CLEAN DEVELOPMENT MECHANISM
PROJECT DESIGN DOCUMENT FORM (CDM-SSC-PDD)
Version 03 - in effect as of: 22 December 2006

CONTENTS

Annexes

Revision history of this document

Version Number	Date	Description and reason of revision
01	21 January 2003	Initial adoption
02	8 July 2005	• The Board agreed to revise the CDM SSC PDD to reflect guidance and clarifications provided by the Board since version 01 of this document. • As a consequence, the guidelines for completing CDM SSC PDD have been revised accordingly to version 2. The latest version can be found at <http://cdm.unfccc.int/Reference/Documents>.
03	22 December 2006	• The Board agreed to revise the CDM project design document for small-scale activities (CDM-SSC-PDD), taking into account CDM-PDD and CDM-NM.

SECTION A. General description of small-scale project activity

A.1 Title of the small-scale project activity:

>>
Title: Cabo Negro Wind Farm Project, Phase 1
Version: Document version number 6.
Date: 06/01/2011

A.2. Description of the small-scale project activity:

>> The project activity consists in the generation of power electricity by wind powered electric generators. The project considers a total installed capacity of renewable sourced power of 2.55 MW. This wind farm will be the first one in the XIIth Region of Magallanes y Antártica Chilena and will therefore contribute significantly to its sustainable development.

This project involves wind electricity generation that will be used to replace electricity currently generated on-site by fossil fuel (natural gas) in Methanex facilities. Therefore the project contributes to the substitution of natural gas consumption for electricity generation.

The wind power plant will have an expected minimum operating life time of 21 years.

Methanex is the world's largest supplier of methanol to major international markets in North America, Asia Pacific, Europe, South Africa and Latin America. In Chile, Methanex's extensive methanol production facilities are located at Cabo Negro, near the city of Punta Arenas in the heart of Chile's petroleum and gas producing Region. These strategic facilities installed in Chile give Methanex its largest production hub, and enables Methanex to ship methanol by tanker to all of its major markets.

Methanex´s wind power plant will be located in South America specifically in the South of Chile, in the Magallanes Region in the Cabo Negro Industrial Complex. The project considers the supply, erection, commissioning and operation of three (3) wind turbine generators, each with a single capacity of 850 Kw. The expected annual generation output is 10,722.2 MWh.

The baseline is calculated considering that Methanex is an individual household that does not have a grid connection, therefore the baseline considers the natural gas electricity generators, that currently exist in Methanex facilities, and the CO_{2e} emission reductions of the baseline considers that the wind electricity generation replaces electricity generation from the natural gas generator. The real emission reductions are going to be monitored and calculated yearly for the project activity, which considers that the wind electricity generation will replace the natural gas that would be used to cover part of the electrical demand of the Methanex facilities.

The electricity generation from this wind farm will contribute to an annual GHG reductions estimated at 12,204 tCO_{2e}. It is important to note that these reductions depend on the wind resource and its performance may vary.

As part of the project activity and in order to estimate the emission reductions; the project activity considers the monitoring of the natural gas that would be use and the wind electricity generation by the Cabo Negro Wind Farm Project, Phase 1.

This small-scale project activity contributes to sustainable development by:

1) Bringing in for the first time in the Region, wind power generation for industrial facilities.
2) Diversifying energy sources currently used in the Region, since the local grid is only supplied with fossil fuel generated electricity.[1]
3) Decreasing the green house gas emissions related to the electricity generation produced by fossil fuel and replacing or substituting part of the fossil fuel consumption with wind generators that produce zero emissions after offsetting the construction carbon footprint.

The Cabo Negro wind farm project is the pioneer wind electric power plant in the Methanex production facilities and in the Region. It is important to note that the nearest wind farm in Chile is "Alto Baguales wind central" which is located approximately 900 kilometers north from the Cabo Negro Industrial Complex in the Aysen Region.

The project implementation considers wind generation only for internal use of the Methanex facilities. Methanex´s vision of the future is to continue to grow the wind generation farm and possibly to export this energy to the Magallanes grid or to other industries; this will be part of another project activity.

It must be noted that for year 2006 the Magallanes Gross Domestic Product (GDP or PIB in Spanish) corresponds only to 1.6% of the Chilean GDP[2]; therefore renewable projects in the Region are very important to promote its development. Wind energy generation also represents an historical aspiration for the Regional community (please refer to stakeholders comments, chapter E). By building this project, Methanex is also contributing to public policy developments in the Region, and therefore providing social, economic and environmental benefits, contributing to Regional sustainable development.

Cabo Negro Wind Farm Project, Phase 1 will be operational at November 2010, and is aimed to supply renewable electricity for methanol production and serve as a test bed for future wind power generation facilities in other company units as well as in the Region.

Methanex is proud to inform that in September of 2009 the Cabo Negro Wind Farm Project, Phase 1 was incorporated as a Bicentenary Project for the Magallanes and Antartica Chilena region[3]. This incorporation confirms the importance and relevance of the project to the region development.

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[1] Source: Nation Energy Commission (Comision Nacional de Energia), 2005, http://www.cne.cl/cnewww/opencms/06_Estadisticas/energia/ERNC.html

[2] Source: Chilean Central Bank Publications, http://www.bcentral.cl/publicaciones/estadisticas/actividad-economica-gasto/Regionalizadas/xls/2003/1_PIB_total%20pais_por_Region.xls

[3] Source: 2010 Chile Bicentenary letter from executive secretary, September 24th 2009 and Chile 2010 Bicentenary web page: http://www.chilebicentenario.cl/frmNoticia.aspx?idArticulo=671

A.3. Project participants:

>>

Name of Party involved	Private and/or public entity(ies) project participants	Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)
Chile (host Country)	METHANEX CHILE S.A. (Private entity)	No

Chile ratified the Kyoto Protocol on August, 2002.

A.4. Technical description of the small-scale project activity:

A.4.1. Location of the small-scale project activity:

A.4.1.1. Host Party(ies):

>> Chile

A.4.1.2. Region/State/Province etc.:

>> XIIth Region of Magallanes y Antártica Chilena, Magallanes Province.

A.4.1.3. City/Town/Community etc:

>> Punta Arenas, Laredo Sector Bay Area, Cabo Negro Industrial Complex.

A.4.1.4. Details of physical location, including information allowing the unique identification of this small-scale project activity:

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The project activity is located in the South of Chile, in the Cabo Negro industrial complex located at Laredo Bay, in Magallanes Province in the XIIth Region of Chile. The following figures and pictures give a better understanding of the location of the project.

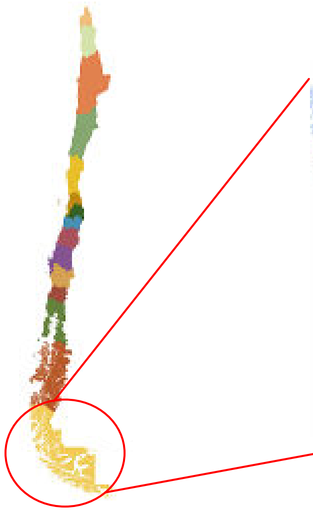

Figure A1: Chile and its Regions[4], Magallanes and Antartica Chilena Region indicated by red circle.

Figure A2: Magallanes Region and its communes[5], Laredo bay indicated by the red circle.

The following figures show the specific location of the Methanex facilities and the Cabo Negro Wind Farm Project, Phase 1.

Figure A3: Specific project activity geographic location[6].

Figure A4: Air view of the Methanex facilities[7] .

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[4] Map of Chile and its Region, http://www2.sag.gob.cl/Pecuaria/establecimientos_habilitados_exportar/imagenes/chile_XV_Regiones.gif

[5] Map of Magallanes Region, http://hosting.snit.cl/goremagallanes/index.php?option=com_content&task=blogsection&id=8&Itemid=30

[6] Project activity location at Google Earth.

[7] Methanex web page, http://www.Methanex.com/ourcompany/locations_chile.html

The wind generators will be separated by approximately 180 meters; the total area covered by the three (3) turbines and the access route, corresponds to approximately 2.46 ha[8]. The following table shows the location of each turbine.

Table A 1: Turbines UTM coordinates (Datum local PSAD '63)[9]

Turbine number	East	North
1	377078	4131832
2	377022	4131658
3	376966	4131484

A.4.2. Type and category (ies) and technology/measure of the small-scale project activity:

>> Methanex project is applying to an approved methodology available for small-scale CDM project at UNFCCC website under Appendix B of the simplified modalities and procedures for small-scale CDM project activities.

Project type & category:
Type: I – "Renewable energy Projects"
Category: A. "Electricity generation by the user"

The project activity is placed in Cabo Negro industrial complex, where Methanex facilities are located.

It must be considered that Methanex facilities do not have grid connection. The electricity consumed by the methanol producing complex is produced onsite. The current energy generation system consists of:

- 3 medium pressure steam turbines (GST-701, 3GST-701 and X-07002)
- 1 natural gas turbine (113-J)
- 1 cogeneration unit -natural gas (GST-703 and X-614)
- 3 medium steam boilers -natural gas (102-U, 106-U and X-611)

These operating units are connected to a common medium steam header and produce always more steam than the volume required for electricity energy generation, as there are many other (plant process plant) users for the medium pressure steam. Therefore, not the whole consumption of natural gas in the boilers (and in the steam stage of the cogeneration unit) to produce steam has to be considered, otherwise the calculated efficiency of the electricity generation system would be (artificially) much lower and the resulting BE calculation would not be conservative.

Thus, the fuel consumption efficiency of the system is determined in case of gas turbines considering the efficiency rate (natural gas consumed/electricity produced) and in case of steam turbines considering the Specific Fuel Consumption (natural gas/steam generated) of the boilers and the efficiency rate (steam

[8, 9] Source: Environmental Impact Assessment, (DIA for its Spanish name). "Parque eólico Cabo Negro, Fase 1", https://www.e-seia.cl/expediente/ficha/fichaPrincipal.php?id_expediente=4010859&idExpediente=4010859&modo=ficha

consumed/electricity produced) so that only the portion of steam actually used for electricity generation in the steam turbines is considered, resulting in a conservative figure for fuel.

The following units were conservatively not included in the baseline efficiency calculation:

- Back up emergency diesel generators, these are used only in emergency and are less efficient equipment, therefore the fuel consumption of these generators is conservatively not included in the fuel efficiency calculation.
- Steam turbine that uses only residual process steam, it does not consume fossil fuel and therefore is not included in the fuel efficiency calculation.
- Boiler that produces high steam pressure for other purpose than energy generation and therefore is not included in the fuel efficiency calculation.

The following table provides detailed information of each generation unit and boiler considered for the baseline fuel consumption efficiency calculation:

Table A 2: Generation units information

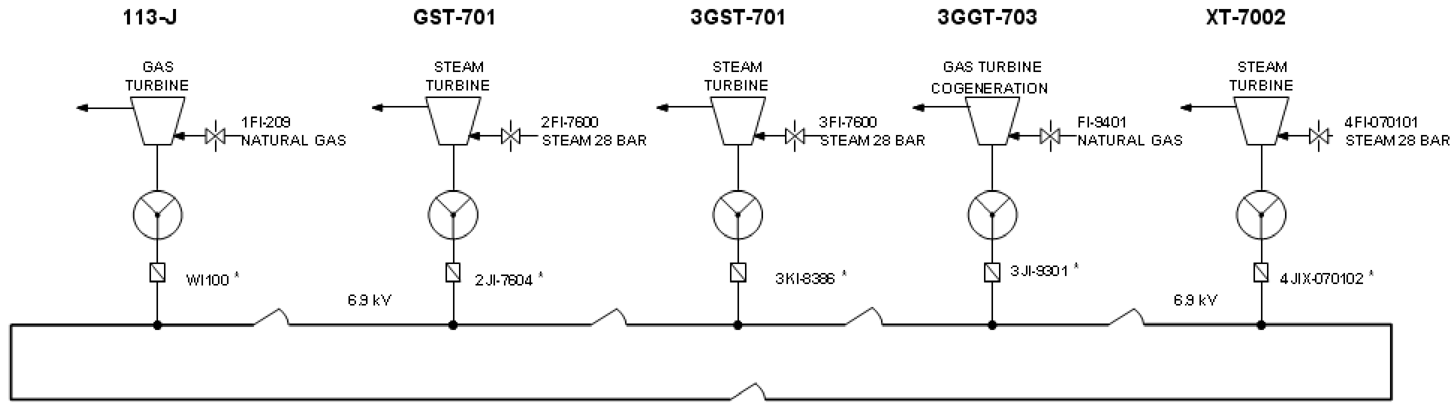
Generator	Technology	Generator Model type	Nominal Power (MW)	Voltage / Generation frequency	Generator serial number	Turbine serial number	Plant location
113-J	Gas turbine	Synchronous A.C generator	5.60	6,9 KV / 50 Hz	B44327501	R8609/1	Plant 1
GST-701	Steam turbine	Synchronous A.C generator	5.60	6,9 KV / 50 Hz	163935-1	D-3798	Plant 2
3GST-701	Steam turbine	Synchronous A.C generator	6.00	6,9 KV / 50 Hz	L41212501	D4376	Plant 3
GST-703	Gas turbine, cogeneration	Synchronous A.C generator	7.20	6,9 KV / 50 Hz	TG00913	TG00913	Plant 3
X-07002	Steam turbine	Synchronous A.C generator	6.00	6,9 KV / 50 Hz	P-141113-10	D-5389	Plant 4

The steam turbine technology generators operate with the steam provided by the following boilers:

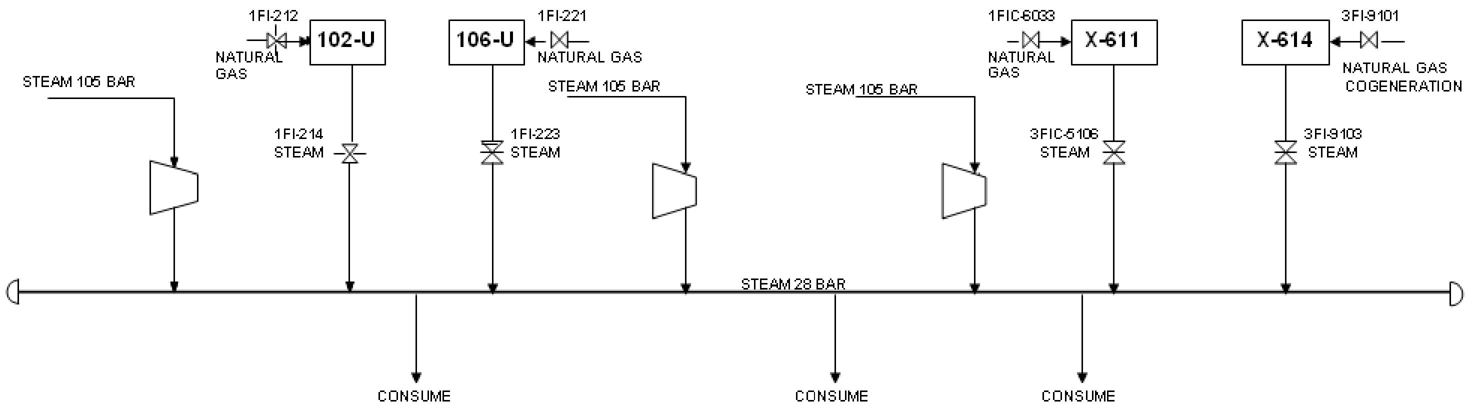
Table A 3: Boilers information

Boiler	Model type	Steam maximun capacity (Ton/h)	Preassure (Kg/cm2)	Temperature (ºC)	Serial number
102-U	Package boiler wall-tube	60.0	28.1	321.0	6768
106-U	Package boiler wall-tube	60.0	28.1	321.0	6767
X-611	Package boiler wall-tube	80.0	28.1	321.0	1019 8
X-614 (COGEN)	Package boiler wall-tube	56.0	28.1	321.0	W-4333

The electricity produced by the energy generation units feed an electrical ring that provides of electricity for methanol producing complex. The following figure corresponds to a flow diagram that shows the electrical ring and the steam header existing in Methanex facilities.



* All the main electricity meters have an electricity backup meter.



The total install capacity in Methanex facilities is 30.40 MW, with the installation of the Cabo Negro Wind Farm Project this capacity will increased to 32.95 MW.

According to the Methanex studies for this project, the design of the wind plant considers three (3) wind turbines of 850 kW of power each, which correspond to a total installed capacity of 2.55 MW. The plant factor is 48% therefore the expected total electricity generation is 10,722.2 (MWh/year).The distance between the wind farm and the existing Methanex facilities is approximately 1,520 linear meters.

The selected turbines for the project activity are Vesta, model V52-850 kW which is a pitch regulated upwind turbine with active yaw and a three-blade rotor. Each turbine has a rotor diameter of 52 m and operates using the OptiSpeed® concept which enables the rotor to operate with variable speed of rotation (RPM); this ensures energy optimization, low noise operation and reduction of loads on the gearbox and other vital components.

The main technical specifications of the rotor, blades and generator are:

Rotor

- Diameter: 52 m
- Swept area: 2124 m2
- Rated rotor speed: 26 RPM
- Rotor speed range: 14.0 - 31.4 RPM

Blades

- Principle: Shells bonded to supporting beam
- Material: Glass-fibre reinforced epoxy (Prepreg)
- Blade - bearing connection: Steel root thread inserts + bolts

Generator

- Type: Asynchronous with wound rotor, slip rings and VCS
- Rated power: 850 kW
- Voltage: 690 VAC
- Frequency: 50/60 Hz

Related to the safety system the V52-850 kW turbine is equipped with both mechanical and aerodynamic brakes which will be activated in case of an emergency situation. The turbine furthermore has an independent electrical emergency circuit which will be activated by an over-speed situation.

Considering the project activity and in order to implement the new electricity generation plant, Methanex needs to develop civil works and other facilities with the purpose of increasing the power generation capacity. These works consist on:

- Wind generators interconnection system
- Substation to connect the wind farm to the industrial complex
- Concrete foundations for the wind turbines and electric substations
- Access route

A.4.3 Estimated amount of emission reductions over the chosen crediting period:

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Table A 4: Estimation of emission reduction

Years	**Estimation of annual emission reductions in tonnes of CO2 e**
2011	12,204
2012	12,204
2013	12,204
2014	12,204
2015	12,204
2016	12,204
2017	12,204
Total estimated reductions (tonnes CO2e)	**85,428**
Total number of crediting years	7
Annual average of estimated reductions over the crediting period (tCO_2 e)	**12,204**

A.4.4. Public funding of the small-scale project activity:

>> The project will not receive public funding.

A.4.5. Confirmation that the small-scale project activity is not a debundled component of a large scale project activity:

>> The project activity is not a part of a large project activity. There is no a registered small-scale CDM project activity or an application to register another small-scale CDM project activity with the same project participant (Methanex S.A.):

- In the same project category and technology/measure; or
- Registered within the previous 2 years; or
- Whose project boundary is within 1 km of the project boundary of the proposed small-scale activity at the closest point.

Therefore the project is not a debundled component of a large project activity

SECTION B. Application of a baseline and monitoring methodology

B.1. Title and reference of the approved baseline and monitoring methodology applied to the small-scale project activity:

>> The small-scale approved methodology applicable to the project activity is:

- **Type I: Renewable Energy Projects**
- **Category A: Electricity generation by the user**
- **Reference: I.A./Version 13**
- **Sectoral Scope: 01**
- **EB42**.

This small scale methodology can be found on the CDM-Executive Board website under the following link:
http://cdm.unfccc.int/UserManagement/FileStorage/CDMWF_AM_J55DI73SVWQ8MG9BLA622YS16UCO2G

B.2 Justification of the choice of the project category:

>> The project activity involves generation of electricity by the means of renewable energy, wind. The project activity falls under the small scale projects and comprises an approved methodology; its selection and applicability reasons are discussed below.

Type I: Renewable Energy Projects
Category A: Electricity generation by the user

According the methodology, the applicability of the project activity is explained through the following arguments:

1. The project activity includes wind power technology to produce electricity to be used on site by the user (Methanex facilities). It is important to note that Methanex does not have electricity supplied through the electric regional grid. Therefore, the project activity considers an individual user that does not have a grid connection and replaces fossil fuel emissions by a renewable energy source (wind power), which is emission free.
2. The project activity doesn't consider cogeneration systems.
3. The project activity considers only the addition of renewable components. The installed capacity of the project activity will be 2.55 MW which is less than the eligibility limit of 15 MW to qualify as a small scale project activity under Type I of the small scale methodologies.
4. The project activity considers new wind power units.
5. The project activity is the first renewable project in Methanex facilities and therefore does not involve the addition of renewable energy generation units at an existing renewable power generation facility.

Hence, it can be concluded that the selected methodology, AMS I.A. – Electricity Generation by the user, is applicable to project activity.

B.3. Description of the project boundary:

>> >The methodology AMS-I.A is selected; according to this *the project boundary encompasses the physical geographical site of the renewable energy generation unit* (Project Activity) *and the equipment that uses the electricity produced* (Baseline). Therefore the boundary of the project encompasses:

Table B 1: Project Boundary

	Source	Gas	Included?	Justification/Explanation
Baseline	Fossil fuel fired power plants (natural gas) in Methanex facilities.	CO_2	Yes	Main emissions source
		CH_4	No	Excluded
		N_2O	No	Excluded
Project Activity	Electricity generation through wind power generators (three (3)) and associated civil works) in Methanex facilities.	CO_2	No	The project activity is renewable energy project which will not create any emissions itself.
		CH_4	No	The project activity is renewable energy project which will not create any emissions itself.
		N_2O	No	The project activity is renewable energy project which will not create any emissions itself.

B.4. Description of baseline and its development:

>> The project considers the replacement of electricity currently generated on Methanex facilities for its own use, according to the AMS I.A version 13 methodology (Electricity generation by the user). The applicable baseline scenario for the project activity is: *The energy baseline is the fuel consumption of the technology in use or that would have been used in the absence of the project activity to generate the equivalent quantity of energy.*

The baseline emissions are estimated using the 3rd option of the methodology, which indicates that: *The emissions baseline is the historic fuel consumption calculated in accordance with a trend-adjusted projection of historic fuel consumption in situations where an existing technology is replaced times the* CO_2 *emission factor for the fuel displaced.*

The project activity replaces natural gas consumption of the technology in use or that would have been used in the absence of the project activity. Therefore the baseline emissions of the project are the emissions associated with the fuel consumption of these generation units.

The replaced fuel consumption is calculated considering a fuel consumption efficiency which is determined considering the historical fuel consumption and electricity generation both monitored by Methanex. The equations and considered values are detailed in sections B.6.1 and B.6.3.

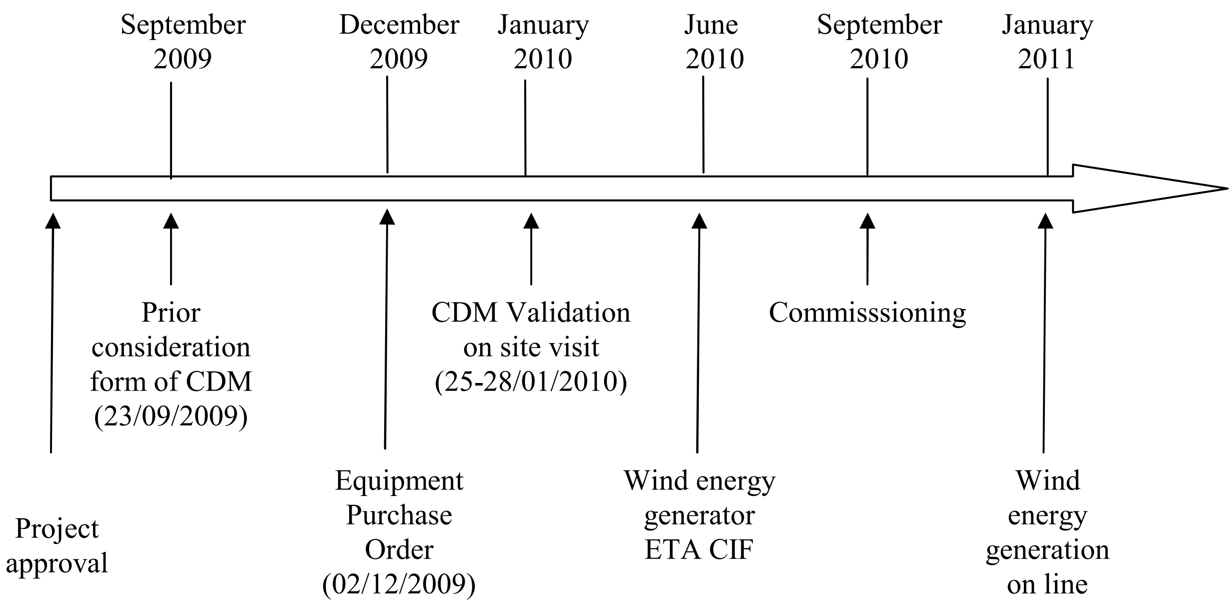
B.5. Description of how the anthropogenic emissions of GHG by Sources are reduced below those that would have occurred in the absence of the registered small-scale CDM project activity:

Early consideration

According to the "Guidance on the demonstration and assessment of prior consideration of the CDM" *the CDM prior consideration is a major element in assessing that CDM benefits were considered necessary in the decision to undertake the project as CDM project activity*.

The project developer sent the Prior Consideration of the CDM form fulfilled with the required project activity information on 23/09/2009 to the UNFCC and on 22/09/2009 to the DNA in Chile (CONAMA).

The following timeline shows the main events of the project implementation and CDM consideration:



Aditionality

Demonstration of project additionality is based on the options listed in "Attachment A to Appendix B" of the "Simplified Modalities and Procedures for Small-Scale CDM Project Activities" which indicates that *"Project participants shall provide an explanation to show that the project activity would not have occurred anyway due to at least one of the following barriers:*

(a) Investment barrier
(b) Technological barrier
(c) Barrier due to prevailing practice
(d) Other barriers

Methanex's project reduces anthropogenic GHG emissions by supplying zero GHG emission power, which will displace fossil fuel-fired electricity generation. Operation of the wind farm, which uses a non-GHG emitting technology, will displace the equivalent amount of electricity that would have been generated with fossil fuel (natural gas) in the Methanex facilities.

The Project developer will overcome with the following barriers:

A. Investment barrier
"A financially more viable alternative to the project activity would have led to higher emissions".

The project activity implementation was decided notwithstanding having performed a preliminary economic assessment and feasibility that indicated a lower outcome and less positive economic results for the wind farm than the national's current economic standards. Despite of a lower feasibility study result, the implementation of the wind power plant will give Methanex a positive enterprise like technological knowledge, positive environmental and corporate image impacts and the possibility of carbon credits which are benefits not stated in the regular economic evaluation.

According to point 15 of the Guidance on the Assessment of Investment Analysis: "*The benchmark analysis 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".*

The project considers changing electricity source for an existing installed power capacity and therefore, according to the project description, no investment is required for the baseline and the benchmark analysis is fully justified for the Methanex project.

The benchmark for the IRR was determined considering an analysis based on the Capital Asset Pricing Model (CAPM). The CAPM is widely used to determine a theoretically appropriate required rate of return of an asset, and its model takes into account the expected return of a theoretical risk-free asset (R_f), the asset's sensitivity to non-diversifiable risk (also known as systematic risk or market risk) represented by Beta (β), the expected risk premium of the market (R_m-R_f) and the country risk, according the following equation:

Equation B 1: CAPM equation

$$R=R_f + \beta*(R_m-R_f)$$

Considering that the analysis uses a value of Beta obtained from the USA Chemical Specific Industries, a country risk shall be included and the equation for the IRR benchmark calculation is as follows:

Equation B 2: IRR Benchmark equation

$$R=R_f+ \beta*(R_m-R_f) + R_{country}$$

Where:
R: Expected rate of return
$\mathbf{R_f}$: Risk-free rate of return. The analysis of this factor was made for the date when the contract was signed based on the 10-year bond of the Central Bank of Chile which does not include inflation rates and is equal to 6.23%, according to the Chilean banks and financial institutions association.
$\boldsymbol{\beta}$: Beta factor is obtained from USA stock market information under Chemical Specific Industries (including Methanex) and resulted in a value of 1.03. It is estimated by regressing weekly returns on stock against NYSE composite, using 5 years of data or listed period (if less than 5 years). If data is available for less than 2 years, the Beta is not estimated.
$\mathbf{(R_m – R_f)}$: Risk premium estimate for the Chilean market based upon the country ratings among various international and national studies concluding in a value of 5.85%.

$R_{country}$: Country risk shall be included since the analysis uses a value of Beta obtained from the USA Chemical Specific Industries. For Chile this value is equal to 1.35% when compared to the USA.

The national benchmark for this type of industries in Chile by December 2th, 2009, including this project activity developed by Methanex S.A. is therefore, equal to 13.6%.

The project evaluation considers the following items:

- **Investment:** The following table details the values of the items considering in the investment.

Table B 2: Investment items details

Investment	USD	Source
Equipment and materials	3,046,102	Vestas contract page 37
Civil works	14,232	Purchase order, Soc. Profesional IBISCUS LTDA.
Cable conection	170,188	Quotation, WHOLESALE ELECTRIC SUPPLY CO.
Fundation	385,870	Economic offer, SALFA SA
Fundation engeenering	14,794	Purchase order, Pares y Alvarez Ingenieros asociados Ltda.
Assembly	701,628	Quotation, BURGER GRÚAS y Transportes Especiales
Transformer	118,583	Quotation, Shaffner
Road	131,126	Purchase order, CONSTRUCTORA A.OJEDA M. Y CIA LTDA
Equipment transport to the site	878,773	Quotation, DSV GL, Chile
Others	163,839	Assumption of 3% of the total investment
TOTAL investment	**5,625,134**	**calculated**
USD/KW installed capacity	**2,206**	**calculated**

- **Operational costs**: The economic evaluation considers a constant expense during the project lifetime associated to preventive maintenance and operational costs that are necessary for the turbine's operation. The following table details each value.

Table B 3: Operational costs details

Operational costs	USD	Source
Preventive Maintenance	52,620	Vestas contract preventive manteinance page 25
Operation	56,251	Assumption of 1% of the investment for operation, administration and corrective maintenance

- **Tax:** The economic evaluation considers two types of tax; one associated with the tax that the company must pay every year during the project lifetime. This corresponds to 35% of the income

before taxes[10], calculated as: total benefits minus total expenses associated to each year of the project activity (total expense considers the operational costs and the annual depreciation of the investment).
The economic evaluation also considers an income tax associated to benefits granted by the austral law[11], which aims to stimulate the economic development of the Region. The austral law indicates that the corresponding tributary credit is 32% of the investment.

- **Sources:** The project sources are the benefits associated with the natural gas savings. The basic parameters for the calculation of the natural gas savings are:

Table B 4: Natural gas savings consumption parameters

Parameter	Value	Source
Installed wind capacity (MW)	2.55	Project specification
Plant load factor (%)	48%	Independent wind availability studies *
Operation hours (h/year)	8,760	Project specification
Maximum estimated output (MWh/year)	10,722.2	calculated
Natural gas consumption efficiency (MWh/ m^3)	0.00167	Monitored by Methanex
Natural gas savings (m^3/year)	6,436,871	calculated
Natural Gas NCV (GJ/m^3)	0.0035	Monitored by ENAP/Methanex
Average natural gas price (US$/$m^3$)	0.106	Internal Methanex information. News paper: "El Magallanes" 14/05/09 - "Prensa Austral" 06/05/09
Natural gas price annual rate	2.1%	Methanex Monthly Average Regional Posted Contract Price History, http://www.methanex.com/products/documents/MxAvgPrice_Aug302010.pdf

* The plant load factor was conservatively determined based on the following two independent wind availability studies on the project activity location: "Micro-modulation of Cabo Negro Sector and Eolic Park Implementation" realized by Universidad de Magallanes on December 2008; and "Preliminary Analyses on eolic exploration in Punta Arenas" realized by EcofysVelgest S.A. on July 2008.

The natural gas savings parameters consider standard temperature and pressure conditions (see Table B 8).

The natural gas annual rate was conservative calculated considering the monthly methanol price published by Methanex in its web site as a source to calculate the methanol price annual rate of growth considering the difference between the methanol price median for years 2005 and 2010. Is important to note that Methanex has long-term natural gas supply contracts for its production facilities in Chile, and

[10] Income Tax rate Chile, http://www.sii.cl/aprenda_sobre_impuestos/estudios/sistemrenta_ingles.htm
[11] 19606 Law: "Establish incentives for the economic development of Aysen and Magallanes Region and the province of Palena", http://www.bcn.cl/leyes/134828.

20.320 Law: "Extending the incentives for economic development of regions of Aysen and Magallanes and the province of Palena and amending the law of free zones contained in the DFL No. 2, 2001 of the Ministry of Finance", http://www.diariooficial.cl/actualidad/20ulle/20320.html

these natural gas supply contracts include base and variable price components and the variable price component is adjusted by formulas related to methanol prices, therefore is conservative to consider the variation of Methanol prices[12].

The period of the financial analysis is 21 years and it is based on the technical lifetime of the wind turbines[13] to be installed in the project activity. A linear depreciation rate over the 21 period years is applied according Chilean accounting regulations, so the assets will be fully depreciated at the end of the analysis period. Nevertheless a fair value of 30% of the initial investment is conservatively included as a cash inflow at the end of the analysis period.

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

Finally, the result of the financial parameter IRR is:

Table B 5: Project IRR

	Project IRR (%)	Benchmark (%)
Financial Parameter	10.8%	13.6%

As it can be seen in Table B 5 above, the project IRR does not reach the benchmark minimum, the baseline does not need additional investment and is therefore not evaluated.

It is important to note that as it can be seen in the following table the current installed capacity of the baseline system is higher than the maximum historic consumption (years 2006 to 2009) and thus Methanex has no need to expand capacity confirming that the baseline does not need additional investment.

Table B 6: System capacity and energy consumption

Parameter	unit	Value
Current installed capacity	MW	30.4
Current maximum generation	MWh/year	266,304.0
Maximum historic consumption (year 2006)*	Mwh/year	122,523.5

* Table B11 details the historic consumption for years 2006 to 2009.

Sensitivity analysis

According to the Guidance on the Assessment of Investment Analysis, *the objective of the sensitivity analysis is to determine in which scenarios the project activity would pass the benchmark.*

According to the economic evaluation the following parameters are included in the sensitivity analysis:

a) Natural gas price

[12] Methanex Annual report 2009, page 72, http://www.methanex.com/investor/documents/2010/Annual%20Report_09.pdf

[13] Vesta's equipments specification, http://www.vestas.com/en/about-vestas/principles/sustainability/wind-turbines-and-the-environment/life-cycle-assessment-(lca).aspx

b) Plant Load factor
c) Investment cost

The project IRR is analyzed for a fluctuation of +10% for Natural gas price and Plant load factor and -10% for investment cost; the three parameters are analyzed independently, the results are shown in the following table:

Table B 7: Sensibility analysis results without sale of CERs

Parameter	Fluctuation (%)	IRR (%)
a) Natural gas price*	+10%	11.7%
b) Plant load factor	+10%	11.7%
c) Investment cost	-10%	12.1%

* It must be considered, that the natural gas price already considered an annual rate of growth and therefore is conservative to consider a fluctuation of +10% for Natural Gas Price.

The results presented above show that the project IRR does not exceed the benchmark minimum confirming the fact that Methanex's wind project activity doesn't reach the benchmark. Therefore this project proves it's additionally by an investment barrier.

Besides the investment barrier, Methanex will overcome the following barriers:

C. Barrier due to First of Its Kind (lack of prevailing practice)
"Prevailing practice or existing regulatory or policy requirements would have led to implementation of a technology with higher emissions".

Related to the barrier due to First of Its Kind, it must be noted that,

1) The project activity is the first of its kind in the Magallanes Region:
In Chile, there are only six wind farm projects in operation: Alto Baguales (1.98 MW) located in the Aysen region, Lebu (3.5 MW) located in the Biobio Region, and Canela I (18.2 MW), Canela II (60 MW), Totoral (46 MW) and Monte Redondo (38 MW) located in the Coquimbo Region[14].

And according to the National Environmental Impact Assessment System there is no another wind farm approved project in the XIIth Region of Magallanes.

Therefore, Cabo Negro Wind farm project corresponds to the first wind farm project in the XIIth Region of Magallanes and it aspires to be a technological reference for future initiatives. It is important to note that the usual practice in the Region is electric generation from natural gas[15], which will prevail without the project activity implementation.

[14] CEDEC, https://www.cdec-sic.cl/estadisticas/peajes/ERNC/Catastro%20ERNC.xls

[15] Installed generation capacity in the XIIth Region of Magallanes
http://www.cne.cl/cnewww/export/sites/default/06_Estadisticas/Documentos/capacidad_instalada_de_generacion.xls

2) The project activity is the first of its kind in captive wind generation (not grid connected) in Chile:
As it was mentioned, in Chile there are only six wind farm projects in operation, all of them export electricity to the grid: Alto Baguales Project is part of the Aysén Interconnected System[16], and Lebu, Canela I, Canela II, Totoral and Monteredondo are part of the Central Interconnected System[17].

And according to the National Environmental Impact Assessment System, despite the Cabo Negro Wind farm project there is no other captive wind farm project approved in Chile (all the wind farm approved projects will be connected to the grid).

Therefore there is no similar project that uses wind power generated electricity in production activities in Chile.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

>> The electricity generated by wind energy is used directly in Methanex facilities. In the absence of the project activity, equivalent amount of electricity would have been generated by the current generators using natural gas, which correspond to the baseline scenario.

According to the approved small scale methodology AMS-I.A *the energy baseline is the fuel consumption of the technology in use or that would have been used in the absence of the project activity to generate the equivalent quantity of energy estimated using three available options*.

For this case the option 3 of the methodology was selected because option 1 considers a number of consumers which did not correspond to the Methanex's project activity and option 2 considers a group of renewable energy technologies.

Option 3 considers that *the baseline can be a trend-adjusted projection of historic fuel consumption in situations where an existing technology is replaced. Specifically the emissions baseline is the historic fuel consumption calculated times the CO2 emission factor for the fuel displaced. IPCC default values for emission factors may be used.*

The emission reductions are calculated as:

Equation B 3: Emission reductions

$$ER_y = BE_y - PE_y - L_y$$

Where:
ER_y: Emission reductions for the year y (tCO_{2e}/y).
BE_y: Baseline emissions for the year y (tCO_{2e}/y).
PE_y: Project emissions for the year y (tCO_{2e}/y)
L_y: Leakage for the year y (tCO_{2e}/y)

16 National Energy Commission http://www.cne.cl/cnewww/export/sites/default/06_Estadisticas/Documentos/capacidad_instalada_de_generacion.xls

17 Economic Load Dispatch Center (CDEC), https://www.cdec-sic.cl/estadisticas/peajes/ERNC/Catastro%20ERNC.xls

Project emissions (PE)

Considering that wind electricity generation is a technology that doesn't generate GHG, there is no project emission, therefore PEy = 0.

Leakage (L)

In accordance with methodology AMS I.A, *leakage is to be considered only if the energy generating equipment is transferred from another activity or if the existing equipment is transferred to another activity*. In this project activity this is not applicable so Ly = 0

Hence,
ERy = BEy

Baseline Emissions (BE)
According to the option 3 of the methodology and considering that the only fuel type in the base line is consumption of natural gas, the baseline emission reduction is calculated as:

Equation B 4: Baseline emissions

$$BE_{CO2,y} = FC_y * NCV * EF_{CO2}$$

Where:

$BE_{CO2\,y}$:	Emissions in the baseline in year *y*; t CO_{2e}/year
FC_y :	Amount of natural gas consumption in year *y;* m^3/year
NCV_y :	Net calorific value of natural gas in year y; GJ/m^3
EF_{CO2} :	CO2 emission factor of natural gas; t CO2e/GJ

The Net Calorific Value (NCV) is calculated considering the average of the Gross Calorific Value (GCV) monitored monthly for each methanol plant by the natural gas supplier (ENAP) and corrected to NCV based on the IPCC 2006 assumption that for Natural Gas NCV is 10% lower than GCV.

The considered CO_2 emission factor corresponds to the one indicated in the 2006 IPCC Guidelines for national greenhouse gas inventories, Volume 2.

The amount of fuel consumption replaced by the project activity is calculated considering that wind electricity generation displaces the electricity that would be generated with natural gas if the project doesn't exist. Therefore the replaced fuel consumption corresponds to the division of wind electricity generation with the fuel consumption efficiency.

Equation B 5: Fuel consumption

$$FC_y = \frac{EG_{WIND\,y}}{FCE}$$

Where:

FC_y :	Amount of natural gas consumption; in year *y;*m^3/year
$EG_{WIND\ y}$:	Net Total Wind Electricity Generation in year y; MWh/year
FCE:	Fuel consumption efficiency; MWh/m^3

The fuel consumption efficiency is calculated considering the following equations:

Equation B 6: Fuel consumption efficiency weighted average calculation

$$FCE = \frac{\sum_{y} FCE_{y} * EG_{TOTAL,y}}{\sum_{y} EG_{TOTAL,y}}$$

Where:

FCE : Fuel consumption efficiency; MWh/m^3

FCE_y: Fuel consumption efficiency in year y; MWh/m^3

$EG_{TOTAL,y}$: Net total electricity generation in year y; MWh/year

It must be considered that, for conservative ex-post Emissions Reduction calculation, Methanex considered that in case the ex-post calculated value for fuel consumption efficiency is higher than the fixed ex-ante figure, it shall be used for the calculation of baseline emissions.

The rationale for that is that in case any of the generating units is replaced (for more modern and efficient one) or in case the least efficient ones are removed during the crediting unit, fixed ex-ante fuel consumption efficiency for the entire crediting period would not be conservative. Therefore, by monitoring and calculating ex-post the fuel consumption efficiency and using it in case it is higher than the ex-ante figure ensures a conservative calculation of baseline emissions.

The fuel consumption efficiency per year for ex-ante and ex-post calculations considers the following equations:

Equation B 7: Fuel consumption efficiency per year

$$FCE_{y} = \frac{EG_{TOTAL,y}}{C_{NG\ TOTAL,y}}$$

Where:

$FCE\ y$: Fuel consumption efficiency in year y; MWh/m^3

$EG_{TOTAL}y$: Net total electricity generation in year y; MWh/year

$C_{NG\ TOTAL}y$: Total natural gas consumption in year y; m^3/year

The total electricity generation corresponds to:

Equation B 8: Total electricity generation per year

$$EG_{TOTAL,y} = \sum_{i} EG_{i}$$

Where:

EG_{TOTALy}: Net total electricity generation in year y; MWh/year

$EG_{i,y}$: Net electricity generation per generation unit i in year y; MWh/year

The total natural gas consumption corresponds to:

Equation B 9: Total natural gas consumption per year

$$C_{NG\ TOTAL,y} = C_{NG\ DIRECT\ y} + C_{NG\ INDIRECT\ y}$$

Where:

$C_{NG\ TOTALy}$: Total natural gas consumption in year y; m^3/year
$C_{NG\ DIRECT\ y}$: Direct natural gas consumption by natural gas turbine in year y; m^3/year
$C_{NG\ INDIRECT\ y}$: Indirect natural gas consumption by steam turbine in year y; m^3/year

Equation B 10: Total direct natural gas consumption by natural gas turbine per year

$$C_{NG\ DIRECT\ y} = \sum_j C_{NG\ DIRECT\ j,y}$$

Where:

$C_{NG\ DIRECT,\ y}$: Total direct natural gas consumption by natural gas turbines in year y; m^3/year
$C_{NG\ DIRECT\ j,\ y}$: Direct natural gas consumption per natural gas turbine j in year y; m^3/year

Equation B 11: Total indirect natural gas consumption by steam turbine per year

$$C_{NG\ INDIRECT\ y} = SFC_y * \sum_k C_{STEAM\ k,y}$$

Where:

$C_{NG\ INDIRECT,\ y}$: Total indirect natural gas consumption by steam turbines in year y; m^3/year
SFC_y: Specific natural gas consumption by boilers in year y; m^3/ton steam
$C_{STEAM\ k,\ y}$: Steam consumption per steam turbine k in year y; ton/year

Equation B 12: Specific natural gas consumption by boilers per year

$$SFC_y = \frac{\sum_l C_{NG\ BOILER\ l,y}}{\sum_l SG_{l,y}}$$

Where:

SFC_y: Specific natural gas consumption by boilers in year y; m^3/ton steam
$C_{NG\ BOILER,\ l,y}$: Natural gas consumption per boiler l in year y; m^3/year
$SG_{,l,\ y}$: Steam generation per boiler l in year y; ton/year

All natural gas consumption values are determined at normal conditions and then corrected at standard conditions.

Table B 8: Measurement conditions

Condition	Temperature (ºK)	Pressure (psia)
Normal conditions	273.15	14.69
Standard conditions	288.75	14.73

B.6.2. Data and parameters that are available at validation:

Data / Parameter:	**FCE**
Data unit:	MWh/ m^3
Description:	Fuel Consumption Efficiency of natural gas
Source of data used:	Project developer
Value applied:	0.00167
Justification of the choice of data or description of measurement methods and procedures actually applied :	This parameter is calculated according the equations detailed in section B.6.1.
Any comment:	As it was explained in chapter B.6.1 the ex-post calculated value for Fuel Consumption Efficiency (FCE) will be used only as a conservative calculation if it is higher than the ex-ante value

Data / Parameter:	**EF_{CO2}**
Data unit:	tCO_{2e}/GJ
Description:	Fixed CO_2 Emission Factor of gas natural
Source of data used:	IPCC default values at the lower limit of the uncertainty at a 95% confidence interval as provided in table 2.4 of Chapter 2 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories
Value applied:	Natural Gas: 0.0543 tCO_{2e}/GJ
Justification of the choice of data or description of measurement methods and procedures actually applied :	No other data is publicly available. IPCC guidelines have been used in a conservative manner.
Any comment:	This value is going to be fixed during the crediting period.

B.6.3 Ex-ante calculation of emission reductions:

>>

Project emission

As it was indicated in chapter B.4, the electricity is generated by a renewable source and therefore is not producing any project emissions. Therefore,

$$PE_y = 0$$

Leakages

According to the detail in Chapter B.6.1 there is not leakage in the project activity. Therefore,

$$L_y = 0$$

Baseline emissions
The baseline emissions are calculated according to the equations detailed in section B.6.1.

The following table shows the values considered for Equation B 4:

Table B 9: Baseline emissions calculation

Baseline emissions		
Fuel consumption (FC)	Sm3/year	6,436,871
Natural gas emission factor (EF_{NG})	ton CO2/GJ	0.0543
Net Calorific Value (NCV)	GJ/m3	0.035
Baseline Emissions (BE)	tCO2/year	12,204.4
Baseline Emissions (BE)	**tCO2/year**	**12,204.0**

The baseline emissions considered data from years 2006 to 2009, the project developer included year 2006 in a conservative manner, because as it can be seen in the following tables the year 2006 was the one with the higher electricity generation.

The baseline emissions are rounded off in a conservative manner.

The fuel consumption is calculated according Equation B 5 considering the following values:

Table B 10: Fuel Consumption calculation

Fuel Consumption		
Total Net Wind Electricity generation (EG_{WIND})	MWh/year	10,722.2
Fuel consumption efficiency (FCE)	MWh/Sm3	0.00167
Fuel consumption (FC)	Sm3/year	6,436,871

The ex-ante fuel consumption efficiency, Equation B 6 is calculated based on:

Table B 11: Weighted average fuel consumption efficiency calculation

Year	EG total	FCE	EG total * FCE
	MWh/year	MWh/m3	MWh/year*MWh/m3
2006	122,523.5	0.00186	227.4
2007	83,272.1	0.00161	134.3
2008	64,318.5	0.00152	97.6
2009	58,277.1	0.00151	87.8
TOTAL	**328,391.2**	**-**	**547.0**

Therefore,

FCE (weighted average)	**MWh/m3**	**0.00167**

The FCE per year is calculated considering Equation B 7 and the following values:

Table B 12: Fuel consumption efficiency calculation

Year	$C_{NG\ TOTAL}$	EG total,y	FCEy
	Sm3/year	MWh/year	MWh/m3
2006	66,023,491.7	122,523.5	0.00186
2007	51,640,347.8	83,272.1	0.00161
2008	42,393,441.8	64,318.5	0.00152
2009	38,688,891.0	58,277.1	0.00151

The electricity generation value per generation unit used in Equation B 8 to calculated total electricity generation is detailed in table 1 in annex 3.

The total natural gas consumption is calculated with Equation B 9 using the following values:

Table B 13: Natural Gas consumption calculation

Year	$C_{NG\ INDIRECT}$	$C_{NG\ DIRECT}$	$C_{NG\ TOTAL}$
	Sm3/year	Sm3/year	Sm3/year
2006	29,445,229.0	36,578,262.7	66,023,491.7
2007	23,485,245.3	28,155,102.6	51,640,347.8
2008	8,640,438.1	33,753,003.8	42,393,441.8
2009	9,812,079.5	28,876,811.5	38,688,891.0

The total direct natural gas consumption ($C_{NG\ DIRECT}$) per year is calculated with Equation B 10 considering the direct natural gas consumption per natural gas turbine; the values are detailed in table 1 of the annex 3.

The total indirect natural gas consumption ($C_{NG\ IN\ DIRECT}$) per year is calculated considering Equation B 11 and Equation B 12 the specific values are detailed in tables 1, 2 and 3 of annex 3.

Emission reductions

The emission reductions are composed by the baseline emissions, the project emissions and leakage emissions according the equation B1.

Considering that there aren't project or leakage emissions, the emission reductions will be the baseline emission.

Therefore, the emission reductions are:

$$ER_y = 12{,}204.0$$

Is important to note that the presented CO_{2e} emission reductions are ex-ante; the calculations for real emissions reductions are going to be done yearly considering the measured wind electricity generation and fuel consumption efficiency.

B.6.4 Summary of the ex-ante estimation of emission reductions:

>>

Table B 14: Summary of ex-ante emission reductions

Year	Estimation of project activity emissions (tonnes CO2 e)	Estimation of baseline emissions (tonnes CO_2 e)	Estimation of leakage (tonnes CO2 e)	Estimation of overall emission reductions (tonnes CO2 e)
2011	0	12,204	0	12,204
2012	0	12,204	0	12,204
2013	0	12,204	0	12,204
2014	0	12,204	0	12,204
2015	0	12,204	0	12,204
2016	0	12,204	0	12,204
2017	0	12,204	0	12,204
Total (tCO_2 e)	**0**	**85,428**	**0**	**85,428**

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

B.7.1 Data and parameters monitored:

Data / Parameter:	**EG_{WINDy}**
Data unit:	MWh/day
Description:	Total Net Wind Electricity Generation by Cabo Negro Wind Farm Project, Phase 1
Source of data to be used:	Directly measured, Project Developer. (SCADA Server stores relevant data in a database, enabling the generation of reports and being the server for the graphical visualization system). The meter model is ION 7650 power quality analyzer; this is a bidirectional meter; has an error range of 0.2 % and measure the total energy generation by the Cabo Negro Wind Farm Project. As back up units there will be an electricity generation meter in each turbine, this back up units correspond to a Vestas Multi Process that use the voltage signals for the supervision.
Value of data	10,722.2 expected value
Description of measurement methods and procedures to be applied:	Measured daily and archive until two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later.
QA/QC procedures to be applied:	The ION 7650 monitored data of electricity generated by the wind turbines will be crosschecked with the sum of the monitored data of each turbine (back up units). These equipments are going to be considered in the maintenance program of Methanex facilities according the document PR-P-005. The maintenance is going to be done according the document MA-EI-PIN007

	“Requerimientos equipos de medición”. And the calibration will be done according provider specification frequency; at least it will be every 3 years (in case the provider’s specification is more than 3 years, the calibration will be within 3 years or in case the provider’s specification is below three years this specification will be applicable rather than the 3 years). It is important to note that Methanex has a certified ISO9001 QMS and that all CDM monitoring will be embedded in the company’s QMS.
Any comment:	---

Data / Parameter:	**$EG_{i,y}$**
Data unit:	MWh/year
Description:	Electricity generation per existing generation unit i in year y
Source of data to be used:	Daily measured, Project developer (SCADA Server stores relevant data in a database, enabling the generation of reports and being the server for the graphical visualization system).
Value of data	Annual values in table 1 of annex 3. Daily values in spreadsheet of the project activity.
Description of measurement methods and procedures to be applied:	Measured daily and archive until two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later. The associated equipment TAGs are: (see table below) All of the electricity generation main meters detailed above, have a backup meters, with power transduction technology. The main and backup meters of each generator are located in the same board (instrument panel).
QA/QC procedures to be applied:	This equipment is going to be considered in the maintenance program of Methanex facilities according the document PR-P-005. The maintenance is going to be done according the document MA-EI-PIN007 “Requerimientos equipos de medición”. And the calibration will be done according provider specification frequency; at least it will be every 3 years (in case the provider’s specification is more than 3 years, the calibration will be within 3 years or in case the provider’s specification is below three years this specification will be applicable rather than the 3 years). It is important to note that Methanex has a certified ISO9001 QMS and that all CDM monitoring will be embedded in the company’s QMS
Any comment:	

Generation unit	**Electricity meter TAG**	**Technology**	**Max error range**
113-J	WI100	Power transduction	± 0.25 %
GGT-703	3JI9301	Power transduction	± 0.2 %
2GST-701	2JI7604	Energy meter	± 0.2 %
3GST-701	3KI8386	Power transduction	± 0.2 %
XT-7002	4JIX07002	Power transduction	± 0.5 %

<table>
<tr><td>Data / Parameter:</td><td>C $_{NG\ DIRECT\ j,y}$</td></tr>
<tr><td>Data unit:</td><td>m^3/year</td></tr>
<tr><td>Description:</td><td>Direct natural gas consumption per natural gas turbine j in year y</td></tr>
<tr><td>Source of data to be used:</td><td>Project developer</td></tr>
<tr><td>Value of data</td><td>Values in table 1 of annex 3</td></tr>
<tr><td>Description of measurement methods and procedures to be applied:</td><td>Measured daily and archive until two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later.

The associated equipment TAGs are:
<table>
<tr><th>Generation unit</th><th>Natural gas consumption TAG</th><th>Technology</th><th>Max error range</th></tr>
<tr><td>113-J</td><td>1FI209</td><td>Differential pressure</td><td>± 0.2 % span</td></tr>
<tr><td>GGT-703</td><td>FI9401</td><td>Vortex</td><td>± 0.65 % span</td></tr>
</table></td></tr>
<tr><td>QA/QC procedures to be applied:</td><td>This equipment is going to be considered in the maintenance program of Methanex facilities according the document PR-P-005.
The maintenance is going to be done according the document MA-EI-PIN007 “Requerimientos equipos de medición”.
And the calibration will be done according provider specification frequency; at least it will be every 3 years (in case the provider’s specification is more than 3 years, the calibration will be within 3 years or in case the provider’s specification is below three years this specification will be applicable rather than the 3 years).
It is important to note that Methanex has a certified ISO9001 QMS and that all CDM monitoring will be embedded in the company’s QMS</td></tr>
<tr><td>Any comment:</td><td></td></tr>
</table>

<table>
<tr><td>Data / Parameter:</td><td>C $_{STEAM\ k,y}$</td></tr>
<tr><td>Data unit:</td><td>ton/year</td></tr>
<tr><td>Description:</td><td>Steam consumption per steam turbine k in year y</td></tr>
<tr><td>Source of data to be used:</td><td>Project developer</td></tr>
<tr><td>Value of data</td><td>Values in table 1 of annex 3</td></tr>
<tr><td>Description of measurement methods and procedures to be applied:</td><td>Measured daily and archive until two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later.

The associated equipment TAGs are:
<table>
<tr><th>Generation unit</th><th>Steam consumption TAG</th><th>Technology</th><th>Max error range</th></tr>
<tr><td>2GST-701</td><td>2FI7600</td><td>Differencial pressure</td><td>± 0.075 % span</td></tr>
<tr><td>3GST-701</td><td>3FI7600</td><td>Differencial pressure</td><td>± 0.075 % span</td></tr>
<tr><td>XT-7002</td><td>4FI070101</td><td>Differencial pressure</td><td>± 0.0625 %</td></tr>
</table></td></tr>
</table>

QA/QC procedures to be applied:	This equipment is going to be considered in the maintenance program of Methanex facilities according the document PR-P-005. The maintenance is going to be done according the document MA-EI-PIN007 “Requerimientos equipos de medición”. And the calibration will be done according provider specification frequency; at least it will be every 3 years (in case the provider’s specification is more than 3 years, the calibration will be within 3 years or in case the provider’s specification is below three years this specification will be applicable rather than the 3 years). It is important to note that Methanex has a certified ISO9001 QMS and that all CDM monitoring will be embedded in the company’s QMS
Any comment:	

Data / Parameter:	**$SG_{l,y}$**
Data unit:	ton/year
Description:	Steam generation per boiler l in year y
Source of data to be used:	Project developer
Value of data	Values in table 2 of annex 3
Description of measurement methods and procedures to be applied:	Measured daily and archive until two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later The associated equipment TAGs are: (see table below)
QA/QC procedures to be applied:	This equipment is going to be considered in the maintenance program of Methanex facilities according the document PR-P-005. The maintenance is going to be done according the document MA-EI-PIN007 “Requerimientos equipos de medición”. And the calibration will be done according provider specification frequency; at least it will be every 3 years (in case the provider’s specification is more than 3 years, the calibration will be within 3 years or in case the provider’s specification is below three years this specification will be applicable rather than the 3 years). It is important to note that Methanex has a certified ISO9001 QMS and that all CDM monitoring will be embedded in the company’s QMS
Any comment:	

Boiler	**Steam generation TAG**	**Technology**	**Max error range**
102-U	1FI-214	Differencial pressure	± 0.075 % span
106-U	1FI-223	Differencial pressure	± 0.075 % span
X-611	3FIC-5108	Differencial pressure	± 0.075 % span
X-614	3FI-9103	vortex	± 0.65 % span

Data / Parameter:	**$C_{NG\ BOILER\ l,y}$**
Data unit:	m^3/year

<table>
<tr><td>Description:</td><td>Natural gas consumption per boiler l in year y</td></tr>
<tr><td>Source of data to be used:</td><td>Project developer</td></tr>
<tr><td>Value of data</td><td>Values in table 2 of annex 3</td></tr>
<tr><td>Description of measurement methods and procedures to be applied:</td><td>Measured daily and archive until two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later.

The associated equipment TAGs are:
<table>
<tr><th>Boiler</th><th>Natural gas consumption TAG</th><th>Technology</th><th>Max error range</th></tr>
<tr><td>102-U</td><td>1FI-212</td><td>Differencial pressure</td><td>± 0.2 % span</td></tr>
<tr><td>106-U</td><td>1FI-221</td><td>Differencial pressure</td><td>± 0.075 % span</td></tr>
<tr><td>X-611</td><td>3FIC-6033</td><td>Differencial pressure</td><td>± 0.075 % span</td></tr>
<tr><td>X-614</td><td>3FI-9101</td><td>vortex</td><td>± 0.65 % span</td></tr>
</table></td></tr>
<tr><td>QA/QC procedures to be applied:</td><td>This equipment is going to be considered in the maintenance program of Methanex facilities according the document PR-P-005.
The maintenance is going to be done according the document MA-EI-PIN007 “Requerimientos equipos de medición”.
And the calibration will be done according provider specification frequency; at least it will be every 3 years (in case the provider’s specification is more than 3 years, the calibration will be within 3 years or in case the provider’s specification is below three years this specification will be applicable rather than the 3 years).
It is important to note that Methanex has a certified ISO9001 QMS and that all CDM monitoring will be embedded in the company’s QMS</td></tr>
<tr><td>Any comment:</td><td></td></tr>
</table>

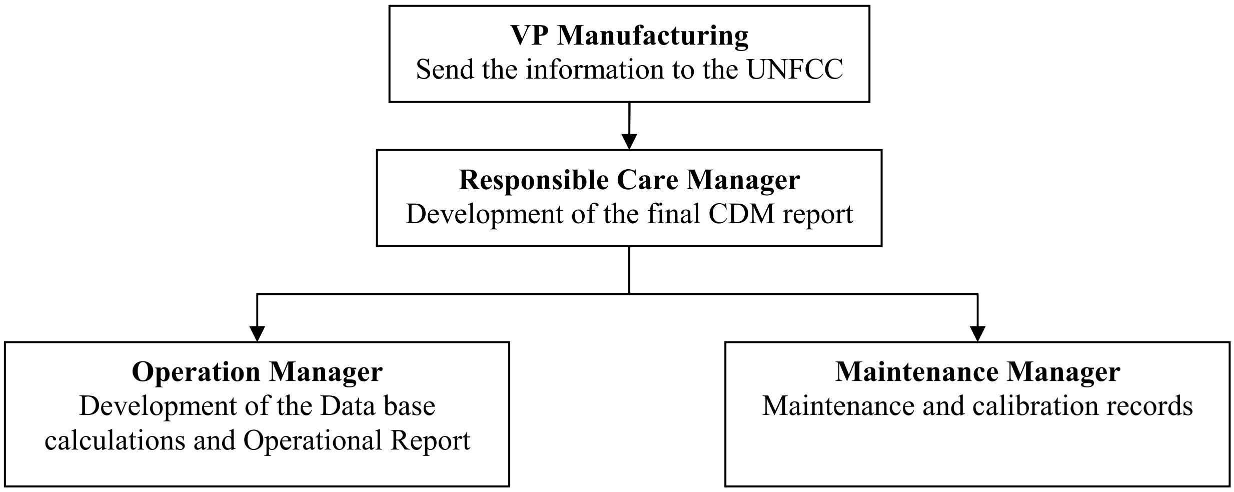
Data / Parameter:	**NCV**
Data unit:	GJ/m^3
Description:	Net Calorific Value for natural gas in year y
Source of data to be used:	This parameter is calculated based on the monitoring of GCV (Gross Calorif Value) by ENAP/Project developer
Value of data	0.035 (see annex 3 for calculation details)
Description of measurement methods and procedures to be applied:	Measured monthly for each plant and archive until two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later.
QA/QC procedures to be applied:	This parameter is monitored monthly by the natural gas supplier (ENAP).
Any comment:	ENAP monitored the Gross Calorific Values (GCV) for natural gas, this value were corrected to Net Calorific Values (NCV) based on the IPCC 2006 assumption that for Natural gas NCV is 10% lower GCV. For the emission reduction calculation the average NCV per year is considered.

B.7.2 Description of the monitoring plan:

>> The monitoring plan to be applied is based on the parameters detailed in section B.7.1.

1. Monitoring organization

The project activity contemplates the proper staff to perform the monitoring of the parameters associated to the CDM project, the following figure shows the roles and responsibilities of the staff involved in the CDM project.



Previous to the project start the Operation and Maintenance Managers will receive the adequate training to gather and record the corresponding data in order to comprehend and know about the adequate sites and systems incorporated for data and record keeping, the correct steps to collect the data and to check it before its storage, the internal audits schedule, how to proceed in cases of equipment failure, etc. The proper procedures will be elaborated, previous to the starting date of the project

2. Monitoring equipment and installation

Related to the monitoring of the electricity generated by the project activity, it is important to note that before the installation of the meter, it should be factory calibrated by the manufacturer. Records of the meter (type, make, model and calibration documentation) will be retained.

As mentioned above, the operation and maintenance managers will be trained in order to ensure that their staff will check periodically the metering equipment operation and keep records of the electricity generation, in MWh/day once a month. The records will be archived electronically for the entire crediting period plus two years.

3. Data recording procedure

For all monitored parameters, with exception of the NCV, the readings of monitored data will be recorded on line on daily basis and archived electronically on a monthly basis by the involve staff. As it can be seen in the spreadsheet, a data analysis will be done considering an occurrence probability analysis that will allow the elimination of data minor than cero and the lower data with an occurrence probability less than 6%.

The only exception is the NCV which is determined monthly by ENAP analysis (see section B.7.1).

The maintenance measurements are going to be done according the document MA-EI-PIN007 "Requerimientos equipos de medición". Maintenance records and any calibration documents will be retained by the project participant.

In the event of electricity meter, of the existing generation units, failing the data will be replaced according the "Procedure of data substitution" considering the existing back up meters.

The failed meter will be repaired or replaced by an accredited equipment testing organization.

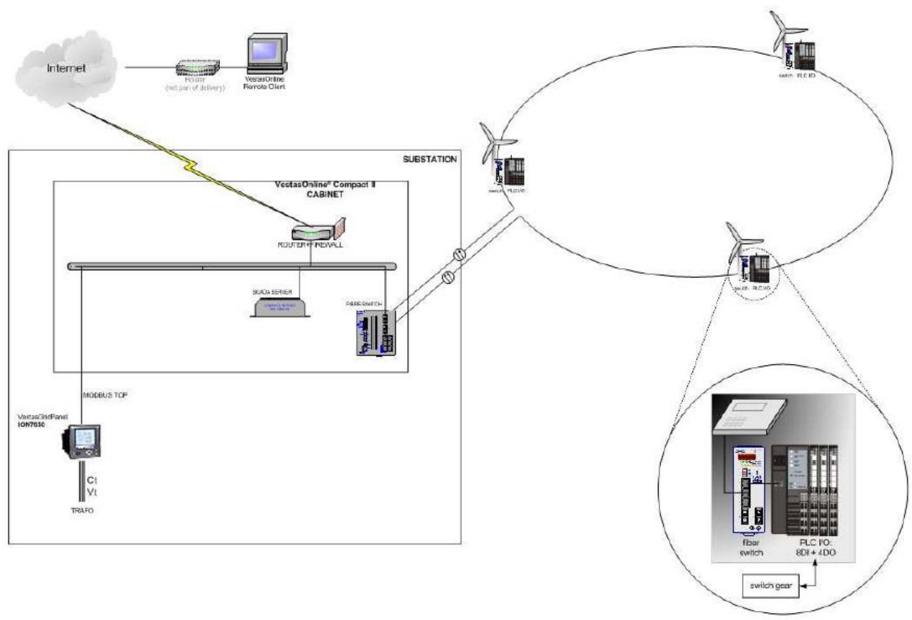
It is important to note that as it was explained in chapter B.6.1 the ex-post calculated value for fuel consumption efficiency will be used only as a conservative calculation if it is higher than the ex-ante value.

For the Total Wind Electricity Generation by Cabo Negro Wind Farm Project, the procedure of data substitution in case of failure of the ION 7650 meter considers the sum of the data monitored by each electricity turbine meter (back up units); this is also described in the "Procedure of data substitution" available in Methanex facilities.

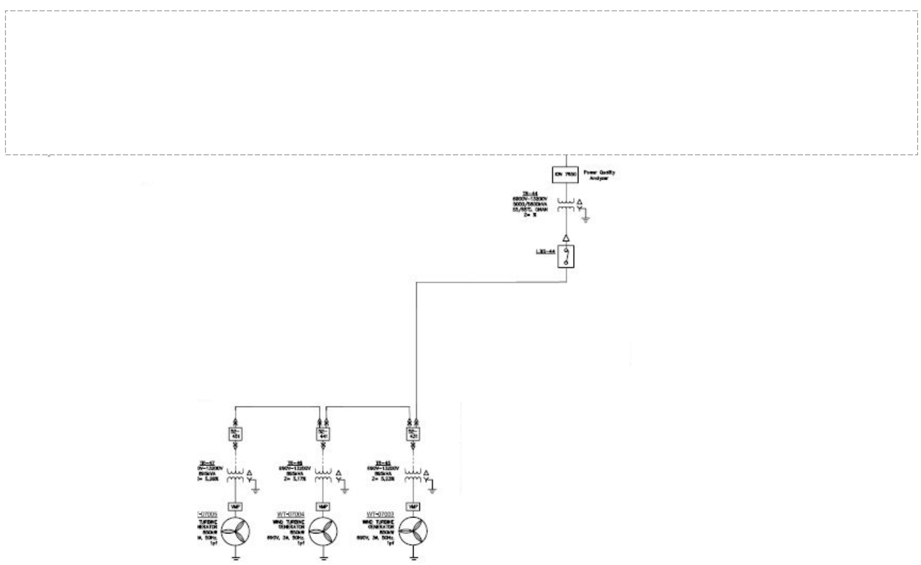
4. Data and records management

At the end of each month the monitoring data will be filed electronically. The electronic files will have digital and hard copy back-up.

For the electricity generated by the project the figure below shows the functional overall layout of the SCADA System and additional components,



The following wiring diagram includes the meters location associated to the Wind Electricity Generation by Cabo Negro Wind Farm Project. It can be seen that ION 7650 will be near to the electricity ring and each turbine meter will be connected to its turbine.



B.8 Date of completion of the application of the baseline and monitoring methodology and the name of the responsible person(s)/entity(ies)

>> 13/07/2010
POCH AMBIENTAL S.A.
Ignacio Rebolledo A.; Carolina Urmeneta L.
Renato Sánchez 3838, Santiago, Chile
Telephone Number: (56 – 2) 207 0154
ignacio.rebolledo@poch.cl; carolina.urmeneta@poch.cl
The entity is not a project participant.

SECTION C. Duration of the project activity / crediting period

C.1 Duration of the project activity:

C.1.1. Starting date of the project activity:

>> 02/12/2009, this date correspond to the date on which contracts for equipment have been signed.

C.1.2. Expected operational lifetime of the project activity:

>> The expected operational lifetime of the project activity will be 21 years or 252 months.

C.2 Choice of the crediting period and related information:

The project activity will use a renewable 7 years crediting period.

C.2.1. Renewable crediting period

C.2.1.1. Starting date of the first crediting period:

>> The first carbon crediting period will begin on 01/01/2011 or the day after registration (if the project is in operation).

C.2.1.2. Length of the first crediting period:

>> 7 years, 0 months

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

>> N/A

C.2.2.2. Length:

>> N/A

SECTION D. Environmental impacts

>>

D.1. If required by the host Party, documentation on the analysis of the environmental impacts of the project activity:

>> Methanex project activity is not subject to obtaining an environmental impact authorization. The applicable Chilean law is the 19300[18] which stipulates in its article number 10, letter (c) that the generator centrals with capacity over 3 MW must be submitted to an environmental impact evaluation. Considering that the installed capacity of the project activity is 2.55 MW it does not have to obtain an environmental authorization.

Despite the previous indication, Methanex according its continuous preoccupation and care with the environment, decided in a voluntary way to present a simplified Declaration of Environmental Impact (DIA for its Spanish acronym) to the environmental authority (CONAMA) on 31/08/2009. Methanex received its approval through the respective Resolution of Environmental Qualifications (RCA for its Spanish acronym) on 05/11/2009.

Environmental Impact Declaration (DIA), project commitments and Resolution of Environmental Qualifications (RCA) can be downloaded from the web page of the National Environmental Impact Assessment System (SEIA for its spanish acronym) at https://www.e-seia.cl/expediente/ficha/fichaPrincipal.php?id_expediente=4010859&idExpediente=4010859&modo=ficha

D.2. If environmental impacts are considered significant by the project participants or the host Party, please provide conclusions and all references to support documentation of an environmental impact assessment undertaken in accordance with the procedures as required by the host Party:

>> According the previous section, this is not applicable.

SECTION E. Stakeholders' comments

>>

E.1. Brief description how comments by local stakeholders have been invited and compiled:

>> Methanex Chile S.A. has invited to the local stakeholder meeting through an open public announcement invitation made by local paper. The meeting was held at the conference room in Magallanes University in Punta Arenas, Chile, on September 4th, 2009.

The meeting was attended by 93 participants, including the Magallanes City Councilor and representatives from Designated National Authority (CONAMA), Health Ministerial Regional Secretariat, National Properties Ministerial Regional Secretariat, Mining Ministerial Regional Secretariat, Magallanes University, Magallanes Electricity Company (EDELMAG S.A), Oil National Company (ENAP S.A.), Gas Distribution Company (GASCO), Isla Riesco Mining, Industrial lawyer's office (Bufete Industrial Ltda.), Oil and Gas Explorer Company (Geopark), Austral Press, among others.

[18] 19300 Law "Ley Sobre bases generales del medio ambiente", http://www.bcn.cl/leyes/30667

Before starting the meeting, each participant received a document with a brief description of wind energy in Magallanes, the project, its technical characteristics and location, and the CDM, a brochure of the company and a note book.

The meeting agenda considered the following topics:

- Opening
- Company introduction
- Technical characteristics of the project
- Environmental considerations of the project
- Climate change, Kyoto protocol, CDM project, emission reductions and contribution to the sustainable development
- Questions session

The meeting was recorded in a video and there are also pictures. Some of the pictures from the stakeholders meeting are presented in the following figure.

Figure E 1: Pictures of stakeholders meeting

Additionally to the local stakeholder meeting, the project developer included the technical and CDM project presentation in the semester meeting of the Community Advisory Panel (PAC for its Spanish name), which is an own Methanex activity that consists in active meetings with community members as a way to participating in and improving the quality of life in the region.

The Community Advisory Panel meeting was held at a conference room in Mundo Dreams Hotel in Punta Arenas, Chile, on September 3[th], 2009. And it was attended by 17 participants, including the Methanex Responsible Care Manager and representatives from Designated National Authority (CONAMA), Health Ministerial Regional Secretariat, Magallanes Council, Chilean Red Cross, Magallanes University, National Youth Institute and Oil National Company (ENAP S.A.) and Chilean Security Association (ACHS).

The following figure corresponds to pictures of the meeting with the Community Advisory Panel.

Figure E 2: Pictures of the Community Advisory Panel meeting

E.2. Summary of the comments received:

>> Participating stakeholders made questions related to:

- Congratulations to Methanex for the project and the transparency that has included in the presentation of the project to the local stakeholders. Whit the congratulations the main stakeholders comments were related to the benefits associated to the project considering:
    - it will be the first one in the region and the people expect that the project would be a technological reference for future initiatives allowing the diversification of the local energy generation in the region
    - wind energy is a widely available source in the region and Methanex is the first company that will install a wind farm making reality a region dream since 1980
    - the benevolence to the environment
- Type of technology considered for the turbines, fixed or variable speed? The project developer explained that a fixed speed had been pre-selected, but the definitive answer will be available once the vendor is selected.
- Landscape improvement with the project, is Methanex considering a visiting center? The project developer indicated that it is a very good suggestion and it would be considered.
- Is the project developer considering a possible interconnection to the grid? The project developer explained that it is Methanex`s vision of the future to continue to grow the wind generation farm and possibly to export this energy to the Magallanes grid but this will be part of another project.

During the Community Advisory Panel the members made questions and comments related to:

- Congratulations to Methanex for the project from all the members of the Panel.
- Does the crediting period make any difference in the CERs value? The project developer explained that the crediting period does not make any difference in the CERs value and there is not any risk evaluation related to it.
- What are going to be the incomes associated to the CERs? And it influence in the economic project evaluation. The project developer indicated that considering an emission reduction of 10,000 ton CO_2/year and a conservative value of 10.0 USD/ton CO_2. The incomes associated to the CERs will be around 100,000 USD/year, this incomes does not provide a significant difference in the economic project evaluation.
- Does the CER value expected to increase? The project developer explained that the CER market operates as any market regulated by the demand and offer. The project developer indicated expected the continuing of the CER market and if the demand is bigger than the offer expected CER value should increase.
- Possible hazard to the fauna from the installation of the aero-generators. The project developer explained that as the Environmental Declaration indicates the project any site is not located near any migratory routes for bird species.
- Will the noise affect the livestock farmer activity? The project developer detailed that, as the Environmental Declaration indicates, the project fulfills with all the requirements including the noise, and therefore the project should not affect the livestock farmer.

E.3. Report on how due account was taken of any comments received:

>> The comments to the project were encouraging and they were mainly congratulations for the implementation of the wind project as the first one in the region.
The questions were immediately answered at the meeting by the project developer.
The project developer received only one suggestion related to the construction of a visiting center which is not a direct suggestion for the project activity, the project developer will evaluate this suggestion.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	METHANEX CHILE S.A.
Street/P.O.Box:	Km 28 ½ , Ruta 9 Norte
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Salutation:	
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Personal E-Mail:	rneumann@methanex.com

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

Not applicable.

Annex 3

BASELINE INFORMATION

The following table details the monitored electricity generation (EG) and gas or steam consumption ($C_{NG\ DIRECT}$ or C_{STEAM}) by each generator for the most recent four years. The daily detail can be seen in the spreadsheet associated to this PDD.

Table 1: Electricity generation and natural gas or steam consumption per tubine

Year	113-J		GGT-703		2GST-701	
	Natural gas turbine		Natural gas turbine		Steam turbine	
	Electricity	Natural gas	Electricity	Natural gas	Electricity	Steam
	MWh	Sm3/h	MWh	Sm3/h	MWh	ton/h
	WI100	1FI209	3JI9301	FI9401	2JI7604	2FI7600
2006	27,913.6	10,420,672.0	35,850.4	26,157,590.7	14,309.8	98,132.0
2007	16,962.6	7,208,371.6	20,012.2	20,946,731.0	17,545.8	114,858.1
2008	19,578.7	9,126,860.7	27,704.5	24,626,143.0	809.3	28,385.7
2009	22,224.2	9,486,906.7	16,483.7	19,389,904.8	131.2	8,082.0

Year	3GST-701		XT-7002	
	Steam turbine		Steam turbine	
	Electricity	Steam	Electricity	Steam
	MWh	ton/h	MWh	ton/h
	3KI8386	3FI7600	4JIX07002	4FI070101
2006	27,009.4	173,703.4	17,440.4	116,411.0
2007	19,227.6	129,280.0	9,523.7	57,553.7
2008	16,226.1	114,384.2	0.0	0.0
2009	19,438.0	132,607.9	0.0	0.0

The following table details the monitored steam generation (SG) and natural gas consumption ($C_{NG\ BOILER}$) by each boiler for the most recent four years. The daily detail can be seen in the spreadsheet associated to this PDD.

Table 2: Steam generation and natural gas consumption per boiler

Year	102-U		106-U		X-611		X-614	
	Steam boiler		Steam boiler		Steam boiler		Steam boiler	
	Steam	Natural gas	Steam	Natural gas	Steam	Natural gas	Steam	Natural gas
	Ton/h	Sm3/h	Ton/h	Sm3/h	Ton/h	Sm3/h	Ton/h	Sm3/h
	1FI-214	1FI-212	1FI-223	1FI-221	3FIC-5108	3FIC-6033	3FI-9103	3FI-9101
2006	296,940.3	22,744,181.4	282,568.5	21,836,228.6	374,370.6	29,143,837.2	337,569.3	24,221,272.7
2007	268,682.3	20,818,280.1	235,594.8	19,573,967.8	234,863.7	18,452,057.5	213,330.3	15,300,928.9
2008	77,438.1	286,962.3	11,396.2	975,470.6	204,682.3	16,334,397.7	199,947.6	12,267,637.2
2009	141,919.3	8,250,711.0	138,258.7	9,944,783.0	139,336.9	11,109,972.2	156,271.6	10,851,370.2

The Specific Fuel Consumption (SFC) determined for the boilers is detailed in the following table.

Table 3: Specific fuel consumption

Year	SFC
	Sm3 natural gas / ton steam
2006	75.8
2007	77.8
2008	60.5
2009	69.7

The average of the Gross Calorific Value monitored by ENAP-Methanex is detailed in the following table; the monthly detail can be seen in the spreadsheet associated to this PDD

Table 4: Average GCV

Year	Average GCV
	(MMBTU/Mm3)
2006	36,888
2007	36,802
2008	36,917
2009	36,689

The NCV calculations details can be seen in the following table:

Table 5: NCV calculation

Parameter	Unit	Value	Source
Average GCV	(MMBTU/Mm3)	**36,824**	Calculated
NCV/GCV		0.9	IPCC
NCV	(MMBTU/Mm3)	33,141	Calculated
NCV	**GJ/m3**	**0.035**	**Calculated**

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Annex 4

MONITORING INFORMATION

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