Programme design document form for CDM programmes of activities (Version 03.0)

PART I. Programme of activities (PoA)

SECTION A. General description of PoA

A.1. Title of the PoA

"Run of River Hydro Power Plants in Chile"
Version 6
12/02/2014

A.2. Purpose and general description of the PoA

Policy/measure or stated goal that the PoA seeks to promote:
The "Run of River Hydro Power Plants in Chile" PoA aims to support the development of renewable energy projects, specifically new grid connected run of river power plants, by simplifying CMD access to those project that are economically or financially unattractive or that faces barriers for its implementation.

Framework for the implementation of the proposed PoA :
In the last 10 years the construction of thermoelectric power plants in the Central Interconnected System (Sistema Interconectado Central, SIC) has largely passed the construction of hydro power plants: 3,819.9MW v/s 971.6MW. The difference is even higher if hydro power plants with an installed capacity lower than 20MW (limit for Non Conventional Renewable Energy in Chile[1]) are considered: they only reach 98.3MW constructed in the period[2].

The reliance in fossil fuel power plants creates a strong dependence on imported fossil fuels. The governments have impulse regulatory modifications intended to diversify the electricity matrix, diversify the companies participating in the electricity system and promote the use of renewable energy sources. Despite that the capacity addition in the SIC is yet dominated by thermoelectric power plants.

Table 1: Capacity additions in the SIC (MW)

TYPE	2005-2006	2007-2008	2009-2010
Thermoelectric	449.8	1,076.4	1,642.4
Hydro (>20MW)	0	157.8	0
Hydro (<20MW)	0	52.4	45.9
Wind	0	18.2	147.6

Source: elaborated based on "Estadísticas de Operación 2001-2010" CDEC-SIC, page 30-32, available at https://www.cdec-sic.cl/datos/anuario2011.pdf

[1] Ley General de Servicios Eléctricos (Electricity Services General Law), Article Artículo 225°, subparagraph (aa), available at http://www.leychile.cl/Navegar?idNorma=258171

[2] Statistics based on the information provided in "Estadísticas de Operación 2001-2010" CDEC-SIC, page 30-32, available at https://www.cdec-sic.cl/datos/anuario2011.pdf

Confirmation that the PoA is a voluntary action by the CME:

The Run of River Hydro Power Plants in Chile" PoA is a voluntary action. It will be coordinated by Besalco Cosnturcciones S.A. who will be the coordinating/managing entity (herein after CME).

In Chile there are no mandatory laws or regulations that require hydro power plants to be included as CDM projects. In Chile any private company can choose to develop an electricity generation project, and they can choose which technologies apply as long as they comply with environmental regulations and construction/operation permits.

In Chile there are no mandatory laws or regulations that require Besalco Construcciones S.A., as CME of the proposed PoA, to develop a PoA for hydropower plants or any other CDM project in the host country. Although there are three laws in Chile with the objective to foster the implementation of Non-Conventional Renewable Energy (NCRE) projects, neither of them constitutes an obligation to the CME to implement the measures included in the PoA. Nor do these laws constitute any obligation to the implementing entities of any of the CPAs under the PoA.

Description of how the proposed PoA contributes to sustainable development

By promoting the development of new grid connected run of river power plants, the proposed PoA will contribute to:

- Reducing the effects of the combustion of fossil fuels, both local and global;
- Helping to satisfy the increasing demand of electricity in Chile by using clean and renewable local resources, reducing the reliance of imported fossil fuels.
- Increasing commercial activity through clean and renewable source of power.
- Helping Chile improve its hydrocarbon trade balance through reduction of oil derivates consumption to be used for electricity generation;

A.3. CMEs and participants of PoA

CME of the proposed PoA, as the entity which communicates with the Board:

The coordinating/managing entity (CME) of the PoA is BESALCO CONSTRUCCIONES S.A.

Project participants to the PoA:

The project participant being registered in relation to the PoA is BESALCO CONSTRUCCIONES S.A.

A.4. Party(ies)

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 (host)	BESALCO CONSTRUCCIONES S.A.	NO

A.5. Physical/ Geographical boundary of the PoA

The geographical boundary of the PoA is the area covered by the Interconnected Central System (Sistema Interconectado Central, SIC), which corresponds to the following regions: Región de Antofagasta, Región de Atacama, Región de Coquimbo, Región de Valparaíso, Región Metropolitana, Región del Libertador General Bernardo O'Higgins, Región del Maule, Región del Bio Bio, Región de la Araucanía, Región de Los Ríos, Región de Los Lagos. This can be observed in the following figure:

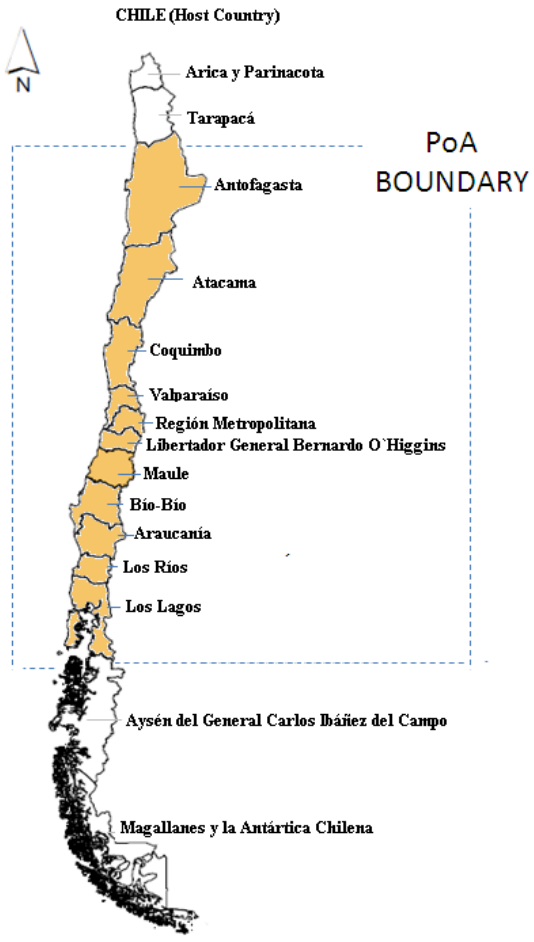

Figure 1: PoA Boundary

A.6. Technologies/measures

Every CPA will comprises one or more greenfield run of river hydro power plant connected to the Central Interconnected System (Sistema Interconectado Central, SIC).

CPA may also consist of hydropower projects associated to existing dams if they operates as run of river power plants (the power plant operator does not control the dam outflow), which must be demonstrated by complying with the eligibility criteria stated in Section B.2 (Part I).

A.7 Public funding of PoA

There will be no public funding.

SECTION B. Demonstration of additionality and development of eligibility criteria

B.1. Demonstration of additionality for PoA

The Standard "Demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programmes of activities" (Version 02.1, Paragraph 7) states that:

"Additionality shall be demonstrated by establishing that in the absence of CDM, none of the implemented CPAs would occur".

For the present PoA the additionality will be demonstrated at the CPA level. This is reflected on the criteria for inclusion of a CPA in the PoA stated on Section B.2 (Part I). As the PoA can include large-scale CPAs, the eligibility criteria are based on the requirements of the additionality for large-scale projects (as detailed in section B.5, Part 2).

B.2. Eligibility criteria for inclusion of a CPA in the PoA

To be included in the PoA, a CPA must comply with the following conditions:

1. Be a greenfield hydro-power plant of one of the following types:
    a. Run of river power plant without reservoir
    b. Run of river power plant with single or multiple reservoir
    c. Power plant associated to an existing dam, which is operated in the same way than a run of river power plant (the regulation of the dam outflow does not depend on the project operator).
2. Not involve switching from fossil fuels to renewable energy sources at the site of the project activity.
3. In the case of greenfield run of river power plants the project must: i) not have a storage reservoir; or ii) have daily limited pondage.
4. In the case of greenfield power plants associated to existing dams the project is eligible if despite the existence of a dam the power plant is operated as a run of river power plant because the project developer is not able of regulate the flows for electricity generation. This can be confirmed by the compliance of the following: (i) the main purpose of the reservoir is other than electricity generation (for example constructed to provide water to farmers for irrigating purposes), (ii) the volume of the existing reservoir is not changed as a

consequence of the project activity, and (iii) the regulation of water flow is not defined only by the power plant requirements.

5. Have a power density greater than 4 W/m^2, if the power plant results in the creation of a new run of river reservoir (pondage). If multiple run of river reservoirs (pondage) are created, power density should be greater than 4 W/m^2 for each of them.
6. In the case of power plants using multiple reservoirs where the power density of any of the reservoirs is lower than 4 W/m^2: multiple reservoirs and hydro power plants located at the same river and where are designed together to function as an integrated project that collectively constitute the generation capacity of the combined power plant. This requirement can be demonstrated, for example: (i) by the fact that water flow from upstream power units spilling directly to the downstream reservoir; or (ii) through the analysis of the water balance.
7. In the case of power plants using multiple reservoirs where the power density of any of the reservoirs is lower than 4 W/m^2: Water flow between multiple reservoirs is not used by any other hydropower unit which is not a part of the project activity.
8. In the case of power plants using multiple reservoirs where the power density of any of the reservoirs is lower than 4 W/m^2: Total installed capacity of the power units, which are driven using water from the reservoirs with power density lower than 4 W/m^2, is lower than 15 MW.
9. In the case of power plants using multiple reservoirs where the power density of any of the reservoirs is lower than 4 W/m^2: Total installed capacity of the power units, which are driven using water from reservoirs with power density lower than 4 W/m^2, is less than 10% of the total installed capacity of the project activity from multiple reservoirs.
10. Be located inside the Geographical Boundary of the PoA, as defined in section A.5, Part I (Región de Antofagasta, Región de Atacama, Región de Coquimbo, Región de Valparaíso, Región Metropolitana, Región del Libertador General Bernardo O'Higgins, Región del Maule, Región del Bio Bio, Región de la Araucanía, Región de Los Ríos, Región de Los Lagos).
11. In order to avoid double counting the CPA can not: (i) have been registered as a CDM project activity, or (ii) be included as a CPA under present PoA or another registered PoA. This must be confirmed as described in section C (Part I).
12. Confirm with a writing statement that the CPA will not:
    a. Be registered as a CDM project activity
    b. Be included as a CPA under another PoA.
13. Be connected to the Central Interconnected System (SIC)
14. Have a project starting date after 22/01/2012 (date on which the PoA-DD was uploaded for Global Stakeholder Consultation). The "staring date" of the Project Activity means the earliest date at which either the implementation or construction or real action of a Project Activity begins. The starting date of the project will be the earliest among:
    - Legally binding contract between the Project Entity and a third party with a commitment by the Project Entity to expenditures[3] related to the implementation or construction of the Project Activity; or
    - Purchase order(s) for the electromechanical equipment; or
    - Any other significant purchase order, contract or payment evidence related to the construction of the Project Activity;

[3] Expenditures related to minor pre-project expenses, e.g. the contracting of services /payment of fees for feasibility studies or preliminary surveys, are not applicable in the context of this Eligibility Criterion as they do not necessarily indicate the commencement of implementation of the Project Activity

If none of these real actions have occurred at the time of the CPA inclusion, the project developer must provide a writing statement confirming it.

15. Demonstrate the compliance with the additionality requirements stated on section B.5 (Part II) of the present PoA-DD.
16. Have conducted a stakeholder consultation process as described in section F (Part I) of the PoA-DD.
17. Have an installed capacity lower than 20 MW.
18. Have conducted an Environmental Impact Statement ("Declaración de Impacto Ambiental", DIA) or through an Environmental Impact Assessment ("Estudio de Impacto Ambiental", EIA), based on the requirement of the Law 19,300 (see section E, Part I, of the PoA-DD).
19. The CPA implementer must provide a statement confirming that funding from Annex I parties, if any, do not result in a diversion of official development assistance.

B.3. Application of methodologies

All the CPAs to be included in the proposed PoA correspond to hydropower plants, not including other technology/measures related with emission reductions.

The methodology ACM0002 "Grid-connected electricity generation from renewable sources" (Version 14.0.0) will be applied.

As required by the methodology all parameters will be measured and then there are no sampling provisions.

SECTION C. Management system

The CME will implement operational and management arrangements for the implementation of the PoA, including:

(i) a record keeping system for each CPA under the PoA,

The CME will maintain a database (electronic) with the following information for each CPA:

a. Name of the CPA and CDM ID number
b. Implementing entity of the CPA
c. Location of the project: Region, Province, Commune.
d. Specific Location of the power plant (coordinates of the power house)
e. Commissioning date
f. Description of the connection to the grid
g. Location of electricity meter (s).
h. Verification status for each monitoring period
i. Environmental Approval status and reference to the relevant documentation, if applicable (see Section E, Part I)

(ii) a system/procedure to avoid double accounting e.g. to avoid the case of including a new CPA that has been already registered either as CDM project activity or as a CPA of another PoA,

In order to avoid the inclusion in the PoA of a CPA that has been already registered (either as CDM Project activity or as a CPA of another PoA) the geographic reference stated in Section A.7.of the specific CPA-DD will be used. This is appropriate because the PoA only includes stationary activities.

For this purpose prior to the inclusion of a new CPA the CME will check the UNFCCC database to identify CDM project activities located in the same Chilean Region (defined in Section A.7.of the new CPA-DD). The CME will specifically identify the registered (or under validation) run of river CDM project activities and the run of river CPAs already included into another PoA; if projects are identified, the CME will compare the specific locations and technical characteristics of the specific CPA and the identified projects. If the new CPA corresponds to another CDM project activity or a CPA included into another PoA, the CME will not proceed with its inclusion in the PoA.

(iii) the provisions to ensure that those operating the CPA are aware and have agreed that their activity is being subscribed to the PoA;

For the inclusion of a CPA under the PoA, the CPA Operator shall provide a notarized letter of consent, stating that:

1) They are aware and have agreed that their activity is being subscribed to the PoA “Run of River Hydro Power Plants in Chile”.
2) The CPA will not be registered as a single CDM project activity nor as a CPA under another PoA.

(iv) a system to determine the status of verification at anytime for each CPA

Monitoring will be carried out individually for each CPA added to the proposed PoA (stated in Section B.7.). The monitoring reports will be prepared and submitted to the DOE for verification by the CME. The CPAs included in a monitoring report may have different or identical verification periods. To avoid double accounting the CME will have a control spreadsheet to register for each CPA the verification period covered by every monitoring report. The spreadsheet will be similar to the following table:

Table 2: Example of the possible structure for the control spreadsheet

CPA	CDM ID	CDM Ref.	Monitoring Report Nº: Date:	Monitoring Report Nº: Date:
Name	number	number	Monitored period	Monitored period
Name	number	number	Monitored period	Monitored period
Name	number	number	Monitored period	Monitored period
Name	number	number	Monitored period	Monitored period
Name	number	number	Monitored period	Monitored period

SECTION D. Duration of PoA

D.1. Start date of PoA

22/01/2012 (date of uploading in the UNFCCC website for Global Stakeholder Consultation)

D.2. Duration of the PoA

28 years.

SECTION E. Environmental impacts

E.1. Level at which environmental analysis is undertaken

The Environmental Analysis will be done at CPA level.

E.2. Analysis of the environmental impacts

Not applicable at PoA level, as the environmental analysis will be done at CPA level.

E.3. Environmental impact assessment

In Chile, the assessment of the environmental impacts and the environmental approval of a specific project are regulated by the Law N° 19,300[4] and the Supreme Decree No 95 (S.D. No 95)[5]. Article 10 of Law 19,300 and Article 3 of the S.D. No 95 list the types of projects that require formally analyze their environmental impacts; the categories that might be applicable for a typical CPA are the following:

Letter (a). Aqueducts, reservoirs, dams and siphons listed in article 294 of the Water Code[6].
Letter (b). High voltage transmission lines (over 23 kV) and their substations.
Letter (c). Power plants with an installed capacity higher than 3MW.

If a CPA does not include the works or activities stated in letters (a), (b) or (c) it will not require a formal environmental impact assessment.

If a CPA includes the works or activities stated in letters (a), (b) or (c) above it must assess its environmental impacts by going through the SEIA ("Sistema de Evaluación de Impacto Ambiental", the Chilean environmental impact assessment system). According to the Law Nº 19,300 the assessment might be done through an Environmental Impact Statement ("Declaración de Impacto Ambiental", DIA) or through an Environmental Impact Assessment ("Estudio de Impacto Ambiental", EIA), based on the effects, characteristics and circumstances of the project as described in Article 11 of Law 19,300 and Articles 4 to 11 of the S.D. No 95.

[4] "Ley de Bases Generales del Medio Ambiente" (Environmental General Basis Law). The current version of law 19,300, which includes the modifications introduced by Law Nº 20,417, available at: http://www.leychile.cl/Consulta/Exportar?radioExportar=Normas&exportar_formato=pdf&nombrearchivo=LEY-19300_09-MAR-1994&exportar_con_notas_bcn=True&exportar_con_notas_originales=True&exportar_con_notas_al_pie=True&hddResultadoExportar=30667.2010-11-13.0.0%23

[5] "Reglamente del Sistema de Evaluación de Impacto Ambiental (SEIA)" (Environmental Impact Assessment System Regulation). Available at: http://www.leychile.cl/Navegar?idNorma=205385&idVersion=2008-11-29

[6] Availabe at http://www.leychile.cl/Navegar?idNorma=5605

SECTION F. Local stakeholder comments

F.1. Solicitation of comments from local stakeholders

The Local stakeholder consultation will be done at CPA level. As every CPA might present different circumstances and opinions of the relevant communities the local stakeholder comments will be invited separately for each CPA and not at PoA level.

In the case of projects which must analyse its environmental impacts through an Environmental Impact Assessment (EIA), a formal stakeholder consultation needs to be included as part of the assessment process by the environmental authority. This stakeholder consultation is defined in articles 26 to 30 of Law N° 19,300[4] and articles 49 to 53 of the Supreme Decree No 95[4]. The coordination of the process is in charge of the Environmental Authority, who defined specific mechanisms to ensure an informed participation of the community based on the characteristics of the project. The project developer must publish a summary of the project in the Official Gazette and in a local or national newspaper; any person affected by the project can submit comments to the Environmental Authority during the following 60 days. These observations are to be weighted by the Environmental Authority and taken into account in the environmental approval process.

In the case of CPAs which assess its environmental impacts through an Environmental Impact Statement ("Declaración de Impacto Ambiental", DIA) and those which don't need to go through the Environmental Impact Assessmen System (SEIA), the stakeholder consultation process before mentioned is not required. In these cases, the invitation and compilation of comments by local stakeholders will be defined by the CPA implementer, taking into account the CPA's local circumstances. The invitation for comments by local stakeholders shall be made in an open and transparent manner, in a way that facilities comments to be received from local stakeholders.

F.2. Summary of comments received

Not applicable at PoA level.

F.3. Report on consideration of comments received

Not applicable at PoA level.

SECTION G. Approval and authorization

There is no Parties which wishes to be involved in the PoA,.

PART II. Generic component project activity (CPA)

SECTION A. General description of a generic CPA

A.1. Purpose and general description of generic CPAs

The purpose of the PoA is to promote the development of greenfield run of river hydro power plants connected to the Central Interconnected System (Sistema Interconectado Central, SIC).

The PoA involves only one type of CPA: greenfield grid connected run of river power plants. (as stated in the eligibility criteria, power plants associated to existing dams are allowed provided they are operated as run of river power plants, then they correspond to the same type of CPA).

SECTION B. Application of a baseline and monitoring methodology

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

The methodology ACM0002 "Grid-connected electricity generation from renewable sources" (Version 14.0.0) will be applied. This methodology includes the use of the following Tools:

- Tool to calculate the emission factor for an electricity system (Version 03.0).
- Tool for the demonstration and assessment of additionality (Version 7.0.0).

B.2. Application of methodology(ies)

The methodology ACM0002 Version 14.0.0 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).* As per eligibility criteria in section B.2 (Part I), all CPA will be grid-connected (eligibility criteria Nº13) renewable power generation power plants at a site where no renewable power plant was operated prior to the implementation of the project activity (greenfield hydro-power plant, eligibility criteria Nº 1),

The methodology ACM0002 Version 14.0.0 is applicable under the following conditions:

1. *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.*

   All the CPAs to be included in the PoA will be run of river hydro power plants. (Eligibility criteria Nº1 in section B.2, Part I)

2. *In the case of capacity additions, retrofits or replacements (except for wind, solar, wave or tidal power capacity addition projects which use Option 2: on page 11 to calculate the parameter EGPJ,y): 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 expansion 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 because all CPAs to be included in the PoA will be greenfield power plants. (Eligibility criteria Nº1 in section B.2, Part I)

3. *In case of hydro power plants, one of the following conditions must apply:*

   - *The project activity is implemented in an existing single or multiple reservoirs, with no change in the volume of any of 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 of the reservoir, as per definitions given in the Project Emissions section, is greater than 4 W/m^2; 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.*

   If a CPA includes single or multiple pondage the power density will be greater than 4 W/m^2 for each run of river reservoirs. (Eligibility criteria Nº5 in section B.2, Part I)

4. *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 all the following conditions must apply:*

   - *The power density calculated for the entire project activity using equation 5 is greater than 4W/m^2;*
   - *Multiple reservoirs and hydro power plants located at the same river and where are designed together to function as an integrated project1 that collectively constitute the generation capacity of the combined power plant;*
   - *Water flow between multiple reservoirs is not used by any other hydropower unit which is not a part of the project activity;*
   - *Total installed capacity of the power units, which are driven using water from the reservoirs with power density lower than 4 W/m2, is lower than 15MW;*
   - *Total installed capacity of the power units, which are driven using water from reservoirs with power density lower than 4 W/m^2, is less than 10% of the total installed capacity of the project activity from multiple reservoirs.*

   If a CPA includes single or multiple pondage the power density will be greater than 4 W/m^2 for each run of river reservoirs. (Eligibility criteria Nº5 in B.2, Part I). Then this condition is not applicable.

5. *The methodology is not applicable to 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;*

   There will be no fuel switching because all the CPAs to be included in the PoA will be Greenfield power plants (Eligibility criteria Nº1 in section B.2, Part I).

6. *The methodology is not applicable to Biomass fired power plants*

   All CPAs to be included in the PoA will be run of river hydro power plants. (Eligibility criteria Nº1 in section B.2, Part I)

7. *The methodology is not applicable to hydro power plant that result in new single reservoir or in the increase in existing single reservoir where the power density of the power plant is less than 4 W/m^2*

   If a CPA includes single or multiple pondage the power density will be greater than 4 W/m^2 for each reservoir. (Eligibility criteria Nº5 in section B.2, Part I)

B.3. Sources and GHGs

As represented in the following figure the spatial extent of the project 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.

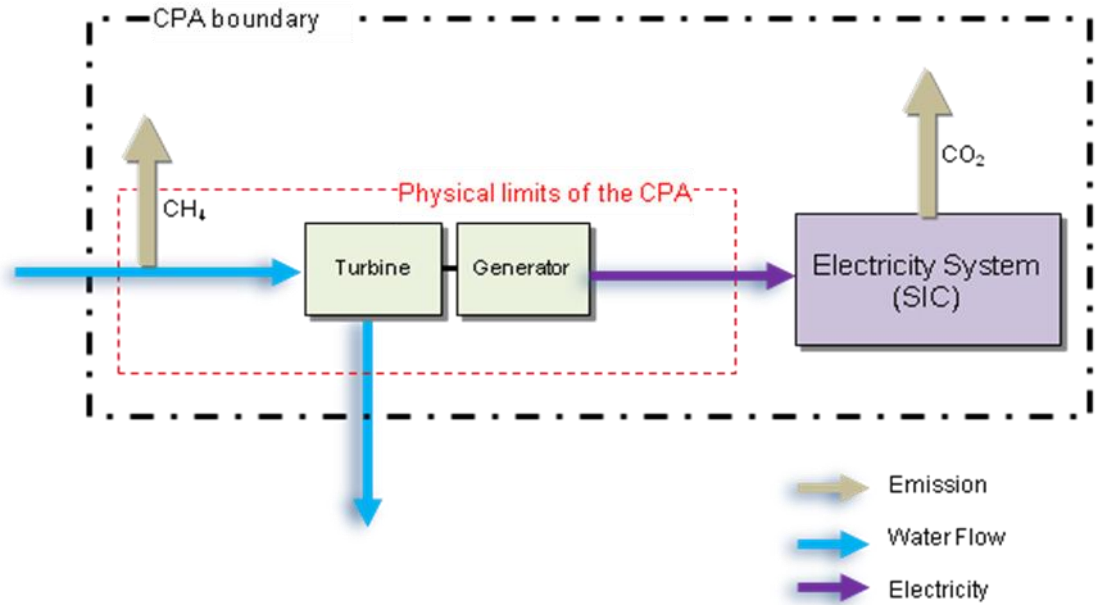

Figure 2: CPAboundary

The following table defines the GHG emission sources included in or excluded from the project boundary:

Source		Gas	Included	Justification/Explanation
Baseline	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 activity	For geothermal power plants, fugitive emissions of CH_4 and CO_2 from non-condensable gases contained in geothermal steam	CO_2	Not applicable	
		CH_4		
		N_2O		

	CO_2 emissions from	CO_2	Not applicable	

	combustion of fossil fuels for electricity generation in solar thermal power plants and geothermal power plants	CH_4		
		N_2O		

	For hydro power plants, emissions of CH_4 from the reservoir	CO_2	No	Minor emission source
		CH_4	Yes	Main emission source
		N_2O	No	Minor emission source
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B.4. Description of baseline scenario

For project activities that comprise the installation of a new grid-connected renewable power plant, the baseline scenario is (ACM0002 version 14.0.0):

> *"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".*

This scenario is applicable for all CPA to be included in the PoA because the PoA only includes greenfield projects. For all CPAs the applicable Grid is the SIC.

B.5. Demonstration of eligibility for a generic CPA

Compliance with the eligibility criteria:

All CPAs to be included in the proposed PoA corresponds to only one type of CPA, which meets the eligibility conditions stated in section B.2 (Part I) as follows:

1. Be a greenfield hydro-power plant of one of the following types:
    a. Run of river power plant without reservoir
    b. Run of river power plant with single or multiple reservoir
    c. Power plant associated to an existing dam.

    All CPA will be a greenfield run of river power plants. Means of verification: technical documentation of the project (such as prefeasibility study) or project description in the environmental assessment process.

2. Not involve switching from fossil fuels to renewable energy sources at the site of the project activity.

    As all the CPA will be greenfield power plants they will not involve switching from fossil fuels. Means of verification: site visit or project site description in the environmental assessment process.

3. In the case of greenfield run of river power plants the project must: i) not have a storage

reservoir; or ii) have daily limited pondage.

All CPAs will be a greenfield run of river power plant with no storage capacity (power plants associated to existing dams are eligible only if they are operated as run of river power plants i.e. the project developer does not control the storage capacity of the existing reservoir). Means of verification: water use conditions stated in the water rights or regulations of the existing dam.

4. In the case of greenfield power plants associated to existing dams the project is eligible if despite the existence of a dam the power plant is operated as a run of river power plant because the project developer is not able of regulate the flows for electricity generation. This can be confirmed by the compliance of the following: (i) the main purpose of the reservoir is other than electricity generation (for example constructed to provide water to farmers for irrigating purposes*),* (ii) the volume of the existing reservoir is not changed as a consequence of the project activity, and (iii) the regulation of water flow is not defined only by the power plant requirements*.*

   In the case of projects related with existing dams, conditions (i), (ii) and (iii) must be demonstrated through documents such as: feasibility study, project description in the environmental assessment process, water use conditions stated in the water rights or regulations of the existing dam.

5. Have a power density greater than 4 W/m^2, if the power plant results in the creation of a new run of river reservoir (pondage). If multiple run of river reservoirs (pondage) are created, power density should be greater than 4 W/m^2 for each of them.

   In the case of projects resulting in new run of river reservoirs this applicability condition must be demonstrated through documents such as: feasibility study or project description in the environmental assessment process.

6. In the case of power plants using multiple reservoirs where the power density of any of the reservoirs is lower than 4 W/m^2: multiple reservoirs and hydro power plants located at the same river and where are designed together to function as an integrated project that collectively constitute the generation capacity of the combined power plant. This requirement can be demonstrated, for example: (i) by the fact that water flow from upstream power units spilling directly to the downstream reservoir; or (ii) through the analysis of the water balance.

   In the case of projects with multiple reservoirs conditions (i) and (ii) must be demonstrated through documents such as: feasibility study, project description in the environmental assessment process.

7. In the case of power plants using multiple reservoirs where the power density of any of the reservoirs is lower than 4 W/m^2: Water flow between multiple reservoirs is not used by any other hydropower unit which is not a part of the project activity.

   In the case of projects with multiple reservoirs this must be demonstrated through documents such as: feasibility study, project description in the environmental assessment process.

8. In the case of power plants using multiple reservoirs where the power density of any of the reservoirs is lower than 4 W/m^2: Total installed capacity of the power units, which are driven using water from the reservoirs with power density lower than 4 W/m^2, is lower than 15 MW.

   In the case of projects with multiple reservoirs this must be demonstrated through

documents such as: feasibility study, project description in the environmental assessment process.

9. In the case of power plants using multiple reservoirs where the power density of any of the reservoirs is lower than 4 W/m^2: Total installed capacity of the power units, which are driven using water from reservoirs with power density lower than 4 W/m^2, is less than 10% of the total installed capacity of the project activity from multiple reservoirs.

   In the case of projects with multiple reservoirs this must be demonstrated through documents such as: feasibility study, project description in the environmental assessment process.

10. Be located inside the Geographical Boundary of the PoA, as defined in section A.5, Part I (Región de Antofagasta, Región de Atacama, Región de Coquimbo, Región de Valparaíso, Región Metropolitana, Región del Libertador General Bernardo O'Higgins, Región del Maule, Región del Bio Bio, Región de la Araucanía, Región de Los Ríos, Región de Los Lagos).

    All CPA will be located in the regions mentioned. Means of verification: technical documentation of the project (such as prefeasibility study) or project description in the environmental assessment process.

11. In order to avoid double counting the CPA can not: (i) have been registered as a CDM project activity, or (ii) be included as a CPA under present PoA or another registered PoA. This must be confirmed as described in section C, Part I.

12. Confirm with a writing statement that the CPA will not:
    a. Be registered as a CDM project activity
    b. Be included as a CPA under another PoA.

    The writing statement will be requested for all CPA to be included in the PoA.

13. Be connected to the Central Interconnected System (SIC)

    All CPA will be connected to the SIC. Means of verification: technical documentation of the project (such as prefeasibility study) or project description in the environmental assessment process.

14. Have a project starting date after 22/01/2012 (date on which the PoA-DD was uploaded for Global Stakeholder Consultation). The "staring date" of the Project Activity means the earliest date at which either the implementation or construction or real action of a Project Activity begins. The starting date of the project will be the earliest among:
    - Legally binding contract between the Project Entity and a third party with a commitment by the Project Entity to expenditures[7] related to the implementation or construction of the Project Activity; or
    - Purchase order(s) for the electromechanical equipment; or
    - Any other significant purchase order, contract or payment evidence related to the construction of the Project Activity;

    If none of these real actions have occurred at the time of the CPA inclusion, the project

[7] Expenditures related to minor pre-project expenses, e.g. the contracting of services /payment of fees for feasibility studies or preliminary surveys, are not applicable in the context of this Eligibility Criterion as they do not necessarily indicate the commencement of implementation of the Project Activity

developer must provide a writing statement confirming it.

15. Demonstrate the compliance with the additionality requirements stated on section B.5 (Part II) of the present PoA-DD.

    All CPAs to be included in the PoA will comply with the requirements of the "Tool for the demonstration and assessment of additionality" as further developed under "Additionality criteria".

16. Have conducted a stakeholder consultation process as described in section F (Part I) of the PoA-DD.

    All CPAs to be included in the PoA will conduct a stakeholder consultation process as further developed in section F (Part I).

17. Have an installed capacity lower than 20 MW.

    All CPA will have a capacity lower than 20MW. Means of verification: technical documentation of the project (such as prefeasibility study) or project description in the environmental assessment process.

18. Have conducted an Environmental Impact Statement ("Declaración de Impacto Ambiental", DIA) or through an Environmental Impact Assessment ("Estudio de Impacto Ambiental", EIA), based on the requirement of the Law 19,300 (see section E, Part I,of the PoA-DD). Means of verification: "project search" at the environmental authority's website (http://www.sea.gob.cl/).

19. The CPA implementer must provide a statement confirming that funding from Annex I parties, if any, do not result in a diversion of official development assistance.

    Means of verification: statement signed by the project developer representatives.

Additionality criteria:

The key criteria and data for assessing additionality of a CPA is defined by the requirements of the "Tool for the demonstration and assessment of additionality" which encompasses the following steps:

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

Not applied (the proposed CPAs to be included in the PoA will not be the first-of-its-kind).

Step 1: Identification of Alternatives to the Project Activity Consistent with Current Laws and Regulations

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

The alternatives to the project activity are:

a) The proposed project activity undertaken without being registered as a CDM project activity;

b) The continuation of the current situation (no project activity: the electricity is generated by the power plants connected to the grid).

c) The construction and operation of other type of renewable energy power plant, such as solar or

wind power plants.

d) The construction and operation of a new fossil fuel power plant, such as diesel, natural gas or coal fired power plants.

Outcome of Step 1a:

a) The proposed project activity undertaken without being registered as a CDM project activity;

b) The continuation of the current situation (no project activity: the electricity is generated by the power plants connected to the grid).

c) The construction and operation of other type of renewable energy power plant, such as solar or wind power plants.

d) The construction and operation of a new fossil fuel power plant, such as diesel, natural gas or coal fired power plants.

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

All alternatives identified in Sub-step 1a are in compliance with Chilean laws and regulations:

a) There is no legal obligation to present the proposed project activity to the CDM.
b) There is no legal obligation for the project participant in order to build or invest in any kind of power plant to supply electricity.
c) In Chile any private entity can construct and operate a renewable power plant if it complies with the environmental and technical regulations.
d) In Chile any private entity can construct and operate a fossil fuel power plant if it complies with the environmental and technical regulations.

Outcome of Step 1b:

The alternatives that are in compliance with Chilean laws and regulations are:

a) The proposed project activity undertaken without being registered as a CDM project activity;

b) The continuation of the current situation (no project activity: the electricity is generated by the power plants connected to the grid).

c) The construction and operation of other type of renewable energy power plant, such as solar or wind power plants.

d) The construction and operation of a new fossil fuel power plant, such as diesel, natural gas or coal fired power plants.

Step 2: Investment Analysis

Sub-step 2a: Determine appropriate analysis method:

The analysis method to be used is a benchmark analysis (Option III). This is suited because the baseline does not require investment, and the choice of the developer is to invest or not to invest:

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

The financial indicator for this analysis will be the project Internal Rate of Return (IRR), which is an indicator commonly used to determine investment decisions. A suitable benchmark value for power generation projects is 10% (before taxes), which is used to determine node prices, transmission line and distribution investment according to DFL 4/2006, Ley General de Servicios Eléctricos (Electricity Services General Law), Article 165, letter (d). If in the future this value is adjusted in the Law or if the benchmark cannot be considered valid due to other reasons, it will be adjusted and validated by a DOE.

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

The calculation of the project IRR of a typical CPA shall be presented in excel format and will be submitted along with the CPA DD. All assumptions of critical parameters have to be substantiated

The table below presents the main parameters to be included the IRR calculation of the project.

Table 3: Parameters for IRR calculation

Parameters	Unit	Source
Electricity generation	MWh/year	Engineering/prefeasibility studies
Total investment	MMUS$	Engineering/prefeasibility studies or budgets
Energy price	US$/MWh	Independent energy price studies
Firm power price	US$/MW (per month)	Statistics or Independent price studies
Firm power	MW	Engineering/prefeasibility studies
Transmission cost	US$ / year	Statistics/ or independent price studies
O&M	US$/year	Values recommended by recognized international agencies.
VAT	%	Chilean tax laws
Operational Life	20 Years	Lifetime used by Chilean authorities for energy price calculations, or specific contractual timeframe
Residual Value	%	Based on linear depreciation

The values to be used must be those valid at the moment of the investment decision. Additional parameters can be included when they better reflect the characteristics and circumstances of a specific CPA.

Once calculated the project IRR it will be compared with the benchmark defined in Sub-step 2b.

The CPA is additional if the project is not financially attractive (the project IRR is lower than the benchmark).

Sub-step 2d: Sensitivity analysis

The sensitivity analysis should include all variables that represent more than 20% of total costs or revenues, including the initial investment. For a typical CPA it is expected that the following 4 parameters needs to be included in the sensitivity analysis (as this might change for some projects it needs to be assessed at CPA level):

- Energy generation
- Energy price
- Investment

- O&M

The typical range of variation for each variable is +/- 10%. If such range is not appropriate for the characteristics and circumstances of a specific CPA, a more suitable range can defined and justified.

Table 4: Sensitivity Analysis

	-10%	0%	10%
Investment			
Energy generation			
Energy price			
O&M			

A CPA will be additional if the project IRR is under the benchmark even for the realistic range of variations in the critical assumptions. In cases where a scenario will result in the CPA passing the benchmark an assessment of the probability of the occurrence of this scenario (taking into consideration correlations between the variables as well as the specific context of the CPA) should be provided in order to confirm that the project activity is unlikely to be economically attractive.

Step 4: Common practice analysis

Sub-step 4a: The proposed CDM project activity(ies) applies measure(s) that are listed in the definitions section above.

As the project activity applies a measure listed in the Definitions section of the Tool (power generation based on renewable energy, corresponding to measure (ii)) the latest version of the "Guidelines on common practice" is applied as follows:

For the purpose of the common practice analysis "different technology" will be considered as follows:

- Energy source: any energy source other than hydro.

- Legal regulations: power plants constructed before 1982, when the Decree with Law Force No 1: Electricity Services General Law was enacted, which privatized the electric sector, changing the conditions for the investment in energy projects.

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

Step 2: identify similar projects (both CDM and non-CDM) which fulfil all of the following conditions:

(a) *The power plant is located in the applicable geographical area*. For applicable geographical area only the regions covered by the SIC will be considered.

(b) *The projects apply the same measure as the proposed project activity.* All CPAs of the present PoA will be renewable energy projects, then all renewable electricity projects connected to the SIC are considered as the same measure.

(c) *The projects use the same energy source/fuel and feedstock as the proposed project activity, if a technology switch measure is implemented by the proposed project activity*. All CPAs of the present PoA will be hydro power projects, the hydro power plants connected to the SIC will be considered for the analysis.

(d) *The plants in which the projects are implemented produce goods or services with comparable quality, properties and applications areas (e.g. clinker) as the proposed project plant*. All the SIC connected hydropower plants complie with this criterion because they deliver goods or services (electricity) with the same quality.

(e) *The capacity or output of the projects is within the applicable capacity or output range calculated in Step 1.* For each CPA the applicable range is to be determined to define the capacity range to be considered for the analysis.

(f) *The projects started commercial operation before the project design document (CDM-PDD) is published for global stakeholder consultation or before the start date of proposed project activity, whichever is earlier for the proposed project activity*. For each CPA the earliest date among the dato of CPA-DD submission for inclusion in the PoA and the project start date must be used to define timeframe for the analysis.

Step 3: within the projects identified in Step 2, identify those that are neither registered CDM project activities, project activities submitted for registration, nor project activities undergoing validation. Note their number $N_{all.}$

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

Step 5: Calculate factor $F=1-N_{diff/Nall}$ representing the share similar projects (penetration rate of the measure/technology) using a measure/technology similar to the measure/technology used in the proposed project activity 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 the factor F is greater than 0.2 and Nall-Ndiff is greater than 3.

B.6. Estimation of emission reductions of a generic CPA

B.6.1, Explanation of methodological choices

Project emissions ($PE_{HP,y}$)

As all CPAs to be included in the present PoA will be hydro power plants the only project emission source to be account for is CH_4 emission from the potential reservoirs. Considering the types of projects defined in the eligibility criteria Nº 1 (Section B.2, Part I, of the PoA) the following are the alternatives for the project emissions:

- Run of river power plant without reservoir: as these CPAs will not result in new reservoirs and will not result in the increase of existing reservoirs, PEy = 0, then the project emission equations and the corresponding monitored parameters will not be applied.

- Power plant associated to an existing dam. As per eligibility criteria Nº 4, power plants associated to existing dams only are eligible if the volume of the existing reservoir is not changed as a consequence of the project activity. Then, as these project activities will not result in new reservoir and will not lead to the increase of existing reservoir, PEy = 0 and so the project emission equations and the corresponding monitored parameters will not be applied.

- Run of river power plant with single or multiple reservoirs: as these project activities result in new single or multiple reservoirs PE_y will be calculated as follows:

  (a) If the power density of the single or multiple reservoirs (PD) is greater than 4 W/m^2 and

less than or equal to 10 W/m^2 (equation 3 of ACM0002):

$$PE_{HP,y} = \frac{EF_{Res} \times TEG_y}{1000}$$ Equation [1]

Where:

$PE_{HP,y}$ = Project emissions from water reservoirs (tCO_2e/yr)

EF_{Res} = Default emission factor for emissions from reservoirs of hydro power plants in year *y* ($kgCO_2e/MWh$)

TEG_y = Total electricity produced by the project activity, including the electricity supplied to the grid and the electricity supplied to internal loads, in year *y* (MWh)

(b) If the power density of the CPA (PD) is greater than 10 W/m^2 (equation 4 of ACM0002):

$$PE_{HP,y} = 0$$ Equation [2]

The power density of the CPA (*PD*) is calculated using equation 5 of ACM0002:

$$PD = \frac{Cap_{PJ} - Cap_{BL}}{A_{PJ} - A_{BL}}$$ Equation [3]

Where:

PD = Power density of the project activity (W/m^2)

Cap_{PJ} = Installed capacity of the hydro power plant after the implementation of the project activity (W)

Cap_{BL} = Installed capacity of the hydro power plant before the implementation of the project activity (W). For new hydro power plants, this value is zero

A_{PJ} = Area of the single or multiple reservoirs measured in the surface of the water, after the implementation of the project activity, when the reservoir is full (m^2)

A_{BL} = Area of the single or multiple reservoirs measured in the surface of the water, before the implementation of the project activity, when the reservoir is full (m^2). For new reservoirs, this value is zero

Baseline Emissions (BEy)

The baseline emissions will be calculated using equation 6 of ACM0002:

$$BE_y = EG_{PJ,y} \times EF_{grid,CM,y}$$ Equation [4]

Where:

BE_y = Baseline emissions in year *y* (tCO_2/yr)
$EG_{PJ,y}$ = 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/yr)
$EF_{grid, CM,y}$ = 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 $EG_{PJ, y}$

As all CPAs to be included in the present PoA will be new grid-connected power plants, in determining the quantity of net electricity generation that is produced and fed into the grid, only the equation for (a) "Greenfield renewable energy power plants" will be applied (equation 7 of ACM0002).

$$EG_{PJ,y} = EG_{facility,y}$$ Equation [5]

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

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

The grid emission factor will be calculated applying the latest version of the "Tool to calculate the emission factor for an electricity system". The operating and the build margin emission factors will be calculated on an ex post basis. The application of the EF tool is presented below:

Step 1: Identify the relevant electric power system

The project electricity system will be the Central Interconnected System (SIC), as defined by the CDEC-SIC (Load Economic Dispatch Center of the Central Interconnected System)[8]. At the moment, there aren't connected electricity systems so there are no electricity imports/exports. If in the future energy imports exist then:

a) For the purpose of determining the operating margin emission factor the CO_2 emission factor for net electricity imports from the connected electricity system will be 0 tCO_2/MWh; and

b) Electricity exports will not be subtracted from electricity generation data used for calculating and monitoring the electricity emission factors.

[8] The Chilean DNA does not publish a delineation of the project electricity system. CDEC is an organization created to coordinate electrical installation operations of concessionaires which operate interconnected among them, in order to: (a) Keep safety of the service in electrical system; (b) Guarantee the most economical operation for the set of electrical system installations; and (c) Guarantee the right of easement over transmission systems established by concession. (see https://www.cdec-sic.cl/contenido_es.php?categoria_id=1&contenido_id=000001)

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

Option 1 will be applied: only grid-connected power plants will be considered.

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

The Simple Adjusted OM will be used. It will be determined using *ex post* option, then it will be updated annually during monitoring.

As required by the Emission Factor Too, the power plants registered as CDM project activities will be included in the sample group that is used to calculate the operating margin.

As the data required to calculate the emission factor for year *y* is usually only available later than six months after the end of year *y*, the emission factor of the previous year *y-1* will be used.

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

The Simple Adjusted emission factor will be calculated based on the net electricity generation and a CO_2 emission factor of each power unit (Option A of the Emission Factor Tool), using equation 7 of the Emission Factor Tool:

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

Equation [6]

Where:

$EF_{grid,OM\text{-}adj,y}$	=	Simple adjusted operating margin CO_2 emission factor in year *y* (tCO_2/MWh)
λ_y	=	Factor expressing the percentage time (number of hours) for which low-cost/must-run sources are on the margin in year *y*
$EF_{EL,k,y}$	=	CO_2 emission factor of power unit *k* in year *y* (tCO_2/MWh)
$EF_{EL,m,y}$	=	CO_2 emission factor of power unit *m* in year *y* (tCO_2/MWh)
k	=	Refers to units which are either low-cost or are must-run
m	=	Refers to the units that are not either low-cost or are must-run
$EG_{k,y}$	=	Net electricity generated and delivered to the grid by power units *k* serving the system in year *y* (MWh)
$EG_{m,y}$	=	Net electricity generated and delivered to the grid by power units *m* serving the system, in year *y* (MWh)
y	=	The relevant year as per the data vintage chosen in Step 3

Determination of λ_y

For λ_y calculation, equation 8 of the Emission Factor Tool will be used:

$$\lambda_y\,(\%) = \frac{\text{Number of hours low - cost / must - run sources are on the margin in year y}}{\text{8760 hours per year}}$$ Equation [7]

The following steps needs to be applied:

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 8760 hours in the year, in descending order.

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

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

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 8760 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.

In determining λ_y only grid power units (and no off-grid power plants) will be considered.

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

For each power plant the use of option A1, A2 or A3 will depend on the information available (fuel consumption, efficiency and fuel type).

If for a power unit *m* data on fuel consumption and electricity generation is available, the emission factor ($EF_{EL,m,y}$) will be determined using Option A.1 (equation 2 of the Emission Factor Tool):

$$EF_{EL,m,y} = \frac{\sum_i FC_{i,m,y} \times NCV_{i,y} \times EF_{CO2,i,y}}{EG_{m,y}}$$ Equation [8]

Where:

$EF_{EL,m,y}$	=	CO_2 emission factor of power unit *m* in year *y* (tCO_2/MWh)
$FC_{i,m,y}$	=	Amount of fuel type *i* consumed by power unit m in year *y* (Mass or volume unit)
$NCV_{i,y}$	=	Net calorific value (energy content) of fuel type *i* in year *y* (GJ/mass or volume unit)
$EF_{CO2,i,y}$	=	CO_2 emission factor of fuel type *i* in year *y* (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* except low-cost / must-run power units

i = All fossil fuel types combusted in power unit *m* in year *y*

y = The relevant year as per the data vintage chosen in Step 3

If for a power unit *m* only data on electricity generation and the fuel types used is available, the emission factor will be determined based on the CO_2 emission factor of the fuel type used and the efficiency of the power unit (Option A.2), as follows (equation 3 of the Emission Factor Tool):

$$EF_{EL,m,y} = \frac{EF_{CO2,m,i,y} \times 3.6}{\eta_{m,y}}$$ Equation [9]

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 except low-cost/must-run power units

y = The relevant year as per the data vintage chosen in Step 3

Where several fuel types are used in a power unit, the fuel type with the lowest CO_2 emission factor for $EF_{CO2, m, i, y}$. will be used.

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

$EF_{EL,k,y}$ and $EG_{k,y}$ will be determined using the same procedures as those for the parameters $EF_{EL,m,y}$ and $EG_{m,y}$ described before.

If in the future energy imports exist, net electricity imports will be considered low-cost/must-run units and the CO2 emission factor for net electricity imports from the connected electricity system will be 0 tCO2/MWh.

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

For the BM calculation Option 2 will be applied for each CPA (ex-post option):

For the first crediting period of the CPA: the build margin emission factor will be updated annually, *ex post*, including those units built up to the year of inclusion of the CPA in the PoA or, if information up to the year of inclusion is not yet available, including those units built up to the latest year for which information is available.

For the second and third crediting period, the build margin emissions factor will be calculated *ex ante* based on the most recent information available on units already built for sample group m at the time of CPA submission to the DOE for its inclusion in the PoA.

The build margin emissions factor is the generation-weighted average emission factor (tCO_2/MWh) of all power units *m* during the most recent year *y* for which electricity generation data is available, calculated as follows (equation 12 of the Emission Factor Tool):

$$EF_{grid,BM,y} = \frac{\sum_{m} EG_{m,y} \times EF_{EL,m,y}}{\sum_{m} EG_{m,y}}$$ Equation [10]

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 electricity generation data is available.

The sample group *m* will be determined as per the following procedure:

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

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

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

Identify the date when the power units in SET_{sample} started to supply electricity to the grid.

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

Otherwise:

(d) Exclude from SET_{sample} the power units which started to supply electricity to the grid more than10 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. $AEG_{SET\text{-}sample\text{-}CDM} \geq 0.2 \times AEG_{total}$), then use the sample group $SET_{sample\text{-}CDM}$ to calculate the build margin. Ignore steps (e) and (f).

Otherwise:

(e) Include in the sample group $SET_{sample\text{-}CDM}$ 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 the generation 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 ($SET_{sample\text{-}CDM\text{->}10yrs}$).

The CO_2 emission factor of each power unit *m* ($EF_{EL,m,y}$) will be determined as per the guidance in Step 4, using options A1, A2 or A3, using for *y* the most recent historical year for which electricity generation data is available, and using for *m* the power units included in the build margin.

If the power units included in the build margin *m* correspond to the sample group $SET_{sample\text{-}CDM\text{->}10yrs}$, then, as a conservative approach, only option A2 from guidance in Step 4 can be used and the default values provided in Annex 1 of the EF tool will be used to determine the parameter $\eta_{m,y}$ for the power units that started to supply electricity to the grid more than 10 years ago.

Step 6: Calculate the combined margin emissions factor

The calculation of the combined margin (CM) emission factor ($EF_{grid,CM,y}$) is based on the weighted average CM method, and calculated as follows (equation 13 of the Emission Factor Tool):

$$EF_{grid,CM,y} = EF_{grid,OM,y} \times w_{OM} + EF_{grid,BM,y} \times w_{BM} \quad \text{Equation [11]}$$

Where:

$EF_{grid,BM,y}$ = 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 for w_{OM} and w_{BM} will be used; as the CPAs will be run of river hydro power plants, the following values will be applied:

Table 5: W_{OM} Values

First crediting period	w_{OM} = 0.5	w_{BM} = 0.5
Second and third crediting period	w_{OM} = 0.25	w_{BM} = 0.75.

Leakage Emissions

ACM0002 states that no leakage emissions are considered.

Emission Reduction (ERY)

Emission Reductions are calculated as per equation 11 of ACM0002 (version 14.0.0):

$$ER_y = BE_y - PE_y$$ Equation [12]

Where:

ER_y = Emissions reductions in year y (t CO_2e/yr).

BE_y = Baseline emissions in year y (t CO_2/yr).

PE_y = Project emissions in year y (t CO_2e/yr).

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

Data / Parameter:	EF_{Res}
Data unit:	$kgCO_2e/MWh$
Description:	Default emission factor for emissions from reservoirs
Source of data:	Decision by EB23
Value(s) applied:	90 $kgCO_2e/MWh$
Choice of data or Measurement methods and procedures:	Default value
Purpose of data	Calculation of project emissions
Additional comment:	Only for CPA that result in new single or multiple reservoirs

Data / Parameter:	Cap_{BL}
Data unit:	W
Description:	Installed capacity of the hydro power plant before the implementation of the project activity
Source of data:	CPA Project site
Value(s) applied:	To be specified by each CPA at the moment of inclusion in the PoA
Choice of data or Measurement methods and procedures:	To be specified by each CPA at the moment of inclusion in the PoA
Purpose of data	Calculation of project emissions
Additional comment:	Only for CPA that result in new single or multiple reservoirs

Data / Parameter:	A_{BL}
Data unit:	m^2
Description:	Area of the single or multiple reservoirs measured in the surface of the water, before the implementation of the project activity, when the reservoir is full. (m^2). For new reservoirs, this value is zero.
Source of data:	CPA project site
Value(s) applied:	To be specified by each CPA at the moment of inclusion in the PoA
Choice of data or Measurement methods and procedures:	To be specified by each CPA at the moment of inclusion in the PoA
Purpose of data	Calculation of project emissions
Additional comment:	Only for CPA that result in new single or multiple reservoirs

B.6.3. Ex-ante calculations of emission reductions

This will be done at CPA level as per equations 1 to 12 of the PoA

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

For all parameters presented below, 100% of the data will be monitored.

Data / Parameter:	$EG_{facility,y}$
Data unit:	MWh/yr
Description:	Quantity of net electricity generation supplied by the project plant/unit to the grid in year *y*.
Source of data:	Electricity meter(s)
Value(s) applied	To be specified by each CPA at the moment of presentation for inclusion in the PoA
Measurement methods and procedures:	The following parameters shall be measured: (i) The quantity of electricity supplied by the project plant/unit to the grid; and (ii) The quantity of electricity delivered to the project plant/unit from the grid The electricity will be measured by continuous bidirectional meters. The electricity meters will be ANSI class 2, in compliance with Chilean applicable regulation 'Norma Tecnica de Seguridad y Calidad de Servicio, Comisión Nacional de Energía'.
Monitoring frequency:	Data will be continuously measured and will be electronically recorded every 15 minutes and aggregated on a monthly basis.
QA/QC procedures:	Measurement results will be cross checked with records for sold electricity. Meters will be calibrated according with the Chilean applicable regulation.
Purpose of data	Calculation of baseline emissions
Additional comment:	Data will be kept for at least 2 years after the end of the crediting period of the CPA or the last issuance of CERs for the CPA, whatever occurs later.

Data / Parameter:	$FC_{i,m,y}$
Data unit:	Tonnes/m^3
Description:	Amount of fuel type *i* consumed by power unit *m* in year *y*
Source of data:	Public records: CDEC-SIC yearbook (CDEC-SIC is the Economic Load Dispatch Center for the Interconnected Central System)
Value(s) applied	To be specified by each CPA at the moment of presentation for inclusion in the PoA
Measurement methods and procedures:	-
Monitoring frequency:	Annually
QA/QC procedures:	-
Purpose of data	Calculation of baseline emissions
Additional comment:	Data will be kept for at least 2 years after the end of the crediting period of the CPA or the last issuance of CERs for the CPA, whatever occurs later.

Data / Parameter:	$NCV_{i,y}$
Data unit:	GJ/mass or volume unit
Description:	Net calorific value (energy content) of fuel type *i* in year *y*.
Source of data:	Last version of National Energy Balance available at the moment of presentation of the CPA for inclusion in the PoA
Value(s) applied	To be specified by each CPA at the moment of presentation for inclusion in the PoA
Measurement methods and procedures:	NCV will be sourced from National Energy Balance. If data unit is not [GJ/mass or volume unit] appropriate unit conversion factors should be used. If for a specific fuel no information is included in National Energy Balance, NCV will be sourced from IPCC default values (default values at the lower limit of the uncertainty at a 95% confidence interval as provided in table 1.4 of Chapter1 of Vol. 2 - Energy- of the 2006 IPCC Guidelines on National GHG Inventories).
Monitoring frequency:	Annually
QA/QC procedures:	-
Purpose of data	Calculation of baseline emissions
Additional comment:	-

Data / Parameter:	$EF_{CO2,i,y}$ and $EF_{CO2,m,i,y}$
Data unit:	tCO_2/GJ
Description:	CO_2 emission factor of fuel type *i* in year *y*
Source of data:	IPCC default values at the lower limit of the uncertainty at a 95% confidence interval as provided in table 1.4 of Chapter1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories.
Value(s) applied	To be specified by each CPA at the moment of presentation for inclusion in the PoA
Measurement methods and procedures:	-
Monitoring frequency:	Annually
QA/QC procedures:	-
Purpose of data	Calculation of baseline emissions
Additional comment:	For biofuels the value applied to the CO_2 emission factor will be zero.

Data / Parameter:	$EG_{m,y}$ and $EG_{k,y}$
Data unit:	MWh
Description:	Net electricity generated by power plant/unit *m* or *k* in year *y*
Source of data:	CDEC-SIC statistics (CDEC-SIC is the Economic Load Dispatch Center for the Interconnected Central System).
Value(s) applied	To be specified by each CPA at the moment of presentation for inclusion in the PoA
Measurement methods and procedures:	-
Monitoring frequency:	Annually
QA/QC procedures:	-
Purpose of data	Calculation of baseline emissions
Additional comment:	-

Data / Parameter:	$\eta_{m,y}$
Data unit:	-
Description:	Average net energy conversion efficiency of power unit *m* in year *y*
Source of data:	Default values provided in Annex 1 of the "Tool to calculate the emission factor for an electricity system" at the moment of presentation of the CPA for inclusion in the PoA
Value(s) applied	To be specified by each CPA at the moment of presentation for inclusion in the PoA
Measurement methods and procedures:	-
Monitoring frequency:	n/a
QA/QC procedures:	-
Purpose of data	Calculation of baseline emissions
Additional comment:	-

Data / Parameter:	A_{PJ}
Data unit:	m^2
Description:	Area of the single or multiple reservoirs measured in the surface of the water, after the implementation of the project activity, when the reservoir is full
Source of data:	Project site
Value(s) applied	To be specify by each CPA at the moment of presentation for inclusion in the PoA
Measurement methods and procedures:	Measured from topographical surveys, maps, satellite pictures, or others means appropriate considering the nature of the CPA.
Monitoring frequency:	Yearly
QA/QC procedures:	-
Purpose of data	Calculation of project emissions
Additional comment:	Only required for CPA that result in new reservoirs.

Data / Parameter:	TEG_y
Data unit:	MWh
Description:	Total electricity produced by the project activity, including the electricity supplied to the grid and the electricity supplied to internal loads, in year *y*
Source of data:	Project site
Value(s) applied	To be specify by each CPA at the moment of presentation for inclusion in the PoA
Measurement methods and procedures:	Total electricity produced by the project activity will be measured using an electricity meter (ANSI Class 2) located at the low voltage side of the transformer.
Monitoring frequency:	Data will be continuously measured and will be electronically recorded every 15 minutes and aggregated on a monthly basis.
QA/QC procedures:	Values will be checked against the net electricity ($EG_{facility,y}$) adjusted considering the efficiency of the transformer
Purpose of data	Calculation of project emissions
Additional comment:	Only required for CPA that result in new reservoirs when power density is lower than 10 W/m^2. Data will be kept for at least 2 years after the end of the crediting period of the CPA or the last issuance of CERs for the CPA, whatever occurs later.

Data / Parameter:	Cap_{PJ}
Data unit:	W
Description:	Installed capacity of the hydro power plant after the implementation of the project activity
Source of data:	Project site
Value(s) applied	To be specify by each CPA at the moment of presentation for inclusion in the PoA
Measurement methods and procedures:	Manufacture's nameplate
Monitoring frequency:	Yearly
QA/QC procedures:	-
Purpose of data	Calculation of project emissions
Additional comment:	Only required for CPA that result in new reservoirs.

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

1. Management Structure and Responsibilities

The CPA implementer will be responsible for the monitoring and reporting of all parameters acquired at the project site: net electricity generation and, if applicable APJ, CapPJ and TEGy. Before the start of the first crediting period the CPA implementer will design a CDM project manager, who will report the monitored data in a monthly basis to the CME. The CDM project manager will be responsible to check the operation of the measuring and monitoring equipments, including the existence of appropriate calibration certificates and maintenance, in compliance with the PoA requirements.

Data Collection
The electricity supplied by the project activity to the grid and the total electricity produced by the project activity (if applicable) will be measured at the project site using calibrated electricity meters.

The CDM project manager will crosscheck the results with records for sold electricity, in the case of electricity supplied by the project activity to the grid; in the case of total electricity produced by the project activity, the record for sold electricity will be adjusted considering the transformer's efficiency.

Data will be monitored continuously, will be electronically recorded every 15 minutes and consolidated in a monthly basis using a Data Acquisition System.

The CPA implementer will kept data for at least 2 years after the end of the crediting period of the CPA or the last issuance of CERs for the CPA, whatever occurs later.

Accuracy and calibration
Electricity meters will ANSI class 2 and will be calibrated at appropriate intervals according to manufacturer specifications or Chilean regulations. At the beginning of the first crediting period CDM project manager will provide the CME with a calibration schedule; any modification will be reported and justified. CDM project manager will provide the CME copies of the calibration certificates.

Data Report
CDM project manager will provide the CME with monthly consolidated data. If total electricity produced by the project activity needs to be monitored copies then the CDM project manager will provide the CME copies of the records for sold electricity and evidence of the transformer's efficiency.

If any discrepancies in the data were found during monitoring the CDM project manager it will inform the CME indicating the possible source of the variation and any measure adopted to correct it.

The CME will keep data for at least 2 years after the end of the crediting period of the CPA or the last issuance of CERs for the CPA, whatever occurs later.

2. Data Quality Control

CME will check the electricity measurements with records for sold electricity provided by the CDM project manager.

3. Training and Monitoring Personnel

All people that participate in the monitoring process will be suitably qualified and trained in the operation and maintenance of the plant. They will also receive a training session on the application of the monitoring plan.

4. Emission factor calculation

The combined margin emission factor used in the emission reduction calculation will be annually updated by the CME. The factor will use information published by the local authorities so no direct measurements are involved.

5. Monitoring Reports and Verification

Monitoring reports will be prepared and submitted to the DOE for verification by the CME.

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

Organization	Besalco Construcciones S A
Street/P.O. Box	Las Condes
Building	Av. Tajamar 183
City	Santigo
State/Region	Metropolitana
Postcode	7550594
Country	Chile
Telephone	56 - 2 - 5205600
Fax	56 - 2 - 5205685
E-mail	construcciones@besalco.cl
Website	www.besalco.cl
Contact person	Julio Espinoza
Title	General Manager
Salutation	Mr.
Last name	Espinoza
Middle name	
First name	Julio
Department	
Mobile	

Appendix 2. Affirmation regarding public funding

The PoA does not receive public funding.

Appendix 3. Application of methodology(ies)

N/A

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

N/A

Appendix 5. Further background information on the monitoring plan

N/A

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Document information

Version	*Date*	*Description*
03.0	3 December 2012	Revision to clarify the determination of the start date for a PoA and the documentation requirement for generic CPA-DDs. (EB 70, Annex 6).
02.0	11 May 2012	EB 66, Annex 12 Revision required to ensure consistency with the "Guidelines for completing the programme design document form for CDM programmes of activities".
01.0	2 March 2012	EB 33, Annex 41 Initial adoption.

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