LARIMAR WIND FARM PROJECT

Document Prepared By MGM Innova Consulting

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1 PROJECT DETAILS

1.1 Summary Description of the Project

The objective of the proposed project activity is to reduce GHG emissions to the atmosphere by generating energy from renewable sources and supplying the generated electricity to the local grid.

EGE Haina S.A. (Largest consumption in DR) is the owner of the Larimar project, which involves the construction and operation of 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), will be installed to bring the power to Los Cocos Substation, which will increase its capacity adding a transformer of 35/45 MW. Therefore Los Cocos substation will interconnect the project to the National Interconnected Electrical System (SENI)[3].

The construction of the first phase of the project 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 is ongoing and is expected to start operation the second quarter of 2018.

The proposed project activity will supply 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.

The project will 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 will decrease emissions to the atmosphere of sulphur oxides (SO_x), nitrogen oxides (NO_x), 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 will help to decrease the dependency of the country on non-renewable resources, which are limited in supply.
- The project activity will help the country to achieve its goals of emission reduction by 2030 and increase the renewable energy mix of the national energy matrix.
- The project activity will generate employment opportunities for the local residents during the construction stage and, after project implementation, for the operation and maintenance activities.

[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

- The project activity will contribute to technology transfer and technological self-reliance through capacity building of employees. Moreover, the project will generate experience in the sector, helping to strengthen institutional capacities and increasing investor's confidence in this technology.
- The project will contribute to the local development and income level by creating new direct and indirect income sources.

1.2 Sectoral Scope and Project Type

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

The project consists in Wind Farm Power Plant presented as a single bundled project. Where the first phase -Larimar I and second phase Larimar II, are planned to operate together.

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
Email	estevezr@egehaina.com

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

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

started on 03/05/2016. The first wind turbine was connected to the national system on 23/05/2016[7].

1.6 Project Crediting Period

The project is expected to have renewable 10- years crediting period. The project crediting period starting date for Larimar I is 01/08/2016, and according to this the end date of the first crediting period is 01/08/2026.

1.7 Project Scale and Estimated GHG Emission Reductions or Removals

Project Scale	
Project	x
Large project	

For Larimar I [8]

Year	Estimated GHG emission reductions or removals (tCO_2e)
August to December 2016	61.566,16
2017	147.758,77
2018	147.758,77
2019	147.758,77
2020	147.758,77
2021	147.758,77
2022	147.758,77
2023	147.758,77
2024	147.758,77
2025	147.758,77
January to July 2026	86.192,62
Total estimated ERs	1'477.587,73
Total number of crediting years	10
Average annual ERs	**147.758**

For Larimar II [9]

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

[8] See the document 41_Larimar EF calculation.xls - Annual average sheet Larimar I

Year	Estimated GHG emission reductions or removals (tCO_2e)
August to December 2018	49.013,83
2019	117.633,20
2020	117.633,20
2021	117.633,20
2022	117.633,20
2023	117.633,20
2024	117.633,20
2025	117.633,20
2026	117.633,20
2027	117.633,20
January to July 2028	68.619,37
Total estimated ERs	1.176.331,98
Total number of crediting years	10
Average annual ERs	**117.633**

Larimar Wind Farm (Both working)

Year	Estimated GHG emission reductions or removals (tCO_2e)
August to December 2016	61.566,16
2017	147.758,77
2018	196.772,61
2019	265.391,97
2020	265.391,97
2021	265.391,97
2022	265.391,97
2023	265.391,97
2024	265.391,97
2025	265.391,97
January to July 2026	203.825,82
Total estimated ERs	2.467.667,14

[9] See the document 41_Larimar EF calculation.xls - Annual average sheet Larimar II

Year	Estimated GHG emission reductions or removals (tCO_2e)
Total number of crediting years	10
Average annual ERs	246.766

1.8 Description of the Project Activity

The Larimar Wind Power Project is implemented by EGE Haina S.A. The project is a wind power plant located in region of Barahona, in the South of Dominican Republic. It is developed in two adjacent properties: (i) "Larimar I" has 15 wind turbine generators with a total installed capacity of 49.5. MW[10]; and (ii) "Larimar II" has 14 wind turbines generators with a total installed capacity of 48.3 MW[11]. The total installed capacity of the wind farm is 97.8 MW. Each wind farm has an expected lifetime of 20 years[12].

The Vestas V112-3.3 MW wind turbine used for Larimar I, is a pitch regulated upwind turbine with active yaw and a three-blade rotor. The Vestas V112-3.3 MW turbine has a rotor diameter of 112m and a rated output power of 3.3 MW. The turbine utilises the OptiTip® concept and a power system based on an induction generator and full-scale converter.

The following table shows the main technical characteristics of the wind turbine:

Table 1. Vestas V112-3.3 MW Wind Turbine

Vestas V112 - 3.3 MW Wind Turbine (Larimar I)	
Rotor	
Diameter	112 m
Speed (dynamic operation range)	8.1 – 17.7 rpm
Blade	
Number	3
Type	Airfoil shells bonded to supporting beam
Length	54.65 m
Material	Fibreglass reinforced epoxy and carbon fibres
Hub	
Type	Cast ball shell hub
Material	Cast iron
Height	84 m

[10] 15 wind turbines - Vestas V112 with 3.3 MW (49.5 MW)

[11] 14 wind turbines - Vestas 117 with 3.45 MW (48.3 MW)

[12] See file 05_Engineering, Procurement and Construction Agreement - EPC. See Annex 1.2 Statement of Compliance, also see 42_Larimar I_Type Certificate_V112.pdf and 43_Larimar II_Type Certificate_V117.pdf.

Vestas V112 - 3.3 MW Wind Turbine (Larimar I)	
Main Shaft	
Type	Hollow shaft
Material	Cast iron
Tower structure	
Type	Cylindrical/conical tubular
Material	Iron
Generator	
Type	Asynchronous with cage rotor
Rated power (PN)	3500 kW
Rated apparent power	4000 kVA
Frequency	0-100 Hz
Voltage, generator	750 V
Voltage, converter	650 V
Number of poles	4/6
Transformer	
Type	Dry-type cast resin transformer
Basic layout	3 phase, 2 winding transformer
Rated power HV / LV1 / LV2	3750 kVA

The Vestas V117 - 3.45 MW wind turbine used for Larimar II, is a pitch regulated upwind turbine with active yaw and a three-blade rotor. The Vestas V117 - 3.45 MW turbine has a rotor diameter of 117m, a rated output power of 3.45 MW and annual energy production of 165 GWh. The turbine utilises the OptiTip® concept and a power system based on an induction generator and fullscale converter. With these features, the wind turbine is able to operate the rotor at variable speed and thereby maintaining the power output at or near rated power even in high wind speed. At low wind speed, the OptiTip® concept and the power system work together to maximise the power output by operating at the optimal rotor speed and pitch angle.

Table 2. Vestas V117 - 3.45 MW Wind Turbine (Larimar II)

Vestas V117 - 3.45 MW Wind Turbine (Larimar II)	
Rotor	
Diameter	117 m
Speed (dynamic operation range)	6.2 – 17.7 rpm
Blade	
Number	3
Type	Airfoil shells bonded to supporting beam
Length	57.15 m
Material	Fibreglass reinforced epoxy,carbon fibres

Vestas V117 - 3.45 MW Wind Turbine (Larimar II)	
	and Solid Metal Tips (SMT)
Hub	
Type	Cast ball shell hub
Material	Cast iron
Height	91.5
Main Shaft	
Type	Hollow shaft
Material	Cast iron
Tower structure	
Type	Cylindrical/Conical tubular
Material	Iron
Generator	
Type	Asynchronous with cage rotor
Rated power (PN)	3500 kW
Rated apparent power or Rated rpm	4000 kVA
Frequency	0 - 100 Hz
Voltage, generator	750 V (at rated speed)
Voltage, converter	650 V
Number of poles	4/6
Transformer	
Type	Dry-type cast resin transformer
Basic layout	3 phase, 2 winding transformer
Rated power HV	3750 kVA

Both turbines are controlled and monitored by the VMP6000 multiprocessor control system that is based on four main processors (ground, nacelle, hub and converter) and serves the following main functions:

- Monitoring and supervision of overall operation.
- Synchronizing of the generator to the grid during connection sequence in order to limit the inrush current.
- Operating the wind turbine during various fault situations.
- Automatic yawing of the nacelle.
- OptiTip® - Blade pitch control.
- Reactive power control and variable speed operation.
- Noise emission control.
- Monitoring of ambient conditions.
- Monitoring of the grid.
- Monitoring of the smoke detection system.

The wind turbines will be connected by a 3.45 KV, double circuit, 100 MW power transmission lines (the first 3.6 km are overhead and the rest 1.4 km underground), to reach the substation. Los Cocos which will increase its capacity from 135 MW to 180 MW adding a transformer of 35/45 MW. Los Cocos substation is interconnected to the National Interconnected Electricity System (SENI).

The net electricity delivered to the grid will be monitored continuously by commercial electricity meters located in the substation.

Since the proposed project involves the installation of wind turbines made in Europe, technology and know-how will be transferred to Dominican Republic, encouraging the continuous development of the local wind power industry.

1.9 Project Location

The proposed 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:

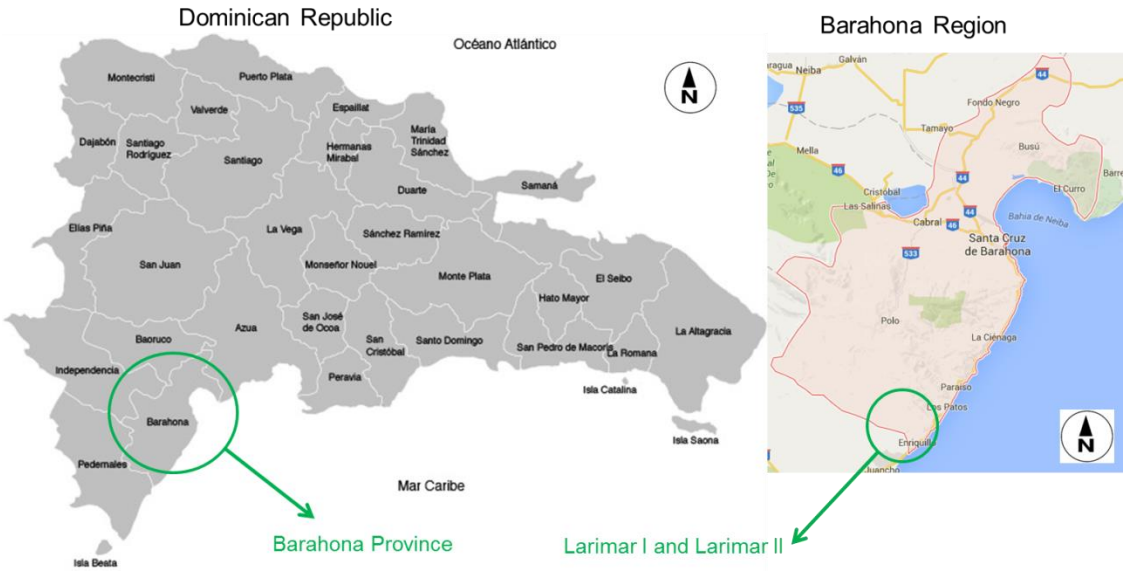

Figure 1. Location of Larimar Wind Farm Project

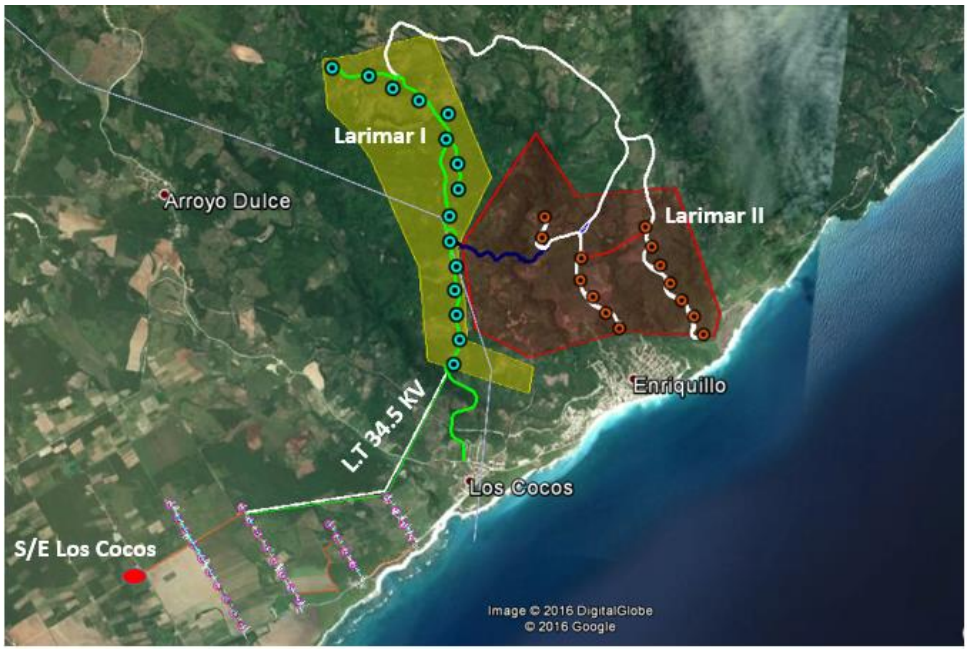

Figure 2. Larimar Wind Farm Satellite view [13]

Larimar I constructed area, will be approximately of 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 will be 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 3. Larimar I and Larimar II Perimeter (Permanent concession by CNE)

Larimar I - Zone: 19Q		
ID	**Este**	**Norte**
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

Larimar II - Zone: 19Q		
ID	**Este**	**Norte**
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

[13] 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.

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

Table 4. 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 images show the location of the project facilities

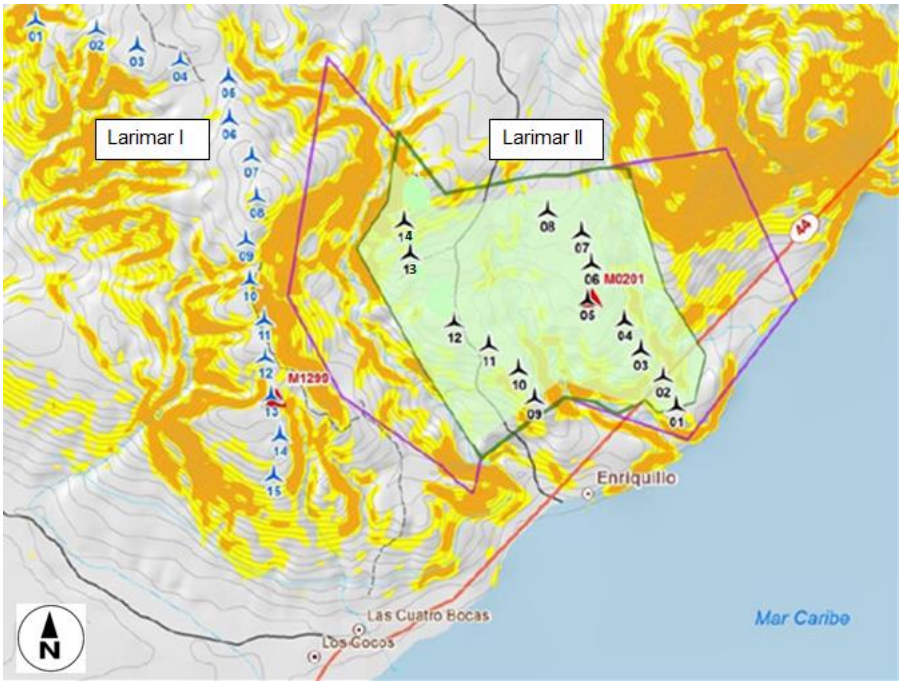

Figure 3. Larimar I and Larimar II – Wind turbines location

1.10 Conditions Prior to Project Initiation

Prior to project implementation, no wind farm is installed at the site. The energy that will be delivered to the grid is generated by renewable power generation as reflected in the combined margin emissions factor (as per the tool applied). Since the project consists of a wind farm plant that does not generate GHG emissions itself, but reduces emissions of other power plants, it is clear that it has not been implemented to generate GHG emissions for the purpose of their subsequent reduction, removal or destruction. For more information please go to Section 2.4 (Baseline Scenario).

1.11 Compliance with Laws, Statutes and Other Regulatory Frameworks

There are two main laws which define the regulatory framework of the electricity generation sector in Dominican Republic in general, and to promote renewable energy in particular. These are briefly described below. ***The General Electricity Act*** (created by the law 125-01 of 2001) and its modification with the law 186-07 of August 2007. The main issues defined by the law are the following:

- Assurance that at least 20 % of all electricity trading is done on the spot market.
- Limiting distribution company ownership of generating plants to not more than 15% of peak load in the interconnected system (renewable energy sources are exempt from this rule).
- Regulation of electricity tariffs for public-grid customers with maximum connected loads of 2 MW as long as the customers do not enter into direct contracts with the suppliers.
- Electricity companies which intend to operate an electricity generation business above 2 MW must request a concession for the operation of electricity works[14].
- Regulation of transit tariffs for the use of transmission and distribution of facilities.

[14] Source: *Reglamento para la Aplicación de la Ley General de Electricidad (No. 125-01).* Article 60. http://www.sie.gov.do/archivos/leyes/Reglamento%20para%20la%20Aplicacion%20de%20la%20Ley%20General%20de%20Electricidad.pdf

- Provision of preferential treatment to companies that generate electricity from renewable energy sources with regard to sales and load distribution - if prices and conditions are otherwise identical.
- Exemption of companies generating electricity using renewable energy sources from national and local taxes for five years.

The ***Law on Incentives for the Development of Renewable Energy Sources and Special Regimes, No. 57-07*** [15] and its Implementation Regulation[16].The law looks to promote the energy diversity of the country in terms of self-sufficiency of strategic inputs, meaning fuel and non-conventional energy, reducing dependence on imported fossil fuels, stimulating private investment to develop projects from renewable energy sources, and mitigate the negative environmental impacts of fossil fuel energy operations.

This law promotes wind farms with a capacity of up to 50 MW, mini hydropower plants of up to 5 MW, PV installations of all sizes, concentrating solar thermal power stations of up to 120 MW, biomass power stations, and ocean power plants. The law also promotes technologies for solar heat generation and refrigeration. The incentives include the following:

- 100% exemption over import duties for equipment, machinery and accessories required for renewable energy production.
- 100% exemption over sales tax, for all above mentioned equipments.
- Reduction to a fixed 5% on the tax over foreign financed interest payments, modifying Art. 306 of the Dominican Tax Code for the beneficiaries of this new law.
- Owners or renters of family homes and commercial or industrial establishments who shift to renewable energy systems for their private consumption are given a tax credit equal to 40% of the capital cost of the equipment purchased. Consumers will be able to discount the tax credit from their income tax for the next three years at a proportion of 33.33% per year.
- This law also calls for the creation of a CO_2 emissions bond market under the platform of the Kyoto Protocol, regulated by the Ministry of Natural Resource's Mechanism of Clean Development.

Since the project activity is a wind farm, there is no legal requirement given by Law ***No. 57-07*** to incorporate any other non-conventional renewable energy (NCRE).

The proposed project activity is fully in compliance with all mandatory laws and regulations.

1.12 Ownership and Other Programs

1.12.1 Project Ownership

The President and Executive Director of the National Energy Commission - CNE, sign a definitive concession contract with Haina's Electricity Generator, S.A (EGE HAINA), for the operation and exploitation, for the account and own benefit of Larimar Wind Farm Project[17].

[15] Source: *Ley No. 57-07 de Incentivo a Las Energías Renovables y Regímenes especiales (07 de Mayo del 2007*).http://www.sie.gov.do/archivos/leyes/Ley%20de%20Incentivo%20a%20las%20Energias%20Renovables%20y%20Sus%20Regimenes%20Especiales.pdf

[16] Source: Reglamento de Aplicación de la Ley No. 57-07, de Incentivo al Desarrollo de Fuentes Renovables de Energía y de sus Regímenes Especiales, aprobado por Decreto No. 202-08. Publicado en la G. O. No. 10469, del 30 de mayo de 2008. http://faolex.fao.org/docs/pdf/dom95065.pdf.

[17] Emitted on April, 2016 by the corresponding Local Government Council to EGE Haina. See document 47_Decreto Concesion Larimar Poder 29-16.pdf.

For Larimar I and II, the permission to start construction is given by the Environmental License assigned to EGE Haina S.A., given by the Ministry of Environment and Natural Resources of Dominican Republic – MIMARENA.
Table 5 shows the different documents and requirements mandatory to pursuit the process to operate the project, starting from the conception of the idea of the project.

Table 5. Legal project performance (x – done) [18]

Documents required	Description	Larimar I	Larimar II
Provisional concession request at the CNE	Permission to perform studies	X	In process
Land use permit given by local council	Permission of the local authority for the use of the land.	X	x
Land Acquisitions - Land owners	Land Negotiation	X	x
Environmental License by MIMARENA	Permission to start construction	X	x
Definitive Concession by the President via CNE	Permission to obtain authorization to operate	X	Not started
Request for interim interconnection to SIE	Permit for interconnection	X	Not started
Request for commissioning to OC-SENI	Permission to operate and take measurements	X	Not started
Request for commissioning to SIE	Permission to operate definitively	X	Not started

According to this information, EGE Haina counts with the project ownership to perform the Wind Farm Project. Documents to support this table will be delivered.

1.12.2 Emissions Trading Programs and Other Binding Limits

Not applicable.

1.12.3 Other Forms of Environmental Credit

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

1.12.4 Participation under Other GHG Programs

The project has no intends to generate any other form of GHG-related environmental credit for GHG emission reductions or removals claimed under the VCS Program.

1.12.5 Projects Rejected by Other GHG Programs

The project has been rejected by Gold Standard, due to start date issues and changes in 2015 of the eligibility laws considering the project eligible, only submitting it within one year of the estimated start date. The GS Technical Advisory Committee (TAC) defines the start date of the project a date not in between the year stipulated.

[18] For Larimar I see files numbered from 47 to 51, and 03_Permiso Ambiental No 2597-15 Parque Eólico Larimar I. For Larimar II see files numbered from 52 to 54.

In order to clarify this issue Table 6 presents the key events which conditioned the start date of the project.
After an important screen of the milestones of the project the GS Technical Advisory Committee (TAC), considered the released of payment (15th October 2015 – EPC contract was signed), a very crucial step in any project implementation and this event marks the start date for the project as per de GS definition. Therefore it was invalid the position of the project owner which argued the milestone of Environmental Licence granting as the start date of the project, due to the impossibility to start the project without this Licence.
Considering this situation and the fact that the project was uploaded the 10th February-2016 to the GS Markit Platform, the project was definitely not presented within the first year after the considered start date of the project for the Gold Standard (which should have been between October 2014/October 2015). In conclusion the project was rejected.

Table 6. Key events – Gold Standard Process

Date	Key event
September 2013	GL Garrad Hassand is required to make an energy production survey to evaluate deployments scenarios of the most competitive companies that submitted bids. Basically three aspects were evaluated: project cost, energy production and the impact on the land and inhabitants in the area. The result of this survey allowed choosing the location that committed the least amount of land for construction, and interfered less in the population of the area. However, this site had a higher cost and was the second in energy production.
August 2013	Starts de development of the environmental impact study, chiropterans and a preliminary study of noise.
February 2014	It starts the Soil survey
August 2014	The board of directors approves the project.
11th September 2014	Investment decision was taken
15th October 2014	The EPC contract of Larimar I is signed and the weather station was installed to measure the wind conditions for Larimar II.
11th February 2015	Environmental License Granting of Larimar I and starting construction phase of Larimar I.
June 2015	Submission of the Prior Consideration to the unfccc – Larimar Wind Farm
September 2015	First EPC draft contract was delivered evaluating different scenarios
10th February 2016	The project was uploaded at Gold Standard Markit Platform
February 2016	Larimar II – Environmental Impact Declaration Submission and Environmental License Demand to the Ministry of Environment and Natural Resources of Dominican Republic
May 2016	Larimar II - Provisional concession proceeded at Comisión Nacional de Energía (CNE)
April 2016	Larimar I – Final concession issued the executive authority
July 2016	Larimar I - Authorization for putting into Operation - awarded by the SIE (Super Intendencia de Electricidad)
August 2016	Larimar I - First Power Purchese Agreement (PPA) invoice, issued to Corporación Dominicana de Empresas Eléctricas Estatales (CDEE).
13th December 2016	Environmental License Granting of Larimar II
28th June 2017	The EPC Contract for Larimar II is signed.

In this context it was decided to present the project to the VCS, considering that the project was within the limits and conditions establish by the Standard regarding the start date of the project and the presentation of the project to the platform.

1.13 Additional Information Relevant to the Project

Eligibility Criteria

The guidelines of the form to complete the Project Document stated that "For grouped projects, identify eligibility criteria for inclusion of new instances of each project activity." Since this is not a grouped project, this is not applicable to the project activity.

As a Multiple Instance Project Larimar Wind Farm includes more than one project activity instance (Larimar I and Larimar II). The inclusion of further project activity instances subsequent to initial validation is not considered. Therefore the baseline determination and additionality demonstration for all project activity instances shall be combined in this PD. Also the project does not exceed any capacity limits to which a project activity is subject.

It is important to remark that the project is in compliance with the VCS requerements and was presented to the VCS within 2 years before the project start date, which is the date the project began generating GHG emission reductions or removals (August 2016 - See Table 6).

Leakage Management

Not applicable as per the applied methodology.

Commercially Sensitive Information

No information has been excluded.

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.

Please refer to section 1.1 to see more information regarding project impact on sustainability.

Further Information

Not applicable.

2 APPLICATION OF METHODOLOGY

2.1 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)[19].

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

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)[20] and the project additionality is demonstrated using the "Tool for the demonstration and assessment of additionality" (version 07.0.0)[21].

2.2 Applicability of Methodology

The methodology ACM0002 is applicable to grid-connected renewable energy power generation project activities that:

(a) Install a Greenfield power plant;
(b) Involve a capacity addition to (an) existing plant(s);
(c) Involve a retrofit of (an) existing operating plants/units;
(d) Involve a rehabilitation of (an) existing plant(s)/unit(s); or
(e) Involve a replacement of (an) existing plant(s)/unit(s).

In this case, the proposed project activity involves grid-connected renewable energy power generation through the installation of two new wind farms (a Greenfield power plant).

The applicability conditions of the methodology ACM0002 are presented below together with an explanation on why each condition is met by the project activity.

Table 7. Methodology Applicability

Applicability Conditions	Project Activity
1. The project activity may include renewable energy power plant/unit of one of the following types: hydro power plant/unit with or without reservoir, wind power plant/unit, geothermal power plant/unit, solar power plant/unit, wave power plant/unit or tidal power plant/unit.	The proposed project activity involves renewable energy power generation through the installation of two wind farms. Thus, this condition is met.
2. 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.	The proposed project activity involves the installation of a Greenfield power plant. Thus, this condition is not applicable.

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

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

Applicability Conditions	Project Activity
3. In case of hydro power plants, one of the following conditions shall apply: (a) The project activity is implemented in existing single or multiple reservoirs, with no change in the volume of any of the reservoirs; or (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 is greater than 4 W/m^2; or (c) The project activity results in new single or multiple reservoirs and the power density is greater than 4 W/m^2; or (d) The project activity is an integrated hydro power project involving multiple reservoirs, where the power density for any of the reservoirs is lower than or equal to 4 W/m^2, all of the following conditions shall apply: (i) The power density calculated using the total installed capacity of the integrated project is greater than 4 W/m^2; (ii) Water flow between reservoirs is not used by any other hydropower unit which is not a part of the project activity; (iii) Installed capacity of the power plant(s) with power density lower than or equal to 4 W/m^2 shall be: a. Lower than or equal to 15 MW; and b. Less than 10 per cent of the total installed capacity of integrated hydro power project.	The proposed project activity involves the installation of two wind farms. Thus, this condition is not applicable.
4. In the case of integrated hydro power projects, project proponent shall: (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 (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.	The proposed project activity involves the installation of two wind farms. Thus, this condition is not applicable.
5. The methodology is not applicable to: (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; (b) Biomass fired power plants/units.	The proposed project activity does not involve switching from fossil fuels to renewable energy sources at the project site or the installation of biomass fired power plants. Thus, this condition is met.

Applicability Conditions	Project Activity
6. In the case of retrofits, rehabilitations, replacements, or capacity additions, this 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".	The proposed project activity involves the installation of a Greenfield power plant. Thus, this condition is not applicable.
7. The applicability conditions included in the tools apply.	The conditions of the "Tool to calculate the emission factor for an electricity system" are analyzed below.
7.1. 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 proposed project activity supplies electricity to the local grid, avoiding part of the electricity generated by the grid-connected power plants. Thus, this condition is met.
7.2. 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. In the latter case, the conditions specified in "Appendix 2: Procedures related to off-grid power generation" should be met. Namely, the total capacity of off-grid power plants (in MW) should be at least 10 per cent of the total capacity of grid power plants in the electricity system; or the total electricity generation by off-grid power plants (in MWh) should be at least 10 per cent of the total electricity generation by grid power plants in the electricity system; and that factors which negatively affect the reliability and stability of the grid are primarily due to constraints in generation and not to other aspects such as transmission capacity.	In this case, the emission factor for the project electricity system is calculated for grid power plants only. Thus, this condition is met.
7.3. The tool is not applicable if the project electricity system is located partially or totally in an Annex I country.	In this case, the project electricity system is located totally in Dominican Republic. Thus, this condition is met.

2.3 Project Boundary

According to the methodology, the spatial extent of the project boundary includes the project power plant/unit and all power plants/units connected physically to the electricity system that the proposed project power plant is connected to.

Additionally, according to the "Tool to calculate the emission factor for an electricity system", a grid/project electricity system is defined by the spatial extent of the power plants that are physically connected through transmission and distribution lines to the project activity and that can be dispatched without significant transmission constraints.

In this case, 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.

The following diagram shows the spatial extent of the project boundary[22]:

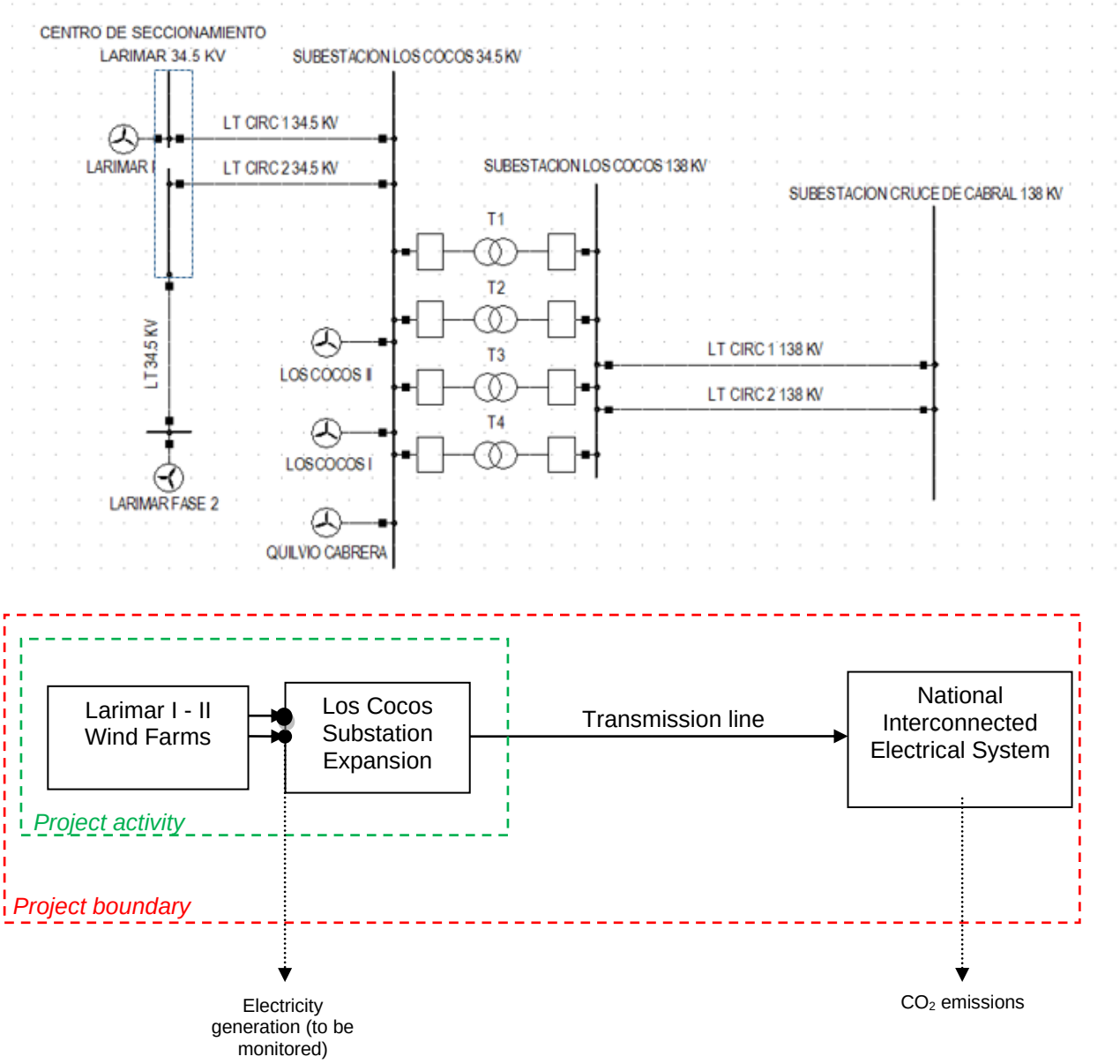

Figure 4. Line Diagram and Spatial Project Boundary

Table 8. Project Boundary – Baseline and Project scenario

Source		Gas	Included?	Justification/Explanation
Baseline	CO_2 emissions from electricity generation in fossil	CO_2	Yes	Main emission source
		CH_4	No	Minor emission source

[22] See document "38_DIAGRAMA UNIFILAR LARIMAR.pdf"

Source		Gas	Included?	Justification/Explanation
	fuel fired power plants that are displaced due to the project activity	N_2O	No	Minor emission source
		Other	No	NA
Project	For geothermal power plants, fugitive emissions of CH_4 and CO_2 from non-condensable gases contained in geothermal steam	CO_2	No	The project activity involves the installation of two wind farms.
		CH_4	No	
		N_2O	No	
		Other	No	
	CO_2 emissions from combustion of fossil fuels for electricity generation in solar thermal power plants and geothermal power plants	CO_2	No	The project activity involves the installation of two wind farms.
		CH_4	No	
		N_2O	No	
		Other	No	
	For hydro power plants, emissions of CH_4 from the reservoir	CO_2	No	The project activity involves the installation of two wind farms

2.4 Baseline Scenario

As stated in the approved methodology ACM0002 "Grid-connected electricity generation from renewable sources", version 17.0.0: If the project activity is the installation of a Greenfield power plant, the baseline scenario is the following:

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 the "Tool to calculate the emission factor for an electricity system".

Therefore, the baseline scenario consists of the electricity that would have been generated and delivered to the grid in the absence of the proposed project activity by:

- Other plants currently connected to the SENI; and
- New capacity additions to the SENI.

Hence, the baseline scenario is identified as the continuation of the common practice of power generation, i.e. mainly thermal power plants (Fuel oil, natural gas and coal) that emit large quantities of carbon dioxide (CO_2) to the atmosphere.

2.5 Additionality

The timeline of project implementation can be summarized as following:

Table 9. Project Timeline

Date	Key event
January 2012	The company requested GL Garrad Hassand, a feasibility study to install two measurement masts in the southern region of the country.
August 2012	After the feasibility study, a weather station was installed to measure the wind conditions.
January 2013	The project is presented to the board of directors of EGE Haina. After getting a good wind profile on the site, it is authorized to invite five international companies to submit proposal to develop a wind farm in the area. The invitations were sent in February 2013 and in May 2014 offers from companies were received.
April 2013	A cadastral survey is conducted to identify all possible affected by the project.
September 2013	GL Garrad Hassand is required to make an energy production survey to evaluate deployments scenarios of the most competitive companies that submitted bids. Basically three aspects were evaluated: project cost, energy production and the impact on the land and inhabitants in the area. The result of this survey allowed choosing the location that committed the least amount of land for construction, and interfered less in the population of the area. However, this site had a higher cost and was the second in energy production.
August 2013	Starts de development of the environmental impact study, chiropterans and a preliminary study of noise.
February 2014	It starts the Soil survey
August 2014	The board of directors approves the project.
11th September 2014	Investment decision was taken
October 2014	The EPC contract of Larimar I is signed and the a weather station was installed to measure the wind conditions for Larimar II.
11th February 2015	Environmental License Granting of Larimar I and starting construction phase of Larimar I.
June 2015	Submission of the Prior Consideration to the unfccc – Larimar Wind Farm
July 2015	Initiation of Soil studies for Larimar II
August 2015	MGM Innova consulting presented to EGE Haina the proposal to develop the project as an Emission Reduction Project under a carbon market.
September 2015	First EPC draft contract was delivered evaluating different scenarios
November 2015	The results of noise preliminary study of Larimar II, was delivered to project owner. Also the subcontractor to perform the Environmental Impact Declaration was hired.
February 2016	Larimar II – Environmental Impact Declaration Submission and Environmental License Demand to the Ministry of Environment and Natural Resources of Dominican Republic
May 2016	Larimar II - Provisional concession proceeded at Comisión Nacional de Energía (CNE)
April 2016	Larimar I – Final concession issued the executive authority
July 2016	Larimar I - Authorization for putting into Operation - awarded by the SIE (Super Intendencia de Electricidad)
August 2016	Larimar I - First Power Purchese Agreement (PPA) invoice, issued to Corporación Dominicana de Empresas Eléctricas Estatales (CDEE).
13th December 2016	Environmental License Granting of Larimar II
28th June 2017	The EPC Contract for Larimar II is signed.

The additionality of the project activity is demonstrated and assessed applying the CDM "Tool for the demonstration and assessment of additionality" (version 7.0.0), as stated in the methodology ACM0002 (version 17.0.0) and accepted by the VCS Standard (version 3.6).

The tool provides a step-wise approach to demonstrate and assess additionality:

Step 0. Demonstration whether the proposed project activity is the first-of-its-kind;

Step 1. Identification of alternatives to the project activity;

Step 2. Investment analysis to determine that the proposed project activity is either: (1) not the most economically or financially attractive, or (2) not economically or financially feasible;

Step 3. Barriers analysis; and

Step 4. Common practice analysis.

Step 0: Demonstration whether the proposed project activity is the first-of-its-kind

This step is optional. It is not applied for this project activity and therefore it is considered that the proposed project activity is not the first-of-its-kind.

Step 1: Identification of alternatives to the project activity consistent with current laws and regulations

Realistic and credible alternatives to the project activity(s) are defined through the following sub-steps:

Sub-step 1a: Define alternatives to the project activity

According to the Tool for the demonstration and assessment of additionality, project activities applying this tool in context of approved methodology ACM0002, only need to identify that there is at least one credible and feasible alternative that would be more attractive than the proposed project activity.

Outcome of Step 1a: For the project proponent, the possible alternatives to the proposed project include:

Alternative 1: The proposed project activity undertaken without being registered as a CDM project activity.

Alternative 2: Continuation of the current situation: In this case, the project activity will not be constructed and the power will be solely supplied by the operation of the Sistema Eléctrico Nacional Interconectado (SENI according to its abbreviation in Spanish) connected power plants and by the addition of new power plants.

Sub-step 1b: Consistency with mandatory laws and regulations

The implementation and operation of the project activity affects two different groups of power plants in the interconnected national system as represented in the baseline scenario by the combined margin:

- Existing power plants whose current electricity generation would be affected by the proposed project activity; and
- Prospective power plants whose construction and future operation would be affected by the proposed project activity.

Both alternatives, i.e. the proposed project activity undertaken without being registered as a VCS project and the continuation of the current situation, are in compliance with all of the mandatory laws and regulations as described in section 1.11. This is supervised by the corresponding authorities:

1. Ministry of Environment and Natural Resources of Dominican Republic: Compliance with all environmental laws and standards. The project proponent received the environmental license for the initial project design on February 2016. For Larimar II was granted on December 13th , 2016.
2. Superintendencia de Electricidad - SIE: The project proponent received the connection approval granted by the SIE on 22/07/2016 for Larimar I.
3. Comisión Nacional de Energía – CNE- and the SIE: The CNE responsible for designing and implementing the energy policy of the state, and the SIE is responsible for overseeing the operation of the electricity market and setting rates to the final consumer. They are also responsible for issuing concessions.

In the following, it is shown that the proposed project is additional as per the latest guidelines of the VCS Standard. In order to assess additionality, the corresponding CDM tool is applied as explained step by step.

The proposed project activity is fully in compliance with all mandatory laws and regulations.

Outcome of Step 1b: Both alternatives identified in sub-step 1a are in compliance with mandatory laws and regulations:

Alternative 1: The proposed project activity undertaken without being registered as a CDM project activity. Is consistent with the current laws and regulations of the country. Regarding the General Electricity Law, the project activity complies with all applicable legal and regulatory requirements. The Law on Incentives for the Development of Renewable Energy Sources and Special Regimes, states that wind farms with overall installed power of under 50 MW would normally be entitled to the incentives established by the Law. However, Article 2, paragraph II of the Regulations for the implementation of the Law indicates that the upper limit could be doubled for projects that install at least 50% of the original capacity requested. Since a capacity of each plant (presented separately of 49,5 MW, was initially requested this condition is met. Therefore authorization for the proposed project to seek the incentives has been applied. Thus, scenario a) is a viable option and is included for further analysis.

Alternative 2: Continuation of the current situation: In this case, the project activity will not be constructed and the power will be solely supplied by the operation of Dominican Republic, Sistema Eléctrico Nacional Interconectado (SENI) - connected power plants and by the addition of new power plants.
Then, electricity not generated by project activity would be dispatched to the SENI by existing plants (operating margin) and by future plants (build margin). As operations in existing plants and construction of new plants are valid alternatives under applicable laws and regulations, the alternative scenario is in compliance with the regulatory framework for electricity supply by existing or future SENI plants. Thus, alternative 2 is a viable option and is included for further analysis.

Step 2: Investment analysis

The project involves two wind power generation plants, Larimar I and Larimar II not designed simultaneously, which means that have different year of investment decision. For this reason it is necessary to perform an investment analysis for each one of them in order to recognize its additionality separately and be able to demonstrate its viability as a whole wind farm.

To conduct the investment analysis, the following Sub-steps are used:

Sub-step 2a: Determine appropriate analysis method

According to CDM "Tool for the demonstration and assessment of additionality" (version 7.0.0), three options can be applied for the investment analysis: the simple cost analysis, the investment comparison analysis and the benchmark analysis.

The project activity generates financial and economic benefits other than CER revenues, therefore the simple cost analysis (Option I) is not applicable. The corresponding CDM Methodological tool: Investment analysis (version 07.0), states that: "*if the alternative to the project activity is the supply of electricity from a grid this is not to be considered an investment and the benchmark approach is considered appropriate"*. Thus, Option II (investment comparison analysis) is also not applicable and the benchmark analysis (Option III) is chosen to prove additionality.

Sub-step 2b – Option III: Apply benchmark analysis

The additionality tool requires an identification of the most appropriate financial indicator. For the case of a power plant that would supply energy to the grid, the most appropriate indicator is the internal rate of return (IRR) as it characterizes the rate of return on invested capital. In this analysis an equity IRR is calculated in accordance with the additionality tool and the corresponding methodological tool as indicated above. Taxation is included as an expense in the IRR calculation, i.e. the IRR is determined as a post-tax indicator.

For **Larimar I**:
In accordance with the "Methodological tool: Investment analysis (version 07.0) a default value for the expected return on equity is used for the benchmark. The relevant benchmark for energy projects in Dominican Republic (Group 1 as given in the methodological tool) is 14.67% in real terms. As per the methodological tool, since the investment analysis is carried out in nominal terms, the real term values provided can be converted to nominal values by adding the inflation rate. The inflation target rate of the Central Bank of Dominican Republic – CBDR, for the duration of the crediting period was available; then the average forecasted inflation rate of 4.00% was calculated for the next five years, based on the forecasts for the period from 2015 to 2019, consistent with the investment decision on 11/09/2014.

The benchmark, i.e. the Nominal Return on Equity, is therefore given as 18.67%.

For **Larimar II**:
In accordance with the "Methodological tool: Investment analysis (version 07.0) a default value for the expected return on equity is used for the benchmark. The relevant benchmark for energy projects in Dominican Republic (Group 1 as given in the methodological tool) is 14.67% in real terms. As per the methodological tool, since the investment analysis is carried out in nominal terms, the real term values provided can be converted to nominal values by adding the inflation rate. The inflation target rate of the Central Bank of Dominican Republic – CBDR, for the duration of the crediting period was available; then the average forecasted inflation rate of 4.00% was calculated for the next five years, based on the forecasts for the period from 2016 to 2020, consistent with the investment decision on 08/06/2016.

The benchmark, i.e. the Nominal Return on Equity, is therefore given as 18.67%.

Sub-step 2c: Calculation and comparison of financial indicators

For the financial analysis the main cash outflows are given by the investment, the ongoing O&M costs and taxes. The cash inflows are generated from revenues of electricity sales (which depends on power generation and electricity prices).

Input values for the investment analysis

Larimar I
The financial structure is applied as suggested by the Methodological tool for Investment analysis (version 07.0). In this case the debt of the project is equal to zero. Therefore the terms of debt structure are given in the following table.

Table 10. Terms of debt structure[23].

Parameter	Value	Source
Total investment (USD)	$120,000,000	Investment decision
% Debt	0%	The project does not have debt
Equity amount (USD)	$120,000,000	Calculated (in nominal terms)
Loan amount (USD)	$0	Calculated (in nominal terms)
Principal (annual)	$0	Annual principal during 10 years

Table 11 lists the parameters and values used for carrying out the investment analysis. All input values are valid at investment decision on 11/09/2014 (see beginning of this section). The energy generation is given in a third-party energy study. All sources and further details are provided in the Investment Analysis spreadsheets.

An operational period of 20 years is used for the financial analysis, given by Engineering, Procurement and Construction Agreement - EPC. See Annex 1.2 Statement of Compliance. Design Lifetime. At the end of the project lifetime, no fair value is included since the equipment will be devaluated. Actually, the dismantling of the wind farm in year 20 (as per the life time) would generate a cost, i.e. a negative fair value, which is not included to be conservative.

Table 11. Input values used in the investment analysis available at the moment of decision making [24].

Electricity generation		
Capacity	49.5	MW
Net energy generation	206.00	GWh / year
Tariffs		
Electricity sales		
Energy price (average)	149.08	USD/MWh
Capacity price (average)	0	USD/kW-month
Renewable energy certificates	0	USD/MWh
INVESTMENT		
Total Capital Costs		
Total Investment (including EPC contract and project rights)	$120,000,000	USD
Equipment cost (for depreciation only)	$105,000,000	USD
OPERATING COSTS & EXPENSES		

[23] For details and specific sources, see Investment Analysis for Larimar I in the document 35_Equity IRR DR LARIMAR I.xls sheet “Debt”.

[24] For details and specific sources, see Investment Analysis for Larimar I in the document 35_Equity IRR DR LARIMAR I.xls sheet “Financial Indicators”.

Operation costs		
O&M (Substation and WTG)	$2,141,700	USD/year
Insurance	$983,100	USD/year
Land costs	0%	% of income
Taxes		
Income taxes	27.0%	%
Depreciation		
Annual depreciation Civil Works + Infrastructure	20	Years
Annual depreciation equipment	20	Years
FINANCIAL PARAMETERS		
Macro		
Inflation rate (forecast BCRD)	4.00%	%
Benchmark		
Return on Equity (real terms)	14.67%	%
Inflation Adjustment	4.00%	%
BENCHMARK: Nominal Return on Equity	18.67%	%

Larimar II

The financial structure is applied as suggested by the methodological tool for Investment analysis (version 07.0). In this case the debt of the project is equal to zero. Therefore the terms of debt structure are given in the following table.

Table 12. Terms of debt structure[25].

Parameter	Value	Source
Total investment (USD)	$113,000,000	Investment decision
% Debt	0%	The project does not have debt
Equity amount (USD)	$113,000,000	Calculated (in nominal terms)
Loan amount (USD)	$0	Calculated (in nominal terms)
Principal (annual)	$0	Annual principal during 10 years

Table 13 lists the parameters and values used for carrying out the investment analysis. All input values are valid at investment decision on 08/06/2016 (see beginning of this section). The energy generation is given in a third-party energy study. All sources and further details are provided in the Investment Analysis spreadsheets.

An operational period of 20 years is used for the financial analysis, given by Engineering, Procurement and Construction Agreement - EPC. See Annex 1.2 Statement of Compliance. Design. At the end of the project lifetime, no fair value is included since the equipment will be devaluated. Actually, the dismantling of the wind farm in year (as per the life time) would generate a cost, i.e. a negative fair value, which is not included to be conservative.

[25] For details and specific sources, see Investment Analysis for Larimar II in the document 36_Equity IRR DR LARIMAR II.xls sheet “Debt”.

Table 13. Input values used in the investment analysis available at the moment of decision making [26].

Electricity generation		
Capacity	49.5	MW
Net energy generation	176	GWh / year
Tariffs		
Electricity sales		
Energy price (average)	115.0	USD/MWh
Capacity price (average)	0	USD/kW-month
Renewable energy certificates	0	USD/MWh
INVESTMENT		
Total Capital Costs		
Total Investment (including EPC contract and project rights)	$113,000,000	USD
Equipment cost (for depreciation only)	$100,000,000	USD
OPERATING COSTS & EXPENSES		
Operation costs		
O&M (Substation and WTG)	$2,141,700	USD/year
Insurance	$983,100	USD/year
Land costs	0%	% of income
Taxes		
Income taxes	27.0%	%
Depreciation		
Annual depreciation Civil Works + Infrastructure	20	Years
Annual depreciation equipment	20	Years
FINANCIAL PARAMETERS		
Macro		
Inflation rate (forecast IMF)	4.00%	%
Benchmark		
Return on Equity (real terms)	14.67%	%
Inflation Adjustment	4.00%	%
BENCHMARK: Nominal Return on Equity	18.67%	%

Result of the investment analysis

Larimar I

Based on the parameters above, the Internal Rate of Return (post-tax equity IRR) is calculated as 16.04%, which is below the benchmark rate of 18.67%.

Larimar II

Based on the parameters above, the Internal Rate of Return (post-tax equity IRR) is calculated as 11.61%, which is below the benchmark rate of 18.67%.

[26] For details and specific sources, see Investment Analysis for Larimar II in the document 36_Equity IRR DR LARIMAR II.xls sheet "Finanacial Indicators".

Sub-step 2d: Sensitivity analysis

A sensitivity analysis is carried out by varying the following key parameters to analyze the impact on the equity IRR:

- Energy generation (MWh): The quantity of energy generated is varied.
- Energy tariff (USD/MWh): The energy tariff is varied.
- Investment costs (USD): the complete investment cost is varied.
- O&M costs (USD/year): the complete operational cost is varied

Larimar I

Table 14 shows a sensitive analysis for the resulting IRR by varying the main parameters +/- 10%.

Table 14. Sensitivity analysis Larimar I.

Variation of electricity generation	Base	+10.00%
IRR	16.04%	17.88%

Variation of electricity tariff	Base	+10.00%
IRR	16.04%	17.88%

Variation of investment costs	Base	-10.00%
IRR	16.04%	16.04%

Variation of O&M costs	Base	-10.00%
IRR	16.04%	16.23%

As can be seen, the benchmark is not reached in these scenarios; thus it can be concluded that the project activity is not financially attractive.

For Larimar I it is important to say that at the moment of investment decision the energy price was 149.08 USD/MWh. Forecast that have changed whitin the years, considering that by now the energy price is around 115 USD/MWh.

Larimar II

Table 15 shows a sensitive analysis for the resulting IRR by varying the main parameters +/- 10%.

Table 15. Sensitivity analysis Larimar II.

Variation of electricity generation	Base	+10.00%
IRR	11.61%	13.09%

Variation of electricity tariff	Base	+10.00%
IRR	11.61%	13.09%

Variation of investment costs	Base	-10.00%
IRR	11.61%	11.61%

Variation of O&M costs	Base	-10.00%
IRR	11.61%	11.82%

For Larimar II it is important to remark that at the investment decision 15 wind turbines with a total install capacity of 49,5MW were considered, after that it was finally decided that only 14 turbines were going to be installed with a total install capacity of 48,3 MW . For that issue it is recommended to check the sensitivity analysis (see Table 15), regarding the variation of electricity generation, to prove that this change does not affect the additionality of the project.

As can be seen, the benchmark is not reached in these scenarios; thus it can be concluded that the project activity is not financially attractive.

Step 3: Barrier analysis

The project activity does not apply a barrier analysis.

Step 4: Common practice analysis

For the assessment of common practice analysis, the "Methodological Tool - Common Practice" (version 03.1) provided in Annex 7 of the EB Report 84 are applied. The applicable geographical area for the assessment of common practice analysis corresponds to the host country Dominican Republic.

According to the guidelines for common practice analysis, the following steps are applied[27]:

Step 1: Calculate applicable capacity or output range as +/-50% of the total design capacity or output of the proposed project activity.

For the common practice analysis, the installed capacity of 97.8 MW is used, and therefore the applicable range as +/-50% of the capacity is 48.9 MW to 146.7 MW.

Step 2: Identify similar projects (both CDM and non-CDM).

The information about all operational power plants connected to the SENI is obtained from Organismo Coordinador del Sistema Eléctrico Nacional OC-SENI[28]. The following power plants have a power generation capacity within the capacity range identified in Step 1:

Table 16. Power plants in the same capacity range (+/-50%).

SENI - Installed capacity per unit 2015 [MW]						
N°	**Generation Agent**	**Power Plant**	**Source**	**Installed Capacity (MW)**	**CDM**	**Different**
1	EGEHID	JIGUEY 1	AGUA	49.00	NO	YES
2	EGEHID	JIGUEY 2	AGUA	49.00	NO	YES
3	LAESA	PIMENTEL 3	GAS Y FUEL #6	51.60	NO	YES
4	EGE-HAINA	LOS COCOS 2	VIENTO	52.00	YES	NO

[27] For the detailed analysis, see Excel file "37_Common Practice Analysis Larimar Wind Farm final.xls"

[28] http://www.oc.org.do/INFORMES/Memorias/A%C3%B1o2015.aspx (accessed: 03/03/2017)

SENI - Installed capacity per unit 2015 [MW]						
N°	**Generation Agent**	**Power Plant**	**Source**	**Installed Capacity (MW)**	**CDM**	**Different**
5	COMPANIA ELÉCTRICA DE PUERTO PLATA	CEPP 2	FUEL # 6	58.10	NO	YES
6	LOS ORIGENES	LOS ORIGENES	GAS	60.69	NO	YES
7	EGE-HAINA	HAINA 4	FUEL # 6	84.90	NO	YES
8	EGE-HAINA	SULTANA DEL ESTE	FUEL # 6	85.00	NO	YES
9	GENERADORA PALAMARA LA VEGA	LA VEGA	FUEL # 6	92.00	NO	YES
10	COMPANIA ELÉCTRICA DE SAN PEDRO DE MACORIS	CESPM 1	FUEL # 2	100.00	NO	YES
11	COMPANIA ELÉCTRICA DE SAN PEDRO DE MACORIS	CESPM 2	FUEL # 2	100.00	NO	YES
12	COMPANIA ELÉCTRICA DE SAN PEDRO DE MACORIS	CESPM 3	FUEL # 2	100.00	NO	YES
13	EGE-HAINA	HAINA TG	FUEL # 2	100.00	NO	YES
14	PVDC	MONTE RIO	FUEL # 6	100.10	NO	YES
15	GENERADORA PALAMARA LA VEGA	PALAMARA	FUEL # 6	107.00	NO	YES
16	SEABOARD TRANSCONTINENTAL CAPITAL	ESTRELLA DEL MAR 2	GAS Y FUEL #6	108.00	NO	YES
17	DOMINICAN POWER	LOS MINA 5	GAS	118.00	NO	YES
18	DOMINICAN POWER	LOS MINA 6	GAS	118.00	NO	YES
19	EGE-ITABO	ITABO 1	CARBON	128.00	NO	YES
20	EGE-ITABO	ITABO 2	CARBON	132.00	NO	YES

Step 3: Within the projects identified in Step 2, identify those that are neither registered CDM project activities, project activities submitted for registration, nor project activities undergoing validation. Note their number Nall.

From the total of 20 power plants in the same capacity range (Step 2), there is 1 project submitted for registration or undergoing validation; thus Nall = 19. (i.e. all projects in Table 16 that are not greyed out)

Step 4: Within plants identified in Step 3, identify those that apply technologies that are different to the technology applied in the proposed project activity. Note their number as N_{diff}.

As per the guidelines, different technologies are technologies that deliver the same output and differ by at least one of the following (as appropriate in the context of the measure applied in the proposed CDM project and applicable geographical area):

(i) Energy source/fuel (example: energy generation by different energy sources such as wind and hydro and different types of fuels such as biomass and natural gas);

(ii) Feed stock (example: production of fuel ethanol from different feed stocks such as sugar cane and starch, production of cement with varying percentage of alternative fuels or less carbon-intensive fuels);

(iii) Size of installation (power capacity) / energy savings:

- Micro (as defined in paragraph 24 of decision 2/CMP.5 and paragraph 39
- of decision 3/CMP.6);
- (Small (as defined in paragraph 28 of decision 1/CMP.2);
- Large.

(iv) Investment climate in the date of the investment decision, inter alia:

- Access to technology;
- Subsidies or other financial flows;
- Promotional policies;
- Legal regulations;

(v) Other features, inter alia:

- Nature of the investment (example: unit cost of capacity or output is considered different if the costs differ by at least 20 %).

An important distinction can be made by the "Energy source/fuel", since there are other technologies involved, using other resources (e.g. thermal power plants or hydro power plants). Thus, from the 19 power plants identified above (N_{all}), all 19 power plants can be excluded, i.e. **N_{diff} = 19**.

Step 4: Calculate factor $F=1-N_{diff}/N_{all}$ representing the share of plants using technology similar to the technology used in the proposed project activity in all plants that deliver the same output or capacity as the proposed project activity.

As per the guidelines, a project is considered a common practice within a sector in the applicable geographical area if the factor F is greater than 0.2 and N_{all} - N_{diff} is greater than 3. Since N_{all} = 19 and N_{diff} = 19,

$N_{all} - N_{diff} = 0$ (and $F \rightarrow 0$)

Based on the second criterion, the project is not a common practice.

Conclusion of the additionality analysis

Since the project activity is not financially attractive (Step 2) and the common practice analysis shows that it is not business-as-usual (Step 4), the proposed project activity is additional.

2.6 Methodology Deviations

Not applicable. No methodology deviations are made.

3 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

3.1 Baseline Emissions

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 CO2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity.

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)

Additionally, the methodology states that the grid emission factor should be calculated using the latest version of the "Tool to calculate the emission factor for an electricity system". Thus, the grid emission factor is calculated as a combined margin emission factor using version 05.0 of the Tool and according to the following steps:

STEP 1: identify the relevant electricity systems

STEP 2: choose whether to include off-grid power plants in the project electricity system (optional)

STEP 3: select a method to determine the operating margin (OM)

STEP 4: calculate the OM emission factor according to the selected method

STEP 5: calculate the build margin (BM) emission factor

STEP 6: calculate the combined margin (CM) emission factor

Step 1: Identify the relevant electricity systems

For determining the electricity emission factors, a project electricity system is defined by the spatial extent of the power plants that are physically connected through transmission and distribution lines to the project activity (i.e., Larimar Wind Farm project) and that can be dispatched without significant transmission constraints. In this case, the project electricity system is the Organismo Coordinador del Sistema Eléctrico Nacional OC-SENI.

For the purpose of determining the OM emission factor, the CO_2 emission factors for net electricity imports from the connected electricity systems are assumed as 0 tCO_2/MWh, according to option (a) given by the Tool. Nevertheless, the SENI grid does not have any imports from other electric grids.

On the other hand, and following the before mentioned tool, electricity exports should not be subtracted from electricity generation data used for calculating and monitoring the baseline emission factors. Nevertheless, the SENI grid does not have any exports to other electric grids.

Step 2: Choose whether to include off-grid power plants in the project electricity system

Either of the following two options can be used to calculate the OM and the BM emission factor:

- **Option I:** Only grid power plants are included in the calculation.
- **Option II:** Both grid power plants and off-grid power plants are included in the calculation.

In accordance with the tool, this step is optional. For the proposed project activity, off-grid power plants are not included in the project electricity system. In this case, Option I is chosen.

Step 3: Select a method to determine the OM

In accordance with the tool, the calculation of the operating margin emission factor ($EF_{grid,OM,y}$) is based on one of the following methods::

(a) Simple OM
(b) Simple Adjusted OM
(c) Dispatch Data Analysis OM
(d) Average OM

For the project activity, the simple OM method is applied, using the *ex ante* data vintage:

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 Tool states that the Simple OM method can only be used where low-cost/must run resources constitute less than 50% of total grid generation (excluding electricity generated by off-grid power plants) in: 1) average of the five most recent years, or 2) based on long-term averages for hydroelectricity production.

All power plants connected to the SENI are included. Power plants registered as CDM project activities are also included as suggested by the tool. Historical data of the three most recent years is available at the Coordinating Organization OC-SENI web site (www.oc.org.do).

Step 4: Calculate the OM emission factor according to the selected method

The simple OM method can only be used if any one of the following requirements is satisfied:

Low-cost/must-run resources constitute less than 50 per cent of total grid generation (excluding electricity generated by off-grid power plants) in the five most recent years (See Table 17).

Table 17. Low-cost/must-run resources

Name	2010	2012	2013	2014	2015
Total generation (GWh)	12101,70	13358,10	13850,37	13463,70	14970,04
Total except (low-cost/must-run) (GWh)	10675,77	11492,39	11751,95	11965,80	13751,92
% of low-cost/must-run plants	11,78%	13,97%	15,15%	11,13%	8,14%

The simple OM emission factor is calculated as the generation-weighted average CO_2 emissions per unit net electricity generation (tCO_2/MWh) of all generating power plants serving the system, not including low-cost/must-run power plants/units. The net electricity generation and a CO_2 emission factor of each power unit (Option a) are used to calculate the Simple OM emission factor.

$$EF_{grid,OM-simpley} = \frac{\sum_m EG_{m,y} \cdot EF_{EL,m,y}}{\sum_m EG_{m,y}} \quad \textbf{(3)}$$

Where:

$EF_{gridOM-simple,y}$	=	Simple operating margin CO_2 emission factor in year y ($t\ CO_2/MWh$)
$EG_{m,y}$	=	Net quantity of electricity generated and delivered to the grid by power unit m in year y (MWh)
$EF_{EL,m,y}$	=	CO_2 emission factor of power unit m in year y (tCO_2/MWh)
M	=	All grid power units serving the grid in year y except low-cost/must-run power units
Y	=	The relevant year as per the data vintage chosen in step 3.

Determination of $EF_{EL,m,y}$

The CO_2 emission factor of each power unit *m* is determined according to Option A2 of the Tool since the data available on fuel consumption was not accurate, considering its inconsistence in units; therefore the results obtained were not compatible. Thus data on electricity generation and fuel types was used.

The CO_2 emission factor of each power unit *m* is calculated as follows:

$$EF_{EL,m,y} = \frac{EF_{CO2,m,i,y} * 3.6}{\eta_{m,y}} \quad \textbf{(4)}$$

Where:

$EF_{EL,m,y}$	=	CO_2 emission factor of power unit *m* in year *y* (tCO_2/MWh)
$FC_{i,m,y}$	=	Amount of fuel type *i* consumed by power unit *m* in year *y* (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_2 emission factor of fuel type *i* in year *y* ($t\ CO_2/GJ$)
$EG_{m,y}$	=	Net quantity of electricity generated and delivered to the grid by power unit *m* in year *y* (MWh)
M	=	All grid power units serving the grid in year *y* except low-cost/must-run power units
I	=	All fuel types combusted in power unit *m* in year *y*
Y	=	The relevant year as per the data vintage chosen in Step 3

By applying formulae to determine the emission factor of each power plant, the results for the OM emission factor, and the corresponding generation weights of each year, as well as the simple OM emission factor is shown in Table 18.

Table 18. Simple operating margin emission factor of the years 2013- 2014- 2015.

Name	2013	2014	2015
EF OM [tCO_2/MWh]	0,7172	0,7350	0,7114
Generation Except low-cost/must run [GWh]	11.751,95	11.965,80	13.751,92
Total Generation [GWh]	13.850,37	13.463,70	14.970,04
EF $_{OM\ Simple\ 13,14,15}$ (tCO_2/MWh)	**0.7208**		

Step 5: Calculate the BM emission factor

In terms of vintage of data, option 1 of the tool is chosen, i.e. the *ex ante* approach:

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.

Capacity additions from retrofits of power plants are not included in the calculation of the Build Margin - BM emission factor.

The sample group of power units *m* used to calculate the BM is determined as per the following procedure, consistent with the data vintage selected above:

a) Identify the set of five power units, excluding power units registered as CDM project activities, that started to supply electricity to the grid most recently ($SET_{5\text{-}units}$) and determine their annual electricity generation ($AEG_{SET\text{-}5\text{-}units}$, in MWh).

b) Determine the annual electricity generation of the project electricity system, excluding power units registered as CDM project activities (AEG_{total}, in MWh). Identify the set of power units, excluding power units registered as CDM project activities, that started to supply electricity to the grid most recently and that comprise 20% of AEG_{total} (if 20% falls on part of the generation of a unit, the generation of that unit is fully included in the calculation) ($SET_{\geq 20\%}$) and determine their annual electricity generation ($AEG_{SET\text{-}\geq 20\%}$, in MWh).

c) From $SET_{5\text{-}units}$ and $SET_{\geq 20\%}$ select the set of power units that comprises the larger annual electricity generation (SET_{sample}).

   Identify the date when the power units in SET_{sample} started to supply electricity to the grid. If none of the power units in SET_{sample} started to supply electricity to the grid more than 10 years ago, then use SET_{sample} to calculate the BM. In this case, ignore steps (d), (e) and (f).

As can be seen in the excel sheet of the emission factor ("Larimar EF calculation.xls"), in this case all steps (a) to (c) need to be applied and the resulting sample group of power units *m* is the SET_{sample}.

The BM emission factor is the generation-weighted average emission factor (tCO_2/MWh) of all power units *m* during the most recent year *y* for which power generation data is available, , i.e. in this case the year 2015. The calculation is made as follows:

$$EF_{grid,BM,y} = \frac{\sum_{m} EG_{m,y} \times EF_{EL,m,y}}{\sum_{m} EG_{m,y}} \quad \textbf{(6)}$$

Where:

$EF_{grid,BM,y}$	=	BM CO_2 emission factor in year *y* (tCO_2/MWh)
$EG_{m,y}$	=	Net quantity of electricity generated and delivered to the grid by power unit *m* in year *y* (MWh)
$EF_{EL,m,y}$	=	CO_2 emission factor of power unit *m* in year *y* (tCO_2/MWh)
M	=	Power units included in the BM
Y	=	Most recent historical year for which electricity generation data is available

The emission factor of each power unit *m* in the build margin is determined analogous as for the operating margin: For all power units *m* the data on fuel consumption and electricity generation is available, therefore option A2 of the tool is chosen as the most appropriate approach (see formulae in OM).

The total generation in 2015 was 14.970.04,31 MWh, which means that 20% of the total generation is 2.994.008,462 MWh. The total generation included in the BM is 2.784.611,30 MWh with corresponding CO_2 emissions of 1.968.224,27 tCO_2.

The detailed calculations are provided in the worksheet “Build Margin” of the Excel file “41_Larimar EF calculation.xls”.

The resulting BM emission factor is **0.7068 tCO_2/MWh**.

Step 6: Calculate the CM emission factor

According to the Tool, the calculation of the Combines Margin - CM emission factor is based on one of the following methods:

(a) Weighted average CM
(b) Simplified CM

In this case, Option (a) is chosen. Thus, the CM emission factor is calculated as follows:

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

Where:

$EF_{grid,CM,y}$	=	CM CO_2 emission factor in year *y* (tCO_2/MWh)
$EF_{grid,OM,y}$	=	OM CO_2 emission factor in year *y* (tCO_2/MWh)
$EF_{grid,BM,y}$	=	BM 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**

According to this the baseline emissions are calculated as follows

$BE_y = EG_{PJ,y} \times EF_{grid,CM,y}$ = 370,000 MWh x 0.7173 tCO_2/MWh

BE_y = 265.391,97 tCO_2.

3.2 Project Emissions

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

3.3 Leakage

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

3.4 Net GHG Emission Reductions and Removals

As explained above in Section 3.1, emission reductions are calculated as follows:

$$ER_y = EG_{facility,y} \times EF_{grid,CM,y}$$

Where:

ER_y	=	Emission reductions in year *y* (tCO_2)
$EG_{facility,y}$	=	Quantity of net electricity generation supplied by the project plant/unit to the grid in year *y* (MWh)
$EF_{grid,CM,y}$	=	CM CO_2 emission factor in year *y* (tCO_2/MWh)

For the ex ante calculation of emission reductions, the quantity of net electricity supplied to the grid is estimated based on wind monitoring carried out in Coquimbo Region. The proposed project activity is expected to supply an average of 370 GWh per year to the grid.

As shown above in Section 3.1, the CM emission factor is calculated as follows:

$$EF_{grid,CM,y} = EF_{grid,OM,y} \times w_{OM} + EF_{grid,BM,y} \times w_{BM}$$

Where:

$EF_{grid,CM,y}$	=	CM CO_2 emission factor in year *y* (tCO_2/MWh)
$EF_{grid,OM,y}$	=	OM CO_2 emission factor in year *y* (tCO_2/MWh)
$EF_{grid,BM,y}$	=	BM 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 OM emission factor is determined as a 3-year generation-weighted average, based on the most recent data available at the time of submission of the project documentation to the DOE for

validation. Specifically, data from years 2013, 2014 and 2015 are used, and the resulting OM emission factor is 0.7208 tCO_2/MWh.

The BM emission factor is determined based on the most recent information available on units already built at the time of submission of the project documentation to the DOE for validation. Specifically, data from year 2015 are used, and the resulting BM emission factor is 0.7068 tCO_2/MWh.

Thus, the resulting CM emission factor is the following:

$EF_{grid,CM,y}$= 0.7208 tCO_2/MWh × 0.75 + 0.7068 tCO_2/MWh × 0.25 = **0.7173 tCO_2/MWh**

As a consequence, the annual value of emission reductions estimated for the project activity is the following:

ER_y = 370,000 MWh × 0.7173 tCO_2/MWh = **265,391.97 tCO_2**

See more details in the attached spreadsheet named "41_Larimar EF calculation.xls".

As shown in the attached spreadsheet, the value of annual emission reductions estimated for the project activity is rounded down.

Approximate values for Larimar I and Larimar II are presented

Table 19. Values of annual emission reductions – Larimar I

Year	Estimated baseline emissions or removals (tCO_2e)	Estimated project emissions or removals (tCO_2e)	Estimated leakage emissions (tCO_2e)	Estimated net GHG emission reductions or removals (tCO_2e)
August to December 2016	61.566,16	0	0	61.566,16
2017	147.758,77	0	0	147.758,77
2018	147.758,77	0	0	147.758,77
2019	147.758,77	0	0	147.758,77
2020	147.758,77	0	0	147.758,77
2021	147.758,77	0	0	147.758,77
2022	147.758,77	0	0	147.758,77
2023	147.758,77	0	0	147.758,77
2024	147.758,77	0	0	147.758,77
2025	147.758,77	0	0	147.758,77
January to July 2026	86.192,62	0	0	86.192,62
Total	1'477.587,73	**0**	**0**	1'477.587,73

For Larimar II

Table 20. Values of annual emission reductions – Larimar II

Year	Estimated baseline emissions or removals (tCO_2e)	Estimated project emissions or removals (tCO_2e)	Estimated leakage emissions (tCO_2e)	Estimated net GHG emission reductions or removals (tCO_2e)
August to December 2018	49.013,83	0	0	49.013,83
2019	117.633,20	0	0	117.633,20
2020	117.633,20	0	0	117.633,20
2021	117.633,20	0	0	117.633,20
2022	117.633,20	0	0	117.633,20
2023	117.633,20	0	0	117.633,20
2024	117.633,20	0	0	117.633,20
2025	117.633,20	0	0	117.633,20
2026	117.633,20	0	0	117.633,20
2027	117.633,20	0	0	117.633,20
January to July 2028	62.309,75	0	0	62.309,75
Total	1’176.331,98	**0**	**0**	1’176.331,98

4 MONITORING

4.1 Data and Parameters Available at Validation

Data / Parameter	$\mathbf{EF_{grid,CM,y}}$
Data unit	tCO_2/MWh
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	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/yr
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 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.
Frequency of monitoring/recording	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.
Value applied:	370 GWh/year
Monitoring equipment	Commercial measurement systems – SMC of Larimar Wind Farm have 2 meters ION 8650, with accuracy class 0.2.
QA/QC procedures to be applied	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.
Purpose of data	Baseline emissions
Calculation method	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.
Comments	Larimar Wimd Farm, has a Certificate of granting authorization of the measurement system[29] and a Proof of Commercial habilitation visits[30].

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 to be measured and the emission factor is already set ex ante, the process is pretty straightforward, as described in the following.

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

1. Data metering and recording

Larimar Wind Farm Project (Larimar 1 and Larimar 2), 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 system of each injection point (in this case Larimar), must 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 SENNI, which has a system of data acquisition and storage of all meters in the system.
Nowadays, the commercial measurement system of Larimar 1, is composed by two SMCs connected to each of the injection lines of the Wind Generators which are connected to Los Cocos substation. When Larimar 2 starts to operate, one of these lines will be used by Larimar 2, and Larimar 1 will remain on the other line.
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.

Acoording 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

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

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

by the project plant/unit to the grid in year *y*(MWh/yr). Teherefore considering Larimar I and Larimar II there are two energy meters considered to monitor this parameter (see Table 21, Figure 5 and Figure 6).

Table 21. Monitoring equipment of the project activity

Energy Meter installed	Specification	Location
Larimar I - $EG_{SMC1\ LINEA\ 10}$ (Main and backup meter)	ION 8650, with accuracy class 0.2 - ID 3276-PELAK-G10	At the 34,5 Kv line
Larimar II - $EG_{SMC2\ LINEA\ 11}$ (Main and backup meter)	ION 8650, with accuracy class 0.2 - ID 3276-PELAK-G20	At the 34,5 Kv line

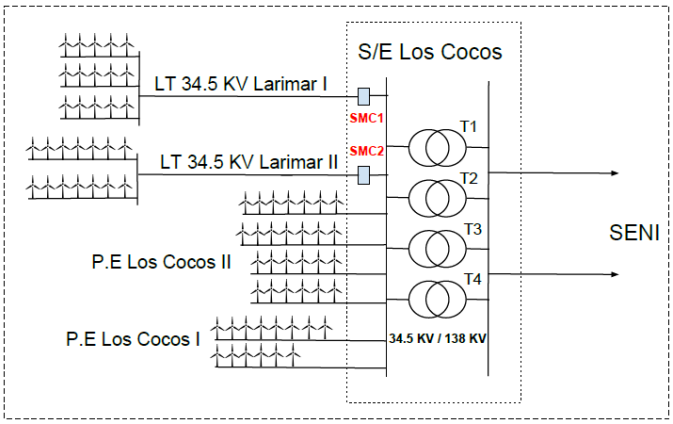

Figure 5. Monitoring Points - Larimar Wind Farm Project (SMC1 and SMC2)

It is important to remark that while Larimar II is not operating, Larimar I is using both meters (SMC1 half and SMC 2 half generation). At the moment both wind farms are operating (approximately august 2018), SMC 1 will meter only Larimar I generation and SMC 2 Larimar II.

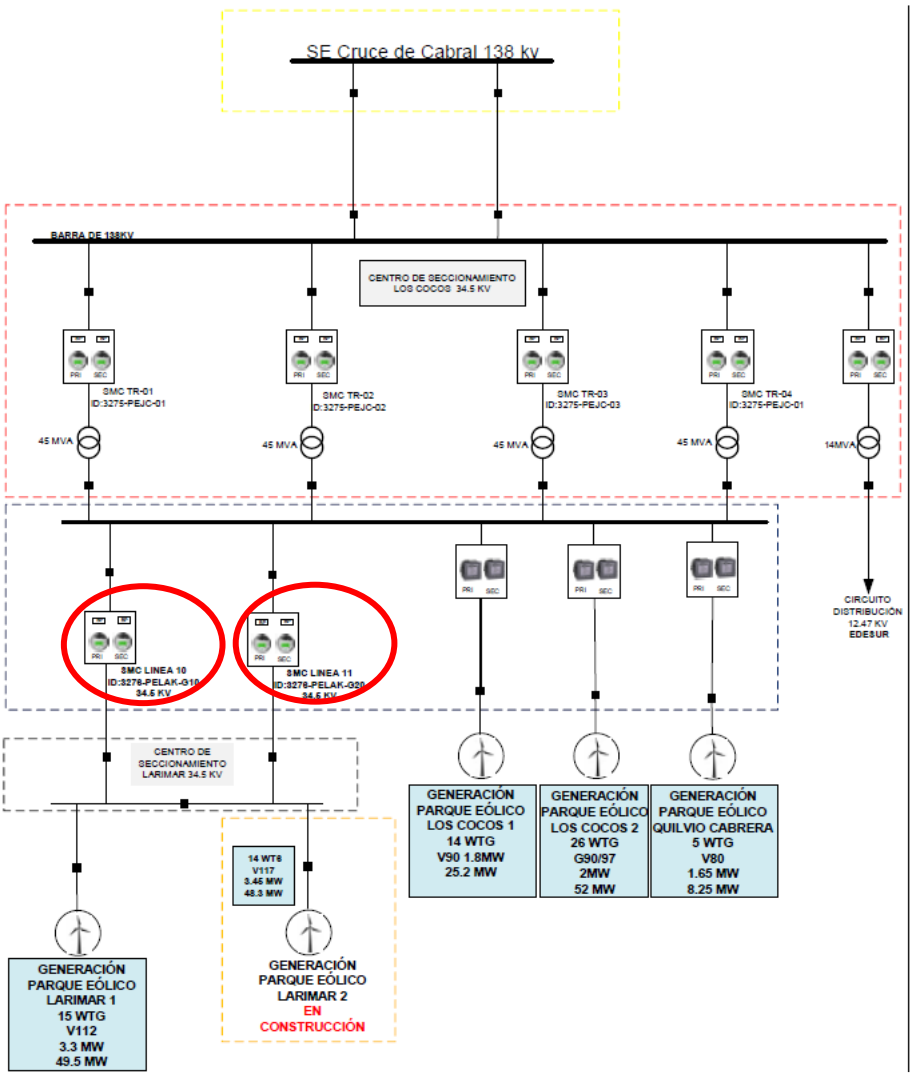

Figure 6. Monitoring Points SMC (LINEA 10-11) within All Wind Farms

It is important to point that EGE Haina Commercial direction monitors Larimar Wind Farm energy production from the 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.

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 settlemen

2. Management Structure and Responsibilities

Roles and responsibilities will be defined for the relevant staff involved in VCS project monitoring. The prospect of nominating a VCS project Manager will be considered. If appointed, he will 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 will be 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. In particular, this process reinforces the fact that GHG reductions are real and credible to the buyers of the Certified Emission Reductions (CERs).

3. 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.

4. Quality Assurance and Quality Control

The quality assurance and quality control procedures for recording, processing and archiving data will be followed, according to rules and requirements, to ensure accurate and consistent data is collected, and to allow the proper verification of the emission reductions on an annual basis.
As said before, calibration of electricity meters will be implemented according to the standards and procedures adopted by the Regulatory Office for the SENI grid. Electricity meters will 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 will be 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 will be evaluated every 2 years. These evaluations will be carried out by specialized companies or with certified equipment. Calibration records will be kept by the project owner for verification purposes.
The values on electricity generation by the project activity will be applied according to the measurements and procedures described in this section and section 4.2. If there is a failure in the electricity meter, the measurement is assured by a back up meter located at the project site.
All electronic data will be backed up on a monthly basis, and two electronic copies of each document will be kept in different locations (the wind farm and its respective head offices). As a backup procedure, excel files containing the monitoring data will be sent to the head offices at Santo Domingo every week, in order to ensure that data is also stored in a different location. At the time of verifying the associated emission reductions, the loaded values will be cross-checked against the generated records in order to confirm that erroneous values have not been applied for the actual emission reduction calculation.

All revisions are made following a normative procedure; therefore, in case of differences between meters, the causes are verified and solutions are given according to the law.

5. Training and Monitoring Personnel

All people that participate in the monitoring process will receive proper CDM training, in order to assure the correct application of the monitoring plan of the Project

6. Verification and Monitoring Results

The monitoring report will be prepared by the monitoring personnel. It shall contain the data report, and the results of the emissions reductions of the project for the defined 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.

5 SAFEGUARDS

5.1 No Net Harm

As explained below (Section 5.2), the impacts of the project are considered minor. Moreover, the project proponent will implement the following corrective, preventive and mitigation actions:

Table 22 . Impacts and corrective actions

Impacts	Corrective, preventive and mitigation actions

Impacts	Corrective, preventive and mitigation actions
Generation of dust and emission combustion gases	- Cover the material to be transported and use tarpaulins for gathering piles. - Wet dry areas - Provide employees with Personal Protection Articles – EPP. - Install signals (speed, horn use, wear EPP) - Carry out regular maintenance of vehicles - Ensure adequate earthmoving planning and management - Monitor air quality - Organise work schedules
Soil conditions	Solid waste: Collected in special buckets separately, classified and disposed according to its characteristics in a proper waste disposal site (organic, unusable, recyclable and hazardous). Industrial wastes (mainly lubricant oils and fuels): This waste type (considered as hazardous) will be collected, stored and disposed as the hazardous waste. Its management will comply with the requirements set forth by the "Regulations for Integral Management of Used Oil" issued by the Ministry of Environment and Natural Resources. Soil erosion[31] - Internal road design will be adapted to the existing road, giving preference to open areas or areas cleared of trees. - Pressing and proper disposal of organic material (vegetation - A drainage ditch will be built, which will circulate parallel to the internal road and will collect drainage waters from the wind turbine platforms and the internal road. - Creation of a perimeter fence for erosion control - Establishment of a monitoring system for ground movement. - Left material (construction debris and soil) management plan
Generation of liquid	Liquid Waste - During construction portable toilets (with discharges storage tank) will be installed. Periodically the contractor will remove waste through vacuum trucks and will transport them to company's treatment and disposal facilities. - Project operation is based at Los Cocos substation. A small wastewater treatment plant is installed at the project site. The plant operates its own Integral Water Management Plan[32].
Generation of noise	Periodic monitoring of noise during the construction and operation stages

5.2 Environmental Impact

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.

[31] See document "09_ Evidencias Fotográficas Acreditación Gold Standard.pdf" pag 8,9,10.

[32] For the detailed Water Management Plan see document " 27_PGIA Los Cocos.pdf"

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.

According to the national environmental authorities, the implementation of Larimar Wind Farm Project would not affect considerably the population or the natural resources of the project site.

The main impacts of the project are the following:

- Generation of dust during the construction stage, due to earth movements, use of vehicles and building activities
- Emission of combustion gases during the construction stage due to the use of vehicles and machinery
- Soil removal during the construction stage
- Generation of liquid and solid waste during the construction and operation stages
- Generation of noise during the construction and operation stages
- Impacts on local flora and fauna

In order to follow these issues there is a Sustainability Monitoring Plan proposed presented in the next boxes:

No	01
Indicator	Air quality [33]
Mitigation measure	Activities to implement in order to prevent and mitigate the impact[34]: ✓ Cover the material to be transported and use tarpaulins for gathering piles. ✓ Wet dry areas ✓ Provide employees with Personal Protection Articles – EPP. ✓ Install signals (speed, horn use, wear EPP) ✓ Carry out regular maintenance of vehicles ✓ Ensure adequate earthmoving planning and management ✓ Monitor air quality ✓ Organise work schedules
Chosen parameter	Emissions of Total Suspended Particulate Matter (TSPM), and Particulate Matter (PM): PM-1.0, PM-2.5, PM-7.0, PM-10.0.
Current situation of parameter	In the specific area of the project, there are no fixed sources of particulate matter
Estimation of baseline situation of parameter	Since no other human activities would be carried out in the project area, the amount of emissions discharged to the environment is expected to be zero in the baseline scenario.
Future target for parameter	Since no project and leakage emissions will occur, the target of the parameter is zero and/or the emission of combustion gases

[33] See Informe de Cumplimiento Ambiental – ICA "24_Informe de Cumplimiento Ambiental ICA No1 Parque Eólico Larimar" pag 27.

[34] see Environmental Impact Declarations (DIA): "01_DIA_LARIMAR-I.pdf" ((Tabla 8.4 Matriz Resumen PMAA etapa de construcción pag 289) and "02_DIA_LARIMAR-II.pdf" (Tabla 8.4 Matriz Resumen PMAA etapa de construcción pag 325 - 325).

		and PM is regulated, control measures and management shall ensure compliance with the environmental standards: NA-AI-001-03, NA-AI-002-03 and NA-AI- 003-03.
Way of monitoring [35]	How	✓ Verify proper cover of cargo and storing materials. ✓ Verify correct functioning of water tank truck and hose used to moisture roads and gathering area. ✓ Verify use of EPP at the construction site. ✓ Verify vehicle maintenance performance. ✓ Check earthmoving time table execution. ✓ Monitor TSPM, PM-1.0, PM-2.5, PM-7.0, PM-10.0 - Perform air quality measurements and compare the results with permissible limits set by the environmental air quality standard NA-AI-001-03. In addition, develop reports with records of atmospheric emissions, vehicle and equipment maintenance, water consumption in wetting areas and photographs.
	When	The first three parameters will be performed on a daily basis during construction. The vehicles will be monitored every six months, and the time schedule will be checked monthly. Air quality will be monitored every six months, for inclusion in the Environmental Compliance Report (*Informe de Cumplimiento Ambiental – ICA)*
	By who	Project owner (EGE Haina) – Environment and Safety Manager and Project contractor

No	02
Indicator	Water quality and quantity[36]
Mitigation measure[37]	✓ During construction portable toilets (with discharges storage tank) will be installed. Periodically the contractor will remove waste through vacuum trucks and will transport them to the company's treatment and disposal facilities. ✓ Project operation is based at Los Cocos substation. A small wastewater treatment plant is installed at the project site. The plant operates its own Integral Water Management Plan[38].
Chosen parameter	Amount of wastewater discharged to the environment (m^3).
Current situation of parameter	Project operation is based at Los Cocos Wind Farm project site. A small wastewater treatment plant is already installed.

[35] see Environmental Impact Declaration (DIA) "01_DIA_LARIMAR-I.pdf" " (Tabla 8.4 Matriz Resumen PMAA Seguridad y Plan Social pag 289). and "02_DIA_LARIMAR-II.pdf" (Tabla 8.4 Matriz Resumen PMAA Seguridad y Plan Social pag 325).

[36] See Informe de Cumplimiento Ambiental – ICA "24_Informe de Cumplimiento Ambiental ICA No1 Parque Eólico Larimar" pag 19.

[37] See document "09_ Evidencias Fotográficas Acreditación Gold Standard.pdf" and "27_PGIA Los Cocos.pdf"

[38] For the detailed Water Management Plan see document " 27_PGIA Los Cocos.pdf"

Estimation of baseline situation of parameter		Since no other human activities would be carried out in the project area, the amount of wastewater discharged to the environment is expected to be zero in the baseline scenario.
Future target for parameter		The target is that no untreated wastewater will be discharged to the environment from the project activity.
Way of monitoring [39]	How	✓ Monitoring installed portable toilets and maintenance of both portable toilets and domestic wastewater collector tank, at project construction site. ✓ Generate environmental and safety management reports, which include information on the amount of wastewater generated and the wastewater disposal (ensuring compliance with the environmental standard on groundwater and subsoil discharges).
	When	Renting toilets and their maintenance will be permanent; verification of the measure will be monthly.
	By who	✓ Project owner (EGE Haina) – Environment and Safety Manager ✓ Portable toilets contractor

No	03
Indicator	Soil condition [40]
Mitigation measure	✓ Wastewater: See indicator 02 “Water quality and quantity” ✓ Solid waste: Collected in special buckets separately, classified and disposed according to its characteristics in a proper waste disposal site (organic, unusable, recyclable and hazardous). ✓ Industrial wastes (mainly lubricant oils and fuels): This waste type (considered as hazardous) will be collected, stored and disposed as the hazardous waste. Its management will comply with the requirements set forth by the "Regulations for Integral Management of Used Oil" issued by the Ministry of Environment and Natural Resources. ✓ Soil erosion[41] - Internal road design will be adapted to the existing road, giving preference to open areas or areas cleared of trees. - Pressing and proper disposal of organic material (vegetation - A drainage ditch will be built, which will circulate parallel to

[39] see Environmental Impact Declaration (DIA) “01_DIA_LARIMAR-I.pdf” ” (Tabla 8.4 Matriz Resumen PMAA etapa de construcción pag 290). and “02_DIA_LARIMAR-II.pdf” (Tabla 8.4 Matriz Resumen PMAA etapa de construcción pag 326).

[40] See Informe de Cumplimiento Ambiental – ICA “24_Informe de Cumplimiento Ambiental ICA No1 Parque Eólico Larimar” pag 18.

[41] See document “09_ Evidencias Fotográficas Acreditación Gold Standard.pdf” pag 8,9,10.

		the internal road and will collect drainage waters from the wind turbine platforms and the internal road. - Creation of a perimeter fence for erosion control - Establishment of a monitoring system for ground movement. - Left material (construction debris and soil) management plan.
Chosen parameter		Wastewater, solid waste (organic, unusable, hazardous and recyclable), industrial waste disposal, and erosion control.
Current situation of parameter		No wastewater, solid and industrial waste are generated and disposed of at the project construction site before project implementation, nor are there any activities that cause erosion.
Estimation of baseline situation of parameter		Since no other human activities would be carried out in the project area, the amounts of wastewater, solid and industrial wastes are expected to be zero in the baseline scenario. This also applies for soil erosion.
Future target for parameter		The project is being operated at the project site, so there may be generation of wastewater, solid waste or industrial waste from the project activity at the project site.
Way of monitoring[42]	How	For <u>solid waste</u> ✓ Verify installation and state of hazardous and non-hazardous waste containers, including appropriate labeling. ✓ Generate reports on environmental and safety management, including information on type, quantity and destination of the waste, along with corresponding approvals/certifications from environmental managers. For <u>industrial waste</u> ✓ Verify the state of fuel containers, including signs, labels and extinguishers. ✓ Generate reports on environmental and safety management, including information on fuel consumption and waste oils produced. ✓ Generate photographic evidences of disposal site for industrial wastes. <u>For Soil erosion</u> ✓ Verify proper installation of perimeter fence. ✓ Verify the correct disposal of vegetation (previous compaction) ✓ Generate control records of soil movement management and reports of environmental and safety management, which includes the soil and water conditions, due to left material management, and photographs.

[42] see Environmental Impact Declaration (DIA) “01_DIA_LARIMAR-I.pdf” ” (Tabla 8.4 Matriz Resumen PMAA etapa de construcción pag 289-290). and “02_DIA_LARIMAR-II.pdf” (Tabla 8.4 Matriz Resumen PMAA etapa de construcción pag 325-326).

	When	Verification for waste: Monthly Verification for soil erosion: Monthly
	By who	✓ Project owner (EGE Haina) – Environmental and Safety Manager ✓ Civil works project contractor

No		04
Indicator		Other pollutants
Mitigation measure		The noise level during the operational phase of the project will comply with the standards under norm NA-RU-001-03 and therefore does not require any mitigation measures. Preventive measures such as wind turbine maintenance and monitoring noise levels for sensitive receptors will be implemented.
Chosen parameter		Noise level during construction and operation
Current situation of parameter		In the specific area of the project, there are no fixed sources of noise. In the outer space polygon (indirect influence), there are activities that generate noise; these are daily activities identified as residential, school activities, children playing, transit of vehicles, street mobilization, farm activities, animal sounds, recreational activities and festivities.
Estimation of baseline situation of parameter		As per the noise impact study and corresponding noise modelling, the wind park operation will not generate noise levels above the national norm (NA-RU-001-03).
Future target for parameter		The target is to keep noise levels at the sensitive locations (i.e. school, houses) below the levels established by the Dominican Republic norm NA-RU-001-03.
Way of monitoring[43]	How	✓ Check the type of wind turbine installed. ✓ Verify the spatial distribution of wind turbines. ✓ Verify that the corresponding maintenance is performed. ✓ Verify the level of noise. Generate records of noise emissions control and reports of environmental and safety management, which include records of vehicles and equipment maintenance, and photographs. Air quality measurements (noise) will be recorded, and the results will be compared with the permissible limits established by environmental air quality standard NA-AI-001-03. In case of exceeding the limits set by the standards the necessary measures will be taken to ensure compliance at any time.
	When	The first two monitoring parameters will be checked once – during the construction process. Maintenance is done according to the manufacturer's recommendations based on operation hours. Verification of the compliance with the measure will be made every six months.

[43] see Environmental Impact Declaration (DIA) "01_DIA_LARIMAR-I.pdf" " (Tablas 8.4 - 8.5 Matriz Resumen PMAA etapa de construcción y operación pag 289 and 291). and "02_DIA_LARIMAR-II.pdf" (Tabla 8.4 – 8.5 Matriz Resumen PMAA etapa de construcción y operación pag 325 and 327).

		Monitoring of noise levels is carried out at the beginning of the operation phase and then every six months in order to present the results to the Environmental Compliance Report - ICA.
	By who	✓ Project owner (EGE Haina) – Environment and Safety Manager

No	05
Indicator	Biodiversity
Mitigation/prevention measures	In order to avoid direct harm to flora and fauna during the construction phase, the following measures will be carried out : a. Identification of trees with environmental importance, which should be saved from cutting. b. Transplant tree station - reforestation plan for species conservation. c. Signs indicating the environmental relevance of the different areas to increase awareness and promote environmental good practices. d. The need to move species that could be disturbed by the project to a temporary habitat will be checked. e. Revegetation and reuse of organic material. Some species will be selected to maintain the floristic structure. f. After revegetation, species retained in the temporary habitat will be relocated. Their survival and readaptation will be monitored as long as necessary. g. Strictly ban the complete or partial burning of trees, to prevent forest fires. h. Prohibit vegetation hunting and cutting. During Operation Phase : a. The turbines will be placed at a distance of about 300 m from each other to allow the safe passage of birds and bats between them. b. The extremes of the helices will be sharp to prevent the formation of turbulence. c. The tower will be tubular, with no openings and projections on the turbine to avoid bird and bat deaths by collision. d. Lighting wind turbines at the top of the gondola, in order to delimit the towers, allowing birds or aircraft to see the towers and avoid collisions. e. Installation of flight deflectors for medium voltage transmission line cables. f. Monitoring of deaths and injuries due to eventual collision of birds and bats with the wind turbines g. Reforestation with 10,000 mahogany seedlings
Chosen parameter	Number of affected flora and fauna (reptiles, amphibians, birds, bats, and vulnerable plant species).

Current situation of parameter		**Flora and Fauna**: Since there are no turbines in the baseline, no collisions occur, and there is no loss of vegetation. **a. Critical plants**: In **Larimar I** seven species of endangered or protected plants, either by national legislation (Peguero et al., 2003; MIMARENA, 2011) or by the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), were found (01_DIA_LARIMAR-I.pdf Cap III pg. 40 of 99). In **Larimar II** six species of endangered or protected plants, either by national legislation (Peguero & Jiménez, 2010; MIMARENA, 2011) or by the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), were found. **b. Critical birds and buts:** In **Larimar I** 87% of the studied birds are under the category of Least Concern (LC). Two endemic species were recorded, which are significantly threatened, *Corvus leucognaphalus* (white-necked crow), and *Amazona ventralis* (Hispaniolan parrot); both species under the category of EP (Endangered) of the Dominican Republic Red List 2011, while the IUCN Red List (2013) classified them under the category of vulnerable (VU). (01_DIA_LARIMAR-I.pdf Cap III pag 75 de 99). For bats only two species, *Artibeus jamaicensis* (Jamaican fruit bat) and *Eptesicus fuscus* (big brown bat) are listed on the IUCN Red List (2014), under the Least Concern (LC) category; however, none of the three species captured and identified are registered in the Dominican Republic Red List (2011). (01_DIA_LARIMAR-I. Cap III pag 81 de 99). In **Larimar II** The reptile "Anolis Barahona", is threatened in the category Endangered (EN) from Dominican Republic Red List of species in danger of extinction. Birds: According to the IUCN Red List, three species on the list of endangered species were found: *Patagioenas leucocephala* (white-crowned pigeon) (almost endangered), *Patagioenas inornata* (plain pigeon) (almost endangered), and *Corvus leucognaphalus* (white-necked crow) (vulnerable). Bats: The four species found are included in the IUCN Red List (2014), under Least Concern Category (LC) "*Phyllops falcatus* (white-shouldered bat), *Artibeus jamaicensis* (Jamaican fruit bat), *Pteronotus quadridens* (sooty mustached bat) and *Pteronotus parnellii* (Parnell's mustached bat).
Estimation of baseline situation of parameter		The baseline is expected to be similar to the current situation.
Future target for parameter		The future target is that the presence of Flora and Fauna should not differ significantly from the baseline scenario (i.e. the current situation), which would mean that the impact of the project activity would be low or neutral.
Way of monitoring	How	**Construction** ✓ Check that the identified trees are safe and verify species survival at the transplant station.

		✓ Verify the existence and condition of signs. ✓ Check the condition and survival of wildlife temporary habitats. ✓ Verify revegetation and use of stored organic material. ✓ Check the restoration of habitats and wildlife survival. ✓ Verify the design and positioning of wind turbines (once). ✓ Verify the lighting of wind turbines. ✓ Check flight diverters placed on transmission line. Generation of records of habitat protection and reports of environmental and safety management, which include tree inventories, transplanted species, species taken to temporary housing, and photographs (See "01_DIA_LARIMAR-I.pdf" Chapter VIII – Programa de Manejo Ambiental Biótico Etapa Construcción page 7 of 12). **Operation** ✓ Record collision frequency of birds and bats with wind turbines. ✓ Annual study update of bird life and bats. (See "01_DIA_LARIMAR-I.pdf". Chapter VIII – Programa de Manejo Ambiental Biótico Etapa Construcción page 11 of 12).
	When	**Construction** The activity will be implemented according to the progress of the work; verification measures will be carried out monthly. The three last parameters will be carried out once, prior to transmission line assembly. **Operation** The report will be updated annually. The collisions will be monitored and registered every 15 days during the three first years, and monthly as from the 4th year.
	By who	✓ Project owner (EGE Haina) – Environment and Safety Manager

No	06
Indicator	Quality of employment
Mitigation measure	No mitigation measures are required
Chosen parameter	Operation and maintenance training (including training in environmental management, health and workers safety)
Current situation of parameter	No trainings are carried out before project implementation.
Estimation of baseline situation of parameter	Without the project, no other similar jobs would be generated in the project area and no trainings would be provided in the baseline scenario.
Future target for parameter	Employees that carry out operation and maintenance tasks will be trained (every two years, employees must take a refresher course to renew their high altitude work and first aid certificates).

Way of monitoring [44]	How	Review of employment records and training documents and/or certificates every two years.
	When	Construction: Monthly Operation: Half year report
	By who	✓ Project owner (EGE Haina) – Environment and Safety Manager ✓ Operation and maintenance contractor

No		07
Indicator		Livelihood of the poor
Mitigation measure		No mitigation measures are required
Chosen parameter		Number of population with access to improved sanitation (Infrastructure)
Current situation of parameter		At the project site, minor improvements in basic services infrastructure have been carried out before project implementation.
Estimation of baseline situation of parameter		The project does not compete with other activities in the area. Therefore, the number of population with access to improved sanitation in the baseline is zero.
Future target for parameter		The project will evaluate local needs for basic services such as sanitation facilities and access to drinking water, and according to their needs activities such as construction of community drinking water stations, water systems for schools and community and communal cistern construction will be carried out. (See 01_DIA_LARIMAR-I. Cap VIII Programa Manejo Ambiental Gestión Ambiental- pg. 10 de 13)
Way of monitoring	How	Verify the implementation of the following measures: ✓ List of key community stakeholders. ✓ Verify studies or surveys conducted in the community, and meeting records. ✓ Document the specific development plan for the community located in the area of influence of the project. ✓ Verify the measures included in the CDP that are designed based on the above items.
	When	For the first two items, monitoring will be monthly, during the first six months of construction. The third item will be monitored once, at the end of the first six months of construction. The last will be carried out periodically every six months.
	By who	Project owner (EGE Haina) - Senior Management

No	08
Indicator	Human and institutional capacity

[44] see Environmental Impact Declaration (DIA) "01_DIA_LARIMAR-I.pdf" " (Tablas 8.6 Matriz Resumen PMAA Seguridad y plan social pag 292). and "02_DIA_LARIMAR-II.pdf" (Tabla 8.6 Matriz Resumen PMAA Seguridad y plan social pag 328).

Mitigation measure		No mitigation measures are required
Chosen parameter [45]		a. Woman in decision making groups at community and regional level b. Change in decision making of the community
Current situation of parameter		No specific community development strategies have been implemented at the project site or in its area of influence.
Estimation of baseline situation of parameter		The project does not compete with other related activities in the area. Therefore, the change in decision making of the community (number of empowered women and child with environmental education – based on a Community Development Plan) in the baseline is zero.
Future target for parameter		Based on a Community Development Plan - CDP: **a.** Community development will be stimulated, promoting workplace and gender equality, empowering women of the community to be independent through workshops and material donations for women centers, among others. **b.** The best way to ensure the sustainability of natural resources is through environmental education of future generations. Agreements with different institutions will be made to develop awareness and training processes for communities close to the projects and generating plans on environmental issues, in order to implement environmentally friendly habits in their daily lives.
Way of monitoring	How	Verify the implementation of the following measures: ✓ List of key community stakeholders. ✓ Verify studies or surveys conducted in the community, and meeting records. ✓ Document the specific development plan for the community located in the area of influence of the project. ✓ Verify the measures included in the CDP that are designed based on the above items.
	When	For the first two items, monitoring will be monthly, during the first six months of construction. The third item will be monitored once, at the end of the first six months of construction. The last will be carried out periodically every six months.
	By who	Project owner (EGE Haina) – Senior Management

No	09
Indicator	Quantitative employment and income generation
Mitigation measure	No mitigation measures are required
Chosen parameter	Number of jobs (Increased level of employment and socio-economic activities - Construction and operation stage) [46]

[45] See document "22_Inversión en sostenibilidad EGE Haina.pdf"and "24_Informe de Cumplimiento Ambiental - ICA No1 Parque Eolico Larimar" pag. 126.

Current situation of parameter		At the project site, no employment opportunities exist before project implementation.
Estimation of baseline situation of parameter		The project does not compete with other activities in the area. Therefore, the number of jobs in the baseline is zero.
Future target for parameter		Around 12 to 15 full time-jobs are expected to be created for the project operation.
Way of monitoring	How	The number of jobs is assessed with employment contracts during each verification period. A list is established with all full-time workers during each period and the average number of employees is assessed. Verify the profiles of the vacancies, and the established mechanisms for selection and recruitment. Verify the induction program given. ✓ The program applies to all project stages, especially during preconstruction and every time there is a need to hire labor (qualified or not).
	When	Construction: Monthly Operation: Annually
	By who	✓ Project owner (EGE Haina) – Environment and Safety Manager ✓ Operation and maintenance contractor (O&M)

5.3 Local Stakeholder Consultation

The project – Larimar I has started the consultation process at the end of 2014 with a Public Sight visit presenting the project and the Environmental Impact Declaration - DIA, to Local Stakeholders[47]. Since then it carried out a series of activities to inform and take into account the communities in the area of direct and indirect influence. The stakeholder consultations were carried out in the Municipality of Enriquillo to facilitate the participation of the stakeholders.

The general objective of this public sight (For both Larimar I and Larimar II), is to present in detail the facts of the project, as the design, construction and operational activities; as well as the environmental and social aspects, and the Environmental Management Program in order to let the Local Stakeholders know the project as a whole and therefore, received their personal comments and questions. Consequently the project owners were able to solve the questions and discuss them in detail, to let everything clear. It is important to point that all questions and suggestions there discussed, were written in the DIA report, to be known and evaluated by the Environment and Natural Resource Ministry. After that the ministry decides if the project follows all the legislations and environmental rules and is viable to obtain the environmental license.

This public sight visit processes is structured within the Dominican Republic Legislation - Law 64-00.

[46] See Dcument"01_DIA_LARIMAR-I.pdf" CAPÍTULO VII – Programa Manejo Ambiental Gestión Social- pg. 3-5 de 13

[47] See folder "03b_Vistas Publicas Larimar I"

Followed is presented a fragment of the list of Stakeholders participants, to the public sigh for Larimar I on November 6th of 2014. In the attached document 01_DIA_LARIMAR-I.pdf, page 695/745 it is possible to check the complete list of 68 participants.

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DECLARACIÓN DE IMPACTO AMBIENTAL PARQUE EÓLICO LARIMAR CÓDIGO 10587
LISTADO DE ASISTENCIA VISTA PÚBLICA
Enriquillo, R.D., Nov 6 2014

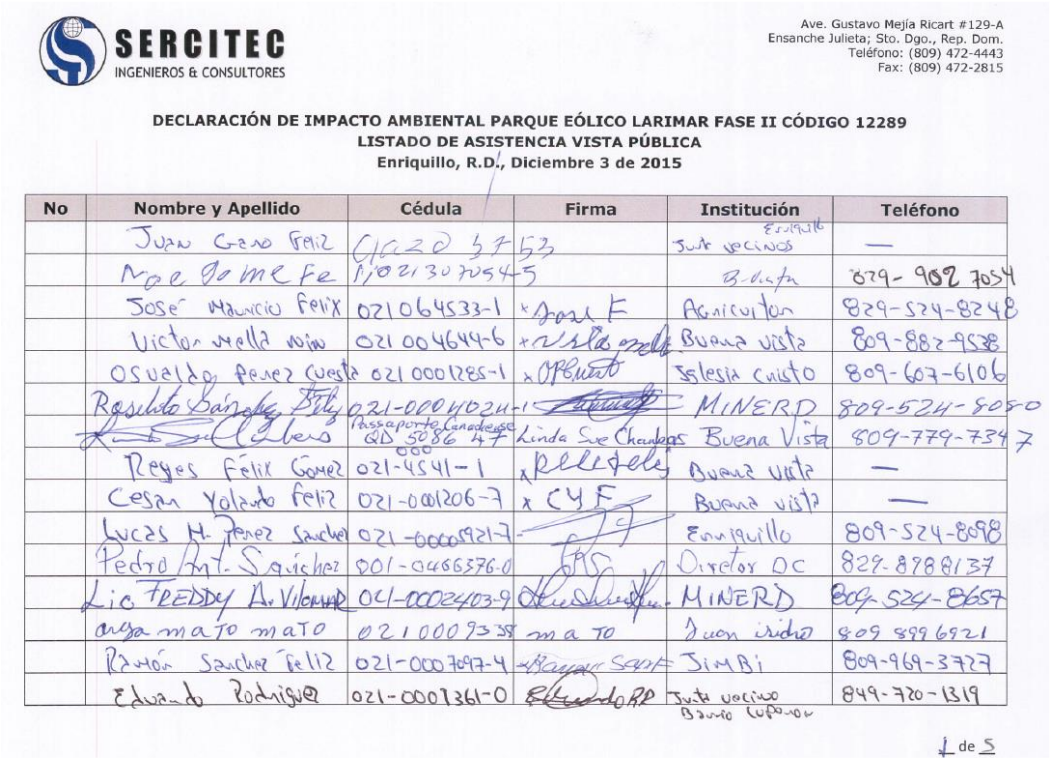
No	Nombre y Apellido	Cédula	Firma	Institución
1	Patria M. Borges	021-0001502-9	Patria M. Borges	Ostrolado. V.
2	Ramón Alberto Sánchez	021-000-5202-2		Comunicador
3	Edwin Lazarus Reynoso	021 0002542-8	A.S.	Agricultor ACHRU
4	Manuel Gómez Mella	021-0002225-6		Buena Vista Comunitario
5	Jesús Paredes Gómez	021-0000130-0		Federación Campesino (Luis Manuel Contable)
6	Pepino Gan	037-0057092-6		Buena Vista
7	Manuel E. Ramón Paez	021-0001687-8		Cuerpo Bomberos
8	Andy Eneo (4 Bocas)	021-0000562-4	Angie Peguero	Agricultor
9	FREDDY A. VILORIA G.	021-0002403-9		Maestro.
10	Leonardo Perdomo Montilla	021-0006698-3		Buena vista
11	Ibón Simón Sánchez	021-0001922-9		Club Liberación
12	Reynaldo Carvajal Feliz	021-0004133-0		Regidor
13	Cristobalina Carrasco	021-0002136-5		Esc. Bás Peñalva
14	Lic. Rosalito Sánchez Feliz	021-0004024-4		Esc. B. Juan Isidro
15	Adriel Encarnación Perez	021-0008017-1		H E Root Multi Service

Figure 7. Stakeholders participants Larimar I (1 of 5)

Figure 8. Stakeholders meeting images – Larimar I

For Larimar II the consultation process started at the end of 2015 with a Public Sight visit presenting the project and the Environmental Impact Declaration - DIA, to Local Stakeholders[48]. As Larimar I, since then it carried out a series of activities to inform and take into account the communities in the area of direct and indirect influence. The stakeholder consultations were carried out in the Municipality of Enriquillo to facilitate the participation of the stakeholders. As said before for Larimar I, this public sight visit processes is structured within the Dominican Republic Legislation - Law 64-00.

Followed is presented a fragment of the list containing the Stakeholders participants to the public sigh, for Larimar II on December 3rd of 2015. In the attached document 02_DIA_LARIMAR-II.pdf, page 672/734 it is possible to check the complete list of 62 participants.



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DECLARACIÓN DE IMPACTO AMBIENTAL PARQUE EÓLICO LARIMAR FASE II CÓDIGO 12289
LISTADO DE ASISTENCIA VISTA PÚBLICA
Enriquillo, R.D., Diciembre 3 de 2015

No	Nombre y Apellido	Cédula	Firma	Institución	Teléfono
	Juan Cero Feliz	021-0037453		Junt Vecinos Enriquillo	—
	Noe Jaime Fe	1102130705-45		B. Victoria	829-902 7054
	José Mauricio Felix	021064533-1	x José F	Agricultor	829-524-8248
	Victor Mella Nina	021 004644-6	x Victor Mella	Buena vista	809-882-9538
	Osvaldo Perez Cuesta	021 0001285-1	x OPCuesta	Iglesia Cristo	809-607-6106
	Rosalito Bárcenas Feliz	021-0004024-1		MINERD	809-524-8050
		Passaporte Canadiense GD 5086 47	Linda Sue Chambers	Buena Vista	809-779-7347
	Reyes Félix Gomez	021-4541-1	x Reyes Felix	Buena vista	—
	Cesar Yolanto Feliz	021-0001206-7	x CYF	Buena vista	—
	Lucas M. Perez Sanchez	021-0000921-7		Enriquillo	809-524-8098
	Pedro Ant. Sanchez	001-0466376-0		Director OC	829-8788137
	Lic. FREDDY A. VILLAMAN	021-0002403-9		MINERD	809-524-8657
	anya mato mato	021000935	mato	Juan isidro	809 899 6921
	Ramón Sanchez Feliz	021-0007097-4		JIMBI	809-969-3727
	Eduardo Rodriguez	021-0007361-0		Junta vecinos Barrio Lupo-Lo	849-720-1319

1 de 5

Figure 9. Stakeholder meeting participants list – Larimar II (1 of 5)

[48] See folder "03a_Vistas Publicas Larimar II"

Figure 10. Stakeholder meeting images – Larimar II

It is important to remark that EGE Haina as a company has a policy and a program of social responsibility which promotes a continuous sustainable communitarian development, helping the people within the project area (Larimar I and Larimar II) to improve their quality of life. The principal programs implemented at the project's area of influence are[49] :

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

[49] For more information please check the files 01_DIA_LARIMAR-I.pdf (Anexo 6.5) and 02_DIA_LARIMAR-II.pdf (page 661/734)

Figure 11. Social Responsability Programs (see page 661/734 of the document 02_DIA_LARIMAR-II.pdf)

5.4 Public Comments

All the comments given by the stakeholders during first consultation for both Larimar I and Larimar II, were answered and clarified. The record of these comments (questions and answers) has been presented in the Environmental Impact Declaration - DIA, revised by the Environment and Natural Resources Ministry of the country - MIMARENA.

Comments Larimar I

1. The vice-president of Enriquillo's Social Club – José David Terrero, is concerned about the fact that in the region they produce good and efficient energy for the country (wind farm projects), but they don't receive energy 24 hours a day like other regions (just 18), and the energy price is very high.
For this issue EGE Haina answered considering its positions as a company of energy generation. They cannot control the energy distribution process and energy price of the country, which is manage by EDESUR for Barahona. In this line EGE Haina encourage the stakeholders to write a communication to EDESUR to express their concern about the price and access to firm energy , all supported by the accompaniment of EGE Haina.

2. The representative of the cattlemen's committee – Silverio Terreno, expressed his concern about the name of the wind farm project, they expected it will be called Enriquillo in order to price the community and Enriquillo's municipality. EGE Haina answered expressing that Larimar denomination, was commonly selected looking for something that would identify the region, something that everyone would feel proud of and that only occurs in the province of Barahona, and Larimar as a representative stone of the region was considered an excellent option.

3. Community participant - Luis Gómez Mella, was concerned about the environmental protection and management. Enriquillo's region has an especial beauty an natural and agricultural potential that must be preserved.
Answer: EGE Haina is committed to operate and fulfil the objectives of its Environmental Management Plan approved by the Ministry in order to impact the less the community, the environment and the economical activities.

4. Community resident – Elvis Teniente wanted to understand why if it is implemented a clean energy project with a natural resource of energy (wind) "with no cost", the price of the energy keeps growing.
Answer: EGE Haina explained Elvis that even if the wind energy use the wind that is "free fuel" as source of energy, the costs associated with its equipment, technology and knowhow is more expensive than a thermal power plant, that must buy its fuel to operate and generate electricity

More Public comments of Larimar I can be found in Anexo 6.5 page 701 of the document 01_DIA_LARIMAR-I.pdf

Comments Larimar II

1. Victor Manuel Tejada – President of the Agriculture Association of Enriquillo was concerned about the consequences for the land owners and the area of influence of the project, in the case an emergency with the wind turbines occurred.
EGE Haina answered that they are committed to operate and fulfil the objectives of its Environmental Management Plan approved by the Ministry in order to impact the less the community, the environment and the economical activities.

2. Roselino Sanchez Feliz – Ministry of Education Representative, asked about the possibility to receive some help at the Educational Centre of Juan Isidro- Enriquillo, and also reconstructing and repairing households for the community. He expressed as well the necessity of the community to have water access.
EGE Haina is committed with the community and at the moment is repairing and helping the community at the influence area of the project, to repair their households. Concerning the Educational Centre, EGE Haina has implemented a program to deliver school kits to every student assisting the schools of Enriquillo and surroundings.
For water issues EGE Haina cannot act independently, because the problematic related with water management and its supply is directly with the INAPA at the National Institution of Hydraulic Resources of Dominican Republic - INDHRI.

More Public comments for Larimar II can be found in Anexo 6.5 page 677 of the document 02_DIA_LARIMAR-II.pdf

APPENDIX 1:

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