



**Monitoring report form for CDM project activity**  
**(Version 07.0)**

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

**MONITORING REPORT**

<b>Title of the project activity</b>	Punta Palmeras Wind Power Project	
<b>UNFCCC reference number of the project activity</b>	10070	
<b>Version number of the PDD applicable to this monitoring report</b>	2	
<b>Version number of this monitoring report</b>	1	
<b>Completion date of this monitoring report</b>	02/08/2019	
<b>Monitoring period number</b>	1	
<b>Duration of this monitoring period</b>	01/01/2015 – 31/05/2019	
<b>Monitoring report number for this monitoring period</b>	1.0	
<b>Project participants</b>	Punta Palmeras S.A.	
<b>Host Party</b>	Chile	
<b>Applied methodologies and standardized baselines</b>	Large Scale Consolidated Methodology ACM0002. Grid connected electricity generation from renewable sources. Version 14.0.0	
<b>Sectoral scopes</b>	Sectoral Scope: 1; Energy industries (renewable / non-renewable sources).	
<b>Amount of GHG emission reductions or net anthropogenic GHG removals achieved by the project activity in this monitoring period</b>	Amount achieved before 1 January 2013	Amount achieved from 1 January 2013
	0 tCO <sub>2</sub> e	322,036 tCO <sub>2</sub> e
<b>Amount of GHG emission reductions or net anthropogenic GHG removals estimated ex ante for this monitoring period in the PDD</b>	368,672 tCO <sub>2</sub> e	

## SECTION A. Description of project activity

### A.1. General description of project activity

The main purpose of this project activity is to generate clean electricity from renewable wind resources, through the development of the Punta Palmeras wind farm. The project activity is promoted by Punta Palmeras S.A.

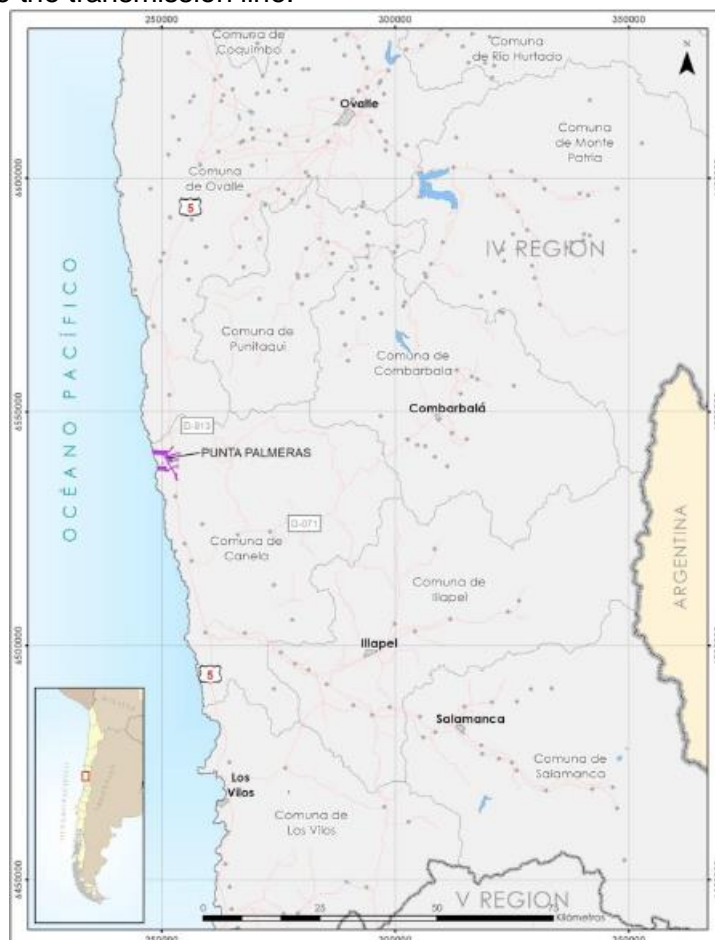
The total installed capacity of this project activity is 45 MW from 15 WTGs, each with a capacity of 3 MW. Electricity generated by the Punta Palmeras project will displace electricity from the national electricity grid, supplied partly from fossil fuels, resulting in a reduction in greenhouse gas (GHG) emissions.

The electricity generated is supplied to the Central Interconnected System (Sistema Interconectado Central - SIC) under a long-term Power Purchase Agreement (PPA). The total emission reductions achieved during this monitoring period (from 01/01/2015 to 31/05/2019) are 322,036 tCO<sub>2</sub>e.

### A.2. Location of project activity

The project is located near the Canela community, in the Choapa province, within the Region IV of Coquimbo, Chile. The geographical coordinates of the project are: Latitude: -31.238831°; Longitude: -71.615990°

Punta Palmeras is located 20 Km north from Canela Baja city and 3 Km West from the Road 5 North. Those coordinates correspond to Punta Palmeras's substation located in the wind investment site before the transmission line.



**A.3. Parties and project participants**

Parties involved	Project participants	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
Chile (host)	Punta Palmeras S.A. (Private entity)	No

**A.4. References to applied methodologies and standardized baselines**

The baseline and monitoring methodology applied for the proposed project activity is the approved methodology ACM0002: "Large-scale Consolidated Methodology: Grid-connected electricity generation from renewable sources" (version 14.0.0)<sup>1</sup>

- "Methodological tool: Tool to calculate the emission factor for an electricity system" (version 04.0, EB75)<sup>2</sup>
- "Methodological tool: Tool for the demonstration and assessment of additionally" (version 07.0.0, EB70)<sup>3</sup>

**A.5. Crediting period type and duration**

The first crediting period of the project activity, to which this monitored period applies, started on 01/01/2015 and runs for 10 years until 31/12/2024. Fixed crediting period.

**SECTION B. Implementation of project activity****B.1. Description of implemented project activity**

a) Description of the installed technology, technical processes and equipment:

All equipment utilized in the project uses proven technology that has been successfully applied in similar projects in other regions of the world. The project is a 45 MW wind power project, expected to produce 124,155 MWh per annum with an average capacity factor of 31.5%. The operational lifetime is 20 years.

Characteristic	Amount	Unit
Total Power Capacity	45	MW
Turbine AW116/3000 IEC IIA T92	15	Not applicable
Rated Power per turbine	3	MW
Cut in-cut-out wind	3-25	m/s
Generator voltage	12.000	V
Equivalent annual operating hours	2.759	Hrs
Annual Production	124.155	MWh
Capacity factor	31,5	%
Transmission line length	6,5	Km
Transmission line Voltage	220	kV
Diameter	116	m
Hub Height	92	m
Nominal rotational speed	Variable 9,2 – 15,6	rpm

AW116/3000 IEC IIA T92 is a wind turbine fabricated by Acciona, a company with 20 years experience of leadership in the sector. The AW116/3000 IEC IIA T92 is a 3000 kW power-rated

<sup>1</sup> <https://cdm.unfccc.int/methodologies/DB/VJ19AX539D9MLOPXN2AY9UR1N4IYGD>

<sup>2</sup> <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v4.0.pdf>

<sup>3</sup> <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v7.0.0.pdf>

horizontal shaft wind turbine, with three blades, variable speed, 380 kV rated voltage and frequency of 50-60 Hz.; Certified by Germanischer Lloyd (GL) for a design duration of 20 years.

The wind turbine has a control software (SCADA) for monitoring and automatically managing the operation. A double-fed asynchronous generator of Insulated Gate Bipolar Transistor's (Pulse Width Modulated) improves voltage and frequency stability, supplies reactive power to the grid when required and operates the power factor in inductive or capacitive power as required.

- b) Information on the implementation and actual operation of the project activity, including relevant dates (e.g. construction, commissioning, continued operation periods, etc.).

All the 15 units of the project were built before November 2014, when the construction of the wind farm was completed. The following table shows a series of events related to the project and its date.

Event	Date
Opening date	13/01/2015
Test period start date (substations)	August - 2014
Test period start date (wind farm)	September - 2014
End date test period (substations)	September - 2014
End date test period (wind farm)	November - 2014
Commissioning date	19/11/2014

## **B.2. Post-registration changes**

### **B.2.1. Temporary deviations from the registered monitoring plan, applied methodologies, standardized baselines or other methodological regulatory documents**

Not applicable. The section is left blank intentionally

### **B.2.2. Corrections**

Not applicable. The section is left blank intentionally

### **B.2.3. Changes to the start date of the crediting period**

Not applicable. The section is left blank intentionally

### **B.2.4. Inclusion of monitoring plan**

Not applicable. The section is left blank intentionally

### **B.2.5. Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other methodological regulatory documents**

Not applicable. The section is left blank intentionally

### **B.2.6. Changes to project design**

Not applicable. The section is left blank intentionally

### **B.2.7. Changes specific to afforestation or reforestation project activity**

Not applicable. The section is left blank intentionally

## **SECTION C. Description of monitoring system**

According to approved Large Scale Consolidated Methodology ACM0002 Version 14.0.0, Sectoral Scope 1, "Grid connected electricity generation from renewable sources" is proposed to be used to monitor the emission reductions. Important information on monitoring is provided below:

Organisational structure: Following management structure is proposed to be implemented at site for the monitoring of project activity. There might be changes in this structure in terms of roles however the responsibilities undertaken by the roles would always be maintained.



Role	Responsibility
General Manager	Overall responsible for the management of project activity.
Technical Director	Ensure correctness of data and compliance of monitoring methodology.
Finance Director	Generation of invoices and CER calculation.
Site Manager	Ensuring proper data recording and calibration of relevant meters as per legal requirements.

Generating point: This would be exact place where energy is generated at the various individual windmills.

Interconnection point: It is the connection point of the electrical line between the wind-farm and the grid.

Point of measurement: Place where meter is connected to measure energy fed into the grid (SIC) at the interconnection point. Meters are located in the interconnection point substation Las Palmas operated by Transelec.

There are two measurement meters in Las Palmas substation:

- Main meter: This would primarily be used for accounting and billing of electricity. The meter will be properly registered by the system operator (CDEC-SIC).
- Check meter: Will be used for accounting and billing of electricity in case of failure of main meter. The project owner will keep a back-up meter installed that can be accessed in case of malfunctioning of the main meter. If the main meter is mal-functioning, the first option for billing is to use the readings from the check meter. If this action is not possible due to any reason, the net energy generation will be calculated by the CDEC-SIC using data from third parties for energy billing purposes, located in the same substation.

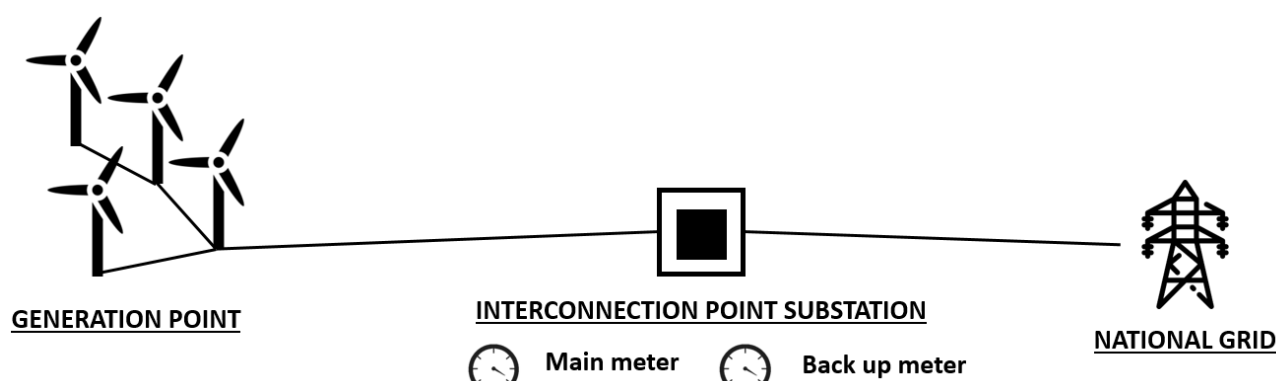
All the meters would be equal or higher than 0.2% accuracy class and will be sealed.

Data recording and storage: Quantity of net electricity generation supplied by the project plant to the grid is continuously measured by meters (with, at least, hourly measurement). Electricity generation related evidence or data will, at least monthly recorded and will be stored in the electronic format and/or hard copy format during the running of the project and for a minimum of

two years after the end of the crediting period or the last issuance, whichever is later. Remote access, through data acquisition software, to the main meter reading will be possible.

Main and check meters reading: The reading shall be taken on a continuous and online basis and will be sent remotely to the grid operator. Standards and requirements of the grid operator will be fulfilled. The same will form the basis for raising invoice and receiving payments for net electricity sold. Data integrity between main and check meters reading will be performed. If there is any discrepancy, a report explaining the problem detected and the corrective actions to be taken will be created and documented.

Data uncertainty: In case the Main and/or Check meters are found to be faulty, the correction factor as per the requirements stated in PPA would be applied to determine the electricity generation for that period.



## SECTION D. Data and parameters

### D.1. Data and parameters fixed ex ante

Data/Parameter	$EF_{grid,CM,y}$
Unit	tCO <sub>2</sub> /MWh
Description	Combined margin CO <sub>2</sub> emission factor for grid connected power generation in year y calculated using the "Tool to calculate the emission factor for an electricity system" (Ex-ante)
Source of data	Calculated
Value(s) applied	0.6732
Choice of data or measurement methods and procedures	The value was calculated ex ante as per the "Tool to calculate the emission factor for an electricity system".
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	No comments

### D.2. Data and parameters monitored

Data/Parameter	$EG_{facility,y}$
Unit	MWh
Description	Quantity of net electricity generation supplied by the project plant to the grid (SIC) in the monitoring period.
Measured/calculated/default	Measured Electricity Generation ( $EG_{facility,y}$ ) is measured continuously using electronic electricity meters.
Source of data	Energy meters

Value(s) of monitored parameter	478,366.57 MWh during the monitoring period
Monitoring equipment	<p><b>Main electricity meter at measurement point N°1: Substation “Las Palmas”</b>  Type: Electronic electricity meter  Accuracy class: IEC 62053-22/23 0.2S  ANSI 0.2  Manufacturer: SHNEIDER  Model: ION 8650  Serial number: 1BY01406006200000  Date of last calibration: 03/09/2014</p> <p><b>Back-up electricity meter at measurement point N°1: Substation “Las Palmas”</b>  Type: Electronic electricity meter  Accuracy class: IEC 62053-22/23 0.2S  ANSI 0.2  Manufacturer: SHNEIDER  Model: ION 8650  Serial number: 1BY01406006300000  Date of last calibration: 03/09/2014</p>
Measuring/reading/recording frequency	The Energy Generated ( <b>EG<sub>facility,y</sub></b> ) in Punta Palmeras is measured continuously.
Calculation method (if applicable)	Not applicable
QA/QC procedures	The accuracy of the metering equipment is calibrated and verified periodically, according to standards of the grid operator (CDEC-SIC), to ensure that any error resulting from such equipment shall not exceed +/- 0.2% of full scale classification. To guarantee QA/QC, it is also double checked by receipts of electricity sales.
Purpose of data/parameter	Calculate the baseline emissions in year "y"
Additional comments	No comments

### D.3. Implementation of sampling plan

Not applicable

## SECTION E. Calculation of emission reductions or net anthropogenic removals

### E.1. Calculation of baseline emissions or baseline net removals

According to the methodology used in the registered PDD (ACM0002: “Large-scale Consolidated Methodology: Grid-connected electricity generation from renewable sources”, version 14.0.0), baseline emissions are calculated using the following formula:

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

Where:

- $BE_y$ : Baseline emissions in year “y” (tCO<sub>2</sub>e).
- $EG_{PJ,y}$ : Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh/year).
- $EF_{grid,CM,y}$ : Combined margin CO<sub>2</sub> 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*” (tCO<sub>2</sub>e/MWh).

Likewise, the CO<sub>2</sub> emission factor of the national connected grid ( $EF_{grid,CM,y}$ ) was calculated ex-ante using the formula for the Combined Margin Emission Factor, consisting of the weighted average

Operating Margin emission factor ( $EF_{grid,OM,y}$ ) and Build Margin emission factors ( $EF_{grid,BM,y}$ ), as follows:

$$EF_{grid,CM,y} = W_{OM} * EF_{grid,OM,y} + W_{BM} * EF_{grid,BM,y}$$

$EF_{grid,CM,y}$  was calculated in the PDD (0.6732 t CO<sub>2</sub>e / MWh) at the time of registration.

Punta Palmeras Wind Power Project			
Year	EG <sub>y</sub> (MWh)	EF <sub>y</sub> (t CO <sub>2</sub> e / MWh)	BE <sub>y</sub> (t CO <sub>2</sub> e)
2015	111,362.75	0.6732	74,969.40
2016	95,122.50	0.6732	64,064.47
2017	116,357.39	0.6732	78,331.79
2018	121,738.91	0.6732	81,954.63
2019	33,785.02	0.6732	22,744.08
<b>TOTAL</b>	<b>478,366.57</b>	<b>0.6732</b>	<b>322,036</b>

## E.2. Calculation of project emissions or actual net removals

The proposed CDM project activity is a wind power system that does not generate project GHG emissions according to the methodology. A value of zero emissions is assigned to the project emissions,  $PE_y = 0$

## E.3. Calculation of leakage emissions

The calculation does not need to consider leakage emissions, so  $LE_y = 0$

## E.4. Calculation of emission reductions or net anthropogenic removals

	Baseline GHG emissions or baseline net GHG removals (t CO <sub>2</sub> e)	Project GHG emissions or actual net GHG removals (t CO <sub>2</sub> e)	Leakage GHG emissions (t CO <sub>2</sub> e)	GHG emission reductions or net anthropogenic GHG removals (t CO <sub>2</sub> e)		
				Before 01/01/2013	From 01/01/2013	Total amount
<b>Total</b>	322,036	0	0	0	322,036	322,036

## E.5. Comparison of emission reductions or net anthropogenic removals achieved with estimates in the registered PDD

Amount achieved during this monitoring period (t CO <sub>2</sub> e)	Amount estimated ex ante for this monitoring period in the PDD (t CO <sub>2</sub> e)
322,036	368,672

### E.5.1. Explanation of calculation of “amount estimated ex ante for this monitoring period in the PDD”

During the first 4 years (2015, 2016, 2017 and 2018) of the monitoring period, the total of the annual ex ante emission reduction is multiplied by 4.

$$83,581 \text{ t CO}_2\text{e/year} * 4 \text{ years} = \underline{334,324 \text{ t CO}_2\text{e}}$$

For the year 2019, the total of the annual ex ante emission reductions is divided by 365 days, with the intention with the intention of calculating daily ex ante reductions.

$$83,581 \text{ t CO}_2\text{e/year} \div 365 \text{ days} = \underline{228.989 \text{ t CO}_2\text{e} / \text{day}}$$



Once this data is known, it is multiplied by the number of days between 01/01/2019 and the 31/05/2019 (150 days).

$$228.989 \text{ t CO}_2\text{e} / \text{day} \times 150 \text{ days} = \underline{34,348.35 \text{ t CO}_2\text{e}}$$

Finally, both amounts are added to know the total ex-ante emission reductions, during the monitoring period.

$$334,324 \text{ t CO}_2\text{e} + 34,348.35 \text{ t CO}_2\text{e} = \underline{368,672 \text{ t CO}_2\text{e}}$$

**E.6. Remarks on increase in achieved emission reductions**

The actual emission reductions during the monitoring period are lower than the ones anticipated ex-ante in the CDM-PDD hence there is no need of explanation of any increase.

**E.7. Remarks on scale of small-scale project activity**

Not applicable

## Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
07.0	31 May 2019	Revision to: <ul style="list-style-type: none"> <li>• Ensure consistency with version 02.0 of the “CDM project standard for project activities” (CDM-EB93-A04-STAN);</li> <li>• Add a section on remarks on the observance of the scale limit of small-scale project activity during the crediting period;</li> <li>• Add "changes specific to afforestation or reforestation project activity" as a possible post-registration changes;</li> <li>• Clarify the reporting of net anthropogenic GHG removals for A/R project activities between two commitment periods;</li> <li>• Make editorial improvements.</li> </ul>
06.0	7 June 2017	Revision to: <ul style="list-style-type: none"> <li>• Ensure consistency with version 01.0 of the “CDM project standard for project activities” (CDM-EB93-A04-STAN);</li> <li>• Make editorial improvements.</li> </ul>
05.1	4 May 2015	Editorial revision to correct version numbering.
05.0	1 April 2015	Revisions to: <ul style="list-style-type: none"> <li>• Include provisions related to delayed submission of a monitoring plan;</li> <li>• Provisions related to the Host Party;</li> <li>• Remove reference to programme of activities;</li> <li>• Overall editorial improvement.</li> </ul>
04.0	25 June 2014	Revisions to: <ul style="list-style-type: none"> <li>• Include the Attachment: Instructions for filling out the monitoring report form (these instructions supersede the "Guideline: Completing the monitoring report form" (Version 04.0));</li> <li>• Include provisions related to standardized baselines;</li> <li>• Add contact information on a responsible person(s)/ entity(ies) for completing the CDM-MR-FORM in A.6 and Appendix 1;</li> <li>• Change the reference number from <i>F-CDM-MR</i> to <i>CDM-MR-FORM</i>;</li> <li>• Editorial improvement.</li> </ul>
03.2	5 November 2013	Editorial revision to correct table in page 1.
03.1	2 January 2013	Editorial revision to correct table in section E.5.
03.0	3 December 2012	Revision required to introduce a provision on reporting actual emission reductions or net GHG removals by sinks for the period up to 31 December 2012 and the period from 1 January 2013 onwards (EB 70, Annex 11).
02.0	13 March 2012	Revision required to ensure consistency with the "Guidelines for completing the monitoring report form" (EB 66, Annex 20).
01.0	28 May 2010	EB 54, Annex 34. Initial adoption.

<i>Version</i>	<i>Date</i>	<i>Description</i>
Decision Class: Regulatory Document Type: Form Business Function: Issuance Keywords: monitoring report		