

## Appendix A<sup>1</sup> to the simplified modalities and procedures for small-scale CDM project activities

**CLEAN DEVELOPMENT MECHANISM  
SIMPLIFIED PROJECT DESIGN DOCUMENT  
FOR SMALL SCALE PROJECT ACTIVITIES (SSC-PDD)  
Version 01 (21 January, 2003)**

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<sup>1</sup> This appendix has been developed in accordance with the simplified modalities and procedures for small-scale CDM project activities (contained in annex II to decision 21/CP.8, see document FCCC/CP/2002/7/Add.3) and it constitutes appendix A to that document. For the full text of the annex II **to decision 21/CP.8** please see <http://unfccc.int/cdm/ssc.htm>.

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

### **A.1 Title of the project activity:**

Antonio Moran Wind Power Plant Project in Patagonia Region, Argentina (hereinafter referred to as the Project)

### **A.2 Description of the project activity:**

A local cooperative in Comodoro Rivadavia city of Argentina, called Sociedad Cooperativa Popular Limitada de Comodoro Rivadavia (SCPLCR), distributes to its members electricity purchased from the Argentina's Patagonia grid. Rapid increase in cooperative members in the late 1990's and growing local demand for electricity required the cooperative to find a way to reduce its electricity expenses. The co-op has chosen to establish its own power generation system that is powered by wind energy, as the Patagonia region (where the city is located) has abundant wind energy potentials.

After the establishment of small-scale pilot projects on wind farm development near the project site in 1994 and 1997, SCPLCR tried to conduct another wind power development project in 2000. This project is the cooperative's first full-scale wind project, with its capacity being 10.56 MW, consisting of 16 units of 660 kW generator. SCPLCR has intended to distribute the electricity produced by this power plant to its members and to substitute electricity purchased from the Patagonia grid, which is mainly fed by natural gas thermal power plants and hydro power plants.

The cooperative has been considering about implementing this project under the CDM scheme since the planning stage of the project. SCPLCR has conducted financial analysis and found that the project is financially feasible only if the reduction credits are applied to the project.

This project contributes sustainable development in the following aspects:

- Created job opportunities for the construction,
- Reduce air pollutants to be emitted from natural gas thermal plants connected to the Patagonia grid, and
- Building the capacities related to wind farm in Argentina through advanced technology transferred from developed country.

### **A.3 Project participants:**

Project participant in host country:

SCPLCR (Sociedad Cooperativa Popular Limitada de Comodoro Rivadavia)  
San Martín 1641 CP 9000 - CC 163 Comodoro Rivadavia Chubut - Argentina

Project participant in donor country:

PCI (Pacific Consultants International)  
1-7-5 Sekido Tama-shi, Tokyo 206-8550 Japan

### **A.4 Technical description of the project activity:**

#### **A.4.1 Location of the project activity:**

**A.4.1.1** Host country Party(ies):

The Argentine Republic

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

Chubut

**A.4.1.3** City/Town/Community etc:

Comodoro Rivadavia

**A.4.1.4** Detailed description of the physical location, including information allowing the unique identification of this project activity (*max one page*):



<http://www.aonikenk.com.ar/DESTINOS/Comodoro%20rivadavia/mapas%20INGLES.htm>

#### **A.4.2 Type and category(ies) and technology of project activity**

The type and category of the project is as shown below, from the methodologies noted in UNFCCC document “Simplified Modalities and Procedures for Small-Scale CDM Project Activities (FCCC/CP/2002/7/Add.3).”

Type I: Renewable energy projects

I.D.: Renewable electricity generation for a grid

The renewable energy projects include wind power generation and the maximum output capacity is required not to be over 15 megawatts to be eligible for type I project activities, according to decision 17/CP.7, paragraph 6 (c) (i). As mentioned above, the project is to construct 10.56 MW wind power plant and supply electricity to the Patagonia grid. Therefore, the project is eligible for type I.D. project activities.

**A.4.3 Brief statement on how anthropogenic emissions of greenhouse gases (GHGs) by sources are to be reduced by the proposed CDM project activity:**

The Project reduces CO<sub>2</sub> emissions from the natural gas thermal power plants, which are considered to continue their operation even in the absence of the Project as identified in the baseline scenario (as described in Section B) during the first crediting period. After the second crediting period, baseline scenario will be reviewed including the fuel type compositions in the Patagonia grid and its interconnection with Argentina’s national power grid.

As shown below, most of the power to the Patagonia grid is currently generated at natural gas thermal power plants; approximately 80% by natural gas and the remaining 20% by hydropower. In the absence of the project, natural gas thermal power plants should be generating the additional electricity that the wind project is to generate.

In addition, Patagonia grid is essentially isolated from the national grid, as revealed in the data of electricity interchange between the two grids. Even if the national government’s plan to develop the capacity of transmission lines connecting the two grids is realized in the future, the Patagonia grid is expected to only supply electricity to the national grid and never receive power due to the excessive demand in the national grid and the excessive supply in the Patagonia grid.

As for the future prospect on dominant power sources, according to the Secretariat of Energy of Argentina, it is expected that natural gas continues to be the main energy source for the Patagonia grid because the selection of energy source is entirely up to the nation’s private sector that tends to choose the cheapest power source, currently natural gas.

Therefore, the amount of CO<sub>2</sub> that would be emitted from natural gas thermal power plants that are equivalent to 10.56 MW wind power plant will be replaced by the Project activity.

Electricity generation of the power plants connected to the Patagonia grid in 1999

Energy source	Power plant	GWh	Total GWh
Natural gas	P. Madrin	200	1,321 79%
	C. Rivadavia	177	
	P. Truncardo 1	337	
	P. Truncardo 2	0	
	PATA21GE	308	
	PATA22GE	299	
Hydro	Futaleufu*	236	342
	Amegihno	106	21%
Total			1,663

Note: Futaleufu hydro power plant supplies electricity exclusively to Aluar aluminium factory. Therefore, the value of Futaleufu shown in this table is the excessive electricity to be supplied to the grid.

**A.4.4 Public funding of the project activity:**

No public funding is not used.

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

The project is not a debundled component of a large project activity, because the other two wind power plants of SCPLCR, the project participant, has been operated since 1994 and 1997, thus they cannot be registered as CDM projects.

## **B. Baseline methodology**

### **B.1 Title and reference of the project category applicable to the project activity:**

The baseline methodology employed in the project activity uses the procedures described in paragraph 27, 28 and 29 of appendix B of the simplified M&P for small-scale CDM project activities for “I.D. Renewable electricity generation for a grid”.

### **B.2 Project category applicable to the project activity:**

As mentioned in paragraph 23 of appendix B of the simplified M&P for small-scale CDM project activities, the category, type I.D., comprises renewables, including wind power plants, which supply electricity to an electricity distribution system that is supplied by at least one fossil fuel.

The applicability to the Project is justified because the project is to construct a wind power plant and supply electricity to the grid, which is supplied by natural gas thermal power plants.

### **B.3 Description of how the anthropogenic GHG emissions by sources are reduced below those that would have occurred in the absence of the proposed CDM project activity (i.e. explanation of how and why this project is additional and therefore not identical with the baseline scenario)**

Additionality of the project is explained below in terms of investment barrier included in the four (investment, technological, prevailing practice, and other) described in attachment A of appendix B of the simplified M&P for small-scale CDM project activities.

#### **B.3.1 Investment barriers:**

Even in Patagonia region that contains rich resources of wind energy, wind power cannot be the main power source because the region is also rich in natural gas and natural gas thermal power plants generate most of the electricity supplied to the Patagonia grid. In order to promote wind power generation, the central government of Argentina and the local government of Chubut province have taken several measures promoting wind power projects, namely subsidy and tax exemption (national law for wind and solar power: Ley 25019, provincial law of Chubut for wind power: Ley 4389). However, due to the government’s severe financial situation, the effects of this policy seem limited and financial feasibility for a wind power development project is not improved enough.

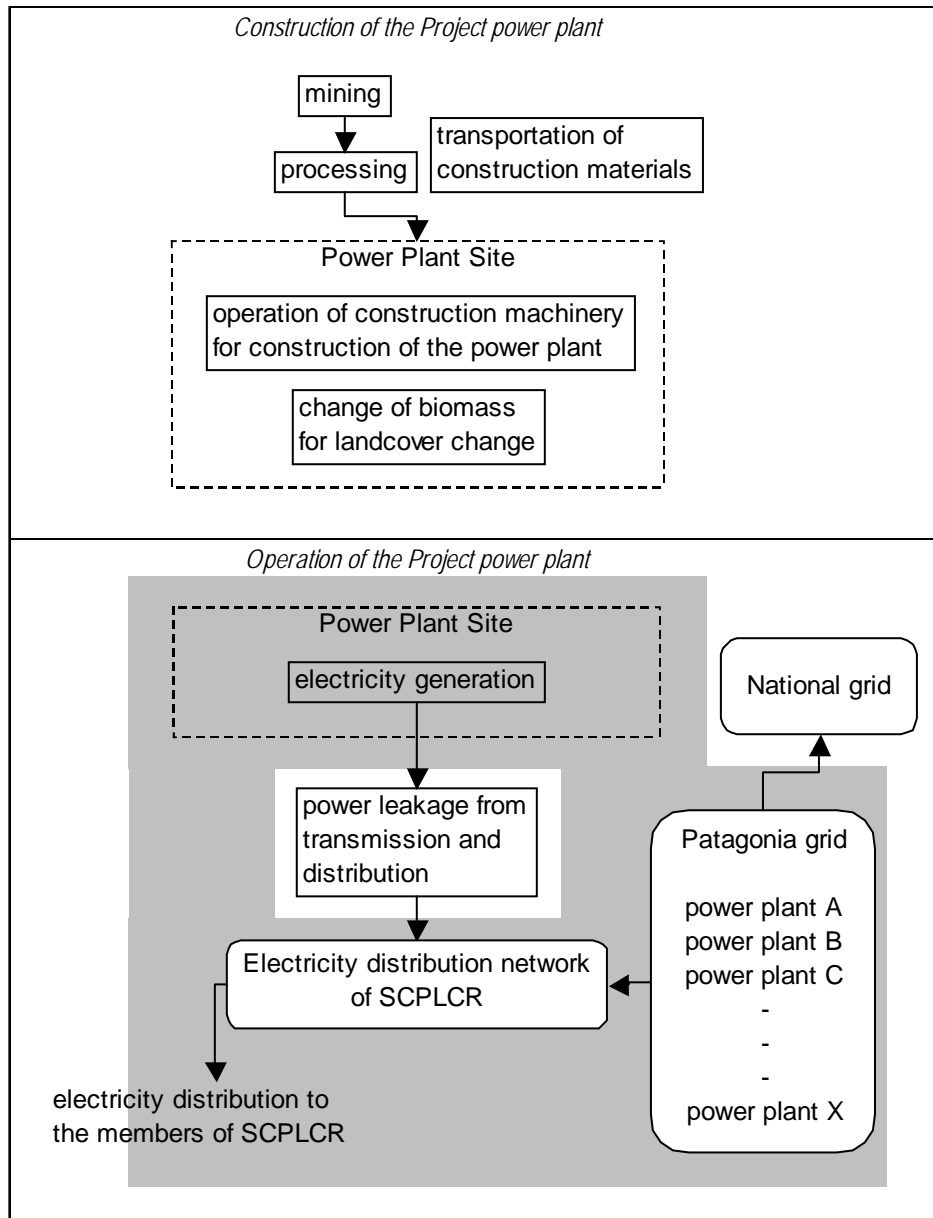
A financial analysis for the project, which was conducted prior to the project implementation, reveals the project is not feasible because the project’s IRR (internal rate of return) during its repayment period is 6.10% without revenue of CER (certified emission reduction), which is lower than the interest rate of 7.5%; however, assuming CER is sold at 5 USD, project IRR improves up to 7.63%, which is higher than interest rate of 7.5%. Therefore, the project has an investment barrier.

#### **B.3.2 Technical barriers:**

The manufacturing technology of a wind power generator is not developed in Argentina and all of the wind power generators of SCPLCR have been imported from developing countries, Denmark and Spain. SCPLCR has to provide education and capacity building for operation staff with the assistance of the plant suppliers in the stage of operation, management and maintenance. Therefore, they form technical barrier to implement the Project.

#### **B.4 Description of the project boundary for the project activity:**

As mentioned in paragraph 26 of appendix B of the simplified M&P for small-scale CDM project activities, the project boundary encompasses the physical, geographical site of the renewable generation source. Therefore, the area within the project boundary is determined inside of the project site as shown in Figure 1.



Note:  
 —▶ : Flow of materials or energy  
 □ : Activity related to GHG emission  
 ■ : Area within project boundary

**Figure 1. The Project boundary determined**

**B.5 Details of the baseline and its development:**

**B.5.1** Specify the baseline for the proposed project activity using a methodology specified in the applicable project category for small-scale CDM project activities contained in appendix B of the simplified M&P for small-scale CDM project activities:

The baseline scenario and its rationale are described below.

**1. SCPLCR will purchase electricity from the Patagonia grid in order to distribute it to its members without constructing any power plant.**

1-1 SCPLCR cannot construct a fossil fuel-based power plant.

Since the Patagonia region has a huge potential of oil and natural gas resources, natural gas has been generally used for electricity generation and oil has been used for other purposes. Even though a natural gas power plant has high financial feasibility, SCPLCR cannot obtain minimum investment required to establish a natural gas power plant and achieve the high feasibility. Considering a relatively low operating rate of a wind power plant compared to a natural gas power plant, equivalent size of a natural gas power plant to the Project is smaller than appropriate size and this scale of natural gas power plant does not exist in the Patagonia grid.

1-2 SCPLCR cannot construct a power plant of renewable energy, except wind power.

There is not any appropriate place for a hydro power plant development near Comodoro Rivadavia city. In addition, it is difficult to achieve lower cost of electricity generation than wind power by other renewable energies in the region.

1-3 SCPLCR cannot construct the wind power plant. (Project case)

SCPLCR has conducted two pilot projects and they are financially dependent on SCPLCR's other public services. Accordingly, the Project should be operated independently in the financial aspect. However, as mentioned in "B 3.1 Investment barriers", the financial analysis shows that the Project cannot be financially independent without the revenue of CER, and therefore, SCPLCR cannot implement the wind power Project in the absence of CDM.

**B.5.2** Date of completing the final draft of this baseline section (*DD/MM/YYYY*):

01/04/2005

**B.5.3** Name of person/entity determining the baseline:

Pacific Consultants Co., Ltd.

Mr. Kenji Asakawa

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**C. Duration of the project activity and crediting period**

**C.1 Duration of the project activity:**

**C.1.1** Starting date of the project activity:

November 2001

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

30 years

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

**C.2.1 Renewable crediting period (at most seven (7) years per crediting period)**

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

01/11/2001

**C.2.1.2** Length of the first crediting period

Seven (7) years

**C.2.2 Fixed crediting period (at most ten (10) years):**

**C.2.2.1** Starting date

(This option is not selected for the Project.)

**C.2.2.2** Length (max 10 years):

(This option is not selected for the Project.)

## **D. Monitoring methodology and plan**

**D.1 Name and reference of approved methodology applied to the project activity:**

As mentioned in paragraph 31 of appendix B of the simplified M&P for small-scale CDM project activities, monitoring shall consist of metering the electricity generated by the renewable technology. Therefore, monitoring consists of metering the electricity generated by wind power plants of the Project.

In order to receive the subsidies from the national government and the provincial government, electricity power producers are required to obtain certification of the method for monitoring electricity generated, because the subsidies are provided per a unit of electricity generated. Therefore, a national monitoring standard is applied to the monitoring activity planned in this PDD.

**D.2 Justification of the choice of the methodology and why it is applicable to the project activity:**

The Project is to construct wind power plants and supply electricity to the grid. In addition, total generation capacity is less than 15MW. Therefore, the methodology of type I.D. (Renewable electricity generation for a grid) is applicable to the Project.

**D.3 Data to be monitored:**

ID number	Data type	Data variable	Data unit	Measured (m), calculated (c) or estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/paper)	For how long is archived data to be kept?	Comment
ID1	Energy amount	Electricity generation by the project	MWh	m	Monthly	100%	Electronic/Paper	At least 2 years after final crediting period	To be measured from electrical meters installed at the plant. Data quality is assured by checking measured data with the values submitted to the governments for the subsidy.
ID2	Energy amount	Fuel consumption by all fossil fuel thermal power plants connected to the Patagonia grid	t, m <sup>3</sup>	m	Every one year	100 %	Electronic/Paper	At least 2 years after final crediting period	To be obtained from the annual report issued by CAMMESA
ID3	Energy amount	Electricity generation by all power plants connected to the Patagonia grid	MWh	m	Every one year	100 %	Electronic/Paper	At least 2 years after final crediting period	To be obtained from the annual report issued by CAMMESA
ID4	Energy amount	Electricity supply from the other grid to the Patagonia grid	MWh	m	Every one year	100%	Electronic/Paper	At least 2 years after final crediting period	To be obtained from the annual report issued by CAMMESA

The following formula shall be used to calculate emission reduction:

$$ER = ID1 * EF_{CM}$$

where,

$$EF_{CM} = \frac{EF_{OM} + EF_{BM}}{2}$$

$$EF_{OM} = \frac{\sum_{i,j} (ID2_{i,j} \times NCV_i \times EF_i \times OXID_i)}{\sum_j (ID3_j) + ID4}$$

$$EF_{BM} = \frac{\sum_{i,m} (ID2_{i,m} \times NCV_i \times EF_i \times OXID_i)}{\sum_m (ID3_m) + ID4}$$

$EF_{OM}$ : Appropriate operating margin (the weighted average emissions of all generating sources serving the system, excluding hydro, geothermal, wind, low-cost biomass, nuclear and solar generation)

$EF_{BM}$ : Build margin (the weighted average emissions of recent capacity additions to the system, which capacity additions are defined as the greater of most recent 20% of existing plants or the 5 most recent plants)

$NCV_i$ : Net calorific value per mass or volume unit of a fuel  $i$ , verified by local values

$EF_i$ : The CO<sub>2</sub> emission factor per unit of energy of the fuel  $i$ , calculated from the default values listed in the 1996 Revised IPCC Guidelines

$OXID_i$ : The oxidation factor of a fuel  $i$  listed in the 1996 Revised IPCC Guidelines

$j$ : The power sources delivering electricity to the grid, not including low-operating cost and must-run power plants, and including imports to the grid

$m$ : The power sources consist of recent capacity additions to the system, which capacity additions are defined as the greater (in MWh) of most recent 20% of existing plants or the 5 most recent plants

#### D.4 Name of person/entity determining the monitoring methodology:

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Mr. Kenji Asakawa

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## E. Calculation of GHG emission reductions by sources

### E.1 Formulae used:

#### E.1.1 Selected formulae as provided in appendix B:

As mentioned in paragraph 29 of appendix B of the simplified M&P for small-scale CDM project activities, the baseline is the kWh produced by the renewable generating unit multiplied by an emission coefficient calculated in a transparent and conservative manner: the average of the “approximate operating margin” and the “build margin”, or the weighted average emissions of the current generation mix. The methodology allows the project participants to choose more transparent one and the project participants select the average of the “approximate operating margin”(OM) and the “build margin” (BM), which is called “combined margin” (CM) for the following reasons:

- the project participants have enough information to estimate the coefficient more transparently to calculate GHG emission reduction,
- the combined margin approach conforms exactly to the approved consolidated baseline methodology ACM0002 of “Consolidated baseline methodology for grid-connected electricity generation from renewable sources” , which can be applied to normal scale wind power plant project and should be more transparent than the simplified baseline methodology, and
- the coefficient will be estimated more transparently by ex-post monitored data, namely fuel consumptions and electricity generations of all power plants connected to the Patagonia grid, as planned.

As mentioned in A.4.3, the OM equals to the average emission factor of the natural gas power plants, because the electricity of the Patagonia grid is supplied by natural gas power plants, fossil fuel power plants and hydro power plants, low-cost/must-run power plants. The OM is calculated as follows:

$$\text{Average fuel consumption rate (FCR) of natural gas power plants connected to the Patagonia grid in 1999} = 0.376 \text{ Nm}^3/\text{kWh}$$

Source: CAMMESA<sup>2</sup>

$$\begin{aligned} \text{OM} &= \frac{\text{CO}_2 \text{ emission factor of natural gas power plant}}{\text{(t-CO}_2\text{/Nm}^3\text{)}} \\ &= \frac{\text{Carbon emission factor}^{*1} \text{ (t-C/TJ)} \times \text{Net calorific value}^{*2} \text{ (Tcal/Nm}^3\text{)} \times \text{Carbon oxidation rate}^{*3} \text{ (0.995)} \times \text{Conversion rate} \text{ (4.1868 TJ/Tcal)} \times \text{FCR} \text{ (0.376 Nm}^3\text{/kWh)} \times 44}{12} \\ &= \frac{15.3 \text{ (t-C/TJ)} \times 8.4 \times 10^{-6} \text{ (Tcal/Nm}^3\text{)} \times 0.995 \times 4.1868 \text{ (TJ/Tcal)} \times 0.376 \text{ (Nm}^3\text{/kWh)} \times 44}{12} \\ &= 0.000738 \text{ t-CO}_2\text{/kWh} \quad \left( \underline{0.738} \text{ kg-CO}_2\text{/kWh} \right) \end{aligned}$$

<sup>2</sup> CAMMESA is an abbreviation of Compañía Administradora del Mercado Mayorista Eléctrico, which is in charge of scheduling, dispatching electricity to meet demand and settling electricity market transactions.

- \*1: Carbon emission factor: Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories: Workbook/TABLE I-2 CARBON EMISSION FACTORS (CEF)
- \*2: Net calorific value: CAMMESA
- \*3: Carbon oxidation rate: Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories: Workbook/TABLE I-4 FRACTION OF CARBON OXIDISED

For BM, the weighted average of the FCR of the recent 5 power plants is estimated higher than the one of the recent 20% power plants as shown in the following table. Therefore, BM is calculated as follows:

$$\begin{aligned}
 \text{BM} &= \frac{\text{Carbon emission factor (t-C/TJ)} \times \text{Net calorific value (Tcal/Nm}^3) \times \text{Carbon oxidation rate} \times \text{Conversion rate (TJ/Tcal)} \times \text{FCR (Nm}^3\text{/kWh)}}{44} \div 12 \\
 &= \frac{15.3 \text{ (t-C/TJ)} \times 8.4 \times 10^{-6} \text{ (Tcal/Nm}^3) \times 0.995 \times 4.1868 \text{ (TJ/Tcal)} \times 0.354 \text{ (Nm}^3\text{/kWh)}}{44} \div 12 \\
 &= 0.000695 \text{ t-CO}_2\text{/kWh} \quad ( \underline{0.695} \text{ kg-CO}_2\text{/kWh} )
 \end{aligned}$$

List of the power plants recently constructed

Energy source	Power plant (Unit)	Commercial operating year (COY)	Generation in 1999 (GWh)	Efficiency in 1999 (m3/kWh)
Natural gas	PATA21GE	1996	308	0.329
	PATA22GE	1996	299	0.329
Total/Weighted average (Weighted average of the recent 20% power plants)			606	<b>0.329</b>
Natural gas	PATA21GE	1996	308	0.329
	PATA22GE	1996	299	0.329
	PMADTG22	1978-1985*	80	0.409
	PMADTG21	1978-1985*	121	0.410
	CRVTG22	1978-1985*	73	0.418
Total/Weighted average (Weighted average of the recent 5 power plants)			880	<b>0.354</b>
<i>(Total generaion of the Patagonia grid, including the above planned plants)</i>			1663	
<i>20% of the total</i>			333	

Note: The most efficient natural gas power plants are selected other than PATA21GE and PATA22GE, because COYs of the power plants, operated after the most recent hydro power plant except PATA21GE and PATA22GE, are uncertain.

Therefore, Combined Margin (CM) is calculated as baseline carbon emission factor (CEF) in the following formulae:

$$\begin{aligned}
 \text{Baseline CEF} &= \text{CM} \\
 &= (\text{OM} + \text{BM}) / 2 \\
 &= ( 0.738 \text{ kg-CO}_2\text{/kWh} + 0.695 \text{ kg-CO}_2\text{/kWh} ) / 2 \\
 &= \underline{0.717} \text{ kg-CO}_2\text{/kWh}
 \end{aligned}$$

Annual baseline GHGs emissions are calculated from electricity supplied to the grid from the wind power plants of the Project, multiplied by the abovementioned CEF.

Operating rate of the existing plants of the pilot project is applied to calculate an amount of electricity supplied to the grid by the Project and the baseline scenario. Because the operating rate depends on the local climatic characteristics, the operating rate can be used to estimate the GHG emission of the Project and the baseline scenario. According to SCPLCR, the average operating rates is 40.6%.

Therefore, GHGs emission is calculated below:

$$\begin{aligned}
 &\text{Electricity supplied to the grid (MWh/year)} &= & 660 \text{ kW} * 16 * 24 \text{ hours/day} * 365 \text{ day/year} * 40.6\% \\
 & &= & 37,557 \text{ MWh/year} \\
 \\
 &\text{Baseline GHGs emission t-CO}_2\text{e/year} &= & \text{Electricity supplied to the grid MWh/year} * \text{Baseline CEF kg-CO}_2\text{e/kWh} \\
 & &= & 37,557 \text{ MWh/year} * 0.717 \text{ kg-CO}_2\text{/kWh} \\
 & &= & 26,928 \text{ t-CO}_2\text{e/year}
 \end{aligned}$$

In addition, any leakage, which is measurable and attributable to the Project activity and causes the net change of anthropogenic emissions by sources of greenhouse gases, is not estimated outside the Project boundary.

**E.1.2 Description of formulae when not provided in appendix B:**

**E.1.2.1** Describe the formulae used to estimate anthropogenic emissions by sources of GHGs due to the project activity within the project boundary:

(This option is not selected for the Project.)

**E.1.2.2** Describe the formulae used to estimate leakage due to the project activity, where required, for the applicable project category in appendix B of the simplified modalities and procedures for small-scale CDM project activities

(This option is not selected for the Project.)

**E.1.2.3** The sum of E.1.2.1 and E.1.2.2 represents the project activity emissions:

(This option is not selected for the Project.)

**E.1.2.4** Describe the formulae used to estimate the anthropogenic emissions by sources of GHG’s in the baseline using the baseline methodology for the applicable project category in appendix B of the simplified modalities and procedures for small-scale CDM

project activities: (for each gas, source, formulae/algorithm, emissions in units of CO2 equivalent)

(This option is not selected for the Project.)

**E.1.2.5** Difference between E.1.2.4 and E.1.2.3 represents the emission reductions due to the project activity during a given period:

(This option is not selected for the Project.)

## **E.2 Table providing values obtained when applying formulae above:**

GHGs emission reduction in first crediting period is estimated below:

Year	Baseline emission (t-CO <sub>2e</sub> )	Project emission (t-CO <sub>2e</sub> )	Emission reduction (t-CO <sub>2e</sub> )
Nov. 2001 - Oct. 2002	26,928	0	26,928
Nov. 2002 - Oct. 2003	26,928	0	26,928
Nov. 2003 - Oct. 2004	26,928	0	26,928
Nov. 2004 - Oct. 2005	26,928	0	26,928
Nov. 2005 - Oct. 2006	26,928	0	26,928
Nov. 2006 - Oct. 2007	26,928	0	26,928
Nov. 2007 - Oct. 2008	26,928	0	26,928
Total	188,496	0	188,496

## **F. Environmental impacts**

### **F.1 If required by the host Party, documentation on the analysis of the environmental impacts of the project activity: (if applicable, please provide a short summary and attach documentation)**

The provincial government of Chubut has enforced an environmental impact assessment (EIA) law (LEY No. 4032), which requires EIA for all types of power generation project regardless of its size. According to the law, EIA has been conducted in October 2000.

It concluded that the negative impacts would be insignificant as follows:

- Air pollution caused in construction stage would be limited and occur only during the construction period.
- The impacts on soil and flora would be neutral and low negative.
- The impacts on fauna would be neutral.
- The impacts on landscape would be highly positive with the strong supports from local people.

## **G. Stakeholders comments**

### **G.1 Brief description of the process by which comments by local stakeholders have been invited and compiled:**

The abovementioned EIA law requires public hearing for the Project. The consultation was conducted by environmental management office of Chubut province on 29 December 2000 and around 40 stakeholders participated.

## **G.2 Summary of the comments received:**

- How about the amount of wastes would be generated during construction stage.
- How to avoid damage on autochthonous flora.
- Sincere support of the Project

## **G.3 Report on how due account was taken of any comments received:**

- How about the amount of wastes would be generated during construction stage.

For the basement, pre-cast concrete will be used to minimize the amount of waste from the construction works. All wastes will be transferred to the dumping site designated by the municipality of Comodoro Rivadavia.

- How to avoid damage on autochthonous flora.

The project site was chosen because the area was used for oil mining or is already prepared for the pilot projects, as much as possible. Accordingly, there is originally no flora in those areas. In the other parts, SCPLCR will try to avoid excessive damage on the autochthonous flora based on the experience from the pilot projects.

Annex 1

**CONTACT INFORMATION FOR PARTICIPANTS IN THE PROJECT ACTIVITY**

*1.1 Project Proponent*

Organization:	Sociedad Cooperativa Popular Limitada de Comodoro Rivadavia (SCPLCR)
Street/P.O.Box:	San Martín 1641 CP 9000 - CC 163
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Represented by:	
Title:	
Salutation:	
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*1.2 Project Advisor/Intermediary*

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Annex 2

**INFORMATION REGARDING PUBLIC FUNDING**

There is no official development assistance spent in the Project.

### Annex 3

#### **DETAIL INFORMATION REGARDING MONITORING PLAN**

According to the National Law N° 25019 and the NEP (National Executive Power) Reglamentary Decree N° 1597 and the Province of Chubut Law N° 4389 and the Reglamentary Decree N° 235, which determine the payment of the corresponding subsidies, the following clauses are established and will be applied in order to determine and monitor on a monthly basis the amount of energy generated by the Antonio Morán Wind Power Plant, in relation with the equipment detailed here:

**First Clause:** Description and location of the equipment

- a) The equipment dedicated to the measurement of the energy generated by the Antonio Morán Wind Power Plant is basically composed of 8 measuring posts strategically distributed according to wind power generators' location.
- b) These posts are equipped with tension and electric current measuring load cells linked to a triphasic electronic indirect measuring recorder and each of them will record what was generated by a group of wind power generators.
- c) The denomination and location of each measuring post, as well as the wind power generators registered by each post are detailed below.

Measuring post N°	Measured aerogenerators	Location
2	G 13H-G14H-G15H	Cerro Hermite
3	G16 U	Km4-Universidad-Cable 2
4	G3A-G4A-G5A-G6A-G7A-G8A	Cerro Arenal-Celda 11
5	G1A-G2A	Cerro Arenal-Pto. La Mata
6	G11CH-G12CH	Barrio Pietrobelli
7	G9CH-G10CH	Cerro Chenque-Cable 28

Measuring posts N° 1, 8 and 9 correspond to wind power generators installed prior to this project.

**Second Clause:** Detail of the equipment and instruments destined to the determination and measurement of the energy generated monthly by the Wind Power Plant detailed in the First Clause.

- a) The wind power generators supply their output to a medium tension line (13.2KV), therefore it is necessary to have medium tension and current load cells, which means that an indirect measurement is made.
- b) All measuring posts basically count with tension load cells (T.V.) with a 13.2/0.11 KV current relation (T.I.) which depends on the amount of generators measured; one triphasic electronic recorder and a shortcircuitable contrast and verification terminal assembly type V3A1.

Measuring post N°	Measuring load cells	Medidor Electrónico
2	Compact module(tension and current load cell) MAK brand MJV-outdoors model Triphasic 15KV	N° 207845- ABB Brand- AlphaII-AIR+Iqm; 1(6)A-

	T.V.= 13,2/0,11Kv-Prest.60VA-Class 0,5 T.I. = 100-200/5Amp-Prest.30VA.-Class 0,5	3x380/220-3x110/63,5V Class 1
3	Compact module (tension and current load cell) MAK brand MJV-outdoors model Triphasic 15KV T.V.= 13,2/0,11Kv-Prest.60VA-Class 0,5 T.I. = 50-100/5Amp-Prest.30VA.-Class 0,5	N° 209948- ABB brand- AlphaII-AIR+Iqm; 1(6)A- 3x380/220-3x110/63,5V Class 1
4	Compact module(tension and current load cell) MAK brand MJV-outdoors model Triphasic 15KV T.V.= 13,2/0,11Kv-Prest.60VA-Class 0,5 T.I. = 100-200/5Amp-Prest.30VA.-Class 0,5	N° 207843-ABB Brand- AlphaII-AIR+Iqm; 1(6)A- 3x380/220-3x110/63,5V Class 1
5	Compact module(tension and current load cell) MAK brand MJV-outdoors model Triphasic 15KV T.V.= 13,2/0,11Kv-Prest.60VA-Class 0,5 T.I. = 50-100/5Amp-Prest.30VA.-Class 0,5	N° 209946-ABB Brand- AlphaII-AIR+Iqm; 1(6)A- 3x380/220-3x110/63,5V Class 1
6	Compact module(tension and current load cell) MAK brand MJV-outdoors model Triphasic 15KV T.V.= 13,2/0,11Kv-Prest.60VA-Class 0,5 T.I. = 50-100/5Amp-Prest.30VA.-Class 0,5	N° 207847-ABB Brand- AlphaII-AIR+Iqm; 1(6)A- 3x380/220-3x110/63,5V Class 1
7	Compact module(tension and current load cell) MAK brand MJV-outdoors model Triphasic 15KV T.V.= 13,2/0,11Kv-Prest.60VA-Class 0,5 T.I. = 50-100/5Amp-Prest.30VA.-Class 0,5	N° 207848-ABB Brand- AlphaII-AIR+Iqm; 1(6)A- 3x380/220-3x110/63,5V Class 1

**Third Clause:** Detail of the Measurement Acts recorded and of the notifications submitted to the National Energy Bureau and to the Authorities of the Province of Chubut, in relation to the Monthly Electric Energy generated by the Wind Power Plant.

- a) According to what is referred in the attached Act, production registers corresponding to each Measurement Post are submitted monthly to the Chubut Province's General Department of Public Services and to the Electric Energy Federal Council.
- b) The reports' archives are available in the SCPLCR in notes and worksheets format.

**Fourth Clause:** Antecedents for calibration tasks, implementation of the equipment cited in the first clause, electrical tests for adjustment, loading of the generator and commercial performance tests of the Plant, manufacturer's recommendations. Commercial Implementation Acts of the Wind Power Plant's Generator Groups.

- a) The measurement modules (T.V. and T.I.) were received based on the test protocols performed by the manufacturer according to IRAM 2275 and 2271 norms, where it is specified that the class is lower than 0.5.
- b) The same is true for the electronic recorders, which fulfill Norm IEC 687.
- c) The installation was carried out based on the norms of good art, using certified electronic energy pattern recorders detailed below to verify the connection, phase sequence and accurate measurement of the generated energy.
  - Electronic Pattern Recorder brand: SCHLUMBERGER Model SM3050 N° 00B17311, Class 0.02%. **Certified INTI CEFIS N° 6.163.**
  - Electronic Pattern Recorder brand: MTE Model PWS 1.3 N° 21684, Class 0.02%. **Certified INTI CEFIS N° 4.839.**

**Fifth Clause:** Antecedents of performance monitoring tests for the Wind Power Plant's generation equipment and generated energy measurement equipment, carried out during maintenance tasks with own staff or an external Technical auditor.

- a) The equipment dedicated to the measurement of the energy generated by the wind power generators (measuring posts) is controlled with own personnel following the steps indicated in the attached Internal Technical Procedure N° 11, every half year.

**Sixth Clause:** Detail of the archives corresponding to the amount of Electric Energy generated by the equipment installed in the Wind Power Plant, available types of documents and archive system which should be maintained for ten (10) years, available for verification.

- a) According to what is referred in the attached act, production registers corresponding to each Measurement Post are submitted monthly to the Chubut Province's General Bureau of Public Services and to the Electric Energy Federal Council.
- b) The reports` archives are available in the SCPLCR in notes and worksheets format

**Seventh Clause:** The National Energy Bureau and the Authorities of the Province of Chubut, fulfilling their duties as Authorities for the application of Laws N° 25019 and N° 4389 and with the objective of carrying out the monitoring and control of the Electric Energy generated by the Wind Power Plant, are entitled to perform the following audits, with prior written notification to the SCPLCR:

- a) Technical audit
- b) Accounts audit

They are entitled to investigate books and archives concerning the energy generated and supplied to the service, and also verify with their own criteria the documentation and equipment available with respect to performance and normal work-hours.

**Eighth Clause:** Operative Structure of the Antonio Morán Wind Power Plant:

PLANIFICATION of the OPERATION OF THE WIND POWER PLANT

Operation of the project

	SCPLCR	Administration Council	
	General Manager		
Technical Supervisor			Administrative Manager
Operators			Accountant
Civil works			Junior Administrative
Mechanical works			
Electrical works			

There is a shared responsibility between the Authorities of the National Energy Bureau, the Authorities of the Province of Chubut and the SCPLCR regarding the measurement, determination and quantification of the Energy generated by the Wind Power Plant and the corresponding application of the subsidies established by the National Law and Provincial Law.

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