PROGRAMME DESIGN DOCUMENT FORM FOR CDM PROGRAMMES OF ACTIVITIES (F-CDM-PoA-DD)
Version 02.0

PROGRAMME OF ACTIVITIES DESIGN DOCUMENT (PoA-DD)

PART I. Programme of activities (PoA)

SECTION A. General description of PoA

A.1. Title of the PoA

>>
Implementation of Grid connected Wind Farm Projects in Chile
Version 03
Date: 05/10/2012

A.2. Purpose and general description of the PoA

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(a)Policy/measure or stated goal that the PoA seeks to promote:

The proposed CDM programme of activities consists in the implementation of Greenfield renewable electricity generation projects by using wind energy in Chile (host country). Electricity produced will be exported to the grid to satisfy the growing electricity demand in the country by using a GHG emissions free electricity generation technology.

The main objective of the PoA is to promote the development of grid-connected electricity generation from wind energy in Chile that will displace electricity generated by fossil fuel based power plants from the grid and therefore its subsequent GHG emissions will be reduced.

(b)Framework for the implementation of the proposed PoA:

The proposed wind power programme is developed by Andes Mainstream SpA. as a coordinating/managing entity.

This PoA includes CDM projects that use wind energy to produce and export electricity to a grid. The projects to be included under the PoA can be implemented either at a micro scale (installed capacity less than 5MW) small scale (installed capacity between 5MW and 15 MW) or at a large scale level (larger than 15 MW).

Currently, the electricity matrix in Chile is mainly composed by fossil fuel fired power plants which represents approximately a 62%, followed by large scale hydroelectric power plants (35%)[1]. Non conventional renewable energy in Chile[2], only represents a 3% of the electricity matrix composed by wind, small hydro and biomass power plants, from which wind power represents 1.2% of the total installed capacity in Chile.

This PoA contributes to the sustainable development in Chile by:

[1] Ministry of Energy
[2] Non conventional renewable energy: In Chile, this concept consist in the energy power based in the use of renewable resources that produces lower environmental impact than conventional energy sources (such as fossil fuels) and that considers higher associated investment costs therefore presenting a slow development in developing countries.

- Promoting wind power technology development in Chile.
- Using wind energy as a renewable source for electricity generation to satisfy part of the growing electricity demand in Chile.
- Diversifying energy sources helping to decrease the import of fossil fuel from other countries.
- Increasing the participation of non conventional renewable energy technologies in the installed capacity of the electricity matrix in Chile.

This PoA is a voluntary action developed by Andes Mainstream SpA.

A.3. CMEs and participants of PoA

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The coordinating or managing entity of the PoA, (as the entity which communicates with the Board) is Andes Mainstream SpA.(private entity).

Project participants to the PoA correspond to Andes Mainstream SpA. as the CME and private companies as the responsible entities of the CPA.

The party involved in the proposed PoA is presented in following table:

A.4. Party(ies)

Table 1. Parties involved

Name of Party involved (host) indicates a host Party	Private and/or public entity(ies) project participants (as applicable)	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
Chile *Chile ratified the Kyoto Protocol on August, 2002.*	Private entity: Andes Mainstream SpA.	No

A.5. Physical/ Geographical boundary of the PoA

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In Chile there are five electricity grids: SING, SIC[3], Aysén, Magallanes and Easter Island systems which cover different geographical locations along the country. All of them operate independently and do not transfer electricity to each other, so neither imports nor exports are observed in any of the mentioned systems.

The geographical boundary of the PoA will be within the limits of Chile (host country), and considers the regions of Chile covered by the grids: Central Interconnected electricity System (SIC) and the Northern Electricity System (SING).

The following figure shows the area of Chile covered by each electricity system operating in the country (as aforementioned only SIC and SING are considered in this PoA):

[3] SING and SIC are the Spanish acronyms for the Great North Interconnected System and the Central Interconnected System respectively.

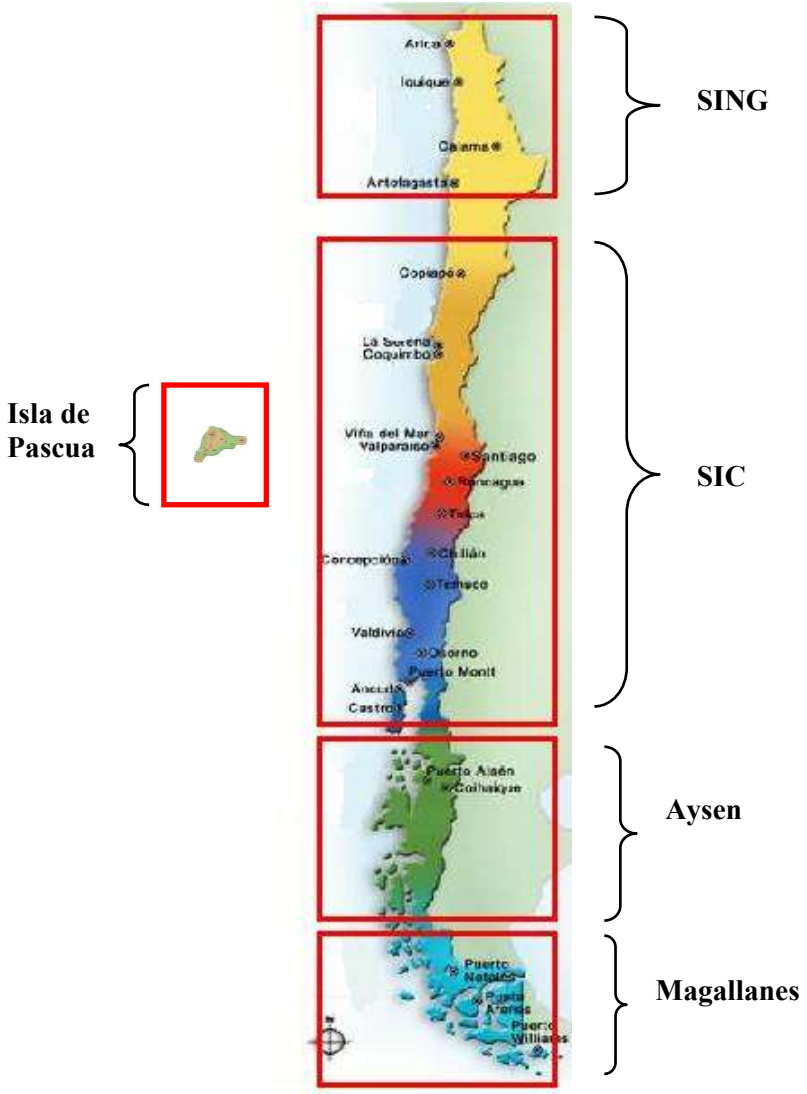

Figure 1. Geographical area covered by each electricity system in Chile.

A.6. Technologies/measures

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The CPAs to be included in the PoA will consist of wind farms. The technology will convert wind into electricity that will be injected to an electricity system (SIC or SING, depending on the geographical location of the CPA).

For this purpose, depending on the size of the wind farm, a given amount of wind turbines will be installed to produce and deliver energy to the grid trough new or an existing transmission line.

The monitoring equipment shall be located in the project site and will consist in one or more electricity meters that will measure the net energy from the CPA power plant exclusively. The meters specification will comply with the current national regulations, wich at the present time correspond to bidirectional meters Class 02 with a 0.2% of accuracy according to the "Manual de procedimientos para los sistemas de medición y sistemas de supervisión en el CDEC-SIC"[4] which is based in the international norm IEC 60687 "Alternating current Watt-meter for active energy Classes 0.2 S and 0.5 S", applicable to the CPAs connected to the SIC grid, and the Resolution Nº 395/2003 "Manual de procedimientos Nº13 Instalación,

[4] Document available at Web site: https://www.cdec-sic.cl/documentos_n_regl_es.php?subcategoria_id=2

Instalación, lectura, sincronización y mantenimiento de equipos de medida utilizados en la valorización de transferencias entre integrantes del CDEC-SING"[5] applicable to the CPAs connected to the SING grid.

In the following figure it is presented a diagram flow of a CPA.

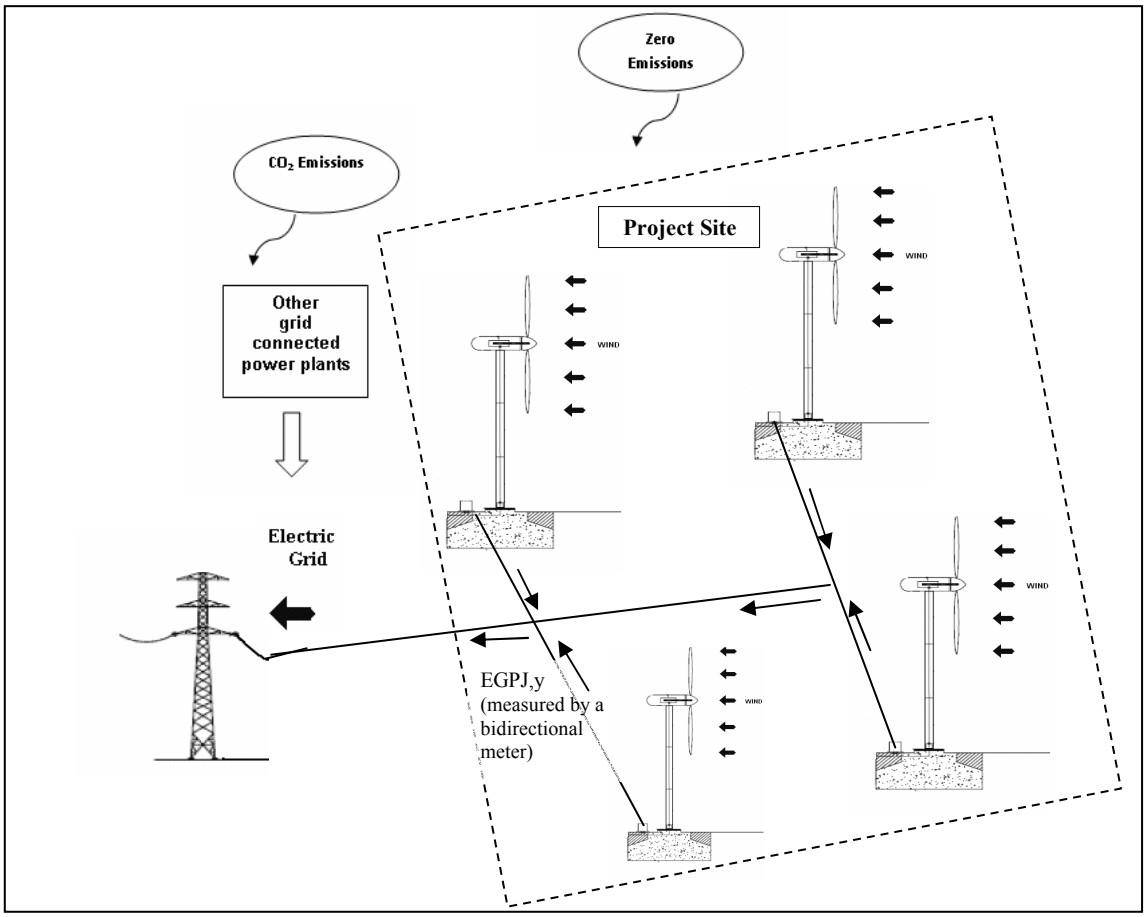

Figure 2. General Diagram Flow of the project

The CPA-DD General diagram flow shall detail the specific location of the monitoring equipment (please see section B.3 of the Generic CPA-DD).

A.7. Public funding of PoA

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No public funding from parties included in Annex I is received by the PoA.

SECTION B. Demonstration of additionality and development of eligibility criteria

B.1. Demonstration of additionality for PoA

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Additionality demonstration for this PoA may be demonstrated using one of the following approaches:

a) Additionality demonstration for CPAs up to 5 MW (optional):

"Guidelines for demonstrating additionality of microscale project activities" version 03 may be applied in

[5]Document available at Web site: http://cdec2.cdec-sing.cl/pls/portal/cdec.pck_web_cdec_pages.pagina?p_id=3009

in cases of project activities up to five megawatts that employ renewable energy technology. According to these guidelines:

CPAs up to 5 MW are additional if:
The project activity employs specific renewable energy technologies/measures recommended by the host country designated national authority (DNA) and approved by the Board to be additional in the host country. In the case of the DNA of Chile, the UNFCCC approved the recommendation that wind energy technologies up to 5MW installed are considered automatically additional[6].

b) Additionality demonstration of CPAs with capacity higher than 5 MW:
According to the "Standard for Demonstration of Additionality, Development of Eligibility Criteria and Application of Multiple Methodologies for Programme of Activities" v.01.0, additionality should be demonstrated by establishing that in the absence of CDM, none of the implemented CDM Project Activities (CPAs) would occur. This should be demonstrated in accordance with the methodology for large scale projects.

According to the applicable methodology, ACM0002 version 13.0.0, the additionality of the project activity shall be demonstrated and assessed using the "Tool for the demonstration and assessment of additionality" version 6.0.0, as follows:

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

Sub-step 1a: Define alternatives to the project activity:
According to the applicable tool, alternatives should include:
(a) The proposed project activity undertaken without being registered as a CDM project activity;
(b) Other realistic and credible alternative scenario(s) to the proposed CDM project activity scenario that deliver outputs services (e.g., cement) or services (e.g. electricity, heat) with comparable quality, properties and application areas, taking into account, where relevant, examples of scenarios identified in the underlying methodology;
(c) If applicable, continuation of the current situation (no project activity or other alternatives undertaken).

In this PoA, alternative scenarios to the CPA are:

(a)The proposed project activity undertaken without being registered as a CDM project activity and,
(c) The continuation of the current situation with the existing power plants of the generation system (no project activity).

Alternative c) is selected for each CPA since the baseline scenario determined as per ACM0002 v.13.0.0 for Greenfield projects is 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"*.

Sub-step 1b: Consistency with mandatory laws and regulations
The identified alternative scenarios are consistent with mandatory laws and regulations in Chile applicable for project activities related to the construction and operation of energy generation power plants, which correspond to the chilean environmental law Nº19,300/1994[7] and the electricity law DFL Nº 4/ 2007[8].

[6] http://cdm.unfccc.int/DNA/submissions/files/2012/0402_chile_res.pdf
[7] http://www.leychile.cl/Navegar?idNorma=30667
[8] http://www.cdec-sic.cl/imagenes/contenidos/File/normativa/Ley_electrica/DFL_N4.pdf

Step 2: Investment analysis
This analysis aims to demonstrate that each CPA to be included in the PoA can't be considered to be economically attractive, without the revenue from the sale of CERs.

To conduct the investment analysis the Guidance on the Assessment of Investment Analysis version 05 will be taken into account and the following sub-steps will be followed:

Sub-step 2a: Determine appropriate analysis method
The CPAs to be included under the PoA generates economic benefits (incomes for energy sell) other than CDM related income, therefore the simple cost analysis (Option I) cannot be applied. The benchmark analysis (Option III) will be applied since it is suited to circumstances where the baseline does not require investment or is outside the direct control of the project developer, i.e. cases where the choice of the developer is to invest or not to invest. As the alternatives scenarios are: to implement the project without the CDM or to continue with the current situation, then the benchmark analysis is suitable for this PoA.

Sub-step 2b: Option III. Apply benchmark analysis
For the investment analysis of the CPAs the financial indicator is IRR (considering 100% equity) which will be compared against a benchmark.

According the "Guidelines on the Assessment of Investment Analysis ver.05", for the selection of appropriate benchmarks, in cases of projects which could be developed by an entity other than the project participant, the benchmark should be based on parameters that are standard in the market. For the proposed CPAs cost of equity will be determined by selecting the values provided in Appendix A of the referred guidelines. The category of the CPAs according to the sectored scopes used under the CDM is Group I: Energy Industry in Chile, therefore the default value for the expected return on equity calculated after taxes is 10.3%. This value is expressed in percentages in real terms, as well as the IRR (considering 100% equity).

Sub-step 2c: Calculation and comparison of financial indicators (only applicable to Options II and III):

The IRR of a CPA is calculated through an economical assessment.

According to the "Tool for the demonstration and assessment of additionality" version 6.0.0,, the economical assessment should include all relevant costs (including, for example, the investment cost, the operations and maintenance costs, etc.), and revenues (excluding CER revenues, but possibly including *inter alia* subsidies/fiscal incentives, ODA, etc, where applicable), and, as appropriate, non-market cost and benefits in the case of public investors if this is standard practice for the selection of public investments in the host country.

The following table shows the parameters to be considered in the economical assessment of each CPA:

Table 2. Parameters considered in the economical assessment for IRR calculation

Parameter	Description
Period of assessment	As per the Guidelines on the Assessment of Investment Analysis, "a minimum period of 10 years and a maximum of 20 years will be appropriate". It is assumed that the operational lifetime of wind power projects is 20 years; therefore the maximum appropriated value may

Parameter	Description
	be applied. Also period equal to the technical lifetime of the project activity can be considered (i.e. an assessment period of 25 years can be assumed if the technical lifetime of the project activity is 25 years).
Plant load factor	Data provided to banks or to the government or determined by a third party
Energy generation	Calculated as follows: Plant load factor × 8760 (Operating Hours in the year) ×Installed capacity
Energy price	Prices estimated in a report or study developed by an external o public entity, available at the time when the investment decision was made.
Firm capacity	This should be based on supported evidence (i.e. external study or based on firm capacity of similar operating projects).
Firm capacity price	It should be obtained from a reliable source (reports or study developed by an external o public entity).
Electricity transmission toll	It should be obtained from a reliable source (reports or study developed by an external entity).
Operation and maintenance costs	It should be obtained from a reliable source (reports or study developed by an external entity).
Investment costs	This should be estimated, based on reliable sources, such as external studies or quotations for main equipment, works and relevant studies.
Fair Value	The fair value should be calculated in accordance with local accounting regulations where available, or international best practice.
Exchange Rate	Central Bank of Chile or from an official source.
Tax rate	Value from the Internal Revenue Service as applicable.
Depreciation rate	This rate is to be calculated according to the technical lifetime provided by the Internal Revenue Service or other evidence provided by the technology supplier or an engineering company.

Sub-step 2d: Sensitivity analysis (only applicable to Options II and III):
According to the Guidance on the Assessment of Investment Analysis version 05, *the objective of the sensitivity analysis is to determine in which scenarios a CPA would pass the benchmark.*

Only variables, including the initial investment cost, that constitute more than 20% of either total project costs or total project revenues should be subjected to a variation of at least +-10%. Where a variable which constitutes less than 20% has a material impact on this analysis, the variable shall be considered in the sensitivity analysis.

Step 3: Barrier analysis
This analysis is not considered for CPAs of this PoA

Step 4: Common practice analysis
The "Tool for demonstration and assessment of additionality" v. 06.0.0 (EB 65) suggests on this step that the above generic additionality tests shall be complemented with an analysis of the extent to which the proposed project type has already diffused in the relevant sector and region. This test is a credibility check to complement the investment analysis (Step 2) or barrier analysis (Step 3). The Step 4 requires to (a) Analyze others activities similar to the proposed CPA, and, if so, to (b) Discuss any similar Options that are occurring.

This step considers to provide an analysis of any other activities that are operational and that are similar to the proposed project activity, considering similar if they are in the same country/region and/or rely on

a broadly similar technology, are of a similar scale, and take place in a comparable environment with respect to regulatory framework, investment climate, access to technology, financing, etc. Other CDM project activities (registered project activities and project activities which have been published on the UNFCCC website for global stakeholder consultation as part of the validation process) are not to be included in this analysis.

In this PoA, the applicable geographical area by default is Chile and it includes all the national electricity grids: SIC, SING[9], Magallanes , Aysén and Easter Island Electricity Systems.

According to paragraph 43 of the "Tool for demonstration and assessment of additionality"v.06.0.0 if a CDM project corresponds to one of the measures listed in paragraph 6, the Common Practice analysis should be according to paragraph 47 and not by following Sub-step 4a and Sub-step 4b detailed in paragraph 44 to 46. Thus, the measure of each CPA from this PoA should analyzed through paragraph 6.

In paragraph 6 of this tool it is defined that the *measure* (for emission reduction activities) *is a broad class of greenhouse gas emission reductions activities possessing common features*. In this framework there are four measures considered:

(a) Fuel and feedstock switch;
(b) Switch of technology with or without change of energy source (including energy efficiency improvement as well as use of renewable energies);
(c) Methane destruction;
(d) Methane formation avoidance.

Considering these definitions, the CPAs of the current CDM PoA correspond to the measure (b) Switch of technology with change of energy source since it is an renewable energy Greenfield power plant activity that will deliver energy to the grid that would otherwise been generated by grid connected fuel based power plants.

According to paragraph 47 of the "Tool for demonstration and assessment of additionality" v.06.0.0 four steps must be analyzed to determine common practice for projects listed in paragraph 6:

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

Step 2: In the applicable geographical area, identify all plants that deliver the same output or capacity, within the applicable output range calculated in Step 1, as the proposed project activity and have started commercial operation before the start date of the project. Note their number N_{all}. Registered CDM project activities and projects activities undergoing validation shall not be included in this step;

Step 3: Within plants identified in Step 2, identify those that apply technologies different that the technology applied in the proposed project activity. Note their number N_{diff}.

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.

The proposed project activity is a "common practice" within a sector in the applicable geographical area if both the following conditions are fulfilled:

[9] SIC: Central Interconnected Grid (Sistema Interconectado Central in Spanish); SING: Great North Interconnected Grid (Sistema Interconectado del Norte Grande in Spanish).

(a) The factor F is greater than 0.2, and
(b) N_{all}-N_{diff} is greater than 3.

If similar activities cannot be observed or similar activities are observed, but essential distinctions between the project activity and similar activities can reasonably be explained, then the proposed project activity is additional.

B.2. Eligibility criteria for inclusion of a CPA in the PoA
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The following table presents the elegibility criterias for inclusion of a CPA in the PoA as per "Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for Programme of Activities", Version 01.0, EB65 plus additional criteria to be imposed by the CME:

Table 3.Eligibility Criterias for inclusion of a CPA in the PoA

Criteria as per "Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for Programme of Activities", Version 01.0, EB65 plus additional criteria to be imposed by the CME	Demonstration of how PoA complies with the criteria
(a) The geographical boundary of the CPA including any time-induced boundary consistent with the geographical boundary set in the PoA;	The CPA must be located within the boundaries of Chile and the CPA shall be grid connected to the SIC or SING national electricity grids. This information will be checked in the Environmental Impact Study or Environmental Impact Statement presented by the CPA project developer to the Chilean Environmental Authority or, if available, in the Environmental Approval or the latest document approved by the Chilean Environmental Authority; or in cases where it is no necessary to apply a Study or Statement, the technical project documentation/description presented by the CPA project developer to the Chilean Environmental Authority in order to obtain the letter of pertinence.
(b) Conditions that avoid double counting of emission reductions like unique identifications of product and end-user locations	The grid-connected power plant of the proposed CPA (identified by its name, GPS coordinates of the project outline and installed capacity) should not be part of another CDM project to insure that double counting of emission reductions is being avoided. The CPA project developer must confirm in writing that the CPA is not registered, or in the process of being registered, as a CDM project activity nor a CPA under another PoA. This writing document must consider also the following information: name of the project,

Criteria as per "Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for Programme of Activities", Version 01.0, EB65 plus additional criteria to be imposed by the CME	Demonstration of how PoA complies with the criteria
	GPS coordinates of the project outline and installed capacity.
(c) The specifications of technology/measure including the level and type of service, performance specifications including compliance with testing/certifications;	The CPA shall consist in a greenfield power plant that employs wind energy source for grid-connected electricity generation. This information will be checked in the approved Environmental Impact Study or Environmental Impact Statement presented by the CPA to the Chilean Environmental Authority or, if available, in the Environmental Approval or the latest document approved by the Chilean Environmental Authority; or in the documentation presented by the CPA project developer to the national authority in order to obtain the letter of pertinence. The CME will check that the plant load factor was defined ex-ante considering one of the following options: - Data provided to banks and/or equity financiers while applying the CPA for project financing, or to the government while applying the project activity for implementation approval - The plant load factor determined by a third party contracted by the project participants (e.g. an engineering company). This information must be delivered to the CME by the CPA project developer.
(d) Conditions to check the start date of the CPA through documentary evidence;	Start date of the CPA must be informed by the project developer, and shall be determined as the earliest date at which either the implementation or construction or real action of the CPA begins (i.e. civil works, wind turbines or other relevant contract is signed). The CME will verify that the start date of the CPA is not prior to the commencement of the validation of the PoA, which is the date the CDM-PoA-DD is first published for global stakeholder consultation (25th of May 2012). If the start date has already happened, the CPA project developer shall provide documentary proof that a real action has been done for example the purchase order for the wind turbines.
(e) Conditions that ensure compliance with	CPA must be in compliance with the

Criteria as per "Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for Programme of Activities", Version 01.0, EB65 plus additional criteria to be imposed by the CME	Demonstration of how PoA complies with the criteria
applicability and other requirements of single or multiple methodologies applied by CPAs;	applicability conditions as well as other requirements of the ACM0002 v.13.0.0 methodology. No other methodologies will be used. The CME will verify that the CPA is the installation of a grid-connected wind power generation plant at a site where no power plant was operated prior to the implementation of the project activity (ie. greenfield wind farm). This information will be checked in the approved Environmental Impact Study or Environmental Impact Statement presented by the CPA project developer to the Chilean Environmental Authority or, if available, in the Environmental Approval or the latest document approved by the Chilean Environmental Authority; or in cases where it is no necessary to apply a Study or Statement, the technical project documentation/description presented by the CPA project developer to the Chilean Environmental Authority in order to obtain the letter of pertinence.
(f) The conditions that ensure that CPAs meet the requirements pertaining to the demonstration of additionality as specified in Section A above;	Additionality must be demonstrated according to the ACM0002 v.13.0.0 methodology and the applicable tool "Tool for the demonstration and assessment of additionality" v.06.0.0. Also the "Guidelines for Demonstrating Additionality of Microscale Project Activities" v.03 may be applied for CPA's with an installed capacity up to 5 MW. Additionality will be demonstrated at the CPA level, as described in section B.1 of this PoA-DD. For CPAs with an installed capacity higher than 5 MW, the CPA project developer must have an economic evaluation with complete data source available and demonstrate that the IRR complies with the benchmark stated in the PoA. This information will be check and approved by the CME and notified to the CPA developer.
(g) The PoA-specific requirements stipulated by the CME including any conditions related to undertaking local stakeholder consultations and environmental impact analysis	The CPA must count with its Environmental Impact Study or Environmental Impact Statement properly approved by the environmental authority when applicable or if not, a letter of pertinence from the national

Criteria as per "Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for Programme of Activities", Version 01.0, EB65 plus additional criteria to be imposed by the CME	Demonstration of how PoA complies with the criteria
	authority in this matter where it is stated that the project doesn't have to enter the environmental impact system, before the CPA is registered. The local stakeholder consultations must be undertaken at CPA level. The minimum requirements are to invite representative local stakeholders (neighbors, local authorities, etc..) to participate in an instance where the project CPA is described and the CDM consideration is informed. The comments of the stakeholders shall be taken into account. Evidence from this consultation shall be presented; for example invitations, photographs, attendance lists, register of comments and answers.
(h) Conditions to provide an affirmation that funding from Annex I parties, if any, does not result in a diversion of official development assistance;	The CPA project developer must confirm in writing that no Official Development Aid will be involved or diverted in the project confirming that the CPA does not receive public funding from Annex I parties.
(i) Where applicable, target group (e.g. domestic/commercial/industrial, rural/urban, gridconnected/ off-grid) and distribution mechanisms (e.g. direct installation);	The target group of the CPAs shall be grid connected users or companies and the distribution mechanism corresponds to the SIC or SING grid as applicable. This information will be checked in the approved Environmental Impact Study or Environmental Impact Statement presented by the CPA to the Chilean Environmental Authority or, if available, in the Environmental Approval or the latest document approved by the Chilean Environmental Authority; or in cases where it is no necessary to apply a Study or Statement, the technical project documentation/description presented by the CPA project developer to the Chilean Environmental Authority in order to obtain the letter of pertinence.
(j) Where applicable, the conditions that ensure that every CPA in aggregate meets the small-scale or microscale threshold criteria and remains within those thresholds throughout the crediting period of the CPA	Microscale CPAs will have an installed capacity up to 5MW and will demonstrate additionality as it is mentioned in section B.1 of this PoA for this type of projects. This information will be check and approved by

Criteria as per "Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for Programme of Activities", Version 01.0, EB65 plus additional criteria to be imposed by the CME	Demonstration of how PoA complies with the criteria
	the CME and notified to the CPA developer. Small scale CPAs (with an installed capacity between 5 to 15 MW) will apply the large scale modalities of procedure and therefore according to Validation and Verification Standard, EB 65, the small scale thresholds criteria is not applicable.
(k) Where applicable, the requirements for the debundling check, in case CPAs belong to small-scale (SSC) or microscale project categories.	The requirements for the debundling check shall be verified just in case CPAs belong to microscale project categories. The debundling will be checked considering the "Guidelines on assessment of debundling for SSC project activities" version ,03.0 EB54.. This information will be checked and approved by the CME and notified to the CPA developer. It is important to clarify that for small scale CPAs (with an installed capacity between 5 to 15 MW) the large scale modalities of procedure will be used and therefore according to Validation and Verification Standard, EB 65, it is no necessary to check debundling.
(l) Condition to ensure that the CPA crediting period does not exceed the length of the PoA	The CPA crediting period shall not exceed the length of the PoA. The CME will check this information considering the starting date informed by the CPA according to criteria (d) shown above. Futhermore, the CPA project developer shall specify in section A.9 of the CPA-DD, that the crediting period does not exceed the length of the PoA.
(m) Conditions to ensure that the monitoring of the CPA meets the PoA criterias.	Confirm that the CPA will be monitored according to the procedures stated in section B.7 of the generic CPA. The CPA shall confirm in writing to the CME that the net energy generation will be monitored considering meters that comply with the national regulation (as detailed in section B.7.2 of the PoA-DD part II) and that will be installed just to measure the net energy generation of the CPA (not including any other generation plant).
(n) Conditions to ensure the awareness and agreement for the CPA project developer of:	A contract will be sign between the CME and the CPA project developer. This contract will

Criteria as per "Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for Programme of Activities", Version 01.0, EB65 plus additional criteria to be imposed by the CME	Demonstration of how PoA complies with the criteria
- participating in the PoA. - ownership of the CERs.	stated that the CPA project developer is aware and agreed to participate in the PoA and also the agreement associated to the CER distribution.

B.3. Application of methodologies

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Since the PoA consist in grid-connected electricity generation by using wind energy source, then the applicable methodology is ACM0002 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" version 13.0.0. Sectoral Scope: 1 "Energy industries (renewable - / non-renewable sources)".

SECTION C. Management system

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The CME has the competencies to check the features of potential CPAs and ensure that each CPA meets all requirements and eligibility criteria before inclusion in the registered PoA

The CME will develop and implement a management system that will include the following:

(a) A clear definition of roles and responsibilities of personnel involved in the process of inclusion of CPAs, including a review of their competencies;

The PoA project manager of Andes Mainstream SpA. (CME) will have complete knowledge of the PoA "Implementation of Grid connected Wind Farm Projects in Chile" and of the Management System for the inclusion of new CPA's. He will be in charge of reviewing the applicability conditions and documentation of each CPA in order to evaluate the inclusion of a project in the PoA "Implementation of Grid connected Wind Farm Projects in Chile", the PoA´s project manager will analyze each eligibility criteria and complete the document named "Cheklist of the eligibility criteria".

The PoA project manager of Andes Mainstream SpA. (CME) will also be in charge of maintaining a record of the CPAs included in the PoA "Implementation of Grid connected Wind Farm Projects in Chile" and evaluate the performance of the management system in order to improve it. He will be also in charge of controlling the training and capacity development of the personnel in charge of implementing the CPA.

If a CPA fulfils all the eligibility conditions of the PoA through a favourable checklist, the project manager of the PoA will inform the General Manager of Mainstream SpA. of the inclusion of the project as a CPA in the PoA "Implementation of Grid connected Wind Farm Projects in Chile"

The CPA developer should have complete knowledge of the project to be included in the PoA and shall provide all the evidence required to the PoA project manager of Maintream SpA. in order to permit its evaluation in the inclusion of the project as a CPA in the PoA "Implementation of Grid connected Wind Farm Projects in Chile".

(b) Records of arrangements for training and capacity development for personnel[10];
Andes Mainstream SpA. PoA´s project manager will be in charge of coordinating the training and capacity development of the personnel in charge of implementing and monitoring the CPA in cases where the CPA developer is not an entity controlled directy by Mainstream SpA. The areas of training will be the CDM project cycle, PoA and CPA managing structure, monitoring plan of the CPA, among others.

The training should be performed at least to the manager of the CPA and the personnel involved in the monitoring of emission reductions once the project has been evaluated positively to be included as a CPA in the PoA.

The records that will be checked by the CME (except in the first CPA) will be:
- Attendance list (please refer to the document of "Attendance list").

(c) Procedures for technical review of inclusion of CPAs;
The technical review of the CPAs in order to analyze their inclusion in the PoA "Implementation of Grid connected Wind Farm Projects in Chile" includes the revision of the checklist of the project (please refer to the document "Checklist").

(d) A procedure to avoid double counting (e.g. to avoid the case of including a new CPA that has already been registered either as a CDM project activity or as a CPA of another PoA);
The CPA project developer must confirm in writing that the CPA is not registered, or in the process of being registered as a CDM project activity nor a CPA under another PoA. This writing document must consider also the following information: name of the project, GPS coordinates of the project outline and installed capacity (please refer to the document "Register to avoid double counting").

(e) Records and documentation control process for each CPA under the PoA;
The control documentation of each CPA will be in charge of the PoA project manager , which includes the revision of the following documentation:

- Environmental Impact Assessment or Study if applicable or the documentation presented to the Environmental Authority to request the pertinence letter.
- Environmental approval if applicable (RCA)
- Documentation presented to the Environmental authority (only for projects that don´t have to be presented to the SEIA).
- Letter of confirmation from the project developer where it confirms that the CPA is not registered, or in the process of being registered, as a CDM project activity nor a CPA under another PoA. This will consider the following information: name of the project, GPS coordinates of the project outline and installed capacity.
- Documentation where it can be checked that the plant load factor is fixed ex-ante (Data provided to a Bank and/or equity financers, data provided to the government or third party study)
- Document of proof of real action performed to check the start date of the project (if applicable) such as a purchase order for wind turbines or contract.
- Common practice spreadsheet.
- Financial evaluation of the project considering a post tax analysis (IRR spreadsheet) and all the backup documents of the values presented.
- Evidence of the Stakeholder's consultation

[10] This requirement is not applicable to the first CPA "Laguna Verde Wind Farm Project" since the CPA is developed by the company (AM Eolica Laguna Verde S.A) which is a company controlled directly by Mainstream SpA, therefore the training is considered unnecessary.

- Document about Andes Mainstream SpA approval of the information related to additionality demonstration of the CPA and notifies it to the project project developer
- Document about how Andes Mainstream SpA checked that the project meets the requirements stated in the "Guidelines on assessment of debundling for SSC project activities" version 03.0, EB54 (this is only required for CPA's with an installed capacity lower than 5 MW).
- Document where the CPA project developer confirms that no Official Development Aid will be involved or diverted in the project confirming that the CPA does not receive public funding from Annex I parties.
- Document where the CPA project developer confirms that the net energy generation will be monitored considering meters that comply with the national regulation and that will be installed just to measure the net energy generation of the CPA.
- Contract signed between Andes Mainstream SpA. (CME) and the CPA project developer. This contract will state that the CPA project developer is aware and has agreed to participate in the PoA and also is aware of the agreement associated to the CER distribution
- Attendance list for training performances[11].

(f) Measures for continuous improvements of the PoA management system;
After each CPA CDM validation, a revision of the observations from the DOE and the UNFCCC Secretariat will be done in order to evaluate possible changes to improve the CPA inclusion management system.

SECTION D. Duration of PoA
D.1. Start date of PoA
>>
30/12/2012.
The start date of the PoA is defined as per the expected date for registration of the PoA.

D.2. Length of the PoA
>>
The length of the PoA is 7 years 3 times renewable (28 years).

[11] This is not applicable for the firts CPA, please refer to footnote on paragraph b) of Section of this Management System.

SECTION E. Environmental impacts
E.1. Level at which environmental analysis is undertaken
>>
Environmental Analysis is undertaken at CPA level.

As a background, according to the chilean environmental law Nº19,300/1994 states that all projects or activities likely to cause environmental impact in any of its phases (construction, operation, etc.) shall assess the environmental impacts of the project if they fall in any of the categories described in the Article 10 of the Law. The project owner shall assess the environmental impacts by submitting a report to the Environmental Impact Evaluation System (SEIA by its Spanish acronym), which is coordinated by the Environmental Assessment Service (SEA by its spanish acronym), for their assessment and approval. Depending on the nature of the impacts, the report that should be presented to the authority could be an Environmental Impact Statement[12] (DIA, for its acronym in Spanish) or an Environmental Impact Assessment[13] (EIA, for its acronym in Spanish), as applicable. If a project does not fall under the categories described in Article 10 of the Law, then the project owner should present a pertinence request to the authority which will send a letter of pertinence where it is stated that the particular project does not have to be submitted to the SEIA.

Therefore since each project is assessed individually by the national authority, the environmental analysis should be undertaken at a CPA level.

E.2. Analysis of the environmental impacts
>>
Environmental impacts analysis is performed at a CPA level as it is explained above in Section E.1.

E.3. Environmental impact assessment
>>
Environmental impacts assessment is performed at a CPA level as it is explained above in Section E.1.

SECTION F. Local stakeholder comments
F.1. Solicitation of comments from local stakeholders
>>
Local stakeholder consultation process will be performed at the CPA level.

Since the PoA will include several CPAs implemented at different locations (project sites) and therefore each CPA will involve different local stakeholders, the local stakeholder consultation process will be performed at the CPA level..

The local stakeholders consultation will require as a minimum to invite representative local stakeholders (neighbors, local authorities, etc.) to participate in an instance where the project CPA is described and the CDM consideration is informed. The comments of the stakeholders shall be taken into account. Evidence from this consultation shall be presented; for example invitations, photographs, attendance lists, register of comments and answers.

In the case of the first CPA of Laguna Verde Wind Farm Project, the stakeholders consultation was performed through a meeting at a well known local restaurant, where stakeholders where the community was invited through their neighborhood committees and in the case of community representatives, through e-mails, phone calls and personally

[12] "Declaracion de Impacto Ambiental – DIA" in Spanish.
[13] "Evaluacion de Impacto Ambiental – EIA" in Spanish.

The meeting agenda considered the following topics:

- Project presentation
- Questions session[14]
- Workshop

The Workshop was held to collect from the stakeholders their opinions and concerns regarding the project.

F.2. Summary of comments received

>>

The local stakeholder consultation will be undertaken at the CPA level .

In the case of the first CPA of Laguna Verde Wind Farm Project, questions where made by the local neighbors and representatives of the community which were present at the meeting. The main questions and comments where related to:

- Is the energy generated stored?
- What is the distance between turbines?
- Where is the wind farm going to be located?
- What happens if the project fails?
- What is the impact on landscape and noise?
- What is the impact on flora and fauna? Are mitigation measures being considered?

All questions where imediately answered at the meeting.

F.3. Report on consideration of comments received

>>

The local stakeholder consultation will be undertaken at the CPA level .

In the case of the first CPA of Laguna Verde Wind Farm Project, there where many encouraging comments from the neighbors and local organizations and questions were immediately answered at the meeting by the project developer.

SECTION G. Approval and authorization

>>

The LoA is not available at the time of submitting the PoA-DD to the validating DOE, but will be available for submission of registration

PART II. Generic component project activity (CPA)

SECTION A. General description of a generic CPA

A.1. Purpose and general description of generic CPAs

>>

[Name of the CPA] is a wind electricity generation power plant project activity to be developed by [Name of the CPA developer] The Project aims to generate electricity using Renewable Energy, in this case wind power. The electricity generated will be supplied to the [SIC or SING] grid

[14] If any questions were made during the presentation, these were answered immediately.

The project will be located in the locality of [name of the locality] in the city of [name of the city], [name of the region] and involves the installation and operation of a wind farm consisting of [number of turbines] wind turbines of [installed capacity per turbine] MW each one with a total installed capacity of [total installed capacity] MW. The project contemplates generating approximately [energy generation] MWh per year of electricity considering a plant load factor of [value]%.

The energy generated by the wind turbines will be [if applicable to the CPA the following sentence should be added: "transformed from [value] kV to [value] kV] conducted to the grid through a [value] kV transmission line.

[Name of the CPA] is a Greenfield project that will displace the dispatch of fuel based power plants currently operating in the system, therefore, the baseline scenario, as the scenario existing prior to the start of the implementation of the CPA, is the electricity delivered by the grid by the CPA that would otherwise been generated by the operation of grid-connected power plants and by the addition of new power plants.

The project will allow to supply clean energy to the system contributing with the greenhouse gases (GHG) emission reductions, diversify the energy pool through the implementation of Renewable Energy source, reduce the dependence of the Chilean electricity system in imported fossil fuel reducing with this the emission of GHG gases and to assist the assurance of the electricity supply, thus contributing with the sustainable development of the country.

SECTION B. Application of a baseline and monitoring methodology

B.1. Reference of the approved baseline and monitoring methodology(ies) selected

>>

The applicable methodology for this PoA is: ACM0002 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" - Version 13.0.0. Sectoral Scope 01; in effect as of EB 67.
http://cdm.unfccc.int/filestorage/D/5/W/D5WJ7B6TGLHF8I4XC2RV9YAP0NO1ES/eb67_repan13.pdf?t=T1h8bTRhMGp2fDDSkdxBIdst_aVKHP9pUy77

This methodology also refers to:

"Tool for the demonstration and assessment of additionality" v.06.0.0, in effect as of EB 65
http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v6.0.0.pdf

"Tool to calculate the emission factor for an electricity system" v02.2.1; in effect as of EB 63.
http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v2.2.1.pdf

B.2. Application of methodology(ies)

>>

The applicable methodology to this CPA is ACM0002, version 13.0.0 since this methodology is applicable to grid-connected renewable power generation project activities that:

(a) install a new power plant at a site where no renewable power plant was operated prior to the implementation of the project activity (greenfield plant); (b) involve a capacity addition; (c) involve a retrofit of (an) existing plant(s); or (d) involve a replacement of (an) existing plant(s).

In this case, the CPA to be included under the PoA "Implementation of Grid connected Wind Farm Projects in Chile" is in accordance to option (a) as described above.

The CPA fulfils the following applicability conditions:

Table 4. Applicability conditions of the CPA´s

Applicability condition	Fulfilment of applicability conditions
The project activity is the installation, capacity addition, retrofit or replacement of a power plant/unit of one of the following types: hydro power plant/unit (either with a run-of-river reservoir or an accumulation reservoir), wind power plant/unit, geothermal power plant/unit, solar power plant/unit, wave power plant/unit or tidal power plant/unit	[Name of the CPA] considers the installation of a Greenfield wind power plant.
In the case of capacity additions, retrofits or replacements (except for capacity addition projects for which the electricity generation of the existing power plant(s) or unit(s) is not affected): the existing plant 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 addition or retrofit of the plant has been undertaken between the start of this minimum historical reference period and the implementation of the project activity;	Not applicable since [Name of the CPA] doesn´t consider capacity addition, retrofit or replacement project
In case of hydro power plants, at least one of the following conditions must apply: -The project activity is implemented in an existing single or multiple reservoir, with no change in the volume of any of the reservoirs; or - The project activity is implemented in an existing single or multiple reservoirs, where the volume of any of reservoirs is increased and the power density of each reservoir, as per the definitions given in the Project Emissions section, is greater than 4 W/m^2 after the implementation of the project activity; or - The project activity results in new single or multiple reservoirs and the power density of each reservoir, as per definitions given in the Project Emissions section, is greater than 4 W/m^2 after the implementation of the project activity.	Not applicable since [Name of the CPA] considers the installation of a wind power plant
In case of hydro power plants using multiple reservoirs where the power density of any of the reservoirs is lower than 4 W/m^2 after the implementation of the project activity all of the following conditions must apply: - The power density calculated for the entire project activity using equation 5 is greater than 4 W/m^2; - All reservoirs and hydro power plants are located at the same river and were designed together to function as an integrated project that collectively constitutes the generation capacity of the combined power plant; - The water flow between the multiple reservoirs is not used by any other hydropower unit which is not a part of the project activity; - The total installed capacity of the power units, which	Not applicable since [Name of the CPA] is a wind power plant

Applicability condition	Fulfilment of applicability conditions
are driven using water from the reservoirs with a power density lower than 4 W/m^2, is lower than 15 MW; - The total installed capacity of the power units, which are driven using water from reservoirs with a power density lower than 4 W/m^2, is less than 10% of the total installed capacity of the project activity from multiple reservoirs.	
The methodology is not applicable to the following: - 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; - Biomass fired power plants; - A hydro power plant that results in the creation of a new single reservoir or in the increase in an existing single reservoir where the power density of the reservoir is less than 4 W/m^2.	Not applicable since [Name of the CPA] do not consider activities that involve switching from fossil fuels to renewable energy at the site of the project activity, use biomass nor are hydro power plants.
In the case of retrofits, 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, i.e. 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"	Not applicable since [Name of the CPA] considers the installation of a Greenfield wind power plant.

B.3. Sources and GHGs

According to the applicable methodology ACM0002 v.13.0.0 , the spatial extent of the CPA boundary includes the project power plant and all power plants connected physically to the electricity system that the CDM project power plant is connected to. In this case, [Name of the CPA] will be connected to the following [name of the grid] ([acronym] according to its Spanish acronym).

The parameters to be monitored, greenhouse gases and emission sources included in or excluded from the project boundary are shown in the following table.

Table 5. GHG emissions included in the CPA boundary

	Source	GHGs	Included?	Justification/Explanation
Baseline scenario	CO_2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity	CO_2	Yes	Main emission source
		CH_4	No	Minor emission source
		N_2O	No	Minor emission source
Project scenario	For geothermal power plants, fugitive emissions of CH_4 and CO_2 from non-condensable gases contained in geothermal steam	CO_2	No	Not Applicable. CPAs correspond to wind power plants
		CH_4	No	
		N_2O	No	
	CO_2 emissions from combustion of fossil fuels for electricity generation in solar thermal power plants and geothermal power plants Source 1	CO_2	No	Not Applicable. CPAs correspond to wind power plants
		CH_4	No	
		N_2O	No	
	For hydro power plants, emissions of CH_4 from the reservoir	CO_2	No	Not Applicable. CPAs correspond to wind power plants
		CH_4	No	
		N_2O	No	

Below is presented a general flow diagram of the CPA.

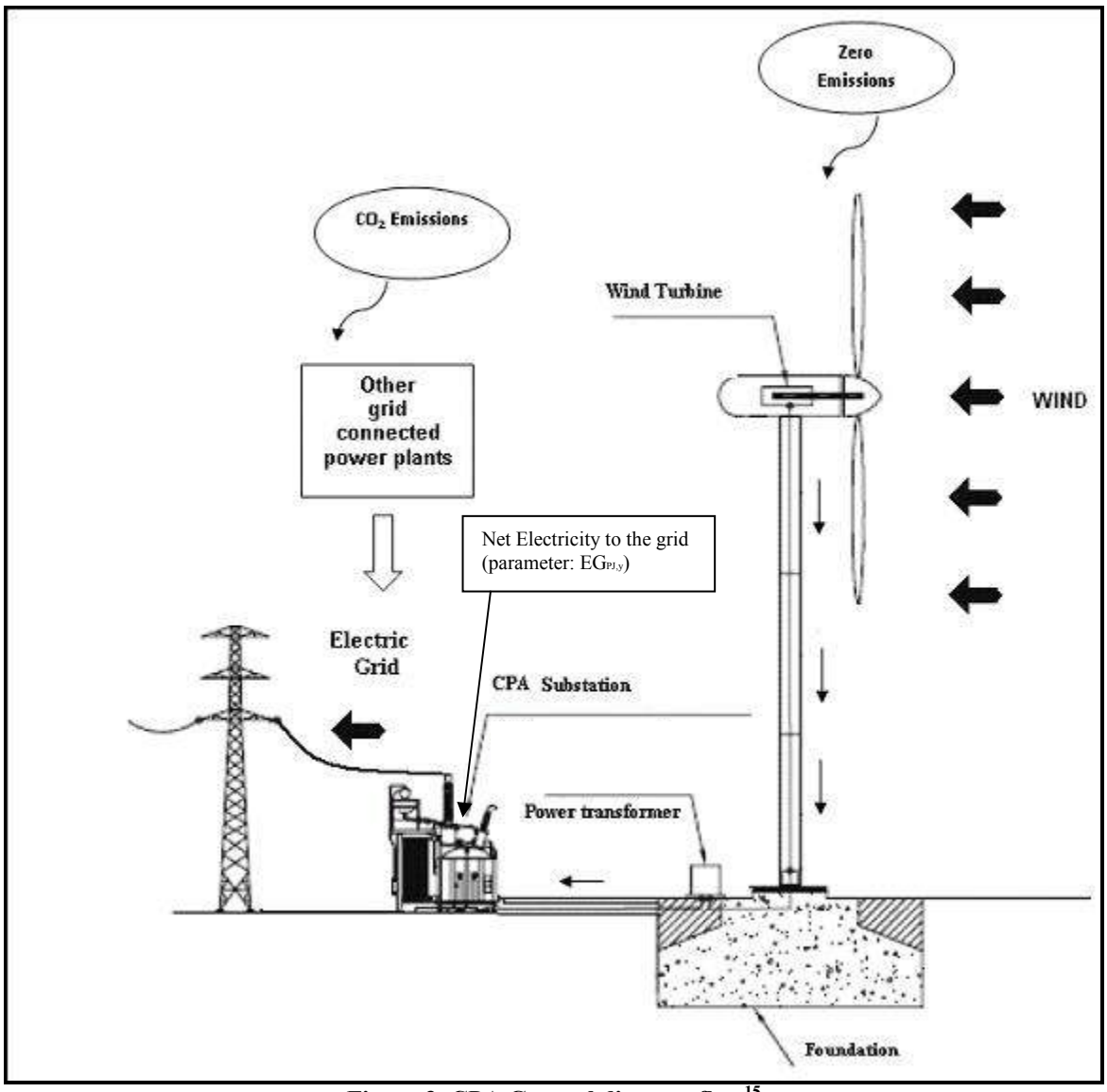

Figure 3. CPA General diagram flow[15]

B.4. Description of baseline scenario

>>

For this CPA the baseline scenario is identified in accordance with the ACM0002 v.13.0.0 methodology as follows:

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".

The combined margin of the [name of the grid] grid will be calculated in section B.6.

[15] This is an example of the diagram flow of a CPA. The meter location and other spedific components of the projects should be adapted in accordance to the specific CPA as long as the specific elegibilidty criterias of the PoA are fullfiled.

As a background, the following information about the installed capacity per energy source in the baseline is provided:

Table 6. Contribution by energy source to the grid.

Energy source	[Name of theGrid]
Hidroelectricity	[XX%]
Wind	[XX%]
Fossil fuels (coal, diesel, natural gas and fuel oil)	[XX%]
[Add other sources if applicable]	[XX%]
Total Installed capacity (MW)	[XX]

[data Source]

As it can be seen, the grid to which a generic CPA will inject renewable electricity considers GHG emissions due to the existing fossil fuel based grid-connected power plants and therefore [name of the CPA] CPA will help to reduce GHG emissions in the grid.

[Grid map to be included]

B.5. Demonstration of eligibility for a generic CPA

>>

The confirmation of additionality for each CPA will be conducted by means of the eligibility criteria, developed in accordance with the "Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programme of activities"v.01.0

The eligibility for this CPA is demonstrated as follows:

Table 7. Compliance of the CPA with Eligibility Criteria of the PoA.

Criteria as per "Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for Programme of Activities", Version 01.0, EB65 plus additional criteria to be imposed by the CME	Demonstration of eligibility criteria for the CPA
(a) The geographical boundary of the CPA including any time-induced boundary consistent with the geographical boundary set in the PoA;	[name of the CPA] will be located on [Geographical coordinates of the project outline] within the boundaries of Chile and the CPA will be grid connected to the [SIC or SING] national electricity grid. The GPS coordinates are detailed in the [name of the document] dated on [day/month/year].
(b) Conditions that avoid double counting of emission reductions like unique identifications of product and end-user locations	The grid-connected power plant of the proposed CPA is identified as follow: - [name of the CPA] - [GPS coordinates of the project outline] - [Installed capacity]

Criteria as per "Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for Programme of Activities", Version 01.0, EB65 plus additional criteria to be imposed by the CME	Demonstration of eligibility criteria for the CPA
	On [day/month/year] [name of the CPA project developer] presented a signed letter with this information including the statement that the CPA is not registered, or in the process of being registered, as a CDM project activity nor a CPA under another PoA. Please refer to letter [name of the document].
(c) The specifications of technology/measure including the level and type of service, performance specifications including compliance with testing/certifications;	The CPA consists in a greenfield power plant that employs [type of energy] energy source for grid-connected electricity generation. This information is detailed in the [name of the document] dated on [day/month/year]. The plant load factor, was defined ex-ante based on [data provided to banks or to the government or determined by a third party]. Please refer to [name of the document].
(d) Conditions to check the start date of the CPA through documentary evidence;	The Start date of [name of the CPA] is [day/month/year] and was determined base on [specify the action for example the signature of purchase order for turbines]. Please refer to the document the [name of the document]. Or The Start date of the [name of the CPA] will be [day/month/year] and was determined as the expected date at which [specify the action for example the signature of purchase order for turbines].
(e) Conditions that ensure compliance with applicability and other requirements of single or multiple methodologies applied by CPAs;	[Name of the CPA] is in compliance with the applicability conditions as well as other requirements of the ACM0002 v.13.0.0 methodology. No other methodologies will be used. [name of the CPA] consists in the installation of a grid-connected wind power generation plant at a site where no power plant was operated prior to the implementation of the project activity (ie. greenfield wind power plant).

Criteria as per "Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for Programme of Activities", Version 01.0, EB65 plus additional criteria to be imposed by the CME	Demonstration of eligibility criteria for the CPA
	This information is detailed in the [name of the document] dated on [day/month/year].
(f) The conditions that ensure that CPAs meet the requirements pertaining to the demonstration of additionality as specified in Section A above;	Additionality was demonstrated according to the ACM0002 v.13.0.0 methodology and the ["Tool for the demonstration and assessment of additionality" v.06.0.0 or the "Guidelines for Demonstrating Additionality of Microscale Project Activities" v.03]. Additionality was demonstrated at the CPA level, as described in section B.1 of this PoA-DD. *Please refer to the text below just for investment analysis:* It is demonstrated that the IRR is below the benchmark stated in the PoA-DD. Please refer to the IRR calculation spread sheet. On [day/month/year] Andes Mainstream SpA approved this information and notified to the [name of the CPA project developer]. Please refer to document [name of the document].
(g) The PoA-specific requirements stipulated by the CME including any conditions related to undertaking local stakeholder consultations and environmental impact analysis	The [name of the CPA project developer] submitted on the [day/month/year] to the Chilean Enviromental authorities all required evidence related to [name of the CPA] in [name of the document] and received the environmental approval on [day/month/year] ([name of the document]). *Note. For projects for which is not necessary to present an Environmental Study o Statement, the following should apply:* [Name of the CPA] received its pertinence letter on [day/month/year] from the Chilean Environmental Authority where it is stated that it should not be presented to the Environmental Impact System. The local stakeholder consultation was performed by [name of the CPA project developer] on [day/month/year]. Evidence from this consultation includes: [name of the documents].

Criteria as per "Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for Programme of Activities", Version 01.0, EB65 plus additional criteria to be imposed by the CME	Demonstration of eligibility criteria for the CPA
(h) Conditions to provide an affirmation that funding from Annex I parties, if any, does not result in a diversion of official development assistance;	A letter dated on [day/month/year] was sent to Andes Mainstream SpA, in order to confirm that no Official Development Aid was involved or diverted in the project confirming that [name of the CPA] does not receive public funding from Annex I parties. Please refer to document [name of the document].
(i) Where applicable, target group (e.g. domestic/commercial/industrial, rural/urban, gridconnected/ off-grid) and distribution mechanisms (e.g. direct installation);	[name of the CPA] will deliver energy to the [SIC or SING] grid. This information is detailed in the [name of the document] dated on [day/month/year].
(j) Where applicable, the conditions that ensure that every CPA in aggregate meets the small-scale or microscale threshold criteria and remains within those thresholds throughout the crediting period of the CPA	This criteria is [applicable; not applicable] for [name of the CPA]. *If applicable the following texts should be included (if not applicable just delete the following text)*: ["The CPA has an installed capacity up to 5MW and therefore is considered as microscale project and its additionality is demonstrated in accordance to section B.1 of the PoA".] On [day/month/year] Andes Mainstream SpA approved this information and notified to [name of the CPA project developer]. Please refer to document the [name of the document].
(k) Where applicable, the requirements for the debundling check, in case CPAs belong to small-scale (SSC) or microscale project categories.	The requirements for the debundling check shall be verified just in case CPAs belong to microscale project categories. Therefore this criteria is [applicable; not applicable] for [name of the CPA]. *If applicable the following texts should be included (if not applicable just delete the following text)*: On [day/month/year] Andes Mainstream SpA checked this information considering the "Guidelines on assessment of debundling for SSC project activities" version 03.0, EB54. Please refer to document the [name of the document].
(l) Condition to ensure that the CPA crediting	Section A.9 of the CPA-DD, specifies that the

Criteria as per "Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for Programme of Activities", Version 01.0, EB65 plus additional criteria to be imposed by the CME	Demonstration of eligibility criteria for the CPA
period does not exceed the length of the PoA	considered crediting period correspond to [xx years] and therefore the crediting period does not exceed the length of the PoA.
(m) Conditions to ensure that the monitoring of the CPA meets the PoA criterias.	On [day/month/year] [name of the CPA project developer] presented a letter to Andes Mainstream SpA in order to confirm that the net energy generation will be monitored considering meters that comply with the national regulation (as detailed in section B.7.2 of the PoA-DD part II) and that will be installed just to measure the net energy generation of [name of the CPA] (not including any other generation plant). Please refer to document [name of the document]. Further information is shown in section B.7 of the CPA.
(n) Conditions to ensure the awareness and agreement for the CPA project developer of: - participating in the PoA. - ownership of the CERs.	On [day/month/year] a contract was signed between Andes Mainstream SpA and [name of the CPA project developer]. This contract stated that [name of the CPA project developer] is aware and agreed to participate in the PoA and also the agreement associated to the CER distribution. Please refer to document the [name of the document].

Additionality demonstration for CPAs up to 5 MW:

For CPAs of 5 MW (or less) additionality can be automatically demonstrated if wind power generation technology is recommended by the host country designated national authority (DNA) and approved by the Board to be additional in the host country.

Additionality demonstration for CPAs with capacity higher than 5 MW:

Since [CPA name] corresponds to a CPA larger than 5MW it is applicable the "Standard for Demonstration of Additionality, Development of Eligibility Criteria and Application of Multiple Methodologies for Programme of Activities" v.01.0 which states that additionality should be demonstrated by establishing that in the absence of CDM, none of the implemented CDM Project Activities (CPAs) would occur. This should be demonstrated in accordance with the methodology for large scale projects.

According to the methodology ACM0002 version 13.0.0, the additionality of the project activity shall be demonstrated and assessed using the "Tool for the demonstration and assessment of additionality", latest version which is version 6.0.0., which considers the following steps to demonstrate and assess additionality:

Step 1: Identification of alternatives to the CPA;
Step 2: Investment analysis to determine that the proposed CPA 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 1 - Identification of alternatives to the project activity consistent with current laws and regulations.
Under this analysis there are defined realistic and credible alternatives to the CPA.

Sub-step 1a: Define alternatives to the project activity:
According to the applicable tool, alternatives should include:
(a) The proposed project activity undertaken without being registered as a CDM project activity;
(b) Other realistic and credible alternative scenario(s) to the proposed CDM project activity scenario that deliver outputs services (e.g., cement) or services (e.g. electricity, heat) with comparable quality, properties and application areas, taking into account, where relevant, examples of scenarios identified in the underlying methodology;
(c) If applicable, continuation of the current situation (no project activity or other alternatives undertaken).

In this PoA, alternative scenarios to the CPA are:

(b)The proposed project activity undertaken without being registered as a CDM project activity and,
(c) The continuation of the current situation with the existing power plants of the generation system (no project activity).

Alternative c) is selected since the baseline scenario determined as per ACM0002 v.13.0.0 for Greenfield projects is 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"*.

Sub-step 1b: Consistency with mandatory laws and regulations:
The electricity generation through any of the previously identified alternatives represents a realistic and credible alternative scenario to the project activity, and are in compliance with Chilean mandatory legislation and regulations applicable for project activities related to the construction and operation of energy generation power plants, specifically the chilean environmental law Nº19,300/1994[16] and the electricity law DFL Nº 4/ 2007[17], taking into account the enforcement in the country and EB decisions on national and/or sector policies and regulations

Step 2. Investment analysis
This analysis aims to demonstrate that each CPA to be included in the PoA can't be considered to be economically attractive, without the revenue from the sale of CERs.

To conduct the investment analysis the "Guidelines on the Assessment of Investment Analysis" version 05 will be taken into account and the following sub-steps will be completed:

Sub-step 2a. Determine appropriate analysis method:
The CPAs to be included under the PoA generates economic benefits (incomes for energy sell) other than CDM related income, therefore the simple cost analysis (Option I) cannot be applied. The benchmark

[16] http://www.leychile.cl/Navegar?idNorma=30667
[17] http://www.cdec-sic.cl/imagenes/contenidos/File/normativa/Ley_electrica/DFL_N4.pdf

analysis (Option III) will be applied since it is suited to circumstances where the baseline does not require investment or is outside the direct control of the project developer, i.e. cases where the choice of the developer is to invest or not to invest. As the alternatives scenarios are: to implement the project without the CDM or to continue with the current situation, then the benchmark analysis is suitable for this CPA.

Sub-step 2b: Option III. Apply benchmark analysis:
For the investment analysis the financial indicator is IRR (considering 100% equity) and it was compared against a post-tax benchmark.

According the "Guidelines on the Assessment of Investment Analysis" v.05.0 for the selection of appropriate benchmarks, in cases of projects which could be developed by an entity other than the project participant the benchmark should be based on parameters that are standard in the market. For the proposed project activity cost of equity will be determined by selecting the values provided in Appendix A of the referred guidelines.

Benchmark determination:

According to the Appendix A of the "Guidelines on the Assessment of Investment Analysis"version 5.0, the selected benchmark as per Group I: Energy Industry, in Chile is therefore, equal to 10.3%. wich is post-tax.

This value is expressed in percentages in real terms and compared with the IRR post-tax (considering 100% equity) which was also calculated in real terms.

Sub-step 2c: Calculation and comparison of financial indicators
The CPA economical evaluation considers the following parameters:

Table 8. Financial evaluation parameters

Parameter	Value	Source
Period of assessment	[Years of asessment] years.	[Source]
Plant Load Factor	[XX] %	[Source]
Energy generation	[XXX] MWh	[Source]
Energy price	[Price and unit (i.e. USD$/MWh)]	[Source]
Firm capacity [18]	[XX] MW	[Source]
Firm capacity price	[Price and unit (i.e. USD/month/kW)]	[Source]
Electricity transmission fee	[Toll and unit (I.e. USD$/year)]	[Source]
O&M costs	[O&M costs] USD$/year	[Source]
Other costs (insurance, administration, etc..)	[O&M costs] USD$/year	[Source]
Investment	[Investment amount]	[Source]
Fair Value	[Fair Value]	[Source]
Exchange Rate	[XX $chlpesos/USD] as per [date].	[Source]
Tax rate	[Tax] %	[Source]
Depreciation	[Depreciation rate]	[Source]

[18] In the Article Nº259 of the Supreme decrete Nº327 which corresponds to the "Regulation of the General Law of Electric Services", it is defined the firm capacity as the *maximum power that a generator can inject and transmit to the transmission systems in the peak hours of the system, considering its probable unavailability.*

Also the following specification about some items calculation is provided:[any detail as necessary]

It must be noted that the cost of financing expenditures (loan repayments and interest) are not included in the calculation of the IRR.

Considering the data presented above, the result of the financial parameter IRR post-tax (100% equity), in real terms, is: [IRR]%

Therefore, the IRR (100% equity) does not reach the post-tax benchmark minimum (10.3%).

Sub-step 2d: Sensitivity analysis

According to the "Guidelines on the Assessment of Investment Analysis" version 05, only variables, (including the initial investment cost) that constitute more than 20% of either total project costs or total project revenues should be subjected to reasonable variation (at least a range of +10% and –10%, is recommended by this guidance). Where a variable which constitutes less than 20% has a material impact on this analysis, the variable shall be considered in the sensitivity analysis.

According to the economic evaluation of the current CPA, the following parameters are included in the sensitivity analysis:

- [parameter a]
- [parameter b]
- [parameter c]
- [etc…]

The IRR (100% equity) is analyzed for a fluctuation of +10% for [parameters] ; and -10% for [parameters]; the [number of parameters] parameters are analyzed independently and the results are shown in the following table:

Table 9. Sensibility analysis results

Parameter	Fluctuation (%)	IRR (%)
[parameter a]	+[variation %]	[IRR]
[parameter b]	+[variation %]	[IRR]
[parameter c]	-[variation %]	[IRR]
[etc]	-[variation %]	[IRR]

Therefore, the conclusion that CDM CPA is not the most economically attractive alternative is robust to reasonable variations in the critical assumptions.

Step 3: Barrier analysis

This analysis is not considered for CPAs of this PoA.

Step 4. Common Practice analysis

The "Tool for demonstration and assessment of additionality" v. 06.0.0 (EB 65) suggests on this step that the above generic additionality tests shall be complemented with an analysis of the extent to which the proposed project type has already diffused in the relevant sector and region. This test is a credibility check to complement the investment analysis (Step 2) or barrier analysis (Step 3). The Step 4 requires to (a) Analyze others activities similar to the proposed CPA, and, if so, to (b) Discuss any similar Options that are occurring.

This step considers to provide an analysis of any other activities that are operational and that are similar to the proposed CPA, considering similar if they are in the same country/region and/or rely on a broadly similar technology, are of a similar scale, and take place in a comparable environment with respect to regulatory framework, investment climate, access to technology, financing, etc. Other CDM project activities (registered project activities and project activities which have been published on the UNFCCC website for global stakeholder consultation as part of the validation process) are not to be included in this analysis.

In this CDM project, the applicable geographical area by default is Chile and it includes all the national electricity grids: SIC, SING[19], Magallanes , Aysén and Easter Island Electricity Systems.

According to paragraph 43 of the "Tool for demonstration and assessment of additionality"v.06.0 if a CDM project corresponds to one of the measures listed in paragraph 6, the Common Practice analysis should be according to paragraph 47 and not by following Sub-step 4a and Sub-step 4b detailed in paragraph 44 to 46. Thus, the measure of [CPA name] must be analyzed through paragraph 6.

In paragraph 6 of this tool it is defined that the *measure* (for emission reduction activities) *is a broad class of greenhouse gas emission reductions activities possessing common features*. In this framework there are four measures considered:

(a) Fuel and feedstock switch;
(b) Switch of technology with or without change of energy source (including energy efficiency improvement as well as use of renewable energies);
(c) Methane destruction;
(d) Methane formation avoidance.

Considering these definitions, the current CPA corresponds to the measure (b) Switch of technology with change of energy source since it is renewable energy generation activity that will deliver energy to the grid that would otherwise been generated by grid connected fuel based power plants.

According to paragraph 47 of the "Tool for demonstration and assessment of additionality" v.06.0.0 four steps must be analyzed to determine common practice for projects listed in paragraph 6. The analysis of these steps for [CPA name] are submitted below and detailed in the Common Practice Spreadsheet.

Step 1: Calculation of the applicable output range.
The output range is calculated based in the CDM CPA design capacity of [data] MW, then the calculated applicable output range is:

-50%: [data] MW
+50%: [data] MW

Step 2: Calculation of N_{all}
In the Common Practice Spreadsheet attached there are identified all plants that deliver the same capacity, within the applicable output range calculated in Step 1 ([range] MW), as the proposed CPA and have started commercial operation before the start date of the CPA. Then, the calculated number N_{all} is [data].

The following table details the information of each N_{all} plant considered for this analysis.

[19] SIC: Central Interconnected Grid (Sistema Interconectado Central in Spanish); SING: Great North Interconnected Grid (Sistema Interconectado del Norte Grande in Spanish).

Table 10. List of all plants that are within the output range calculated based on the design capacity

System	Power Plant	Registered CDM Projects/Under validation	Energy source / fuel	Gross Capacity (MW)
[GRID]	[Name of the power plant]	[Yes;No]	[Energy source]	[data]
[GRID]	[Name of the power plant]	[Yes;No]	[Energy source]	[data]
[GRID]	[Name of the power plant]	[Yes;No]	[Energy source]	[data]
…..				

Step 3: Calculation of N_{diff}
In this step, from the plants identified in Step 2, there should be identified all the plants that use a different technology than the technology applied in the proposed project activity (N_{diff}).

According to the definition of different technologies stated in paragraph 9 of the "Tool for demonstration and assessment of additionality" v.06.0.0, in the context of the current CPA, would be plants that deliver the same output and that differ by:

a) Energy source.

The CPA uses wind power as energy source, therefore projects that use geothermal, hydro, biomass, solar, diesel, gas, coal or other energy source are considered as different technologies.

Then, as it can be seen in the table above, the calculated number N_{diff} is [data]

Step 4: Calculation of factor $F=1-N_{diff}/N_{all}$ is calculated. This Factor (F) represents 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.

Considering the values calculated above F=1- [dataN_{diff}]/ [dataN_{all}]

Finally, according to the "Methodological tool demonstration and assessment of additionality" version 06.0:

The proposed project activity is a common practice within a sector in the applicable geographical area if both the following conditions are fulfilled:

(a) the factor F is greater than 0.2, and
(b) N_{all}-N_{diff} is greater than 3.

Considering the above calculations, the result of N_{all}-N_{diff} is equal to [data] and the calculated factor F is [data], which means that [data]% of the operating technologies in Chile are similar as the used in the CPA.

As a result of the previous analysis, [CPA name] has proved not to be a "common practice" and therefore additionality can be demonstrated.

B.6. Estimation of emission reductions of a generic CPA
B.6.1. Explanation of methodological choices
>>
According to the methodology ACM0002 v.13.0.0, the baseline scenario of the CPA is 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, as reflected in the combined margin (CM) calculations described in the "Tool to calculate the emission factor for an electricity system" v.02.2.1.

The emission reductions are calculated as the difference between the emission of the baseline scenario and the emissions due to the [CPA name] and the associated leakage.

Baseline emissions

Baseline emissions include only CO_2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the CPA. The methodology 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. The baseline emissions are to be calculated as follows:

Equation [number]. Baseline emissions

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

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 CDM project activity in year *y* (MWh)
$EF_{grid,CM,y}$:	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" (tCO_2/MWh)

Calculation of $EG_{PJ,y}$

The calculation of $EG_{PJ,y}$ is different for (a) Greenfield plants, (b) retrofits and replacements, and (c) capacity additions. Since the [CPA name] is a is a Greenfield renewable energy power plant because of the installation of a new grid-connected renewable power plant/unit at a site where no renewable power plant was operated prior to the implementation of the project activity, then:

Equation [number]. CPA electricity generation

$$EG_{PJ,y} = EG_{facility,y}$$

Where:

$EG_{PJ,y}$:	Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM CPA in year *y* (MWh)
$EG_{facility,y}$:	Quantity of net electricity generation supplied by the project plant/unit to the grid in year *y* (MWh)

$EG_{facility,y}$ is the quantity of net electricity generation supplied by the project plant/unit to the grid. It shall be determined as a difference between (i) quantity of electricity supplied by the project plant/unit to the grid and quantity of electricity delivered to the project plant/unit from the grid.

Calculation of $EF_{grid\ CM,,y}$

The emission factor is calculated ex-ante in a transparent and conservative manner as a Combined Margin (CM). CM consists in the combination of operating margin and build margin in accordance with the "Tool to calculate the emission factor of an electricity system", v.02.2.1, which includes six steps to be applied:

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 operating margin emission factor according to the selected method.
Step 5. Calculate the build margin (BM) emission factor.
Step 6. Calculate the combined margin (CM) emissions factor.

The steps and formulae used to estimate baseline emissions and project emissions of the proposed CPAs are described below:

Step 1. Identify the relevant electric systems

There are five electricity systems in Chile; SING, SIC, Aysen, Magallanes and Easter Island systems which cover different geographical locations along the country. All of them operate independently and do not transfer electricity to each other, so neither imports nor exports are observed in any of the mentioned systems.

The electricity systems to which this CPA is connected is the [grid name] grid therefore all the necessary information of the power plants within the [grid name] will be considered to calculate the build margin and the operating margin emission factor for each electricity system.

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

To calculate the operating margin and build margin emission factors, the chosen method is Option I: Only grid power plants are included in the calculation.

Step 3. Select a method to determine the operating margin (OM).

Note: *Since the CPA could be connected either to the SING or the SIC, then the calculation methodology for the emission factor of both systems are described in the following lines (only one should be used in the specific CPA-DD):*

Method to determine the OM of the SING:
The selected OM emission factor method from the "Tool to calculate the emission factor of an electricity system" version 02.2.1 is Option (d) Average OM. In this method the emission factor is calculated as the average emission rate of the all power plants serving the grid.

Method to determine the OM of the SIC:
The selected OM emission factor method from the "Tool to calculate the emission factor of an electricity system"v.02.2.1 is Option (b) Simple Adjusted OM. In this method power plants/units are separated in low-cost/must-run power sources and other power sources.

Note: *For CPA's connected either to the SING or the SIC grid, the following paragraph should be considered:*

The data vintage chosen for the calculation of the OM emission factor is the ex-ante option, where calculations are based on a 3-year generation-weighted average and the most recent data (2011, 2010 and 2009) available at the time of submission of the CPA-DD to the DOE for validation, without requirement to monitor and recalculate the emission factor during the crediting period.

Step 4. Calculate the operating margin emission factor according to the selected method.

SING grid OM calculation:
The simple OM may be calculated by one of the following two options:

Option A: Based on the net electricity generation and a CO_2 emission factor of each power unit; or

Option B: Based on the total net electricity generation of all power plants serving the system and the fuel types and total fuel consumption of the project electricity system.

Option A is selected. Under this option, the Average OM emission factor is calculated based on the net electricity generation of each power unit and an emission factor for each power unit, as follows:

Equation[number] . Operating Margin Emission factor

$$EF_{grid,OMAve,y} = \frac{\sum_m EG_{m,y} \times EF_{EL,m,y}}{\sum_m EG_{m,y}}$$

Where:

$EF_{grid,OMAve,y,}$	: Average operating margin 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 plant / 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 power units serving the grid in year *y* .
y	: The three most recent years for which data is available at the time of submission of the CDM-CPA-DD to de DOE for validation (ex-ante option).

The CO_2 emission factor of each power unit is determined using options A1, A2 or A3, as indicated in the "Tool to calculate the emission factor of an electricity system" version 02.2.1, using the most recent historical year (2011, 2010 and 2009) for which power generation data is available.

For power plants where data on fuel consumption and electricity generation is available, the emission factor should be determined using Option A1 as follows:

Equation [number] . Operating Margin Emission factor. Option A1

$$EF_{grid,OMAve,y} = \frac{\sum_m (FC_{i,y} \times NCV_{i,y} \times EF_{CO2,i,y})}{EG_y}$$

Where:

$EF_{EL,m,y}$	: CO_2 emission factor of power unit *m* in year *y* (tCO_2/GWh)
$FC_{i,m,y}$	: Amount of fossil fuel type *i* consumed by power unit *m* in year *y* (mass or volume unit)
$NCV_{i,y}$	: Net calorific value (energy content) of fossil fuel type *i* in year *y* (GJ / mass or volume unit)
$EF_{CO2,i,y}$	: CO_2 emission factor of fossil fuel type *i* in year *y* (tCO_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 power units serving the grid in year *y*.

i : All fossil fuel types combusted in power unit *m* in year *y*
y : The three most recent years for which data is available at the time of submission of the CDM-CPA-DD to the DOE for validation (ex-ante option).

When using option A1, data on fuel consumption of a particular power plant/unit ($FC_{i,m,y}$) can be obtained from the total amount of fuel in mass or volume units (kg or m^3), from CDEC-SING;

In cases where power units haven't got available data of fuel consumption, the emission factor for those power plants was determined using option A2 and the following equation:

Equation [number]. CO_2 emission factor of power units. Option A2

$$EF_{EL,m,y} = \frac{EF_{CO2,m,i,y} \times 3.6}{\eta_{m,y}}$$

Where:

$EF_{EL,m,y}$:CO_2 emission factor of power unit *m* in year *y* (tCO_2/MWh)
$EF_{CO2,m,i,y}$:Average CO_2 emission factor of fuel type *i* used in power unit m in year y (tCO_2/GJ)
$\eta_{m,y}$: Average net energy conversion efficiency of power unit *m* in year *y* (ratio)
m : All power units serving the grid in year *y*.
i :All fossil fuel types combusted in power unit *m* in year *y*
y : The three most recent years for which data is available at the time of submission of the CDM-CPA-DD to the DOE for validation (ex-ante option).

Option A3. If for a power unit m only data on electricity generation is available, an emission factor of 0 tCO_2/MWh can be assumed as a simple and conservative approach.

Since the required information about fuel consumption and electricity generation is available for all power plants/units, only option A1 is used

SIC grid OM calculation:

The calculation of the Simple Adjusted OM emission factor is calculated as a generation-weighted average CO_2 emission per unit net electricity generation (tCO_2/MWh) of all generating power plants serving the system, where the power plants/units are separated in low-cost/must-run power sources (*k*) and other power sources (*m*). As described in Option A of the Simple OM method, it is calculated based on the net electricity generation of each power unit and an emission factor for each power unit, as follows:

Equation [number]. Operating Margin emission factor

$$EF_{grid,OM-adj,y} = (1-\lambda_y) \bullet \frac{\sum_m EG_{m,y} \cdot EF_{EL,m,y}}{\sum_m EG_{m,y}} + \lambda_y \bullet \frac{\sum_k EG_{k,y} \cdot EF_{EL,k,y}}{\sum_k EG_{k,y}}$$

Where:

$EF_{grid,OM-adj,y}$: Simple adjusted operating margin CO_2 emission factor in year *y* (tCO_2/MWh)
λ_y : Factor expressing the percentage of time when low-cost/must-run power units are on the margin in year *y*

$EG_{m,y}$: Net quantity of electricity generated and delivered to the grid by power plant / unit *m* in year *y* (MWh)
$EG_{k,y}$: Net quantity of electricity generated and delivered to the grid by power plant / unit *k* in year *y* (MWh)
$EF_{EL,m,y}$: CO_2 emission factor of power unit *m* in year *y* (tCO_2/MWh)
$EF_{EL,k,y}$: CO_2 emission factor of power unit *k* in year *y* (tCO_2/MWh)
m: All grid power units serving the grid in year *y*, except low-cost/must-run power units
k: All low-cost/must-run grid power units serving the grid in year *y*
y: The three most recent years for which data is available at the time of submission of the CDM PDD to the DOE for validation (ex-ante option).

Determination of $EF_{EL,m,y}$[20]

The CO_2 emission factor of each power unit is determined using options A1, A2 or A3, as indicated in the "Tool to calculate the emission factor of an electricity system" v.02.2.1 using the most recent historical year (2011, 2010 and 2009) for which power generation data is available.

For power plants where data on fuel consumption and electricity generation is available, the emission factor should be determined using Option A1 as follows:

Equation [number]. CO_2 emission factor of power units. Option A1

$$EF_{EL,m,y} = \frac{\sum_i FC_{i,m,y} \bullet NCV_{i,y} \bullet EF_{CO2,i,y}}{\sum_m EG_{m,y}}$$

Where:

$EF_{EL,m,y}$: CO_2 emission factor of power unit *m* in year *y* (tCO_2/GWh)
$FC_{i,m,y}$: Amount of fossil fuel type *i* consumed by power unit *m* in year *y* (mass or volume unit)
$NCV_{i,y}$: Net calorific value (energy content) of fossil fuel type *i* in year *y* (GJ / mass or volume unit)
$EF_{CO2,i,y}$:CO_2 emission factor of fossil fuel type *i* in year *y* (tCO_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 fossil fuel types combusted in power unit *m* in year *y*
y : The three most recent years for which data is available at the time of submission of the CDM-CPA-DD to the DOE for validation (ex-ante option).

When using option A1, data on fuel consumption of a particular power plant/unit ($FC_{i,m,y}$) can be obtained from two different sources that present the information in different ways:

1) Total amount of fuel in mass or volume units (kg or m^3), from CDEC-SIC; or
2) Specific Fuel Consumption in mass or volume units over energy units (kg/MWh or m^3/MWh), from CNE. In this case fuel consumption is calculated multiplying the presented value and the total electricity generated by the power plant/unit.

[20] $EF_{EL,k,y}$ is not calculated since *k* power plants (low cost/must run) from the SIC correspond to Renewable energy power plants (such as run-of-hydro and wind power plants) that not consume fossil fuel or generate project emissions.

When for a power plant/unit data from both sources is available, the first one is preferred over the second one.

In cases where power units haven't got available data of fuel consumption, the emission factor for those power plants was determined using option A2 and the following equation:

Equation [number]. CO_2 emission factor of power units. Option A2

$$EF_{EL,m,y} = \frac{EF_{CO2,m,i,y} \times 3.6}{\eta_{m,y}}$$

Where:

$EF_{EL,m,y}$	: CO_2 emission factor of power unit *m* in year *y* (tCO_2/MWh)
$EF_{CO2,m,i,y}$	: Average CO_2 emission factor of fuel type *i* used in power unit m in year y (tCO_2/GJ)
$\eta_{m,y}$	: Average net energy conversion efficiency of power unit *m* in year *y* (ratio)
m	: All grid power units serving the grid in year *y*, except low-cost/must-run power units
i	: All fossil fuel types combusted in power unit *m* in year *y*
y	: The three most recent years for which data is available at the time of submission of the CDM-CPA-DD to the DOE for validation (ex-ante option).

Option A3. If for a power unit m only data on electricity generation is available, an emission factor of 0 tCO_2/MWh can be assumed as a simple and conservative approach.

Since information is available for all power plants/units, only options A1 and A2 are used.

Determination of $EG_{m,y}$ and $EG_{k,y}$

According to the "Tool to calculate the emission factor of an electricity system, v. 02.2.1", for grid power plants $EG_{m,y}$ and $EG_{k,y}$ correspond to the net electricity (in MWh) generated by power plant/unit *m* or *k* in year *y* or hour *h*.. In the case of this project, these parameters are calculated based in hourly data from the latest three years in which power generation data is available (years 2009, 2010 and 2011).

Determination of λ_y

The parameter λ_y *is defined* as follows:

Equation [number]. λ_y determination

$$\lambda_y(\%) = \frac{Number\ of\ hours\ low-cost/must-run\ sources\ are\ on\ the\ margin\ in\ year\ y}{8{,}760\ \ hours\ \ per\ year}$$

Lambda (λ_y) is calculated as per the following procedure:

Step i) Plot a load duration curve. Collect chronological load data (typically in MW) for each hour of the year *y*, and sort the load data from the highest to the lowest MW level. Plot MW against 8,760 hours in the year, in descending order.

Step ii) Collect power generation data from each power plant / unit. Calculate the total annual generation (in MWh) from low-cost/must-run power plants / units (i.e. $\sum_k EG_{k,y}$).

Step iii) Fill the load duration curve. Plot a horizontal line across the load duration curve such that the area under the curve (MW times hours) equals the total generation (in MWh) from low-cost/must-run power plants / units (i.e. $\sum_k EG_{k,y}$).

Step iv) Determine the "Number of hours for which low-cost/must-run sources are on the margin in year *y*". First, locate the intersection of the horizontal line plotted in step (iii) and the load duration curve plotted in step (i). The number of hours (out of the total of 8,760 hours) to the right of the intersection is the number of hours for which low-cost/must-run sources are on the margin. If the lines do not intersect, then one may conclude that low-cost/must-run sources do not appear on the margin and λ_y is equal to zero.

Step 5. Calculate the build margin (BM) emission factor.

BM calculation of SIC and SING grid:

The BM emission factor is determined in accordance to Option 1 of the "Tool to calculate the emission factor of an electricity system" v.02.2.1, where for the first crediting period the build margin emission factor is calculated ex-ante based on the most recent information available (2011) on units already built for sample group *m* at the time of CDM-PoA-DD submission to the DOE for validation. For the second crediting period, the BM 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 BM emission factor calculated for the second crediting period should be used. This option does not require monitoring the emission factor during the crediting period.

The sample group of power units *m* used to calculate the build margin is determined as per the following procedure provided in the "Tool to calculate the emission factor for an electricity system v.02.2.1":

(a) Identify the set of five power units, excluding 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 ($AEG_{SET5\text{-units}}$ in MWh);

(b) Determine the annual electricity generation of the project activity 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, $AEG_{SET\geq 20\%}$ in MWh).

(c) From SET $AEG_{SET5\text{-units}}$ 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 build margin. Ignore steps (d), (e) and (f).

Otherwise:

(d) Exclude from SET_{sample} the power units which started to supply electricity to the grid more than 10 years ago. Include in that set the power units registered as CDM project activities, starting with power units that started to supply electricity to the grid most recently, until the electricity generation of the new set comprises 20% of the annual electricity generation of the project electricity system (if 20% falls on part of the generation of a unit, the generation of that unit is

fully included in the calculation) to the extent is possible. Determine for the resulting set ($SET_{sample\text{-}CDM}$) the annual electricity generation ($AEG_{SET\text{-}sample\text{-}CDM}$, in MWh).

If the annual electricity generation of that set is comprises at least 20% of the annual electricity generation of the project electricity system (i.e. AEGSET-sample-CDM ≥ 0.2 × AEGtotal), then use the sample group SETsample-CDM to calculate the build margin. Ignore steps (e) and (f).

Otherwise:

(e) Include in the sample group SETsample-CDM the power units that started to supply electricity to the grid more than 10 years ago until the electricity generation of the new set comprises 20% of the annual electricity generation of the project electricity system (if 20% falls on part of thgeneration of a unit, the generation of that unit is fully included in the calculation);

(f) The sample group of power units m used to calculate the build margin is the resulting set (SETsample-CDM->10yrs).

The $SET_{\geq 20\%}$ was selected as the SET_{sample} because it is the set of power units that comprises the larger annual generation (compared to $SET_{5\text{-units}}$).

The $SET_{\geq 20\%}$ consist in the power units (excluding CDM project activities) that started to supply electricity to the system most recently and that comprises the 20% of the annual total electricity generation in the system excluding electricity generated by CDM project activities.

None of the power units in SET_{sample} started to supply electricity to the grid more than 10 years ago therefore steps (d), (e) and (f) are ignored.

The build margin emission factor is the generation-weighted average emission factor (tCO_2/MWh) of all power units *m* during the most recent year *y* (2011) for which power generation data is available, calculated as follows:

Equation [number]. Build Margin emission factor

$$EF_{grid,BM,y} = \frac{\sum_m EG_{m,y} \cdot EF_{EL,m,y}}{\sum_m EG_{m,y}}$$

Where:

$EF_{grid,BM,y}$:	Build margin 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 build margin
y :	Most recent historical year for which power generation data is available

The CO_2 emission factor of each power unit *m* ($EF_{EL,m,y}$) is determined using options ["A1 (represented by ["Equation [number])" in case of calculating BM of the SING grid and "A1 or A2 (represented by Equation [number]and Equation [number] respectively)" in case of calculating the BM of the SIC grid], using for *y* the most recent historical year (2011) for which power generation data is available, and using for *m* the power units included in the build margin.

Step 6. Calculate the combined margin (CM) emissions factor.

The calculation of the combined margin (CM) emission factor ($EF_{grid,CM,y}$) is based on method (a) Weighted average CM as follows:

Equation [number]. Combined Margin emission factor

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

Where:

$EF_{grid,CM,y}$: Combined margin CO_2 emission factor in year y (tCO_2/MWh)
$EF_{grid,BM,y}$: Build margin CO_2 emission factor in year y (tCO_2/MWh)
$EF_{grid,OM,y}$: Operating margin CO_2 emission factor in year y (tCO_2/MWh)
w_{OM}: Weighting of operating margin emissions factor (%)
w_{BM}: Weighting of build margin emissions factor (%)

The default values established in the "Tool to calculate the emission factor for an electricity system" version 02.2.1 for the weighting of the OM (w_{OM} = 75%) and for the weighting of the BM (w_{BM} = 25%), are used in the calculation of the baseline emission factor, as stated in the "Tool to calculate the emission factor of an electricity system".

Project emissions

According to the applicable methodology ACM0002 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" version 13.0.0 for most renewable power generation project activities, PEy = 0. However, some project activities may involve project emissions that can be significant. These emissions shall be accounted for by using the following equation:

Equation [number]. Project Emissions

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

Where:

PEy = Project emissions in year y (tCO_2e)
$PE_{FF,y}$ = Project emissions from fossil fuel consumption in year y (tCO_2)
$PE_{GP,y}$ = Project emissions from the operation of geothermal power plants due to the release of non-condensable gases in year y (tCO_2e)
$PE_{HP,y}$ = Project emissions from reservoirs of hydro power plants in year y (tCO_2e)

Accordingly for this CPA $PE_{GP,y}$ and $PE_{HP,y}$ are not applicable. Regarding $PE_{FF,y}$, the only fossil fuel involved will be for back up or emergency purposes which can be neglected according to the ACM0002 v.13.0.0. $PE_y = PE_{FF,y}$.

Leakage

Under the methodology ACM0002 version 13.0.0 no leakage emissions are considered. The main emissions potentially giving rise to leakage in the context of electric sector projects are emissions arising due to activities such as power plant construction and upstream emissions from fossil fuel use (e.g. extraction, processing, transport, etc). These emissions sources are neglected.

Emission reductions

Emission reductions of the CPA are calculated as follows:

Equation[number]. Emission Reductions

$$ER_y = BE_y - PE_y - LE_y$$

Where:
ER_y: Emission reductions for the year y (tCO_2).
BE_y: Baseline emissions for the year y (tCO_2).
PE_y: Project emissions for the year y (tCO_2).
LE_y: Leakage emissions for the year y (tCO_2).

B.6.2. Data and parameters that are to be reported ex-ante

Data / Parameter	**$EG_{m,y}$**
Unit	MWh
Description	Net quantity of electricity generated and delivered to the grid by power unit *m* in year *y*.
Source of data	CDEC-SIC and CDEC-SING Annual Reports
Value(s) applied	Please refer to values in Table 16 for SING grid and in Table 19 for SIC grid data of Appendix 4.
Choice of data or Measurement methods and procedures	Data from CDEC represents the most recent and reliable information available.
Purpose of data	Calculation of Baseline emissions.
Additional comment	N/A

Data / Parameter	**$FC_{i,m,y}$**
Unit	For Diesel and Coal: kg, for Natural Gas: m^3
Description	Amount of fossil fuel type *i* consumed by power plant / unit *m* in year *y*
Source of data	CDEC-SIC and CDEC-SING Annual Report and CNE Definitive Technical Report (Half-Yearly).
Value(s) applied	Please refer to values in Table 17 for SING grid and in Table 20 for SIC grid data of Appendix 4.
Choice of data or Measurement methods and procedures	Data from CDEC and CNE represents the most recent and reliable information available.
Purpose of data	Calculation of Baseline emissions.
Additional comment	If information on annual fuel consumption for a specific power plant is not available from CDEC, specific fuel consumption data reported by CNE is used.

Data / Parameter	$NCV_{i,y}$
Unit	For Diesel and Coal: [GJ/kg] and For Natural Gas: [GJ/m^3]
Description	Net calorific value (energy content) of fossil fuel type *i* in year *y*
Source of data	CNE Annual Energy Balance Report 2010 and IPCC revised guidelines (2006).
Value(s) applied	Values in Table 22 of Appendix 4.
Choice of data or Measurement methods and procedures	Data from CNE represent the most reliable information available for national fuels, and IPCC represent the most reliable information available for default values and methodological requirements.
Purpose of data	Calculation of Baseline emissions.
Additional comment	CNE Energy Balance Report includes Gross Calorific Values (GCV) for different types of fuel. These values were corrected to Net Calorific Values (NCV) based on IPCC assumption stating that for liquid and solid fuels NCV is 5% lower than GCV, and for gas fuels NCV is 10% lower than GCV.

Data / Parameter	$EF_{CO2,i,y}$ and $EF_{CO2,m,i,y}$
Unit	tCO_2/GJ
Description	CO_2 emission factor of fossil fuel type *i* used in power unit *m* in year *y*.
Source of data	IPCC revised guidelines (2006). Available in Web Page: http://www.ipcc-nggip.iges.or.jp/public/2006gl/
Value(s) applied	Values in Table 22 of Appendix 4.
Choice of data or Measurement methods and procedures	No other data is publicly available. For estimating emission factor for different fossil fuel-based generation technologies, IPCC guidelines have been used in a conservative manner
Purpose of data	Calculation of Baseline emissions.
Additional comment	N/A

Data / Parameter	η_m
Unit	%
Description	Efficiency of power plant *m*
Source of data	Defaults values from "Tool to calculate the emission factor for an electricity system v.02.2.1" page 27. Available in Web Page: http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v2.2.1.pdf
Value(s) applied	Defaults values from "Tool to calculate the emission factor for an electricity system v.02.2.1" page 27
Choice of data or Measurement methods and procedures	This data is used to calculate the emission factor of a plant *m* (as per option A2 of the tool to calculate the emission factor of an electricity system) in case that there is no fuel consumption data available from public national sources like CDEC-SIC (fossil fuel consumption) and CNE (specific fossil fuel consumption).
Purpose of data	Calculation of Baseline emissions.
Additional comment	This parameter is only used if no fuel consumption data is available

Data / Parameter	$EF_{grid,CM,y}$
Unit	tCO_2/MWh
Description	Combined margin CO_2 emission factor for SING and SIC grid connected power generation in year *y* calculated using the latest version of the "Tool to calculate the emission factor for an electricity system v.02.2.1"
Source of data	Calculated as per the "Tool to calculate the emission factor for an electricity system" version 02.2.1; based on: -CDEC-SIC and CDEC-SING Annual Report -Energy National Balance 2010, Energy National Commission (CNE) -Revised 1996 IPCC Guidelines Defaults values from "Tool to calculate the emission factor for an electricity system v.02.2.1" page 27
Value(s) applied	$EF_{grid,CM,y}$ SING: 0.841 tCO_2/MWh $EF_{grid,CM,y}$ SIC: 0.679 tCO_2/MWh
Choice of data or Measurement methods and procedures	This data is used to calculate the combined emission factor of SING and SIC grid. All data is available from public national sources like CDEC-SING and CDEC-SIC (fossil fuel consumption), CNE (specific fossil fuel consumption) or international available data like IPCC Guideline.
Purpose of data	Calculation of Baseline emissions.
Additional comment	The $EF_{grid,CM,y}$ value will be fixed ex- ante

B.6.3. Ex-ante calculations of emission reductions

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Note: *Since the CPA could be connected either to the SING or the SIC, then the ex-ante calculation for the emission factor of both systems are described in the following lines (only one should be used in the specific CPA):*

SING Emission Reductions

Baseline Emissions

The CO_2 emission factor of the grid ($EF_{CO2grid,y}$= 0.841 tCO_2/MWh) was calculated in a transparent and conservative manner as a combined margin consisting in a combination of operating margin (OM) and a build margin (BM) according procedures prescribed in the "Tool to calculate the Emission Factor for an electricity system" version 02.2.1

Operating Margin (OM) Emission Factor

A transparent ex-ante calculation of the OM emission factor is presented below, applying all relevant equations presented in section B.6.1 above, provided in the "Tool to calculate the emission factor for an electricity system" version 02.2.1 and using the data presented in Appendix 4.

The values used for estimating the emission factor for each power plant included in the OM are exposed in the tables presented in Appendix 4 and depending on annual fuel consumption or specific fuel consumption data availability option A1 is applied, using Equation [number].

An example of the calculation considering Option A1 is provided using 2009 data for Gas Atacama, that consumes Natural Gas and Diesel:

$$EF_{EL,m,y} = \frac{428{,}363{,}300(kg)\times 0.043(\frac{GJ}{kg})\times 0.0726(\frac{tCO2}{GJ}) + 117{,}290{,}000(m3)\times 0.035(\frac{GJ}{m3})\times 0.0543(\frac{tCO2}{GJ})}{3{,}115{,}476MWh}$$

$$EF_{EL,m,y} = 0.559\ tCO_2/MWh$$

The OM emission factor is calculated using Equation 3 for each year (2009, 2010 and 2011).

As an example of the calculation of the operating margin emission factor for year2009 using Equation [number] is provided below:

$$EF_{grid,AverageOM,2009} = \frac{11{,}030{,}289tCO_2}{14{,}114{,}369MWh} = 0.7815tCO_2/MWh$$

According to the data vintage chosen in Step 3 (ex-ante option), the Operating Margin emission factor is calculated as a 3-year generation-weighted average of the values for years 2011, 2010 and 2009.

Year	Operational Margin Emission Factor $EF_{grid,OM-adj,y}$ [tCO_2/MWh]
2009	0.7815
2010	0.7871
2011	0.8491

Finally, the full generation-weighted average operating margin emission factor for the most recent 3 years is 0.807tCO_2/MWh

Build margin (BM) emission factor

A transparent ex-ante calculation of the BM emission factor is presented below, applying all relevant equations presented in section B.6.1 above, provided in the "Tool to calculate the emission factor for an electricity system" version 02.2.1 and using the data presented in Appendix 4.

The values used for estimating the emission factor for each power unit included in the BM are presented in Appendix 4 and depending on annual fuel consumption or specific fuel consumption data availability option A1 is applied, using Equation [number]. The BM emission factor is calculated for year 2011 using Equation [number].

The option selected to calculate the build margin was option (b) of the tool. The option was selected since power plant capacity additions in the electricity system that include the 20% of the system net generation and have been built most recently comprises a larger annual generation than the five power units that have been built most recently as it can be seen in Appendix 4.

An example of the calculation considering Option A1 is provided for Andina, considering its coal and diesel consumption (using data from the year 2011):

$$EF_{EL,m,y} = \frac{250{,}850{,}671(kg)\times 0.028(\frac{GJ}{kg})\times 0.0873(\frac{tCO_2}{GJ}) + 1{,}398{,}000(kg)\times 0.043(\frac{GJ}{kg})\times 0.0726(\frac{tCO_2}{GJ})}{692{,}287(MWh)}$$

$$EF_{EL,m,y} = 0.887\ tCO_2/MWh$$

Using the values presented in Appendix 4 the following value for the BM emission factor is calculated by applying equation [number] :

$$EF_{grid,BM,y} = \frac{2{,}910{,}684\ tCO_2}{3{,}077{,}418\ MWh} = 0.946\ tCO_2/MWh$$

Finally the Build Margin Emission factor of the grid is 0.946tCO_2/MWh

Combined margin (CM) emission factor

Using the $EF_{grid,OM}$ value, the $EF_{grid,BM}$ value and the weighting values of the OM (w_{OM} = 75%) and the BM (w_{BM} = 25%), the CM emission factor estimation is calculated as follows:

$$EF_{GRID,CM,Y} = 0.807tCO_2 / MWh \times 0.75 + 0.946tCO_2 / MWh \times 0.25 = 0.841tCO_2 / MWh$$

Finally, the baseline emission factor of the grid is 0.841 tCO_2/MWh

SIC Emission Reductions

Baseline Emissions

The SIC CO_2 emission factor of the grid ($EF_{CO2grid,y}$=0.679 tCO_2/MWh) was calculated ex ante in a transparent and conservative manner as a combined margin consisting in a combination of operating

margin (OM) and a build margin (BM) according procedures prescribed in the "Tool to calculate the Emission Factor for an electricity system v.02.2.1" as follows:

Operating Margin (OM) Emission Factor

A transparent ex-ante calculation of the OM emission factor is presented below, applying all relevant equations presented in section B.6.1 above, provided in the "Tool to calculate the emission factor for an electricity system" v.02.2.1 and using the data presented in Appendix 4.

The values used for estimating the emission factor for each power unit included in the OM (except those considered as low-cost/must-run power sources since they represent an emission factor of 0 tCO_2/MWh) are exposed in the tables presented in Appendix 4 and depending on annual fuel consumption or specific fuel consumption data availability options A1 and A2 are applied, using Equation [number] and Equation [number], respectively. The OM emission factor is calculated using Equation [number].

An example of the calculation considering Option A1 is provided using 2009 data for Quellon Diesel power unit:

$$EF_{EL,m,y} = \frac{310{,}000(kg) \bullet 0.043354(GJ/kg) \bullet 0.0726(tCO_2/GJ)}{1{,}463(MWh)} = 0.667(tCO_2/MWh)$$

An example of the calculation considering Option A2 is provided using 2010 data for Curanilahue which is a Natural Gas based power unit:

$$EF_{EL,m,y} = \frac{0.05430(tCO_2/GJ) \times 3.6}{0.395} = 0.495 tCO_2/MWh$$

An example of the load duration curve is shown below for the year 2009. The resulting hours of low-cost/must run power sources operating not on the margin is 8,759 hours, thus the value of lambda is:

$$\lambda_y(\%) = \frac{1}{8{,}760} = 0.000114$$

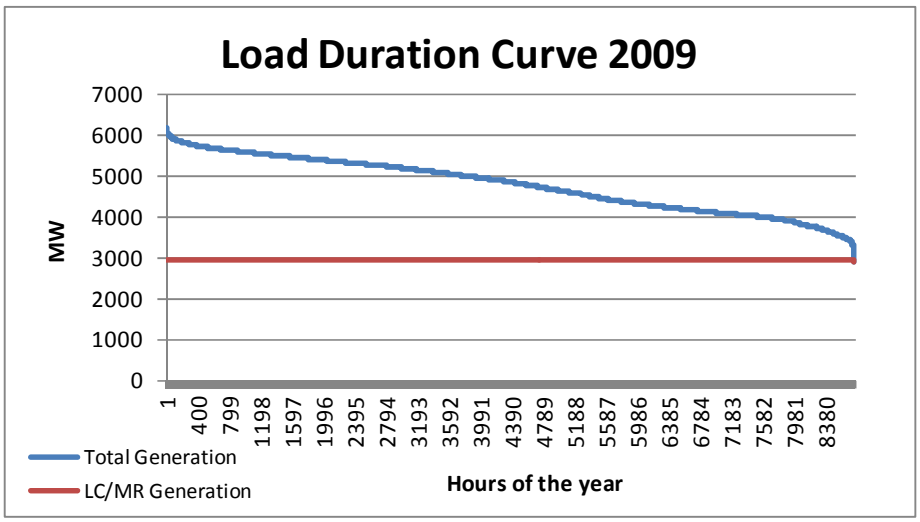

Figure 4. Load Duration Curve for year 2009
Source: CDEC-SIC

Values of Lambda for each year are shown in the following table:

Table 11. Lambda Values

Year	Lambda λ_y
2009	0.000114
2010	0.006507
2011	0.000114

Finally, as an example of the OM emission factor estimation, the calculations for year 2009 is presented below in accordance to the data provided in Appendix 4:

$$EF_{grid,OM-adj,y} = (1-0.000114)\times\frac{12,530,939}{16,206,547}+0.000114\times\frac{0}{25,532,513}$$

$$EF_{grid,OM-adj,2009} = 0.773114 tCO_2 / MWh$$

According to the data vintage chosen in Step 3 (ex-ante option), the Operating Margin emission factor is calculated as a 3-year generation-weighted average of the values for years 2011, 2010 and 2009.

Table 12. Operational Margin Emission Factors

Year	Operational Margin Emission Factor $EF_{grid,OM-adj,y}$ [tCO_2/MWh]
2009	0.773114
2010	0.646167
2011	0.654872

Therefore, the operating margin emission factor is:

Table 13. Operating Margin Emission Factor

Operating Margin Emission Factor $EF_{grid,OM}$ [tCO_2/MWh]
0.690

Build Margin (BM) Emission Factor

A transparent ex-ante calculation of the BM emission factor is presented below, applying all relevant equations presented in section B.6.1 above, provided in the "Tool to calculate the emission factor for an electricity system" v.02.2.1 and using the data presented in Appendix 4.

The values used for estimating the emission factor for each power unit included in the BM are exposed in the tables presented in Appendix 4 and depending on annual fuel consumption or specific fuel

consumption data availability options A1 and A2 were applied, using Equation [number] and Equation [number], respectively. The BM emission factor is calculated using Equation [number].

An example of the calculation considering Option A1 is provided for Guacolda 4 coal based power unit (considering data from the year 2011):

$$EF_{EL,m,y} = \frac{430{,}015{,}671(kg) \times 0.02784222(GJ/kg) \times 0.0895(tCO_2/GJ)}{1{,}228{,}616(MWh)} = 0.872(tCO_2/MWh)$$

An example of the calculation with Option A2 is provided using data from year 2011 for Collipulli diesel based power unit:

$$EF_{EL,m,y} = \frac{0.0726(tCO_2/GJ) \times 3.6}{0.395} = 0.662(tCO_2/MWh)$$

Using the values presented in Appendix 4 the following value for the BM emission factor is calculated:

$$EF_{grid,BM,y} = \frac{6{,}340{,}392(tCO_2)}{9{,}780{,}099(MWh)} = 0.648(tCO_2/MWh)$$

Therefore, the build margin emission factor is:

Table 14. Build Margin Emission Factor

Build Margin Emission Factor $EF_{grid,BM}$ [tCO_2/MWh]
0.648

The detailed list of power units selected in the Build Margin and their data is presented in Appendix 4.

Combined Margin (CM) Emission Factor

Using the $EF_{grid,OM}$ value, the $EF_{grid,BM}$ value and the weighting values of the OM (w_{OM} = 75%) and the BM (w_{BM} = 25%), the CM estimation is calculated as follows:

$$EF_{GRID,CM,Y} = 0.690tCO_2/MWh \times 0.75 + 0.648tCO_2/MWh \times 0.25 = 0.679tCO_2/MWh$$

Finally, the baseline emission factor of the SIC grid is 0.679tCO_2/MWh

Project Emissions

Emissions during the CPA are equal to zero (PE_y = 0).

Leakage

There is no energy generating equipment being transferred from another activity, therefore leakage is not considered in the CPA (LE_y=0).

CPA Emission reductions

The following table summarizes the results for OM and BM emission factors. These values are used to obtain an estimation of the CM emission factor of [CM EF data] tCO_2/MWh and considering that the CPA expects to displace an average of [EG_{PJ} data] MWh of electricity per year, the emission reductions come approximately up to [ER data] tCO_2e per year.

Table 15. Emissions Reductions Estimation Data

Variable	Unit	Value
OM Emissions Factor ($EF_{grid,OM-adj,y}$)	tonnes CO_2e/MWh	[data]
BM Emissions Factor ($EF_{grid,BM,y}$)	tonnes CO_2e/MWh	[data]
CM Emissions Factor ($EF_{grid,CM,y}$)	tonnes CO_2e/MWh	[data]
Electricity Generated by the project	MWh/year	[data]
Emissions Reduction (ER_y)	tonnes CO_2e/year	**[data]**

B.7. Application of the monitoring methodology and description of the monitoring plan

B.7.1. Data and parameters to be monitored by each generic CPA

Given that the emission factor is calculated ex-ante and according to the "Tool to calculate the emission factor of an electricity system v.02.2.1" the only data to be monitored is the electricity supplied to the grid.

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Data / Parameter	$EG_{PJ,y}=EG_{facility}$
Unit	MWh
Description	Quantity of net electricity generation supplied by the CPA to the grid in year *y*.
Source of data	Electricity meter located at the project site
Value(s) applied	[energy generation] MWh
Measurement methods and procedures	The electricity exported by the CPA and imported from the grid will be continuously measured by a bi-directional meter to be installed at [meter location] at the project site and recorded monthly. The electricity meter should have a maximum error of 0.2% according with national regulations [indicate standard or procedure applicable]. [Indicate calibration frequency adopted]
Monitoring frequency	The net electricity of the CPA will be continuously measured by a bidirectional meter (class 02) and recorded monthly. Data will be archived electronically and kept for two years after the end of the crediting period or the last issuance of CER's, whichever occurs later.
QA/QC procedures	The measurements will be crosschecked with the records for sold electricity and the smaller value of the two will be considered in a conservative manner.
Purpose of data	Calculation of Baseline emissions
Additional comments	The data will be archived electronically and kept until two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later.

B.7.2. Description of the monitoring plan for a generic CPA

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1. Monitoring organization

The CPA developer will assure the designation of a proper staff to perform all the CDM monitoring tasks and manage all the activities involved in the monitoring procedures which comprises an on site operator, which will be in charge of downloading the data from the main meter every month, a project supervisor, which will be in charge of gathering the data and sending it to the CDM manager.

The CDM manager will be in charge of archiving and processing all the data collected and also will be in charge of crosschecking the information with the project sales receipts.

The CDM manager will be in charge of coordinating the performances of the calibrations and reporting any special events (i.e. meter errors, stoppages, etc.).

The CDM manager is also responsible of ensuring that the operating staff members are properly trained.

2. Monitoring equipment and installation

[Name of the CPA] will deliver energy to the [SIC or SING] grid. The net energy generated by the power plant will be measured by a bidirectional electricity meter located at [location of the meter] at the project site.

This meter will measure the net energy generated by the power plant and have a maximum error of 0.2% according with Chilean regulations [name of the standard or procedure applicable]. [Indicate calibration frequency].

The measurements will be crosschecked with the records for sold electricity and in cases where any differences are detected, in a conservative manner the smaller value of the two will be considered.

3. Data recording procedure

a) Metering Electricity Delivered to the Grid

- Electricity generation data will be downloaded from the meter every one month and kept for CDM verification and cross-check invoicing purposes.
- The data will be archived electronically until two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later

b) Main meter failure

In case the main meter is found to be beyond the permissible error then the error encountered will be discounted to all meter readings since the last calibration was performed as a conservative approach. However, the meter will be calibrated as soon as possible once the error is detected.

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Appendix 1: Contact information on entity/individual responsible for the PoA

Organization	Andes Mainstream SpA.
Street/P.O. Box	Av. Apoquindo 4700, piso 10º, Las Condes
Building	
City	Santiago
State/Region	Región Metropolitana
Postcode	
Country	Chile
Telephone	(56 2) 5923100
Fax	56 (2) 592 3101
E-mail	
Website	www.mainstreamrp.com
Contact person	Christian Evans
Title	Project Manager
Salutation	Mr.
Last name	Evans
Middle name	
First name	Christian
Department	
Mobile	
Direct fax	
Direct tel.	
Personal e-mail	Christian.Evans@mainstreamrp.com

Appendix 2: Affirmation regarding public funding

This PoA does not receive public funding.

Appendix 3: Application of methodology(ies)

All the information related to the methodologies applied is presented in the PoA-DD

Appendix 4: Further background information on ex ante calculation of emission reductions

SING Emission Reduction Information

Table 16. Net electricity generation and delivered to the grid by source, 2009, 2010 and 2011

Net Electricity generation MWh			
Company	**2009**	**2010**	**2011**
Celta	989,762	999,870.00	906,153
Electroandina	3,764,150	4,544,500.51	3,141,694
E-CL	3,044,968	2,682,154.65	2,768,888

Net Electricity generation MWh			
Company	**2009**	**2010**	**2011**
AES Gener	1,340,181	953,078.89	732,533
GasAtacama	3,115,476	2,887,730.35	2,055,744
Norgener	1,826,322	2,120,336.49	2,075,505
Cavancha	14,672	14,203.63	14,531
Enernuevas	0	2,778.97	16,564
Enorchile	6,143	17,463.22	10,378
Inacal	12,696	44,123.20	24,225
Angamos	0	249.95	1,786,906
Andina	0	641.20	692,287
Hornitos	0	0	598,225
TOTAL	**14,114,368.92**	**14,267,131.06**	**14,823,633**

Table 17. Fuel Consumption per fuel in the SING

Company	**Fuel type**	**Fuel consumption 2009**	**Fuel consumption 2010**	**Fuel consumption 2011**
	i	**$FC_{i,m,2009}$**	**$FC_{i,m,2010}$**	**$FC_{i,m,2011}$**
	-	**kg or m^3(for Natural gas)**	**kg or m^3(for Natural gas)**	**kg or m^3(for Natural gas)**
Celta	Coal	408,690,000	413,910,000	375,990,000
	Natural gas	0	0	0
	Diesel	4,085,100	4,368,000	3,983,000
	Fuel oil Nº 6	3,817,000	0	0
Electroandina	Coal	1,256,170,000	1,346,520,000	940,760,000
	Natural gas	142,150,000	295,830,000	233,410,000
	Diesel	12,248,770	11,205,000	17,894,000
	Fuel oil Nº 6	75,703,483	53,435,000	31,239,000
E-CL	Coal	991,640,000	900,040,000	907,420,000
	Natural gas	78,760,000	28,400,000	64,290,000
	Diesel	58,118,633	67,547,700	12,876,420
	Fuel oil Nº 6	17,589,700	24,345,000	13,432,000
AES Gener	Coal	0	0	0
	Natural gas	14,210,000	0	0
	Diesel	0	607,600	144,086,150
	Fuel oil Nº 6	0	0	0
Gas Atacama	Coal	0	0	0
	Natural gas	117,290,000	302,170,000	390,730,000
	Diesel	482,363,300	275,938,500	47,664,700
	Fuel oil Nº 6	0	0	0
Norgener	Coal	750,400,000	877,320,000	854,160,000
	Natural gas	0	0	0
	Diesel	685,000	299,750	182,870
	Fuel oil Nº 6	366,000	234,920	64,010
Enorchile	Coal	0	0	0
	Natural gas	0	0	0
	Diesel	1,396,900	3,714,630	2,235,570
	Fuel oil Nº 6	0	0	0
Inacal	Coal	0	0	0

Company	Fuel type	Fuel consumption 2009	Fuel consumption 2010	Fuel consumption 2011
	i	$FC_{i,m,2009}$	$FC_{i,m,2010}$	$FC_{i,m,2011}$
	-	kg or m^3(for Natural gas)	kg or m^3(for Natural gas)	kg or m^3(for Natural gas)
	Natural gas	0	0	0
	Diesel	297,420	349,710	657,480
	Fuel oil Nº 6	2,577,010	9,356,560	4,699,630
Angamos	Coal	0	0	741,230,000
	Natural gas	0	0	0
	Diesel	0	64,600	4,900,650
	Fuel oil Nº 6	0	0	694,020
Andina	Coal	0	0	250,850,000
	Natural gas	0	0	0
	Diesel	0	3,871,000	1,398,000
	Fuel oil Nº 6	0	0	0
Hornitos	Coal	0	0	190,220,000
	Natural gas	0	0	0
	Diesel	0	3,871,000	4,747,000
	Fuel oil Nº 6	0	0	0

Table 18. Build Margin Calculation Data*

Company	Power Plant	Starting Year	Power plant Net generation (MWh)	Emissions tCO_2
Andina	Andina	2011	36,048	614,123
Andina	Andina	Oct-10	656,239	
Angamos	Angamos	2011	635,956	1,819,266
Angamos	Angamos	Dic-2010	1,150,950	
Hornitos	Hornitos	2011	550,712	477,295
Hornitos	Hornitos	2011	47,513	
Total			**3,007,418**	**2,910,684**

***Note**: Since for power units owned by Angamos, Hornitos and Andina (SET of power units included in the BM), fuel consumption data is reported only at a company level, then the emission factor is calculated at a company level.

SIC Emission Reduction Information

Table 19. Power Plants type "m" and "k", Energy Generation Data (MWh)

Power Plant	Fuel type	Power Plant category	Energy Generated	Energy Generated	Energy Generated
(name)	*i*	*m or k*	$EG_{m,2009}$	$EG_{m,2010}$	$EG_{m,2011}$
			[MWh]	[MWh]	[MWh]
Abanico	run off river (hydro)	*k*	346,329	315,050	282,864
Calle-Calle	Diesel	*m*	0.000	0.000	17,084
Carena	run off river (hydro)	*k*	0.000	0.000	50,552
Cem Bio Bio DIESEL	Diesel	*m*	0.000	0.000	465

Chacayes	run off river (hydro)	*k*	0.000	0.000	93,099
Diuto	run off river (hydro)	*k*	0.000	0.000	5,025
Dongo	run off river (hydro)	*k*	0.000	0.000	13,316
Energía Pacífico	Diesel	*m*	0.000	0.000	34,105
HBS	Diesel	*m*	0.000	0.000	28
La Arena	run off river (hydro)	*k*	0.000	0.000	1,605
Lautaro	Biomass	*k*	0.000	0.000	378
Lautaro-Comasa	Biomass	*k*	0.000	0.000	52,775
Licán	run off river (hydro)	*k*	0.000	0.000	41,660
Loma Los Colorados II	Biomass	*k*	0.000	0.000	17,545
Mallarauco	run off river (hydro)	*k*	0.000	0.000	12,236
Muchi	run off river (hydro)	*k*	0.000	0.000	477
Multiexport I	Diesel	*m*	0.000	0.000	121
Santa María	Coal	*m*	0.000	0.000	95,992
Tirúa	Diesel	*m*	0.000	0.000	6
Tomaval	Diesel	*m*	0.000	0.000	2,899
Polincay	Diesel	*m*	0.000	0.000	9
Punta Colorada Diesel	Diesel	*m*	0.000	0.000	2,528
Punta Colorada Eólica	Wind	*k*	0.000	0.000	3,940
Lonquimay	Diesel	*m*	0.000	0.000	11
Aconcagua	run off river (hydro)	*k*	409,801	249,805	0
Alfalfal	run off river (hydro)	*k*	893,804	845,500	671,519
Ancud	Diesel	*m*	579	834	1,896
Antilhue TG	Diesel	*m*	112,723	71,742	207,952
Antuco	Reservoir (Hydro)	*k*	1,610,652	1,448,334	1,470,889
Arauco	biomass	*k*	11,139	15,232	91,073
Biomar	Diesel	*m*	0	2	1
Blanco	run off river (hydro)	*k*	0	78,342	193,097
Bocamina	coal	*m*	919,093	215,770	928,573
Cabrero	biomass	*k*	0	1,358	46,780
Campanario	Natural Gas	*m*	0	106	7,396
Campanario Diesel	Diesel	*m*	104,955	25,858	70,057
Candelaria 1	Natural Gas	*m*	21,114	43,217	143,718
Candelaria 1 Diesel	Diesel	*m*	69,531	48,571	53,714
Candelaria 2	Natural Gas	*m*	7,320	44,494	179,957
Candelaria 2 Diesel	Diesel	*m*	30,257	46,559	78,316

Canela	wind	*k*	29,337	0	0
Canela 1	wind	*k*	8,005	28,375	24,007
Canela 2	wind	*k*	19,663	122,611	107,823
Canutillar	Reservoir (Hydro)	*k*	910,740	1,162,424	715,907
Cañete	Diesel	*m*	2,859	728	3,747
Capullo	run off river (hydro)	*k*	64,810	72,746	70,271
Carbomet	run off river (hydro)	*k*	0	20,660	41,046
Casablanca 1	Diesel	*m*	1,075	221	246
Casablanca 2	Diesel	*m*	0	0.310	26
Cem Bio Bio IFO	IFO 180	*m*	0	4,186	57,460
Cenizas	Diesel	*m*	46,839	26,866	42,554
Chacabuquito	run off river (hydro)	*k*	161,006	136,617	122,718
Chiburgo	run off river (hydro)	*k*	82,554	75,847	67,390
Chiloé	Diesel	*m*	763	1	4,918
Cholguán	biomass	*k*	76,393	81,600	89,658
Chuyaca	Diesel	*m*	2,508	5,495	18,875
Cipreses	Reservoir (Hydro)	*k*	498,783	517,338	190,028
Colbun	Reservoir (Hydro)	*k*	2,269,765	1,542,401	1,913,935
Colihues DIE	Diesel	*m*	0	146	0
Colihues IFO	IFO 180	*m*	0	21,982	50,537
Collipulli	Diesel	*m*	2,227	646	1,446
Colmito	Diesel	*m*	5,203	1,108	6,836
Concon	Diesel	*m*	1,926	418	1,282
Confluencia	run off river (hydro)	*k*	0	3,935	130,512
Constitución	biomass	*k*	56,363	51,539	53,758
Constitución 1	Diesel	*m*	768	1,887	5,634
Constitución A.	biomass	*k*	49,313	30,943	37,358
Coya	run off river (hydro)	*k*	91,606	83,304	69,363
Curacautin	Diesel	*m*	2,818	1,565	2,508
Curanilahue	Natural Gas	*m*	0	52	0
Curauma	Diesel	*m*	1,703	480	654
Curicó	coal	*m*	0	385	1,235
Curillinque	run off river (hydro)	*k*	616,641	621,357	482,410
D. Almagro	Diesel	*m*	24,735	442	675
Degan	Diesel	*m*	42,073	41,051	80,784
Eagon	Diesel	*m*	4	15	720

El Manzano	run off river (hydro)	*k*	26,688	27,498	25,088
El Peñón	Diesel	*m*	11,433	57,821	168,505
El Rincón	run off river (hydro)	*k*	2,145	2,447	2,499
El Salvador	Diesel	*m*	0	297	209
El Tártaro	run off river (hydro)	*k*	0	138	497
El Toro	Reservoir (Hydro)	*k*	1,515,426	1,784,247	1,397,033
Emelda	IFO 180	*m*	0	1,186	1,227
Escuadrón (ex FPC)	biomass	*k*	77,883	90,536	78,453
Esperanza 1	Diesel	*m*	1,477	1,020	1,881
Esperanza 2	Diesel	*m*	877	804	815
Esperanza TG	Diesel	*m*	9	15	2,246
Eyzaguirre	run off river (hydro)	*k*	8,273	6,686	3,792
Florida	run off river (hydro)	*k*	143,168	118,661	75,141
Guacolda 1	coal	*m*	1,266,852	1,138,228	1,173,637
Guacolda 2	coal	*m*	1,217,009	1,109,295	1,003,168
Guacolda 3	coal	*m*	723,012	1,199,067	1,289,490
Guacolda 4	coal	*m*	0	1,036,429	1,228,616
Guayacán	run off river (hydro)	*k*	0	20,806	73,162
Horcones Diesel	Diesel	*m*	1,475	6,260	11,777
Horcones TG	Natural Gas	*m*	90	313	91
Hornitos	run off river (hydro)	*k*	269,732	195,559	173,422
Huasco TG	Diesel	*m*	561	927	847
Huasco TG IFO	IFO 180	*m*	23,566	142	215
Isla	run off river (hydro)	*k*	446,085	488,228	386,850
Juncal	run off river (hydro)	*k*	0	39,806	99,288
Juncalito	run off river (hydro)	*k*	0	1,263	2,625
L.Verde	coal	*m*	20,180	284	438
L.Verde TG	Diesel	*m*	19,161	4,211	1,459
La Higuera	run off river (hydro)	*k*	0	168,758	199,297
La Paloma	run off river (hydro)	*k*	0	3,983	4,353
Laja	biomass	*k*	46,299	44,715	45,873
Las Vegas	Diesel	*m*	1,462	673	1,705
Lebu	Diesel	*m*	1,777	56	0
Lebu (Cristoro)	wind	*k*	4,600	6,800	9,090
Licantén	biomass	*k*	20,268	21,497	28,730

Linares Norte	Diesel	*m*	167	142	474
Lircay	run off river (hydro)	*k*	121,976	121,921	119,902
Loma Alta	run off river (hydro)	*k*	271,785	270,328	227,146
Loma Los Colorados	biomass	*k*	0	7,914	7,786
Los Corrales	run off river (hydro)	*k*	0	171	2,838
Los Espinos	Diesel	*m*	27,238	14,201	107,783
Los Molles	run off river (hydro)	*k*	47,987	28,343	27,387
Los Morros	run off river (hydro)	*k*	19,136	17,354	10,193
Los Pinos	Diesel	*m*	108,097	174,311	265,247
Los Quilos	run off river (hydro)	*k*	262,678	213,571	199,668
Los Sauces	Diesel	*m*	4,094	1,107	6,055
Los Vientos TG	Diesel	*m*	155,101	49,180	45,216
Louisiana Pacific	Diesel	*m*	4	0	780
Machicura	Reservoir (Hydro)	*k*	506,593	340,602	411,442
Maitenes	run off river (hydro)	*k*	130,467	129,722	115,590
Mampil	run off river (hydro)	*k*	177,339	106,542	158,042
Mariposas	run off river (hydro)	*k*	0	602	29,744
Maule	Diesel	*m*	318	647	3,099
Monte Patria	Diesel	*m*	6,526	172	114
Monte Redondo	wind	*k*	6,065	82,791	101,789
Multiexport II	Diesel	*m*	3	0	213
Nehuenco	Natural Gas	*m*	111,629	199,755	738,891
Nehuenco Diesel	Diesel	*m*	937,297	673,473	796,372
Nehuenco II	Natural Gas	*m*	12,755	979,119	1,327,291
Nehuenco II Diesel	Diesel	*m*	1,525,926	1,547,613	507,633
Nehuenco TG 9B	Natural Gas	*m*	25,002	6,628	20,070
Nehuenco TG 9B Diesel	Diesel	*m*	17,238	580	16
Newen Diesel	Diesel	*m*	2,333	600	0
Newen Natural Gas	Natural Gas	*m*	926	29,865	35,098
Newen LPG	LPG	*m*	1,160	8,325	11,915
Nueva Aldea	biomass	*k*	103,073	93,894	97,981
Nueva Aldea 2	Diesel	*m*	0	0	0
Nueva Aldea 3	biomass	*k*	266,799	192,853	106,985
Nueva Renca	Natural Gas	*m*	18,916	611,541	1,765,901
Nueva Renca Diesel	Diesel	*m*	1,257,488	1,300,008	281,908
Nueva Ventanas	coal	*m*	117,212	1,997,870	2,026,899

Ojos de Agua	run off river (hydro)	*k*	37,059	49,805	41,306
Olivos	Diesel	*m*	52,873	4,019	29,547
Palmucho	run off river (hydro)	*k*	244,092	232,351	224,097
Pangue	Reservoir (Hydro)	*k*	2,139,157	1,630,702	1,725,084
Pehuenche	Reservoir (Hydro)	*k*	2,728,707	2,091,261	2,282,243
Pehui	run off river (hydro)	*k*	3,634	7,134	6,541
Petropower	Fuel Oil	*m*	482,252	65,525	349,126
Peuchén	run off river (hydro)	*k*	269,135	166,451	221,253
Pilmaiquén	run off river (hydro)	*k*	248,859	263,127	239,280
Placilla	Diesel	*m*	2,954	1,121	983
Puclaro	run off river (hydro)	*k*	41,022	24,379	14,545
Pullinque	run off river (hydro)	*k*	229,045	209,844	198,408
Punitaqui	Diesel	*m*	7,922	283	341
Punta Colorada	Fuel Oil	*m*	0	5,114	67,503
Puntilla	run off river (hydro)	*k*	148,986	146,903	121,259
Quellon	Diesel	*m*	1,463	758	2,750
Quellon II	Diesel	*m*	15,339	14,376	21,955
Queltehues	run off river (hydro)	*k*	342,934	357,686	309,226
Quidico	Diesel	*m*	0	43	0
Quilleco	run off river (hydro)	*k*	414,463	387,240	376,786
Quintay	Diesel	*m*	3,039	935	3,106
Quintero	Diesel	*m*	7,100	16,757	46,453
Quintero GNL	Natural Gas	*m*	15,186	245,838	174,625
Ralco	Reservoir (Hydro)	*k*	3,128,046	2,220,597	2,444,309
Rapel	Reservoir (Hydro)	*k*	730,402	469,720	335,303
Renca	Diesel	*m*	338	2,661	27,825
Rucue	run off river (hydro)	*k*	1,017,020	943,174	918,233
Salmofood II	Diesel	*m*	22	76	5
San Clemente	run off river (hydro)	*k*	0	5,924	17,270
San Fco. Mostazal	Diesel	*m*	2,172	630	15,843
San Gregorio	Diesel	*m*	64.730	264.640	636
San Ignacio	run off river (hydro)	*k*	201,921	122,229	171,869
San Isidro	Natural Gas	*m*	398,588	31,297	3,694

San Isidro GNL	Natural Gas	*m*	695,498	2,160,912	2,502,079
San Isidro Diesel	Diesel	*m*	585,447	43,974	6,073
San Isidro II	Natural Gas	*m*	115,958	16,930	0
San Isidro II GNL	Natural Gas	*m*	268,841	2,846,079	3,043,464
San Isidro II Diesel	Diesel	*m*	1,415,122	87,600	8,045
San Lorenzo de D. de Almagro	Diesel	*m*	635	309	412
Santa Lidia	Diesel	*m*	10,455	49,516	147,215
Sauce Andes	run off river (hydro)	*k*	7,271	6,334	5,071
Sauzal 50Hz	run off river (hydro)	*k*	472,301	423,943	387,163
Sauzal 60Hz	run off river (hydro)	*k*	0	0	295
Sauzalito	run off river (hydro)	*k*	81,879	72,404	68,047
Skretting	Diesel	*m*	2	59	44
Taltal 1	Natural Gas	*m*	116,564	19,280	46
Taltal 1 Diesel	Diesel	*m*	118,814	34,900	37,816
Taltal 1 GNL	Natural Gas	*m*	0	1,661	67,252
Taltal 2	Natural Gas	*m*	123,272	36,508	476
Taltal 2 GNL	Natural Gas	*m*	0	39	15,245
Taltal 2 Diesel	Diesel	*m*	83,818	55,707	28,655
Tapihue	Natural Gas	*m*	1,187	1,050	2,027
Teno	Diesel	*m*	2,076	58,042	114,254
Termopacífico	Diesel	*m*	4,899	19,786	49,807
TG_Coronel	Natural Gas	*m*	3,075	29,037	9,514
TG_Coronel Diesel	Diesel	*m*	23,418	63,493	105,399
Tierra Amarilla	Diesel	*m*	23,655	2,181	762
Totoral	Diesel	*m*	2,418	429	2,266
Totoral (eólica)	wind	*k*	4,018	84,686	77,491
Traigen	Diesel	*m*	4,020	1,115	3,196
Trapén	Diesel	*m*	47,835	42,690	170,041
Trueno	run off river (hydro)	*k*	0	19,652	25,975
Truful Truful	run off river (hydro)	*k*	0	36	1,736
Valdivia	biomass	*k*	258,665	225,050	100,763
Ventanas 1	coal	*m*	883,371	914,403	907,267
Ventanas 2	coal	*m*	1,667,410	1,157,329	1,431,906
Volcan	run off river (hydro)	*k*	102,729	107,659	87,663
Watts	Diesel	*m*	0.10	0.00	306

Table 20. Power Plants "m", Fuel type, Yearly Fuel Consumption and Efficiency

Power Plant	Fuel type	Fuel Consumption			Efficiency
m	i	$FC_{i,m,2009}$	$FC_{i,m,2010}$	$FC_{i,m,2011}$	(for option A2)
		[kg; m^3 (gas)]	[kg; m^3 (gas)]	[kg; m^3 (gas)]	[%]
Calle-Calle	Diesel	0	0	3,171,418	
Cem Bio Bio DIESEL	Diesel	0	0		39.5%
Energía Pacífico	Diesel	0	0		39.5%
HBS	Diesel	0	0		39.5%
Multiexport I	Diesel	0	0		39.5%
Santa María	Coal	0	0	33,789,043	
Tirúa	Diesel	0	0		39.5%
Tomaval	Diesel	0	0		39.5%
Polincay	Diesel	0	0		39.5%
Punta Colorada Diesel	Diesel	0	0		39.5%
Lonquimay	Diesel	0	0		39.5%
Ancud	Diesel	140,021	201,901		39.5%
Antilhue TG	Diesel	28,780,000	18,530,000	47,862,232	
Biomar	Diesel	0			39.5%
Bocamina	coal	370,080,000	81,990,000	352,857,740	
Campanario	Natural Gas	0			60.0%
Campanario Diesel	Diesel	30,550,000	6,450,000		39.5%
Candelaria 1	Natural Gas	6,838,993	14,283,965	46,277,196	
Candelaria 1 Diesel	Diesel	19,370,684	13,688,516	14,528,563	60.0%
Candelaria 2	Natural Gas	2,371,007	14,706,035	57,946,154	
Candelaria 2 Diesel	Diesel	8,429,316	13,121,484	21,182,912	60.0%
Cañete	Diesel	650,000	190,000		39.5%
Casablanca 1	Diesel	320,000	49,930		39.5%
Casablanca 2	Diesel	0	70		39.5%
Cem Bio Bio IFO	IFO 180	0		12,526,215	39.5%
Cenizas	Diesel	1,720,000	980,000	9,787,328	
Chiloé	Diesel	210,000	296	1,386,961	
Chuyaca	Diesel	590,000	1,390,000	4,190,272	39.5%
Colihues DIE	Diesel	0	31,137	0	
Colihues IFO	IFO 180	0			39.5%
Collipulli	Diesel	490,000			39.5%
Colmito	Diesel	1,550,530	330,205	2,037,039	39.5%
Concon	Diesel	460,000	180,000	305,855	
Constitución 1	Diesel	220,000	430,000	1,588,901	
Curacautin	Diesel	660,000	360,000		39.5%

Power Plant	Fuel type	Fuel Consumption			Efficiency
m	i	$FC_{i,m,2009}$	$FC_{i,m,2010}$	$FC_{i,m,2011}$	(for option A2)
		[kg; m^3 (gas)]	[kg; m^3 (gas)]	[kg; m^3 (gas)]	[%]
Curanilahue	Natural Gas	0		0	39.5%
Curauma	Diesel	470,000	160,000		39.5%
Curicó	coal	0			39.0%
D. Almagro	Diesel	10,430,000	190,000	227,475	
Degan	Diesel	8,960,000	8,740,000	17,691,762	
Eagon	Diesel				39.5%
El Peñón	Diesel	2,280,000	12,250,000		39.5%
El Salvador	Diesel	0	100,000	70,433	
Emelda	IFO 180	0			39.5%
Esperanza 1	Diesel	343,634	238,556	677,909	
Esperanza 2	Diesel	204,179	187,958	202,542	
Esperanza TG	Diesel	2,188	3,485	535,734	
Guacolda 1	coal	626,520,000	438,910,000	422,509,320	
Guacolda 2	coal	595,200,000	423,280,000	361,140,480	
Guacolda 3	coal	307,760,000	437,800,000	451,321,500	
Guacolda 4	coal	0	326,270,000	430,015,670	
Horcones Diesel	Diesel	770,000	3,270,000	4,135,105	
Horcones TG	Natural Gas	0	120,000		39.5%
Huasco TG	Diesel	236,472	537,643		39.5%
Huasco TG IFO	IFO 180	9,933,528	82,357	74,820	
L.Verde	coal	14,420,000	133,480	180,456	
L.Verde TG	Diesel	4,970,000	1,030,000	385,176	
Las Vegas	Diesel	370,000	140,000	406,696	
Lebu	Diesel	390,000	10,000	0	39.5%
Linares Norte	Diesel	30,000	30,000	104,785	
Los Espinos	Diesel	6,025,134	3,030,000	23,820,065	39.5%
Los Pinos	Diesel	22,570,000	36,780,000	50,577,298	39.5%
Los Sauces	Diesel	870,000	240,000		39.5%
Los Vientos TG	Diesel	41,500,000	14,010,000	12,072,768	
Louisiana Pacific	Diesel				39.5%
Maule	Diesel	90,000	120,000	874,003	
Monte Patria	Diesel	1,840,000	40,000		39.5%
Multiexport II	Diesel		0		39.5%
Nehuenco	Natural Gas	22,600,000	39,750,000	145,561,527	39.5%
Nehuenco Diesel	Diesel	152,900,000	111,170,000	127,100,971	
Nehuenco II	Natural Gas	2,340,000	139,760,000	240,239,671	39.5%
Nehuenco II Diesel	Diesel	246,420,000	252,940,000	80,591,815	

Power Plant	Fuel type	Fuel Consumption			Efficiency
m	i	$FC_{i,m,2009}$	$FC_{i,m,2010}$	$FC_{i,m,2011}$	(for option A2)
		[kg; m^3 (gas)]	[kg; m^3 (gas)]	[kg; m^3 (gas)]	[%]
Nehuenco TG 9B	Natural Gas	8,350,000	1,580,000		39.5%
Nehuenco TG 9B Diesel	Diesel	5,310,000	180,000	4,395	
Newen Diesel	Diesel	20,000		0	39.5%
Newen Natural Gas	Natural Gas				39.5%
Newen LPG	LPG				39.5%
Nueva Aldea 2	Diesel	0	0	0	
Nueva Renca	Natural Gas	4,521,295	116,180,000	380,648,274	39.5%
Nueva Renca Diesel	Diesel	211,940,000	227,200,000	48,206,268	
Nueva Ventanas	coal	40,770,000	745,350,000	770,221,620	
Olivos	Diesel	11,830,000	910,000	6,648,008	
Petropower	Fuel Oil		26,680,000		37.5%
Placilla	Diesel	660,000	230,000	229,505	
Punitaqui	Diesel	2,230,000	90,000		39.5%
Punta Colorada	Fuel Oil	0		14,783,246	39.5%
Quellon	Diesel	310,000			39.5%
Quellon II	Diesel	3,440,000	3,230,000	5,225,242	
Quidico	Diesel	0		0	39.5%
Quintay	Diesel	660,000	210,000	725,384	
Quintero	Diesel	770,000	4,050,000	11,241,626	
Quintero GNL	Natural Gas	4,950,000	67,840,000	34,575,750	39.5%
Renca	Diesel	123,370	790,000	10,156,125	
Salmofood II	Diesel				39.5%
San Fco. Mostazal	Diesel	740,000	280,000		39.5%
San Gregorio	Diesel	13,593	60,000	140,589	
San Isidro	Natural Gas	81,730,000	6,350,000		39.5%
San Isidro GNL	Natural Gas	137,490,000	437,270,000	507,922,037	
San Isidro Diesel	Diesel	102,170,000	7,870,000		39.5%
San Isidro II	Natural Gas		3,110,000	0	39.5%
San Isidro II GNL	Natural Gas	82,030,000	522,330,000	559,997,376	
San Isidro II Diesel	Diesel	244,520,000	14,840,000	1,367,650	
San Lorenzo de D. de Almagro	Diesel	360,000	180,000	140,972	
Santa Lidia	Diesel	2,850,000	12,860,000	38,864,805	39.5%
Skretting	Diesel				39.5%
Taltal 1	Natural Gas	37,860,000	5,840,000	16,298	

Power Plant	Fuel type	Fuel Consumption			Efficiency
m	i	$FC_{i,m,2009}$	$FC_{i,m,2010}$	$FC_{i,m,2011}$	(for option A2)
		[kg; m^3 (gas)]	[kg; m^3 (gas)]	[kg; m^3 (gas)]	[%]
Taltal 1 Diesel	Diesel	32,607,123	8,862,991	9,605,264	
Taltal 1 GNL	Natural Gas	0	500,000	22,541,460	
Taltal 2	Natural Gas	40,040,000	11,060,000	159,545	39.5%
Taltal 2 GNL	Natural Gas	0	10,000	5,109,804	
Taltal 2 Diesel	Diesel	23,002,877	14,147,009	7,278,370	
Tapihue	Natural Gas				39.5%
Teno	Diesel	500,000	12,827,304	25,021,604	
Termopacífico	Diesel	1,102,217	4,451,949	11,206,643	
TG_Coronel	Natural Gas	340,000	3,210,000		39.5%
TG_Coronel Diesel	Diesel	6,130,000	16,600,000	23,714,753	
Tierra Amarilla	Diesel	7,640,000	740,000	182,116	
Totoral	Diesel	530,000	90,000	529,140	
Traigen	Diesel	840,000	230,000		39.5%
Trapén	Diesel	10,280,000	8,920,000	37,238,870	
Ventanas 1	coal	331,140,000	346,790,000	376,515,805	
Ventanas 2	coal	635,740,000	450,450,000	568,466,682	
Watts	Diesel		0		39.5%

Table 21. Build Margin Calculation Data

Power Plant Date of Build	Power Plant	Fuel type	Energy Generated	Emission Factor	Emissions
	-	i	$EG_{m,2011}$	$EF_{CO2,m}$	$EG_{m,2010} * EF_{CO2,m}$
	-	-	[MWh]	[tCO_2/MWh]	[tCO_2]
2011	Diuto	run off river (hydro)	5,025	0.000	0.0
2011	Mallarauco	run off river (hydro)	12,236	0.000	0.0
2011	Licán	run off river (hydro)	41,660	0.000	0.0
2011	Loma Los Colorados II	Biomass	17,545	0.000	0.0
2011	Chacayes	run off river (hydro)	93,099	0.000	0.0
2011	Muchi	run off river (hydro)	477	0.000	0.0
2011	La Arena	run off river (hydro)	1,605	0.000	0.0
2011	Calle-Calle	Diesel	17,084	0.584	9,982.1
2011	Polincay	Diesel	9	0.662	6.0
2011	Lautaro	Biomass	378	0.000	0.0
2011	HBS	Diesel	28	0.662	18.3
2011	Tomaval	Diesel	2,899	0.662	1,917.9
2011	Lonquimay	Diesel	11	0.662	7.2

Power Plant Date of Build	Power Plant	Fuel type	Energy Generated	Emission Factor	Emissions
	-	i	$EG_{m,2011}$	$EF_{CO2,m}$	$EG_{m,2010} * EF_{CO2,m}$
	-	-	[MWh]	[tCO_2/MWh]	[tCO_2]
2011	Tirúa	Diesel	6	0.662	4.2
2011	Lautaro-Comasa	Biomass	52,775	0.000	0.0
2010	Multiexport I	Diesel	121	0.662	79.7
2010	Dongo	run off river (hydro)	13,316	0.000	0.0
2010	Punta Colorada Diesel	Diesel	2,528	0.662	1,672.9
2010	Carena	run off river (hydro)	50,552	0.000	0.0
2010	Energía Pacífico	Diesel	34,105	0.662	22,566.3
2010	Punta Colorada Eólica	Wind	3,940	0.000	0.0
2010	Cem Bio Bio Diesel	Diesel	465	0.662	307.5
2010	Santa María	Coal	95,992	0.877	84,198.2
2010	Cabrero	biomass	46,780	0.000	0.0
2010	Cem Bio Bio IFO	IFO 180	57,460	0.687	39,496.8
2010	Nueva Ventanas	coal	2,026,899	0.947	1,919,298.8
2010	Colihues DIE	Diesel	0	0.000	0.0
2010	Colihues IFO	IFO 180	50,537	0.688	34,774.3
2010	El Salvador	Diesel	209	1.061	221.7
2010	El Tártaro	run off river (hydro)	497	0.000	0.0
2010	Emelda	IFO 180	1,227	0.688	844.6
2010	Guacolda 4	coal	1,228,616	0.872	1,071,546.9
2010	Juncalito	run off river (hydro)	2,625	0.000	0.0
2010	Los Corrales	run off river (hydro)	2,838	0.000	0.0
2010	Mariposas	run off river (hydro)	29,744	0.000	0.0
2010	Punta Colorada	Fuel Oil	67,503	0.691	46,613.5
2010	Quidico	Diesel	0	0.000	0.0
2009	Biomar	Diesel	1	0.662	0.4
2009	Curicó	coal	1,235	0.826	1,020.2
2009	Canela 2	wind	107,823	0.000	0.0
2009	Canela	wind	0	0.000	0.0
2009	Eagon	Diesel	720	0.662	476.3
2009	El Peñón	Diesel	168,505	0.662	111,494.9
2009	Guacolda 3	coal	1,289,490	0.872	1,124,638.4
2009	Linares Norte	Diesel	474	0.695	329.8
2009	Los Espinos	Diesel	107,783	0.696	74,974.2
2009	Louisiana Pacific	Diesel	780	0.662	516.1
2009	Multiexport II	Diesel	213	0.662	140.9
2009	Newen Diesel	Diesel	0	0.000	0.0
2009	Newen Natural	Natural Gas	35,098	0.495	17,369.6

Power Plant Date of Build	Power Plant	Fuel type	Energy Generated	Emission Factor	Emissions
	-	i	$EG_{m,2011}$	$EF_{CO2,m}$	$EG_{m,2010} * EF_{CO2,m}$
	-	-	[MWh]	[tCO_2/MWh]	[tCO_2]
	Gas				
2009	Newen LPG	LPG	11,915	0.561	6,689.5
2009	Pehui	run off river (hydro)	6,541	0.000	0.0
2009	Quintero	Diesel	46,453	0.762	35,383.3
2009	Quintero GNL	Natural Gas	174,625	0.378	66,083.0
2009	Salmofood II	Diesel	5	0.662	3.5
2009	San Gregorio	Diesel	636	0.695	442.5
2009	San Lorenzo de D. de Almagro	Diesel	412	1.076	443.7
2009	Tapihue	Natural Gas	2,027	0.495	1,003.2
2009	Teno	Diesel	114,254	0.689	78,756.1
2009	Termopacífico	Diesel	49,807	0.708	35,273.2
2009	Tierra Amarilla	Diesel	762	0.752	573.2
2009	Trapén	Diesel	170,041	0.689	117,210.2
2009	Truful Truful	run off river (hydro)	1,736	0.000	0.0
2009	Watts	Diesel	306	0.662	202.5
2009	Los Pinos	Diesel	265,247	0.600	159,193.2
2009	Cenizas	Diesel	42,554	0.724	30,805.8
2009	Santa Lidia	Diesel	147,215	0.831	122,327.9
2008	Chiloé	Diesel	4,918	0.888	4,365.5
2008	Chuyaca	Diesel	18,875	0.699	13,189.0
2008	Colmito	Diesel	6,836	0.938	6,411.6
2008	Coya	run off river (hydro)	69,363	0.000	0.0
2008	Curanilahue	Natural Gas	0	0.000	0.0
2008	Olivos	Diesel	29,547	0.708	20,924.8
2008	Placilla	Diesel	983	0.735	722.4
2008	Quellon II	Diesel	21,955	0.749	16,446.6
2008	Quintay	Diesel	3,106	0.735	2,283.2
2008	Skretting	Diesel	44	0.662	29.4
2008	Totoral	Diesel	2,266	0.735	1,665.5
28-nov-2007	Palmucho	run off river (hydro)	224,097	0.000	0.0
22-ago-2007	Esperanza TG	Diesel	2,246	0.751	1,686.2
19-jul-2007	Chiburgo	run off river (hydro)	67,390	0.000	0.0
12-jul-2007	Monte Patria	Diesel	114	0.662	75.5
6-jul-2007	Punitaqui	Diesel	341	0.662	225.7
4-jul-2007	Degan	Diesel	80,784	0.689	55,685.2
29-jun-2007	Esperanza 1	Diesel	1,881	1.134	2,133.7
27-jun-2007	Esperanza 2	Diesel	815	0.783	637.5
7-jun-2007	Maule	Diesel	3,099	0.888	2,750.9
6-jun-2007	Constitución 1	Diesel	5,634	0.888	5,001.1
1-may-2007	Collipulli	Diesel	1,446	0.662	957.0
1-may-2007	Curacautin	Diesel	2,508	0.662	1,659.2
1-may-2007	Traigen	Diesel	3,196	0.662	2,114.6
1-may-2007	Lebu	Diesel	0	0.000	0.0
1-may-2007	Los Sauces	Diesel	6,055	0.662	4,006.4
1-may-2007	Cañete	Diesel	3,747	0.662	2,478.9

Power Plant Date of Build	Power Plant	Fuel type	Energy Generated	Emission Factor	Emissions
	-	i	$EG_{m,2011}$	$EF_{CO2,m}$	$EG_{m,2010}$ * $EF_{CO2,m}$
	-	-	[MWh]	[tCO_2/MWh]	[tCO_2]
23-apr-2007	Concon	Diesel	1,282	0.751	962.7
23-apr-2007	San Isidro II	Natural Gas	0	0.000	0.0
23-apr-2007	San Isidro II Diesel	Diesel	8,045	0.535	4,304.7
23-apr-2007	San Isidro GNL	Natural Gas	2,502,079	0.388	970,767.0
Total			**9,780,099**	**-**	**6,340,393**

Fossil Fuel Data

Table 22. Fossil Fuel Data

Fuel type	CO_2 Emission Factor	Gross calorific Value	GCV to NCV	Net Calorific Value
i	$EF_{CO2,i,y}$	$GCV_{i,y}$	conversion factor	$NCV_{i,y}$
	[tCO_2/GJ]	[Kcal/Kg; Kcal/m^3 (gas)]	according to IPCC guidelines	[GJ/kg; GJ/m^3 (gas)]
Coal	0.0895	7,000	0.95	0.027842
Diesel	0.0726	10,900	0.95	0.043354
Natural Gas	0.0543	9,341	0.90	0.035198
IFO 180	0.0755	10,500	0.95	0.041763
Residual Fuel Oil and Fuel Oil Nº6	0.0755	10,500	0.95	0.041763
LPG	0.0616	12,100	0.95	0.048127

Appendix 5: Further background information on the monitoring plan

All the information related to the monitoring plan is presented in the PoA-DD

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History of the document

Version	Date	Nature of revision(s)
02.0	EB 66 13 March 2012	Revision required to ensure consistency with the "Guidelines for completing the programme design document form for CDM programmes of activities" (EB 66, Annex 12).
01	EB33, Annex 41 27 July 2007	Initial adoption.
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