

#	Topic	Presenter
1)	Ministry of Environment will be the point of contact for Dominica	MS
2)	Green Climate Fund project, related to the agriculture health and education, will tie into this project  This is part of a broader effort to make all public buildings energy efficient and climate-resilient. The request therefore is to have this project assess a range of building types that could then inform	MS

	that much bigger initiative which is of high strategic importance to the government of Dominica.	
3)	Need to take these packages out for tender	MS
4)	Suggest creating templates for different types of buildings (police, school, hospitals, etc.) that are only climate resilient buildings that meet new building code	MS
5)	Visual inspections may not be enough to get better cost estimates. Will consider 10 building or less building templates instead in order to gain further budget to do a more in-depth costing analysis	MS
6)	Invoicing to RS (CTCN), and cc EH: <a href="mailto:huntere@dominica.gov.dm">huntere@dominica.gov.dm</a>	RS
7)	Approval from Minister and cabinet will delay project to mid January	MS
8)	Water and solar does not need to be installed on roof tops	NS/DL

### Meeting Record Distribution List

<input checked="" type="checkbox"/> All Attendees	<input type="checkbox"/> Absent Invitees	<input type="checkbox"/> Project File	<input type="checkbox"/> Other:	
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