MONITORING REPORT

LARIMAR WIND FARM PROJECT

Document Prepared by MGM Innova Consulting

Project Title	Larimar Wind Farm Project
Version	3
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CONTENTS

1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

EGE Haina S.A. (Largest consumption in DR) is the owner of the Larimar project, this are two wind farms located in Enriquillo Region, Dominican Republic. (i) "Larimar I" has 15 wind turbine generators with a total installed capacity of 49.5 MW[1]; and (ii) "Larimar II" has 14 wind turbines generators with a total installed capacity of 48.3 MW[2]. The total installed capacity of the wind farm is 97.8 MW. Besides, a medium voltage transmission line of double circuit – two conductors per phase (a 34.5 kV, 100 MW of 5 km), that bring the power to Los Cocos Substation, this substation interconnect the project to the National Interconnected Electrical System (SENI)[3].

The construction of the first phase of the project "Larimar I" started on 11/02/2015 and its operation took place in August 2016. The Power Purchase agreement – PPA, was signed on 02/08/2016. The second phase "Larimar II" started operation in October 2018.

The project activity supplies an average of 370 GWh per year to the SENI (Larimar I = 206 GWh/y[4] and Larimar II = 164 GWh/y[5]), avoiding part of the electricity generated by the grid-connected power plants. This is the current scenario (the scenario existing prior to the implementation of the project activity) and it is the same as the baseline scenario (the scenario that would occur in the absence of the project activity). The baseline scenario implies that all the 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.

This monitoring report represents the verification of the first crediting period of the Wind Farm Project. The monitoring period counts from the 1st of August 2016 to the 31st of December 2019. The total GHG emissions reduction achieved by the project for this period is 581,384 tCO_2e.

Regarding relevant operational highlights partial stops of the equipment have occurred (represented in lower generation), which obeys the routine of the equipment warranty, maintenance and common failures (See section 3.1).

[1] 15 wind turbines – Vestas 112 with 3.3 MW (49.5 MW)

[2] 14 wind turbines – Vestas 117 with 3.45 MW (48.3 MW)

[3] In Spanish: Sistema Eléctrico Nacional Interconectado - SENI

[4] See for Larimar I - Energy Production file 18_Energy Production Assesment EPA_Larimar I.pdf

[5] See for Larimar II - Energy Production file 19_Energy Production Assesment EPA_Larimar II.pdf

1.2 Sectoral Scope and Project Type

Scope 1 - Energy (renewable/non-renewable).

The project is a Wind Farm Power Plant presented as a single bundled project. Where the first phase - Larimar I and second phase Larimar II, are operating together since October 2018.

1.3 Project Proponent

Organization name	EMPRESA GENERADORA DE ELECTRICIDAD HAINA S.A. (EGE HAINA)
Contact person	Ricardo Estevez
Title	Project Director
Address	Lope de Vega No. 29, Torre Novo-Centro, piso 17, Ensanche Naco
Telephone	+1 809-947-4023
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1.4 Other Entities Involved in the Project

Organization name	MGM Innova Consulting
Role in the Project	Consultancy firm for project development
Contact person	Juliana Correa
Title	Project Manager of MGM Innova
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1.5 Project Start Date

The starting date of the project is 01/08/2016[6], date which the Wind Farm Project started its commercial period operation – injecting energy to Dominican Republic interconnected system, thus the beginning of the emission reduction generation of the project. Trial period operation started on 03/05/2016. The first wind turbine was connected to the national system on 23/05/2016[7].

[6] See for starting date of the Project file 56_FAC EGE Haina-CDEEE FM-CO-14-2016.pdf

[7] See for trial period 49_RESOLUCION SIE-024-2016-PS PROVISIONAL.pdf and operational period 50_RESOLUCION_SIE-053-2016-PS_AUTORIZACION.pdf

In 16/10/2018 starts the commercial operation of the second phase of the project “Larimar II”, so since this date the generation and the emission reductions increased.

1.6 Project Crediting Period

The length of the project crediting period is 10 years renewable once (two crediting periods of 10 years).

The starting date of the first crediting period of Larimar Wind Farm Project is 01/08/2016, according to this the end date of the first crediting period is 31/07/2026. Second crediting period will be from 01/08/2016 to 31/07/2036.

1.7 Project Location

The project is located in Enriquillo Municipality, Barahona Province which belong to Enriquillo Region. Both wind farms Larimar I and Larimar II are approximately 240 km far from Santo Domingo, capital of the country.

The following maps show the general location of the project:

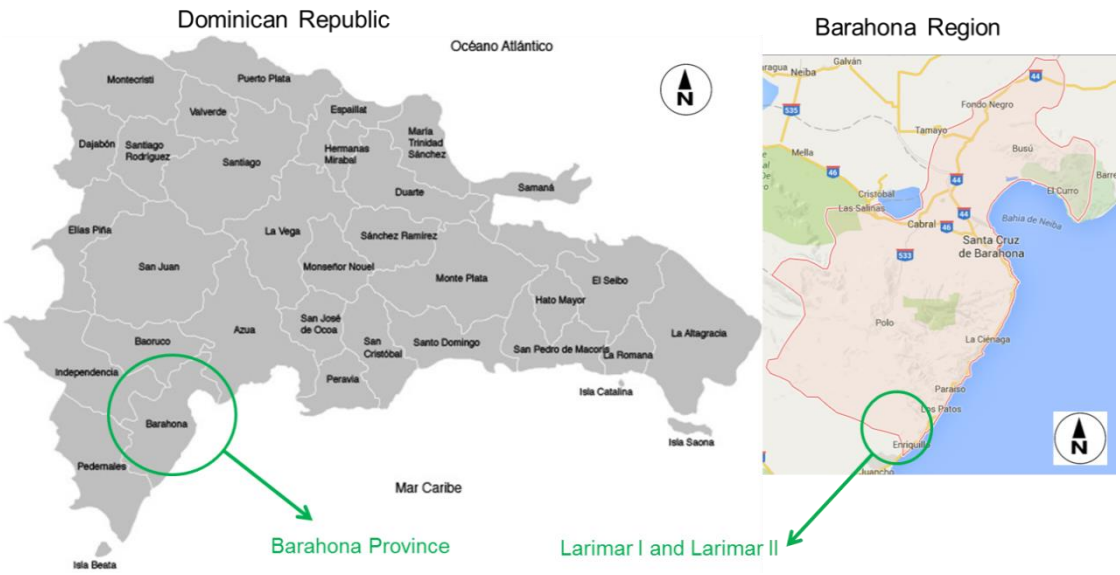

Figure 1. Location of Larimar Wind Farm Project

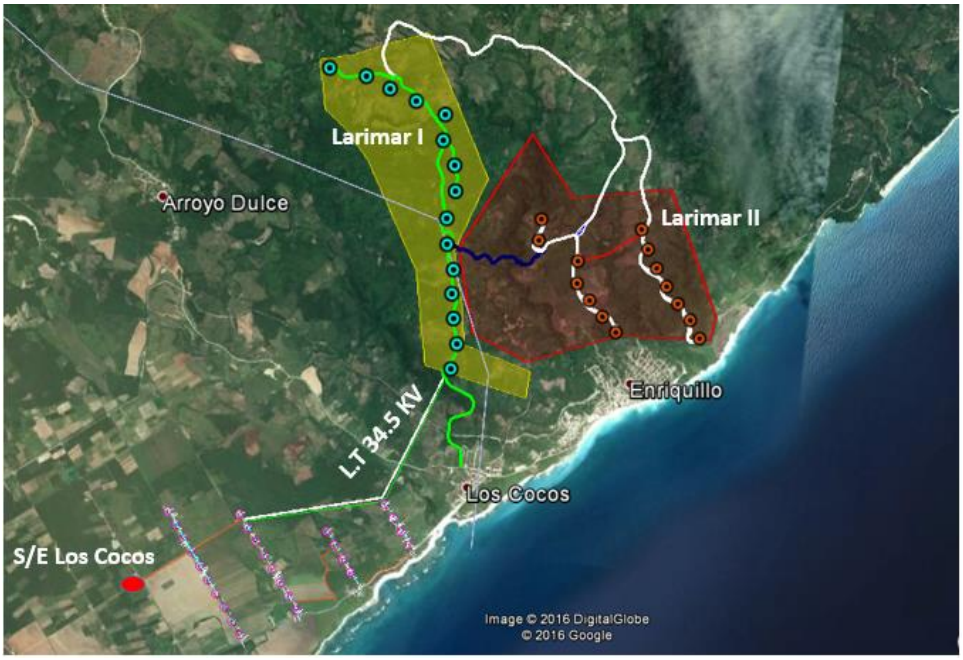

Figure 2. Larimar Wind Farm Satellite view [8]

Larimar I constructed area, is approximately 371,100m² including: 192,000 m² for internal and access roads, 42,000 m² for platforms and 137,100 m² for medium voltage transmission line. Furthermore, Larimar II construction area is approximately 158,500 m² including: 78,000 m² for roads, 25,600 m² for platforms, 5,300 m² for underground lines and 50,000 m² for interconnection with Larimar I.

Each wind farm lies in a perimeter defined by the following UTM coordinates at zone sector 19Q:

Table 1. Larimar I and Larimar II Perimeter (Permanent concession by CNE)

Larimar I - Zone: 19Q		
ID	East	North
LAR2-1	260545	1984394
LAR2-2	261442	1982799
LAR2-3	261102	1981910
LAR2-4	261318	1980841
LAR2-5	262157	1980574
LAR2-6	262134	1980248
LAR5-7	260869	1980521
LAR2-8	260660	1981645
LAR2-9	259951	1982885
LAR2-10	259379	1983442
LAR2-11	259273	1984030

[8] See Google earth application Files Attached 55_Geographic Location – Concesion Larimar I.kmz, Concesion Larimar II.kmz and Posiciones de Molinos Larimar I.kmz , Posiciones de Molinos Larimar I.kmz.

Larimar II - Zone: 19Q		
ID	East	North
LAR2-1	261951	1983345
LAR2-2	262488	1982652
LAR2-3	263669	1982861
LAR2-4	264387	1981369
LAR2-5	264328	1981101
LAR2-6	263217	1981068
LAR5-7	262120	1980650
LAR2-8	261432	1980915
LAR2-9	261162	1981921

The UTM coordinates of each wind generator for both Wind Farms are the following:

Table 2. Generators coordinates

Wind turbines	Coordinates - Larimar I	
	East	North
LM01	19Q259392.98	1983946.15
LM02	19Q259853.00	1983884.00
LM03	19Q260154.98	1983758.17
LM04	19Q260481.98	1983647.18
LM05	19Q260845.98	1983520.19
LM06	19Q260923.38	1983515.19
LM07	19Q261015.68	1982926.20
LM08	19Q261069.58	1982633.20
LM09	19Q260972.08	1982305.20
LM10	19Q261003.18	1981986.20
LM11	19Q261050.48	1981708.20
LM12	19Q261133.98	1981422.20
LM13	19Q261166.38	1981122.20
LM14	19Q261230.78	1980844.20
LM15	19Q261187.18	1980554.20

Wind turbines	Coordinates - Larimar II	
	East	North
LMII01	19Q264208	1981174
LMII02	19Q264069	1981382
LMII03	19Q263896	1981562
LMII04	19Q263736	1981754
LMII05	19Q263593	1981960
LMII06	19Q263466	1982174
LMII07	19Q263366	1982404
LMII08	19Q263167	1981151
LMII09	19Q262984	1981321
LMII10	19Q262807	1981502
LMII11	19Q262635	1981689
LMII12	19Q262622	1981956
LMII13	19Q262124	1982155
LMII14	19Q262133	1982405

The following image shows the location of the project facilities (wind turbines).

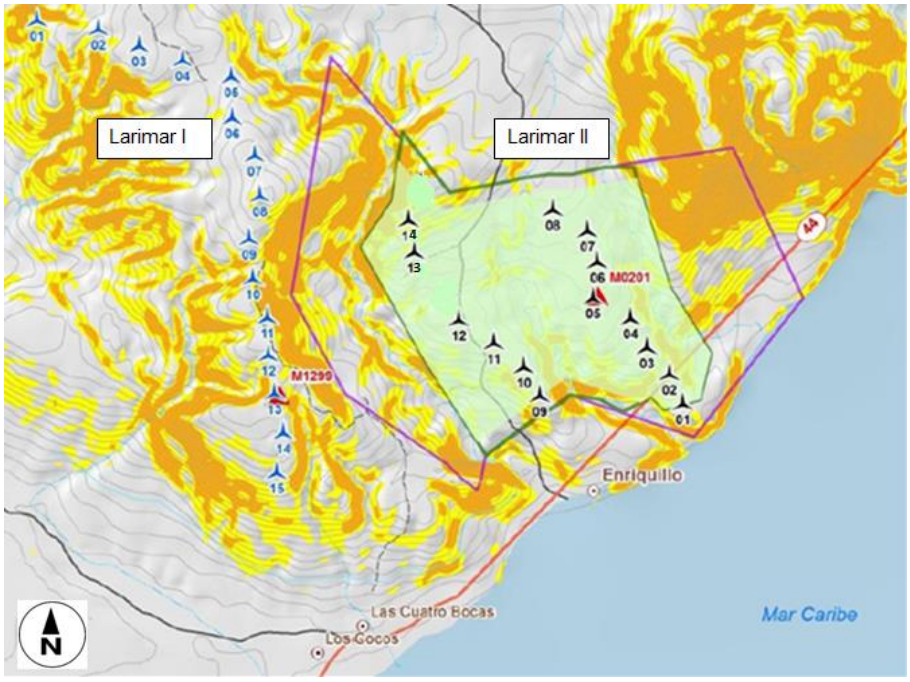

Figure 3. Larimar I and Larimar II – Wind turbines location

1.8 Title and Reference of Methodology

The project activity is developed in accordance with the approved large-scale consolidated methodology ACM0002 "Grid-connected electricity generation from renewable sources" (version 17.0 sectoral scope: 01)[9].

According to the methodology, the grid emission factor is calculated using the - "Tool to calculate the emission factor for an electricity system" (version 5.0)[10] and the project additionality is demonstrated using the "Tool for the demonstration and assessment of additionality" (version 07.0.0)[11].

1.9 Participation under other GHG Programs

The project is not registered under any other GHG program and has no intends to generate any other form of GHG-related environmental credit for GHG emission reductions or removals claimed under the VCS Program.

1.10 Other Forms of Credit

The project has not been registered and is not seeking registration under any other GHG programs.

For Larimar Wind Farm Project the following information is applicable:

- Emission Trading Programs and Other Binding Limits: The PP has not applied this project in any Emission Trading Programs and other Binding Limits.
- Other Forms of Environmental Credit: The PP has not applied this project in any other form of environmental credits.
- Participation under Other GHG Programs: The PP has not participated under other GHG Programs with this project activity.

Therefore, EGE Haina as PP will warrantee that no double – counting of emission reductions will occur in case of this Wind Farm project during its VCS crediting period. The project has not been registered or is seeking registration under any other GHG programs. The project neither has, nor intends to generate any other credit form of GHG-related environmental credit for GHG emission reductions or removals claimed under the VCS Program.

[9] https://cdm.unfccc.int/methodologies/DB/8W400U6E7LFHHYH2C4JR1RJWWO4PVN

[10] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v5.0.pdf

[11] http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v7.0.0.pdf

1.11 Sustainable Development

Dominican Republic as a signatory of Kyoto Protocol and Paris agreement has a commitment to increase its renewable energy share by 2030. In this direction the project development is directly contributing to the country goals to achieve their INDC objectives, and consequently promote the development of sustainable activities that become priority for the nation to reduce their emissions and keep grown in the line of sustainability. All these efforts are founded on the Law on Incentives for the Development of Renewable Energy Sources and Special Regimes, No. 57-07.

The project also contribute to the sustainable development of the region and the country as follows:

- By replacing conventional fossil fuel based power generation with clean renewable wind power generation, the project decrease emissions to the atmosphere of sulphur oxides (SOx), nitrogen oxides (NOx), carbon monoxide (CO), particulate matter and other pollutants associated with the combustion of fossil fuels.
- By reducing the use of fossil fuels in thermal power plants, the project help to decrease the dependency of the country on non-renewable resources, which are limited in supply.
- The project activity helps the country to achieve its goals of emission reduction by 2030 increasing the renewable energy mix of the national energy matrix.

2 SAFEGUARDS

2.1 No Net Harm

During the present monitoring period there was not potential negative environmental or socio-economic impacts.

The Environmental Impact Declaration for Larimar I Wind Farm was submitted for approval on 27/11/2014 and the Environmental License given by the Dominican Republic Ministry of Environment and Natural Resources was obtained on 11/02/2015.

In the same way, the Environmental Impact Declaration for Larimar II Wind Farm was submitted for approval on 01/02/2016, the Environmental License given by the Ministry of Environmental and Natural Resources was granted on 13/12/2016.

It is important to remark that with the environmental license Larimar Wind Farm Project is conditioned to issue an Environmental Compliance Report (ICA), used to report on progress, effectiveness and compliance of environmental management programs presented in the Environmental Management Plan of the project (Includes Larimar I and Larimar II). In consequence, being coherent with the ICAs during the present monitoring period it is possible to identify some potential negative environmental and socio-

economic impacts. Table 3 present the most frequent impacts during this period and mitigation measures.

Table 3. Potential negatives environmental and socio-economic impacts and mitigation

Summarize any potential negative socio-environmental impact identified	Strategy to mitigate it
1. Impact on Birdlife: Loss of individuals due to collision	Weekly monitoring of individual collisions, accounted for by species
2. Impact on soil and water: generation of solid hazardous and non-hazardous waste.	Classification by type of waste, storage, registration and disposal by managers authorized by the Ministry of the Environment
3. Impact on soil and water: Generation of liquid hazardous waste.	Adequate storage and disposal through management companies authorized by the Ministry of the Environment
4. Impact to soil and water: Fuel storage	Containment buckets against spills
5. Impact on soil and water: Generation of domestic residuals.	Septic tank and waste removal through management companies authorized by the Ministry of the Environment
6. Impact to soil and water: Pest and weed control	weekly control of pests and weeds using authorized products
7. Socio-economic impact: Risk of occupational accidents	1. Mandatory use of personal protective equipment 2. Training and safety meetings 3. Medical check-ups 4. Incident report 5. Conduct of emergency drills
8. Socioeconomic Impact Employment generation	1. Recruitment of required personnel for the operation of the company 2. Recruitment of unskilled labor from the communities
9. impact on flora: loss of vegetation	Reforestation of areas, follow-up inspections
10. Alteration to air quality	Air quality measurements

Also, EGE Haina manage a Socio/environmental Matrix where aspects and impacts of Larimar I and Larimar II are identify, classified and prioritized, in this sense can be followed in order to satisfy the Environmental Management Plan and present the Environmental Compliance Report - ICAs .

2.2 Local Stakeholder Consultation

From 2016 several activities have been developed in order to involve local stakeholders and generate community participation, Table 4 presents the different methods to involve the community and the respective mechanisms used to document the results.

It is important to remark the socio-economical work sponsored by EGE Haina. The company has a policy and a program of social responsibility which promotes a continuous sustainable communitarian development, helping the people within the Larimar Wind Farm Project area (known as Enriquillo, Barahona), to improve their quality of life. This program has helped the population in areas such as: (See EGE Haina's magazine "Junto a la comunidad de Enriquillo")[12]

1. Scholar partnering
2. Income generation training
3. Health promotion
4. Environmental Protection
5. Promotion of Communitarian institutions
6. Sports promotion
7. Civil society promotion and its organizations

Figure 4 gives a graphic overview of the different events and activities framed in the social responsibility program from the beginning of the Wind Farm Project.

[12] See link of EGE Haina's web page - http://www.egehaina.com/ege-haina-junto-a-la-comunidad-de-enriquillo/

Figure 4. Social Responsibility Program evidence between 2016 -2019

EGE Haina carries out different mechanisms to maintain fluid and efficient communication with the people close to the project, apart from their development and social commitment to the community, it is also monitoring the observations that may arise in relation to the project, in this case communication is maintained through social leaders and workshops mainly. These mechanisms indicated above and the way the information has been recorded are shown in Table 4.

Table 4. Stakeholder consultation methods and documentation.

Procedures/methods used to involve local stakeholders between 2016 and 2019	Procedures or methods used to document the results
Diagnoses and uprising of leaders and authorities	The credentials of the results is supported in documents, such as: letters, reports, report of complaints, pictures, videos, among others.
Direct and telephone contact with local authorities and leaders	
Visits and meetings with local authorities and leaders in their communities.	
Meetings, talks and workshops	

EGE Haina continually seeks to develop and maintain respectful, permanent, and collaborative relationships with communities and their representatives in the immediate vicinity of operations and projects.

The communication channels they use are direct contact through visits and meetings, telephone calls and chats via WhatsApp between the leaders of the communities and the coordinator of social responsibility of EGE Haina and the manager of the plant in the area. These actions guarantee them to maintain fluid communication between the community and the company.

In addition, they have mass media: the company's website and social media accounts, annual report, advertising, and news broadcast through local media.

Regarding claims and complaints management in the project area, an example for the current monitoring period is presented in Table 5.

Table 5. Community claims and complaints reported for the monitoring period

Claims / Complaints			Date
Organization	Community consultation	Response by the company	
Movimiento de Acción Reivindicativa del Municipio	Requirement to provide, through EDESUR, 24 hours of electrical energy free of charge to	EGE Haina pays EDESUR the energy consumed by the agricultural producers in the area for the use of the irrigation pumps (whose consumption has increased from $ 3,000 to $ 1,200,000 (Dominican Peso) per month, due to the exponential growth of crops since the parks were	07/03/2017

Claims / Complaints			Date
Organization	Community consultation	Response by the company	
De Enriquillo (MARME)	the municipality of Enriquillo and surrounding communities	installed). Likewise, the company provides important support in various areas to the communities, including Enriquillo. The Superintendence was informed of this situation, and EDESUR participated in the dialogues with the claimants, to clarify the confusion about the different roles of generators and distributors in the electric power supply chain.	

These requests are classified according to the procedure established by the company, in complaints and petitions, submitted as follows:

Table 6. Suggestions and Grievance mechanism

Action order	Suggestions and Grievance mechanism
1	EGE Haina receives and registers the claim and notifies it to the corresponding areas, including Communications and Social Responsibility, Operations and Patrimonial Security. When applicable, the Legal Department and the General Management are also notified.
2	The relevance of the claim is internally evaluated.
3	If it does not apply, it is communicated to the claimant explaining why the claim does not apply or indicating to whom the claim should be addressed. N-P02.F04 Final Claims Form.[13]
4	If the claim applies and the solution is internal responsibility, a solution is requested. For this, it is verified that the claim includes the following information: name of the person (s) that submits the claim; date it was received; nature of it; date of the follow-up actions and the response offered; names of company members who have been contacted or to whom a copy of the correspondence has been sent; measures taken, if any, and coordination of the implementation of the solution.

[13] See document 10 - N-P02.F04 Formulario Reclamos Final.doc

Action order	Suggestions and Grievance mechanism
5	Interested parties are notified in writing and verbally about the complaint solution implementation - In the event that a more thorough investigation is required and a delay is anticipated, the complaining party should be informed that more time will be required and, if necessary, periodically updated information will be provided.
6	If the solution to the claim is not of internal responsibility directly, but the company is indirectly related to the claim (eg related to the impact of a contractor during the construction or operation of a company project, or the free supply claim or 24 hours of electrical service), the communication received is sent to the corresponding organizations and awaits their response.
7	If the answer is sent to EGE Haina, the Social Responsibility Coordination informs the claimants about the implementation of the agreed solution or indicates to whom they should address their claim.
8	Once the solution is implemented, if applicable, thank you letters are prepared and sent, and details of participation of each organization involved in the solution of the claim.
9	End of the procedure

2.3 AFOLU-Specific Safeguards

Not applicable – The monitored project is not AFOLU

3 IMPLEMENTATION STATUS

3.1 Implementation Status of the Project Activity

The implementation status of the project activity includes the following information:

- The project activity has been in operation since 01/08/2016 until now giving energy supply to the SEIN. There is not any event of break down or non-operational phase during the

monitoring period, but partial stops of the equipment (represented in lower generation), which obeys the routine of the equipment warranty, project maintenance or minor failures[14].

- Project is implemented and operational as per the VCS Project description submitted.

- In 16/10/2018 the second phase of the project has started "Larimar II", generating more energy and having more emissions reductions.

For the project, all maintenance operations are tracked through an Excel file called "Master Schedule". There is a file for each wind farm where the approximate duration of maintenance work by wind farm and by turbine is stored.

This duration is regulated by contract, corresponding to the Operation and maintenance contract signed with the Vestas company.

For both Larimar I and Larimar II, a preventive maintenance control is carried out (see Annex 1 or SIF Scheduled Maintenance[15]). The duration of this maintenance may vary slightly, but in general per turbine, it usually lasts 2 days in 8-hour working day, with 3 technicians and is carried out annually.

For unplanned corrective maintenance (forced shutdowns), Vestas has a SCADA system that monitors the status of the parks 24/7/365, as well as a vibration monitoring system (CMS). For the project, there is a type of SAA contract (AOM4000) where these corrective measures are the responsibility of Vestas, both the labor and the cost of the corresponding materials.

The response to these failures or forced shutdowns are immediate - remotely or in person, as required - seeking to reduce the impact of this loss of production due to the failure.

Usually, the most common alarms that maintain a turbine with a prolonged failure over time are usually caused by:

a) External fault in the network affecting the Wind Farm, classified as CCE (network or electrical system deficiency).

b) Lack of spare parts, lack of specialized tool or alarm of considerable difficulty in troubleshooting, classified as Forced.

c) Failure in the 34.5kV transmission line from Larimar to Los Cocos, classified as CCE.

[14] See documents 11_PELARI - Eventos significativos.xls and 12_PELARII - Eventos significativos.xls

[15] See document 13_Schedule 1 to Annex 1 - Service Inspection Form (SIF).pdf

The most significant events of both parks are presented in the excel files 11_PELARI - Eventos significativos and 12_PELARII - Eventos significativos discriminating the duration of the failure in hours, date on which the failure occurred, turbine on which occurred and failure name[16].

3.2 Deviations

3.2.1 Methodology Deviations

Not applicable. No methodology deviations are made.

3.2.2 Project Description Deviations

During the desk review stage for the project first verification, it was noted a typo mistake in the registered PD. The combined emission factor for electrical interconnected grid in Dominican Republic was calculated using the simple OM method, and its value was fixed during the first crediting period, $EF_{grid,CM,y}$ = 0.7173 tCO_2e/MWh, as it was presented by the PP (see attached file[17]) after responsed the audit team findings. However, in registered PD section 4.1 it is stated that $EF_{grid,CM,y}$ = 0.6435 tCO_2e/MWh, despite that in section 3.4 of registered PD it was described the calculations for this parameters and also is stated the final value for $EF_{grid,CM,y}$ = 0.7173 tCO_2e/MWh. Considering this typo mistake, section 4.1 of registered PD named PROJ_DESC_1644_01SEP2017.pdf has been updated with the correct combined emission factor, $EF_{grid,CM,y}$ = 0.7173 tCO_2e/MWh[18].

3.3 Grouped Projects

Larimar Wind Farm Project is not a grouped project, therefore is not necessary to provide information in this paragraph.

4 DATA AND PARAMETERS

4.1 Data and Parameters Available at Validation

Data / Parameter	$EF_{grid,CM,y}$
Data unit	tCO_2/MWh

[16] The nature of the failure can be: Planned (even if it is a corrective, but having planned its solution), Forced (failure that is not planned, accidental), Reserved (the turbine stops producing but due to an environmental circumstance), CCE (for network or electrical system deficiency), Force Majeure (turbine time out of service due to an event that could put the integrity of the unit at risk, eg: Hurricane, earthquakes, strikes, attacks, wars, etc.) .
[17] See excel file of Emission Factor Calculation at validation stage – 41_Larimar EF Calculation.xls
[18] See updated registered PD - PROJ_DESC_1644_01SEP2017-updated.pdf

Description	Combined margin CO_2 emission factor for grid connected power generation in year y calculated using the latest version of the "Tool to calculate the emission factor for an electricity system"
Source of data	Calculated based on information provided by the grid operator - Organismo Coordinador del Sistema Eléctrico Nacional OC-SENI.
Value applied	0.7173 tCO_2/MWh.
Justification of choice of data or description of measurement methods and procedures applied	As per the most recent "Tool to calculate the emission factor for an electricity system"
Purpose of Data	Calculation of baseline emissions
Comments	

4.2 Data and Parameters Monitored

Data / Parameter	$EG_{facility,y}$ – Larimar I - $EG_{SMC\ LINEA\ 10}$ Larimar II - $EG_{SMC\ LINEA\ 11}$
Data unit	MWh/y
Description	Quantity of net electricity generation supplied by the project plant/unit to the grid in year y
Source of data	Electricity meter(s)
Description of measurement methods and procedures to be applied	EGE Haina Commercial direction, monitors Larimar wind farm energy production from the Dispatch Center - CDH in real time. There is a Software available, which download automatically and on a daily basis the commercial measurement systems (SMC) data, that by law, has the Wind Farm for recording the measurements. In real time, the dispatch center verifies through the Scada system of Larimar Wind Farm the parameters of generation and service quality. After each day, there is a download and information management software of the plant measurement system (PrimeRead) that automatically performs the discharge of these measurements. The measurement systems have a communication link for remote access. Monthly or as often as required, information can be obtained from the download database. Therefore, the parameter is both monitored by EGE Haina and the Organismo Coordinador del Sistema Eléctrico Nacional OC-SENI. OC-SENI, check energy meters remotely in order to define the quantity of electricity supplied by the project plant/unit to the grid.

<table>
<tr><td>Frequency of monitoring/recording</td><td>Operation managers monitor and issue daily reports of the plant energy production, the information is consolidated monthly with the SMC data.
Also, technicians have the task to download, process, store and deliver to the OC-SENI the information coming from the SMC monthly, for the settlement of monthly economic transaction
Typically, the measured data can be seen on-line in real time by the owner and the OC-SENI.

The data is filed instantly on the meter, daily in a download database and monthly processed data for settlement.</td></tr>
<tr><td>Value monitored</td><td>810,517.25 MWh
<table><tr><th>Year</th><th>$EG_{P,J,y}$ Total Generation (MWh)</th></tr><tr><td>2016 (from 01/08 to 31/12)</td><td>70,619.27</td></tr><tr><td>2017</td><td>179,278.16</td></tr><tr><td>2018</td><td>245,966.36</td></tr><tr><td>2019</td><td>314,653.46</td></tr><tr><td>Total</td><td>810,517.25</td></tr></table>See excel file ER_Larimar_MR1.xls for generation data.</td></tr>
<tr><td>Monitoring equipment</td><td>Commercial measurement systems – SMC of Larimar Wind Farm have 2 meters ION 8650, with accuracy class 0.2. See Table 7.</td></tr>
<tr><td>QA/QC procedures to be applied</td><td>Calibration tasks follow national standards and are in accordance with the calibration instructive specified in Dominican Republic standard for electricity metering devices.

The equipment is calibrated by the SENI. The frequency is every 2 years according to regulations, or if any element of the SMC is changed, intervened or modified.</td></tr>
<tr><td>Purpose of the data</td><td>Calculate of baseline emissions</td></tr>
<tr><td>Calculation method</td><td>All data collected as part of the monitoring process is archived electronically and kept.

The data is stored on a company server. It is used the manufacturer's software (Schneider's ION Setup 3.0) and / or PrimeRead.</td></tr>
</table>

Comments	Larimar Wind Farm, has a Certificate of granting authorization of the measurement system[19], a Proof of Commercial habilitation visits[20] and the certification of the first meter's calibration on 8/02/2018 (see Table 8).

4.3 Monitoring Plan

The Monitoring Plan basically consists in the procedures to meter the project's electricity generation. Since this is the only parameter that is measured and the emission factor is already set ex ante, the process is straightforward, as described in the following.

Monitoring tasks are implemented according to the monitoring plan in order to ensure that the real, measurable and long-term greenhouse gas (GHG) emission reduction for the project is monitored and reported.

Data metering and recording

Larimar Wind Farm Project (Larimar I and Larimar II), has a commercial measurement system - SMC in accordance with the requirements of current legislation, which govern commercial operations in the electricity industry. According to this regulation, the measurement systems of each injection point of the Larimar Wind Farm Project are located at the 34.5Kv Lines (Larimar I and Larimar II) and are recognized as SMC 1 and SMC 2 (as shown in Figure 6 and Figure 7). Each SMC have a main meter, a backup meter, and an emergency measurement system, which must have a continuous power supply system (even at times when the entire system has failed). These meters must be class 0.2. and have the capability to store data for 3 months.

Also due to regulations, transactions must be settled monthly, so these meters are discharged with this frequency. The data is stored by the company but is also stored by the coordinating agency – OC SENI, which has a system of data acquisition and storage of all meters in the system.

The SMC according to current regulations, are reviewed and calibrated every two years. Coordinated Agency – OC, contrasts all the SMCs in the system with this frequency.

According to methodology ACM0002 version 17.0.0, the main parameter that need to be monitored during the operation of the Wind Farm is: $EG_{facility,y}$ = Quantity of net electricity supplied by the project plant/unit to the grid in year *y*(MWh/yr). Therefore considering Larimar I and Larimar II, there are two energy meters considered to monitor this parameter (see Table 7, Figure 6 and Figure 7).

[19] See file 57_Certificado de Habilitación del SMC del Parque Eólico Larimar I y II.

[20] See file 58_Habilitación Sistema de Medición Comercial Larimar I y II.

Table 7. Monitoring equipment and calibration frequency

Energy Meter installed	ID meter	Description	Type of meters	Location / Subestation	Calibration frequency
Larimar I - $EG_{SMC1\ LINEA\ 10}$ (Main and backup meter)	SMC 1 LARIMAR I G10: Main meter. Serie: MW-1507A003-02	Sistema de Medición Comercial (SMC) LARIMAR G10 ID: 3276-PELAK-G10 Main meter	Brand: SCHNEIDER Model: ION8650C Type: 9S Class: 0.2	At the 34.5 Kv line S/E Los Cocos	Every 2 years according regulations of General Electricity Law 125-01
	SMC 1 LARIMAR I G10: Backup meter Serie: MW-1507A004-02	Sistema de Medición Comercial (SMC) LARIMAR G10 ID: 3276-PELAK-G10 Backup meter	Brand: SCHNEIDER Model: ION8650C Type: 9S Class: 0.2	At the 34.5 Kv line S/E Los Cocos	
Larimar II - $EG_{SMC2\ LINEA\ 11}$ (Main and backup meter)	SMC 2 LARIMAR II G20: Main meter. Serie: MW-1507A001-02	Sistema de Medición Comercial (SMC) LARIMAR G20 ID: 3276-PELAK-G20 Main meter	Brand: SCHNEIDER Model: ION8650C Type: 9S Class: 0.2	At the 34.5 Kv line S/E Los Cocos	Every 2 years according regulations of General Electricity Law 125-01
	SMC 2 LARIMAR II G20: Backup meter. Serie: MW-1507A009-02	Sistema de Medición Comercial (SMC) LARIMAR G20 ID: 3276-PELAK-G20 Backup meter	Brand: SCHNEIDER Model: ION8650C Type: 9S Class: 0.2	At the 34.5 Kv line S/E Los Cocos	

The project activity is connected to the National Interconnected Electrical System (SENI). Thus, the Larimar Wind Farm Project sites and all power plants connected to the SENI are included in the project boundary.

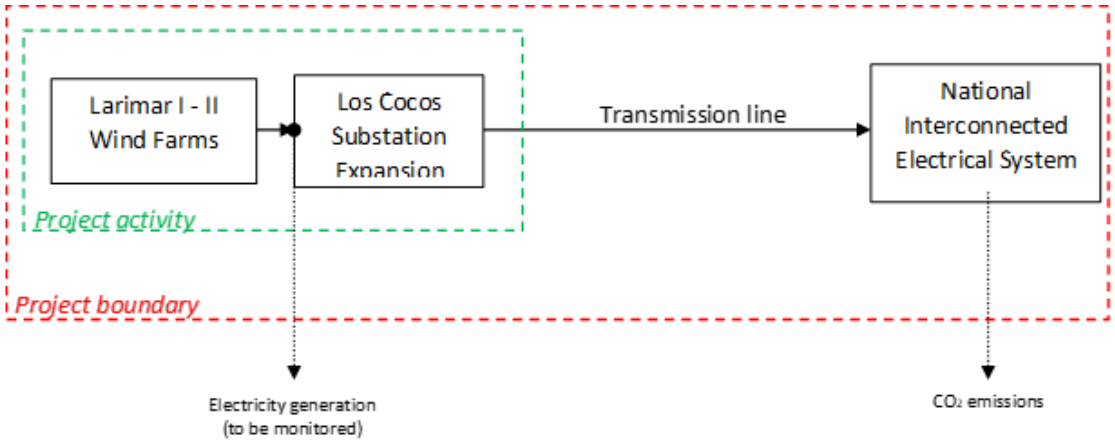

Figure 5. Line Diagram and Spatial Project Boundary

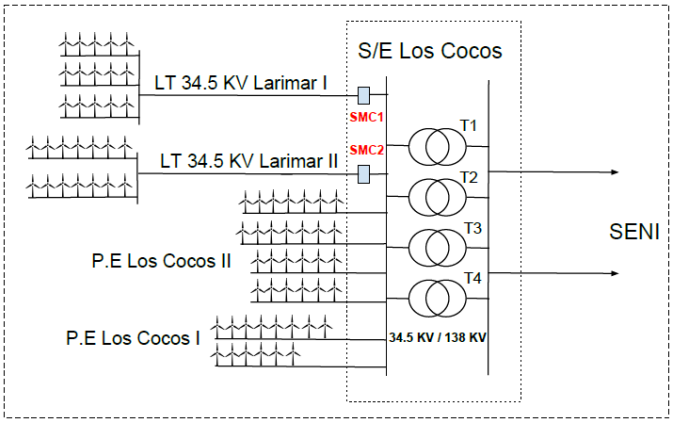

Figure 6. Monitoring Points - Larimar Wind Farm Project (SMC1 and SMC2)

It is important to remark that while Larimar II was not operating, Larimar I was using both meters (SMC1 half and SMC 2 half generation). Now both wind farms are operating (since October 2018), so SMC 1 measures only Larimar I generation and SMC 2 Larimar II.

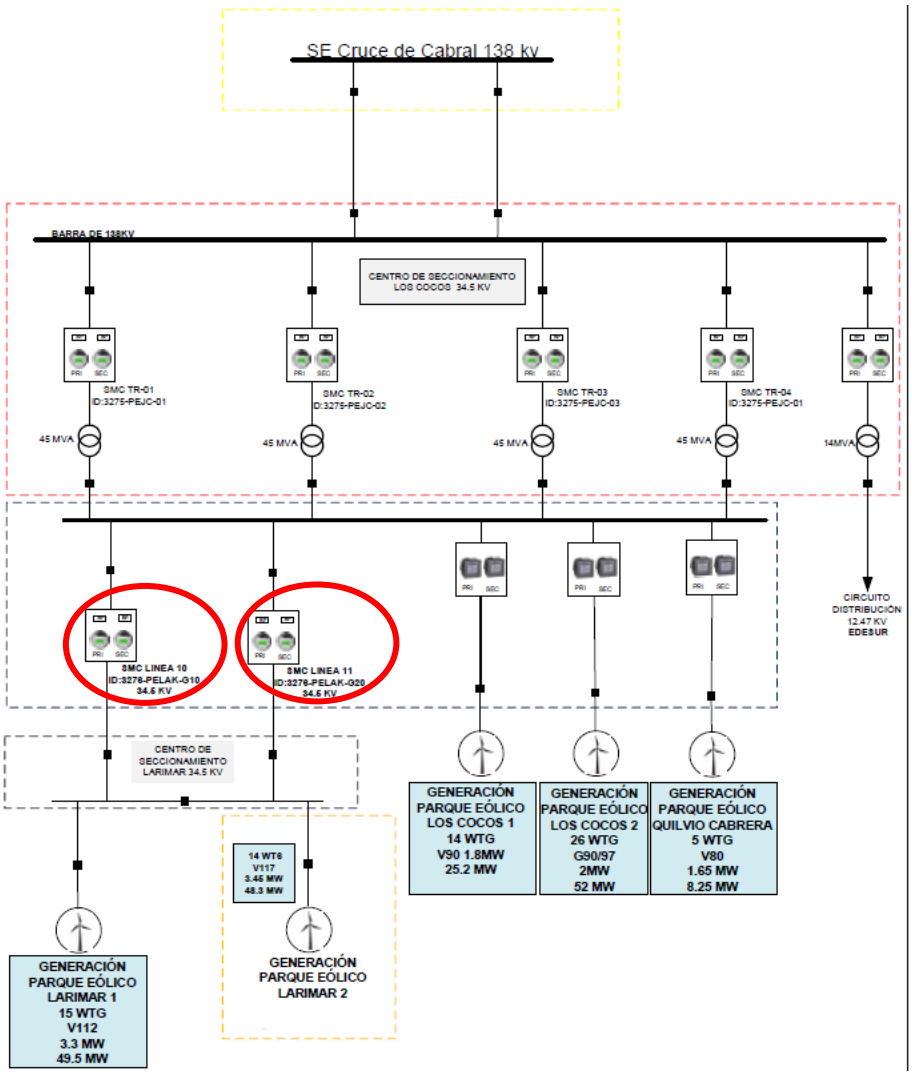

Figure 7. Monitoring Points SMC 1 and SMC 2 (LINEA 10 and LINEA 11) within All Wind Farms

It is important to point that EGE Haina's Commercial direction, monitors Larimar Wind Farm energy production from the Haina's Dispatch Center – CDH, in real time.

There is a Software available, which download automatically and on a daily basis the commercial measurement systems (SMC) data, that by law, has the Wind Farm for recording the measurements.

In real time, the dispatch center verifies through the Scada system of Larimar Wind Farm the parameters of generation and service quality. After each day, there is a download and information management software of the plant measurement system (PrimeRead) that automatically performs the discharge of these measurements.

The measurement systems have a communication link for remote access. Monthly or as often as required, information can be obtained from the download database.

Therefore, the parameter is both monitored by EGE Haina and the OC-SENI, check energy meters remotely in order to define the quantity of electricity supplied by the project plant/unit to the grid.

Operation managers monitor and issue daily reports of the plant energy production, the information is consolidated monthly with the SMC data.

Also, technicians have the task to download, process, store and deliver to the OC-SENI the information coming from the SMC monthly, for the settlement of monthly economic transaction. Typically, the measured data can be seen on-line in real time by the owner and the OC-SENI. The data is filed instantly on the meter, daily in a download database and monthly processed data for settlement.

Monthly, the Coordinating Body prepares for the Regulatory System and the Agents, a detailed report of the commercial measurement activities of the SENI facilities, where is presented a follow-up and registration of any eventuality in any of them and the tasks carried out.

Management Structure and Responsibilities

Roles and responsibilities are defined for the relevant staff involved in VCS project monitoring. There is a VCS project Manager which have the overall responsibility for the monitoring system on this Project, including the reviewing of project data, quality assurance and quality control and definition of monitoring duties and responsibilities of project staff.

The monitoring of electricity generation and emission reductions of the project is carried out by the project staff as described below. They will be responsible for the maintenance of traceable and updated records for verification purposes.

VCS Project Coordinator:

- Responsible for data monitoring and recording activities, and review of calculations on emission reductions.
- Responsible for communications with VCS parties (DOE, etc.), associates, and miscellaneous procedures related to CDM project activities.

Commercial Department:

- Responsible for running and updating the model to calculate the emission factor of the electricity system, gathering information on electricity generation by the project activity, and the calculation of emission reductions.
- Reports to the CDM Project Coordinator.

Monitoring Department

- In charge of printing/retrieving data on electricity generation and reporting to the commercial department.
- Responsible for addressing and reporting any condition that could prevent the correct monitoring or data acquisition.

– Responsible for gathering data on electricity displaced by the project activity every hour and reporting on any condition that could prevent the monitoring or data acquisition by the control system.

Managers of the project must maintain credible, transparent, and adequate data estimation, measurement, collection, and tracking systems to successfully develop and maintain the proper set of information to undergo an audit for a greenhouse gas (GHG) emission reduction investment. These records and monitoring systems are needed to subsequently allow a Designated Operational Entity to verify project performance as part of the verification and certification process. This process reinforces the fact that GHG reductions are real and credible to the buyers of the Certified Emission Reductions (CERs).

Policies for over sighting and accountability of monitoring activities

The measurement systems have backup systems (main meter + backup meter + emergency meter). Monthly when downloading the SMC data, the Coordinating Body makes a cross-reference of the meters, in the case of any anomaly or difference, makes observations, investigations and corrections on place. In fact, the OC automatically makes the daily download of the SMC, therefore, survey and monitoring is constant.

Quality Assurance and Quality Control

The quality assurance and quality control procedures for recording, processing and archiving data follow rules and requirements that ensure accurate and consistent in the data collected and allow the proper verification of the emission reductions on an annual basis.

As said before, calibration of electricity meters was implemented according to the standards and procedures adopted by the Regulatory Office for the SENI grid. Electricity meters receive a periodic calibration at least every 2 years according to article 342 of the Regulation for the application of the General Electricity Law 125-01. Calibration of electricity meters was performed as detailed in articles 342, 343, 344 and 345 of the Regulation for the application of the General Electricity Law 125-01. Electricity transformers will be verified every 10 years. Electricity meters were evaluated every 2 years. These evaluations were carried out by the OC-SENI. Calibration records are being kept by the project owner for verification purposes (See Table 8).

Table 8. Calibration meter records

ID Meters	Meter habilitation date	Meter Calibration Date	Next Calibration Date
SMC1	09/03/2016 (A) [21]	8/02/2018 (B) [22]	8/02/2020

[21] See file 57_Certificado de Habilitación del SMC del Parque Eólico Larimar.pdf

[22] See file B_ACM-0018-2018 PARQE EOLICO LARIMAR G10.pdf

ID Meters	Meter habilitation date	Meter Calibration Date	Next Calibration Date
3276-PELAK-G10			
SMC 2 3276-PELAK-G20	10/03/2016 (A) [16]	8/02/2018 (C) [23]	8/02/2020

The system measurement elements have a valid calibration certificate, issued by the OC-SENI before the date on which they should have been. Calibration tasks follow national standards for electricity metering devices.

All electronic data have a monthly back up, and two electronic copies of each document is kept in different locations (the wind farm and its respective head offices). As a backup procedure, excel files containing the monitoring data are sent to the head offices at Santo Domingo every week, in order to ensure that data is also stored in a different location.

Training and Monitoring Personnel

All the people who participate in the wind farm monitoring process receive adequate training on the collection, synthesis and analysis mechanisms of the wind farm generation data, in order to guarantee the correct application of the Project's monitoring plan.

Verification and Monitoring Results

This monitoring report has been prepared by the monitoring personnel. It contains the data report, and the results of the emissions reductions of the project for the present verification period.

The verification of the monitoring report is a mandatory process required for all emission reduction projects. The main objective of the verification is to independently verify that the project has achieved the emission reductions as effectively generated and projected in the PD.

[23] See file C_ ACM-0019-2018 PARQUE EOLICO LARIMAR G20.pdf

5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

5.1 Baseline Emissions

The baseline scenario and the emission rate calculation are based on the electricity that otherwise would have been generated by the plants connected to the grid and by addition of future plants. According to the methodology, no leakage emissions are considered.

The methodology ACM0002 assumes that all project electricity generation above baseline levels would have been generated by existing grid-connected power plants and the addition of new grid-connected power plants. Thus, baseline emissions include only CO_2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity.

Baseline emissions are calculated by multiplying the combined margin emission factor ($EF_{grid,CM,y}$, in tCO_2e/MWh) by the electricity generated by the proposed project activity during the year y ($EG_{PJ,y}$, in MWh).

The detailed calculations and data of the baseline emissions are presented in the Excel file "ER_Larimar_MR1.xls". In the following, the relevant methodological approaches and formulas are presented. Baseline emissions are calculated as follows:

$$BE_y = EG_{PJ,y} \times EF_{grid,CM,y} \quad \textbf{(1)}$$

Where:

BE_y = Baseline emissions in year *y* (tCO_2)

$EG_{PJ,y}$ = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the project activity in year *y* (MWh)

$EF_{grid,CM,y}$ = Combined margin CO_2 emission factor for grid connected power generation in year *y* (tCO_2/MWh)

According to the methodology, if the project activity is the installation of a Greenfield power plant, the quantity of net electricity generation is determined as follows:

$$EG_{PJ,y}=EG_{facility,y} \quad \textbf{(2)}$$

Where:

$EG_{facility,y}$ = Quantity of net electricity generation supplied by the project plant/unit to the grid in year y (MWh)

The Calculation of $EG_{PJ,y}$ was made for each year according to quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the VCS project activity in each year for each period of this monitoring report that the project activity has been in operation as seen in Table

9. It is important to remark that as stated in section 3.2 parameter $EG_{facility,y} = EG_{PJ,y}$, for this monitoring period from 01/08/2016 to 31/12/2019 a calibration for the meters was required for 09/03/2018 – SMC1 and 10/03/2018 SMC2 (see Table 8), this calibration was made in 08/02/2018 so the generation hourly data was not penalized.

Table 9. $EG_{P,J,y}$ Project generation

Year	$EG_{P,J,y}$ Larimar I (MWh)	$EG_{P,J,y}$ Larimar II (MWh)	$EG_{P,J,y}$ Total (MWh)
2016 (from 01/08 to 31/12)	70,619.27	0	70,619.27
2017	179,278.16	0	179,278.16
2018	218,777.12	27,189.23	245,966.36
2019	183,249.54	131,403.92	314,653.46
Total	651,924.10	158,593.15	810,517.25

Calculation of the **Combined Margin CO_2 Emission Factor** for grid connected power generation **$EF_{grid,CM,y}$**

As for Operating Margin Emission Factor **$EF_{grid,OM,y}$**, the Simple OM ex-ante option was chosen:

Ex ante option: if the ex-ante option is chosen, the emission factor is determined once at the validation stage, thus no monitoring and recalculation of the emissions factor during the crediting period is required. For grid power plants, use a 3-year generation-weighted average, based on the most recent data available at the time of submission of the PDD for validation. For off-grid power plants, use a single calendar year within the five most recent calendar years prior to the time of submission of the PDD for validation.

The Operating Margin Emission Factor - Simple OM is **0.7208 (tCO_2/MWh)**

As for the Build Margin Emission Factor **$EF_{grid,BM,y}$** in terms of vintage of data the *ex-ante* approach was chosen, and this is the first crediting period:

Option 1: For the first crediting period, calculate the build margin emission factor ex ante based on the most recent information available on units already built for sample group m at the time of CDM-PDD submission for validation. For the second crediting period, the build margin emission factor should be updated based on the most recent information available on units already built at the time of submission of the request for renewal of the crediting period to the DOE. For the third crediting period, the build margin emission factor calculated for the second crediting period should be used. This option does not require monitoring the emission factor during the crediting period.

The resulting BM Emission Factor is **0.7068 tCO_2/MWh**.

According to the Tool, the calculation of the Combines Margin - CM emission is calculated as follows:

$$EF_{grid,CM,y} = EF_{grid,OM,y} \times w_{OM} + EF_{grid,BM,y} \times w_{BM} \quad (8)$$

Where:

$EF_{grid,CM,y}$	=	Combined Margin CO_2 emission factor in year *y* (tCO_2/MWh)
$EF_{grid,OM,y}$	=	Operating Margin CO_2 emission factor in year *y* (tCO_2/MWh)
$EF_{grid,BM,y}$	=	Build Margin CO_2 emission factor in year *y* (tCO_2/MWh)
w_{OM}	=	Weighting of OM emissions factor
w_{BM}	=	Weighting of BM emissions factor

According to the Tool, for wind power generation projects, the weights to be applied are:

w_{OM} = 0.75 and w_{BM} = 0.25.

The combined margin emission factor is calculated as $EF_{grid,CM,y}$ = **0.7173 tCO_2/MWh**

The ex-ante estimation of the annual emission reductions gives

$BE_y = EG_{PJ,y} \times EF_{grid,CM,}$

Table 10. Baseline Emission Larimar Wind Farm Project

Year	BE,y – Baseline emissions – Larimar I - tCO2e	BE,y – Baseline emissions – Larimar II - tCO2e	BE,y – Baseline emissions – Total Wind Project - tCO2e
2016 (from 01/08 to 31/12)	50,655.20	0	50,655.20
2017	128,596.23	0	128,596.23
2018	156,928.83	19,502.84	176,431.67
2019	131,444.9	94,256.03	225,700.93
Total	467,625.16	113,758.87	581,384.03

$BE_y = EG_{PJ,y} \times EF_{grid,CM,y}$ = 810,517.25 MWh x 0.7173 tCO_2/MWh

BE_y = 581,384.03 tCO_2.

5.2 Project Emissions

As per the methodology, project emissions in year *y* (PE_y) for wind power projects are null. Thus, $PE_y = 0$. See explanation below.

$PE_y = PE_{FF,y} + PE_{GP,y} + PE_{HP,y}$

Where

PE*y* = Project emissions in year y (tCO_2e)

$PE_{FF,y}$ = Project emissions from fossil fuel consumption in year y (tCO_2e)

$PE_{GP,y}$ = Project emissions from the operation of geothermal power plants due to the release of non-condensable gases in year y (tCO_2e)

$PE_{HP,y}$ = Project emissions from reservoirs of hydro power plants in year y (tCO_2e)

In Larimar Wind Farm Project:

$PE_{FF,y}$ = Project emissions from fossil fuel consumption in year y (tCO_2)

Due to the absence of a back-up generator, fossil fuel combustion that does not occur.

Therefore, $PE_{FF,y} = 0$

$PE_{GP,y}$ = Project emissions from the operation of geothermal power plants due to the release of non-condensable gases in year y (tCO2e).

Operation of geothermal power plants due to the release of non-condensable gases are not considered, because there are not geothermal power plants connected in the Dominican Republic grid.

Therefore, $PE_{GP,y} = 0$

$PE_{HP,y}$ = Project emissions from reservoirs of hydro power plants in year y (tCO_2e)

The proposed project is a wind farm, then emission from reservoirs are not considered.

Therefore, $PE_{HP,y} = 0$

5.3 Leakage

As per the methodology, leakage emissions in year *y* (LE_y) are null. Thus, $LE_y = 0$.

5.4 Net GHG Emission Reductions and Removals

In accordance with the Methodology ACM0002 (version 17.0.0) for the proposed project activity, the calculation of the project emission reductions only considers the baseline emissions.

Since project emissions and leakage emissions are zero, emission reductions are directly given as the baseline emissions as follows:

$$ER_y = BE_y - PE_y - LE_y = BE_y$$

Where:

ER*y* = Emission reductions in year y (tCO_2e/yr)

BE*y* = Baseline emissions in year y (tCO_2e/yr)

PE*y* = Project emissions in year y (tCO_2e/yr)

LE*y* = Leakage emissions in year y (tCO_2e/yr)

Thus: ER*y* = **581,384.03 tCO_{2e}**

See more details in the attached spreadsheet named "EF_Larimar_MR1.xls".

Table 11. Net GHG Reduction or removals for Larimar I

Year	Baseline emissions or removals (tCO_2e)	Project emissions or removals (tCO_2e)	Leakage emissions (tCO_2e)	Net GHG emission reductions or removals (tCO_2e)
2016	50,655.20	0	0	50,655.20
2017	128,596.23	0	0	128,596.23
2018	156,928.83	0	0	156,928.83
2019	131,444.9	0	0	131,444.9
Total	**467,625.16**	**0**	**0**	**467,625.16**

Table 12. Net GHG Reduction or removals for Larimar II

Year	Baseline emissions or removals (tCO_2e)	Project emissions or removals (tCO_2e)	Leakage emissions (tCO_2e)	Net GHG emission reductions or removals (tCO_2e)
2018	19,502.84	0	0	19,502.84
2019	94,256.03	0	0	94,256.03
Total	**113,758.87**	**0**	**0**	**113,758.87**

Table 13. Net GHG Reduction or removals for the total Larimar Wind Farm project

Year	Baseline emissions or removals (tCO_2e)	Project emissions or removals (tCO_2e)	Leakage emissions (tCO_2e)	Net GHG emission reductions or removals (tCO_2e)
2016	50,655.20	0	0	50,655.20
2017	128,596.23	0	0	128,596.23
2018	176,431.67	0	0	176,431.67
2019	225,700.93	0	0	225,700.93
Total	**581,384.03**	**0**	**0**	**581,384.03**