




**Validation report form for renewal of crediting period for  
CDM project activities  
(Version 03.0)**

*Complete this form in accordance with the instructions attached at the end of this form.*

**BASIC INFORMATION**

|   |  |
|---|--|
| <b>Title and UNFCCC reference number of the project activity</b>  | Los Cocos Wind Farm Project<br>UNFCCC #: 7093  |
| <b>Number and duration of the next crediting period</b>   | 2 <sup>nd</sup> crediting period<br>01/01/2020 – 31/12/2026  |
| <b>Version number of the validation report</b>  | 1  |
| <b>Completion date of the validation report</b>   | 27/07/2020   |
| <b>Version number of PDD to which this report applies</b>   | 11   |
| <b>Project participants</b>   | Empresa Generadora de Electricidad HAINA (EGE HAINA)   |
| <b>Host Party</b>   | Dominican Republic   |
| <b>Applied methodologies and standardized baselines</b>   | ACM0002 - Grid-connected electricity generation from renewable sources (version 20.0)  |
| <b>Mandatory sectoral scopes</b>  | 1 : Energy industries (renewable - / non-renewable sources)  |
| <b>Conditional sectoral scopes, if applicable</b>   | N/A  |
| <b>Estimated amount of annual average GHG emission reductions or GHG removals by sinks in the next crediting period</b> | 36,457 tCO <sub>2</sub> e  |
| <b>Name and UNFCCC reference number of the DOE</b>  | Earthood Services Private Limited<br>UNFCCC Ref. Number: E-0066  |
| <b>Name, position and signature of the approver of the validation report</b>  | <br>Dr. Kaviraj Singh<br>Managing Director |

## SECTION A. Executive summary

### Brief summary of the project activity

The project activity consists the installation and operation of a windfarm called Los Cocos, constituted by 14 wind turbines with 1.8 MW each totalizing 25.2 MW of installed capacity. The wind farm is located in Juancho and Los Cocos towns, in south-western province of Pandemales, in Dominican Republic. The geographical coordinates of the wind turbines are (UTM):

| Wind Turbine Number | UTM Easting | UTM Northing  |
|---------------------|-------------|---------------|
| 1                   | 256860.9170 | 1978577.2990  |
| 2                   | 257038.6900 | 1978333.5240  |
| 3                   | 257205.4960 | 1978102.1300  |
| 4                   | 257385.8500 | 1977 855.9820 |
| 5                   | 257560.3610 | 1977616.0410  |
| 6                   | 257712.1360 | 1977402.7040  |
| 7                   | 257889.7490 | 1977163.0230  |
| 8                   | 258053.3530 | 1976892.8760  |
| 9                   | 256494.2640 | 1977919.3100  |
| 10                  | 256663.9090 | 1977684.4360  |
| 11                  | 256837.7650 | 1977448.0220  |
| 12                  | 257007.8760 | 1977209.3240  |
| 13                  | 257180.0810 | 1976 976.0950 |
| 14                  | 257347.6600 | 1976747.0950  |

The wind power plant is connected to the Dominican National Interconnected System (SENI) by 138 kV Substation of Commercial Measurement System. This Substation also connects the wind farms Quilvio Cabrera and Los Cocos Wind Farm II. Therefore, the net electricity dispatched to the grid by the project activity is prorated based on individual measurement of each Wind Farm carried out by intermediate Substations. The measurement is dully detailed in the PDD section B.6.2 and assessed in this report, section D.4.

The project activity reduces the GHG emissions through dispatching GHG-free electricity to the Dominican National Interconnected System.

#### Technical description and equipment:

##### Turbines:

| Wind Farm           | WT Model | Quantity | Total Capacity        |
|---------------------|----------|----------|-----------------------|
| Los Cocos Wind Farm | V-90     | 14       | 14 x 1.8 MW = 25.2 MW |

The lifetime of the main equipment is 20 years as per evidence provided<sup>/16/</sup>.

The estimated ERs of the project activity is 36,457 tCO<sub>2</sub>e/y and 255,198 tCO<sub>2</sub>e for the entire crediting period.

### Scope of validation

Empresa Generadora de Electricidad HAINA (EGE HAINA) has contracted ESPL to conduct the validation of the renewal of the crediting period of the project activity "Los Cocos Wind Farm Project".

The scope of the validation is to establish that:

- the PA is in accordance with all relevant CDM rules and requirements;
- the PA is in accordance with conditions of the latest version of applied methodology ACM0002: Grid connected electricity generation from renewable sources --- Version 20.0;
- the validation of the renewal of crediting period is in accordance with requirements of CDM methodological tool "TOOL11 – Assessment of the validity of the original / current baseline and update of the baseline at the renewal of the crediting period" – version 03.0.1.

### Validation process

The validation process involved the following:

- Contract with EGE HAINA for the scope of validation of the renewal of the crediting period of the project activity;
- desk review;
- physical on-site inspection (not applied for this renewal process in accordance with VVS v.02.0 para 31. Instead, other auditing techniques were applied (alternative means) as detailed in section C.2);
- issuance of validation findings;
- reporting, calculation checks, QA/QC and resolution of findings;
- issuance of draft validation report;
- independent technical review of the project documentation;
- issuance of the final validation report;
- submission of the request for renewal, as appropriate.

## Conclusion

ESPL has performed the validation of the renewal of the crediting period of the CDM PA “Los Cocos Wind Farm Project” (UNFCCC Ref. Number: 7093) for the 2<sup>nd</sup> crediting period.

The validation team has confirmed that it is in accordance with all relevant CDM rules and requirements and conditions of the latest version of applied methodology ACM0002 – version 20.0. In addition, it was confirmed that the monitoring system is feasible and the estimated emission reductions are conservatively calculated.

The PA is expected to generate an annual average of 36,457 tCO<sub>2</sub>e in the second crediting period.

The request for renewal of the crediting period of the PA is being submitted in accordance with the CDM procedures.

## SECTION B. Validation team, technical reviewer and approver

### B.1. Validation team member

| No. | Role                  | Type of resource | Last name | First name | Affiliation<br>(e.g. name of central or other office of DOE or outsourced entity) | Involvement in       |                    |              |                     |
|-----|-----------------------|------------------|-----------|------------|---|----------------------|--------------------|--------------|---------------------|
|     |                       |                  |           |            |   | Desk/document review | On-site inspection | Interview(s) | Validation findings |
| 1.  | Team Leader           | OR               | Sebben    | Marcelo    | Verifit   | Y                    | N                  | Y            | Y                   |
| 2.  | Local Expert          | OR               | Lopes     | Ricardo    | Verifit   | Y                    | N                  | Y            | Y                   |
| 3.  | Methodological Expert | OR               | Sebben    | Marcelo    | Verifit   | Y                    | N                  | Y            | Y                   |
| 4.  | Technical Expert      | OR               | Sebben    | Marcelo    | Verifit   | Y                    | N                  | Y            | Y                   |

### B.2. Technical reviewer and approver of the validation report for RCP

| No. | Role               | Type of resource | Last name | First name | Affiliation<br>(e.g. name of central or other office of DOE or outsourced entity) |
|-----|--------------------|------------------|-----------|------------|---|
| 1.  | Technical reviewer | IR               | Garg      | Shreya     | Central Office  |
| 2.  | Technical Expert   | IR               | Garg      | Shreya     | Central Office  |
| 3.  | Approver           | IR               | Singh     | Kaviraj    | Central Office  |

**SECTION C. Means of validation****C.1. Desk/document review**

A desk review was conducted by the validation team that included:

- a. a review of the data and information presented to assess its completeness;
- b. a review of the registered project activity, the applied methodology including applicable tool(s) and, where applicable, the applied standardized baseline;
- c. a review of supporting documents.

A complete list of documents/evidences reviewed is included as Appendix 3.

**C.2. On-site inspection**

| Duration of on-site inspection: |                            |               |      |             |
|---------------------------------|----------------------------|---------------|------|-------------|
| No.                             | Activity performed on-site | Site location | Date | Team member |
| -                               | -                          | -             | -    | -           |

A site visit has not been performed for the validation of the renewal of the crediting period as it is not required, in accordance with CDM validation and verification standard for project activities – version 02.0 – paragraph 31, considering that the estimated annual average of ERs is below 100,000 tCO<sub>2</sub>e. Moreover, as this is the validation of renewal of the second crediting period, there is no pre-project information that is relevant to the requirements for registration of the project activity which may not be traceable after the registration.

In addition, the PPs have provided evidences to show the facilities and equipment (e.g. pictures, equipment manuals) and Project's consultant have been interviewed and operation personnel have provided all necessary information for a clear and precise understanding of the project activity.

The Validation team conducted the audit process using standard audit techniques as required by VVS for PA, version 02.0 para 29 and in accordance with para 31 of the same standard. These audit techniques have been considered sufficient and credible by the validation team for the purpose of the present validation.

**C.3. Interviews**

| No. | Interviewee |            |             | Date       | Subject   | Team member    |
|-----|-------------|------------|-------------|------------|---|----------------|
|     | Last name   | First name | Affiliation |            |   |                |
| 1.  | Correa      | Juliana    | MGM Innova  | 07/05/2020 | - General aspects<br>- CDM aspects<br>- EF calculation<br>- ER calculation<br>- Operation of wind farms | Marcelo Sebben |
| 2.  | Rosso       | Faydern    | EGE Haina   | 07/05/2020 | - Operation of wind farm  | Marcelo Sebben |

**C.4. Sampling approach**

Not applicable as no sampling has been used during the validation.

**C.5. Clarification requests (CLs), corrective action requests (CARs) and forward action requests (FARs) raised**

| Area of validation findings   | No. of CL | No. of CAR | No. of FAR |
|---|-----------|------------|------------|
| Compliance with PDD form  | CL 01     | -          | -          |
| Application and selection of methodologies and standardized baselines | -         | -          | -          |
| Validity of original baseline or its update                           | -         | -          | -          |
| Estimated emission reductions or net anthropogenic removals           | CL 02     | CAR 01     | -          |
| Validity of monitoring plan   | CL 03     | -          | -          |
| Crediting period  | -         | -          | -          |
| Project participants  | -         | -          | -          |
| Post-registration changes   | -         | -          | -          |
| Others (issues from previous validation/verification)                 | -         | -          | -          |
| <b>Total</b>  | <b>3</b>  | <b>1</b>   | <b>-</b>   |

## SECTION D. Validation findings

## D.1. Compliance with PDD form

|                            |   |
|----------------------------|---|
| <b>Means of validation</b> | The PDD was crosschecked with the CDM-PDD-FORM template available at the UNFCCC website and with the instructions for filling it out. Nevertheless, some issues have been found   |
| <b>Findings</b>            | CL 01<br><i>Appendix 7: as per instructions for completing the PDD, provide the history of all post-registration changes to the project activity that have been approved by the Board after its registration, its approval reference number and date of approval.</i> |
| <b>Conclusion</b>          | The latest version of the PDD template (CDM-PDD-FORM – version 11.0) available at the UNFCCC website has been used. The issues found were all addressed. It has been filled out in accordance with the instructions.  |

## D.2. Application and selection of methodologies and standardized baselines

|                            |   |  |
|----------------------------|---|--|
| <b>Means of validation</b> | The PA applies approved methodology ACM0002 - Grid-connected electricity generation from renewable sources --- Version 20.0, which is latest one available at UNFCCC website.   |  |
|                            | All applicability conditions of the applied methodology and applied tools are met:  |  |
|                            | <b>Applicability Criteria – ACM0002 – v. 20.0</b>   | <b>Assessment</b>  |
|                            | <p>a) Install a Greenfield power plant;</p> <p>b) Involve a capacity addition to (an) existing plant(s);</p> <p>c) Involve a retrofit of (an) existing operating plants/units;</p> <p>d) Involve a rehabilitation of (an) existing plant(s)/unit(s); or</p> <p>e) Involve a replacement of (an) existing plant(s)/unit(s).</p>  | The PA complies with the condition (a) as it was a greenfield power plant. It has been evidenced through prior verification process <sup>/06/</sup> , which was conducted and approved by EB and operational permit <sup>/16/</sup> which helps the validation team to conclude that the PA corresponds to a greenfield power plant. |
|                            | <p>The methodology is applicable under the following conditions:</p> <p>a) The project activity may include renewable energy power plant/unit of one of the following types: hydro power plant/unit with or without reservoir, <b>wind power plant/unit</b>, geothermal power plant/unit, solar power plant/unit, wave power plant/unit or tidal power plant/unit;</p> <p>b) In the case of capacity additions, retrofits, rehabilitations or replacements (except for wind, solar, wave or tidal power capacity addition projects) the existing plant/unit started commercial operation prior to the start of a minimum historical reference period of five years, used for the calculation of baseline emissions and defined in the baseline emission section, and no capacity expansion, retrofit, or rehabilitation of the plant/unit has been undertaken between the start of this minimum historical reference period and the implementation of the project activity.</p> | The PA complies with the condition (a) as it is composed by one wind power plant. It has been evidenced through operational permit <sup>/16/</sup> and pictures <sup>/15/</sup> .  |
|                            | In case of hydro power plants, one of the following conditions shall apply:   | Not applied for this PA as it corresponds to wind power plant. It has been evidenced   |

|  |  |   |
|--|--|---|
|  | <p>a) The project activity is implemented in existing single or multiple reservoirs, with no change in the volume of any of the reservoirs; or</p> <p>b) The project activity is implemented in existing single or multiple reservoirs, where the volume of the reservoir(s) is increased and the power density, calculated using equation (3), is greater than 4 W/m<sup>2</sup>; or</p> <p>c) The project activity results in new single or multiple reservoirs and the power density, calculated using equation (3), is greater than 4 W/m<sup>2</sup> ; or</p> <p>d) The project activity is an integrated hydro power project involving multiple reservoirs, where the power density for any of the reservoirs, calculated using equation (3), is lower than or equal to 4 W/m<sup>2</sup> ,</p>  | through operational permit <sup>/16/</sup> and pictures <sup>/15/</sup> .   |
|  | <p>In the case of integrated hydro power projects, project proponent shall</p> <p>a) Demonstrate that water flow from upstream power plants/units spill directly to the downstream reservoir and that collectively constitute to the generation capacity of the integrated hydro power project; or:</p> <p>b) Provide an analysis of the water balance covering the water fed to power units, with all possible combinations of reservoirs and without the construction of reservoirs. The purpose of water balance is to demonstrate the requirement of specific combination of reservoirs constructed under CDM project activity for the optimization of power output. This demonstration has to be carried out in the specific scenario of water availability in different seasons to optimize the water flow at the inlet of power units. Therefore, this water balance will take into account seasonal flows from river, tributaries (if any), and rainfall for minimum five years prior to implementation of CDM project activity.</p> | Not applicable, as the PA is not an integrated hydro power project. It has been evidenced through operational permit <sup>/16/</sup> and pictures <sup>/15/</sup> . |
|  | <p>The methodology is not applicable to:</p> <p>a) Project activities that involve switching from fossil fuels to renewable energy sources at the site of the project activity, since in this case the baseline may be the continued use of fossil fuels at the site;</p> <p>b) Biomass fired power plants/units.</p>  | Not applied for this PA as it corresponds to wind power plant. It has been evidenced through operational permit <sup>/16/</sup> and pictures <sup>/15/</sup> .      |
|  | In the case of retrofits, rehabilitations, replacements, or capacity additions, this   | The PA is not a project with capacity addition, retrofit,   |

methodology is only applicable if the most plausible baseline scenario, as a result of the identification of baseline scenario, is "the continuation of the current situation, that is to use the power generation equipment that was already in use prior to the implementation of the project activity and undertaking business as usual maintenance"

replacement or rehabilitation as evidenced by operational permit<sup>16/</sup>.

The applicability conditions of all tools are also met as follows

| Applicability Criteria – TOOL 01   | Assessment  |
|--|---|
| This tool provides for a step-wise approach to demonstrate and assess additionality. | The assessment of additionality is not required when renewing the Crediting period. Thus the applicable version of the additionality tool (TOOL01) remains as per valid version of PDD for the 1 <sup>st</sup> CP (TOOL01 version 06.0) |

| Applicability Criteria – TOOL 07   | Assessment  |
|--|---|
| This tool may be applied to estimate the OM, BM and/or CM when calculating baseline emissions for a project activity that substitutes grid electricity that is where a project activity supplies electricity to a grid or a project activity that results in savings of electricity that would have been provided by the grid (e.g. demand-side energy efficiency projects). | The project claims baseline emission by substituting the grid electricity by renewable electricity. Thus, this tool is applicable. As evidence, the validation team refers to operational permit <sup>16/</sup>   |
| Under this tool, the emission factor for the project electricity system can be calculated either for grid power plants only or, as an option, can include off-grid power plants.   | Only grid power plants were included. Therefore, this condition is met. All plants applied in the EF calculations were checked in the Dominican Republic Government website <sup>18/</sup> and it could be concluded that the calculation consisted only in grid-connected power plants |
| In case of CDM projects the tool is not applicable if the project electricity system is located partially or totally in an Annex I country   | The electricity system is not located partially or totally in the Annex I country.  |
| Under this tool, the value applied to the CO2 emission factor of biofuels is zero  | CO2 emission factor for biofuels are considered equal to zero. Therefore, this condition is met.  |

| Applicability Criteria – TOOL 11   | Assessment   |
|--|--|
| This tool provides a stepwise procedure to assess the continued validity of the baseline and to update the baseline at the renewal of a crediting period, as required by paragraph 49 (a) of the modalities and procedures of the clean development mechanism. | The tool is duly used for the renewal of Crediting period of this project activity. Therefore this condition is met. |

**Findings** N/A

|                   |   |
|-------------------|---|
| <b>Conclusion</b> | <p>All applicability conditions of the applied methodology and applied tools are met. The latest versions of applied tools have been used:</p> <ul style="list-style-type: none"> <li>a. TOOL01: Tool for the demonstration and assessment of additionality". (Version 6.0.0). Although this is not the latest available version of the tool, the additionality is not assessed during this renewal process and the applicable version of the additionality tool used in the PDD is version 06.0.0. Thus the version remains unaltered</li> <li>b. TOOL07: Tool to calculate the emission factor for an electricity system (version 7.0);</li> <li>c. TOOL11 – Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period – version 03.0.1.</li> </ul> <p>The methodology and tools are from UNFCCC CDM website.</p> |
|-------------------|---|

### D.3. Validity of original baseline or its update

|                            |  |
|----------------------------|--|
| <b>Means of validation</b> | <p>The baseline scenario is given by applied methodology ACM0002 – version 20.0: "the baseline scenario is electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in "TOOL07: Tool to calculate the emission factor for an electricity system" (version 7.0).</p> <p>In addition, in accordance with the directives for the renewal of the crediting period of a registered CDM project activity, the validity of the current baseline shall be reassessed using the latest version of the TOOL11 "Tool to assess the validity of the original/ current baseline and to update the baseline at the renewal of a crediting period" (version 03.0.1).</p> <p>The assessment of TOOL11 is made as follows:</p> <p><u>Step 1: Assess the validity of the current baseline for the next crediting period</u></p> <p><i>Step 1.1: Assess compliance of the current baseline with relevant mandatory national and/or sectoral policies:</i></p> <p>The current baseline scenario complies with all relevant mandatory national/sectoral legislation<sup>21/</sup>. The latest available version of the Electricity Law was issued in 2015, with no influence in the baseline (reference to electricity generated by solid waste and biomass). The compliance with all national legislation can be evidenced through current operational permit<sup>16/</sup>.</p> <p><i>Step 1.2: Assess the impact of circumstances:</i></p> <p>As the baseline scenario identified at the validation of the project activity was the continuation of the current practice without any investment the PP informed that there was no changes in the Market characteristics that affect the Project activity.</p> <p>The conditions used to determine the baseline emissions in the previous crediting period are still valid. It was not observed the availability of new fuels or raw materials in the power plants connected to the grid, neither significant variation of prices in the power generation. The PP provided the list of all applicable legislation<sup>21/</sup> and further information related to electricity market in Dominican Republic. Based on these information, it was observed that no changes occur since the registration of the PA that affect the baseline of the project activity.</p> <p><i>Step 1.3: Assess whether the continuation of use of current baseline equipment(s) or an investment is the most likely scenario for the crediting period for which renewal is requested:</i></p> <p>The baseline scenario is not the continuation of use of current baseline equipment. The PA consists in the installation of a greenfield wind power plant where no power plant was installed before. Thus, this step is not applied.</p> <p><i>Step 1.4: Assessment of the validity of the data and parameters:</i></p> <p>An assessment regarding the update of fixed parameters to the 2<sup>nd</sup> CP has been made. According to TOOL07, parameter EFgrid are to be updated for the 2<sup>nd</sup> crediting period. Therefore, the parameters that remained fixed for the 2<sup>nd</sup> CP (related to EFbm</p> |
|----------------------------|--|



calculation) were updated based on the latest information available (2019) in accordance with TOOL07.

The application of Steps 1.1, 1.2, 1.3 and 1.4 above confirmed that the current baseline remains valid for the subsequent crediting period and that fixed parameters were updated in accordance with applied methodology and tools.

Thus, the baseline emissions were updated for the 2<sup>nd</sup> crediting period and the Step 2 is assessed below:

Step 2: Update the current baseline and the data and parameters

*Step 2.1: Update the current baseline:*

Although the current baseline is valid, the baseline emissions were updated in accordance using the latest information available for Grid Emission Factor. The following parameters were kept fixed for the CP:

- **$NCV_{i,y}$**  (Net calorific value (energy content) of fossil fuel type  $i$  in year  $y$ ) this value was used for calculating the  $EF_{bm}$  and was based on most recent information from SENI Coordinating Organization (OC) reports which is a government agency (official values). Values are in accordance with requirements of TOOL07 (national values). Values applied for each plant are based on the official reports and can be checked at EF calculation spreadsheet, tab FUEL DATA. The correctness is duly observed in the evidences provided.
- **$EF_{CO_2,i,y}$  and  $EF_{CO_2,m,i,y}$**   $CO_2$  emission factor of fossil fuel type  $i$  used in power unit  $m$  in year  $y$ ): values were used for  $EF_{bm}$  calculations and were based on IPCC default values at the lower limit of the uncertainty at a 95% confidence interval. Values are in accordance with requirements of TOOL07. The values applied are the following:

| Fuel                            | Value | Unit                 |
|---------------------------------|-------|----------------------|
| Coal                            | 89.5  | tCO <sub>2</sub> /TJ |
| Natural Gas                     | 54.3  | tCO <sub>2</sub> /TJ |
| Fuel Oil Nr. 2                  | 72.6  | tCO <sub>2</sub> /TJ |
| Fuel Oil Nr. 6                  | 75.5  | tCO <sub>2</sub> /TJ |
| Fuel Oil Nr. 2 / Fuel Oil Nr. 6 | 73.8  | tCO <sub>2</sub> /TJ |

- **$EG_{m,y}$ ,  $EG_y$ , and  $EG_{n,h}$** ; (Net electricity generated by power plant/unit  $m$  or  $n$  (or in the project electricity system in case of  $EG_y$ ) in year  $y$  or hour  $h$ ): values were used for calculation of  $EF_{bm}$  and were based on Official publications from the Coordinating Organization (OC)<sup>18/</sup> (government agency) and are considered accurate and in accordance with requirements of TOOL07. Values are duly described in the  $EF_{BM}$  calculations spreadsheet for each plant. Refer to it for the individual values. Their correctness is duly observed in the evidences provided.
- **$FC_{i,m,y}$  and  $FC_{i,n,h}$** : (Amount of fossil fuel type  $i$  consumed by power unit  $m$  or  $n$  in year  $y$  or hour  $h$ ): values were used for calculation of  $EF_{bm}$  and were based on Official publications from the Coordinating Organization (OC)<sup>18/</sup> (government agency) and are considered accurate and in accordance with requirements of TOOL07. Values are duly described in the  $EF_{BM}$  calculations spreadsheet Please refer to it. Their correctness is duly observed in the evidences provided.

|                   |  |
|-------------------|--|
|                   | <p>- <b>EF<sub>BM</sub></b> (Build Margin CO<sub>2</sub> emission factor for grid connected power generation in year y) value calculated based on TOOL07 which applied the parameters cited above. The value is equal to <b>0.5106 tCO<sub>2</sub>/MWh</b> and will be kept fixed for the whole CP. The parameter was determined accurately and in accordance with TOOL07 requirements.</p> <p>The parameter EF<sub>CM</sub> will be calculated annually due to the annual calculation of parameter EF<sub>OM</sub>.</p> <p><i>Step 2.2: Update the data and parameters:</i></p> <p>All fixed parameters required by applied methodology and tools were updated in accordance with the new version of applied methodology and tools.</p> |
| <b>Findings</b>   | N/A  |
| <b>Conclusion</b> | <p>The baseline scenario remains valid for the new crediting period.</p> <p>The baseline scenario is the one given by the applied methodology ACM0002 – v. 20.0.</p> <p>The baseline emissions were updated taking into account the latest available data (2019) for calculating the EF<sub>grid</sub> provided by the Dominican DNA and the most recent data for estimating the parameter EG<sub>facility,y</sub> from updated wind study<sup>/14/</sup>.</p> <p>The presented values are reliable and obtained either by official sources and reputed technical experts. The calculations are in accordance with CDM rules and requirements.</p>   |

#### D.4. Estimated emission reductions or net anthropogenic removals

|                            |  |
|----------------------------|--|
| <b>Means of validation</b> | <p>All equations, formulas and assumptions were correctly applied as per the applied methodology (ACM0002) and tools.</p> <p>The baseline emissions are calculated by the multiplication of the electricity supplied by the project activity to the grid by the combined margin of CO<sub>2</sub> emission factor as follows:</p> $BE_y = EF_{grid,CM,y} \times EG_{PJ,y}$ <p>Where:</p> <p><b>BE<sub>y</sub></b> = Baseline emissions in the year y</p> <p><b>EF<sub>grid,CM,y</sub></b> = Combined Margin Emission factor of the grid in the year y</p> <p><b>EG<sub>PJ,y</sub></b> = Net electricity of the power plant delivered to grid in the year y (hourly value aggregated for each year)</p> <p>For the determination of parameter <b>EG<sub>PJ,y</sub></b> the following apply:</p> <p>The electricity meters (TR01, TR02, TR03 and TR04) that measure the Electricity that is dispatched to the grid also measure the electricity dispatched by two other power plants; Los Cocos Wind Farm II and Quilvio Cabrera Wind Farm. Thus, the parameter <b>EG<sub>PJ,y</sub></b> is calculated based on prorating the total electricity generated by each power plant which is measured by individual electricity meters at intermediary substations. The ratio is done as following:</p> $EG_{PJ,h} = EG_{SMC,h} \times K_{LC,h}$ <p>Where,</p> <p><b>EG<sub>SMC,h</sub></b> = Quantity of net electricity supplied to the grid at Commercial Measurement System (SMC) by Los Cocos Wind Farm, Los Cocos II Wind Farm and Quilvio Cabrera Wind Farm in hour <i>h</i> (MWh/h).</p> <p><b>K<sub>LC,h</sub></b> = Proportion of the electricity generated by Los Cocos Wind Farm in hour <i>h</i> (ad), taking into account transformation losses to be able to handle similar voltage levels (From 34.5 kV to 138 kV- network delivery point <b>EG<sub>SMC,h</sub></b>). Therefore, in order to determine the parameter K<sub>LC,h</sub> through the formula below, the parameters <b>EG<sub>(LCI)</sub>, L2+L3,h</b>, <b>EG<sub>(QC),L1,h</sub></b> and <b>EG<sub>(LCII), L5+L6+L8+L9,h</sub></b> have to apply the transformation losses mentioned below.</p> |
|----------------------------|--|

$$K_{LC,h} = \frac{(EG_{(LCI),L2+L3,h})}{(EG_{(QC),L1,h} + EG_{(LCI),L2+L3,h} + EG_{(LCII),L5+L6+L8+L9,h})}$$

$EG_{(LCI),L2+L3,h}$  = Quantity of net electricity generated by Los Cocos Wind Farm, measured by intermediary substation. Since the electricity measurement is calculated by means of measurements at 138kV ( $EG_{SMC,h}$ ) transformation losses at the delivery point for electricity generation 138/34.5 kV substation are taken into account, applying the following transformation losses equation to Los Cocos I generation data ( $EG_{(LCI),L2+L3,h}$ ).

$$E(h)_{138\text{ kV}}|LCI = E(h)_{34.5\text{ kV}}|LCI - [25.59 + 0.003988 \times E(h)_{34.5\text{ kV}}|LCI]$$

$EG_{(QC),L1,h}$  = Quantity of net electricity generated by Quilvio Cabrera Wind Farm measured at the 34.5 kV line, line L1 in hour  $h$  (MWh/h), . Since the electricity measurement is calculated by means of measurements at 138kV ( $EG_{SMC,h}$ ) transformation losses at the delivery point for electricity generation 138/34.5 kV substation are taken into account, applying the following transformation losses equation to Quilvio Cabrera generation data ( $EG_{(QC),L1,h}$ ).

$$E(h)_{138\text{ kV}}|QC = E(h)_{34.5\text{ kV}}|QC - [8.44 + 0.003988 \times E(h)_{34.5\text{ kV}}|QC]$$

$EG_{(LCII),L5+L6+L8+L9,h}$  = Quantity of net electricity generated by Los Cocos II Wind Farm measured at the 34.5 kV line, representing the generation sum of lines L5, L6, L8 and L9 in hour  $h$  (MWh/h), . Since the electricity measurement is calculated by means of measurements at 138kV ( $EG_{SMC,h}$ ) transformation losses at the delivery point for electricity generation 138/34.5 kV substation are taken into account, applying the following transformation losses equation to Los Cocos II generation data ( $EG_{(LCII),L5+L6+L8+L9,h}$ ).

$$E(h)_{138\text{ kV}}|LCII = E(h)_{34.5\text{ kV}}|LCII - [53.22 + 0.003988 \times E(h)_{34.5\text{ kV}}|LCII]$$

These equations that determine the transformation losses were already approved during the previous CP. It worth mentioning that the terms used in these equations correspond to no-losses and full load losses applicable to the transformers.

#### Calculation of Emission Factor:

The emission factor is calculated using "Tool to calculate the emission factor for an electricity system", which uses the following step by step approach to calculate emission factor of the grid for this project:

- STEP 1. Identify the relevant electricity systems: SENI which is the Dominican Republic electricity grid has been identified, in accordance with paragraph 17 of applied TOOL07, option 1.
- STEP 2. Choose whether to include off-grid power plants in the project electricity system (optional): only grid plants were considered as per paragraph 29 of TOOL07
- STEP 3. Select a method to determine the operating margin (OM). The PP has chosen option c) of paragraph 38 of TOOL 07 – Dispatch data analysis OM. This option was chosen as hourly data from each power plant on power generation and fuel type and fuel consumption will be available. For the estimated value during the renewal phase, the latest full year has been taken into account (2019). Nevertheless, during the monitoring, the factor will be determined for each hour which electricity is displaced by the project activity as required by TOOL07 paragraph 63. Therefore, the monitoring of this parameter will be ex-post, as per TOOL07 paragraph . The option chosen is in accordance with TOOL07 based on the available data during the monitoring period.
- STEP 4. Calculate the operating margin emission factor according to the selected method. The EFom was calculated as follows (para 64 of TOOL07):

$$EF_{grid,OM-DD,y} = \frac{\sum h EG_{PJ,h} * EF_{EL,DD,h}}{EG_{PJ,y}}$$

Where:

$EF_{grid,OM-DD,y}$  = Dispatch data analysis operating margin CO<sub>2</sub> emission factor in year  $y$  (tCO<sub>2</sub>/MWh)

$EG_{PJ,h}$  = Electricity displaced by the project activity in hour  $h$  of year  $y$  (MWh)

$EF_{EL,DD,h}$  = CO<sub>2</sub> emission factor for grid power units in the top of the dispatch order in hour  $h$  in year  $y$  (tCO<sub>2</sub>/MWh)

$EG_{PJ,y}$  = Total electricity displaced by the project activity in year  $y$  (MWh)

$h$  = Hours in year  $y$  in which the project activity is displacing grid electricity

$y$  = Year in which the project activity is displacing grid electricity

And for the calculation of  $EF_{EL,DD,h}$ , the following will be applied (Option A.1 of paragraph 49 of TOOL07):

$$EF_{EF,DD,h} = \frac{\sum_{i,n} FC_{i,n,h} \times NCV_{i,y} \times EF_{CO2,i,y}}{\sum_n EG_{n,h}}$$

Where:

$EF_{EL-DD,h}$  = CO<sub>2</sub> emission factor for grid power units in the top of the dispatch order in hour  $h$  in year  $y$  (tCO<sub>2</sub>/MWh)

$FC_{i,n,h}$  = Amount of fuel type  $i$  consumed by grid power unit  $n$  in hour  $h$  (Mass or volume unit)

$NCV_{i,y}$  = Net calorific value (energy content) of fuel type  $i$  in year  $y$  (GJ/mass or volume unit)

$EF_{CO2,i,y}$  = CO<sub>2</sub> emission factor of fuel type  $i$  in year  $y$  (t CO<sub>2</sub>/GJ)

$EG_{n,h}$  = Electricity generated and delivered to the grid by grid power unit  $n$  in hour  $h$  (MWh)

$n$  = Grid Power units in the top of the dispatch.  
At each hour,  $h$ , stack each grid power unit's electricity generation using the merit order. The group of grid power units  $n$  in the dispatch margin includes the units in the top  $x\%$  of total electricity dispatched by the hour  $h$ , where  $x\%$  is equal to the greater of either:  
(a) 10%; or  
(b) The quantity of electricity displaced by the project activity during hour  $h$  divided by the total electricity generation in the grid power plants during that hour  $h$ .

$i$  = Fuel types combusted in grid power unit  $n$  in year  $y$

$h$  = Hours in year  $y$  in which the project activity is displacing grid electricity

$y$  = Year in which the project activity is displacing electricity

As stated above, the dispatch data is consistent for the determination of the EFom as per TOOL07, as hourly data is available<sup>/18/</sup>. During this renewal phase, hourly data has been used for the whole year of 2019 as it was the latest year available. Nevertheless, the calculation will be carried out ex-post as per TOOL07 requirements. The options taken by the PP to determine the EFom and the  $EF_{EF-DD,h}$  are appropriate.

- STEP 5. Calculate the build margin emission factor.

The parameter  $EF_{BM}$  was calculated for the renewal process using the latest available data (2019) and will remain fixed for the crediting period (option 1 of paragraph 72 of TOOL07). The following formula was applied:

|                   |  |
|-------------------|--|
|                   | $EF_{grid,BM,y} = \frac{\sum_m EG_{m,y} \times EF_{EL,m,y}}{\sum_m EG_{m,y}}$ <p>Where</p> <p><math>EF_{grid,BM,y}</math> = Build margin CO<sub>2</sub> emission factor in year y (tCO<sub>2</sub>/MWh)</p> <p><math>EG_{m,y}</math> = Net quantity of electricity generated and delivered to the grid by power unit m in year y (MWh)</p> <p><math>EF_{EL,m,y}</math> = CO<sub>2</sub> emission factor of power unit m in year y (tCO<sub>2</sub>/MWh)</p> <p><math>m</math> = Power units included in the build margin</p> <p><math>y</math> = Most recent historical year for which power generation data is available.</p> <p>The <math>EF_{BM}</math> has been calculated in accordance with TOOL 07 paragraph 75: the Stepwise approach can be duly checked at calculation spreadsheet tab BM. The data presented regarding the start date of each plant and the yearly generation (2019) were duly checked in the evidences provided<sup>18/</sup> and are considered correct and accurate by the Validation team. The <math>EF_{BM}</math> calculation was carried out in accordance with TOOL07.</p> <ul style="list-style-type: none"> <li>STEP 6. Calculate the combined margin (CM) emissions factor.</li> </ul> <p>The Combined margin emission factor of the grid (<math>EF_{grid,CM,y}</math>) was calculated as follows (using weighted average approach):</p> $EF_{grid,CM,y} = EF_{OM} \times w_{OM} + EF_{BM} \times w_{BM}$ <p>The values of <math>w_{om}</math> and <math>w_{bm}</math> are determined by the TOOL07 for the 2<sup>nd</sup> crediting period and are equal to 0.75 and 0.25 respectively as per paragraph 86 of TOOL07, considering this project refers to a wind power plant. Therefore, the data is consistent with TOOL requirements..</p> <p>As the plants connected to the SMC substation are not clear in the PDD, a CL has been raised. Moreover, issues were found in the EF calculations. Refer to CAR 1</p> |
| <b>Findings</b>   | <p>CL 02</p> <p><i>As per diagram presented in section B.3, the power plant Larimar also dispatch its electricity through the four meters from SMC (TR1 to TR4). However it is explained in the same section that these meters only measure the power plants Los Cocos I, Los Cocos II and Quilvio Cabrera. It is not clear, though, how the four meters mentioned above, do not consider the electricity generated by Larimar.</i></p> <p>CAR 01</p> <p><i>EF calculation spreadsheet</i></p> <ol style="list-style-type: none"> <li><i>1. Tab dispatch analysis column K: as per TOOL07, para 69 "At each hour h, stack each grid power unit's electricity generation using the merit order". However in the calculations, the merit order has been applied from the latest to the first power unit dispatched, which is not in accordance with TOOL requirements</i></li> <li><i>2. When carrying out the determination of the % of plants that are in the top of the dispatch, not electricity from all grid power units are being taken into account, unlike required by TOOL07 para 69.</i></li> </ol>   |
| <b>Conclusion</b> | <p>The methodology and tools were correctly applied in order to calculate the estimates of emission reductions, with reliable and conservative parameters.</p> <p>For this period, the parameter <math>EF_{OM}</math> will be determined ex-post and the parameter <math>EF_{BM}</math> will be determined ex-ante as required by TOOL07.</p> <p>Considering that the plant consist in a wind power plant, the project emissions were not taken into account.</p> <p>The <math>EF_{OM}</math> and the <math>EF_{BM}</math> were determined based on the latest available data (2019) provided by the Dominican DNA for the ex-ante calculations.</p> <p>The parameters used to calculate the emission reductions are conservative, traceable and from official, public or reliable sources.</p> <p>All findings were duly closed and explanations were considered sufficient for detailing the monitoring of parameter EGfacility.</p> <p>The parameters are in accordance with applied methodology and tools.</p>   |

## D.5. Validity of monitoring plan

|                     |   |
|---------------------|---|
| Means of validation | <p>The PDD sets a monitoring plan, which is feasible and in accordance with the applied methodology and tools.</p> <p>The management structure and roles and responsibilities are established for data collection, calibration frequency of meters, data report and data archiving. Moreover, there are procedures set for crosschecking the monitored data. No sampling plan is set to monitor the parameter.</p> <p>The management structure and roles and responsibilities are set for data collection, calibration frequency of monitoring equipment, data report and data archiving. In addition, procedures for quality assurance and quality control are be set, as well as specific training for involved personnel.</p> <p>The parameters fixed are listed in section above and the ones to be monitored necessary for the project activity are listed at the PDD section B.7.1, in accordance with the applied methodology and tools.</p> <p>However the source value of parameter <math>EG_{PJ,y}</math> applied in the estimated ER calculations is not clear, thus a CL has been raised.</p>   |
| Findings            | <p>CL 03</p> <p><i>It is not clear the source of the value applied at the estimated ERs calculations for the parameter <math>EG_{PJ,y}</math>.</i></p>  |
| Conclusion          | <p>The parameters required for monitoring are contained in the monitoring plan:</p> <ul style="list-style-type: none"> <li>- <b><math>EG_{PJ,h}</math></b>: Quantity of net electricity generation supplied by the project plant/unit to the grid in hour <math>h</math>. The value applied for the baseline estimations is equal to 6.58 MWh/h which was obtained from most recent wind study carried out by reputed consultancy company<sup>/14/</sup>.</li> <li>- <b><math>EG_{PJ,y}</math></b>: Quantity of net electricity generation supplied by the project plant/unit to the grid in year <math>y</math>. The value applied for the baseline estimations is equal to 57,600 MWh/year which is the hourly value multiplied by 8,760 hours/year.</li> <li>- <b><math>EG_{SMC,h}</math></b>: Quantity of net electricity supplied to the grid at Commercial Measurement System (SMC) point at the 138/34.5kV substation by Los Cocos, Los Cocos II and Quilvio Cabrera Wind Farms in hour <math>h</math>. The parameter was not used for ex-ante calculations but will be used during crediting period for determining the parametaer <b><math>EG_{PJ,h}</math></b></li> <li>- <b><math>K_{LC,h}</math></b>: Proportion of the electricity generated by Los Cocos Wind Farm at each hour <math>h</math>. The parameter was not used for ex-ante calculations but will be used during crediting period for determining the parametaer <b><math>EG_{PJ,h}</math></b></li> <li>- <b><math>EG_{(LCI),L2+L3,h}</math></b>: Total quantity of net electricity generated by Los Cocos Wind Farm measured at the 34.5 kV line, representing the generation sum of L2 and L3. The parameter was not used for ex-ante calculations but will be used during crediting period for determining the parametaer <b><math>EG_{PJ,h}</math></b></li> <li>- <b><math>EG_{(QC),L1,h}</math></b>: Quantity of net electricity generated by Quilvio Cabrera Wind Farm measured at the 34.5 kV line, line L1. The parameter was not used for ex-ante calculations but will be used during crediting period for determining the parametaer <b><math>EG_{PJ,h}</math></b></li> <li>- <b><math>EG_{(LCII),L5+L6+L8+L9,h}</math></b>: Total quantity of net electricity generated by Los Cocos II Wind Farm measured at the 34.5 kV line, adding generation of lines L5 – L6 – L8 and L9. The parameter was not used for ex-ante calculations but will be used during crediting period for determining the parametaer <b><math>EG_{PJ,h}</math></b></li> <li>- <b><math>NCV_{i,y}</math></b>: Net calorific value (energy content) of fossil fuel type <math>i</math> in year <math>y</math>: the parameters are based on national values or IPCC default values.</li> <li>- <b><math>EF_{CO2,i,y}</math> and <math>EF_{CO2,m,i,y}</math></b>: CO<sub>2</sub> emission factor of fossil fuel type <math>i</math> used in power unit <math>m</math> in year <math>y</math>: IPCC default values at the lower limit of the uncertainty at a 95% confidence interval will be applied as national values are not available</li> <li>- <b><math>EG_{m,y}</math>, <math>EG_y</math>, and <math>EG_{n,h}</math></b>: Net electricity generated by power plant/unit <math>m</math> or <math>n</math> (or in the project electricity system in case of <math>EG_y</math>) in year <math>y</math> or hour <math>h</math>. values of parameter based on data provided by the official public sources.</li> <li>- <b><math>FC_{i,m,y}</math> and <math>FC_{i,n,h}</math></b>: Amount of fossil fuel type <math>i</math> consumed by power unit <math>m</math> or <math>n</math> in year <math>y</math> or hour <math>h</math>. values of parameter based on data provided by the official public sources.</li> </ul> |

|  |  |
|--|--|
|  | <p>- <b><math>EF_{CM,y}</math></b>: Combined margin CO<sub>2</sub> emission factor for grid connected power generation in year y calculated using version 7.0 of the “<i>Tool to calculate the emission factor for an electricity system</i>”. – the value applied for the estimations is equal to 0.632932 tCO<sub>2</sub>/MWh and are based on calculations using the latest data available provided by official data from Dominican Republic. This value will be monitored ex-post.</p> <p>The monitoring plan of the PA is in accordance with the approved monitoring methodology and the means of monitoring of the parameters contained in the monitoring plan are feasible.</p> |
|--|--|

#### D.6. Crediting period

|                            |   |
|----------------------------|---|
| <b>Means of validation</b> | The crediting period is 7 years renewable. This is the 2 <sup>nd</sup> crediting period and its start date is 01/01/2020, which is the first date after the end of the 1 <sup>st</sup> crediting period and it ends on 31/12/2026.  |
| <b>Findings</b>            | -   |
| <b>Conclusion</b>          | The 2 <sup>nd</sup> crediting period is from 01/01/2020 to 31/12/2026 – the request for renewal of the crediting period is being done in accordance provisions of PCP paragraph 278 “...Such a submission shall be made no earlier than 270 days prior to, but no later than one year after, the expiry of the crediting period.”, Therefore, the project activity is in accordance with CDM requirements and procedures. |

#### D.7. Project participants

|                            |  |
|----------------------------|--|
| <b>Means of validation</b> | The project participants are:<br><br>Empresa Generadora de Electricidad HAINA (EGE HAINA) (private and public entity) <sup>1</sup>   |
| <b>Findings</b>            | N/A  |
| <b>Conclusion</b>          | The name of the project participant included in the updated PDD were assessed in accordance with the applicable validation requirements related to the renewal of crediting period.<br>All information is in accordance with UNFCCC website. |

#### D.8. Post-registration changes

| Type of post-registration changes (PRCs)   | Confirmation (Y/N) | Validation report for PRCs |                 |
|--|--------------------|----------------------------|-----------------|
|  |                    | Version                    | Completion date |
| Temporary deviations from the registered monitoring plan, applied methodologies, standardized baselines or other methodological regulatory documents <sup>2</sup>                              | N                  |                            |                 |
| Corrections  | N                  |                            |                 |
| Change to the start date of the crediting period   | N                  |                            |                 |
| Inclusion of a monitoring plan   | N                  |                            |                 |
| Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other methodological regulatory documents | N                  |                            |                 |
| Changes to the project design  | N                  |                            |                 |
| Changes specific to afforestation and reforestation project activities   | N                  |                            |                 |

### SECTION E. Internal quality control

The draft validation report that is prepared by validation team is reviewed by an independent technical review team (one or more members) to confirm if the internal procedures established and implemented by ESPL were

<sup>1</sup> The company is partially public and partially private entity

<sup>2</sup> Other standards, methodologies, methodological tools and guidelines (to be) applied in accordance with the applied(selected) methodologies are collectively referred to as the other (applied) methodological regulatory documents).

duly complied with and such opinion/conclusion is reached in an objective manner that complies with the applicable CDM rules/requirements.

The technical review team is collectively required to possess the technical expertise of all the technical area/sectoral scope to which the project activity is related. All members of technical review team are independent of the validation team.

During the technical review process, additional findings may be identified or the closed-out findings may be opened, which needs to be satisfactorily resolved before the request for the renewal of the crediting period is submitted to UNFCCC. The independent technical reviewer may either approve the report as such or reject/return the same, in such case, providing the comments/findings/issues that needs to be resolved by the validation team. The decision taken by the technical reviewer is final and is authorized on behalf of ESPL.

## **SECTION F. Validation opinion**

ESPL, contracted by Empresa Generadora de Electricidad HAINA (EGE HAINA), has performed the independent validation of the renewal of crediting period of the project “Los Cocos Wind Farm Project”, with UNFCCC Ref. Number: 7093.

ESPL commenced the validation based on the baseline and monitoring methodology ACM0002 – version 20.0, the registered PDD (from previous crediting period) and draft PDD (for the 2<sup>nd</sup> crediting period).

ESPL's validation approach is based on the understanding of the risks associated with reporting the project activity, estimates of GHG emission data and the controls to be implemented to mitigate these. ESPL planned and performed the validation by obtaining evidence, other information and explanations that ESPL considered necessary to give reasonable assurance that the estimated GHG emission reductions are fairly to be achieved.

The validation team confirms, based on final version of revised PDD for the 2<sup>nd</sup> crediting period, that:

- the original baseline is still valid as it is given by the applied methodology;
- the project additionality is valid for the renewal of the crediting period. No regulatory surplus has been identified. The project is in accordance with all applicable regulations and legislations;
- the project description is in accordance with the characteristics identified on site;
- the monitoring plan is adequate to the project activity and it is in accordance with the applied methodology;
- at this 2<sup>nd</sup> crediting period, the project activity is likely to achieve the estimated of 36,457 tCO<sub>2</sub>e per year.



## Appendix 1. Abbreviations

| Abbreviations      | Full texts  |
|--------------------|---|
| ACM                | Approved Consolidated Methodology                     |
| BE                 | Baseline Emission                                     |
| BM                 | Build Margin  |
| CAR                | Corrective Action Request                             |
| CDM                | Clean Development Mechanism                           |
| CL                 | Clarification Request                                 |
| CM                 | Combined Margin                                       |
| CO <sub>2</sub>    | Carbon dioxide  |
| CO <sub>2</sub> e  | Carbon dioxide equivalent                             |
| CP                 | Crediting Period                                      |
| DNA                | Designated National Authority                         |
| DOE                | Designated Operational Entity                         |
| EB                 | Executive Board                                       |
| EIA                | Environmental Impact Assessment                       |
| ESPL               | Earthood Services Private Limited                     |
| FAR                | Forward Action Request                                |
| GHG                | Green House Gas                                       |
| GSC/GSP            | Global Stakeholder Consultation Process               |
| IPCC               | Intergovernmental Panel on Climate Change             |
| KP                 | Kyoto Protocol  |
| kW                 | kilo Watt   |
| kWh                | kilo Watt hour  |
| LoA                | Letter of Approval/Authorization                      |
| MoC                | Modalities of Communication                           |
| MP                 | Monitoring Plan                                       |
| MW                 | Mega Watt   |
| MWh                | Mega Watt hour  |
| OM                 | Operating Margin                                      |
| PA                 | Project Activity                                      |
| PCP                | Project Cycle Procedure                               |
| PDD                | Project Design Document                               |
| PE                 | Project Emission                                      |
| PLF                | Plant Load Factor                                     |
| PP                 | Project Participant                                   |
| PS                 | Project Standard                                      |
| tCO <sub>2</sub> e | Tonnes of Carbon dioxide equivalent                   |
| UNFCCC             | United Nations Framework Convention on Climate Change |
| VT                 | Validation Team                                       |
| VVS                | Validation and Verification Standard                  |

## Appendix 2. Competence of team members and technical reviewers

| Competence Statement      |   |             |            |
|---------------------------|---|-------------|------------|
| <b>Name</b>               | Marcelo Sebben  |             |            |
| <b>Country</b>            | Brazil  |             |            |
| <b>Education</b>          | M.Sc. (Sustainable Energy System)<br>B. Eng. (Chemical Engineering)   |             |            |
| <b>Experience</b>         | +12.5 Years   |             |            |
| <b>Field</b>              | Chemical process industry, CDM, Energy, Climate Change  |             |            |
| Approved Roles            |   |             |            |
| <b>Team Leader</b>        | Yes   |             |            |
| <b>Validator</b>          | Yes   |             |            |
| <b>Verifier</b>           | Yes   |             |            |
| <b>Methodology Expert</b> | Yes (ACM0001, ACM0002, ACM0006, AM0065, AMS ID, AMS-I.E, AMS-I.C, AM0026, AMS-I.A, AMS-I.F, AMS-III.H, AMS-III.I. GS: Ecologically Sound Fuel Switch to Biomass with Reduced Energy Requirement, GS: Technologies and Practices to Displace Decentralized Thermal Energy Consumption) |             |            |
| <b>Local expert</b>       | Brazil, Chile, Honduras, Colombia   |             |            |
| <b>Financial Expert</b>   | Yes   |             |            |
| <b>Technical Reviewer</b> | No  |             |            |
| <b>TA Expert</b>          | Yes (TA 1.1, 1.2, 4.1, 5.1, 9.1, 13.1)  |             |            |
| <b>Reviewed by</b>        | Shreya Garg   | <b>Date</b> | 05/03/2020 |
| <b>Approved by</b>        | Anshika Gupta   | <b>Date</b> | 05/03/2020 |

| Competence Statement      |   |             |            |
|---------------------------|---|-------------|------------|
| <b>Name</b>               | Ricardo Lopes   |             |            |
| <b>Country</b>            | Brazil  |             |            |
| <b>Education</b>          | Technical Diploma in Data Processing  |             |            |
| <b>Experience</b>         | 12 years  |             |            |
| <b>Field</b>              | CDM, Energy, Environment  |             |            |
| Approved Roles            |   |             |            |
| <b>Team Leader</b>        | Yes   |             |            |
| <b>Validator</b>          | Yes   |             |            |
| <b>Verifier</b>           | Yes   |             |            |
| <b>Methodology Expert</b> | Yes (ACM0001, ACM0002, AM0026, AMS ID, AMS III.H, AMS III.F)  |             |            |
| <b>Local expert</b>       | Brazil, Argentina, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, Honduras, Mexico, Nicaragua, Uruguay |             |            |
| <b>Financial Expert</b>   | Yes   |             |            |
| <b>Technical Reviewer</b> | No  |             |            |
| <b>TA Expert</b>          | Yes (1.2, 13.1)   |             |            |
| <b>Reviewed by</b>        | Shreya Garg   | <b>Date</b> | 04/06/2019 |
| <b>Approved by</b>        | Anshika Gupta   | <b>Date</b> | 04/06/2019 |

| Competence Statement |  |  |  |
|----------------------|--|--|--|
|----------------------|--|--|--|

|                           |  |             |            |
|---------------------------|--|-------------|------------|
| <b>Name</b>               | Shreya Garg  |             |            |
| <b>Country</b>            | India  |             |            |
| <b>Education</b>          | M.Sc. (Climate Science & Policy), TERI University  |             |            |
| <b>Experience</b>         | 6 Years +  |             |            |
| <b>Field</b>              | Climate Change   |             |            |
| <b>Approved Roles</b>     |  |             |            |
| <b>Team Leader</b>        | YES  |             |            |
| <b>Validator</b>          | YES  |             |            |
| <b>Verifier</b>           | YES  |             |            |
| <b>Methodology Expert</b> | AMS.I.A., AMS.I.C., AMS.I.D., AMS.I.F., AMS.II.D., AMS.II.G., AMS.II.J., AMS.III.AV., ACM0002, ACM0012 |             |            |
| <b>Local expert</b>       | YES (India)  |             |            |
| <b>Financial Expert</b>   | NO   |             |            |
| <b>Technical Reviewer</b> | YES  |             |            |
| <b>TA Expert</b>          | YES (TA 1.2, TA 3.1)   |             |            |
|                           |  |             |            |
| <b>Reviewed by</b>        | Abhishek Mahawar   | <b>Date</b> | 01/03/2018 |
| <b>Approved by</b>        | Ashok Gautam   | <b>Date</b> | 01/03/2018 |

### Appendix 3. Documents reviewed or referenced

| No. | Author | Title   | References to the document                                       | Provider |
|-----|--------|---|--|----------|
| 1.  | UNFCCC | Standard: CDM PS for PA   | version 02.0   | Other    |
| 2.  | UNFCCC | Standard: CDM PCP for PA  | version 02.0   | Other    |
| 3.  | UNFCCC | Standard: CDM VVS for PA  | version 02.0   | Other    |
| 4.  | UNFCCC | Form: CDM-PDD-FORM  | version 11   | Other    |
| 5.  | UNFCCC | Registered Project design document (latest valid version)   | version 8 – 28/02/2019   | PP       |
| 6.  | UNFCCC | Latest verification report – issued by ICONTEC (1 <sup>st</sup> MP of 1 <sup>st</sup> CP)   | Version 02.0 – 17/04/2019  |          |
| 7.  | PP     | Project design document (draft)   | version 9 – 03/03/2020   | PP       |
| 8.  | PP     | Project design document (revised/final)   | version 10: 01/06/2020 (final)<br>version 11: 24/07/2020 (final) | PP       |
| 9.  | PP     | ER and EF Spreadsheet (draft)   | version 1  | PP       |
| 10. | PP     | ER and EF calculation Spreadsheet (revised/final)   | version 2 (final)  | PP       |
| 11. | UNFCCC | <u>Methodology</u> : ACM0002: Grid-connected electricity generation from renewable sources  | version 20.0   | Other    |
| 12. | UNFCCC | <b><u>Methodological tools:</u></b><br>1. “TOOL01: Tool for the demonstration and assessment of additionality” (tool applicable in the validation phase as additionality is not being assessed during this renewal process).<br>2. TOOL07 – Tool to calculate the emission factor for an electricity system<br>3. TOOL 11 – Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period | version 06.0.0<br><br>version 07.0<br><br>version 03.0.1         | Other    |
| 13. | DNV    | <u>Project Lifetime:</u><br><br>DNV Statement of Compliance of Vestas V90-1.8 MW VCUS. Date 06/07/2009. <i>Annex 1.2 - Statement of Compliance.pdf</i>  |  | PP       |
| 14. | PP     | <u>Estimated EG<sub>facility,y</sub></u><br><br>GL Garrad Hassan Technical Note – Doc # 236128-MXQU-T-01 (page 6) stating Net energy output   | 22/03/2013   |          |
| 15. | PP     | <u>Technical description:</u><br><br>1. Technical information on the Wind turbines: Turnkey Supply,   | 23/03/2010   | PP       |

|     |   |  |   |        |
|-----|---|--|---|--------|
|     |   | Construction and Installation Agreement between Empresa Generadora de Electricidad Haina S.A. and Urbaenergía, S.L. y Energía y Recursos Ambientales Internacional, S.L. Unión Temporal de Empresas Ley 18/1982 (abreviadamente UTE Los Cocos) - Punto 2. A1 Annex 1.1.0 - General Specification Los Cocos I<br><br>Pictures of plant<br>1. Pictures wind turbines |   |        |
| 16. | Ministry of Environment and Natural Resources | <u>Operational licensing</u><br><br>Operational Permit # 1340-11 dated on 18/01/2017 valid for 5 years   | Expiring date:<br>17/01/2022  | PP     |
| 17. | National Law Dominican Republic               | <u>Calibration procedures</u><br><br>To be carried out in accordance with Regulation for the application of the General Electricity Law 125-01 (Law 125 – 01 of 2001 modified on 2007 – Law 186-07 General electricity Law) – every 2 years  |   | Others |
| 18. | EF  | <u>EFgrid calculations</u><br><br>Data provided by the Dominican Government regarding EFgrid calculations<br>- Parameter $NCV_{i,y}$<br><br>- $EF_{CO2,i,y}$ and $EF_{CO2,m,i,y}$<br><br><br>- $EG_{m,y}$ , $EG_y$ , and $EG_n$ ,<br><br>- $FC_{i,m,y}$ and $FC_{i,n,h}$   | <a href="http://www.oc.org.do/">http://www.oc.org.do/</a><br><br>IPCC Guidelines for National Greenhouse Gas Inventories, Reference Manual, Volume 2 (2006), chapter 1. Table 1.4. IPCC default values at the lower limit of the uncertainty at a 95% confidence interval<br><br><a href="http://www.oc.org.do/">http://www.oc.org.do/</a><br><br><a href="http://www.oc.org.do/">http://www.oc.org.do/</a> | PP     |
| 19. | PP  | <u>Installed capacity evidences</u><br><br>1. Technical information on the Wind turbines: Turnkey Supply, Construction and Installation Agreement between Empresa Generadora de Electricidad Haina S.A. and Urbaenergía, S.L. y Energía y Recursos Ambientales Internacional, S.L. Unión Temporal de Empresas Ley 18/1982 (abreviadamente UTE Los Cocos) -         | 23/03/2010  | PP     |

|     |   |   |  |       |
|-----|---|---|--|-------|
|     |   | Punto 2. A1 Annex 1.1.0 - Punto 2. A0 EPC Agreement Los Cocos I   |  |       |
| 20. | Power Climber Wind  | <b><u>Trainings and Duties of Personnel:</u></b><br>1. Operator: Faydern Alberto Rosso Castillo - SD2 Model TSL Maintenance Course  | 12/11/2015   | PP    |
| 21. | National Law Dominican Republic   | <ul style="list-style-type: none"> <li>- Law 57-07 of 2007 – about Renewable energies and its incentives.</li> <li>- New Law 115-15 about modification to Law 57-07. (Articles 10.12 and 23 of this law were modified in 2012 not impacting the baseline. Decree 253-12 Eliminate some incentives offered by Law No.57-07)</li> <li>- Law 125 – 01 of 2001 modified on 2007 – Law 186-07 General electricity Law</li> </ul> |  |       |
| 22. | Coordinating Organism of National Electric System of Dominican Republic (OC-SENI) | <p>Monthly report from economic transactions (from Spanish: Informe Mensual de Transacciones Económicas). Ref. # OC-GC-14-IMTE1912-200123-V0</p> <p>This report on its pg 9 informs the electricity generated from Los Cocos Wind Farm (which comprehends Los Cocos I, Los Cocos II and Quilvio Cabrera wind farm. Larimar I and II is being reported separately.</p>   | December 2019  | PP    |
| 23. | -   | IPCC publications   | <a href="http://www.ipcc-nggip.iges.or.jp">www.ipcc-nggip.iges.or.jp</a> | Other |
| 24. | -   | UNFCCC  | <a href="http://cdm.unfccc.int">http://cdm.unfccc.int</a>                | Other |

## Appendix 4. Clarification requests, corrective action requests and forward action requests

Table 1. CL from this validation

|   |    |                    |     |                          |
|---|----|--------------------|-----|--------------------------|
| <b>CL ID</b>  | 01 | <b>Section no.</b> | D.1 | <b>Date</b> : 11/05/2020 |
| <b>Description of CL</b>  |    |                    |     |                          |
| <i>Appendix 7: as per instructions for completing the PDD, provide the history of all post-registration changes to the project activity that have been approved by the Board after its registration, its approval reference number and date of approval.</i>  |    |                    |     |                          |
| <b>Project participant response</b>   |    |                    |     | <b>Date</b> : 24/07/2020 |
| <i>Appendix 7 has been updated as per instructions for completing the PDD, provide the history of all post-registration changes to the project activity that have been approved by the Board after its registration. The Effective approval date of this changes was: 23/09/2019 and approved on 25/09/2019<br/>The PRC reference for the project is: PRC-7093-002</i>  |    |                    |     |                          |
| <b>Documentation provided by project participant</b>  |    |                    |     |                          |
| <i>24 07 2020 Los Cocos I - PDD v11.0 - CCv2<br/>24 07 2020 Los Cocos I - PDD v11.0 – Clean<br/>See web page: <a href="https://cdm.unfccc.int/PRCContainer/DB/prcp846188537/view">https://cdm.unfccc.int/PRCContainer/DB/prcp846188537/view</a></i>   |    |                    |     |                          |
| <b>DOE assessment</b>   |    |                    |     | <b>Date</b> : 27/07/2020 |
| All changes that occurred since registration of the PA are duly explained in Appendix 7 of the revised PDD. The changes refer to the construction of other wind power plants that would be measured by the same boundary meter, to which a proportional calculation has to be carried in order to obtain the net electricity generated by each one of the installed power plants. Moreover, electricity meters were installed by each power plant in order to measure each individual generation. And to these electricity generated, equations that account for transformation losses were also taken into account. The explanation given is clear and this permanent change was duly approved under PRC-7093-002 on 25/09/2019. |    |                    |     |                          |
| <b>CL is closed</b>   |    |                    |     |                          |

|  |    |                    |     |                          |
|--|----|--------------------|-----|--------------------------|
| <b>CL ID</b>   | 02 | <b>Section no.</b> | D.4 | <b>Date</b> : 11/05/2020 |
| <b>Description of CL</b>   |    |                    |     |                          |
| <i>As per diagram presented in section B.3, the power plant Larimar also dispatch its electricity through the four meters from SMC (TR1 to TR4). However it is explained in the same section that these meters only measure the power plants Los Cocos I, Los Cocos II and Quilvio Cabrera. It is not clear, though, how the four meters mentioned above, do not consider the electricity generated by Larimar.</i>  |    |                    |     |                          |
| <b>Project participant response</b>  |    |                    |     | <b>Date</b> : 01/06/2020 |
| <i>It is important to clarify that even though Larimar Wind Farm is part of the whole Eolic system as can be seen in Figure 9, the wind farm generation data reported to the SENI is measured in the commercial measurement points recognized by the OC-SENI on the side of 34.5 kV located in Lines L10 and L11; which allows to manage Larimar independently from the generations of Quilvio Cabrera, Los Cocos and Los Cocos II Wind Farms. Taking this into account the public generation data and economical transactions reports performed by the OC SENI for Larimar Wind Farm (includes Larimar I and Larimar II), are always presented separated from the rest of the Wind Farm System.</i> |    |                    |     |                          |
| <b>Documentation provided by project participant</b>   |    |                    |     |                          |
| <i>61_Memoria Generacion 2019 OC-GC-14-IMTE1912-200123-V0.pdf page 9<br/>PDD (version 08) - 01 06 2020 Los Cocos II - PDD v11.0.doc</i>  |    |                    |     |                          |
| <b>DOE assessment</b>  |    |                    |     | <b>Date</b> : 24/06/2020 |

The public generation data referred to in the evidence provided<sup>/22/</sup> states that the Larimar Wind Farm has its net electricity dispatched presented separately from Los Cocos wind Complex (which comprehends Los Cocos I, Los Cocos II and Quilvio Cabrera wind farms). It is important to point out that the meters that measure the electricity dispatched to the grid from Los Cocos Complex are part of the Commercial Measurement System - SMC point, and their raw measurements are not within PP's Control. The information from electricity generation of the complex are directly given by this system (which belongs to OC-SENI – Coordinator of Electricity system), which already excludes the generation of Larimar Wind Farm. Then, considering that the provided values for electricity generation comprehend the whole Los Cocos Complex, the electricity dispatched by Los Cocos I is pro-rated. The formulas and the calculation is duly demonstrated in the revised PDD.

Thus, it is concluded that the parameter  $EG_{\text{facility}}$  is determined in accordance with TOOL03 and the meters responsible for its measurement will be duly controlled by the calibration procedures mentioned in the PDD.

**CL is closed**

|  |    |                    |     |                          |
|--|----|--------------------|-----|--------------------------|
| <b>CL ID</b>   | 03 | <b>Section no.</b> | D.5 | <b>Date :</b> 11/05/2020 |
| <b>Description of CL</b>   |    |                    |     |                          |
| <i>It is not clear the source of the value applied at the estimated ERs calculations for the parameter <math>EG_{PJ,y}</math>.</i>   |    |                    |     |                          |
| <b>Project participant response</b>  |    |                    |     | <b>Date :</b> 01/06/2020 |
| <i>It is important to note that for the second crediting period the nominal generation output of Los Cocos Wind Farm is expected to be approximately 57,600 MWh per year (according to the most updated Energy production assessment of Los Cocos I), this change is due to the slipstream effect produced by Los Cocos II Wind Farm, which was constructed next to Los Cocos Wind Farm.</i>         |    |                    |     |                          |
| <b>Documentation provided by project participant</b>   |    |                    |     |                          |
| Los Cocos I wind report – GL Garrad Hassan page 6<br>PDD (version 10) - 01 06 2020 Los Cocos I - PDD v11.0.doc   |    |                    |     |                          |
| <b>DOE assessment</b>  |    |                    |     | <b>Date:</b> 24/06/2020  |
| The nominal generation output used for estimating the electricity generated within the next crediting period was based on information provided technical report <sup>/11/</sup> provided by GL Garrad Hassan which is the latest information available. The validation team agrees that this parameter is reliable for estimating the electricity generated by the project activity for the next CP. |    |                    |     |                          |
| <b>CL is closed</b>  |    |                    |     |                          |

**Table 2. CAR from this validation**

|  |    |                    |     |                          |
|--|----|--------------------|-----|--------------------------|
| <b>CAR ID</b>  | 01 | <b>Section no.</b> | D.3 | <b>Date :</b> 09/03/2020 |
| <b>Description of CAR</b>  |    |                    |     |                          |
| <i>EF calculation spreadsheet</i>  |    |                    |     |                          |
| <ul style="list-style-type: none"> <li>- <i>Tab dispatch analysis column K: as per TOOL07, para 69 “At each hour h, stack each grid power unit’s electricity generation using the merit order”. However in the calculations, the merit order has been applied from the latest to the first power unit dispatched, which is not in accordance with TOOL requirements.</i></li> <li>- <i>When carrying out the determination of the % of plants that are in the top of the dispatch, not electricity from all grid power units are being taken into account, unlike required by TOOL07 para 69.</i></li> </ul> |    |                    |     |                          |
| <b>Project participant response</b>  |    |                    |     | <b>Date :</b> 01/06/2020 |



1. The merit order in Dominican Republic is based on the total cost of each plant, so in this case the merit order N°1 is the cheaper generation unit of the day and the last one is the most expensive; that's why in the EF calculation the top of the dispatch is shown as the top (most expensive) generation that the project is going to displace in each day.

This decision is based on para 68 of the Tool "To determinate the set of grid power units  $n$  in the top of the dispatch..... b) The amount of power (MWh) that is dispatched from all grid power units in the system during each hour  $h$  that the project is displacing electricity", this shows that the most expensive units are the ones that the project generation is going to displace. So, the top of the dispatch is taken as the most expensive units.

In the formula for the Dispatch data analysis shown below always talk about the energy that the project is displacing, so, the generation that the project is going to displace is the one that is most expensive that's why the most expensive are in the top of the dispatch and that units are used for the 10 percent.

The formula for the Dispatch data analysis OM emission factor ( $EF_{grid,OM-DD,y}$ ) is shown in the paragraph 66 of the Tool.

$$EF_{grid,OM-DD,y} = \frac{\sum h EG_{PJ,h} * EF_{EL,DD,h}}{EG_{PJ,y}} \quad (1)$$

Where:

- $EF_{grid,OM-DD,y}$  = Dispatch data analysis operating margin CO<sub>2</sub> emission factor in year  $y$  (tCO<sub>2</sub>/MWh)
- $EG_{PJ,h}$  = Electricity displaced by the project activity in hour  $h$  of year  $y$  (MWh)
- $EF_{EL,DD,h}$  = CO<sub>2</sub> emission factor for grid power units in the top of the dispatch order in hour  $h$  in year  $y$  (tCO<sub>2</sub>/MWh)
- $EG_{PJ,y}$  = Total electricity displaced by the project activity in year  $y$  (MWh)
- $h$  = Hours in year  $y$  in which the project activity is displacing grid electricity
- $y$  = Year in which the project activity is displacing grid electricity

2. Electricity from all grid power units is now being taken into account when determining the % of units that are in the top of the dispatch.

#### Documentation provided by project participant

PDD (version 10) - 01 06 2020 Los Cocos I - PDD v11.0.doc

General Electricity Law - Ley 125-01 - Reglamento.Ley\_.No\_.125-01.pdf article 202.

#### DOE assessment

Date: 24/06/2020

1. It is well explained that the top of the dispatch order refers first to the more costly power plants and then driving towards the less costly ones. The more costly are to be replaced by the project plant when calculating the EF<sub>om-DD</sub>. The calculations are done in accordance with TOOL07. The information is justified and no changes were carried out in the EF<sub>om-DD</sub> calculations in this regard.
2. The group of grid power units in the dispatch margin is being determined in accordance with TOOL07 para 69.

The EF is being calculated in accordance with TOOL07.

#### CAR is closed

Table 3. FAR from previous validation/verification

| FAR ID  | Section no. | Date : |
|---|-------------|--------|
| Description of FAR                            |             |        |
| Not applied                                   |             |        |
| Project participant response                  |             | Date : |
| Documentation provided by project participant |             |        |
| DOE assessment                                |             | Date:  |

- - - - -

**Document information**

| <i>Version</i>   | <i>Date</i>     | <i>Description</i>  |
|--|-----------------|---|
| 03.0   | 31 May 2019     | Revision to: <ul style="list-style-type: none"><li>• Ensure consistency with version 02.0 of the “CDM validation and verification standard for project activities” (CDM-EB93-A05-STAN) and version 02.0 of the “CDM project cycle procedure for project activities” (CDM-EB93-A06-PROC);</li><li>• Make editorial improvements.</li></ul> |
| 02.0   | 31 October 2017 | Revision to align with the requirements of the “CDM validation and verification standard for project activities” (version 01.0).  |
| 01.0   | 23 March 2015   | Initial publication.  |
| Decision Class: Regulatory<br>Document Type: Form<br>Business Function: Renewal of crediting period<br>Keywords: crediting period, project activities, validation report |                 |   |