

GEF

**Mohamed T. El-Ashry**

Chief Executive Officer  
and Chairman

## Global Environment Facility

1818 H Street, NW  
Washington, DC 20433 USA  
Tel: 202.473.3202  
Fax: 202.522.3240/3245  
Email: melashry@worldbank.org

January 13, 2003

Dear Council Member,

The World Bank, as the Implementing Agency for the project, ***Argentina: Enabling Activities Leading to the Second National Communication of the Argentine Government to the Conference of the Parties to UNFCCC***, has submitted the attached proposed project document for CEO endorsement prior to final approval of the project document in accordance with the World Bank procedures.

The Secretariat has reviewed the project document. It is consistent with the proposal approved by the Council in May 2002 and the proposed project remains consistent with the Instrument and GEF policies and procedures. The attached explanation prepared by the World Bank satisfactorily details how Council's comments and those of the STAP have been addressed. I am, therefore, endorsing the project document.

We have today posted the proposed project document on the GEF website at [www.gefweb.org](http://www.gefweb.org). If you do not have access to the Web, you may request the local field office of the World Bank or UNDP to download the document for you. Alternatively, you may request a copy of the document from the Secretariat. If you make such a request, please confirm for us your current mailing address.

Sincerely,

cc: Alternate, Implementing Agencies, STAP

## OFFICE MEMORANDUM

DATE: December 20, 2002

TO: Mr. Mohamed El-Ashry, CEO/Chairman, GEF



FROM: Lars Vidaeus, GEF Executive Coordinator

EXTENSION: 34188

SUBJECT: **ARGENTINA: *Enabling Activity For The Second National Communication Of Argentine Government To The Convention On Climate Change*****Submission for Final CEO Endorsement**

1. Please find attached the electronic file of the Project Appraisal Document (PAD) for the above-mentioned project for your final review and endorsement. This project was approved by the GEF Council Meeting at its May 5, 2002 Council meeting. The scheduled Board date for this project is February 6, 2003. We would appreciate receiving your response, so that we may finalize the Bank Board submission, by January 6, 2002.
2. The PAD is fully consistent with the objectives, scope, and overall cost of the proposal approved at the May 5, 2002 Council meeting. Minor adjustments have been made during final preparation, which have been included in the PAD, are summarized as follows:

Adjustments concerning funds contributed by Recipient:

The in-kind contribution of the Government of Argentina (GOA) to the project has been reduced from its initial amount, as summarized in the following table:

	<b>Distribution of funds approved at Council Meeting (May 5, 2002) [US\$ Million]</b>	<b>Final distribution of Project Funds (December 16, 2002) [US\$ Million]</b>
Recipient	0.71 (in kind)	0.5 (in kind)
GEF	1.14	1.14
<b>Total</b>	<b>1.85</b>	<b>1.64</b>

The Government's contribution to this project accounts for resources to be used for the final development of terms of references of the studies to be executed, for overall supervision and guidance of project execution, and for evaluation of results. A Steering Committee, formed by representatives from all relevant government authorities will be officially created, and will ensure not only proper ownership and cross-sectoral participation, but also transparency and sustainability.

Adjustments concerning resource allocation:

Section C.1 of the PAD includes a table that summarizes the resources allocated to each sub-component of the project. A minor redistribution of resources has been agreed with GOA, to better address the Government's needs and priorities without affecting the total amount of funds provided by the GEF. The following table compares the current allocation of funds, to that approved by the Council in May 2002.

	Allocation of funds approved at Council Meeting (May 5, 2002) [%]	Final allocation of funds (December 16, 2002) [%]
Updating of National GHG inventories and development of emission factors	26.8	24.4
Vulnerability assessment and institutional strengthening for adaptation	40.2	31.1
Formulation of National Mitigation Program	12.3	21.3
Public awareness	10.2	8.2
Drafting of Second National Communication	3.2	1.2
Project management	7.3	12.1 (*)

(\*) The new allocation includes budget for undertaking consultative workshops

The final version of the PAD presents a redistribution of resources, in which additional funds have been allocated to the design of a National Mitigation Program for greenhouse gases (GHG) and resources for the vulnerability component of the project have been reduced. This redistribution stems from the inclusion of an assessment of opportunities for reduction of methane emissions from enteric fermentation, as the impact on GHG emission reductions from this new component may be significant.

The final version of the PAD allocates additional resources to project management, relative to the version presented to the Council Meeting. These resources will fund a Project Implementation Unit (PIU) to ensure the timely and effective execution of all project components, while maintaining communication between all parties involved. More than 15% of this allocation includes the costs of consultative workshops.

GEFSEC comments:

The only GEFSEC comment expected to be addressed at CEO endorsement concerns Project design activities:

*Adjustments to activities to take into account new requirements for second national communications (if any) agreed in the UNFCCC in October 2002.*

The revised version of the GHG inventory sub-component of the project incorporates changes in methodology accorded during COP 8, in October 2002. In particular, national GHG inventories will be estimated and reported using the *Revised 1996 Intergovernmental Panel on Climate Change (IPCC) Guidelines for National*

*Greenhouse Gas Inventories.* The description of the sub-component and its corresponding terms of reference have been modified in the latest version of the PAD.

Council comments:

Council comments were received from Switzerland and from Australia following the meeting on May 5, 2002. Comments from Australia consisted of an endorsement of the project as it was presented to the Council.

Comments from Switzerland consisted of the following three points:

- a. *Switzerland encourages the GEF and the Government of Argentina to utilize the revised UNFCCC guidelines for national communications though they are not legally binding at the time of the GEF council meeting but are expected to enter into force by COP8.*

This comment has already been addressed in regards to the GEFSEC comments.

- b. *Switzerland welcomes efforts to limit the growth of high Global Warming Potential CFC substitutes and encourages the GOA to report, with the update GHG inventory for 2000, on potential emissions of F-gases as outlined in the revised guidelines submitted to SB16.*

The revised IPCC guidelines include recommended tables for reporting national inventory data, which include provisions for reporting HFC and PFC emissions. This is the format that will be used for reporting the data compiled by the inventory.

- c. *The section on vulnerability assessment and institutional strengthening on and the project budget allocate the largest parts of the Vulnerability & Adaptation (V&A) budget to sectoral/subregional investigations. Workstep h) i.e. framing a stage II adaptation programme receives a GEF budget of USD 30,000. Considering the importance of strengthening the awareness on V&A within the Government and the need to establish adaptation policies as an ongoing process, the emphasis on institutional strengthening in this regard may be reconsidered and may merit a higher budget allocation.*

The final budget allocated to the subcomponent in question is US\$ 31,000. Although the concerns expressed by the Swiss constituency are very relevant, this Enabling Activity cannot be yet considered as Stage II; it will rather continue to advance in assessing vulnerabilities (Stage I), while identifying potential elements for an Adaptation Plan (Stage II). The emphasis is placed on the vulnerability assessment, so the budget balance for the vulnerability and adaptation components was not affected. Nonetheless, as can be seen in the terms of reference included in Appendix 12, every regional vulnerability study includes an assessment of potential adaptation options aimed at reducing the impacts of climate change. Moreover, the project includes a sub-component that evaluates the socio-economic impacts of climate change on each of the regions considered, which will also present a comparative economic analysis of the costs of adaptation versus those of mitigation.

Activity *h* in question consists of compiling results from all the studies in the vulnerability component of the project and of designing national adaptation measures.

3. Please let me know if you require any additional information to complete your review of the project document prior to circulation to Council. We look forward to hearing from the Secretariat as soon as possible, whether this document can now be circulated to Council for their review and receiving your endorsement of the project for Bank Board approval.

Many thanks.

Attachments :            Project Appraisal Document

cc: Messrs./Mmes.    K. King, K.Kumari, G. Castro (GEFSEC); A. Van Trotsenburg, F. Saez (LCC7C) ; E. Gacitua-Mario, J. López-Silva, J. Redwood, M. Serra, K. Shepardson (LCSES), R. Khanna, S. Wedderburn, D. Aryal, T. Johnson (ENV); F. Molnar, M. Montiel (LEGLA), ENVGC ISC, IRIS3

DRAFT OF PROJECT APPRAISAL DOCUMENT  
ON A  
PROPOSED GRANT  
IN THE AMOUNT OF SDR 0.859 MILLION  
(US\$ 1.14 MILLION EQUIVALENT)  
TO THE  
REPUBLIC OF ARGENTINA  
FOR AN  
ENABLING ACTIVITY  
FOR THE SECOND NATIONAL COMMUNICATION  
OF ARGENTINE GOVERNMENT TO THE CONVENTION ON CLIMATE CHANGE

December 16, 2002

**Environmentally and Socially Sustainable Development Sector Management Unit  
Country Management Unit Argentina, Chile and Uruguay  
Latin America and Caribbean Region**

## CURRENCY EQUIVALENTS

(Exchange Rate Effective)

Currency Unit = Argentina Peso (Arg.\$)  
 ARG\$ = US\$  
 US\$ = ARG\$

## FISCAL YEAR

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## ABBREVIATIONS AND ACRONYMS

CAMMESA	Compañía Administradora del Mercado Mayorista Eléctrico (Wholesale Electric Power Administration Company)
CAS	Country Assistance Strategy
CIMA	Centro de Investigación del Mar y la Atmósfera (Center for Atmospheric and Ocean Studies)
CDM	Clean Development Mechanism
CNG	Compressed Natural Gas
COFEMA	Consejo Federal sobre el Medio Ambiente
COP	Conference of Parties
EEM	Energy Efficiency Measures
ELI	Efficient Lighting Initiative
ENARGAS	Ente Nacional Regulador del Gas (National Gas Regulatory Agency )
ENRE	Ente Nacional Regulador de la Electricidad (National Electricity Regulatory Agency)
ENSO	El Niño Southern Oscillation
ESCO	Energy Services Company
FB	Fundación Bariloche
GEF	Global Environmental Facility
GHG	Greenhouse Gases
GOA	Government of Argentina
GTACA	Grupo de Trabajo Ampliado sobre Cuestiones Ambientales
IAS	International Accounting Standards
INA	Instituto Nacional del Agua (National Institute for Water)
INTA	Instituto Nacional de Tecnología Agropecuaria (National Institute of Farming Technology)
IPCC	Intergovernmental Panel on Climate Change
LUCF	Land-use change and forestry activities
MEM	Mercado Eléctrico Mayorista (Wholesale Electric Power Market)
MTCE	Million Tons of Carbon Equivalent
NGO	Non-governmental Organization
NMP	National Mitigation Program
NMVOC	Non Methane Volatile Organic Compounds
OAMDL	Oficina Argentina del Mecanismo para un Desarrollo Limpio (Argentine Clean Development Office)
OLADE	Organización Latinoamericana de Energía (Latin American Energy Organization)
PAEPRA	Programa de Abastecimiento Eléctrico a la Población Rural dispersa de Argentina (Program for electric energy supply for the rural dispersed population of Argentina)
PERMER	Proyecto de Energía Renovables en Mercados Rurales (Project of renewable energies in the rural market)
PIU	Project Implementation Unit
PNUD	Programa de las Naciones Unidas para el Desarrollo (UN Development Program)
RE	Renewable Energy

RCM	Regional Circulation Model
SAGPyA	Secretaría de Agricultura, Ganadería, Pesca y Alimentos (Secretary of Agriculture, Livestock, Fisheries, and Nutrition)
SAyDS	Secretaría de Ambiente y Desarrollo Sustentable (Secretary of Environment and Sustainable Development)
SECyT	Secretaría de Ciencia, Tecnología, e Innovación Productiva (Secretary of Science, Technology, and Productive Innovation)
UNFCCC	United Nations Framework Convention on Climate Change
URE	Uso Racional de la Energía (Rational Use of Energy)

Vice President:	David De Ferranti
Country Manager/Director:	Axel Van Trotsenburg
Sector Manager/Director:	John Redwood
Task Team Leader/Task Manager:	Juan López-Silva

**ARGENTINA**  
**ENABLING ACTIVITY FOR SECOND NATIONAL COMMUNICATION OF ARGENTINE GOVERNMENT TO**  
**THE CONVENTION ON CLIMATE CHANGE**

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MAP(S)

**ARGENTINA**  
**Enabling Activity for Second National Communication of**  
**Argentine Government to the Convention on Climate Change**

**Project Appraisal Document**

Latin America and Caribbean Region  
 LCSEN

**Date:** December, 2002

**Team Leader:** Juan López-Silva

**Sector Manager/Director:** John Redwood

**Country Manager/Director:** Axel van Trotsenburg

**Project ID:** P078143

**Focal Area:** G

**Sector(s):** Other environment (100%)

**Theme(s):** ENVIRONMENT

**Project Financing Data**

Loan     Credit     Grant     Guarantee     Other:

**For Loans/Credits/Others:**

**Amount (US\$m):** \$1.64

<b>Financing Plan (US\$m):</b>	<b>Source</b>	<b>Local</b>	<b>Foreign</b>	<b>Total</b>
BORROWER/RECIPIENT		0.50	0.00	0.50
GLOBAL ENVIRONMENT FACILITY		1.14	0.00	1.14
<b>Total:</b>		<b>1.64</b>	<b>0.00</b>	<b>1.64</b>

**Borrower/Recipient:** Fundación Bariloche

**Responsible agency:** MINISTRY OF FOREIGN AFFAIRS

Address: Ministry of Foreign Affairs, Buenos Aires, Argentina

Contact Person: Raul Alfredo Estrada Oyuela

Tel:                      Fax:                      Email: [eoy@mrecic.gov.ar](mailto:eoy@mrecic.gov.ar)

**Estimated Disbursements ( Bank FY/US\$m):**

	<b>FY</b>	<b>FY03</b>	<b>FY04</b>	<b>FY05</b>
<b>Annual</b>				
<b>Cumulative</b>				

**Project implementation period:** Two years

## **A: PROJECT DEVELOPMENT OBJECTIVE**

### **1. Project Development Objective:** (see Annex 1)

The primary objective of this project is to support enabling activities for the preparation of the Second National Communication of the Government of Argentina to the Conference of the Parties to the UN Framework Convention on Climate Change (UNFCCC). This Communication will enable the Government of Argentina (GOA) to satisfy requirements under Art.12.1 of the UNFCCC, in accordance with decisions 10/CP.2, 11/CP.2 and 8/CP.5. The Government of Argentina submitted its First National Communication in 1997 and a revised version in 1999.

This project will complement ongoing activities undertaken by the Government of Argentina to implement the UNFCCC requirements and consists of five major components. First, studies will be carried out to update and improve national inventories of greenhouse gases (GHG). Second, the project will assess the vulnerability of various ecosystems to climate change and will formulate possible adaptation strategies. To this end, studies will evaluate the impacts of climate change on: (a) coastal zones and water resources in different regions of the country; (b) agricultural production; (c) precipitation patterns; (d) energy system and infrastructure; and (e) socio-economic sector. Third, the project will contribute to the formulation of a National Mitigation Program, which will include measures to reduce national emissions of GHG. Fourth, activities will be conducted around the country to promote capacity building and public awareness. Finally, the fifth component of the project will assist in the drafting of the Second National Communication to the UNFCCC.

### **2. Global objective:** (see Annex 1)

The global environmental objective of this project is to contribute to the development of country policies that will be a part of global efforts to mitigate climate change. This objective will be achieved by financing incremental activities aimed at assessing the vulnerability of Argentine ecosystems to climate change and contributing to the development of a national mitigation plan aimed at reducing current levels of GHG emissions.

### **3. Key Performance Indicators:** (see Annex 1)

Key outcome-level performance indicators will be used to monitor the progress towards the achievement of the development objectives for each project component, as follows:

#### *1. Updating of national greenhouse gas inventories:*

- (a) Updated national inventory of GHG emissions and analysis of emission trends of major polluting sectors during the period from 1990 to 2000
- (b) Local GHG emissions factors
- (c) Harmonized energy balances

#### *2. Vulnerability studies*

- (a) Assessment of vulnerability of various ecosystems to climate change. Indicators include assessment of the impacts of climate change on the coastline of the *Río de la Plata*, and on the water resources of the *Litoral-Mesopotamia*, the *Pampa Húmeda*, and *Patagonia*
- (b) Assessment of the vulnerability of agricultural productivity on the *Pampa Húmeda* to climate change
- (c) Assessment of socio-economic impacts of climate change on the various ecosystems
- (d) Proposal of national and regional mitigation and adaptation strategies to reduce the negative impacts of climate change
- (e) Assessment of the impact of climate change on the energy sector
- (f) Model simulations of future climate scenarios

### 3. *National Mitigation Program*

Development of National Mitigation Program, which includes initiatives to reduce GHG emissions through energy efficiency, energy savings, substitution of fuel and energy sources, changes in transportation modes, and carbon sequestration and substitution programs

### 4. *Promotion of public awareness*

Development of national pilot plan to promote public awareness to the global impacts of climate change, as well as adaptation and mitigation strategies

### 5. *Drafting of Second National Communication*

- (a) Second National Communication to the UNFCCC
- (b) Development of institutional framework and procedures necessary to continue updating of GHG inventories, preparing National Communications and carrying out public awareness activities.

Other indicators that reflect the achievement of project objectives include:

- (a) Number of government agencies that include climate change-related initiatives in their working plans
- (b) Development of adaptation and mitigation initiatives funded with contributions from all Ministries
- (c) Number of research initiatives and academic programs in areas related to climate change
- (d) Number of public campaigns that aim at protecting areas most vulnerable to climate change
- (e) Agencies more capable of preparing subsequent communications.

## **B: STRATEGIC CONTEXT**

### **1. Sector-Related Country Assistance Strategy (CAS) Goal Supported By The Project:**

*Document Number:* 20354

*Date of latest CAS:* September 2000

The CAS highlights the need for Argentina to take measures aimed at promoting sustainable growth. It recognizes pollution reduction as a strategy to attaining sustainable growth and measures performance in this regard in terms of GOA's fulfillment of its commitments to global environmental agreements. One such agreement is the UN Framework Convention on Climate Change –UNFCCC. The communication will report on strategies, plans, and programs in place to implement the Convention's objectives: a) the stabilization of the concentrations of GHG in the atmosphere at levels that would prevent dangerous interference with the sustainability of economic activities; b) the promotion of adequate impact assessment of climate change in ecological and economic systems; and c) support of adaptation policies that address changes in climate already observed, as well as those contemplated for the next century.

In general terms, and outside the context of the UNFCCC, the project fits well with the Bank's overall Energy and Environmental Strategies, since issues related to climate change are relevant to both sectors. The CAS further identifies management of water resources as a development priority for Argentina, with financial support envisioned for funding of projects in water supply and sanitation, ground water management, flood control, drainage, and irrigation.

In addition to complying with international commitments, the CAS further stresses the need to expand the use of GEF resources to complement national programs and to build capacity on global issues. It identifies continued building of the GEF pipeline, including global warming objectives, as an integral feature of its strategy.

## 2. Main Sector Issues And Government Strategy:

### *Sector Issues*

#### **2.1 Climate Change, sources and impact**

The projected impacts of climate change, or in more specific terms of global warming, include increasing temperatures, sea level rise, and changing precipitation patterns. Although there is a significant level of uncertainty concerning the causes of climate change, it has been recognized that global climatic patterns have changed considerably during the last century. It is also well known that the impacts of severe climatic events have become increasingly damaging to natural resources and infrastructure, as well as threatening to human life.

The concentration of greenhouse gases in the atmosphere has been increasing steadily for the past century. It is nowadays widely accepted that GHG are, at least to some extent, responsible for the global warming trend. A reversal of this trend is therefore related to the management and the abatement of greenhouse gas pollution, both of which depend on the type of source of the emissions. Increasing emissions of GHG mainly result from: 1) combustion of fossil fuels (*i.e.* oil, coal) that occur, among others, during power generation and industrial and transportation activities; 2) reduction of carbon sinks through, for example, deforestation activities; and 3) methane emissions originating from organic matter decomposition related to human activities.

Studies have shown that the capacity to adapt to relatively short-term climatic change is not distributed evenly amongst different societies and that in fact, the impacts of climatic change are more severely felt in developing countries, amongst the poorest fractions of the population. Furthermore, the ability to manage and to control GHG emissions and pollution, and therefore the ability to reduce the impact of climate change, requires an institutional, technological and financial framework that may not exist in these countries.

#### **2.2 GHG emissions in Argentina**

The 1997 inventory of GHG emissions revealed that between 1990-1994 and 1994-1997, GHG emissions increased by 13.7% and 6.2% respectively, a cumulative increase of 20.7%. (Figures do not include emissions from changes in crop management or from silviculture). The economic context during 1990-97 can be used to justify trends of emission production. Indeed, in 1990 the economy was undergoing a deep recession. A period of rapid recovery started in 1992, manifested by increasing economic activity and consequently rising GHG emissions. 1997 marked the peak of economic activity for the decade, but the decreasing trend of emissions was already evident. A combination of factors contributed to this decreasing trend of emissions, of which the most influential were: i) increased power generation from clean energy sources; ii) replacement of public transportation fleet with cleaner vehicles; and iii) reduction of total heads of cattle with a resulting decrease in enteric emissions.

GHG emissions in Argentina mainly originate from: 1) combustion of fossil fuels, consistently releasing approximately 90% of the CO<sub>2</sub> emissions and around 42% of the total GHG emissions of the country in 1997 (power generation (30%) and transport (33%) account for most of the energy-related GHG emissions); 2) enteric fermentation, releasing 62% of methane emissions and 19% of total GHG emissions in 1997 (mainly cattle); and 3) management of agricultural land, releasing 95% of total nitrous oxide emissions and 21% of total GHG emissions in 1997. Annex 13 contains a detailed breakdown of GHG emissions.

#### **2.2.1 Impacts of climate change**

##### **2.2.1.1 Impacts on water resources**

The wide range of climatic conditions in Argentina result in complex water resource management issues. Argentina is repeatedly subjected to periods of extreme drought in the dry regions and to inundations in the more humid zones. It is to be expected that the various regions have considerably different water resource issues concerning their surface water bodies, groundwater supplies, and irrigation practices.

### 2.2.1.2 Impacts on land resources

The lack of effective land management policies in Argentina is a contributing factor to the severity of the impacts from climate change-related events. Unsustainable land use (*e.g.* substitution of pastures for crops), soil degradation (*e.g.* salinization) and deforestation contribute to the degradation of the natural vegetation cover, a factor that ultimately leads to erosion. Erosion of extensive productive areas is not only a devastating economic event, but in the context of this study, it increases the vulnerability of a region to the damaging effects of extreme climatic incidents

### 2.2.1.3 Impacts of human settlements

Inadequate zoning regulations in urban areas of Argentina and the incomplete access to water and sanitation services are partly to blame for the expansion of the cities towards flood-prone areas. Settlements grow along the banks of major waterways, without consideration to the risks of flooding. The infrastructure is, in many cases, precarious, aggravating the extent of the damages and the number of people affected during flooding events.

## 2.2.2 Integration of climate change into national planning

Despite the heightened level of attention given to climate change issues in international circles, linkages between the facts regarding climate change and preventive decision-making in Argentina remain weak at national, provincial, district, and private levels. Contributing factors include the prevalent dichotomy between policy and science, a weak institutional capacity, and the lack of collaboration between public and private institutions on climate change issues. Efforts have been made by government agencies to sponsor interactions between private and public sectors on issues related to climate change, such as promotional activities, workshops and studies sponsored by the *Secretaría de Ambiente y Desarrollo Sustentable* (SayDS). However, the severity of the impacts of climatic events of the past two decades have emphasized the need to strengthen linkages between climate change issues and national planning. The contribution to the development of a National Mitigation Program, the design of a national pilot plan to promote public awareness to adaptation and mitigation strategies, and the development of an institutional framework to carry out public awareness activities are critical to encouraging the formulation of priority plans for mitigation and adaptation to climate change.

## Government Strategy

### 2.3 First National Communication to the UNFCCC

The Government of Argentina submitted its First National Communication to the UNFCCC in 1997. The project was led by the *Secretaría de Ciencia, Tecnología, e Innovación Productiva* (SECyT) and the executing agency was the *Programa de las Naciones Unidas para el Desarrollo* (PNUD).

The areas covered by the study and the main findings are summarized as follows:

1. An inventory of GHG was compiled, following IPCC procedures
2. The overall vulnerability of water resources to climate change was investigated. It was concluded that:
  - i. A decrease in the amount of precipitation in the Southern Cone would reduce the available volumes of water used for irrigation in the arid and semi-arid regions of the country
  - ii. Higher precipitations would in turn increase the risks of flooding and inundations in the humid regions of the country.
3. The vulnerability to climate change of two specific ecosystems was evaluated:
  - i. *Oases between 29° S and 36° S* – These Oases are located at the foothills of the arid provinces of *La Rioja*, *San Juan* and *Mendoza*, the water resources of which depend on snow melt from Andean mountain tops. Increasing temperatures resulting from climatic changes would decrease minimum levels of snow cover and would therefore have impacts on summer melting conditions.

- ii. *Ocean levels along the Argentine coastline* – Two areas were found to be at risk from flooding due to increasing ocean levels: a) *Bahía of Samborombón*, in northern *Buenos Aires* province, where economic losses would be significant; and b) *Bahía Blanca* and the *Río Colorado* delta in the south of *Buenos Aires* province.
- 4. The vulnerability to climate change of the following two economic sectors was considered:
  - i. *Agriculture* – It was found that crops would be more affected than livestock activities. The net impact on crops and pastures was found to be negative.
  - ii. *Energy* – A reduction in the volumes of water from snow melt was found to have significant repercussions for the electricity sector. Indeed, many hydroelectric facilities in the north-eastern region of the country operate using water from local rivers, the flow of which is dependent of snow melt.
- 5. Finally, the impact of climate change on public health was investigated, and results showed that higher temperatures could lead to increases in the number of the vectors of certain diseases (*e.g.* dengue, malaria, etc.)

GHG inventories were updated in 1999, and a revised version of the First Communication was submitted to the UNFCCC.

#### **2.4 Mitigation strategies**

Several projects have been implemented that have contributed to mitigating air pollution by the Argentine energy sector, which have placed the country in the forefront of clean energy production. These include: 1) the construction and operation of several hydropower plants and two nuclear power plants; 2) the replacement of coal and petroleum derivatives by natural gas for thermoelectric plants; 3) the promotion of compressed natural gas (CNG) as motor vehicle fuel; 4) the adoption of specific regulations to abate gas-flaring; and 5) the reduction of natural gas flaring at its source.

There have been pilot or sporadic measures implemented such as: (1) initiatives of co-generation of electricity and heat in industry; (2) programs for energy-efficient drying of seeds and crops; (3) programs of efficient street lighting; (4) energy saving initiatives in public and commercial buildings; and (5) energy-saving residential heating systems. In spite of the fact that these measures present large saving potentials, they were not supported by policy initiatives and other measures aimed to overcome existing market barriers and, consequently, were not adopted by either energy suppliers or consumers.

In addition, GOA has recently adopted a new set of policies aimed at reducing future GHG emissions, which include: 1) the promotion of wind and solar energy through programs of temporary subsidies that have been recently enacted as national law; 2) the promotion of co-generation projects and Rational Use of Energy (RUE) programs; 3) the implementation of the Efficient Lighting Initiative (ELI), an IFC-GEF project developed through ENDESA-ENDESUR (Argentina) and ELECNOR (Perú), which promotes the sale of efficient lamps to residential users around the country; and 4) the implementation of the Renewable Energies in the Rural Market project (PERMER), supported by the World Bank and GEF, aimed to supply modern energy based on renewable sources to dispersed rural populations.

Efforts have also been made to reduce emissions from deforestation. Several afforestation and reforestation programs are developing increasing interest, particularly within the framework of the Joint Implementation (JI) and Clean Development Mechanism (CDM). Technical cooperation programs, from Germany and France for instance, have evaluated the participation of NGOs and other institutions in projects that would improve carbon-sink capabilities in Argentina. The SAyDS is actively participating in CDM initiatives and has established *the Oficina Argentina del Mecanismo para un Desarrollo Limpio* (OAMD), with the purpose of promoting projects that can be implemented within the context of the CDM. The OAMD was amongst the first non-Annex I CDM offices to formulate detailed guidelines for project preparation and is conducting a series of workshops to advance in the formulation of LULUCF-CDM projects.

In 1999, with the support of the Government of Canada and of the World Bank, the GOA published its

first National Strategy Study (NSS). These types of studies promote market-based instruments for GHG reductions within the framework of the CDM. The results of the first NSS helped Argentina define its position in global climate change negotiations. A second NSS is currently being conducted, funded by the Bank, with the main purpose of identifying a portfolio of GHG mitigation projects that can be implemented through the CDM. This activity is tightly related to the development of the National Mitigation Program under the present project

## **2.5 Monitoring systems**

The occurrence of flooding events related to climate change led to the establishment of Inter-Province Boards, which are responsible for the implementation of coordinated measures to address adverse effects of heavy precipitation and flood events. Other mechanisms have been instituted at the national level to coordinate responses to emergency situations. The *Sistema de Alerta Hidrológico del Río Paraná*, for example, is managed from the *Instituto Nacional del Agua* (INA), and is charged with the monitoring and prediction of impacts from extreme climatic events

## **2.6 Programs related to public awareness**

Outreach activities to promote public awareness of climate change issues within Argentina are routinely conducted by both public and private sector entities as well as by national and international NGOs. These activities are mainly conducted by the SAyDS and the Federal Council on the Environment (COFEMA). During the last two years, the SAyDS organized several workshops, seminars and public audiences on climate change issues. Other Secretariats, such as Science and Technology, Agriculture, Energy, Transport, and Industry frequently participate in these activities. On the international front, the Ministry of Foreign Affairs was involved in discussions on membership of global agreements on climate change. For example, the Ministry took an active role in the negotiation and adoption of the Kyoto Protocol and the elaboration of its implementation plan in Argentina, OECD environmental issues, and the bodies derived from the international and regional agreements dealing with the Global Change Issues. The Ministry established the Expanded Working Group on Environmental Issues (*Grupo de Trabajo Ampliado sobre Cuestiones Ambientales – GTACA*) in early 1989, which meets regularly to inform national stakeholders of relevant international discussions. The GTACA consolidates stakeholder inputs and defines a national position on issues under debate at international fora.

## **3. Sector Issues to be Addressed by the Project and Strategic Choices:**

### **3.1 Lack of institutional capacity to produce GHG inventories and upgrade methodologies**

Information and methodologies for producing GHG emission inventories have been limited to NGOs and universities hired on an ad-hoc basis. Local factors of emission are typically not available and therefore international factors are used and adapted to local conditions. The project will help to institutionalize practices for data collection and processing to maintain updated GHG emission inventories. Also, the project will coordinate and harmonize methodologies to produce the GHG inventories and energy balances.

### **3.2 Lack of coordination of infrastructure investment plans with measures for adaptation to climate change**

Cross-sectoral coordination is needed to minimize investment costs, as rising water levels generally require sound land-use policies and practices not only at the preventive but also at the corrective levels. Settlements and human activities in general require adequate regulation by all affected sectors so that climate change effects can be minimized.

### **3.3 Lack of institutional coordination on policies, programs, and projects related to mitigation of GHG emissions**

A set of strategies needs to be developed to reduce GHG emissions through energy efficiency, energy savings, substitution of fuel and energy sources, changes in transportation modes, and carbon

sequestration and substitution programs. A National Mitigation Program (NMP) will help drive institutional coordination at all levels.

### **3.4 Low electricity prices and institutional weakness for promoting energy efficiency measures**

Without a program in place to promote energy efficiency, considering the relatively clean production of energy, and with very low energy prices, the incentives to adopt clean technologies are few. Previous experience in Argentina has shown that in the absence of a solid institutional framework, energy efficiency, regardless of its economic benefits, is not perceived as a priority by energy consumers. Any NMP that attempts to reduce emissions from the energy sector by promoting energy efficiency must do so by introducing a balanced combination of market oriented EE programs, supporting policies and regulations, public dissemination activities, and capacity-building activities aimed at main stakeholders. Initiatives that will be considered to overcome barriers to energy efficiency include: (a) development of a national EE strategy and design of enhanced EE policies and regulations, (b) implementation of public awareness programs to support organized participation of civil society and key stakeholders; (c) support to emergent Energy Services Companies (ESCOs); (d) establishment of a standards and labeling program for appliances, equipment, and building envelopes; and (e) capacity building activities aimed to support implementing agencies, regulators and policy makers.

### **3.5 Lack of incentives to promote renewable energy**

As with energy efficiency, low energy prices provide a disincentive to new ventures in this field. The NMP needs to introduce mechanisms that promote the use of renewable energy resources. Examples of these mechanisms include: (a) temporary and targeted subsidies to new technologies; (b) tax deductions to companies at the development stage; (c) regulatory intervention to ensure the presence of renewable technologies in the energy market; (d) technical assistance for fuel switching (*e.g.* biomass); and (e) technology transfer to increase the availability of suitable equipment.

### **3.6 Lack of a coordinated transportation plan linking environment and land-use policies**

Initiatives that may be considered to promote modal changes in travel behavior include: (a) construction of segregated bus lanes; (b) construction of bicycle pathways; (c) education and promotion initiatives; (d) monitoring of activities to inform users of the benefits of the mitigation programs; and (e) regulatory intervention in freight shipping to promote changes in distribution of transportation modes (*e.g.* trucks, navigation, railroad)

### **3.7 Lack of governmental commitment for long-term plans that favor forestry and bio-energy projects**

Programs that would increase the development of carbon sequestration projects are: (a) increased promotion of the environmental benefits of the programs and of the financial gains that may be generated from CDM-funded projects; and (b) government programs that support the formulation and promotion of CDM-funded projects addressing sustainable forestry and bio-energy.

## C: PROJECT DESCRIPTION SUMMARY

### 1. Project Components: (see Annexes 1 & 2)

The five project components were planned such to result in the preparation of the Second National Communication to the UNFCCC. The communication will be structured according to the categories set out in the GEF Operational Guidelines for Expedited Funding of Second National Communications from Non-Annex I Parties. Each sub-component represents a study or other activity.

Component/Sub-component	First National Communication GEF grant (US\$M)	Second National Communication			
		Indicative Costs (US\$M)	% of Total	GEF financing (US\$M)	% of Total
a. Updating of National GHG Inventories and development of emission factors	0.320	0.40	24.39	0.240	60.00
▪ GHG Inventory	0.320	0.20		0.140	
▪ Emission Factors	-	0.08		0.060	
▪ Comparative analysis	-	0.07		0.025	
▪ Energy Balance harmonization	-	0.05		0.015	
b. Vulnerability assessment and institutional strengthening for adaptation	0.448	0.51	31.10	0.355	69.61
▪ Vulnerability of coastal zone <sup>1</sup>	0.103	0.08		0.045	
▪ Assessment of vulnerability of water resources in the <i>Pampa Bonaerense</i> 's	-	0.05		0.040	
▪ Assessment of climate change impact on watersheds in the <i>Litoral-Mesopotamia</i>	-	0.05		0.045	
▪ Agric. Production in the <i>Pampa</i> <sup>2</sup> <i>Húmeda</i>	0.239	0.10		0.045	
▪ Assessment of Oasis region Vulnerability	0.106	-		-	
▪ Assessment of impact from rainfall increases in <i>Patagonia</i>	-	0.07		0.047	
▪ Economic Impact Assessment to help formulate Adaptation Plan (stage II)	-	0.05		0.037	
▪ Assessment of vulnerability of energy system	-	0.04		0.025	
▪ Design of Adaptation measures (stage II)	-	0.04		0.031	
▪ Climate change projections from Regional Circulation Models	-	0.03		0.040	
c. Formulation of National Mitigation Program	0.171	0.35	21.34	0.215	61.43

<sup>1</sup> The FNC covered from *Samborombón* to *Bahía Blanca*. The SNC will cover the *Gran Buenos Aires* area and the *Paraná Delta*.

<sup>2</sup> The SNC will update previous assessment, considering the changes to transgenic soja.

Component/Sub-component	First National Communication GEF grant (US\$M)	Second National Communication			
		Indicative Costs (US\$M)	% of Total	GEF financing (US\$M)	% of Total
<ul style="list-style-type: none"> <li>▪ Assessment of EEM opportunities</li> <li>▪ Assessment of opportunities for energy efficiency in transport</li> <li>▪ Assessment of renewable energy technologies</li> <li>▪ Opportunities for CO<sub>2</sub> sequestration</li> <li>▪ Assessment of opportunities to reduce enteric methane emissions</li> </ul>	0.110	0.08		0.040	
	0.041	0.10		0.060	
	0.020	0.05		0.040	
	-	0.07		0.045	
		0.05		0.030	
d. Promotion of public awareness <ul style="list-style-type: none"> <li>• Communication campaign</li> <li>• Training and Symposia</li> </ul>	-	0.134	8.17	0.105	78.36
		0.090		0.070	
		0.044		0.035	
e. Drafting of Second National Communication to the UNFCCC		0.020	1.22	0.019	95.00
f. Project Management and Workshops	0.061	0.200	12.12	0.176	88.00
g. Audit		0.030	1.82	0.030	100.00
<b>TOTAL</b>	<b>1.000</b>	<b>1.64</b>	<b>100</b>	<b>1.14</b>	<b>69.34</b>

Further descriptions of all the activities included in each project component are included in Annex 2. Preliminary terms of reference, with specific information about objectives, activities, and expected results for each of the studies to be funded by the project, are included in Annex 12.

### 1.1 National GHG Inventories

The main objectives of this component are to upgrade national inventories of GHG emissions and to develop indicators for evaluation of national emission trends. The following four tasks will be completed as part of this component: (a) GHG inventory update, which will consist of a methodological revision and update of 1997 inventories with data from the year 2000. National GHG inventories will be estimated and reported using the *Revised 1996 Intergovernmental Panel on Climate Change (IPCC) Guidelines for National Greenhouse Gas Inventories*; (b) comparative analysis of previous and current GHG inventories, in order to identify current trends of GHG emissions and main drivers of their changing patterns; (c) development of own emission factors; and (d) harmonization of National Energy Balances with GHG Emission Inventories, which involves the evaluation of modifications needed by existing National Energy Balances in order to make them compatible with Inventory Emission Source Categories (as defined by the Inter-governmental Panel on Climate Change, IPCC).

### 1.2 Vulnerability Assessment and Institutional Strengthening for Adaptation

This component complements previous work and consists of vulnerability studies to assess the impacts of climate change on the water resources of humid region of the country, where the large majority of the population is concentrated and where most of the economic activity of the country occurs. These studies will give a pathway to the future development of a long-term adaptation plan. Specifically, studies will be conducted in the following areas: (a) the north western section of the *Río de la Plata* coastline; (b) the *Gran Buenos Aires* region, where the variable water levels of the *Río de la Plata* and the seasonal

flooding of the *Paraná* river cause persistent flooding and inundations; (c) the *Pampa Húmeda*, where seasonal wet-dry cycles cause flooding and drought, respectively, and where the exploitation of ground water resources is not sustainable; (d) the *Litoral-Mesopotamia* region, where precipitation-induced flooding of the major rivers is a widespread and recurrent event; and (e) *Patagonia*, one of the arid regions of the country.

### **1.2.1 Vulnerability of the coastal zone**

The study will assess the relative impact of climate change and human action on the degradation of the coastline of the *Río de la Plata*. In particular, focus will be put on assessing the impacts on the coastline from: (a) changes in the river's water level caused by climate change; (b) flooding of the *Río Paraná*; and (c) the expansion of the *Paraná delta*. All of these phenomena are likely to cause significant damages to human settlements that have grown along the shores of the estuary. The socio-economic consequences of these events and their repercussions on the development of the region will also be evaluated.

### **1.2.2 Vulnerability of the *Pampa Bonaerense***

This study is directed at evaluating the impact of climate change on the water resources of the *Pampa Húmeda*. The following aspects will be considered: (a) characterization of the region's water resources (surface water and groundwater) to precipitation fluctuations; (b) evaluation of the effectiveness of flood protection infrastructure existing in the area, including future effects if higher tides; (c) assessment of the level of soil degradation in the region; (d) evaluation of socio-economic impact of climate change on the *Pampa Húmeda*; and (e) suggestions of measures to mitigate damages and to adapt to future climatic changes.

### **1.2.3 Vulnerability of agriculture production in the *Pampa Húmeda***

This study will analyze the effects of climate change on the productivity and the vulnerability of crops in the region and erosion in the higher part of the relevant tributary basins. The study will: (a) evaluate the effects of the new measures on the drainage capacity and soil degradation potential of the region; (b) assess whether the current productivity levels of the region can be maintained under expected climatic conditions; (c) estimate the socio-economic impact of changes in productivity; and (d) propose mitigation and adaptation strategies.

### **1.2.4 Vulnerability of the water resources in the *Litoral-Mesopotamia***

The objectives of the study are: (a) to determine how climate change, and more specifically higher precipitation rates are likely to affect the major rivers of the area; (b) to estimate the extent of the damages that may occur as a result of the changes; (c) to determine the socio-economic impact of the flooding on the region and the effects on its economic growth; and (d) to propose mitigation and adaptation strategies to decrease future damage.

### **1.2.5 Vulnerability of the *Patagonia***

This study will be conducted to assess the potential impacts of climate change in the region, in particular: (a) determining how the surface and groundwater resources may be affected; (b) proposing mitigation and adaptation strategies to reduce impacts from climate change; and (c) assessing the socio-economic impact climatic changes may have on *Patagonia* and on regional development.

### **1.2.6 Overall socio-economic impacts of climate change**

One of the objectives of the vulnerability assessments conducted is to make predictions of how the impacts of climate change on natural resources may affect the socio-economic development of the regions in question. This study will compile results from all the studies performed for the Second National Communication, as well as those from the First National Communication, and will help in the assessment of social and economic impacts of climate change. This involves: (a) compiling baseline scenarios (*i.e.* present vulnerability of a system to a given climatic condition); (b) making assumptions on adaptation capacity to climatic impacts; (c) making projections of future climate scenarios; (d) building consensus on

potential policy scenarios and courses of action in response to climatic conditions; and (e) providing support for the estimation of the costs and the social implications of the various scenarios.

### **1.2.7 Vulnerability of the energy system and energy infrastructure**

This study will provide support for the evaluation of: (a) how climate change affects the electric generating capacity of the country, considering the impact of snowpack reduction; (b) how climate change affects the overall energy supply; (c) how climate change will affect the demand sector; and (d) the adequacy of the existing energy infrastructure to supply future energy demands given the potential impacts of climate change on the sector.

### **1.2.8 Preliminary National Adaptation Program and regional adaptation plans**

This activity will draw from the results of the other studies with the objective of incorporating adaptive capacity to climate change into national and regional development plans. Based on assessments from previous components, this component will contribute to the development of a Preliminary National Adaptation Program to: (a) identify climatic vulnerabilities; (b) help in the identification the most cost effective and socially acceptable measures to prevent, or to adapt to, the negative impacts of climate change; (c) give support in the identification of adequate policy measures and institutional framework to implement the measures; and (d) contribute to proposals of resource allocation for the implementation of adaptation programs.

### **1.2.9 Estimates of regional climate change scenarios through Regional Climate Models**

The focus of this activity will be to support the generation of regional climate change projections using high-resolution atmospheric circulation models. Models for Argentina have been developed at the *Centro de Investigaciones del Mar y la Atmósfera* (CIMA / CONICET / UBA) and the *Centro Nacional Patagónico* (CENPAT / CONICET). Projections will cover the period from 1970 to 2050 and will be based on a “business as usual” emission scenario. The information obtained will include predictions of local circulation patterns and estimates of temperature and precipitation scenarios. This information will subsequently be used in the assessment of the vulnerability of various regions to climate change and in the planning of mitigation and adaptation strategies.

## **1.3 Formulation of National Mitigation Program (NMP)**

A NMP will be formulated, which will include proposals for measures aimed at reducing national GHG emissions. The NMP will help identify opportunities for mitigation of emissions through measures that promote energy efficiency, energy savings, and renewable energy sources, through programs aimed at reducing emissions in the transportation sector, and at promoting carbon sequestration and substitution programs. It will also consider options to reduce methane emissions from both waste and enteric fermentation. The NMP will primarily concentrate on identifying measures aimed at removing currently existing barriers to these types of initiatives.

### **1.3.1 Energy efficiency measures (EEM)**

The NMP will address current obstacles to the adoption of EEM, such as: (a) low prices of traditional sources of energy; (b) excess generating capacity; (c) lack of incentives for distributors; (d) absence of shared economic costs for EEM; (e) limited supply of energy efficient services; and (f) absence of regulatory and financial frameworks to promote energy conservation. The NMP will promote the introduction to programs that encourage energy efficiency and supporting regulation.

This sub-component will: (a) provide support in the identification of energy efficiency measures that can be implemented as part of emission mitigation strategies; (b) contribute to the evaluation of the applicability of EEM measures to the Argentine energy system; (c) assess the need for government support of EEM initiatives; and (d) identify programs that can be implemented through the CDM.

### **1.3.2 Transportation sector**

The NMP will contribute to the promotion of measures that reduce GHG emissions from the

transportation sector, focusing on reductions of travel demand and on increases in travel efficiency. Current barriers to these measures include, among others, consumer preferences and behaviors that are not in line with environmental concerns. Institutionalized measures therefore need to be implemented to ensure the effectiveness of emission reduction initiatives. This study will: (a) update GHG emissions data from all segments of the transportation sector; (b) evaluate the impact of the economic crisis on emissions from the transportation sector; (c) assess the extent of regional and national emission mitigation strategies in the transportation sector; (d) evaluate the impact of recent infrastructure developments on GHG emissions; (e) perform cost-benefit analysis and feasibility studies of various types of emission reduction initiatives (*e.g.* modal shifts versus technological improvements) in all segments of the transportation sector; and (f) identify candidate cities where emission mitigation strategies may be implemented.

### **1.3.3 Renewable energy (RE)**

The NMP will include provisions to promote the use of renewable energy sources, which are currently under-developed, in spite of their abundance and extensive potential. Obstacles that contribute to the limited use of RE in Argentina, including among others: (a) its competitive disadvantage relative to the electricity market; (b) a mismatch between demand and adequate supply locations; (c) constrained demand; and (d) financing barriers. The project will (a) identify potential emission mitigations through the development of renewable energy projects that can be implemented through the CDM; (b) promote capacity-building on issues related to the use of renewable energy; and (c) identify policy and regulatory options to facilitate the use of renewable energy, in particular in areas without access to electricity grids.

### **1.3.4 Carbon sequestration**

A number of obstacles exist to the development of carbon sequestration and substitution projects, including: (a) the lack of suitable technical guidelines for the development of carbon sequestration and substitution projects; (b) the uncertainty of the international framework for monitoring and validation of LULUCF projects under the CDM; (c) the lack of technical and financial resources for the collection and interpretation of bio-energy data; and (d) the lack of specific norms and incentives for the implementation of actual carbon sequestration and substitution projects.

This component will (i) provide support in the evaluation of carbon sequestration and substitution potential through LULUCF projects and policies; (ii) encourage capacity-building for the assessment of carbon sequestration and substitution potential from afforestation and reforestation projects; and (iii) identify carbon sequestration and substitution projects that could be implemented through the CDM. To that end, the study will help in the generation of information related to geo-referenced forest, classified according to their carbon sequestration potential, to potentialities for afforestation and reforestation, and to associated costs per additional sequestered carbon ton. Also, it will evaluate and assess on carbon sequestration factors.

### **1.3.5 Reduction of enteric methane emissions**

The NMP will address the need to assess, and subsequently reduce, enteric methane emissions from cattle in Argentina. Current enteric methane figures have been estimated using emission factors developed abroad, which may not be representative of local cattle raising practices and conditions. The objectives of this component of the NMP are: first, to make provisions to determine local enteric methane emission factors; second, to evaluate and adjust, if necessary, current national methane emission figures; and third, to develop programs for the reduction of methane emissions from enteric fermentation.

## **1.4 Promotion of Public Awareness**

The objective of this component is to encourage the development of education plans and outreach programs centered on the issue of climate change. The program will consist of two major sub-components, as follows.

### **1.4.1 Training program**

The focus of this sub-component is to promote the development of training programs for government

officials and general members of the community interested on climate change. The program seeks to provide authorities at the national and regional level with methodology and background on climate change issues. The program also aims at encouraging individual and collective civil actions that ultimately lead to reductions of GHG emissions and climate change impacts. It will be performed mainly through the preparation and dissemination of training information and the organization of workshops, seminars, web-based discussion groups and public audiences on climate change issues. These activities will be targeted at specific audiences such as public servants, members of the private sector, NGOs, academics, students, professionals, civil organizations, media personnel, civil society and community leaders to encourage exchanges of information and collaborations.

#### **1.4.2 Promotional campaign**

A promotional campaign will be organized to disseminate information on climate change, as well as to promote the activities of the training program. The objective of the campaign is to raise the level of awareness on the topic at a national level. Promotional material for all ages, consistent to that prepared for the training program, will be distributed around the country. A leading role of the Secretariat of Environment is expected. Other Secretariats, such as Science and Technology, Agriculture, Energy, Transport, and Industry will also participate in promotional activities.

#### **1.5 Drafting of Second National Communication to UNFCCC**

This component addresses the actual generation of the Second National Communication to the UNFCCC. The document will compile results from the various project components and other publicly available information, such as national statistics on population, social and cultural characteristics, economic indicators, and institutional settings. The Second National Communication will be drafted, translated if necessary, published, and ultimately distributed.

#### **1.6 Project Management**

Project management be the responsibility of the Project Implementation Unit (PIU) that will be hosted at the *Fundación Bariloche* (see Section E below). Periodic progress reports on all project components will be routinely evaluated to assess the adequate advance of the overall project. Four workshops have been projected with participation of all coordinators, experts, and assistants with the objective of: (a) launching the project; (b) monitoring and evaluating progress; (c) exchanging information and results from the various subprojects, particularly the development of the NMP; and (d) emitting a final assessment on the outcome of the project. Lectures from experts have been envisioned as one additional method to verify advances in the completion of objectives.

## **2. Key Policy And Institutional Reforms Supported By The Project:**

*Mainstreaming climate change into national planning.* This project seeks to ensure that appropriate policies for adaptation and mitigation to climate change are incorporated into national planning. To this end, vulnerability assessments of several ecosystems and economic sectors will be conducted. Adaptation initiatives will subsequently be developed, and these will be integrated to the country's development plan. The project will produce a National Mitigation Plan, which will involve active participation of stakeholders in its development and implementation.

*Cross-sectoral Coordination.* The project will strengthen coordination among the various institutions and groups dealing with climate change related studies, by the formation of a Steering Committee, including representatives from all relevant authorities and by a small group of recognized and prestigious individuals. This committee will have the last word not only with respect to the project implementation, but also to implement and monitor the national mitigation, and adaptation plans.

*Public awareness and behavioral changes.* The project will strengthen institutional capacity in terms of promoting and sustaining public awareness and participation, as cultural and behavioral practices in terms

of rational use of energy, transport, water, and land will definitely contribute to mitigate climate change.

### **3. Benefits And Target Population:**

#### *Benefits*

- Strengthened institutional capacity to address climate change issues and to incorporate them into regular sector policy planning;
- Improved knowledge about vulnerabilities to climate change in terms of water resources and productivity in different Argentine ecosystems and about the impact of anthropogenic activity on regional and global climate change;
- Better knowledge about opportunities for mitigating the impacts of climate change and their associated costs;
- Increased involvement of stakeholders through comprehensive public awareness and education programs;
- Long-term local environmental benefits from sustainable practices related to energy consumption (less energy combustion, usage and exploitation), and water use (preventing land degradation, impairment of aquifer drainage, and flooding). These include protection of ecosystems that are vulnerable to climate change, improved air quality among others.
- Long-term global environmental benefits, namely climate change mitigation and conservation of biodiversity.

#### *Target Population*

The primary beneficiaries of this project will be:

- National and provincial governments, as their capacity for incorporating climate change dimensions into their planning will be strengthened, both in terms of mitigation and adaptation responses;
- Stakeholders, whose awareness about climate change impact will allow informed decisions relating housing, water and energy use, and productive activities;
- Coastal and delta area communities and tourism interests directly affected by flooding, temperature changes, and sea level rise;
- General population from urban centers affected by air pollution and in particular vulnerable groups such as children and the elderly;
- NGOs, members of the public, and academic institutions will benefit from additional training and information from project activities.

### **4. Institutional And Implementation Arrangements:**

#### **4.1 Grant Recipient and Project Implementation**

The recipient of the grant will be the *Fundación Bariloche* -FB, which was selected for its trajectory, institutional capacity and experience related to climate change topics to execute the project. It was decided that an independent NGO could better achieve the project objectives without any institutional bias and independent from the constant political cycles present in Argentina. FB will not only compile the results from the different studies in order to produce the Second National Communication to the Convention on Climate Change, but also will directly implement Component A (Update of GHG emissions inventory), given its experience and participation in previous inventories. All other studies will be contracted following the World Bank procurement procedures.

#### **4.2 General Guidance**

As mentioned in section C.2 above, the execution of the project will be directed by a Steering Committee that will be created with representatives from the main federal authorities (Ministry of Foreign Affairs, Trade and Religion, Secretariats of Environment and Sustainable Development, Science and Technology and Innovative Production, Energy; Industry, Transport, Infrastructure, and Agriculture, the

Subsecretariat of Water Resources, National Institute of Water, and Chief Cabinet of Ministers) as well as relevant members of academia and the private sector. The Steering Committee, will be presided by the President of the National Committee on Science and Technology.

The functions of the Steering Committee will be to direct the planning, implementation, and monitoring stages of the project, by: (a) reviewing and defining terms of reference; (b) approving final structure of project documents; (c) overseeing the selection of consultants; (d) defining the procurement and implementation plans; (e) reviewing studies and implementation progress; and (f) setting strategic orientation for the project outputs. The Steering Committee is the link between the *Fundación Bariloche* and the Government and stakeholders. As the project involves strategic studies leading to the adoption of national policies, the Steering Committee is necessary to ensure proper ownership while keeping implementation and financial responsibilities under FB's control. The President of the Steering Committee will be in charge of communicating with the Bank to request no objections regarding TORs and consultants selection. Its logistic support will be provided by FB (see below).

#### **4.3 Project Implementation Unit (PIU)**

To carry out the different tasks associated to the implementation of the project, a Project Implementation Unit (PIU) will be formed and hosted by FB. The PIU will provide logistical and administrative support both to the Steering Committee and to FB. The PIU will also act as a link between the Steering Committee and the consultants contracted for the project studies. Basically, this unit will have a Project Coordinator, a procurement and contract analyst, two technical assistants with expertise in mitigation and vulnerability topics, and one administrative assistant.

#### **4.4. Procurement**

The PIU will be staffed with a procurement specialist who will be directly responsible for producing the Project's procurement documents and overseeing contract processing.

The Bank's Procurement Specialist (PS) is conducting a Procurement Capacity Assessment of the PIU. The terms of reference have been agreed and preliminary results are expected to be available during the appraisal and negotiation mission scheduled for December 9-11, 2002. A satisfactory revised Procurement Plan for the first year of execution will be a condition of effectiveness.

#### **4.5 Financial Management**

The PIU within *Fundación Bariloche* would maintain adequate financial management systems—including accounting, financial reporting, and auditing systems—to ensure that they can provide the Bank accurate and timely information regarding project resources and expenditures, in accordance with: (i) the Financial Accounting, Reporting and Auditing Handbook (Washington, D.C.: World Bank, 1995), (ii) the Guidelines and Terms of Reference for Audits of Projects with Financing by the World Bank in Latin America (World Bank, May 1999), and (iii) the Bank's Operational Policy (OP) and Best Practice (BP) 10.02, dated July 1996.

A Financial Management Assessment of *Fundación Bariloche* is being conducted by the Bank's Financial Management Specialist (FMS). The terms of reference have been agreed upon and preliminary results are expected to be available during the appraisal and negotiation mission scheduled for December 9-11, 2002

#### **4.6 Auditing**

The FB will maintain the records, accounts, files and project documentation, and will produce standard financial statements according to International Accounting Standards (IAS). Project operations will be audited on an annual basis following generally accepted auditing standards (compatible with IAS and satisfactory to the Bank) and procedures consistently applied, by an independent qualified auditor (based on applicable Bank guidelines). The audit and statements will be submitted to the Bank four months after the end of the fiscal year. A section providing details on the audit will be included in the Project Manual.

#### 4.7 **Fundación Bariloche**

The *Fundación Bariloche* was created in 1963, as a non-profit private organization engaged in scientific and economic research, and education. It is associated to the United Nations University (UNU); to UNESCO; to the International Federation of Institutes for Advanced Studies (IFIAS); and to the Association of Ibero-american Education Televisión (ATEI). The FB has ample experience in dealing with energy and environment, and in particular with climate change related topics. In 1990-91 participated in elaborating a regional document with UNDP and IADB in preparation for the Rio Summit. Later in 1994 participated with discussion papers for the Summit of the Americas. It has produced technical documents for GEF and participated in the making of the national GHG emissions inventories, undertaken for the FNC to the Parties to the Climate Change Convention, its revision in 1999, and in the World Bank study on Flexible Mechanisms established under the Kyoto Protocol. With programs in energy economics, and environment, the FB has a working relationship with prestigious international organizations such as WRI, UNDP, CEPAL, IISD, RISO, and the European Union.

In coordination with the RISØ - UNEP Center, the *Fundación Bariloche* produced a study on the Economic Aspects of Greenhouse Effect Gas Mitigation, which examined methodological aspects and conceptual approaches to evaluation of mitigation actions. Within the same framework, the project entitled “Energy and the Environment in Argentina: Past and Future Evolution” was also developed by the FB for the RISØ National Laboratory / UNEP and completed in March 1994. The project on Environmental Impacts of the Latin American Energy System 1970 - 1990 / 1990 -2010, was carried out by FB for OLADE and completed in August 1993.

There have been different projects related to energy efficiency, both at domestic and the regional levels, including the Study on the Rational Use of Energy in Argentina, carried out by *Fundación Bariloche* within the framework of the COPED network, with partial financing from DGXVII / European Union. Another study, “Confronting Climate Change. Economic Priorities and Climate Protection in Developing Nations, Argentina Case Study”, demonstrated that developing countries have taken significant steps to reduce GHG emissions with far fewer technological and capital resources than developed nations. This study was carried out with support from the National Environmental Trust (NET) and with the participation of a network of NGOs and academic institutes of several developing countries (including the FB).

### **D: PROJECT RATIONALE**

#### **1. Project Alternatives Considered And Reasons For Rejection:**

*Government Execution.* An alternative to the project design was the implementation by the Government of Argentina, with the support of a third party financial agency. However, it was decided that the implementation of such a cross-sectoral project would better be in an unbiased institution detached from the government. This would not only avoid inter-institutional friction but potential bias towards a particular set of policies or priorities defined by any of the governmental agencies. Also, the FB offers an alternative way to routing the resources through the federal budget, in view of the current financial and fiscal difficulties. Argentina is contributing with in-kind counterpart resources, and the use of an NGO also facilitates full disbursement (100%) of the approved GEF grant.

*Limited geographical coverage.* The project is only focusing at some key geographical areas when studying vulnerabilities to climate change. The *Pampa Húmeda*, the coastal zone south of *Buenos Aires*, the *Litoral-Mesopotamia* and *Paraná Delta*, and *Patagonia* are the areas to be studied which will complement studies in the Oases area undertaken by the Enabling Activity to prepare the First National Communication to UNFCCC. These areas were selected for their contribution to the federal GDP; other areas in the country will be studied in future projects. Of particular interest are the basins near the Andean range, where much economic activity depends on the melting of snow pack. Climate change has a great impact in the hydrologic balance in these areas, which also host relevant productive activities such as wine and fruits, and winter tourism.

*Regional vs Federal participation.* Regional participation in project coordination was considered, but at the end it was decided that the Steering Committee should only include representatives of federal agencies, as obligations under UNFCCC and the Kyoto Protocol fall under the responsibilities and functions of national agencies. Nonetheless, regional participation at the implementation level will be key to ensure proper institutional ownership and first hand data and information sources.

## 2. Major Related Projects Financed By The Bank And/Or Other Development Agencies (Completed, Ongoing And Planned):

Sector issue	Project	Latest Supervision (Form 590) Ratings (Bank-financed projects only)	
		Implementation Progress (IP)	Development Objective (DO)
Bank-financed			
Water, Sanitation and Flood Protection	Drainage Infrastructure Management Project		
Water, Sanitation and Flood Protection	Water resources management - policy elements for sustainable development in the 21st century		
Infrastructure and Urban Development	Flood Protection Project	S	S
Urban Development	<i>El Niño</i> Emergency Flood Project	S	S
Environment	Native Forests and Protected Areas Project		
Agriculture, Fishing, and Forestry	Forestry Development Project	S	S
Agriculture, Fishing, and Forestry	Provincial Agricultural Development Project (PROSAP)	S	U
Protection of Ozone Layer	Reduction of Ozone Depleting Substances project	S	S
Natural Resource Management	Biodiversity Conservation Project	S	S
Environment	Pollution Management	U	U
Renewable Energy	Renewable Energy in Rural Markets (PERMER)	U	S
	Efficient Lighting Initiative (ELI)		
<b>Other development agencies</b>			
Country Study on Climate Change (UNDP)	Country Study		

IP/DO Ratings: HS (Highly Satisfactory), S (Satisfactory), U (Unsatisfactory), HU (Highly Unsatisfactory)

### *Linkages to World Bank Portfolio*

The only Bank projects financed with GEF resources under the Climate Change Operational Programs are PERMER and ELI (IFC project). PERMER provides rural areas with reliable electric supply in a sustainable manner, using renewable sources (where feasible) in order to reduce Argentina's dependence on fossil fuels; the project also aims at removing market barriers to application, implementation, and dissemination of renewable energy sources. The province of *Jujuy*, for instance, was one of the first in which PERMER began implementation. The world's first and most advanced rural off-grid concessionaire began providing rural off-grid electricity services to *Jujuy* in 1995. The concessionaire

now serves a total of 3,050 rural customers, 1,333 of these with individual or collective photo-voltaic systems. The initial success of PERMER however, has been slowed down considerably given the current economic difficulties of the country. Studies involving the availability of markets for renewable energy, which were planned components of the project, have for instance not yet begun. The RE and EE studies to be conducted as part of the Second National Communication will therefore be used to produce an initial diagnostic of the RE market in Argentina. Results from these studies will later be used as a baseline for more specific characterizations envisioned by the PERMER. Coordination between energy experts from the two studies has been in effect, ensuring that results produced by the Second Communication are compatible with the objectives of the PERMER.

ELI is a private sector project, which promotes the growth of markets for energy-efficient lighting technologies, aiming at reducing energy costs and resulting GHG emissions. The response to ELI-promoted projects in Argentina has been very positive and includes, among others, the creation of the first ESCOs, the participation of electricity distribution companies in DSM programs, and the development of educational programs that promote energy efficiency.

Forestry projects are directly linked to the net emissions of GHG, as forests affect the global carbon balance by acting as carbon sinks. The *Native Forests* and *Forestry Development* projects promote conservation and adequate management of national forests. The projects have contributed to the generation the first inventory of Argentine forests, which has resulted in a quantified the carbon sink capacity of the country.

Bank projects that focus on flood prevention and water resource management offer more direct links to the vulnerabilities and adaptation components. The *Flood Protection* and *Drainage Infrastructure Management* projects, for instance, directly address issues related to the reduction of impacts from flooding in vulnerable areas of Argentina. The *Drainage Infrastructure Management* project in particular, has contributed to the determination of flood-prone areas around the major rivers of the *Litoral-Mesopotamia* and has promoted creation of monitoring systems. The rural development projects focus, among other things, on promoting sustainable agricultural practices, which increase productivity and ensure the preservation of natural resources.

National Strategy Studies (NSS), two of which have been funded by the Bank, promote market-based instruments for GHG reductions within the framework of the Clean Development Mechanism (CDM). NSS primarily focus on the identification of projects in the forestry, transportation, and energy sectors.

#### *Linkages to Other GEF Implementing Agencies' projects*

UNDP implemented both the Country Study to prepare the First National Communication to the UNFCCC; and also the project to revise the First Communication, and presented at Buenos Aires' Conference of the Parties (COP). The first study centered in the Oases area as with respects to studying climate change impact on vulnerability; other work was undertaken to identify opportunities for mitigating GHG emissions. The revised version presented in 1999, centered its efforts in devising a way for Argentina to acquire voluntary commitments regarding GHG emissions. This communication aims at complementing preceding studies, so that policy making can benefit from the studies.

### **3. Lessons Learned And Reflected In Proposed Project Design:**

The First Communication of the Parties was performed by UNDP in 1997. A revised communication was produced in 1999. Later that year, the Bank sponsored the first Argentine NSS, a study on opportunities under the flexible mechanisms recently established by the Kyoto Protocol. Lessons learned from those involvements can be summarized as follows:

- Participation of political stakeholders and decision makers in the development of policies and strategies is of critical importance, as this will ensure ownership of the project and commitment for the implementation phase. Since the project will help develop cross-sectoral strategies and programs,

joint participation from all relevant governmental agencies since the project inception and during its development and implementation will ensure proper implementation and adequate mainstreaming at the different sectors.

- A close coordination and supervision of the studies is needed, in particular with relation to the vulnerability assessments implemented by local institutions. This will ensure coherence in the approach of the strategies devised under the study.
- Development of local emission factors and carbon sequestration coefficients is important, as Argentina presents particularities not easy to standardize with general approaches.
- Development of regional circulation models is important to better estimate vulnerability of fragile and critical ecosystems.
- A strong consultative process with the general public will ensure that whatever voluntary commitments are assumed or ratified are fully endorsed by the general population and stakeholders.

#### **4. Indications Of Borrower Commitment and Ownership:**

Art.41 of the Constitution of Argentina enshrines the main principles of the national environmental policy. International agreements approved by the Argentine Legislative branch have a high hierarchical level in the legal system, second only to the Constitution itself.

The GOA has shown a consistent commitment to the topic of climate change and has demonstrated leadership in the advancement of current global policies that address this issue. In accordance with the UNFCCC and COP decisions, GOA carried out the Project Study on Climate Change, and as a result, the First National Communication of the Argentine Republic to the UNFCCC was submitted in 1997. Argentina was amongst the first non-Annex I nations to submit a National Communication to the UNFCCC. The GOA had an active participation in the negotiation of the UNFCCC and the Kyoto Protocol, contributing at the same time to the establishment and functioning of GEF and to the activities of the International Panel on Climate Change (IPCC), of which Bureau is a member. In November 1998, Argentina hosted the UNFCCC Fourth Meeting of the Conference of the Parties (COP-4), and contributed to the understandings reached in Bonn and Marrakech in July and November 2001 for the implementation of the Buenos Aires Plan of Action (BAPA). Under the BAPA, parties set a two-year deadline for strengthening UNFCCC implementation and preparing for the future entry into force of the Kyoto Protocol.

Argentina, as member of IPCC's bureau, holds key posts in the preparation of the IPCC Special Reports (application of Article 3 of the Kyoto Protocol). More than 20 Argentine scientists are engaged as leading and contributing authors as well as review editors of the IPCC Assessment Reports and, some of them, were involved in the preparation of the IPCC TAR Synthesis Report. Argentina's specialists are currently contributing to the development of IPCC Technical Papers, such as that on Climate Change and Sustainable Development, Climate Change and Biodiversity, and CO<sub>2</sub> concentrations involving dangerous effects to natural systems.

GOA has shown commitment to the project establishing the Steering Committee, which not only will guide project implementation, but also will be key to developing strategic plans for mitigating climate change and long-term adaptation plans.

#### **5. Value Added Of Bank's Support For This Project:**

The Bank offers a multi-sectoral approach through on-going operations in Argentina and the rest of the world related to climate change and its impact. Thus, preparing and implementing the project allows the participation of seasoned experts already managing or involved with project related activities in the

country. This not only ensures a coherent and comprehensive view of the problem, but also favors the use of existing information and local resources. Of particular interest are the Bank-supported projects in Argentina on flood prevention, water resource management, urban transport, reduction of ozone-depleting substances, native and commercial forestry, renewable energy, and rural development.

Furthermore, the Bank is implementing the second phase of a National Strategic Study on Climate Change, aimed at developing institutional capacity for dealing with the flexible mechanisms originated in the Kyoto Protocol, and leading to potential operations for the Bank's Prototype Carbon Fund.

## **E: SUMMARY PROJECT ANALYSIS**

(Detailed assessments are included in the project file, see Annex 8)

### **1. Economic (see Annex 4):**

Other (specify) NPV=US\$ million; ERR = % (see Annex 4)

The economic loss in Argentina associated to climate change is difficult to determine, due to the lack of data and the complex linkages amongst sectors. Costs could be structured into two categories:

(i) Productivity losses derived from climate changes. Weather changes affect temperature and hydrologic balance, and have influence in floods and economic activities such as agriculture and tourism. Argentina is one of the 14 countries of the world most affected by flooding events, reaching economic losses greater than 1.1% of GDP. Impacts on agricultural production derived from climate change are difficult to ascertain, as production practices may help exacerbate or diminish climate impact; soil salinization, and erosion are linked to poor irrigation and land management practices.

(ii) Economic costs associated to cleaner production of energy, and energy use, resulting from emission standards and regulation. High upfront costs, and market and regulation barriers prevent investments in energy saving activities. Clean transport technologies involve higher costs not necessarily recoverable in the short term.

### **2. Financial (see Annex 4 and Annex 5):**

Argentina is in the throes of economic recession characterized by a plunge of the peso (by as much as 60%) since it was devalued and allowed to float in early January 2002 following years of being pegged to the US dollar. In an effort to curb the rapid devaluation of its currency, Argentina recently imposed restrictions on foreign exchange holdings in domestic and foreign accounts. National Banks were ordered to limit their dollar holdings and restrictions on bank transactions were imposed. Additionally, restrictions on cash withdrawals known as the "*corralito*" were created, as a means of: 1) protecting the financial system from bankruptcy due to insufficient liquidity; and 2) to act as a pseudo-monetary policy instrument.

Considering the current fiscal constraints, the grant recipient will be *Fundación Bariloche*, who will implement the project without the need of passing through the national budget. Being an NGO, the Bank disbursements for the project expenses for all categories will be 100%

#### *Fiscal Impact*

The project will not have fiscal impact. Argentina's counterpart will be "in-kind", and derived from the costs of representatives from the members of the Steering Committee involved in preparing, guiding, and monitoring the implementation of the project. Also, from the costs of offices and other operating resources utilized to that end.

### 3. Technical

The project has been prepared with the inputs and participation of local and Bank experts involved not only with climate change related on-going and past operations in Argentina, but also with access to information about programs, experiences and priorities in the areas of urban transport, rural development, forestry, agriculture, energy, flood control, and water resource management. The project draws from the results of the country studies undertaken to prepare the First Communication to UNFCCC, and from previous and on-going studies aimed at estimating marginal cost from climate change mitigation measures, and at identifying potential CDM projects.

As per the geographical areas selected to conduct the vulnerability analysis, it is important to signal that additional work with relation to the snow packs and their influence on the national hydrologic balance may be necessary in the future to ensure a good assessment of the regional vulnerabilities, and adaptation possibilities. This might be conducted as a bi-national project, incorporating the Chilean Andes into the analysis.

### 4. Institutional

Argentina's institutional framework for managing climate change issues and policies is relatively weak and lacks coordination mechanisms. The only existing coordination mechanism with respect to climate change is the Office for the Clean Development Mechanism of the Secretariat of Environment and Sustainable Development, limited to developing and coordinating potential CDM projects.

Climate change is a complex issue that links different sector policies and programs. Human activities and economic development usually entail GHG emissions resulting from energy use, organic matter decomposition, and from changes in land's vegetal cover. Therefore, preventing climate change, or adapting to it is a matter that concerns all stakeholders, public and private. At the governmental level, promoting the prevention and abatement of GHG emissions from energy use, involves the participation of the Secretariats of Energy, Transport, Environment, and Industry and Mining; and the regulatory bodies on energy (ENRE) and gas (ENARGAS) at the Ministry of Economics. Land-use related policies and programs, which directly affect carbon sink capacity, fall under the Secretariats of Agriculture, Environment, and Industry and Mining, and the Ministry of Infrastructure and Housing. Institutions dealing with climate change impacts and adaptation programs include the National Institute on Water; the Subsecretariat of Water Resources; the Secretariats of Health, Environment, and Agriculture, and the Ministry of Infrastructure and Housing. National Meteorological Service, and the Secretariat of Public Works, are charged of monitoring impacts and coordinating emergency responses in case of floods.

The agencies dealing with climate change from a cross-sectoral perspective are the Secretariats of Environment, and Science and Technology; and the Ministry of Foreign Affairs, which not only leads the negotiations and representation at international bodies and forums, but also performs as official focal point for GEF. The leadership for conveying stakeholders and establishing national positions with respect to the on-going international negotiations has over the years moved from one Secretariat to the other. The first communication to UNFCCC (1997) was led by the Ministry of Foreign Affairs, and locally coordinated by the Secretariat of Science and Technology. The revision to the First Communication (1999), was led by the Secretariat of Environment. Today, the leadership is back at the Ministry of Foreign Affairs, who has not only requested the Bank support to implement the Enabling Activity project, but also has already as focal point endorsed the project and the designation of *Fundación Bariloche* as the grant recipient.

The project will strive for strengthening the inter-agency and stakeholder coordination on climate change, which will help to ensure project ownership, implementation of resulting policies by stakeholders, and sustainability. To this end, a Steering Committee will be created, which will ensure coordination at the government level; this will be a condition for effectiveness. To coordinate all other stakeholder participation, the project will have open workshops, in addition to the mechanisms to be developed under the Public Awareness component.

#### **4.1 Executing agencies:**

The FB will execute the project (for a full description of FB please refer to section C.4.7). A letter to this effect has been sent by the Ministry of Foreign Affairs and Focal Point for the GEF on October 10 2002. The FB will be responsible for entering into legal agreements with the Bank and will act as official liaison for the project. The FB will be assisted as follows:

##### Steering Committee

The Steering Committee will oversee monitoring and evaluation of the project, including the coordination of the overall audit, to ensure that it is in compliance with the agreement entered into with the Bank. The Committee will include representatives from the agencies in charge of climate change related issues (See section C.4 for further details). Its Rules of Procedure will be agreed on its first session and incorporated into the Manual of Operation of the project. With respect to project implementation, the President of the Steering Committee will be responsible for requesting the Bank's "no objections" for TORs, procurement plans, consultants' short lists, selection of consultants, and monitoring of study reports.

##### Project Implementing Unit

The FB will establish a Project Implementing Unit (PIU), whose core staff will be a Project Coordinator, two technical assistants, one procurement and contract expert, and one technical assistant. The PIU will respond both to the FB, and to the President of the Steering Committee. The Project Coordinator will be responsible for day-to-day operations of the project such as planning and report writing, procurement, financial management, and technical monitoring and evaluation. The PIU will also be in charge of preparing and implementing workshops to exchange views about the project implementation with relevant stakeholders, and to advance the preparation of the National Mitigation Program.

#### **4.2 Project management:**

Successful project management will be contingent on: (a) adequate coordination between the Steering Committee and the FB; (b) timely financial evaluations; (c) adequate information for decision making processes; (d) participatory processes with all relevant actors and stakeholders; and (e) timely response to changes during project implementation.

Manual of Operations: The functions and responsibilities of the project management would be governed by the Manual of Operations (MOP), which would include, among other aspects, a full description of project activities, functioning of Steering Committee, and project procedures, financial guidelines, criteria for selecting consultants, staffing, and assignment of staff responsibilities, project supervision, flow of funds, special account, budgeting, auditing, reporting, as well as procurement and disbursement procedures. MOP will be a condition of Grant Effectiveness.

#### **4.3 Procurement issues:**

Procurement arrangements and plans have been discussed with FB and are included in Annex 6 of the PAD. The Manual of Operations will also include a full section on procurement procedures and arrangements, and a 2 year Procurement Plan for the project. The PIU will be responsible and would follow Standard Bank Procedures for all project procurement. Procurement includes consultant services, goods and equipment.

The PIU will be supported by a procurement specialist who will be directly responsible for producing the Project's procurement documents and overseeing contract processing.

The Bank's Procurement Specialist (PS) is currently conducting a Procurement Capacity Assessment of the PIU. Results are expected to be available during the appraisal and negotiation mission scheduled for December 9-11, 2002. A satisfactory revised Procurement Plan for the first year of execution will be a condition of effectiveness.

#### **4.4 Financial management issues:**

*Fundación Bariloche* will have experienced accountants to maintain adequate financial management systems—including accounting, financial reporting, and auditing systems. In addition, PIU will also be staffed with an accountant, to ensure that they can provide the Bank accurate and timely information regarding project resources and expenditures, in accordance with: (i) the Financial Accounting, Reporting and Auditing Handbook (Washington, D.C.: World Bank, 1995), (ii) the Guidelines and Terms of Reference for Audits of Projects with Financing by the World Bank in Latin America (World Bank, May 1999), and (iii) the Bank’s Operational Policy (OP) and Best Practice (BP) 10.02, dated July 1996.

A Financial Management Assessment of the FB is being conducted by the Bank's Financial Management Specialist (FMS). Results are expected to be available during the appraisal and negotiation mission scheduled for December 9-11, 2002

Disbursements: A special account will be established in a commercial bank acceptable to the Bank. The account will be managed by the FB, which will be responsible to regularly submit withdrawal applications, supported by the appropriate documentation according to Bank disbursement procedures.

Auditing: The PIU will be responsible for preparing combined financial statements for the project as a whole. The project will be audited annually; an annual audit report of project accounts, and a separate opinion with respect to the Statement of Expenditures and the Special Account will be prepared by independent auditors acceptable to the Bank, in accordance with International Standards on Auditing and the guidance provided in the “Guidelines and Terms of Reference for audits of Projects with Financing by the World Bank in the Latin America and Caribbean Region”. The auditors will be selected before the end of the first year to be audited. The PIU will send to the Bank a certified copy of the agreed audit report no later than four months after the end of each year. TORs for all audits should obtain the Bank’s no objection.

#### **5. Environmental:**

Environmental Category: C

The project is a category C for environmental assessment purposes consistent with the provisions of OP 4.01, because it does not create direct or induce indirect impacts on the environment. The preparation of a National Mitigation Program and elements for an Adaptation Plan to Climate Change will not have an adverse environmental impact. No civil works or remediation activities are financed under the Project.

#### **5.1 Summarize the steps undertaken for environmental assessment and EMP preparation (including consultation and disclosure) and the significant issues and their treatment emerging from this analysis.**

The project is expected to have a beneficial environmental impact and no negative environmental impacts are foreseen.

#### **5.2 What are the main features of the EMP and are they adequate?**

NA

#### **5.3 For Category A and B projects, timeline and status of EA:**

NA

#### **5.4 How have stakeholders been consulted at the stage of (a) environmental screening and (b) draft EA report on the environmental impacts and proposed environment management plan? Describe mechanisms of consultation that were used and which groups were consulted?**

NA

**5.5 What mechanisms have been established to monitor and evaluate the impact of the project on the environment? Do the indicators reflect the objectives and results of the EMP?**

NA

**6. Social**

**6.1 Summarize key social issues arising out of project objectives, and the project's planned social development outcomes. If the issues are still to be determined, describe current or planned efforts to do so.**

There are no social issues associated with the project objectives.

**6.2 Participatory Approach: How will key stakeholders participate in the project?**

The project is aimed at developing strategies and plans for both mitigation and adaptation; therefore, participation of the community and of stakeholders is critical to ensure implementation.

*Promotion of public awareness:*

Approximately 10% of the total budget of the project has been assigned to raising public awareness levels. The GOA is allocating significant funds for education and for the general change in perception of the overall population

*Elaboration of Second National Communication and the National Mitigation Program*

The Government has made plans to publish and distribute the Communication and the NMP widely, further promoting communication and public awareness efforts.

- One of the project objectives is to integrate climate change issues into national planning. The project will be coordinated by the Steering Committee, which will act to ensure participation by all stakeholders and will monitor the implementation of the project.
- Public awareness activities, including seminars, workshops, and web-based discussion groups, will provide opportunities for various members of the public to participate. Activities will also feature tailored messages targeted at specific audiences such as students, professionals, clubs and civil organizations, media personnel, community leaders, and others.

**6.3 How does the project involve consultations or collaboration with NGOs or other civil society organizations?**

- The project will develop a pilot plan of public awareness education for all members of the community. One of its objectives is that of providing methodology and experience to NGOs for future action in the field of climate change.
- Also, project implementation emphasizes participation, through workshops and seminars. Informal meetings and discussions will be promoted between, among others, members of the private sector, NGOs, national and regional public servants, academics, and civil society leaders, to encourage exchanges of information and collaborations

**6.4 What institutional arrangements are planned to ensure the project achieves its social development outcomes?**

The National Mitigation Program, and the future National Adaptation Plan will involve the participation of stakeholders from its inception, which is the only way to ensure an effective implementation at all levels of society.

**6.5 What mechanisms are proposed to monitor and measure project performance in terms of social development outcomes? If unknown at this stage, please indicate**

TBD.

**7. Safeguard Policies**

**7.1 Do any of the following safeguard policies apply to the project?**

Policy	Applicability		
Environmental Assessment ( <a href="#">OD 4.01</a> )	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> TBD
Natural habitats ( <a href="#">OP/BP/GP 4.04</a> )	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> TBD
Forestry ( <a href="#">OP 4.36</a> )	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> TBD
Pest Management ( <a href="#">OP 4.09</a> )	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> TBD
Cultural Property ( <a href="#">OPN 11.03</a> )	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> TBD
Indigenous People ( <a href="#">OD 4.20</a> )	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> TBD
Involuntary Resettlement ( <a href="#">OP 4.30</a> )	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> TBD
Safety of Dams ( <a href="#">OP 4.37</a> )	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> TBD
Projects in International Waterways ( <a href="#">OP 7.50</a> )	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> TBD
Projects in Disputed Areas ( <a href="#">OP 7.60</a> )	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> TBD

**7.2 Project Compliance**

(a) Describe provisions made by the project to ensure compliance with safeguard policies, which are applicable.

N/A

**8. Business Policies**

**8.1 Check applicable items:**

- \_ Financing of recurrent costs ([OMS 10.02](#))
- \_ Cost sharing above country 3-yr average ([OP/BP/GP 6.30](#))
- \_ Retroactive financing above normal limit ([OP/GP/BP 12.10](#))
- \_ Financial management ([OP/BP 10.02](#))
- \_ Involvement of NGOs ([GP 14.70](#))

**8.2 For business policies checked above, describe issue(s) involved.**

N/A

**F: SUSTAINABILITY AND RISKS**

**1. Sustainability:**

The project will promote integration of climate change concerns into sector policies and programs, while promoting cross-sectoral coordination. This will help influence the investments of the country, complementing and redirecting resources towards mitigation and adaptation options. Joint financial efforts from different sectors will ensure a synergetic effect towards reducing GHG emissions and adaptation related costs.

Active participation from all stakeholders in the formulation of policies, programs and projects oriented to both mitigating and adapting to climate change will ensure ownership and sustainability. Many of the

measures oriented to reduce GHG emissions also offer economic savings and local environmental benefits and rational policies to avoid floods, erosion, and salinization will avoid future corrective and expensive measures. Sustainability is therefore linked to achieving win-win results, geared by a participatory and coherent approach.

The project will aim at identifying investment options to be financed under the Clean Development Mechanism, GEF, or the Carbon Prototype Fund.

Also, the project will identify barriers to measures contributing to reduce GHG emissions, such as energy efficiency, use of renewable energy, or a rational transport system integrated to land-use policies; and to sound adaptation measures involving land-use planning and enforcement, and adequate infrastructure investment.

Argentina being part of UNFCCC is obligated to continue to produce National Communications to the convention, showing advance and policies oriented to comply with its objectives. National adaptation plans will be necessary to minimize the impact of climate influenced events such as flooding, hurricanes, salinization, drought, and the associated productivity loss.

Finally, to ensure a sustained Government policy towards consistent goals and objectives in terms of climate change mitigation and adaptation, the institutional layout will have to be strengthened. Not only will a good and sustained coordination of policies have to be pursued through the Steering Committee, but also it will be necessary to train officials at the institutional level to enhance the national capacity to produce subsequent National Communications.

## 2. Critical Risks: (reflecting the failure of critical assumptions found in the fourth column of Annex 1)

Risk	Risk Rating	Risk Mitigation Measure
<b>From Outputs to Objective</b>		
GHG Inventory is solid and accepted by stakeholders	<b>N</b>	Make information public and open to comments and suggestions by general public
Secretariat of Energy coordinates methodology for energy balance (after OLADE) harmonization with IPCC methodology	<b>H</b>	Involve key players at Secretary of Energy in the development
Data are available from regional authorities	<b>M</b>	Check from the beginning the need to produce primary information Have political support
Data and information produced is reliable and sound	<b>M</b>	Utilize state-of-the-art methodologies
Information produced by project is not adequately absorbed by institutions	<b>M</b>	Dissemination of results to stakeholders and governmental agencies
Political commitment	<b>H</b>	Ensure that Steering Committee on Climate Change meets periodically to know the development of the project
Economic and technical feasibility of potential energy efficiency measures	<b>N</b>	Build probable scenarios to anticipate different outcomes
Stakeholders support measures in Climate Change Mitigation National Plan	<b>M</b>	Promote participation of NGO and private sector

Risk	Risk Rating	Risk Mitigation Measure
<b>From Components to Outputs</b>		
Political commitment	<b>H</b>	Steering committee meets and participation is ensured
Consistent data can be gathered around the country	<b>M</b>	Local universities will be involved, and government agencies will be consulted from the beginning
Accurate and consistent records of GHG emissions exist	<b>N</b>	Data available from former communications and updated registers
<b>Overall Risk Rating:</b>		
	<b>H</b>	

Risk Rating - H (High Risk), S (Substantial Risk), M (Modest Risk), N (Negligible or Low Risk)

### **Risk Analysis:**

The overall risk associated with this project is high because of a possible lack of government commitment, especially after elections. The project requires a sustained participation of the Steering Committee, which will depend on the political commitment of the different agencies involved. Relationships between some of the key agencies have not been smooth in the recent past, as institutions tend to compete for taking the leading role. To mitigate this risk, the project has conditioned Grant Effectiveness on the establishment of a functioning Steering Committee, involving all key authorities. Also, the government has shown a relatively consistent commitment to the issue of global climate change; the active participation of the GOA in key positions of the IPCC and COP, for instance, indicates the level of commitment of this administration.

As to the participation of stakeholders, the project also has the risk of changes with respect to a participatory approach with the community. A National Mitigation Program can only be effectively implemented if developed with the participation of stakeholders, usually responsible for effecting the changes (behavioral and technology changes).

### **3. Possible Controversial Aspects:**

Not identified

## **G. MAIN CONDITIONS**

### **1. Effectiveness Condition**

The following activities are specified as additional conditions to the effectiveness of the GEF Trust Fund Grant:

- (a) Operational Manual completed;
- (b) Procurement plan for first-year project operations;
- (c) PIU established with qualifications and experience satisfactory to the Bank;
- (d) Steering Committee established and Rules of Procedures for its functioning in place.

### **2. Other [classify according to covenant types used in the Legal Agreements.]**

The PIU shall arrange for annual audits to be undertaken by an independent auditor.

## **H. READINESS FOR IMPLEMENTATION**

1. The procurement documents for the first year's activities are complete and ready for the start of project implementation.
2. The Project Implementation Plan in draft form, has been appraised and found to be realistic and of satisfactory quality. Its final version acceptable to the Bank will be a condition of effectiveness.

## **I. COMPLIANCE WITH BANK POLICIES**

1. This project complies with all applicable Bank policies.
2. The following exceptions to Bank policies are recommended for approval. The project complies with all other applicable Bank policies.

Juan López-Silva  
**Team Leader**

John Redwood  
**Sector Manager/Director**

Axel van Trotsenburg  
**Country Manager/Director**

## PROJECT DESIGN SUMMARY

### Argentina Enabling Activities Leading to Second National Communication of the Argentine Government to the Conference of Parties to UNFCCC

Hierarchy of Objectives	Key Performance Indicators	Monitoring and Evaluation	Critical Assumptions
<b>Sector-related CAS Goal:</b>	<b>Sector Indicators:</b>	<b>Sector / Country Reports:</b>	<b>(from Goal to Bank Mission)</b>
Promoting sustainable growth, pollution abatement, integration of global warming objectives in local strategies	<ul style="list-style-type: none"> <li>-Local capacity enhanced to incorporate global environmental dimension in sector planning</li> <li>-Increase in number of projects dealing with climate change and pollution abatement</li> </ul>	<ul style="list-style-type: none"> <li>Second National Communication to the UNFCCC</li> <li>National Mitigation Program</li> <li>Sector Work (World Bank)</li> </ul>	<ul style="list-style-type: none"> <li>Macroeconomic stability</li> <li>Political acceptance</li> </ul>
<b>Project Development Objective:</b>	<b>Outcome / Impact Indicators:</b>	<b>Project Reports:</b>	<b>(from Objective to Goal)</b>
<ul style="list-style-type: none"> <li>▪ Support enabling activities for the preparation of the Second National Communication of the GOA to the Conference of the Parties of UNFCCC</li> <li>▪ Update and improve GHG National Inventories</li> <li>▪ Strengthen local capacities to integrate climate change issues in planning and in the development of public awareness</li> <li>▪ Assist in the preparation of National mitigation policies and measures</li> <li>▪ Assess vulnerability and adaptation options for key ecosystems and agricultural regions</li> </ul>	<ul style="list-style-type: none"> <li>▪ Institutional procedures in place to prepare national communications</li> <li>▪ Updated GHG emissions inventory and trend analysis</li> <li>▪ Local factors of emissions and carbon sequestration</li> <li>▪ Harmonized Energy Balance</li> <li>▪ Assessment of vulnerability of particular ecosystems to climate change (coastal zone, <i>Pampa, Patagonia</i>)</li> <li>▪ Assessment of Economic impact of climate change</li> <li>▪ Design of adaptation measures</li> <li>▪ Regional climate change projections from modified General Circulation Model</li> <li>▪ Assessment of technologies and policies that aim at reducing the effects of climatic variations</li> <li>▪ Assessment of priorities and opportunities for mitigation carbon sequestration and technology transfer</li> </ul>	<ul style="list-style-type: none"> <li>▪ Second National Communication to the UNFCCC</li> <li>▪ National Mitigation Program</li> <li>▪ Project Reports</li> </ul>	<ul style="list-style-type: none"> <li>Commitment from Agencies and stakeholders</li> <li>Sustainability of institutional framework</li> <li>Programs, Policies and Programs addressing climate change are economically and technically feasible</li> </ul>

<p><b>Project Global Objective:</b> Development of country policies that will contribute to global efforts to mitigate climate change</p>	<ul style="list-style-type: none"> <li>▪ Measurements of variation of local climatic patterns</li> <li>▪ Results from simulations of global circulation models using regional indicators</li> </ul>	<p>Reports of the UNFCC</p>	<p>Sector policies include climate change mitigation and carbon sequestration measures</p>
<p><b>Output from each component:</b></p>	<p><b>Output Indicators:</b></p>	<p><b>Project Reports:</b></p>	<p><b>(from Outputs to Objective )</b></p>
<p>a. GHG emissions inventory</p> <ul style="list-style-type: none"> <li>▪ GHG emissions inventory up date</li> <li>▪ Factors of Emission</li> <li>▪ Energy balance harmonization</li> </ul>	<ul style="list-style-type: none"> <li>▪ Information gathering from various economic sectors;</li> <li>▪ Data processing, using IPCC methodological tools;</li> <li>▪ Analysis on evolving GHG emission trends and cross sector evaluation;</li> <li>▪ Review and adjustment of national emission factors, with emphasis in methane emissions from cattle enteric fermentation;</li> <li>▪ Review and study recent methodological improvements of IPCC;</li> <li>▪ Review of late national inventories, and identification of methodological or informational gaps;</li> <li>▪ Review methodology recognized by IPCC for determining own factors of emissions for energy sectors as well as that for land-use and forestry Record of national emissions factors per economic sector.</li> </ul>	<p>Progress, evaluation, and completion reports</p>	<ul style="list-style-type: none"> <li>• GHG Inventory is solid and accepted by stakeholders</li> <li>• Secretary of Energy coordinates methodology for energy balance</li> </ul>

<p>b. Vulnerability Assessment</p> <ul style="list-style-type: none"> <li>▪ Assessment of vulnerability in specific ecosystems (<i>Patagonia, Pampa Húmeda, Coastal Zone</i>)</li> <li>▪ Evaluation of climate change impacts on hydrological resources and on the energy sector</li> <li>▪ Economic impact assessment</li> <li>▪ Design adaptation measures</li> <li>▪ Regional Climate models</li> </ul>	<ul style="list-style-type: none"> <li>▪ Environmental indicators and data sets either generated or updated will include: <ul style="list-style-type: none"> <li>i) Water level dependence on tidal fluctuations along coastline</li> <li>ii) Seasonal record of flood and drought in the flatlands</li> <li>iii) Seasonal, regional water resource fluctuations in the flatlands</li> <li>iv) Dependence of crop performance on water inputs</li> <li>v) Precipitation records in Patagonia</li> </ul> </li> <li>▪ Hydrological budget for various regions of the country</li> <li>▪ Mapping of the following indicators: <ul style="list-style-type: none"> <li>i) Zones of water scarcity</li> <li>ii) Zones of potential natural hazards</li> <li>iii) Zones of environmental stress</li> <li>iv) Zones of population stress</li> </ul> </li> <li>▪ Identification of institutional capacity gaps to address potential natural disasters</li> <li>▪ Review of regulatory framework to address natural disasters</li> <li>▪ Review of natural energy resources</li> <li>▪ Figures of national energy demand</li> <li>▪ Projections from Regional Climate Model of climatic scenarios as function of emissions levels</li> </ul>	<p>Progress, evaluation, and completion reports</p>	<ul style="list-style-type: none"> <li>▪ Data are available from regional authorities</li> <li>▪ Data and information is reliable and sound</li> <li>▪ Information produced by project is not adequately absorbed by institutions</li> </ul>
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<p>c. Identification of alternatives aimed at reducing GHG emissions</p> <ul style="list-style-type: none"> <li>▪ EEM opportunities</li> <li>▪ Energy efficiency in the transportation sector and changes in the relative distribution of transportation modes</li> <li>▪ Renewable Energy Technologies</li> <li>▪ Carbon sequestration and substitution</li> <li>▪ Opportunities for reduction of enteric methane emissions</li> </ul> <p>PAD– December 16, 2002</p>	<ul style="list-style-type: none"> <li>▪ EEM Opportunities <ul style="list-style-type: none"> <li>(i) Evaluate energy pricing schemes and trends;</li> <li>(ii) Review current energy efficiency programs;</li> <li>(iii) Identify energy saving measures at the demand side, and pre-feasibility analysis of options for households, public and commercial buildings;</li> <li>(iv) Identify energy saving measures and pre-feasibility analysis at the production sector, including co-generation and self-generation.</li> <li>(v) Cost-effectiveness and incremental cost evaluation of measures.</li> <li>(vi) Analysis of the possibilities of energy sources switch.</li> </ul> </li> <li>▪ Assessment of opportunities for energy efficiency in transport <ul style="list-style-type: none"> <li>(i) Evaluate energy use in the transport sector.</li> <li>(ii) Identify feasible options to improve energy efficiency in transport, including analysis of regional and national transportation and travel needs, energy efficiency of current transport mode mix, and infrastructure assessment.</li> <li>(iii) Evaluate fuel mixes and fuel formulation, with the aim of coordinating the promotion of efficient vehicle technologies with <i>cleaner</i> fuel specifications.</li> <li>(iv) Evaluate government plan, programs, and policies, which may be used to boost energy efficiency in transportation.</li> <li>(v) Identify opportunities for GEF and CDM fundable pilots aimed at promoting energy efficiency.</li> </ul> </li> <li>▪ Assessment of renewable energy technologies <ul style="list-style-type: none"> <li>(i) Identify technologies</li> <li>(ii) Analyze opportunities for renewable energy technologies</li> <li>(iii) Cost-effective analysis of different technological options</li> </ul> </li> <li>▪ Assessment of opportunities for carbon sequestration and substitution <ul style="list-style-type: none"> <li>(i) Identify areas suitable for afforestation and reforestation for the sequestration of CO<sub>2</sub></li> <li>(ii) Assess economic cost and social impacts of reforestation as a substitute for the agricultural use of former forest and forested soils</li> <li>(iii) Evaluate alternatives to deforestation when it is done to clear land for crop and livestock production or a way to obtain fuel.</li> <li>(iv) Assess feasibility of sink enhancement in native forests through sustainable management practices</li> <li>(v) Survey CDM opportunities on carbon sequestration and substitution</li> <li>(vi) Evaluate legal and regulatory framework governing the forestry sector at the regional and national levels</li> </ul> </li> </ul>	<p>Progress and completion reports</p>	<ul style="list-style-type: none"> <li>• Political commitment</li> <li>• Economic and technical feasibility of potential energy efficiency measures</li> <li>• Interest and support from stakeholders</li> </ul>
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d. Encouragement of public environmentally responsible behavior	<ul style="list-style-type: none"> <li>(i) Fostering awareness - a sensitivity to the climate change and associated problems</li> <li>(ii) Knowledge - an understanding of how climate change functions, how people interact with and depend on climatic conditions, and how climate change problems may be solved</li> <li>(iii) Attitudes - a concern for the environment and the personal motivation and commitment to participate in environmental improvement and protection</li> <li>(iv) Skills - the ability to identify and investigate climate change problems and to contribute to their resolution</li> <li>(v) Participation - active involvement in working toward the reduction of climate change. Increasing voluntary programs/ public participation</li> <li>(vi) Consultation of the climate change web site</li> </ul>	<ul style="list-style-type: none"> <li>• Progress reports. Monitoring of effectiveness of campaign can be done through: <ul style="list-style-type: none"> <li>i) Utility bills</li> <li>ii) Enrollment figures at education institutions</li> <li>iii) Balance sheets of pro-environmental companies</li> </ul> </li> <li>• Evaluation report</li> <li>• Completion report</li> </ul>	<ul style="list-style-type: none"> <li>▪ Political commitment.</li> <li>▪ Available channels of communication</li> <li>▪ Public acceptance</li> </ul>
e. Drafting and distribution of Second National Communication to UNFCCC	<ul style="list-style-type: none"> <li>▪ Compilation of environmental, economic, and social indicators;</li> <li>▪ Draft communication</li> <li>▪ Consultation with authorities and main stakeholders;</li> </ul>	Final document to FCCC	Political endorsement
f. Monitoring of project performance	<ul style="list-style-type: none"> <li>▪ General coordination of activities;</li> <li>▪ Monitoring performance.</li> </ul>	Progress and workshop reports	<ul style="list-style-type: none"> <li>• Funding and project completion will take place as planned</li> <li>• Political support</li> </ul>
<b>Project Components/Sub-components:</b>	<b>Inputs: (budget for each component)</b>	<b>Project Reports:</b>	<b>(from Components to Outputs)</b>
a. Updating of National GHG Inventories and development of emission factors <ul style="list-style-type: none"> <li>▪ GHG Inventory</li> <li>▪ Local Emission Factors</li> <li>▪ Comparative GHG Inventory analysis</li> <li>▪ Energy Balance harmonization</li> </ul>	<p style="text-align: center;">US\$0.4 million (GEF: US\$0.24 M)</p> <p style="text-align: center;">US\$0.20 million</p> <p style="text-align: center;">US\$0.08 million</p> <p style="text-align: center;">US\$0.07 million</p> <p style="text-align: center;">US\$0.05 million</p>	Progress, evaluation, and completion reports	<ul style="list-style-type: none"> <li>• Access to cross-sector information is available</li> <li>• Accurate and consistent records of GHG emissions exist</li> </ul>

<p>b. Vulnerability assessment and institutional strengthening for adaptation</p> <ul style="list-style-type: none"> <li>▪ Assessment of coastal zone vulnerability</li> <li>▪ Assessment of vulnerability of water resources in <i>Pampa Bonaerense</i></li> <li>▪ Assessment of climate change impact on watersheds in <i>Litoral-Mesopotamia</i></li> <li>▪ Agric. Production at <i>Pampa</i></li> <li>▪ Assessment of impact from rainfall increases in <i>Patagonia</i></li> <li>▪ Economic Impact Assessment to help formulate Adaptation Plan (stage II)</li> <li>▪ Assessment of vulnerability of energy system</li> <li>▪ Design of Adaptation measures (stage II)</li> <li>▪ Climate change projections based on Regional Circulation Models</li> </ul>	<p>US\$0.51 million (GEF: US\$0.355 M)</p> <p>US\$0.08 million</p> <p>US\$0.05 million</p> <p>US\$0.05 million</p> <p>US\$0.1 million</p> <p>US\$0.07 million</p> <p>US\$0.05 million</p> <p>US\$0.04 million</p> <p>US\$0.04 million</p> <p>US\$0.03 million</p>	<p>Progress, evaluation, and completion reports</p>	<ul style="list-style-type: none"> <li>▪ Consistent data can be gathered around the country</li> </ul>
<p>c. Formulation of National Mitigation Program</p> <ul style="list-style-type: none"> <li>▪ Assessment of EEM opportunities</li> <li>▪ Assessment of opportunities for energy efficiency in the transportation sector and changes in the relative distribution of transportation modes</li> <li>▪ Assessment of renewable energy technologies</li> <li>▪ Assessment of opportunities for carbon sequestration and substitution</li> <li>▪ Assessment of opportunities to reduce enteric methane emissions</li> </ul>	<p>US\$0.35 million (GEF: US\$0.215 M)</p> <p>US\$0.08 million</p> <p>US\$0.1 million</p> <p>US\$0.05 million</p> <p>US\$0.07 million</p> <p>US\$0.05 million</p>	<p>Progress and completion reports</p>	<ul style="list-style-type: none"> <li>• Political Commitment</li> </ul>
<p>d. Promotion of public awareness</p> <ul style="list-style-type: none"> <li>• Communication campaign</li> <li>• Training and symposia</li> </ul>	<p>US\$0.134 million (GEF: US\$0.105 M)</p> <p>US\$ 0.09 million</p> <p>US\$ 0.044 million</p>	<ul style="list-style-type: none"> <li>• Progress reports</li> <li>• Evaluations of campaign effectiveness</li> <li>• Manual for implementation of public awareness programs</li> </ul>	
<p>e. Drafting of Second National Communication to UNFCCC</p>	<p>US\$0.02 million (GEF: US\$0.019 M)</p>	<p>Final document to FCCC</p>	<p>The GOA will continue to endorse global efforts to limit the extent of climate change</p>

f. Project Management	US\$0.2 million (GEF: US\$0.176 M)	Progress and workshop reports	Funding and project completion will take place as planned
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## DETAILED PROJECT DESCRIPTION

This annex presents a more detailed description of the project different components. Annex 12 presents draft TOR for each of the studies to be contracted.

### PROJECT COMPONENTS

#### **A. National GHG Inventories**

In accordance with Articles 4 and 12 of the UNFCCC, and the relevant decisions of the COP, all Parties to the Convention must submit national Greenhouse Gas (GHG) inventories to the Climate Change secretariat. Inventories compile data on emissions of carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), as well as Non Methane Volatile Organic Compounds (NMVOCs), CO, and NO<sub>x</sub>. Emission estimates are presented in accordance with the source categories of the Intergovernmental Panel on Climate Change guidelines for National Greenhouse Gas Inventories (1996).

The inventory focuses on emissions from the following sources: 1) energy use, and more specifically related to the following category of use (i) residential; (ii) commercial; (iii) public; (iv) industrial; and (v) transport; 2) power generation; 3) land use change, including (i) agriculture; (ii) forestry; and (iii) native forests and vegetal cover; and 4) waste (*i.e.* solid waste, wastewater, and sewage). Guidelines are given by IPCC on the manner in which emissions totals are to be estimated and reported.

The activities producing the largest shares of emissions correspond to: 1) combustion of fossil fuels, consistently releasing approximately 90% of the total CO<sub>2</sub> emissions and around 42% of the total GHG emissions of the country; 2) enteric fermentation, releasing 62% of methane emissions and 19% of total GHG emissions in 1997; and 3) management of agricultural soils, releasing 95% of total nitrous oxide emissions and 21% of total GHG emissions in 1997 (see Annex 13 for the most recent information on GHG emissions).

The main objectives of this component of the project are to: 1) upgrade inventories of GHG emissions; 2) develop own factors of emissions; and 3) harmonize methodologies for developing energy balance and GHG emission inventories. The following four tasks will be completed as part of this component:

##### ***a) GHG inventory update***

The existing inventories of GHG emissions published in 1999 with data from 1997 will be updated with data from the year 2000. National GHG inventories will be estimated and reported using the *Revised 1996 Intergovernmental Panel on Climate Change (IPCC) Guidelines for National Greenhouse Gas Inventories*. This will involve: i) gathering information from all relevant sectors; ii) processing data using IPCC methodological tools, using bottom-up and top-down methodological approaches; iii) reviewing and adjusting to national emission factors; and iv) analyzing evolving GHG emission trends and cross sector evaluation.

##### ***b) Comparative analysis of previous and current GHG inventories***

Argentina is one of the few countries in the world that will have performed four inventories of GHG emissions covering the period 1990-2000. Consequently, a detailed assessment and analysis of the evolution of emissions, by sector, will be conducted. This analysis aims at identifying current trends of GHG emissions, as well as main drivers of their changing patterns.

Using pertinent socio-economic data, a series of indicators will subsequently be generated. These indicators will reflect the evolution of emissions by economic activity, relative to population. Results will illustrate the evolution of emissions during the period 1990-2000.

### ***c) Development of national emission factors***

The project will help develop own factors of emissions, which will allow a more accurate GHG emission inventory. Up till now, most emissions have been calculated using either IPCC or EPA factors, adjusted to local conditions.

### ***d) Harmonization of National Energy Balances and GHG Emission Inventories***

This activity involves the evaluation of modifications needed by existing National Energy Balances in order to make them compatible with IPCC's categories of emission sources. Currently, the energy balance structure groups energy consumption for commercial, public, and residential sub-sectors under one single category, while the GHG emissions inventory separates it into the three groups. Since the methodology for building the energy balance has been applied for years, the study proposes to identify any adjustment and modification that should be incorporated in the elaboration of the National Energy Balances, in order to make them compatible with the emissions inventories.

## **B. Vulnerability Assessment and Institutional Strengthening for Adaptation**

This project will enable Argentina to expand on a series of vulnerability assessments that was conducted as part of the First National Communication, which addressed potential impacts of climate change on various regions of the country (see Annex 14 for a Table comparing activities implemented for the First Communication and activities planned for the Second Communication). A second series of vulnerability studies is proposed as part of this project. These studies will take advantage of the development of a high resolution Regional Circulation Model (RCM) by the CIMA – *Centro de Investigación del Mar y la Atmósfera*, at the Scientific and Technological National Center. This new RCM simulates the effects of climate change on hydrological conditions around the country and suggests adequate adaptation strategies. Nine independent vulnerability studies will be conducted, as described in the following sections. Terms of reference for all of the studies are included in Annex 12.

### ***a) Vulnerability of the coastal zone***

The leading role of the region in a national context, both politically and economically, is unquestionable. The *Río de la Plata* basin generates approximately 89% of the gross domestic product of the country, covers more than one third of the territory and is home to about 79% of its population. The area is vulnerable to the tidal floods produced by storms over the *Río de la Plata* or over the nearby Atlantic Ocean. The whole basin has historically undergone periodical occurrences of flooding and drought, caused by, among others, a combination of rainfall patterns, topography, and soil conditions. However, flooding patterns in recent times have noticeably changed and during the 1980s and 1990s floods were large, repetitive, and resulting damages were extremely costly.

The impact of changing climatic conditions on the region is severe. The problem is particularly critical if it is considered that, although the development of population centers in the basin concentrates in flood-prone areas, infrastructure and services are designed for dry zones. More than 14 million people have settled along the shores of the *Río de la Plata* for instance, which implies enormous investments on coastal areas. This type of investment is growing with time, without consideration to the potential risks and consequences of rising ocean levels. Equally alarming is the occupation of coastal areas for precarious housing by impoverished population, with minimal infrastructure development, which intensifies the social and economical impacts of the flooding events.

Given the impact on the coastal environment that a changing climate entails, this specific study component will focus on the response of the coastline of the *Río de la Plata*. The study will focus on two areas: 1) *Gran Buenos Aires*; and 2) the *Paraná delta*. It will focus on three objectives: 1) the impacts of climate change on the water resources of the area, giving particular attention to the effects of the water level of the *Río de la Plata* on the coastline of the *Gran Buenos Aires* region; 2) the pervasive flooding of the *Río Paraná* and its effect on the increasing water levels along the coastline of the *Río de la Plata*; and 3) review of the relationships between climate change and the expansion of the *Paraná delta*, and the

resulting effects on the coastline of the *Río de la Plata*.

These three events have the potential to cause major damages to the human settlements that have developed along the shores of the estuary. This component of the project will thus assess the social and economic effects that climate-change related events might have on the *Gran Buenos Aires* area. The project will further evaluate the need to take remedial action in order to protect the settlements from further climate change impacts, and to prevent additional environmental damage the coastline of the *Río de la Plata*.

#### ***b) Vulnerability of the Pampa Bonaerense***

Since the beginning of the 1970s the *Pampa Húmeda* has been subjected to a “Humid Cycle”, characterized by an increase in the frequency and the magnitude of precipitation events, as well as by higher mean temperatures. Because of these climatic patterns, the area undergoes periods of drought followed by periods of flooding. The impact of these climatic cycles, and particularly of the flooding, is aggravated by the flatness of the region. It is clear that climate change events, and particularly the occurrence of the “wet-dry” cycles, may drastically affect the surface water and the groundwater water resources of the *Pampa Bonaerense*. It is also to be expected that human intervention, through changes in land use, deforestation, and other practices has worsened the capacity of the region to adapt to the changing climate.

Given the economic importance of the area and the large number of people who may be at risk from climate events, it is of critical importance to develop adaptation strategies and mitigation measures to reduce as much as possible the impacts of global warming. This component of the project will therefore focus on the following areas: 1) characterization of the sensitivity of the region’s water resources to climate fluctuations. This assessment will partly build on results from other vulnerability studies that will be conducted as part of this project (*i.e.* components *a* and *c*). A particular emphasis will be given to the evaluation of the status of current ground water resources; 2) evaluation of the effectiveness of drainage and flood protection infrastructure works that have been constructed in the region; 3) assessment of the level of degradation of soils in the *Pampa Bonaerense*; and 4) socio-economic impact of climatic changes on the *Pampa Bonaerense*.

#### ***c) Vulnerability of agriculture production in the Pampa Húmeda***

The *Pampa Húmeda* occupies approximately 18% of the country’s total land area and produces approximately 80% of its annual agricultural output. The region produces a variety of temperate crops, including most grains and oilseeds. Over 90% of Argentina’s soybean production, between 80 and 90% of the corn, wheat, sorghum, barley, and sunflower production of the country take place in the region.

The livestock sector, traditionally strong in Argentina, is also present in the *Pampa Húmeda*, where it occupies a portion of the available land. In fact nearly 90% of country’s total beef production is grass-fed, and therefore depends on the existence of pastures. The region can thus be divided into three zones according to the predominant form of land use: cropping, mixed crop/livestock, and livestock.

The introduction of new crops and new land management methods to the agricultural practices in the *Pampa Húmeda* may have caused changes in the area’s ability to withstand the effects of extreme climatic changes. In particular, the local drainage and soil water retention capacities, as well as the soil’s degradation potential may have been altered. This component of the project will focus on the potential effects of climate change on the productivity and the vulnerability of crops. The study will: 1) evaluate whether the current productivity levels of the region can be maintained under projected climatic conditions; 2) estimate the economic impacts of a potential decrease in productivity; 3) assess the social implications of lower regional productivity; and 4) propose adaptation measures to reduce the negative impacts of climate change.

#### ***d) Vulnerability of the water resources in the Litoral-Mesopotamia***

This component of the project will evaluate the impacts of climate change on the water resources of the *Litoral-Mesopotamia*. This region includes the provinces of *Misiones, Corrientes, Entre Ríos, Formosa, Chaco* and *Santa Fe*. The *Litoral-Mesopotamia* has a humid climate, comprises most of the *Río de la Plata* basin, and is the richest of the country in terms of its hydrologic resources. The study will focus on some of the most prominent surface water resources in the region, such as the *Bermejo* and *Pilcomayo* rivers, located on the northern part of the *Litoral-Mesopotamia* region, and the *Paraná, Paraguay* and *Uruguay* rivers.

Climate effects on climate have shown great impact in this region, and streamflow values in the Parana/Paraguay basin have increased leading to flooding. Besides, human activity has had marked, detrimental effects on the hydrographical characteristics of the region of study and is also blamed for aggravating the conditions of the region and contributing to the dramatic flooding events that have occurred in recent years. Examples of the negative human intervention include, among others: a) gradual replacement of natural vegetation for foreign species; b) changes of land-use from pastures to agricultural land; c) non conservational practices of land clearing; d) changes in phreatic surface levels due to poor irrigation practices; e) groundwater contamination from agrochemical use; g) use of river banks for agricultural purposes during dry cycles; and h) development of infrastructure (*i.e.* roads, housing, etc.) that forces the diversion of rivers and streams. These activities alter natural drainage and surface runoff patterns, contribute to erosion processes, and are partly to blame for the extent of the damage caused by flooding of the past three decades.

The purpose of this project component is to evaluate the impact of climate change on the water resources of the *Litoral-Mesopotamia*. Pervasive flooding events and the magnitude of the damages make it critical to understand how climate change is affecting the hydrological characteristics of the region. The study will: 1) assess if the observed changes in precipitation patterns are sufficient to cause such disruption of hydrological regimes, or if human action is also partly responsible for the observed behavior; 2) determine how climate change, and more specifically higher precipitation rates are likely to affect the major rivers of the area; 3) estimate the extent of the damages that may occur as a result of the changes; 4) determine the socio-economic impact of the flooding on the region and the effects on its economic growth; and 5) propose mitigation and adaptation strategies that may contribute to decreasing future damage.

#### ***e) Vulnerability of the Patagonia***

Overgrazing has caused irreparable damage to the natural ecosystem, where it is estimated that 80% of the surface of the region presents some level of degradation. The area has undergone partial desertification, and the potential exists for a more widespread degradation. Other factors that have contributed to the occurrence of desertification, include deforestation, misuse of water resources and irrigation that have caused salinization, forest fires, mining, and petroleum exploration. Also, the glaciers located in the high areas of Patagonia present signs of melting affecting the hydric and snowpack balance. Agricultural activities in the Argentinean plains are maintained through irrigation and therefore, snowfall fluctuations will likely have strong impacts in the region.

The objectives of this project component are to: 1) estimate the impacts of climate change on the various natural resources of the region; 2) estimate the effect of current land and water management practices on the sustainability of the region's water resources; 3) propose mitigation and adaptation plans to reduce the impacts of climate change; and 4) identify and evaluate the potential for socio-economic development of the *Patagonia* in light of possible climate change impacts.

#### ***f) Overall socio-economic impacts of climate change***

Estimating the socio-economic impacts of climate change involves assessing the present and future vulnerability of a sector or a community to the various climatic conditions. This, in turn, involves making estimates and projections of the evolution of the socio-economic system. These projections are strongly dependent on assumptions about the adaptive capacity of the sector or the community, since the ability to adapt to climate change may considerably reduce its negative impacts. The capacity to adapt to climate change varies among regions and socioeconomic groups, and with time. It depends on existing scientific and technical knowledge, information, infrastructure, skills, institutions, and funds. The poorest regions and communities, which often lack all of these adaptation tools, are therefore those that are the most vulnerable to climate change.

This component of the project aims at identifying the socio-economic impacts associated with climate change and the range of options available for communities and institutions to respond to the changes. Enhancing the adaptive capacity of these regions may be the best alternative to reducing future impacts of climate change.

The study will build on results from vulnerability assessments conducted for the Second National Communication on *the Gran Buenos Aires* area, the *Pampa Húmeda*, the *Litoral-Mesopotamia* and the *Patagonia* regions. In addition, results from vulnerability studies conducted for the First National Communication will also be used, namely those for the coastal areas of the country and for the Oasis regions. Estimating socio-economic impacts consists of various tasks, among which: 1) establishing baselines, which involves assessing current environmental conditions and identifying vulnerabilities; 2) determining projected emissions scenarios and estimating associated climate patterns; 3) assessing the environmental impacts under the assumed climatic conditions; 4) evaluating system's adaptability to new climatic and environmental conditions; 5) developing series of policies to address the various impacts; and 6) determining the economic costs of the proposed policies and the effects they may have on the development of the region

#### ***g) Vulnerability of the energy system and energy infrastructure***

The impact of climate change on the energy system in Argentina must be evaluated in two stages, first on a short-term basis, and later at a longer scale. On a short term, and the time horizon for this evaluation must be determined based on estimates from climate change projections, the impacts of climate change will primarily consist in changes of the role of the various energy sources in meeting the energy demands of the country. This short-term scenario can be illustrated by assuming that climate change leads, for example, to shortages of water in certain regions of the country. To mitigate these impacts, water use is partly diverted from electric power generation to consumption, resulting in a decrease in the electricity generated. Other sources of energy must then be used to compensate for the loss of hydropower, altering the patterns of consumption of energy sources. If this change in patterns of consumption continues for a sufficiently long period of time, then the impacts of climate change need to be considered on a longer-term scenario, at which point infrastructure changes may be needed to meet the changes in demand.

This component of the project will focus on evaluating climate change impacts on the Argentine energy system. The demand for energy is dominated by the transportation and industry sectors, which, in general terms, primarily consume natural gas and derivatives from petroleum. In terms of energy supply, primary sources consist, again, mainly of petroleum products and natural gas. The share of hydro power to the total electricity generated however, is a factor of two larger than that of all the remaining sources. Climate change is not likely to affect exploitation of petroleum and natural gas, and therefore the direct impacts of climate change will only be significant to the electricity sector. Impacts to the hydroelectric generating capacity of the country, however, will be felt across the energy system, since other sources will have to compensate for any disruptions in energy supply. This study will evaluate: 1) how climate change can affect the electric generating capacity of the country; 2) how this impact affects the energy supply; 3) how the demand sector will be influenced; and 4) the adequacy of the existing energy infrastructure system.

### ***h) National Adaptation Program and regional adaptation plans***

Based on the premise that adaptation strategies have the potential to significantly reduce the vulnerability to climate change, this component of the project will build upon results of the previous components to promote the development of adaptive capacity in Argentina. This objective can be approached from a national development policy perspective, recognizing that many of the activities that promote adaptation to climate change are in line with those that promote sustainable development. In fact, many of the communities who are the most vulnerable to climate change impacts also face problems of natural resource depletion, and therefore climate adaptation and sustainability objectives can be pursued jointly. It will therefore be beneficial to address issues of adaptation capacity at the policy development stage.

Based on results from previous studies, this component will develop a framework of adaptation policies that may be incorporated either in the national development plan or in regional development initiatives. This adaptation framework involves: 1) identification of climatic vulnerabilities; 2) choice of the most cost effective and socially acceptable measures to prevent or to adapt to negative impacts of climate; 3) assessment of adequate policy measures and institutional framework to implement the adaptation initiatives; and 4) allocation of resources for the implementation of adaptation programs.

### ***i) Estimates of regional climate change scenarios through Regional Climate Models***

This component is aimed at contributing to the climate modeling efforts being carried out in Argentina, so that simulations on future regional climate episodes can help develop regional and national climate change mitigation strategies.

Results from separate GCM models are considerably different when they are used for predictions of regional climatic patterns. The reason for the discrepancies is that regional distribution of climate variables, such as precipitation and temperature, are often strongly influenced by local features (*i.e.* topography). The spatial resolution of GCM is typically not sufficiently refined to capture these features, and consequently the uncertainty of the predictions increases. GCM results are typically statistically downscaled in order to obtain regional data. Another method that exists to refine model resolution is that of using limited-area models nested in global circulation models. This is the methodology which will be used by this project for the development of regional climate scenarios in Argentina. Regional scenarios of climate change for Argentina will be based on an increase in greenhouse gases according to the IPCC “business-as-usual” emission scenario. This scenario is used to predict how emissions and the atmospheric concentration of GHG might evolve in the absence of global efforts, in the present time, to limit emissions. Predictions of climate for South America will be made over the period 1970 – 2050. The information obtained will include predictions of local circulation patterns and estimates of temperature and precipitation scenarios.

## **C. Formulation of National Mitigation Program**

This project will promote the development of a National Mitigation Plan (NMP), which will include measures for the reduction of national GHG emissions levels. The Strategy will identify opportunities for mitigation of emissions through measures in the following areas, among others:

### ***a) Energy Efficiency Measures (EEM)***

The energy sector is the largest emitter of GHG in Argentina, in spite of the country’s long trajectory using clean energy sources. Significant reductions to the amount of GHG emissions can be achieved by increasing the efficiency of energy consumption. To that effect, government measures to promote the Rational Use of Energy (URE) were first introduced, by law, during the 1985-89 period. The impact of the initial phase of URE was however limited, largely due to economic turmoil in the Region at the end of

the 1980s, and to the short duration of the programs, which were not sufficiently long to accomplish significant changes in the patterns of energy use.

Estimates of potential energy savings for Argentina reach values greater than 25% of the total national energy consumption and it is therefore clear that a NMP for GHG emissions must include mitigation measures for the energy sector. However, several obstacles are currently in place that difficult the effectiveness of these measures and the NMP must introduce initiatives that specifically address some of these barriers. These barriers include: 1) low prices of energy; 2) excess generating capacity; 3) lack of incentives for distributors; 4) absence of shared economic responsibility; 5) limited supply of energy efficient services; and 6) absence of regulatory and financial frameworks to promote energy conservation

Previous experience in Argentina has shown that in the absence of a solid institutional framework, energy efficiency, regardless of its economic benefits, is not a priority of energy consumers. It is therefore clear that any NMP that attempts to reduce emissions from the energy system by promoting energy conservation must do so by introducing a combination of programs that promote efficiency, as well as regulation that accompanies those programs. This component will (i) develop portfolio of energy efficiency measures that can be implemented as part of emission mitigation strategies; (ii) evaluate the applicability of EEM measures to the Argentine energy system; (iii) assess the need for government support of EEM initiatives; and (iv) identify programs that can be implemented through the CDM

#### ***b) GHG Emission Mitigation in the Transport sector***

The contribution of the transportation sector to the GHG emission balance in Argentina is considerable, making it an important factor in any emission reduction strategy or climate change mitigation plan. Well-known measures to reduce transportation emissions essentially address two issues, namely a reduction of travel demand or an increase in travel efficiency.

The first type of emission mitigation measures, those aimed at changing transportation patterns and at reducing the demand for traveling, include initiatives such as: 1) promoting shifts in modes of travel from automobiles to public transportation; 2) promoting emission-free modes of transportation (*i.e.* bicycles); 3) instituting road pricing programs, which charge drivers for the use of particularly congested roads during peak hours; 4) promoting *travel blending* initiatives, which consist of programs aimed at reducing private car use by modifying travel behavior; 5) introducing zoning regulations; 6) establishing location-efficient mortgages; 7) implementing location-dependent development costs; 8) encouraging substitutions of communications for traveling; and 9) adjusting automobile insurance policies according to average distances traveled.

The second type of measures can be achieved by improving vehicle efficiency. Examples of measures that can be implemented include: 1) programs that eliminate old, inefficient and polluting cars; 2) system of taxes on the sale of inefficient vehicles; 3) programs that charge taxes on vehicle fuels; and 4) fuel conversion programs, a measure that has already been implemented in Argentina, where approximately 12% of private automobiles and 47% of the taxis have converted from gas to compressed natural gas (CNG).

The National Mitigation Program will address the need to introduce measures such as the ones mentioned, to control GHG emissions from the transportation sector. To that end, current strategies will be assessed and measures to reduce GHG emissions will be evaluated using cost-benefit analysis.

#### ***c) Renewable energy sources (RE)***

The generation of renewable energy has a large potential in Argentina. Several commercially proven technologies are available to make use of existing resources such as: 1) small-scale hydropower; 2) solar energy; 3) solar thermal power; 4) wind power; 5) biomass power; 6) biogas power; 7) geothermal power; and 8) wood energy.

The NMP must include provisions to promote the use of renewable energy sources. Given the extensive potential of resources of Argentina, an emphasis should be put on the inclusion of these energy sources

into the mainstream of power generation options. However, with the exception of large-scale hydro-power, most of the renewable energy resources in Argentina are under developed.

Several obstacles contribute to the limited use of RE in Argentina, including: 1) a mismatch between demand and adequate supply locations; 2) constrained demand; and 3) financing barriers for RE projects. However, the most significant barrier to the development of the renewable energy sector and in the future role it may achieve in Argentina involves its competitive disadvantage relative to the current, liberalized electricity market.

The NMP therefore needs to introduce mechanisms that promote the use of renewable energy resources. Examples of these mechanisms may include, for instance: (a) temporary subsidies to new, targeted technologies at the research, development, demonstration, or commercialization stage; (b) temporary subsidies that cover the cost difference between renewable and less costly options; (c) tax deductions to suppliers of RE; and (d) regulation covering both supply and demand of RE. The project will identify potential GHG emission reductions due to RET use; and identify policy and regulatory options.

#### ***d) Carbon dioxide sequestration***

Land-use, land-use change, and forestry activities (LULUCFs) reduce GHG emissions and may evolve into programs that qualify for emission trades under the provisions of the Kyoto Protocol. The development of forests is an example of LULUCFs, and an effective mechanism of sequestering carbon dioxide (CO<sub>2</sub>) present in the atmosphere. Carbon sequestration by forests can be achieved in two basic ways: 1) by maintaining existing sinks of CO<sub>2</sub>, which can be achieved, for instance, by conserving and sustainably managing existing forests; and 2) by expanding sinks of CO<sub>2</sub> through, among others, expanding planted forests. Additionally, the forestry sector can contribute to decreasing GHG emissions by promoting a reduction in the use of disposable forestry goods. The potential for development of carbon sequestration and substitution projects in Argentina is extensive. The NMS will therefore promote the implementation of these types of projects and provide guidelines and methodology for identifying potential sites.

This study will aim at: a) evaluating carbon sequestration and substitution potential through LULUCF projects; b) building capacity for the assessment of carbon sequestration and substitution potential from afforestation and reforestation projects; c) identifying carbon sequestration and substitution projects that can be implemented through the CDM; and d) developing policy options to promote carbon sequestration through afforestation, reforestation, and deforestation prevention measures.

#### ***e) Reduction of methane enteric emissions***

The 1999 revision of the 1997 GHG emission inventory provides the most current figures available on GHG emissions from the agriculture and livestock sectors in Argentina. According to the report, the livestock sector alone is responsible for approximately 35% of the total GHG emissions, which are primarily methane but also, include nitrous oxide. More specifically, approximately 68% of the total methane emissions in Argentina are released by the agriculture and livestock sector. Cattle release approximately 92% of the total methane emissions liberated from enteric fermentation.

Current enteric methane figures have been estimated using emission factors developed abroad, which may not be representative of local cattle raising practices and conditions. The objectives of this component of the NMP are: a) to perform monitoring and sampling of Argentine livestock emissions in order to determine local emissions of methane by enteric fermentation processes; b) to compare these measured factors with those used in the prediction of methane emissions in the country; c) to adjust emission figures included in GHG inventories if significant differences exist between measured and estimated factors; and d) to develop programs that reduce methane emissions from enteric fermentation

### **D. Promotion of Public Awareness**

The objective of the public awareness program is to develop education and outreach programs that focus on the issue of climate change. This project component will consist of two sub-components, namely a communication campaign and a training program.

**a) Communication campaign**

The public awareness program will promote the climate change training program, raise awareness on the topic, and will encourage individual and collective actions aimed at reducing practices that contribute to climate change. The promotion of public awareness on climate change issues will focus on encouraging environmentally responsible behavior through five key concepts. The program will foster: i) *awareness* - sensitivity to climate change and overall global warming issues; ii) *knowledge* - understanding of the causes and consequences of global climate change, the impacts it may have on the population, and of potential measures that can be implemented to reduce its impacts; iii) *attitudes* - concern for the environment, personal motivation and commitment to participate in activities promoting environmental improvement and protection; iv) *skills* - ability to identify and investigate climate change issues and to contribute to their solution; and v) *participation* - active involvement in working towards the reduction of climate change. The promotional campaign will be conducted at the national level, through newspapers, radio, and television, and will target a widespread audience. No institutional provision has yet been made regarding the implementation of the public awareness program.

**b) Training program**

The project will develop a pilot training program for community leaders, as well as for all members of the community interested in the topic. In order to reach a widespread audience, the project will involve the media, educational institutions, NGOs and any other organization that could contribute in any way to climate change outreach. Audiences need to be specifically targeted in order to maximize the efficiency of the education campaign. All population groups, both urban and rural, must be taken into account, including all students and teachers, professionals, parents, senior citizens, community leaders, etc.

The project will focus on building capacity and on assisting for planning and conducting future public awareness campaigns. Following is a series of activities suggested as a way of implementing the climate change training program: i) review, evaluation, and update of current public environmental information programs, such as those currently implemented by the SAyDS; ii) information exchange on climate change challenges and opportunities of involvement for leaders and representatives from stakeholders' institutions; iii) development of grade school and informal education materials such as booklets, manuals, brochures, interpretive displays, training manuals, and slide shows; iv) coordination of seminars, workshops, and public audiences; v) improvement of the OAMDL web site to host the "National Climate Change Web Site". A plan for evaluating the success of the pilot program and for the establishment of a continuous awareness and training program must be implemented. After any outreach product is distributed to the intended audience, follow-up monitoring activities will be instituted such that the effectiveness of the product can be assessed.

**E. Elaboration of Second National Communication to UNFCCC**

This component addresses the actual generation of the Second National Communication. The document will compile results from the various project components and other publicly available information. This information includes national statistics on population, social and cultural characteristics, economic indicators, and institutional settings.

The Second National Communication will include the following sections: i) national statistics; ii) national inventories and emission factors; iii) methodological review and comparative analysis of previous and current GHG inventories (1990-1994-1997-2000); iv) study on the possibilities to increase consistency between National Energy Balances and the Inventory Emission Source Categories; v) vulnerability

assessment and institutional strengthening for adaptation; vi) preliminary formulation of a National Mitigation Program; vii) development of circulation models and climate change scenarios; viii) statement of financial needs; ix) promotion of public awareness.

The Second National Communication will be drafted, translated if necessary, published, and ultimately distributed.

**F. Progress Reports and Workshops**

Periodic progress reports on all project components will be routinely evaluated to assess the adequate advancement of the overall project. Four workshops have been projected with participation of all coordinators, experts, and assistants with the objective of: (i) launching the project; (ii) assessing progress of various project components; (iii) exchanging information and results from the various subprojects, particularly the NMP; and (iv) producing a final assessment. Lectures from experts have been envisioned as one additional method to verify advances in the completion of objectives.

**ESTIMATED PROJECT COSTS**

**ARGENTINA: Enabling activity for Second National Communication of Argentine Government to the Convention on Climate Change**

<b>Project Cost By Component</b>	<b>Foreign</b>	<b>Local</b>	<b>Total</b>
	----- US \$million -----		
<b>A. Updating Nat'l GHG Emission Inventories</b>	0.00	0.4	0.4
<b>B. Vulnerability Assessment</b>	0.00	0.51	0.51
<b>C. National Mitigation Strategy</b>	0.00	0.35	0.35
<b>D. Public Awareness</b>	0.00	0.134	0.134
<b>E. Drafting of Second Communication</b>	0.00	0.02	0.02
<b>F. Operating Costs (incl. Workshops)</b>	0.00	0.151	0.151
<b>G. Audit</b>	0.00	0.03	0.03
<b>TOTAL BASELINE COSTS</b>	0.00	1.55	1.55
<b>Physical Contingencies</b>	0.00	0.00	0.00
<b>Price Contingencies</b>	0.00	0.09	0.09
<b>TOTAL PROJECT COSTS</b>	0.00	1.64	1.64
<b>Total Financing Required</b>	0.00	1.64	1.64

<b>Project Cost By Category</b>	<b>Foreign</b>	<b>Local</b>	<b>Total</b>
	----- US \$million -----		
<b>Goods</b>	0.00	0.01	0.01
<b>Consultant Services</b>	0.00	1.489	1.489
<b>Operating Costs</b>	0.00	0.141	0.141
<b>Total Project Costs</b>	0.00	1.64	1.64
<b>Total Financing Required</b>	0.00	1.64	1.64

### INCREMENTAL COSTS

Component	Category	Amount [US\$ M]	Domestic benefits	Global benefits
a. Updating of National GHG inventories and development of emission factors	Baseline	0.000		
	Alternative	0.400	Upgrade of national inventories of GHG emissions and development of indicators for evaluation of emission trends	Information on regional contribution to global GHG emission loads and trends
	Increment	0.240		
b. Vulnerability assessment and institutional strengthening for adaptation	Baseline	0.000		
	Alternative	0.510	Information on: <ol style="list-style-type: none"> <li>i. Relative impact of climate change and human action on the degradation of the coastline of the <i>Río de la Plata</i></li> <li>ii. Impact of climate change on water resources of the <i>Pampa Húmeda</i></li> <li>iii. Impact of climate change on agricultural productivity of the <i>Pampa Húmeda</i></li> <li>iv. Impact of climate change on water resources of the <i>Litoral-Mesopotamia</i></li> <li>v. Effects of climate change on water resources and productivity of <i>Patagonia</i></li> <li>vi. Overall effects of climate change on socio-economic development of various Argentine regions</li> <li>vii. Development of National Adaptation Plan to reduce future impacts of climate change</li> <li>viii. Generation of regional climate change projections</li> </ol>	<ul style="list-style-type: none"> <li>▪ Increased knowledge on specific impacts of climate change</li> <li>▪ Increased protection and sustainable use of globally significant ecosystems</li> <li>▪ Increased knowledge of effects of human practices on climate change impacts</li> <li>▪ Valuable impacts to water resource management practices in countries vulnerable to climate change</li> <li>▪ Development of regional and national adaptation programs that can be used in comparable ecosystems</li> <li>▪ Results from regional circulation simulations that can be incorporated to global atmospheric modeling efforts</li> </ul>
	Increment	0.355		
c. Formulation of National Mitigation Program	Baseline	0.000		

Component	Category	Amount [US\$ M]	Domestic benefits	Global benefits
	Alternative	0.350	i. Increased knowledge about sustainable practices in the energy, transportation, and forestry sectors ii. Development of strategy for the reduction of national GHG emissions	Development of mitigation strategies for GHG emissions that can be applied to or save as model to that of other countries
	Increment	0.215		
d. Promotion of public awareness	Baseline	0.000		
	Alternative	0.134	i. Development of outreach programs and education plans centered around the issue of climate change ii. Increased capacity for sustainable management of water resources iii. Increasing adaptation capacity to impacts of climate change	Development of programs that can be adapted and used in other countries also vulnerable to climate change
	Increment	0.105		
e. Drafting of Second National Communication to the UNFCCC	Baseline	0.000		
	Alternative	0.020	i. Compiled analysis of impacts and vulnerabilities to climate change, and development of adaptation and mitigation strategies ii. Fulfillment of Argentine commitment to UNFCCC	Development of methodology to carry out studies and to produce a Second Communication, which can be used in other countries
	Increment	0.019		
f. Project Management	Baseline	0.000		
	Alternative	0.200	Realization of activities to adequately manage project execution	Development of methodologies for management of activities leading to National Communications
	Increment	0.176		
g. Audit	Baseline	0.000	Ensure adequate use of resources and transparency in operations	Development of adequate methodology to conduct studies
	Alternative	0.030		
	Increment	0.030		
<b>TOTAL</b>	<b>Baseline</b>	<b>0.000</b>		
	<b>Alternative</b>	<b>1.640</b>		
	<b>Global Increment</b>	<b>1.140</b>		

**FINANCIAL SUMMARY**

**ARGENTINA: Enabling activity for Second National Communication of Argentine Government  
to the Convention on Climate Change**

**Years Ending December 31  
(US\$, 2003)**

	<b>IMPLEMENTATION PERIOD</b>		
	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>
<b><u>Project Costs</u></b>			
<b>Investment Costs</b>	0.90	0.70	0.04
<b>Recurrent Costs</b>	0.00	0.00	0.00
<b>Total Project Costs</b>	0.90	0.70	0.04
<b><u>Financing</u></b>			
<b>GEF</b>	0.70	0.40	0.04
<b>Government</b>	0.20	0.30	0.00
<b>Total Project Financing</b>	0.90	0.70	0.04

**PROCUREMENT ARRANGEMENTS****ARGENTINA: Enabling activity for Second National Communication of Argentine Government to the Convention on Climate Change****Procurement****Procurement and Disbursement Arrangements****Table A: Project Costs by Procurement Arrangements**  
(US\$ million equivalent)

<b>Expenditure Category</b>	<b>ICB</b>	<b>Procurement NCB</b>	<b>Method<sup>1</sup> Other<sup>2</sup></b>	<b>N.B.F.</b>	<b>Total Cost</b>
<b>1. Goods</b>			0.01 (0.01)		0.01 (0.01)
<b>2. Consultant Services</b>	0.00 (0.00)	0.00 (0.00)	0.85 (0.85)	0.5 (0.0)	1.35 (0.85)
<b>3. Operating Costs</b> (Including Workshops)	0.00 (0.00)	0.00 (0.00)	0.04 (0.04)	0.00 (0.00)	0.04 (0.04)
<b>Total</b>	0.00 (0.00)	0.00 (0.00)	0.90 (0.90)	0.50 (0.0)	1.40 (0.90)

Note: ICB = International Competitive Bidding  
 NCB = National Competitive Bidding  
 N.B.F. = Not Bank Financed

- 1/ Figures in parenthesis are the amounts to be financed by the GEF Grant. All costs include contingencies.
- 2/ Includes civil works and goods to be procured through national shopping, consulting services, services of contracted staff of the project management office, training, technical assistance services, and incremental operating costs related to (i) managing the project, and (ii) re-lending project funds to local government units.

**Table A1: Consultant Selection Arrangements**  
(US\$ million equivalent)

<b>Consultant Services Expenditure Category</b>	<b>QCBS</b>	<b>QBS</b>	<b>SFB</b>	<b>LCS</b>	<b>CQ</b>	<b>SS<sup>2</sup></b>	<b>N.B.F.</b>	<b>Total Cost<sup>1</sup></b>
<b>Firms</b>	0.114 (0.114)	0.195 (0.195)	0.339 (0.339)	0.029 (0.029)	0.000 (0.000)	0.040 (0.040)	0.500 (0.500)	1.217 (0.717)
<b>Individuals</b>	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.137 (0.137)	0.000 (0.000)	0.000 (0.000)	0.137 (0.137)
<b>Total</b>	0.114 (0.114)	0.195 (0.195)	0.339 (0.339)	0.029 (0.029)	0.137 (0.137)	0.040 (0.040)	0.500 (0.500)	1.354 (0.854)

1\ Including contingencies

Note: QCBS = Quality- and Cost-Based Selection

QBS = Quality-based Selection

SFB = Selection under a Fixed Budget

SS = Single Source Selection

LCS = Least-Cost Selection

CQ = Selection Based on Consultants' Qualifications

Other = Selection of individual consultants (per Section V of Consultants Guidelines), Commercial Practices, etc.

N.B.F. = Not Bank-financed

Figures in parenthesis are the amounts to be financed by the Bank Grant.

2\ Justification for the use of SS Selection

*Study objective: To develop estimates of climate change scenarios through regional climate models.*

This contract will be awarded to CIMA, which is the only institution in Argentina with the experience, capacity, data, and on-going research suitable to implement the study. Since 1987, the *Centro del Investigaciones del Mar y la Atmósfera* (CIMA) has been using regional models to study the response of meteorological systems in South America and in the Antarctic Peninsula to global climate change. Recent pilot studies have been conducted to model the South American climate, using a technique developed at CIMA, based on the simultaneous use of a regional model and a global model of variable resolution. CIMA is currently running an Atmosphere General Circulation Model (AGCM) coupled to an ocean model developed at IPSL, France, as well as a regional high-resolution model MM5 developed at the National Center for Atmospheric Research (NCAR), USA. Additionally, CIMA also has results from simulations from 1860-2000, which were performed using a coupled ocean-atmosphere model from the IPSL that also incorporates a carbon-model.

**Table B: Thresholds for Procurement Methods and Prior Review<sup>1</sup>**

<b>Expenditure Category</b>	<b>Contract Value Threshold (US\$ thousands)</b>	<b>Procurement Method</b>	<b>Contracts Subject to Prior Review (US\$ millions)</b>
<b>1. <u>Goods</u></b>	<100	Shopping	First two contracts
<b>2. <u>Consultant Services</u></b>			
<b>Firms</b>	>100	QCBS/QBS	All
	>100	LCS/SFC/CQ	First two contracts
<b>Individuals</b>	>50	Other	All
	<50	Other	Review of TORs only

**Total value of contracts subject to prior review: US\$0.05 million**

### **Overall Procurement Risk Assessment**

**Frequency of procurement supervision missions proposed:** One every 6 months (includes special procurement supervision for post-review/audits). Procurement supervision will be performed by the Procurement Specialist (PS) and will include a review of: (i) the PIU's capacity; (ii) the procurement plan for the project, including a timetable for procurement actions anticipated during the next 12 months; (iii) the PIU's monitoring system; and (iv) complete records for one in every five contracts for consultant services.

### **Scope of Procurement under the GEF Grant**

Procurement of goods and services, as well as contracting of consultants with GEF grant funds, would be carried out in accordance with Guidelines for Procurement under IBRD and IDA credits (January 1995, revised September 1997 and January 1999) and the Guidelines for the Use of Consultants (January 1997, revised September 1997 and January 1999).

**Goods (first two contracts using shopping subject to prior review).** The GEF grant would finance the purchase of office equipment (such as computers) to support project coordination and management. It is estimated that about US\$0.01 million of the GEF grant would be allocated to goods and equipment. These goods would be acquired by shopping, whereby at least three quotations will be requested and the goods will be purchased at a reasonable price.

**Consultants' Services (All consulting firm contracts over US\$100,000 subject to prior review; prior review threshold US\$50,000 for individuals).** The GEF grant would finance consulting services, including studies and technical assistance, for a total estimated US\$0.85 million.

Consulting firm contracts over \$100,000 will be selected on the basis of Quality and Cost-Based Selection (QCBS) and Quality-Based Selection (QBS). Consulting firm contracts below \$100,000

will be selected on the basis of a fixed-budget for precisely defined assignments, least-cost selection for standard assignments (eg., audits), as well as on the basis of the firms' experience and competence relevant to the assignment (Selection Base on Consultants' Qualifications – CQ).

**Incremental Operating Costs.** The grant would also finance operating costs (about US\$0.04 million), including workshop expenses, incremental staff, office supplies, and conference materials.

## FINANCIAL MANAGEMENT AND DISBURSEMENT ARRANGEMENTS

### ARGENTINA: Enabling activity for Second National Communication of Argentine Government to the Convention on Climate Change

#### Financial Management

##### 1. Summary of the Financial Management Assessment

A Financial Management Assessment of *Fundación Bariloche* is being conducted by the Bank's Financial Management Specialist (FMS). Results are expected to be available during the appraisal and negotiation mission scheduled for December 9-11, 2002

##### 2. Audit Arrangements

The PEU will maintain adequate financial management systems—including accounting, financing reporting and auditing systems—to ensure that they can provide the Bank accurate and timely information regarding project resources and expenditures in accordance with: (i) the Financial Accounting, Reporting and Auditing Handbook (Washington, D.C.: World Bank, May 1999); (ii) the Guidelines and Terms of Reference for Audits of Projects with Financing by the World Bank in Latin America (World Bank, May 1999); and (iii) the Bank's Operational Policy (OP) and Best Practice (BP) 10.02, dated July 1996.

The PEU will contract an independent auditor, with qualifications acceptable to the Bank, to audit the records and accounts each fiscal year. The report by the auditor will be furnished to the Bank no later than six months after the end of each year.

##### 3. Disbursement Arrangements

#### Allocation of grant proceeds (Table C)

**Table C: Allocation of Grant Proceeds**

Expenditure Category	Amount in US\$ million	Financing Percentage
<b>1. Goods</b>	0.010	100% (net of taxes)
<b>2. Consultant Services</b>	0.850	100%
<b>3. Fundación Bariloche</b>	0.240	100%
<b>4. Operating Costs</b>	0.040	100%
<b>Total</b>	1.140	100%

**Special account:           US\$ 200,000**

**PROJECT PROCESSING SCHEDULE**

**ARGENTINA: Enabling activity for Second National Communication of Argentine Government to the Convention on Climate Change**

<b>Project Schedule</b>	<b>Planned</b>	<b>Actual</b>
<b>Time taken to prepare the project (months)</b>	<b>6</b>	
<b>First Bank mission (identification)</b>	<b>March 2002</b>	
<b>Appraisal mission departure</b>	<b>December 9, 2002</b>	
<b>Negotiations</b>	<b>December 11, 2002</b>	
<b>Planned Date of Effectiveness</b>	<b>February 2003</b>	

**Prepared by:**

**Juan López-Silva, LCSEN**  
**Catalina Marulanda, LCSEN**

**Preparation assistance:**

**Bank staff who worked on the project included:**

<b>Name</b>	<b>Specialty</b>
<b>Juan Lopez-Silva</b>	<b>Task Manager</b>
<b>Catalina Marulanda</b>	<b>Environmental Consultant</b>
<b>Angela Armstrong</b>	<b>Operations Analyst</b>
<b>Jose Simas</b>	<b>Water Management / Environment / Flood Prevention</b>
<b>Steven William Oliver</b>	<b>Agriculture Economist</b>
<b>Robert Ragland Davis</b>	<b>Agriculture / Forestry</b>
<b>Pierre Graftieaux</b>	<b>Urban Transport</b>
<b>Luis Vaca-Soto</b>	<b>Energy</b>
<b>Antonio Leonardo Blasco</b>	<b>Financial Management</b>
<b>Andres Mac Gaul</b>	<b>Procurement</b>
<b>Mariana M. Montiel</b>	<b>Legal</b>
<b>Jose Ramon Gomez Guerrero</b>	<b>Consultant</b>

**DOCUMENTS IN THE PROJECT FILE\***

**ARGENTINA: Enabling activity for Second National Communication of Argentine Government to the Convention on Climate Change**

**A. Project Implementation Plan**

Project Implementation Plan

**B. Bank Staff Assessments**

Project Concept Document

Water Resources Management – Policy Elements for Sustainable Development in the XXI Century

Financial Management Assessment

Procurement Assessment

Procurement Plan

**C. Other**

First Communication to the Framework Convention on Climate Change, 1995

Revision to the First Communication, 1997

\*Including electronic files

STATEMENT OF LOANS AND CREDITS

ARGENTINA: Enabling activity for Second National Communication of Argentine Government to the Convention on Climate Change  
24-Oct-2002

Active Projects		Last PSR Supervision Rating		Fiscal Year	IBRD	Original Amount in US\$ Millions			Difference Between Expected and Actual Disbursements <sup>1</sup>		
Project ID	Project Name	Development Objectives	Implementation Progress			EIA	GRANT	Cancel.	Unabs.	Orig.	From Flow'd
P04447	AR Cerveza Provincial R	R	U	2001	70			44.3		45	20
P062344	AR Cordoba PRLS	S	U	2001	300			200		100	
P057473	AR INDIGENOUS COMMU	S	S	2001	5			4.75		1.8	
P050713	AR MODEL COURT DEV.	S	S	1998	5			3.530314		3.5	
P066880	AR MUSIC DEVT II	HS	S	1995	210			3.22285	39.000935	27.8	6.042089
P046221	AR PENSION TA	S	S	1997	20			3.629504		3.6	3.636604
P070374	AR PROFAM LL	S	S	2002	5			5		1.3	
P009030	AR PROV DEVT II	S	S	1995	225			25.74777		26.7	14.62822
P037049	AR PUB INV STRENGTHO	S	U	1990	16			5.687932	5.5	11.2	
P055481	AR SOC&PSC MTL ID SV	S	HS	1999	10			3.453442		3.5	3.453442
P069913	AR Santa Fe Provincial Pat	S	U	2002	380			176.7		50	
P057489	AR State Modernization	U	U	1999	30.303			29.83043		33.8	
P064614	AR. Second Secondary Ed	S	U	2001	56.99			53.33448		-3.7	
P043416	AR AIDS and STD Control	S	S	1997	15			0.928748		0.9	
P034891	AR Higher Ed. Reform	S	S	1995	356			27.89630	26.4	53.3	53.26633
P062625	AR-Maternal & Child Hlth	S	S	1997	100			41.52851		20.6	
P055482	AR-Pub. Hlth. Serv. & Dis	S	S	2000	52.5			31.53707		24.9	
P006057	AR-SECONDARY ED. 2	S	S	1996	115.5			29.69899		29.7	
P060714	AR-Secondary Ed. 3	S	S	1998	119			0.867545		0.5	
P006058	AR-Social Protec.3	S	S	1999	80.75			54.54255		44.6	
P049260	AR-Social Protec.3	S	S	1998	284			1.26376		1.3	
P039984	B.A. URB. TSP	U	U	1997	200			125.8917		115.9	49.89172
P052235	EL NIÑO EMERGENCY FL	S	S	1998	42			15.78614		16.8	-4E-08
P000012	FLOOD PROTECTION	S	S	1997	200			130.0380		130.1	7
P006040	FORESTRY/0V	S	S	1996	16			4.827108		4.4	
P039787	GEF AR-BIODIVERSITY C	S	S	1998				7.854911	10.1	3.4	
P049048	GEF AR-RENEWABLE EN	S	M	1999				8.954535	9.5	5	
P005230	MGAR-REDUCTION OF O	S	S	1997				11.23215	25	-10.5	
P048008	N-FOREST/PROFC	S	S	1997	19.5			11.3930		5.9	
P052592	NAT HWY REHAB&MAINT	S	S	1998	450			155.4127		153.4	
P006070	POLLUTION MGT	U	U	1998	16			10.37287	6	26.8	6.618803
P009030	PROV AG DEVT I	U	U	1997	125			104.8978		81.7	50.11481
P006980	PROV ROADS	S	U	1997	300			200.6035		197.6	20.75205
P009043	RENEW ENERGY R MKT	S	U	1999	30			28.35223		16	
P006041	SMALL FARMER DN.	U	U	1998	75			35.19382		34.2	34.24862
P000040	WATER SCTR RFRM	U	U	1999	30			25.9025		27	0.4
Overall result				Result	3733.543		44.6	39.6200935	1652.954	1272.7	270.0794

**ARGENTINA**  
**STATEMENT OF IFC's**  
**Held and Disbursed Portfolio**  
**As of 6/30/2002**  
**(In US Dollars Millions)**

FY Approval	Company	Held				Disbursed				
		Loan	Equity	Quasi	Partic	Loan	Equity	Quasi	Partic	
2000	ASF	20	0	0	0	20.5	20	0	0	20.5
1998	AUTCL	5.22	0	0	0	5.22	0	0	0	0
1994/02	Acceitera General	30	0	0	0	30	0	0	0	0
1960/95/97/99	Acindar	48.61	0	0	0	48.61	0	0	0	0
1994/95/96	Aguas	0	0	0	0	0	0	0	0	0
1977/84/86/88/94/96	Alpargatas	10	0	0	0	40.5	10	0	0	40.5
1999	American Plast	7.82	0	0	0	7.82	0	0	0	0
1993	Arg Equity Inv.	0	2.79	0	0	0	2.79	0	0	0
2000	Argentina SMMC	26.65	12.5	0	0	23.2	12.5	0	0	0
1989/91/96	BBV Bco. Frances	0.45	0	0	0	0.45	0	0	0	0
1994/99	BGN	0	0	33	0	0	0	33	0	0
2001	BSFE	19.42	0	0	0	5.25	0	0	0	0
1996/99	Banco Galicia	50	0	0	0	200	50	0	0	200
1996	Bansud	1.89	0	0	0	1.89	0	0	0	0
2000	Bco Hipotecario	25	0	0	0	102.5	25	0	0	102.5
1996	Brahma - ARG	3.57	0	8.5	3.3	3.57	0	8.5	3.3	0
1997	Bunge-Ceval	9.65	0	5	0	9.65	0	5	0	0
1996	CAPSA	6	0	5	16.5	6	0	5	16.5	0
1999	CCI	0	20	6	0	0	20	6	0	0
1995	CEPA	6.67	0	3	1.2	6.67	0	3	1.2	0
2000	Cefas	10	0	5	0	6	0	5	0	0
1999	Correo Argentino	52.18	6.82	5.18	0	52.18	6.82	5.18	0	0
1994/95	EDENOR	0	0	0	0	0	0	0	0	0
1998	F.V. S.A.	8.25	0	4	0	8.25	0	4	0	0
1998	FAID	0	2.75	0	0	0	2.75	0	0	0
2000	FAPLAC	10	0	5	0	10	0	5	0	0
1992	FEPSA	0.55	0	2	0	0.55	0	2	0	0
1997	FRIAR	10	0	2.5	7	10	0	2.5	7	0
1996	Grunbaum	6	0	2	3.33	6	0	2	3.33	0
1995/97	HSEC Argentina	22	0	0	0	22	0	0	0	0
1998	Hospital Privado	9.06	0	0	0	9.06	0	0	0	0
1992	Huantraico	0	17	0	0	0	0	0	0	0
1995/97	Kleppe/Caldero	6	0	0	0	6	0	0	0	0
1996	MBA	0	0.16	0	0	0	0.16	0	0	0
1992/93/96	Malteria Pampa	1.5	0	1	0	1.5	0	1	0	0
0/97	Milkaut	5.63	0	10	1.5	5.63	0	10	1.5	0
1978/81/86/87/91/93/96/99	Minetti	30	0	14	100	30	0	14	100	0
1993/94	Molinos	0	1.24	0	0	0	1.24	0	0	0
1995	Nahuelat	8.82	5	0	0	8.82	5	0	0	0
1996/99	Neuquen Basin	0	5	0	0	0	0	0	0	0
1993	Nuevo Central	0.63	3	0	0	0.63	3	0	0	0
1992/95	PAE - Argentine	1.82	0	0	3.64	1.82	0	0	3.64	0
1998	Patagonia	2.7	0	1	0	2.7	0	1	0	0
1998	Patagonia Fund	0	14.97	0	0	0	7.8	0	0	0
1996	Pecom	7.27	0	0	6	7.27	0	0	6	0
1990/94	Petroken	4.76	0	0	0.68	4.76	0	0	0.68	0
1994	Quilmes	4	0	0	0	4	0	0	0	0
1992	Rioplatsense	5.33	1	0	1.67	5.33	1	0	1.67	0
1999	S.A. San Miguel	8.61	0	0	0	8.61	0	0	0	0
1995	SIDECO	0	15	0	0	0	15	0	0	0
1995	SanCor	8.67	0	20	0	8.67	0	20	0	0
1995	Socma	6.26	0	0	15	6.26	0	0	15	0
1997/98	Suquia	32	0	0	20	32	0	0	20	0
1997	T6I	7.78	0	5	18.75	7.78	0	5	18.75	0
1987/89/90/96/97	Terminal 6	7.78	0	0	8.13	7.78	0	0	8.13	0
1995	Terminales Port.	4.5	0	0	0	4.5	0	0	0	0
1995/00	Tower Fund	0	5	0	0	0	3.6	0	0	0
1995	Tower Fund Mgr	0	0.14	0	0	0	0.14	0	0	0
1996	Transconor	20.29	0	17.87	157.58	20.29	0	17.87	157.58	0
2001	USAL	10	0	0	0	7	0	0	0	0
1997	Vicentin	17.5	0	0	2	17.5	0	0	2	0
1993	Yacylec	4.5	5.04	0	0	4.5	5.04	0	0	0
1996	Zanon	17.67	0	0	0	17.67	0	0	0	0
Total Portfolio:		623.01	117.41	155.05	759.78	568.39	86.84	155.05	729.78	

Approvals Pending Commitment					
		Loan	Equity	Quasi Partic	
2000	APSF	0	0	0	9500
1998	Suquia CL	2500	0	0	0
1999	American Plast	0	350	0	0
2000	Minetti Int Swap	4000	0	0	0
2000	Argentina SMMC	50000	37500	0	450000
2000	Hipotecario USCP	25000	0	0	0
2001	ITBA	7000	0	0	0
2001	Eki	9500	0	2500	0
2001	Edenor SME	20000	0	0	0
2001	Gasnor	21000	0	0	20000
2002	EDET	20000	0	15000	50000
Total Pending Commitment:		159000	37850	17500	529500

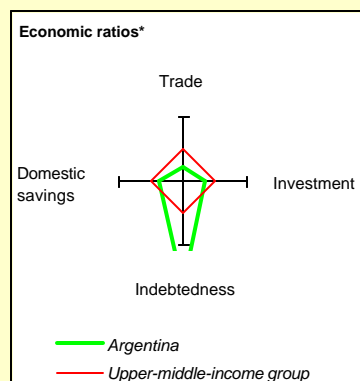
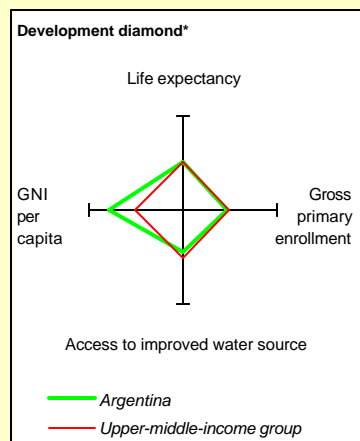
## COUNTRY AT A GLANCE

### ARGENTINA: Enabling activity for Second National Communication of Argentine Government to the Convention on Climate Change

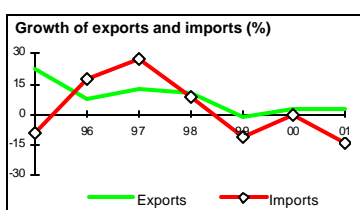
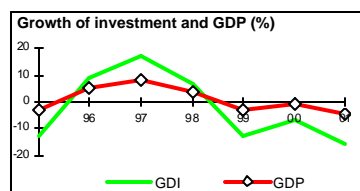
# Argentina at a glance

9/14/02

	Argentina	Latin America & Carib.	Upper-middle-income		
<b>POVERTY and SOCIAL</b>					
<b>2001</b>					
Population, mid-year (millions)	37.5	524	504		
GNI per capita (Atlas method, US\$)	6,940	3,560	4,460		
GNI (Atlas method, US\$ billions)	260.0	1,862	2,248		
<b>Average annual growth, 1995-01</b>					
Population (%)	1.3	1.5	1.3		
Labor force (%)	2.1	2.2	1.8		
<b>Most recent estimate (latest year available, 1995-01)</b>					
Poverty (% of population below national poverty line)	18	..	..		
Urban population (% of total population)	88	76	77		
Life expectancy at birth (years)	74	70	71		
Infant mortality (per 1,000 live births)	17	29	24		
Child malnutrition (% of children under 5)	5	9	9		
Access to an improved water source (% of population)	79	85	87		
Illiteracy (% of population age 15+)	3	11	10		
Gross primary enrollment (% of school-age population)	120	130	127		
Male	120	131	128		
Female	120	128	126		
<b>KEY ECONOMIC RATIOS and LONG-TERM TRENDS</b>					
	<b>1981</b>	<b>1991</b>	<b>2000</b>	<b>2001</b>	
GDP (US\$ billions)	78.7	189.7	283.1	268.5	
Gross domestic investment/GDP	22.7	14.6	16.2	14.1	
Exports of goods and services/GDP	6.9	7.7	10.9	11.4	
Gross domestic savings/GDP	22.2	16.2	15.6	15.4	
Gross national savings/GDP	..	13.4	13.0	12.4	
Current account balance/GDP	-6.2	-1.3	-3.1	-1.7	
Interest payments/GDP	2.6	1.2	3.4	2.8	
Total debt/GDP	45.3	34.5	51.6	52.4	
Total debt service/exports	45.7	35.6	70.8	99.5	
Present value of debt/GDP	..	..	54.7	..	
Present value of debt/exports	..	..	401.3	..	
	<b>1981-91</b>	<b>1991-01</b>	<b>2000</b>	<b>2001</b>	<b>2001-05</b>
(average annual growth)					
GDP	-0.1	2.9	-0.8	-4.5	-1.1
GDP per capita	-1.5	1.6	-2.0	-5.6	-3.4
Exports of goods and services	4.2	8.8	2.7	2.9	0.7



	1981	1991	2000	2001
<b>STRUCTURE of the ECONOMY</b>				
<i>(% of GDP)</i>				
Agriculture	6.5	6.7	5.0	4.8
Industry	40.3	32.7	27.6	26.6
Manufacturing	28.8	24.4	17.5	16.9
Services	53.2	60.6	67.4	68.5
Private consumption	..	80.4	70.6	74.2
General government consumption	..	3.3	13.8	10.4
Imports of goods and services	7.4	6.1	11.5	10.2
	<b>1981-91</b>	<b>1991-01</b>	<b>2000</b>	<b>2001</b>
(average annual growth)				
Agriculture	0.7	3.2	-1.8	1.0
Industry	-0.7	2.1	-3.4	-6.7
Manufacturing	-0.3	1.1	-3.8	-7.5
Services	0.4	3.3	0.5	-4.0
Private consumption	..	1.9	0.2	-4.9
General government consumption	..	1.9	0.6	-2.1
Gross domestic investment	-3.6	3.4	-6.8	-15.9
Imports of goods and services	-1.3	9.1	-0.2	-14.0



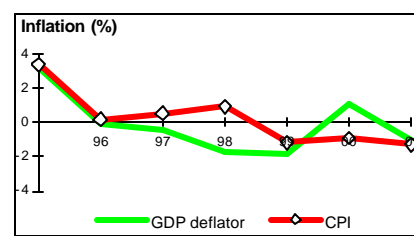
Note: 2001 data are preliminary estimates.

\* The diamonds show four key indicators in the country (in bold) compared with its income-group average. If data are missing, the diamond will be incomplete.

Argentina

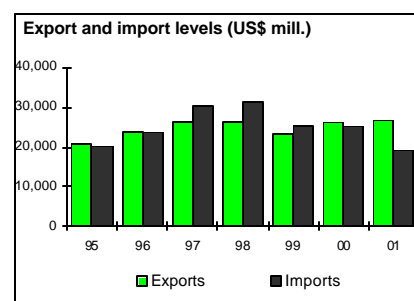
PRICES and GOVERNMENT FINANCE

	1981	1991	2000	2001
<b>Domestic prices</b> (% change)				
Consumer prices	104.5	171.7	-0.9	-1.3
Implicit GDP deflator	106.4	133.0	1.0	-1.1
<b>Government finance</b> (% of GDP, includes current grants)				
Current revenue	7.0	16.2	19.8	18.7
Current budget balance	1.2	-0.6	-1.5	-2.9
Overall surplus/deficit	-5.1	0.6	-2.4	-3.8



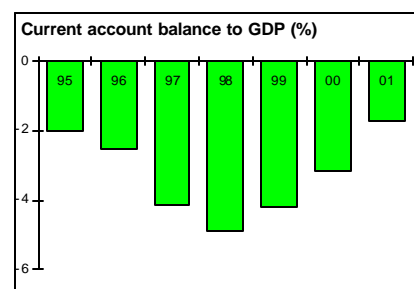
TRADE

	1981	1991	2000	2001
<i>(US\$ millions)</i>				
Total exports (fob)	..	12,146	26,244	26,655
Food	..	1,067	2,322	2,358
Meat	..	892	933	947
Manufactures	..	2,984	7,825	7,947
Total imports (cif)	..	8,403	25,157	19,148
Food	..	..	..	..
Fuel and energy	..	564	719	547
Capital goods	..	2,874	11,724	8,924
Export price index (1995=100)	..	..	88	85
Import price index (1995=100)	..	..	83	76
Terms of trade (1995=100)	..	..	106	112



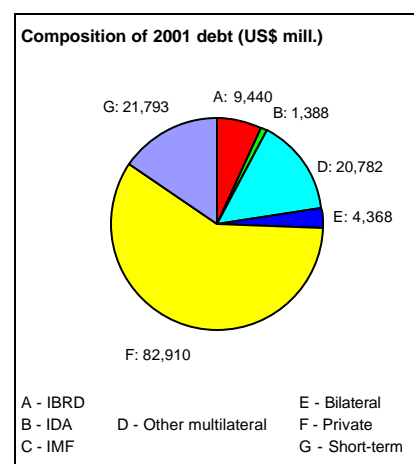
BALANCE of PAYMENTS

	1981	1991	2000	2001
<i>(US\$ millions)</i>				
Exports of goods and services	10,853	14,843	31,114	30,919
Imports of goods and services	11,611	11,843	32,861	27,565
Resource balance	-758	3,000	-1,747	3,354
Net income	-3,932	-5,862	-7,372	-8,094
Net current transfers	-206	420	241	190
Current account balance	-4,896	-2,442	-8,878	-4,550
Financing items (net)	17,921	5,236	7,702	..
Changes in net reserves	-13,025	-2,794	1,176	..
<b>Memo:</b>				
Reserves including gold (US\$ millions)	..	16,516	26,465	14,382
Conversion rate (DEC, local/US\$)	9.50E-8	1.0	1.0	1.0



EXTERNAL DEBT and RESOURCE FLOWS

	1981	1991	2000	2001
<i>(US\$ millions)</i>				
Total debt outstanding and disbursed	35,657	65,406	146,172	140,681
IBRD	477	2,790	8,789	9,440
IDA	0	0	0	0
Total debt service	5,391	5,420	27,345	36,392
IBRD	82	567	1,239	1,388
IDA	0	0	0	0
Composition of net resource flows				
Official grants	1	42	31	0
Official creditors	70	760	1,957	11,695
Private creditors	6,327	38	625	-8,938
Foreign direct investment	837	2,439	12,645	3,067
Portfolio equity	0	420	14	-7
World Bank program				
Commitments	0	1,004	83	735
Disbursements	120	460	1,019	1,329
Principal repayments	46	351	538	676
Net flows	74	109	481	653
Interest payments	36	216	701	713
Net transfers	37	-107	-220	-60



**UPDATE OF NATIONAL GREENHOUSE GAS EMISSIONS INVENTORIES  
AND TREND ANALYSIS  
PRELIMINARY TERMS OF REFERENCE**

**A. Background**

In accordance with Articles 4 and 12 of the UNFCCC, and the relevant decisions of the COP, all Parties to the Convention must submit national Greenhouse Gas (GHG) inventories to the Climate Change secretariat. Inventories compile data on emissions of carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), as well as Non Methane Volatile Organic Compounds (NMVOCs), CO, and NO<sub>x</sub>. Emission estimates are presented in accordance with the source categories of the Intergovernmental Panel on Climate Change guidelines for National Greenhouse Gas Inventories (1996).

The inventory focuses on emissions from the following sources: 1) energy use, and more specifically related to the following category of use (i) residential; (ii) commercial; (iii) public; (iv) industrial; and (v) transport; 2) power generation; 3) land use change, including (i) agriculture; (ii) forestry; and (iii) native forests and vegetal cover; and 4) waste (*i.e.* solid waste, wastewater, and sewage). Guidelines are given by IPCC on the manner in which emissions totals are to be estimated and reported.

The activities producing the largest shares of emissions correspond to: 1) combustion of fossil fuels, consistently releasing approximately 90% of the total CO<sub>2</sub> emissions and around 42% of the total GHG emissions of the country; 2) enteric fermentation, releasing 62% of methane emissions and 19% of total GHG emissions in 1997; and 3) management of agricultural soils, releasing 95% of total nitrous oxide emissions and 21% of total GHG emissions in 1997 (see Annex 13 for the most recent information on Argentine GHG emissions).

The main objectives of this component of the project are to: 1) upgrade inventories of GHG emissions; 2) develop own factors of emissions; and 3) harmonize methodologies for developing energy balance and GHG emission inventories.

*GHG inventory update*

The existing inventories of GHG emissions published in 1999 with data from 1997 will be updated with data from the year 2000. National GHG inventories will be estimated and reported using the *Revised 1996 Intergovernmental Panel on Climate Change (IPCC) Guidelines for National Greenhouse Gas Inventories*. This will involve: i) gathering information from all relevant sectors; ii) processing data using IPCC methodological tools; iii) reviewing and adjusting national emission factors; and iv) analyzing evolving GHG emission trends and cross sector evaluation.

*Comparative analysis of previous and current GHG inventories*

Argentina is one of the few countries in the world that will have performed four inventories of GHG emissions covering the period 1990-2000. Consequently, a detailed assessment and analysis of the evolution of emissions, by sector, will be conducted. This analysis aims at identifying current trends of GHG emissions, as well as main drivers of their changing patterns.

Using pertinent socio-economic data, a series of indicators will subsequently be generated. These indicators will reflect the evolution of emissions by economic activity, relative to population. Results will illustrate the evolution of emissions during the period 1990-2000.

**B. Objectives**

- To update 1990-1994 and 1997 inventory of GHG emissions
- To produce the 2000 GHG inventory

- To compare GHG inventories from 1990-1994 and 1997 to that from 2000
- To establish emission trends, by economic sector

**C. Activities**

1. Review all published UNFCCC guidelines for the development of the inventories
2. Review methodology followed to perform 1990-1994 and 1997 emissions inventory
3. Identify and correct methodological errors
4. Gather information from all sectors to be included in the inventory
5. Process data following IPCC procedures, formats and standards
6. Review and adjust, when necessary and following guidelines, national emissions factors
7. Review and adjust existing information on local emission factors
8. Review 1990-1999, 1997, and 2000 GHG emissions inventories
9. Gather all existing GHG inventories and ensure compatibility of figures (*i.e.* methodology for estimating emissions)
10. Determine all sources and sinks of GHG by sector
11. Identify critical issues in evolution of emissions (*i.e.* economic, technological, policy-related)
12. Analyze and assess the evolution of emissions
13. Compare emissions through the 1990-2000 decade and highlight significant trends

**D. Expected outputs**

1. GHG emissions inventory for the year 2000
2. Analysis of Argentine emissions trends during the 1990-2000 decade

## **DEVELOPMENT OF NATIONAL FACTORS OF EMISSIONS PRELIMINARY TERMS OF REFERENCE**

### **A. Background**

In accordance with Articles 4 and 12 of the UNFCCC, and the relevant decisions of the COP, all Parties to the Convention must submit national Greenhouse Gas (GHG) inventories to the Climate Change secretariat. Inventories compile data on emissions of carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), as well as Non Methane Volatile Organic Compounds (NMVOCs), CO, and NO<sub>x</sub>. Emission estimates are presented in accordance with the source categories of the Intergovernmental Panel on Climate Change guidelines for National Greenhouse Gas Inventories (1996).

The inventory focuses on emissions from the following sources: 1) energy use, and more specifically related to the following category of use (i) residential; (ii) commercial; (iii) public; (iv) industrial; and (v) transport; 2) power generation; 3) land use change, including (i) agriculture; (ii) forestry; and (iii) native forests and vegetal cover; and 4) waste (*i.e.* solid waste, wastewater, and sewage). Guidelines are given by IPCC on the manner in which emissions totals are to be estimated and reported.

The activities producing the largest shares of emissions correspond to: 1) combustion of fossil fuels, consistently releasing approximately 90% of the total CO<sub>2</sub> emissions and around 42% of the total GHG emissions of the country; 2) enteric fermentation, releasing 62% of methane emissions and 19% of total GHG emissions in 1997; and 3) management of agricultural soils, releasing 95% of total nitrous oxide emissions and 21% of total GHG emissions in 1997 (see Annex 13 for the most recent information on GHG emissions).

The main objectives of this component of the project are to: 1) upgrade inventories of GHG emissions; 2) develop own factors of emissions; and 3) harmonize methodologies for developing energy balance and GHG emission inventories.

### **B. Objectives**

- To develop national emission factors for industry, transport, and power generation

### **C. Activities**

1. Determine all sources and sinks of GHG by sector
2. Evaluate current factors of emissions utilized in previous GHG emission inventories
3. Use classification for energy use from International Energy Agency
4. Identify fuel consumption patterns per technology per category
5. Determine scope of analysis within budget range
6. Measure fuel use
7. Measure tailpipe emissions from selected technologies and equipment type
8. Calculate factors of emissions and perform sensitivity analysis
9. Compare with international standard and calibrate

### **D. Expected outputs**

1. Identification of all emission factors used in former GHG emission inventories
2. Local factors of emissions per selected technology

## HARMONIZATION OF METHODOLOGIES FOR NATIONAL ENERGY BALANCES AND GHG EMISSION INVENTORIES PRELIMINARY TERMS OF REFERENCE

### A. Background

In accordance with Articles 4 and 12 of the UNFCCC, and the relevant decisions of the COP, all Parties to the Convention must submit national Greenhouse Gas (GHG) inventories to the Climate Change secretariat. Inventories compile data on emissions of carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), as well as Non Methane Volatile Organic Compounds (NMVOCs), CO, and NO<sub>x</sub>. Emission estimates are presented in accordance with the source categories of the Intergovernmental Panel on Climate Change guidelines for National Greenhouse Gas Inventories (1996).

The inventory focuses on emissions from the following sources: 1) energy use, and more specifically related to the following category of use (i) residential; (ii) commercial; (iii) public; (iv) industrial; and (v) transport; 2) power generation; 3) land use change, including (i) agriculture; (ii) forestry; and (iii) native forests and vegetal cover; and 4) waste (*i.e.* solid waste, wastewater, and sewage). Guidelines are given by IPCC on the manner in which emissions totals are to be estimated and reported.

The activities producing the largest shares of emissions correspond to: 1) combustion of fossil fuels, consistently releasing approximately 90% of the total CO<sub>2</sub> emissions and around 42% of the total GHG emissions of the country; 2) enteric fermentation, releasing 62% of methane emissions and 19% of total GHG emissions in 1997; and 3) management of agricultural soils, releasing 95% of total nitrous oxide emissions and 21% of total GHG emissions in 1997 (see Annex 13 for the most recent information on GHG emissions).

The main objectives of this component of the project are to: 1) upgrade inventories of GHG emissions; 2) develop own factors of emissions; and 3) harmonize methodologies for developing energy balance and GHG emission inventories.

### *Evaluation of National Energy Balances*

This activity involves the evaluation of modifications needed by the existing National Energy Balances in order to make them compatible with Inventory Emission Source Categories. Currently, the energy balance structure groups energy consumption for commercial, public, and residential sub-sectors under one single category, while the GHG emissions inventory separates it into the three groups. Since the methodology for building the energy balances has been applied for years, the study proposes to identify any adjustment and modification that should be incorporated in the elaboration of the National Energy Balances, in order to make them compatible with the emissions inventories.

### B. Objectives

- To evaluate National Energy Balances and make them compatible with the categories of the inventory of emissions

### C. Activities

1. Review 1990-1999, 1997, and 2000 GHG emissions inventories
2. Review IPCC guidelines and definition of emission source categories. Compare to those used for the existing National Energy Balances
3. Assess necessary modifications to the National Energy Balances to make them compatible with categories of emissions inventories
4. Obtain additional data necessary to convert National Energy Balances
5. Compute Harmonized National Energy Balances
6. Propose guidelines to change the methodology for computation of National Energy Balances

**D. Expected outputs**

1. Harmonized National Energy Balances

## VULNERABILITY OF THE COASTAL ZONE PRELIMINARY TERMS OF REFERENCE

### A. Background

The First National Communication of the Argentinean Government to the UNFCCC of 1997 proposed to evaluate the coastal vulnerability of the country to the impacts of climate change. The scope of the final analysis was restricted to the ocean coastline of the *Buenos Aires* province and to the *Bahía de Samborombón* in the *Río de la Plata* basin. The final report concluded that the region would be severely affected by any change in sea level, and that even a small raise of the ocean level would cause major flooding of the planes on the valley of the *Río Salado*. Moreover, it was found that an increase of the base level of the river could decrease the drainage potential for the entire province, which could subsequently lead to flooding of one of the most prominent agricultural areas of the country.

The First National Communication was useful to assess the magnitude of potential impacts of climate change on a portion of the coastal areas of the *Río de la Plata*, an estuary where the mean water level is less than one meter over the nearby sea level. Nonetheless, the studies conducted did not evaluate the vulnerability of the entire coastline of the *Río de la Plata*. Given the economic and social importance of the region, a more in-depth analysis of its vulnerability to potential climatic changes is justified, and will be conducted as part of the Second National Communication. This component of the study will thus build on results from the First National Communication and will address the vulnerability to climate change of the coastline of the *Río de la Plata*, in particular the region located to the north west of the *Bahía de Samborombón*. Although the region occupies less than 10% of the total area of the country, it is the most important urban center and houses almost 40% of the total population. The area's high population density makes it particularly vulnerable to the negative impacts of climate change. Given the impact on the coastal environment that a changing climate entails, this specific study component will focus on the response of the coastline of the *Río de la Plata*. The study will focus on two areas: 1) *Gran Buenos Aires*; and 2) the *Paraná delta*.

#### Gran Buenos Aires area

The *Gran Buenos Areas* region is located in the northern part of the *Buenos Aires* province. Several facts contribute to persistent flooding of the area. First, flooding of the *Paraná* river, caused by heavy precipitations during spring and summer. Floods are of long duration, such that in certain zones, unusually high water levels can exist for several months. When precipitations are high, internal tributaries of the *Paraná* and *Uruguay* rivers flood, making the overflow conditions at the larger rivers even more delicate. Second, the flatness of the region accentuates drainage problems. The third factor contributing to flooding of the region are the *sudestadas*, which are Atlantic storms characterized by very strong winds, persistent precipitation, and low temperatures. These Atlantic winds are of high velocity and are believed to raise water levels in the region.

The area of *Gran Buenos Aires* comprises two zones, the *Región Pampeana* and a relatively small strip of land bordering the *Paraná* river. Both sub-regions are characterized by the absence of topographic relief and by flat slopes. Precipitation rates oscillate between 800 and 1000 mm/yr. The area is windy, with currents from the Atlantic bringing moisture, and cool winds from the South bringing freezing temperatures. The characteristics of the *Región Pampeana* are described in a later section. The strip along the *Paraná* river has a zone of high elevations, where flooding is not a concern. As the river banks are approached however, this high zone abruptly ends in steep cliffs and the low side is greatly affected by both flooding of the river and by precipitation events. Various settlements exist in this zone of risk of the *Paraná*, most of which are of precarious nature, where inhabitants live exposed to the risks imposed by changing climate.

#### The delta region

The *delta* region extends from the *Paraná* river towards the North into the province of *Entre Ríos*. It is a region of low elevations underlain by sedimentary soils that were deposited by the *Paraná* river. The *delta* is characterized by the presence of islands of very dense vegetation, the interior of which is usually

covered by water. A second characteristic is the presence of numerous rivers and streams that cut across the entire region. Due to its very flat slope, the *delta* is constantly subjected to inundations. The climate of the *delta* is temperate, and precipitation rates are in the order of 950 mm/yr. The area is subjected to strong winds from the South and the Southeast, which tend to drive recurrent precipitation events. Rains caused by the action of Southern winds, referred to as *Pamperos*, are of high intensity but of short duration. Southeast Atlantic winds drive the *Sudestadas*, with persistent precipitations but of lesser intensity than that caused by the *Pamperos*. The *sudestadas* have a profound effect on the hydrologic characteristics of the *delta*.

The *Paraná* delta is currently growing towards the city of *Buenos Aires* at a pace of 40 m/yr, as a result of sediment deposition by the *Bermejo* and the *Pilcomayo* rivers. These rivers originate in the Andean peaks of Argentina and Bolivia, where steep slopes and high stream velocities cause erosion of the underlying rock. The sediments produced are transported downstream and deposited in flat areas. It is estimated that approximately 100 million tons of sediments are transported each year into the *Paraguay* and *Paraná* rivers, although not exclusively by the *Bermejo*. At the present rate of expansion, it is estimated that the *Paraná* delta will reach the suburbs of *Buenos Aires* in approximately 100-150 years.

## B. Objectives

- To determine the effects of climate change on the water level along the northern coastline of the *Río de la Plata*, particularly the coastline of the *Gran Buenos Aires* area
- To review and compile existing information regarding flooding along the coastline of the *Gran Buenos Aires* and the expansion of the *Paraná Delta*
- To determine the effects of flooding of the *Paraná* basin on the *Gran Buenos Aires* area
- To assess the influence of climate change on the expansion of the *Paraná Delta* on the coastline of the *Río de la Plata*
- To evaluate the effects of the expansion of the *Paraná Delta* on its floodplains
- To generate simulations of potential climate change scenarios for the area
- To assess socio-economic impacts of climate change on the *Gran Buenos Aires* area

## C. Activities

1. Review and compile existing studies, reports, measurements and predictions of flooding along the *Gran Buenos Aires* coastline and of the expansion of the *Paraná Delta*
2. Find historic records of local characteristics of the *Río de la Plata* and *Río Paraná*, including seasonal streamflows and water levels
3. Find historic records of seasonal precipitation, of major storm events, and of local flooding events. Determine whether correlations between rainfall and flooding can be established and how trends have changed in the previous century
4. Determine the seasonal trends in strength and direction of the winds, both the *sudestadas* and the *pamperos*. Find historic records and determine whether these trends have changed over the past century, and whether they can be correlated to flooding of the region
5. Document effects attributed to ENSO on the coastline of the *Río de la Plata* and the banks of the *Río Paraná* during the previous century
6. Map the historic progression of the coastline of the *Río de la Plata*. In particular:
  - (a) Determine (i) if and by how much the coastline has receded; (ii) if current patterns have changed; (iii) if inlets have formed; and (iv) if major sediment transport has occurred (*i.e.* sand and bottom sediments).
  - (b) Determine whether breakwaters or other containment structures have been built and map their location
  - (c) Find historic records of phreatic surface levels in the vicinity of the coastline and document level changes through the years
  - (d) Establish locations where groundwater pumping is conducted and determine pumping trends
  - (e) Evaluate the condition of regional groundwater aquifers

- (f) Assess the magnitude of the damages caused by the occurrence of saltwater intrusion
  - (g) Map the movement of the boundary between saltwater and fresh water
  - (h) Map historic population migration and settlements along the coastline of the *Río de la Plata*
7. Map historic progression of the front of the *Paraná delta*, as well as changes in the location of the banks of the *Río Paraná*
  8. Find records of sediment loads in the *Bermejo* and *Pilcomayo* rivers and determine how these have changes over the previous century.
  9. Determine whether the streamflows at the sources of the *Bermejo* and *Pilcomayo* have increased as a result of higher rainfall, which would account for increasing erosion and therefore higher sediment transport
  10. Document the occurrence of landslides or other instabilities along the banks of the *Paraná* river
  11. Locate existing man-made structures and document performance during severe rainfall events
  12. Map historic population migration and settlements along the banks of the *Río de la Plata*
  13. Conduct Regional Climate Model simulations (under predetermined carbon scenarios) to evaluate projected changes in water level on the coastline of the *Río de la Plata* and the banks of the *Río Paraná*. Predictions should be made at intervals of 15-20 years, unless results show a more rapid trend of changes
  14. Evaluate the relative benefits of population relocation (or settlement control) versus drainage infrastructure development
  15. Assess costs of damages caused by flooding in the area and by the expansion of the delta
  16. Evaluate changes in local productivity as a result of changing climatic patterns and of the deterioration they have caused

**D. Expected Outputs**

1. Assessment of the specific changes in climatic conditions in the area and on the occurrence of natural disasters. Positive correlations may exist but need to be carefully evaluated
2. Clear assessment of the occurrence of degradation of coastline and river banks
3. Evaluation of predictions of sea-level rise in the area
4. Mapping of potential zones of risk from results of climate change simulations
5. Assessment of the relative importance of changes in climatic events, ENSO, and population settlement on the occurrence of natural disasters in the area
6. Guidelines for the development of adaptation measures to reduce the impact of changing climate conditions on local settlements and on the coastline of the *Río de la Plata*
7. Regional socio-economic impacts of climate change

## VULNERABILITY OF THE PAMPA BONAERENSE PRELIMINARY TERMS OF REFERENCE

### A. Background

The *Pampa Bonaerense* or *Pampa Húmeda* is located in the *Buenos Aires* province. It shares the topographic characteristics of the *Pampa* region, namely widespread flat slopes and a virtual lack of topographic features. The climate of the region is temperate, with annual precipitations typically ranging from 600 to 1000 mm. The region has traditionally been subjected to wet-dry cycles, which cause alternating periods of flooding and drought. The severity of flooding events in the past twenty years has increased, with resulting economic and environmental impacts on the area. Droughts have also become more frequent, causing permanent damage to the soils. In addition to the problems associated with surface water resources, unsustainable practices in the area have led to the over-exploitation and contamination of groundwater aquifers.

Flooding in the region occurs primarily along the plains of one of its most prominent rivers, the *Río Salado*. The drainage basin of the *Río Salado* also includes the *Río Samborombón*, along with an extensive network of streams and lakes. Given the low regional gradients, the system carries large volumes of water at very low velocities. Two characteristics of the area aggravate drainage conditions during high-intensity rainfalls and contribute to the extent of inundations: 1) rainfall is often accompanied by strong winds that drive floodwater further inland, away from river banks; and 2) phreatic levels are typically very close to the surface, which limits the water retention capacity of the soils. Excess water has therefore no pathway for drainage and accumulates on the surface creating enormous, flat floodplains. Evapotranspiration is often the only mechanism for water to be evacuated, which explains the long residence times of floodwaters. Damages are often considerable due to the destruction of crops, infrastructure, animal and even human life.

Conversely, during periods of drought, waterways tend to decay and typically lead to the death of vegetation and the loss of surface cover. Windy conditions in the area subsequently cause surface erosion, through processes of suspension, transport, and re-deposition of local sediments. Additionally, during the dry periods, evaporation of the upper water table, typically close to the ground surface, leads to salinization of the soils. Even short periods of drought result in noticeable deterioration of the soils, changes in the area's ecosystems and in the human activities associated with them.

The state of groundwater resources in the *Pampa Bonaerense* is also a matter of concern given their particularly poor management. The overexploitation of groundwater aquifers has already created serious environmental problems in the past and will continue to jeopardize future subsurface water resources. Three interconnected aquifers exist in the province, the *Puelches*, the *Pampeano*, and the *Paraná*. Pumping from the *Pampeano* aquifer is limited, due to its low yield and to the poor quality of the water, which has been contaminated by municipal and industrial pollution. The *Puelches* aquifer has been so extensively exploited that during the 1980s, the regional groundwater flow regime was inverted. Problems of saltwater intrusion along the coastline of the *Río de la Plata* and of contamination of drinking water wells were prevalent at the time. Polluted drinking water wells were then shut down and water was extracted from the *Río de la Plata*. This water supply regime ultimately led to the rising of the phreatic surface levels in the region, a factor that is now exacerbates the flooding potential of the area.

The use of supplementary irrigation for agricultural purposes in the region has also been an important cause of over-pumping of the *Puelches* and *Pampeano* aquifers. The province of Buenos Aires is second in the country in terms of irrigated surface, with approximately 180,000 hectares covered in 2000, a figure that continues to grow at a fast rate. Aquifers continue to be pumped at excessive rates, further compromising future supplies of groundwater.

**B. Objectives**

- To collect existing information on frequency and intensity of wet-dry cycles in the *Pampa Bonaerense*
- To achieve an adequate assessment of the sensitivity of water resources to climate fluctuations
- To determine the impact of human action on region's ability to adapt to extreme climatic events
- To determine the need to regulate water resource exploitation and land use change
- To define mitigation strategies aimed at reducing the negative impacts of extreme climate conditions in the area
- To assess socio-economic impacts of climate change on the *Pampa Bonaerense*

**C. Activities**

1. Collect historic records of cycles of rainfall and drought in the *Pampa Bonaerense* over the past century. Particular focus should be given to:
  - (a) Duration of cycles
  - (b) Increasing frequency
  - (c) Severity of extremes (*i.e.* records of temperature variations and volumes of rainfall)
  - (d) Characterization of extent and magnitude of the damages, particularly from flooding in rural areas around *Buenos Aires*
2. Obtain records of streamflows of the *Salado* and *Pilcomayo* rivers, and particularly of their variations during extreme climate events
3. Characterize wind patterns in the region and determine the influence of winds on damaging weather events
4. Map temporal variations of phreatic surface levels and document known historic changes
5. Characterize the hydraulic properties of regional soils
6. Document land use changes in the area, and focus particularly on water needs of present and past crops. This specific activity will complement studies of the agricultural vulnerability of the *Pampa Húmeda*
7. Establish water pumping and irrigation patterns in the region
8. Document occurrence of soil degradation (*i.e.* salinization and erosion)
9. Determine extent and occurrence of groundwater contamination
10. Document drainage infrastructure development and the effectiveness of man-made drainage structures
11. Evaluate mitigation options against floods including, amongst others:
  - (a) Additional drainage or containment structures
  - (b) Potential storage capacity of regional surface water bodies
  - (c) Diversion of excess waters to the coast
  - (d) Re-zoning of crops and improvements to the use of the land
12. Evaluate mitigation options against cycles of drought, which may consist of:
  - (a) Planning of sustainable, supplementary irrigation practices
  - (b) Changes in crops
13. Estimate costs of damages caused by regional flooding and drought events
14. Estimate costs of productivity changes in the *Pampa Bonaerense* as a result of changes in the conditions of soil and water resources

**D. Expected outputs**

1. Assess the relative impact of human action and climate variations on the occurrence of flood and drought periods in the *Pampa Bonaerense*
2. Determine the likelihood that climate change may indeed be causing increases in both the frequency and the magnitude of wet-dry cycles in the area
3. Evaluate the extent of soil degradation in the region and identify areas of risk
4. Assess the potential of the area's water resources, and particularly groundwater resources, to maintain an adequate supply during periods of drought

5. Determine the need to impose policies on pumping and irrigation in the *Greater Buenos Aires* area
6. Determine the need to introduce guidelines on land use change
7. Recommend mitigation strategies to reduce the impact of flooding and droughts on the *Pampa Bonaerense*
8. Regional social and economic impacts of climate change

**VULNERABILITY OF AGRICULTURE PRODUCTION  
IN THE PAMPA HUMEDA  
PRELIMINARY TERMS OF REFERENCE**

**A. Background**

The *Pampa Húmeda* covers approximately 45 million hectares (about 18% of the country's total land area) and is one of the most important areas of natural resources for temperate agriculture on earth. From the late 19<sup>th</sup> century, the expansion of agriculture and its articulation with international trade made it the engine of Argentina's economic growth. Agriculture<sup>1</sup> in the *Pampa Húmeda* contributes the major part of Argentina's agricultural exports and contributes approximately 80% of the country's agricultural output. Over 90% of Argentina's soybean production, between 80 and 90% of the corn, wheat, sorghum, barley, and sunflower production of the country take place in this area. The *Pampa Húmeda* is highly fertile and has access to abundant water resources. Production in the *Pampa Húmeda* typically consists of joint grain-oilseed-livestock practices, with each activity competing for land, and where their relative partitioning depend on factors such as prices, weather conditions, etc. Grain and oilseed are in fact both competitors and compliments to cattle raising, since the rotation of crops and pastures ensures soil fertility.

Economic reforms enacted in Argentina in the early 1990s created a macro-economic environment more favorable to agricultural investment, production and exports, and gave rise to sectoral growth of 6% per p.a. between 1992-2000. The total area of cultivated land increased, accompanied by an increase in the use of agricultural inputs, machinery, and new varieties of seed, among which were transgenic species. Farmers throughout the country responded strongly to the new policies, and, agricultural production systems changed. These changes have defined a new baseline scenario, in which the vulnerability of the agricultural sector to climatic changes needs to be re-evaluated. The new practices have drastically improved agricultural production over the past decade, but their effects on the soils and the subsequent response of these to climatic variations have not been investigated.

Changes in agricultural practices can be separated into: a) changes in land use; and b) changes in crop management. In one single year, from 1995/96 to 1996/97, Argentina's total harvested area for major field crops increased by 16%. Increases in harvested area resulted from the incorporation of new land, the conversion of pastures to crop production, or the shift in traditional crop-livestock rotation patterns to a more crop-oriented use. Soybean production for instance, presents the most dramatic example of increasing cultivated area, with an average yearly area expansion of 6.8% during the 1990s.

Changes in crop management included several factors, most important of which was the increase in the use of agricultural inputs. The use of fertilizers, for example, increased by a factor of five from 1991 to 1996, while that of other agrochemicals increased by threefold during the same period. Argentina's corn and wheat yields increased by approximately 50% and 75% , respectively, between 1991 and 2001, primarily due to the increased use of fertilizers. Along with chemicals, the use of machinery, such as tractors and harvesters, and of irrigation equipment also increased, improving crop yields. Lastly, shifts in crop management brought about the incorporation of biotech varieties of seed, which have, in some cases, greatly reduced production costs. Once more, the case of soybean is illustrative of this trend. Since the 1990s, a rapid rise in the use of "Roundup Ready" soybean varieties has taken place. It is estimated that 90% of the soybean crop of 2001 is planted to biotech varieties, which greatly reduced the costs of weed control, mature early, and help to reduce weather risks. These characteristics are clearly attractive to farmers, since they reduce labor and time and they increase cost savings. In addition, early crop maturity, combined with the introduction of no-till cropping, has resulted in more intensive land use, as soybeans are double-cropped with wheat. The combination of all these factors resulted in the growth of soybean production by an estimated yearly average of 8% during the 1990s.

Over the long term, the structure of agriculture has shown great flexibility in its capacity to adapt to technological change and altered relative prices and profitability of different activities. The challenge for

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<sup>1</sup> For the purposes of this study, agriculture includes crop production, livestock raising, forestry, and horticulture.  
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the Argentine agricultural sector as a whole is to maintain production costs low, such as to sustain their competitive level in international markets. Implementation of practices such as no-till cropping, which drastically reduce fuel consumption, or the use of biotech seeds, which reduce the cost of weed control, are likely to spread. At the same time, the sustainable use of natural resources is of key importance to economic recovery.

Over a large part of its area, the *Pampa Húmeda* is highly deficient in terms of natural drainage, and the flooding of land, as a result of heavy rain within the area and high water levels which occur cyclically in the Paraná river system, has a serious impact on production. Other climatic factors (e.g., the occurrence of periodic drought, crop-damaging hail and high winds) are also important. The management of climate-generated risk is not well developed (for example, through crop insurance) and studies are under way to understand and quantify the pattern of risks as a first step towards the development of insurance and other market-based instruments. In carrying out the study, the consultant would be expected to liaise closely with the *Oficina de Riesgo Agropecuario* at SAGPyA<sup>2</sup> in order to incorporate the results of the work being done, particularly that concerning the preparation of the “agricultural risk maps” (*mapas de riesgo*).

Agricultural activity itself produces green-house gasses (GHGs) which contribute to climate change. Thus, agriculture is both highly susceptible to climatic conditions and, at the same time, contributes to the generation of the factors driving climate change.

## B. Objectives

The purpose of the study is to analyze the vulnerability of the agricultural sector in the *Pampa Húmeda* to climate change, and to quantify the net effect of agricultural activity on the production of GHG. Accordingly, the objectives of the study are:

- To analyze the structure of agricultural production and natural resource use in the *Pampa Húmeda*
- To identify the actual and potential contribution of agricultural activity to factors generating climate change
- To identify the potential impact of climate change on the present structure of production
- To evaluate the potential of agriculture to respond to climate change
- To determine the socio-economic impacts of these potential changes in the structure of production

## C. Activities

The study would be carried out by building a model of land use for the *Pampa Húmeda*, analyzing in detail the technical structure of agricultural production and simulating a number of scenarios corresponding to plausible occurrences of climate change. The following activities will be carried out:

- 1 The study should be based on a Geographic Information System (GIS) covering the whole of the study area, the principle basic information layers of which should be: (a) a topographical map-base at a scale of at least 1:100,000; (b) soils data at reconnaissance or semi-detailed soil survey level; (c) climatic data; and (d) hydrological data.
- 2 The GIS would be used to carry out a series of physical simulations, including the definition of the extent of flooding of land as a result (a) of increased rainfall within the study area, and (b) of increased flows of the river systems in response to increased rainfall outside the study area, under various scenarios.
- 3 Argentina can be divided into six major ecological zones<sup>3</sup>, of which the study area is one. For the study area, the GIS would include as a further information layer the major agro-ecological regions and sub-regions based on the classification shown in Table 12-B-3 (or on any other suitable classification to be presented in the proposal). Based on this regional/sub-regional classification, a detailed description would be made of existing land use, defining the areas under permanent

<sup>2</sup> *Secretaría de Agricultura, Ganadería, Pesca y Alimentación*

<sup>3</sup> These are: the North-east, the North-west, the *Pampa*, the West, *Patagonia*, and the territories of Antarctica.  
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cultivation, permanent pastures, cultivation in rotation with pastures, forestry and other uses, to arrive at a complete inventory of land use in the study area. The inventory would include estimates of land under different forms of permanent agriculture and double cropping, the use of conventional vs. minimum/no tillage systems, soil degradation both structural and chemical, etc.

- 4 Detailed analyses would be made of the farming systems employed and the technical “production functions” utilized in each agricultural activity. This should be disaggregated at the level of the agro-ecological region and sub-region to the extent necessary. The objective would be to define input/output matrices for each activity in each region and sub-region that: (a) capture the technical elements of production that affect the drivers of climate change (e.g., production and liberation of GHGs, carbon sequestration), including fossil fuel and fertilizer use; and (b) describe the degree of susceptibility to climate change (e.g., changes in ambient temperature, changes in rainfall regime including amount and distribution). The use of different technical “production functions” utilized within a given region or sub-region would be analyzed (e.g., the use of conventional cultivation *cf.* minimum and zero-tillage methods).
- 5 Farm budget and enterprise (activity) analysis would be made to estimate production costs, revenues, and gross and net margins. The changes in relative product prices and gross margins over the period 1990-2002 would be compared with the changes in planted areas and yields to derive: (a) data on the elasticities of substitution between crop production and livestock, and between individual crops; and (b) data on the use of land at the margin.

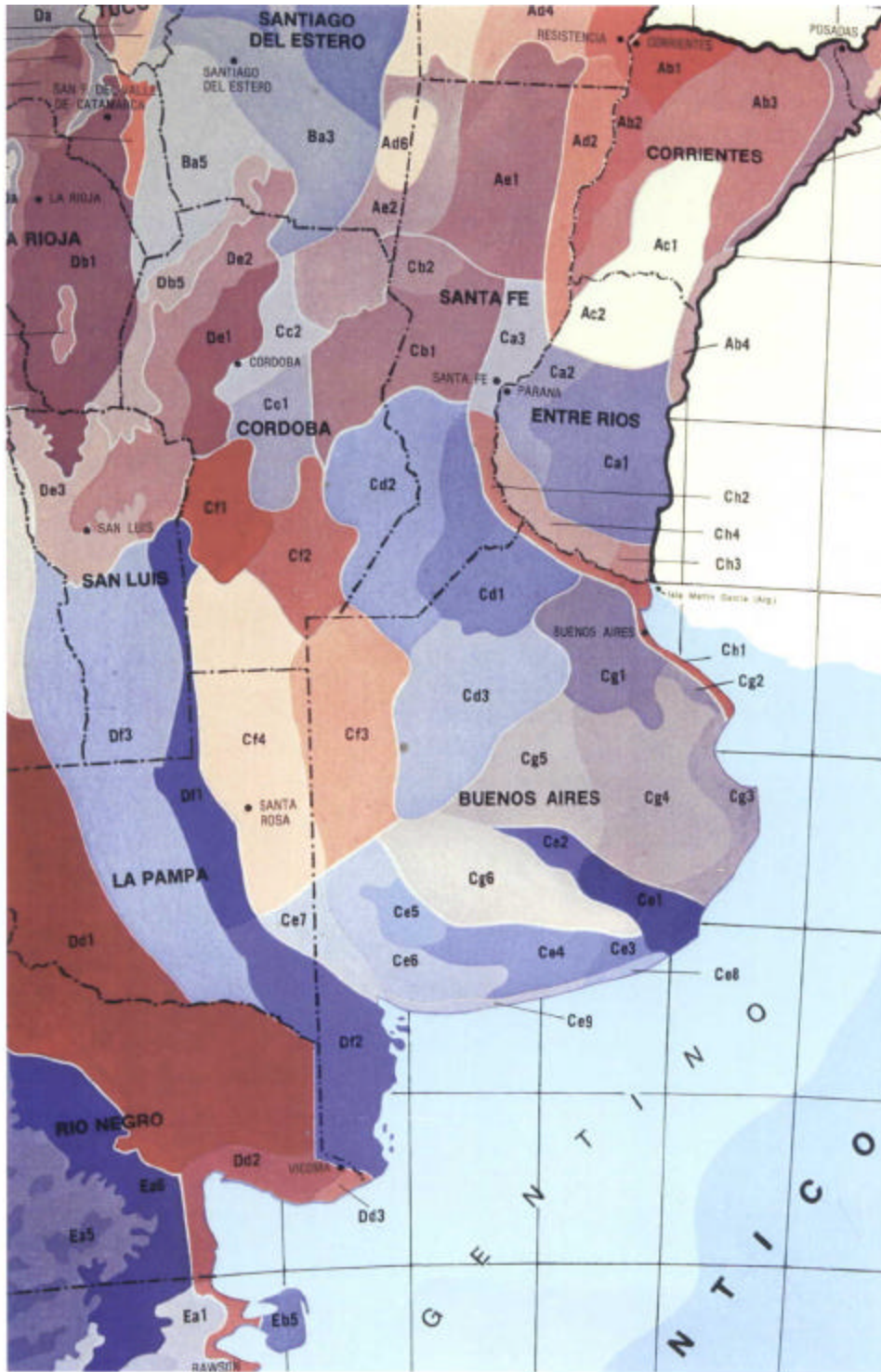
#### D. Expected outputs

- 1 Determine the actual and potential contribution of agricultural activity to factors generating climate change: the present production of GHG would be estimated, and the scope for introducing technical changes to the systems of production to reduce their output would be discussed.
- 2 Evaluate the potential impact of climate change on the present structure of production: the possible effects on production of plausible scenarios of climate change would be calculated through the model.
- 3 Evaluate the potential of agriculture to respond to climate change: the macro-level changes (e.g., in the distribution of land use between activities and in farming systems) and the micro-level changes (e.g., in the technological production aspects of individual crops and products) should be quantified.
- 4 Determine the socio-economic impacts of these potential changes in the structure of production.

**Table 12-B-3. The Pampa Húmeda: Agro-Ecological Regions and Sub-regions**

Region		Sub-region	
Pampa sub-tropical linera	Ca	Concepción del Uruguay	Ca1
		Paraná	Ca2
		Santa Fe	Ca3
Pampa sub-tropical alfalfera	Cb	Rafaela	Cb1
		Ceres	Cb2
Pampa sub-tropical manicera	Cc	Río Tercero	Cc1
		Córdoba ciudad	Cc2
Pampa agrícola norte	Cd	Maicera	Cd1
		Triguera de Santa Fe - Córdoba	Cd2
		9 de Julio	Cd3
Pampa agrícola sur	Ce	Balcarce	Ce1
		Azul	Ce2
		Lobería	Ce3
		Tres Arroyos	Ce4
		Coronel Suárez	Ce5
		Guamini	Ce6
		Bahía Blanca	Ce7

<b>Region</b>		<b>Sub-region</b>	
		Necochea	Ce8
		Faro Encalada	Ce9
Pampa occidental	Cf	Río Cuarto	Cf1
		Laboulaye	Cf2
		Trenque Lauquen	Cf3
		Huinca Renanco	Cf4
Pampa deprimida	Cg	Luján	Cg1
		Llavallol	Cg2
		Dolores	Cg3
		Las Flores	Cg4
		Tapaiquén	Cg5
		Laprida	Cg6
Costa y delta del Paraná y La Plata	Ch	Costa de la Plata	Ch1
		Rosario	Ch2
		Delta interior	Ch3
		Delta superior	Ch4



## VULNERABILITY OF WATER RESOURCES IN THE LITORAL-MESOPOTAMIA PRELIMINARY TERMS OF REFERENCE

### A. Background

The *Litoral-Mesopotamia* comprises six provinces in the humid region of the country, towards the north eastern part of Argentina. The area is, in hydrographic terms, the richest of the country, comprising almost the entire basin of the *Río Paraná* and its main effluents *Uruguay* and *Paraguay*, including a portion of the *Río de la Plata* basin. Severe precipitation events have traditionally caused flooding in the area. However, over the past two decades, both the frequency and the intensity of precipitations have increased, leading to flooding events of major consequences.

Predictions of the effects of global warming on the Argentine climate vary considerably depending on the model and on the emissions scenario used to make them. The resulting impact on water resources is therefore difficult to assess, especially considering the drastically variable climatic and hydrographic characteristics of the country. In the humid regions, precipitation is typically abundant, and the need for drainage infrastructure has traditionally been much more pressing than that for supplemental irrigation during the summer. In the arid zones, conversely, the presence of irrigation systems is crucial.

It is anticipated that global warming will lead to an increase of atmospheric temperatures of unknown magnitude. Higher temperatures, in turn, may result in the increase of atmospheric moisture, as the capacity of the air to take up water increases, which will ultimately result in more frequent precipitation events. Although not confirmed by all existing predictions of climate change in Argentina, it is likely that global warming will cause an increase in rainfall in the humid areas of the country. Desert areas could, conversely, become drier, an event that in relative terms would result in less serious conditions.

Statistical analyses have shown that streamflow values in the *Paraná/Paraguay* basin have increased in the last third of the 1900s, relative to values recorded during the first two thirds of the century. Local precipitation rates have also noticeably increased during the same period. The combined effects of these two phenomena have led to flooding and inundations of particular severity. Records show that, in the case of the *Paraná* river for example, there have been 16 flooding events (in excess of 30,000 m<sup>3</sup>/s) from the years 1904 to 2000. Of those 16 events, seven have occurred in the past 20 years and 3 in the last 10 years. In the case of the *Uruguay* river, 17 flooding events (over 24,000 m<sup>3</sup>/s) have taken place during the period of 1898 to 1998, six of which have occurred in the past 10 years. From 1940 to 2000 the *Bermejo* river has undergone 20 flooding events, 10 in the last 20 years and four in the past 10 years.

The cause of these events is not known with certainty, although various explanations have been provided. Climate change has been suggested as a possible reason for the increasing rainfall in the region, although no concrete evidence has been yet presented that supports that claim. On the other hand, *El Niño/La Niña* Southern Oscillation (ENSO) events, which have become more frequent and more intense over the last decade, have also been associated with increasing precipitation and drastic climatic events. The relationship between the occurrence of *El Niño* and changes in precipitation patterns and streamflows, in different regions of South America, has not been entirely formulated. Nonetheless, it has been noted, for example, that during the years of *El Niño* precipitation in the *Pampa Húmeda* increases. The same trend has been observed in years of no *Niño* however, and therefore the link is not direct. During the years of *La Niña* on the contrary, the streamflow of the *Bermejo* river tends to increase.

### B. Objectives

- Assessment of the historical climatic trends of the region
- Assessment of hydrological characteristics in the region and of their possible response to changing climatic conditions

- Development of strategies to protect natural resources against the detrimental effects of climate change
- Evaluation of human settlement and land management practices and their impact of the region's ability to adapt to the effects of climate change
- To assess socio-economic impacts of climate change on the *Litoral-Mesopotamia*

### C. Activities

1. Collect historic records of precipitation on the drainage basins of the rivers *Paraná, Uruguay, Paraguay, Bermejo, Pilcomayo, and Salado*. These records should focus on events of uncharacteristic intensity. Identify changes in rainfall trends
2. Collect historic temperature records in the region
3. Gather information concerning historic records of streamflow in these rivers
4. Map historic phreatic surface elevations in the area
5. Develop database of flooding events in the drainage basins in question. Investigate trends in flooding frequency, as well as possible correlations with streamflows and precipitation events
6. Estimate costs of flooding events
7. Catalog occurrence of ENSO-associated events, and when possible, correlate with instances of flooding
8. Map historic population settlements in floodplains and river banks
9. Evaluate the effect of infrastructure works (*i.e.* roads, highways, dams) on drainage characteristics in the area
10. Identify historic changes in land management practices (*i.e.* changes in crops or cultivation techniques)
11. Map deforestation practices in the basins of the rivers in question
12. Map the occurrence of desertification in the area. Identify areas of high erosion potential
13. Identify existing irrigation networks as well as drainage infrastructure. Determine whether there have been changes in irrigation frequency and/or intensity
14. Evaluate vulnerability of the water resources in the *Litoral-Mesopotamia* by incorporating climate predictions from Global Circulation Models to existing hydrodynamic models of surface runoff and streamflow dynamics
15. Evaluate possible mitigation and adaptation measures that can be taken to reduce the impacts of flooding
16. Assess magnitude of disruption of the area's economic productivity as a result of flooding events

### D. Expected Outputs

1. Historic perspective on the trends of the changing climate in the region
2. Evaluation of the relative influence of global warming, ENSO, and human action on documented flooding events
3. Maps of areas of risk of flooding and desertification (based on empirical data)
4. Assessment of the need for reforestation in specific areas
5. Assessment of the effectiveness of irrigation and drainage practices in the region and of the need to regulate these practices (*i.e.* to reduce soil salinization)
6. Regional vulnerability assessments based on hydrological model predictions
7. Evaluation of effectiveness of additional drainage control infrastructure works
8. Evaluation of the need to control population settlements such that they do not take place in areas of high flooding risk
9. Assessment of effectiveness of potential mitigation and adaptation measures
10. Evaluation of social and economic impacts of climate change on the *Litoral-Mesopotamia*

## VULNERABILITY OF THE PATAGONIA PRELIMINARY TERMS OF REFERENCE

### A. Background

The *Patagonia* covers an extensive area, approximately equal to one third of the total area of the country, and encompasses the five southernmost provinces. It is located in the arid region of Argentina, where the combined effects of climate and poor land management practices have caused extensive desertification. The impacts of climate change on the region are likely to be severe and include: a) erosion from increasing rainfall in the lowlands; and b) disruptions to recharge patterns of regional groundwater aquifers, caused by effect decreasing precipitation and increasing temperature at the areas' glaciers.

The *Patagonia* covers an extensive area (in the order of 750,000 km<sup>2</sup>), approximately one third of the total area of Argentina, encompassing the provinces of *Nuquén*, *Río Negro*, *Chubut*, *Santa Cruz* and *Tierra del Fuego*. Population density in the region is low and primarily concentrated in urban developments. The region is limited on the west by the *Andes* and on the east by the Atlantic Ocean, and this topographic variability leads to drastic climatic and ecological contrasts.

The low areas can be described as arid or semi-arid, where annual precipitation values range from 100 to 300 mm. Westerly winds of intensities ranging from moderate to strong are present throughout the year. Soils predominantly consist of loose deposits with scarce vegetation cover. Increasing trends in annual precipitation during the past 100 years have been observed in stations at the *Rio Colorado*, *Neuquén*, and *Paso de los Indios*, all located in northern *Patagonia*, but stations in southern *Patagonia* show no obvious change.

Large cattle factories began settling in the region towards the end of the XIX century and have maintained extensive raising practices, particularly ovine. This has become the dominant economic activity, practiced intensively to this date, in an unsustainable manner. Sheep have grazed for years on the natural pastures, further reducing surface cover and contributing to more pronounced erosion.

The high areas of the *Patagonia* are located in the *Andes*, one of the primary locations of the glaciers of Latin America. It has been predicted that increasing temperatures in high mountain regions could lead to the disappearance of significant snow and ice surfaces. In fact, there is now scientific evidence that glaciers in Latin America have receded dramatically in the past decades (IPCC, 2001). Although the reasons for the melting of the glaciers is still debatable, in 18 glaciers of the Peruvian Andes, mass balances since 1968 and satellite images show a reduction of more than 20% of the glacial surface. Significant reductions of glaciers have also occurred in southern Chile and Argentina, specifically at the *Sarmiento* glacier.

On a smaller scale, snowfall rates may also be affected by changes in atmospheric circulation resulting from the ENSO phenomenon, as well as by increasing temperatures. Snow accumulates at high elevations and melts during the summer, becoming the main source of surface and underground runoff in the lowlands.

### B. Objectives

- To identify and evaluate potential impacts of climate change on the *Patagonia*
- To propose mitigation actions and measures to reduce the vulnerability of the region to the impacts of climate change
- To estimate the effect of current land and water management practices on the sustainability of the region's resources
- To evaluate the socio-economic impacts of climate change on the *Patagonia* its potential for development

**C. Activities**

1. Evaluate historic temperature records of the *Patagonia* and identify warming trends. In particular, document temperature changes at the location of the glaciers
2. Review available historic precipitation data in the *Patagonia* and identify:
  - (a) Variations in frequency and magnitude of rainfall and snowfall
  - (b) Spatial distribution of rainfall and snowfall
  - (c) Impacts to streamflows of rivers in the region
  - (d) Impacts on glaciers
  - (e) Impacts on groundwater recharge
  - (f) Locations of increasing erosion
3. Document occurrences of flooding in the region
4. Estimate costs of flooding events
5. Evaluate recorded changes in the size of glaciers and observed impact on the streamflow of local rivers
6. Assess the condition of groundwater resources in the *Patagonia*, particularly in the vicinity of urban settings
7. Map historic human settlements on the *Patagonian* river valleys
8. Document the extent of irrigation practices in the region
9. Evaluate water requirements of cultivated crops
10. Evaluate the current use of agrochemicals in the region
11. Study the impacts of increasing livestock grazing on soil and drainage characteristics
12. Evaluate variations of the rate of desertification in the past decades and assess current extent of degradation
13. Assess the sediment load of rivers in the region and its impacts on water supply
14. Evaluate water quality in urban settings
15. Estimate losses in area's economic productivity due to changes in climate and the resulting effects
16. Assess impacts of climate change on tourism. Estimate losses from decreasing number of tourists

**D. Expected outputs**

1. Evaluation of the adequacy of water resources in the *Patagonia* under current conditions, and under projected scenarios of climate change
2. Specific evaluation on the hydrological impact of glacial meltdown and evaluate adaptation measures
3. Proposal for water resource management procedures in order to diminish the vulnerability of the region to climate change.
4. Assessment of soil degradation potential of the region and of vulnerability to a likely increase in precipitation
5. Evaluation of sustainability of current land use and land management practices
6. General assessment of socio-economic development potential of the area
7. Development of regional plan to adapt for changing climate conditions and to mitigate their resulting impacts on the provinces

## OVERALL SOCIO-ECONOMIC IMPACTS OF CLIMATE CHANGE PRELIMINARY TERMS OF REFERENCE

### A. Objectives

- To compile results from existing vulnerability studies in order to determine the social and economic impacts of climate change.
- To determine range of economically feasible options available to adapt to projected climate changes.

### B. Activities

1. Collect results from vulnerability studies conducted for the First and Second National Communication, including those for the *Gran Buenos Aires, Pampa Húmeda, Litoral-Mesopotamia, Patagonia*, coastlines, and the *Oasis*
2. Establish environmental and emissions baselines
3. Determine key stakeholders and institutional presence in the different areas considered
4. Assess existing policies for mitigation and/or adaptation
5. Choose critical future emissions scenario and estimate the extent of regional impacts to projected climatic conditions
6. Estimate the costs of projected damages on the different regions and at the national level
7. Assess the costs of regional losses of economic productivity as a result of resource degradation
8. Estimate potential costs of various alternatives that can be implemented to mitigate damages
9. Assess the social impact of projected measures, in the region and on the country
10. Compile all costs expressed in terms of GDP and prioritize regions as function of total economic impact on the country
11. Determine opportunity costs from not adapting to climate change
12. Compare adaptation costs to mitigation costs

### C. Expected outputs

1. Assessment of regional and national social vulnerability to climate changes
2. Evaluation of costs of damages that could be caused by climate change
3. Assessment of projected costs of mitigation and adaptation policies
4. Evaluation of adaptive capacity in Argentina to the various impacts of climate change
5. Identification of areas where adaptation and mitigation initiatives are lacking
6. Comparative analysis of mitigation and adaptation costs, and analysis of implications for the Argentine economy

## VULNERABILITY OF THE ENERGY SYSTEM AND ENERGY INFRASTRUCTURE PRELIMINARY TERMS OF REFERENCE

### A. BACKGROUND

The supply and the demand of energy in Argentina primarily revolve around natural gas and derivatives from petroleum. Climate change is not likely to significantly affect the exploitation of these natural resources, but could have a major impact on the hydroelectric generating capacity, the largest contributor to electricity generation in the country. Impacts to the hydroelectric capacity are likely to affect the entire energy sector since other resources will need to be used to compensate for changes in electricity supply.

### B. Objectives

- To assess the impacts of climate change on supply and demand of energy in Argentina
- To determine the need for increasing the country's energy infrastructure
- To evaluate possible market for alternate sources of energy and energy efficiency programs

### C. Activities

1. Review inventory of hydroelectric facilities in operation around the country and determine current capacities
2. Make projections of energy demand, by province, under varying climate scenarios. Use historic trends of demand to predict customer response to increase/decrease in temperatures. Separate consumption projections of residential and industrial sectors
3. Evaluate potential impacts of climate change on electric generating capacity. Use different climate change scenarios to determine the effect of precipitation patterns on electric generating capacity
4. Determine the need to increase electric distribution and transmission lines to meet electricity demand in areas of shortage. Evaluate costs of providing additional infrastructure
5. Evaluate the adequacy of the energy generation capacity of the country to meet demand, given the affected electric generation capacity and the increase in consumption
6. Determine the costs of altering current schemes of energy distribution
7. Map zones where energy supply may be insufficient
8. Evaluate the increase in GHG emissions from use of alternate sources of energy
9. Determine the need to increase the coverage of gas pipelines. Estimate related costs
10. Determine the stress imposed on oil and natural gas reserves from additional consumption
11. Assess the need to import oil and natural gas. Estimate costs
12. Evaluate the possibility of increasing energy supply from underutilized sources
13. Determine the need to build additional hydroelectric plants and the associated costs
14. Propose regional adaptation measures to reduce the stress on the energy system. Consider regional acceptance to energy conservation initiatives, renewable energy sources, etc.

### D. Expected outputs

1. Evaluation of energy consumption trends around the country under varying climate scenarios
2. Determination of regional and national vulnerability of energy system to climate change
3. Assessment of the environmental impacts of the increase in GHG emissions as hydro power is substituted
4. Determination of national energy infrastructure needs and costs
5. Identification of regions where mitigation strategies would most effective and estimation of expected costs of those measures

## **NATIONAL ADAPTATION PROGRAMS AND REGIONAL ADAPTATION PLANS PRELIMINARY TERMS OR REFERENCE**

### **A. Objectives**

- To develop an Adaptation Policy Framework for the preparation of adaptation strategies and policies against climate change
- To identify adaptation strategies in line with planned policy interventions

### **B. Activities**

1. Compile all of the proposed mitigation and adaptation strategies that were developed as a result of vulnerability studies
2. Determine if magnitude of impacts should be addressed from a regional or from a national perspective
3. Determine range of possible actions that can be taken to address each adaptation initiative
4. Assess financial and social costs of various alternatives
5. Review objectives of regional and national development plans and identify compatibilities with adaptation strategies
6. Define policies that integrate adaptation initiatives into development plans
7. Identify institutional framework to implement adaptation policies at the regional and national levels
8. Evaluate regulatory framework for the implementation of regional and national adaptation policies
9. Assess resource allocation mechanisms to finance adaptation measures

### **C. Expected outputs**

1. Portfolio of adaptation strategies to the impacts of climate change that can be incorporated in national and regional development plan
2. Adaptation strategies to climate change impacts that are compatible with Argentine sustainable development goals

## ESTIMATES OF REGIONAL CLIMATE CHANGE SCENARIOS THROUGH REGIONAL CLIMATE MODELS PRELIMINARY TERMS OF REFERENCE

### A. Background

In 2001, the Intergovernmental Panel for Climate Change (IPCC) published a report in which the sensitivity, adaptive capacity, and vulnerability of environmental and human systems to climate change, as well as the potential consequences of climate change were evaluated. Predictions presented in the report are primarily based on results from General Circulation Models (GCM). GCM have been widely used to predict the effect that varying concentrations of GHG in the atmosphere would have on the global climate. Several of these models currently exist, based on different assumptions and representations of climate systems. Since GCM simulate *large-scale* climatic features, all these models yield comparable results, on a global basis (IPCC, 2001). However, results from separate GCM models are considerably different when they are used for predictions of regional climatic patterns.

Since 1987, the *Centro de Investigaciones del Mar y la Atmósfera* (CIMA) has been using regional models to study the response of meteorological systems in South America and in the Antarctic Peninsula to global climate change. Recent pilot studies have been conducted to model the South American climate, using a technique developed at CIMA, based on the simultaneous use of a regional model and a global model of variable resolution. These studies were based on a regional model developed by LAHM/CIMA nested in a global model by LMDZ and lead to satisfactory results.

In order to improve the quality of the results obtained, a new system has been developed, which consists of the nesting of a new regional model (the most recent version of the Fifth-Generation Penn State/NCAR Mesoscale Model, MM5 version 3.4) in a more recent general circulation model (LMDZ version 3.2). A zooming feature was applied to the latter model, centred on 30°S-latitude and 60°W-longitude, which makes it possible to incorporate greater details over the region. Both models are equipped with greater horizontal and vertical resolution.

The models that will be used to for the simulations were developed at the *Centro de Investigaciones del Mar y la Atmósfera* (CIMA / CONICET / UBA) and the *Centro Nacional Patagónico* (CENPAT / CONICET). CIMA is currently running an Atmosphere General Circulation Model (AGCM) coupled to an ocean model developed at IPSL, France, as well as a regional high-resolution model MM5 developed at the National Center for Atmospheric Research (NCAR), USA. CENPAT is running the coupled AGCM MARK 4 developed at CSIRO, Australia, and the regional high-resolution ETA model from NCEP, USA.

Additionally, CIMA also has results from simulations from 1860-2000, which were performed using a coupled ocean-atmosphere model from the IPSL that also incorporates a carbon-model. Simulations were forced with historic CO<sub>2</sub> concentrations up to 1995 and a SRES A2 IPCC-scenario from 1996. Two time periods will be specifically targeted, namely that representative of the actual climate (+/- 10 years around 1990) and that of a future climate (+/- 10 years around 2090). Results from climate simulations using the IPSL model are currently being analysed with positive preliminary results. The model captures, for example, regional details such as the warming at the western Arctic Peninsula, which other models are typically not able to capture.

The next stage of research involves the use of a downscaling technique in order to obtain regional results. This technique implies the preparation of initial forcing conditions for the LMDZ and MM5 model based on information already obtained from long-term simulations using the global IPSL model. It is expected that results of simulations of regional climate change will be available within the next 10-14 months.

### B. Objectives

- To contribute to the climate modeling efforts being carried out in Argentina
- To obtain future, regional predictions of climate that can be used as reference for the development of regional and national climate change mitigation strategies

**C. Activities**

1. Establish, with the participation of relevant members of the Steering Committee, the most adequate set of emission scenarios to be used in the simulations that will be carried out as part of this project. The goal will be to establish those scenarios that lead to the most useful and critical conditions for the development of mitigation and adaptation strategies
2. Establish, with the participation of relevant members of the Steering Committee, the most adequate time frames for running simulations
3. Target simulations to regions found to be the most vulnerable to climate change by the vulnerability studies conducted
4. Conduct simulations to assess likely temperature and precipitation changes in the region
5. Conduct simulations to evaluate the importance of changes in ocean level around regional coastlines
6. Compile results in a manner that they can be used in the development of mitigation or adaptation plans, namely through maps of risk and probability grids
7. Provide indications regarding uncertainty of predictions
8. Final report must contain an expert analysis and a discussion of the results obtained, which outlines the most critical findings
9. Make results of climate simulations available for input of regional hydrological models

**D. Expected outputs**

1. Increased national knowledge and expertise in the generation and use of climate simulations
2. Updated knowledge on probably of climate change impacts in Argentina
3. Results from regional climate simulations that can be used in the development of climate-change related mitigation strategies
4. Climatic input parameters for hydraulic models

**NATIONAL MITIGATION PROGRAM  
EMISSION MITIGATION THROUGH ENERGY EFFICIENCY MEASURES PROGRAMS  
PRELIMINARY TERMS OF REFERENCE**

**A. Background**

The energy sector is the largest emitter of GHG in Argentina, in spite of the country's long trajectory using clean energy sources. Significant reductions to the amount of GHG emissions can be achieved by increasing the efficiency of energy consumption. To that effect, government measures to promote the Rational Use of Energy (URE) were first introduced, by law, during the 1985-89 period. The program included four objectives, namely: 1) energy conservation; 2) use of alternative fuels; 3) assessment, development and use of new energy sources; and 4) development of financial options that would encourage efficiency. However, the impact of the initial phase of URE was limited, largely due to economic turmoil in the Region at the end of the 1980s, and to the short duration of the programs, which were not sufficiently long to accomplish significant changes in the patterns of energy use.

In 1992, drastic reforms of the energy sector were implemented, primarily focused towards privatization and the deregulation of energy markets. Energy efficiency measures were not amongst the priorities of the reforms. A National Office for the Rational Use of Energy was nonetheless part of the organizational structure of the Secretary of Energy, with functions essentially limited to demonstration projects. Some of the measures promoted by the URE included: 1) for the industrial sector, significant energy savings were estimated from: (a) initiatives of co-generation of electricity and heat; and (b) programs for energy-efficient drying of seeds and crops; 2) for the public and commercial sector, major savings were estimated from: (a) programs of efficient street lighting; (b) energy saving initiatives in public and commercial buildings; (c) energy efficient heating systems in public buildings; and (d) co-generation in hospitals, public buildings, schools, etc; 3) for the residential sector, savings from programs related to: (a) efficient lighting; (b) efficient appliances (*i.e.* refrigerators); (c) energy-saving heating systems. In spite of the fact that these measures presented tremendous saving potentials, they were not supported by policy measures and consequently were not effective at promoting energy savings by either the supply or the demand side. It is therefore not surprising that despite its long history, the impact of URE in terms of energy efficiency and energy conservation has not been significant.

Estimates of potential energy savings for Argentina reach values greater than 25% of the total national energy consumption. It is therefore clear that a NMP for GHG emissions must include mitigation measures for the energy sector. However, several obstacles are currently in place that difficult the effectiveness of these measures. Significant barriers to energy efficiency, for instance, are imposed by the structure of the energy sector itself, and due to: (a) the price of energy – low efficiencies in the consumption of energy are partly a reaction to its low price. Since the establishment of the reforms tariffs for residential users are low, a factor that does little to deter energy waste. On the other hand, large energy users (*i.e.* consumption greater than 2 MW) benefit from low prices by directly obtaining energy from generators at the MEM; (b) excess generating capacity – generators have been encouraged to develop thermal facilities in an effort to use more efficient equipment. Given the low price of natural gas, there is currently an excess of generating capacity, which discourages energy savings and further contributes to the drop in prices; and (c) no incentives to distributors to promote energy conservation given that they are independent from the generation and the transmission segments and that larger users deal directly with generators; (d) shared economic responsibilities – in many cases, decisions regarding the purchase or the installation of energy efficient systems are not those who benefit from energy savings. Builders for example, will not pay operating costs from less efficient systems; (e) difficulties in procuring low rates of financing are one of the major difficulties of energy efficient systems; and (f) limited supply of energy efficient services – given all of the barriers mentioned, the number of services offered is very limited, reinforcing the difficulties.

Additional obstacles to the development of energy efficient systems in Argentina include: 1) institutional barriers, which are related to the absence of regulatory and financial frameworks where energy

conservation can be promoted; 2) economic barriers, related to the difficulties associated with making uncertain investments in a volatile economic climate; 3) technological barriers, due to limited access to modern technologies that allow energy savings; and 4) educational barriers, caused by the lack of public awareness concerning the costs and the benefits of energy efficient systems.

Having reviewed the difficulties that exist to the development of energy efficient systems and to the promotion of energy saving programs, the NMP must introduce initiatives that specifically address some of these barriers. Several of the initiatives that have been used around the world in similar situations consist of: a) encouraging energy savings by adopting pricing schemes that reward efficiency and by imposing taxes on energy consumption; b) introducing Energy Services Companies (ESCOs), firms whose services consist of developing energy efficiency programs for their clients and get compensated as a function of the actual savings they help achieve; c) raising awareness amongst consumers about the costs and benefits of saving energy by providing, for instance, labels on appliances that provide information about energy efficiency; d) establishing minimum standards for efficiency of appliances, construction codes and materials, buildings, etc; e) encouraging the creation of agencies, public and private, that promote the efficient use of energy; f) promoting voluntary participation of the various sectors in programs of energy efficiency

The NMP must therefore aim at reducing emissions from the energy system by promoting energy conservation through programs that promote efficiency and regulation to support those programs.

## **B. Objectives**

1. To contribute to the development of portfolio of energy efficiency measures that can be implemented as part of emission mitigation strategies
2. To evaluate the applicability of EEM measures to the Argentine energy system
3. To assess the need for government support of EEM initiatives
4. To identify programs that can be implemented through the CDM

## **C. Activities**

1. Review results and recommendations of studies aimed at promoting energy efficiency in Argentina. Include, among others, analysis of results of NSS, IADB, GT, and EU-funded initiatives
2. Review of current energy pricing schemes at the national level
3. Identification of energy-saving measures at the demand side. These will include, among others: (i) for the residential sector, efficient lighting and appliances; (ii) for the public and commercial sectors, efficient public lighting, efficient heating and lighting in public buildings, and energy consumption programs; and (iii) for the industrial sector, co-generation and self-generation programs. Perform cost-benefit analysis of alternatives
4. Gather information on the performance of former and of on-going energy efficiency measures. Evaluate the performance and the difficulties of programs implemented in other countries
5. Estimate number of users of energy-saving measures and awareness of consumers nationwide to the existence of these measures
6. Review of current level of government intervention on energy efficiency programs. Review must consider aspects such as: (i) existing laws and regulations that promote the role of energy efficiency in the economic structure; and (ii) policies to promote energy conservation
7. Design the implementation of supporting measures for ESCO development including: i) commercial tools (*i.e.* performance contracts, verification protocols, and dissemination of best practices, case studies and technical guidelines); and ii) project financing mechanism
8. Design aggressive information campaign, to be endorsed by the government, which will convey the importance of energy conservation and will promote energy efficiency programs
9. Design program for *standards* and *labeling* of appliances, equipment, and building envelopes that clearly identify energy-efficient products
10. Design nationwide government policy that requires mandatory reductions of energy consumption in all public facilities. Policy could include, for instance, requirements for: (i) use of energy

efficient materials for all new construction; (ii) design of co-generation/self-generation installations for all new, large public buildings; and (iii) exclusive use of energy efficient lighting, appliances, A/C, heating systems, etc.

11. Identify environmentally conscious cities or communities where pilot programs can be implemented. Focus on evaluating the effectiveness of government action (*i.e.* regulatory intervention) on the success of energy efficiency/conservation initiatives
12. Evaluate the possibility of instituting a system of government-sponsored incentives to persuade consumers to use energy efficiency/conservation initiatives
13. Provide government incentives to self-generation and co-generation initiatives
14. Provide cost effectiveness analysis of consumer-targeted campaigns and government-targeted campaigns that promote energy conservation
15. Evaluate the potential implementation of the programs considered by the CDM

**D. Expected outputs**

1. Evaluation of the efficiency of current energy conservation initiatives
2. Alternatives for projects that stimulate energy conservation
3. Strategies for government intervention in order to promote energy efficiency and conservation
4. Identification of energy efficient initiatives that may be implemented through the CDM

**NATIONAL MITIGATION PLAN**  
**EMISSION MITIGATION IN THE TRANSPORTATION SECTOR**  
**PRELIMINARY TERMS OF REFERENCE**

**A. Background**

The contribution of the transportation sector to the GHG emission balance in Argentina is considerable, making it an important factor in any emission reduction strategy or climate change mitigation plan. Well-known measures to reduce transportation emissions essentially address two issues, namely a reduction of travel demand or an increase in travel efficiency. The latter consists of a variety of measures including improving infrastructure, introducing more efficient technologies or implementing government regulations. The optimal strategy for emissions reduction in a given city will likely encompass a combination of measures that need to be adapted to the characteristics of the city and its demographics.

Current emission mitigation scenarios for Argentina include proposals for improving or increasing the transportation infrastructure. It is typically assumed that by increasing road capacity there is a relief in congestion and thus in the level of emissions, given that vehicles that were previously confined to inefficient stop-an-go patterns can travel at higher, more efficient speeds. Mitigation scenarios for Argentina include, among others, the following measures: 1) construction of highways and beltways in larger cities; and 2) construction of suburban highways in Greater Mendoza, Greater *Tucumán*, Greater *Bahía Blanca*, and Greater *Mar del Plata* between the years 2010 and 2020. However, traffic studies in large urban developments have repeatedly shown that independently of the levels of initial road congestion and those of final road capacity, both emissions and congestion ultimately rise and become higher than those that existed initially. Travelers will, for example, be willing to travel greater distances since time of travel remains the same, until congestion levels rise again. Greater capacity generates greater levels of traffic, which eventually leads to higher levels of emissions. It is therefore important that mitigation scenarios address complimentary alternatives to infrastructure development, which address changes in mobility patterns of the population.

Mitigation scenarios for Argentina, for instance, may include other types of measures aimed at changing transportation patterns at reducing the demand for traveling and at increasing travel efficiency, such as the introduction of zoning regulations. These new zoning laws establish administrative activities inside the cities while industrial activities are confined to the periphery, thus reducing traffic flow towards the most densely populated areas. Other measures that reduce travel demand and increase travel efficiency that could be implemented are, for instance: (i) promoting shifts in modes of travel from automobiles to public transportation; (ii) promoting emission-free modes of transportation (*i.e.* bicycles); (iii) instituting road pricing programs, which charge drivers for the use of particularly congested roads during peak hours; (iv) promoting *travel blending* initiatives, which consist of programs aimed at reducing private car use by modifying travel behavior; (v) establishing location-efficient mortgages, which present adaptable interest rates that account for lower transportation costs; (vi) implementing location-dependent development costs, which are charges imposed on developers to cover municipal costs of water and sewer lines, for instance; (vii) encouraging substitutions of communications for traveling, by investing in communication infrastructure or providing incentives to corporations; and (viii) adjusting automobile insurance policies according to average distances traveled.

A reduction of emissions can also be achieved by improving vehicle efficiency. Technological advances over the last three decades, for instance, have considerably increased the efficiency of automobiles. However, consumer preferences are not always in line with environmental concerns, and more institutionalized measures need to be implemented. In such cases, vehicle efficiency can be either regulated through government standards, or through incentives related to the vehicle or the fuel. Examples of measures that can be implemented to increase vehicular efficiency are: (i) programs that eliminate old, inefficient and polluting cars; (ii) system of taxes on the sale of inefficient vehicles; (iii) programs that charge taxes on vehicle fuels; (iv) fuel conversion programs, a measure that has already

been implemented in Argentina, where approximately 12% of private automobiles and 47% of the taxis have converted from gas to compressed natural gas (CNG).

## B. Objectives

- To update GHG emission figures from the transportation sector
- To analyze the impact of the current economic crisis on emissions from the transportation sector
- To assess the extent of emission mitigation practices around the country
- To identify locations for potential implementation of emission mitigation programs

## C. Activities

1. Review results of two NSS and other relevant studies on emission reductions from the transportation sector
2. Update emission figures from the transportation sector and analyze recent trends
3. Calculate emissions per passenger-km for private and public passenger transportation systems and emissions per ton-km for all modes of freight transport systems, in urban areas and on interurban links in Argentina
4. Evaluate impacts of the current economic crisis on emissions from the transportation sector. Include, among others, an analysis of the following: (i) shifts in transportation patterns from private to public or to non-motorized transportation means and the resulting potential decrease in emissions; (ii) increase in the use of old, polluting vehicles for public transportation as sources of income for unemployed sector and the resulting increase in emissions; and (iii) decrease in emissions in inter-city and urban travel, as travel demand dropped
5. Evaluation of transportation trends in the largest cities of Argentina and analysis of mitigation potential from vehicular transportation. Identify:
  - a. Relative use of public and private transportation systems in the biggest cities and on major interurban links
  - b. Existing programs to improve fuel efficiency, including among others: (i) elimination of old, inefficient, and polluting vehicles; (ii) taxation of inefficient vehicles; (iii) taxation of fuel; and (iv) fuel conversion. Perform cost-benefit analysis of existing programs and their success in achieving reductions of fuel consumption
  - c. Existing programs that promote the use of cleaner technologies, such as: (i) cleaner fuels and fuel mixes; (ii) more efficient vehicles, through improvements in engines and propulsion devices; (iii) electric vehicles; and (iv) inspection and maintenance programs with specific emphasis on fuel efficiency. Analyze cost-benefits results of existing initiatives
  - d. Evaluation of measures to reduce GHG emissions, including among others: (i) promoting shifts from private to public transportation; (ii) promoting the use of low-emission vehicles; (iii) instituting road pricing initiatives; (iv) establishment of zoning laws; (v) location-depending development costs; and (vi) location-efficient mortgages. Perform cost-benefit analysis of impacts on GHG emissions of various alternatives
  - e. Identify cities where emission reduction programs may be instituted. Use as example initiatives put in place in other cities of Latin America such as Santiago de Chile, Quito, Curitiba, and Bogotá
6. Compare impact of current emission mitigation programs with existing model predictions of impacts from these programs
7. Quantification of the impact of last decade's infrastructure improvements, especially on roads, on: (i) travel demand; and (ii) GHG emissions
8. Perform cost benefit analysis of impacts on emissions from infrastructure investments (*i.e.* highways such as *Acceso-Norte* in *Buenos Aires*) and from investments on trains, subway lines and buses
9. Perform cost-benefit analysis of a higher public transportation use versus an increase in the use of cleaner technologies in the largest cities of Argentina. Compare, for example, the

- costs, the impacts on GHG emissions, and the feasibility of: (i) small modal shift from private vehicles to public transport; (ii) moderate increase in the average capacity of public transportation vehicles, assuming an unchanged total capacity of the system; and (iii) a shift to cleaner technologies
10. Assess the emission mitigation potential from inter-city passenger transportation. Evaluate factors such as: (i) existence of fuel-efficiency initiatives; (ii) programs to maintain vehicles and eliminate polluting vehicles; and (iii) existence of clean-technology programs
  11. Evaluation of GHG emission mitigation potential from freight transportation around the country. Analyze, among others, the following:
    - a. Existing measures to increase fuel efficiency of truck transportation, including for example: (i) maximum weight requirements; and (ii) technical specifications on trucks.
    - b. Perform cost-benefit analysis and evaluate the impact on GHG emissions from modal shifts from trucks to navigation and railroad. Assess the feasibility of such changes
    - c. Investigate the impact and the feasibility of policies aimed at promoting efficiency in freight transport between member countries of MERCOSUR
  12. Evaluation of GHG emission mitigation potential in air transport by introducing measures such as tradable emissions credits

**D. Expected outcomes**

1. Update of GHG emissions figures from all segments of the transportation sector
2. Evaluation of the impact of the economic crisis on emissions from the transportation sector
3. Assessment of extent of regional and national emission mitigation strategies in the transportation sector
4. Evaluation of the impact of recent infrastructure developments on GHG emissions
5. Cost-benefit analysis and feasibility studies of various types of emission reduction initiatives (*i.e.* modal shifts versus technological improvements) in all segments of the transportation sector
6. Proposal of candidate cities where emission mitigation strategies may be implemented and outlines of mitigation strategies

**E. Suggested references**

1. Saving Oil and Reducing CO<sub>2</sub> emissions in Transport – Options & Strategies (2001), International Energy Agency (IEA)
2. Policy Improvements for Achieving Environmental Sustainability in Transport (2002), Organization for Economic Co-operation and Development (OECD)

**NATIONAL MITIGATION PROGRAM  
EMISSION MITIGATION THROUGH RENEWABLE ENERGY DEVELOPMENT  
PRELIMINARY TERMS OF REFERENCE**

**A. Background**

The generation of renewable energy has a large potential in Argentina. Several commercially proven technologies are available to make use of existing resources. The following technologies are particularly promising:

a) *Small scale hydropower* – following the same principles as traditional hydro electric facilities, small-scale hydro is a cost-effective and reliable alternative for electricity supply to local and regional grids. The environmental and social impacts of a small-scale facility are significantly smaller than those of a large-scale project. Argentina's hydropower resources are extensive, with estimates of installed capacity reaching 44,500 MW. However, the vast majority of water-related power projects involve large-scale hydro power facilities. In 1995, a total capacity of 9,800 MW was installed in large-scale systems, while only 40 MW of small-scale capacity existed.

b) *Solar energy* – photovoltaic (PV) cells have been used for years to collect solar energy and convert it to electricity. Uses for this technology are considerable, ranging from residential kilowatt systems to megawatt plants. Although the costs of PV technologies have limited the competitiveness of solar power generation, prices have been steadily decreasing. PV can currently be used to strengthen local electricity grids as part of distributed generation programs. Solar power resources are substantial in Argentina, particularly north of the *Limay-Rio Negro* rivers. Large sections of the north west part of the country receive solar inputs comparable to those in the southwestern U.S., where solar power generating facilities have been developed. Total installed capacity in Argentina 1999 was estimated around 1 MW, where maximum estimates were in the order of 190 MW.

c) *Solar thermal power* – this technology is an alternative to the use of PV, in which instead of directly converting sunlight into electricity, solar heat is collected and supplied to a thermal engine that produces electricity.

d) *Wind power* – wind can be used to generate electricity on an intermittent basis. Wind turbines are designed to provide energy across variable ranges of wind speeds and to withstand storm conditions. Typical turbines have outputs of 600 kW. The technology is mature, widely used, and when situated at optimal locations, competitive with new coal-fired power stations.

Argentina has tremendous wind energy potential, concentrated primarily south of the *Limay-Rio Negro* rivers. Given the high wind speeds registered in most of the southern part of the country, and particularly in the *Patagonia*, the potential power generating capacity in Argentina is one of the largest in the world. It has been estimated that the province of *Santa Cruz* alone could support an installed capacity equivalent to that of the E.U. and the U.S. combined. In 1999, installed capacity was in the order of 3 MW, with planned investments of 6 MW.

e) *Biomass power* – agricultural and forest product wastes, as well as dedicated crops and fast growing trees represent potential sources of renewable energy. Commonly used sources of biomass include, among others, bagasse and alcohol from sugarcane, poultry litter, straw, and waste wood. Several technologies are currently available, including wood fueled boilers for heat or electricity production, dual-fuel plants, where biomass is used as a complement to fossil fuels in boilers, gasification processes, which convert biomass to a fuel gas that can be used as a substitute for fossil fuels, and more complex liquefaction processes to produce methanol and other liquid fuels.

Argentina already partially exploits its large biomass potential. Approximately 57% of the energy used by the pulp and paper industry, for example, is derived from biomass. Notwithstanding, enormous quantities of forestry, wood-working and other agro-industrial residues, which could be used as substitutes for fossil fuels, are instead burned in the open air or left to decompose without any energetic use.

f) *Biogas power* – decomposing waste (*i.e.* organic matter) generates methane as one of the by-products. This biogas can be collected, purified, and used as fuel input for power generation in all applications designed for natural gas. The technology is proven, readily available, and competitive when located in adequate sites. Engineered landfills are particularly attractive sites for biogas capture, although alternate sources are manure and sewage and industrial sludge ponds.

Biogas power generation is an attractive alternative in Argentina, particularly in the Buenos Aires metropolitan area, which concentrates the majority of the population and where the largest number of engineered municipal landfills is located.

g) *Geothermal power* – geothermal energy uses heat obtained below the earth's surface to generate electricity or thermal power through steam turbines. Normally geothermal power is associated with the exploitation of hot water and steam reservoirs. The costs of this technology are linked to the accuracy and effectiveness of resource exploration, and research is being conducted towards the improvement of these characteristics. The exploration of geothermal resources has recently begun in Argentina. One project exists in the *Neuquén* province, generating approximately 760 KW out of a total estimated installed capacity of 50 MW.

h) *Wood energy* – wood energy is a potential, although possibly not major source of renewable energy. Wood harvesting has not typically been an economically feasible alternative. With the present economic problems, however, it may have become a more affordable source of energy.

In spite of the considerable potential for RE generation in Argentina, most of the existing resources, with the exception of large-scale hydro-power, are under developed. Several obstacles contribute to their limited use, including: (i) mismatch between demand and supply locations - renewable resources are often located in distant locations, away from the centers of demand and not connected to transmission lines (*i.e.* *Patagonia* wind power); (ii) difficulties related to financing – large-scale investment in renewable energies require significant initial capital investments and due to the relative inexperience of the sector are considered investment risks. A traditional lack of availability of development capital in this sector has limited the number of investors. Small-scale renewable energy systems have been successful at providing services to localized users, as demonstrated by PAEPRA and PERMER projects; (iii) constrained demand – unless consumers use more than 2MwH/year or install renewable energy systems for on-site generation they do not have the choice of power suppliers and are therefore not able to opt for renewable sources.

However, the most significant obstacle to the development of the renewable energy sector and in the future role it may achieve in Argentina involves its relative position with respect to the electricity market. Indeed, renewable energy sources are currently at a competitive disadvantage in the liberalized electricity market, and incentives must be put in place in order to favor their development. The first major disadvantage of the renewable energy market exists at the transmission level. Power generators are, by law, restricted on the share of transmission facilities they may own. Transmission lines in Argentina are controlled by one national and six regional high-voltage companies. Generators have guaranteed access to the transmission grid, but the electricity is dispatched by CAMMESA to the grid, and ultimately delivered to distribution companies. The limited access to transmission lines in remote areas of the country with high renewable energy potential hinders the development of these alternative sources of energy. A second disadvantage concerns the pricing of electricity. Prices are determined by the interaction of supply and demand, and therefore strong incentives exist to become a low-cost producer. The large capital investments required by renewable energy projects increase production costs, therefore reducing their competitiveness. A third, and perhaps the largest disadvantage of renewable power systems involves the financing of power projects in a liberalized electricity market. In such a market, financing for projects becomes based on anticipated electricity sales, given that long-term power contracts become rare and therefore that customers become uncertain. As a result, financing is tied to more equity, less debt, and shorter repayment periods. These conditions favor large, traditional companies and leave renewable energy companies at a considerable disadvantage.

This component of the project will be used to evaluate the existing market for renewable energy and the feasibility of mechanisms that promote its use in Argentina. Examples of these mechanisms include: (a) grant-based, consisting in temporary subsidies to targeted, new technologies at the research, development, demonstration, or commercialization stage; (b) kilowatt-hour-based, which are also a subsidy that covers the cost difference between renewable and less costly options; (c) tax-based, which involve tax deductions and are also beneficial to companies near or at the commercial stage of development; (d) regulation-based, which include, among others: (i) requirement of utilities to purchase renewable energy generation at a fixed price over a long-term period; (ii) requirement that a certain percentage of annual electric use in a given jurisdiction comes from renewable energy; and (iii) regulations that electricity providers disclose fuel sources. Results from this study will serve as an initial diagnostic of the RE situation in the country, which can later be incorporated to the various components of the PERMER.

## **B. Objectives**

1. To evaluate market for RE in Argentina
2. To identify potential emission mitigations through the development of renewable energy projects that can be implemented through the CDM

## **C. Activities**

1. Review results and recommendations of studies aimed at promoting renewable energy in Argentina. Include, among others, analysis of results of NSS, PERMER, and EU-funded initiatives
2. Evaluation of coverage of energy supply around the country and identification of areas of inadequate coverage
3. Identification of renewable energy technologies applicable to those areas. Possible options include: (i) small hydro; (ii) solar; (iii) wind; (iv) biomass; and (v) geothermal
4. Assessment of suitability of technologies in terms of: (i) potential location of generating facility; (ii) capacity of generation; (iii) reliability of supply of energy source; and (iv) access to transmission and distribution grids
5. Identification of cost effectiveness of technologies as a function of: (i) initial capital investment; (ii) sale price of generated power; (iii) operating costs and maintenance; and (iv) cost of alternative sources of energy available in the market
6. Identification of potential sources of financing for technologies
7. Assessment of potential client base (*i.e.* local awareness to the benefits of the renewable energy source)
8. Assessment of existing local government support for the development of energy source (*i.e.* regulatory, fiscal)
9. Identification of parties around the country, interested in energy self-generation (*i.e.* pro-environmental communities, industry, etc.)
10. Identification of locations for pilot programs that could be used as demonstrations to raise awareness on the advantages of the use of renewable energy sources
11. Design a commercial demonstration program, supported by the appropriate incentives and regulations (*e.g.* PERMER), which would provide a central focus to the activities considered

## **D. Expected outputs**

1. Preliminary analysis of market for renewable energy in Argentina
2. Identification of potential renewable energy projects that can be implemented by the CDM
3. Assessment of the level of awareness of existing alternatives to traditional energy sources

**NATIONAL MITIGATION PROGRAM  
EMISSION MITIGATION THROUGH CARBON SEQUESTRATION OPTIONS  
PRELIMINARY TERMS OF REFERENCE**

**A. Background**

Mitigation measures to reduce atmospheric concentrations of GHG consist of measures that reduce future emissions, as those described in the previous initiatives of the NMP, and those that increase the capture of already existing GHG. Some land-use, land-use change and forestry activities (LULUCFs) reduce GHG emissions and qualify for the Clean Development Mechanism (CDM) activities under the provisions of the Kyoto Protocol.

The forestry sector can contribute to the reduction of atmospheric CO<sub>2</sub> in three major ways:

- (a) Maintaining existing sinks of GHG, which can be accomplished by: i) conservation measures that protect both young and mature forests (*i.e.* biomass stocks); and ii) programs geared at expanding plantations of fuel-wood, which protect native forests as they provide sources of energy;
- (b) Expanding sinks of GHG, done by: i) increasing the productivity of forests through technological improvements and forest management programs; ii) promoting afforestation programs that establish forest plantations in unutilized or abandoned lands for example; iii) restoring degraded forest ecosystems through programs of natural regeneration or reforestation; and iv) increasing the carbon storage capacity of soils by increasing agroforestry activities and leaving organic waste behind after harvesting (increases in organic matter of forested soils are added to total forest biomass);
- (c) Reducing sources of GHG emissions related to forestry, which involves the promotion of programs geared at reducing production of disposable forestry products. These initiatives may include, for instance, recycling programs for wood products.

Trees sequester carbon as they grow, such that the rate of growth of a tree is a function of the total amount of carbon absorbed. Therefore, for forests to be effective sinks of carbon, the growth of their trees must be continuous. Conversely, when forests are cleared, carbon is released by: i) trees that are cut or burned; and ii) forest soils that stored certain amounts of carbon during the lifetime of the trees.

There are two types of forests in Argentina, namely native forests and plantations. Two recent inventories of forests, commissioned by the *Secretaría de Ambiente y Desarrollo Sustentable* (SAyDS) and the *Secretaría de Agricultura, Ganadería, Pesca, y Alimentos* (SAGPyA) concluded that the area of native forests was 40 million hectares. Approximately 70% of the native forests of the country are located in the *Parque Chaqueño*. On the other hand, the area of plantation forest was estimated as approximately 780,000 hectares, of which 75% are located in the provinces of *Misiones*, *Corrientes*, and *Entre Ríos*, 13% are found in the province of *Buenos Aires*, and the remaining 12% are distributed among 10 other provinces. A high proportion of Argentine forests is privately owned, and no regular monitoring of their management is conducted.

Most of the forests under private ownership are utilized for logging and livestock grazing, with areas gradually being converted from forests to pastures. For the most part, logging in these forests takes place unmonitored. Natural forest management practices, which are based on selective logging and the sustainable maintenance of the forests, are not common in Argentina.

Projects involving LULUCF afforestation and reforestation activities qualify for CDM activities and are therefore an attractive option to consider as part of the NMP for Argentina. The CDM establishes that the generation of emission reductions suitable for trade requires the following steps:

- a) Assessment of a baseline – emission reductions are tradable provided they are in excess of those that would take place in the absence of the project. A baseline is thus defined as those emissions that would be generated without the project.
- b) Choice of a model - the potential of a carbon sequestration project must initially be evaluated by using a model that tracks the carbon stored by the forest. Models are used to forecast emission reductions and to identify the resulting carbon pools. They must, however, be supplemented by actual monitoring since they are not accepted as a verification of emission reductions.
- c) Monitoring and verification – emission reductions can only be traded after they have been accumulated, reviewed by an overseeing panel, and verified by an independent audit. Monitoring of all the pools generated by a project can be extremely costly, and therefore procedures have been developed to estimate the total reductions of a project based on a limited number of key carbon pools.
- d) Choice of accounting practice –different methods to account for emission reductions from forestry projects exist. When designing a LULUCF project care must be taken in establishing, from the start, the method of emission accounting.
- e) Estimates of leakage – emission leakage occurs when the emission reductions obtained by a project are later lost due to emissions generated directly or indirectly by the project, for example, by promoting the clearance of other forested areas. Leakage is of particular concern in countries where regulations on land use do not exist.

The potential for development of carbon sequestration projects in Argentina is high. Benefits from such projects are further increased by the possibility of entering emission credit markets. The NMP should therefore promote the implementation of these types of projects and provide guidelines and methodology for identifying potential sites and formulating the projects.

The *Native Forest and Protected Areas* (LN 3948 AR), in particular, is conducting the first national forest inventory, executing applied research and developing the regulatory framework for the conservation and improved management of native forests. The Bank is also working with the GOA in researching techniques, improving the regulatory framework and strengthening institutions for the improved management and utilization of planted forests through the *Forestry Development Project*.

## B. Objectives

- To evaluate carbon sequestration and substitution potential through LULUCF projects
- To build capacity for the assessment of carbon sequestration and substitution potential from afforestation and reforestation projects
- To identify carbon sequestration and substitution projects that can be implemented through the CDM
- To contribute to the development of policy options to promote carbon sequestration through afforestation, reforestation, and deforestation prevention measures

## C. Activities

1. Review results and recommendations of NSS and other emission mitigation studies for the implementation of carbon sequestration/substitution programs
2. Identification of areas suitable for afforestation and reforestation. This activity involves:
  - (a) Review of national maps and forest inventories
  - (b) Survey and evaluation of biomass functions, wood density values, and growth rates of different tree species that show potential for carbon sequestration
  - (c) Selection of modeling tools to estimate carbon capture
3. Assessment of carbon sequestration factors
4. Assessment of methodologies for baseline determination for potential afforestation and reforestation projects
5. Assessment of economic cost and social impacts of reforestation as substitutes for agricultural land. Estimate number of people affected, income levels, and output of economic activities before land conversion

6. Evaluation of policy measures to avoid deforestation
7. Assessment of options and opportunities for bio-energy. This activity entails a cost-benefit analysis of activities such as:
  - (a) Collection and interpretation of bio-energy data to promote its use through effective policies
  - (b) Assessment of the potential role of bio-energy as a major contributor to the total energy balance
  - (c) Selection and preliminary formulation of case studies
8. Evaluation of the legal and regulatory framework for the forestry sector at regional and national levels
9. Evaluation of the potential and the feasibility of campaigns aimed at reducing: i) the production of disposable wood products; and ii) the recycling of wood products
10. Survey and cost-benefit analysis of options to improve reporting and control of wildfires
11. Assessment of CDM opportunities for carbon sequestration and substitution and estimation of marginal cost functions

**D. Expected outputs**

1. Assessment of the carbon sequestration and substitution potential of the country
2. Contributions to policy formulation for the promotion of bio-energy and replacement by wood of energy-intensive products
3. Identification of sites and parameters for potential projects that can be implemented through the CDM in the LULUCF sector

**E. Suggested references**

A source of funding for potential carbon sequestration and substitution programs is the Bank's Bio-Carbon Fund. Information on program can be obtained at the following website: [www.prototypecarbonfund.org](http://www.prototypecarbonfund.org)

**NATIONAL MITIGATION PLAN**  
**EMISSION MITIGATION THROUGH REDUCTION IN METHANE EMISSIONS**  
**PRELIMINARY TERMS OF REFERENCE**

**A. Background**

Methane is produced and emitted as a result of digestive processes that take place in the stomach of ruminant animals. The amount of methane emitted during enteric fermentation varies according to a variety of factors, which include, among others, diet, chemicals ingested, grazing methods, and environmental conditions.

The revision of the 1997 GHG emission inventory, published in 1999, provides the latest figures available on GHG emissions from the agriculture and livestock sectors. According to the report, the livestock sector alone is responsible for approximately 35% of the total GHG emissions in Argentina, which are primarily methane but also, include nitrous oxide. More specifically, approximately 68% of the total methane emissions in Argentina are released by the agriculture and livestock sector. Cattle release approximately 92% of the total methane emissions liberated from enteric fermentation.

Current enteric methane figures have been estimated using emission factors developed abroad, which may not be representative of local cattle raising practices and conditions. This component of the project therefore addresses the need to evaluate enteric methane emissions from cattle in Argentina, proposes initiatives to reduce the amount of emissions.

**B. Objectives**

- To perform monitoring and sampling of Argentine livestock emissions in order to determine local emissions of methane by enteric fermentation processes
- To compare these measured factors with those used in the prediction of methane emissions in the country
- If significant differences exist between measured and estimated factors, this study will develop a method to adjust emission figures included in GHG inventories
- To contribute to the development of programs that reduce methane emissions from enteric fermentation
- To increase transparency in the reporting of methane emission data

**C. Activities**

1. Compile all existing information on methane emissions from livestock in Argentina
2. Determine methodology and sources of data used to determine current methane emissions factors. Provide documentation to assess how the current factors were determined
3. Review figures of methane emissions from countries with significant livestock industries (*i.e.* U.S., Canada, New Zealand). Refer to the web-based Emission Factor Database for global measurements of methane emissions.
4. Review work currently being done on methane emission from livestock in Uruguay and Brazil. Assess the similarity of conditions and the possibility of participating in studies currently underway.
5. Obtain standardized methodology for sampling of methane emissions from enteric fermentation (*i.e.* SF<sub>6</sub> technology)
6. With input from Steering Committee and relevant stakeholders, establish representative sites for sampling of methane emissions
7. Measure methane emissions at these selected sites
8. Compare measured emissions and local background factors with those from other countries considered
9. Determine the validity of using published emission factors to characterize Argentine conditions. If new factors are significantly different from those previously used, develop new factors, following standardized methodologies, which are representative of local conditions
10. Once national methane emissions from enteric fermentation have been determined, identify potential methods or technologies that can be used to reduce the level of emissions from livestock

11. This activity will involve an active consultation process with relevant local scientists who are currently conducting research on the topic. Consult, among others, representatives of the INTA and of the Secretary of Agriculture
12. Evaluate costs and benefits (related to reduction of emissions and to increases/decreases of livestock productivity) of possible alternatives, such as changes in livestock diet to decrease final methane release
13. Design programs for the implementation of the most feasible alternatives, which would be incorporated in a National Emission Mitigation Plan

**D. Expected outputs**

1. Establishment of methodology for sampling methane emissions from enteric fermentation in Argentina
2. Quantification of methane emissions from enteric fermentation in the country
3. Evaluation of the adequacy of current methane emission factors and, if necessary, development of more representative factors
4. Assessment of current alternatives for the reduction of methane emissions from livestock
5. Contributions to the development of methane emission mitigation programs

**PROMOTION OF PUBLIC AWARENESS  
TRAINING PROGRAM  
PRELIMINARY TERMS OF REFERENCE**

**A. Objectives**

- To develop an educational program on the issue of climate change
- To educate the general population on the impacts of climate change and on existing, feasible, mitigation actions
- To build institutional capacity on the issue of climate change

**B. Activities**

1. Coordinate a local and national institutional framework for the implementation of the program
2. Establish coordinating group for educational campaign. Group will have a core working on issues at the national level but will have local representation
3. Assess existing resources, *i.e.* facilities, personnel, institutional support, etc.
4. Review, evaluate, and update current programs and educational initiatives on climate change-related issues
5. Locate professionals with background on the climate change issue to prepare educational material and conduct training programs
6. Develop educational material for different age groups (*i.e.* primary, secondary and university level) consisting of manuals, brochures, booklets, etc. Material should include coverage on issues such as: i) drivers of climate change; ii) impacts of climate change in the national and global context; iii) mitigation and adaptation alternatives; and iv) influence of individual behavior on national and global impact
7. Produce educational material geared to professionals, which can be distributed to employees of all economic sectors
8. Train teachers at the primary and elementary level on how to educate children about climate change and its impacts
9. Organize educational seminars and working groups, in Buenos Aires and around the country, for government officials, major stakeholders, and leaders of community groups.
10. Organize seminar for entrepreneurs, to which foreign investors will be invited. Seminars should stress issues related to: i) emissions; ii) mitigation and adaptation strategies; and iii) benefits of CDM and opportunities for private investment
11. Contact authorities conducting environmental education at institutions at the local and national level to inform them of the program and to incorporate them in the implementation phase
12. Contact research institutions, academia, NGOs, government agencies and others to raise awareness about the program
13. Upgrade the OAMDL website to host the “National Climate Change website”
14. Conduct periodic surveys to assess the effectiveness of the campaign, in relation to the extent of the population reached and on the quality of the information transmitted
15. Develop a manual that compiles the methodology and the procedures involved in organizing and conducting a public awareness campaign

**C. Expected outputs**

1. Development of educational material on climate change for all ages and all sectors of the economy
2. Training of educators on how to teach climate change-related topics
3. National education campaign, backed by local and national authorities, on the relevance of climate change
4. Increased institutional capacity and coordination, at the national and regional level, on issues related to climate change
5. Raised level of awareness concerning climate change issues
6. Improvements in the perception of the impact of individual actions on national mitigation efforts

**PROMOTION OF PUBLIC AWARENESS  
PROMOTIONAL CAMPAIGN  
PRELIMINARY TERMS OF REFERENCE**

**A. Objectives**

- To develop a promotional campaign that will raise awareness on the issue of climate change
- To educate the general population on the impacts of climate change and on the existing feasible mitigation actions
- To promote national training program on climate change

**B. Activities**

1. Coordinate national framework for the dissemination of the promotional campaign
2. Design a promotional campaign that incorporates the five pillars of environmentally responsible behavior, namely: a) awareness; b) knowledge; c) attitude; d) skills; and e) participation
3. Link promotional campaign to national training program. Promote the objectives of the training program
4. Locate professionals with background on the climate change issue to prepare promotional material.
5. Develop material that reaches all ages and backgrounds. Ensure consistency with material used for the training program
6. Maintain campaign's high profile at the national level
7. Develop a cartoon character that symbolizes the campaign against the drivers of climate change, which can be used in the advertising of educational programs and mitigation initiatives. Include the cartoon character in all climate change-related advertisement and literature
8. Identify events of relevant content around the country, where the campaign can be showcased
9. Identify regional and national celebrities (*i.e.* political, sports, entertainment) willing to publicly endorse the climate change awareness program
10. Include promotional material on the OAMDL website for the "National Climate Change website"
11. Conduct periodic surveys to assess the effectiveness of the campaign, in relation to the extent of the population reached and on the quality of the information transmitted
12. Develop a manual that compiles the methodology and the procedures involved in organizing and conducting a public awareness campaign

**C. Expected outputs**

1. National promotional campaign on the relevance of climate change
2. Promotion of training program
3. Raised level of awareness, at the national level, concerning climate change issues

**DRAFTING OF SECOND NATIONAL COMMUNICATION TO UNFCCC  
PRELIMINARY TERMS OF REFERENCE**

**A. Objectives**

- To draft the Second Communication of the Argentine Government to the UNFCCC

**B. Activities**

14. Review UNFCCC methodology for drafting of National Communications
15. Review all material included in the First Communication and methodology followed for its compilation
16. Review all material developed for Second Communication
17. Submit outline of Second Communication to Steering Committee for approval
18. Submit regular progress reports to Steering Committee

**C. Expected outputs**

6. Second Communication of the Argentine Government to the UNFCCC

## PROJECT COORDINATOR PRELIMINARY TERMS OF REFERENCE

### A. Background

A Project Implementation Unit (PIU) will be instituted to oversee the implementation of the project. The PIU will provide logistical and administrative support to the Steering Committee and to the *Fundación Bariloche*. The unit will also act as a link between the Steering Committee and the consultants conducting all the project studies

The PIU will consist of five members:

- i. One general coordinator
- ii. One technical assistant responsible for matters concerning mitigation and adaptation plans
- iii. One technical assistant responsible for matters related to vulnerability studies
- iv. One technical assistant
- v. One procurement expert

The PIU office will be located within the premises of the *Fundación Bariloche* but its costs of operation will be covered by project funds

### B. Objectives

- To coordinate and supervise all logistical and administrative activities performed by the PIU
- To act as a bridge between the Steering Committee, the *Fundación Bariloche*, and the consultants working on the various project components

### C. Activities

1. Coordinate and supervise the activities of the PIU staff
2. Oversee the preparation and submission of periodic activity reports of the PIU to the World Bank
3. Ensure communication between World Bank and all relevant parties involved in the project
4. Carry out coordination activities between the Steering Committee and the *Fundación Bariloche*
5. Draft final terms of reference for consultants, to be approved by Steering Committee, prior to initiation of consultant selection activities
6. Assist in the identification of local and international consultants that may carry out project components
7. Establish format for delivery of project components
8. Review qualifications of all candidates who submit proposals for project studies. Coordinator will screen candidates prior to the submittal of their *curriculum vita* to the Steering Committee for final selection
9. Ensure communications between the Steering Committee and all hired consultants
10. Assist Steering Committee with monitoring and evaluation of overall project activities
11. Ensure compliance of all consultants with pre-accorded commitments (*i.e.* dates of submission and deliverables)
12. Perform initial review of studies delivered by consultants
13. Ensure compliance of all activities with project chronogram
14. Act as a bridge between national and regional agencies involved in issues relevant to the project, seeking coordination that will benefit the execution of the project
15. Facilitate institutional arrangements that will provide support to consultants at the regional and national level
16. Assist consultants in all coordination and organization activities related to workshops
17. Assist in the compilation of all information to be included in the Second Communication
18. Assist in the coordination of activities related to the publishing and distribution of the Second Communication

## TECHNICAL ASSISTANT RESPONSIBLE FOR MITIGATION AND ADAPTATION PRELIMINARY TERMS OF REFERENCE

### A. Background

A Project Implementation Unit (PIU) will be instituted to oversee the implementation of the project. The PIU will provide logistical and administrative support to the Steering Committee and to the *Fundación Bariloche*. The unit will also act as a link between the Steering Committee and the consultants conducting all the project studies

The PIU will consist of five members:

- i. One general coordinator
- ii. One technical assistant responsible for matters concerning mitigation and adaptation plans
- iii. One technical assistant responsible for matters related to vulnerability studies
- iv. One technical assistant
- v. One procurement expert

The PIU office will be located within the premises of the *Fundación Bariloche* but its costs of operation will be covered by project funds

### B. Objectives

- To provide implementation support for the development of mitigation and adaptation studies

### C. Activities

1. Coordinate the implementation of all activities related to the development of mitigation and adaptation plans
2. Assist Project Coordinator overseeing the execution of components related to the development of mitigation and adaptation plans
3. Advise Project Coordinator on all aspects related to the development of mitigation and adaptation plans
4. Provide support for communication between consultants developing mitigation and adaptation plans and governmental agencies
5. Oversee contracts of all consultants developing mitigation and adaptation plans
6. Provide logistical support to the Steering Committee for matters related to mitigation and adaptation studies

**TECHNICAL ASSISTANT RESPONSIBLE FOR VULNERABILITY STUDIES  
PRELIMINARY TERMS OF REFERENCE**

**A. Background**

A Project Implementation Unit (PIU) will be instituted to oversee the implementation of the project. The PIU will provide logistical and administrative support to the Steering Committee and to the *Fundación Bariloche*. The unit will also act as a link between the Steering Committee and the consultants conducting all the project studies

The PIU will consist of five members:

- i. One general coordinator
- ii. One technical assistant responsible for matters concerning mitigation and adaptation plans
- iii. One technical assistant responsible for matters related to vulnerability studies
- iv. One technical assistant
- v. One procurement expert

The PIU office will be located within the premises of the *Fundación Bariloche* but its costs of operation will be covered by project funds

**B. Objectives**

- To provide implementation support for the execution of all vulnerability studies

**C. Activities**

1. Coordinate the implementation of all activities related to the development of vulnerability studies
2. Assist Project Coordinator overseeing the execution of components related to vulnerability studies
3. Advise Project Coordinator on all aspects related to the development of vulnerability studies
4. Provide support for communication between consultants developing mitigation and adaptation plans and governmental agencies
5. Oversee contracts of all consultants carrying out vulnerability studies
6. Provide logistical support to the Steering Committee for matters related to mitigation and adaptation studies

## TECHNICAL ASSISTANT PRELIMINARY TERMS OF REFERENCE

### A. Background

A Project Implementation Unit (PIU) will be instituted to oversee the implementation of the project. The PIU will provide logistical and administrative support to the Steering Committee and to the *Fundación Bariloche*. The unit will also act as a link between the Steering Committee and the consultants conducting all the project studies

The PIU will consist of five members:

- i. One general coordinator
- ii. One technical assistant responsible for matters concerning mitigation and adaptation plans
- iii. One technical assistant responsible for matters related to vulnerability studies
- iv. One technical assistant
- v. One procurement expert

The PIU office will be located within the premises of the *Fundación Bariloche* but its costs of operation will be covered by project funds

### B. Objectives

- To carry out support activities for the members of the PIU and the Steering Committee
- To help in the compiling and processing of reports and information
- To provide support for the computer needs of the PIU

### C. Activities

1. Serve as logistical and administrative support for the PIU and the Steering Committee
2. To manage the computer resources of the PIU
3. To process, compile and catalog incoming reports
4. Assist consultants with general organization activities

**PROCUREMENT EXPERT  
PRELIMINARY TERMS OF REFERENCE**

**A. Background**

A Project Implementation Unit (PIU) will be instituted to oversee the implementation of the project. The PIU will provide logistical and administrative support to the Steering Committee and to the *Fundación Bariloche*. The unit will also act as a link between the Steering Committee and the consultants conducting all the project studies

The PIU will consist of five members:

- i. One general coordinator
- ii. One technical assistant responsible for matters concerning mitigation and adaptation plans
- iii. One technical assistant responsible for matters related to vulnerability studies
- iv. One procurement expert
- v. One administrative assistant

The PIU office will be located within the premises of the *Fundación Bariloche* but its costs of operation will be covered by project funds

**B. Objectives**

- To assist the *Fundación Bariloche* in all activities related to the hiring and payment of consultants
- To assist the *Fundación Bariloche* in all procurement activities related to the project

**C. Activities**

1. Ensure that all consultant selection activities comply with World Bank procedures
2. Verify that all contracts to be signed by consultants comply with World Bank procedures
3. Assist the *Fundación Bariloche* in all general accounting activities related to the project and ensure compliance with Bank procedures
4. Assist Project Coordinator in the drafting of periodic activity reports to the World Bank
5. Verify timely payment of consultants

**ANNEX 13****GHG Emissions Inventories 1990, 1994, and 1997**

Table A.1 Emissions of GHG by type of gas and by economic activity (in percentage)

Activity	Percent of total CO <sub>2</sub> /CH <sub>4</sub> /N <sub>2</sub> O emissions			Percent of total GHG emissions		
	1990	1994	1997	1990	1994	1997
<b>CO<sub>2</sub></b>						
Combustion of fossil fuels	89.4	89.9	90.1	39.1	40.8	42.2
Natural gas venting	4.5	4.8	3.3	2.0	2.2	1.6
Production of limestone and dolomite	1.8	2.5	3.2	0.8	1.1	1.5
Production of lime	0.1	0.1	0.1	0.0	0.1	0.0
Steel	4.2	2.7	3.3	1.8	1.2	1.6
<b>Total CO<sub>2</sub> emissions</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>43.8</b>	<b>45.3</b>	<b>46.9</b>
<b>CH<sub>4</sub></b>						
Stationary sources	0.0	0.0	0.1	0.0	0.0	0.0
Mobile sources	0.2	0.7	0.8	0.1	0.2	0.3
Coal mining	0.2	0.1	0.2	0.1	0.0	0.1
Oil and gas systems	12.6	13.3	16.0	4.1	4.4	5.0
Petrochemical	0.0	0.0	0.1	0.0	0.0	0.0
Enteric fermentation	72.2	65.9	61.8	23.6	21.8	19.2
Management of manure	2.8	2.9	2.4	0.9	0.9	0.7
Rice cultivation	0.5	0.9	1.1	0.2	0.3	0.3
Combustion of agricultural waste	0.2	0.2	0.2	0.1	0.1	0.1
Sanitary landfills	8.7	13.8	14.8	2.9	4.6	4.6
Wastewater treatment	2.2	2.1	2.7	0.7	0.7	0.8
<b>Total CH<sub>4</sub> emissions</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>32.8</b>	<b>33.1</b>	<b>31.1</b>
<b>N<sub>2</sub>O</b>						
Stationary sources	2.1	1.9	2.1	0.5	0.4	0.5
Mobile sources	0.5	0.6	0.7	0.1	0.1	0.2
Nitric acid	0.3	0.3	0.3	0.1	0.1	0.1
Management of manure	0.3	0.3	0.4	0.1	0.1	0.1
Management of agricultural soils	95.4	95.3	94.8	22.4	20.6	20.5
Combustion of agricultural soils	0.1	0.1	0.1	0.0	0.0	0.0
Sewage	1.4	1.5	1.6	0.3	0.3	0.4
<b>Total N<sub>2</sub>O emissions</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>23.5</b>	<b>21.6</b>	<b>21.6</b>
<b>Total HFC, PFC, and SF<sub>6</sub> emissions</b>	N/A	N/A	<b>100.0</b>	N/A	N/A	<b>0.4</b>

Source: Revision of the First Communication of the Government of Argentina to the UNFCCC, October 1999

## Notes:

1. Emissions were computed and converted to MTCE
2. Table does not include emissions/sinks from land use change and forestry activities (LUCF)
3. CO<sub>2</sub> – Carbon dioxide; CH<sub>4</sub> – Methane; N<sub>2</sub>O – Nitrous oxide; HFC – Hydrochlorofluorocarbons; PFC – Perfluorocarbons; SF<sub>6</sub> – Sulphur hexafluoride.

Activities related to the production of energy (including the transportation sector) account for 50% of the total emissions of the country. The share of the agriculture and livestock sectors to the total balance of emissions is high, contributing to approximately 41% of total GHG emissions.

**Emissions from the energy sector**

Table A.2 summarizes the relative proportions of GHG emitted by the energy sector. The two most significant sources of emissions are combustion of fossil fuels, releasing approximately 89% of the total CO<sub>2</sub>, and fugitive emissions, releasing practically 95% of the total methane releases of the sector.

TableA.2 Emissions of GHG by the energy sector in 1997 (in percentage)

	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	NO <sub>x</sub>	CO	NM VOC
Combustion of fossil fuels	88.6	5.0	83.3	98.2	47.1	85.5
Fugitive emissions	3.3	94.7	0.0	0.6	34.5	9.1
Biomass combustion	8.1	0.3	0.0	1.3	18.4	5.4

Source: Revision of the First Communication of the Government of Argentina to the UNFCCC, October 1999

**Emissions from the transportation sector**

Table A.3 shows the breakdown of the energy consumption of the transportation and farming sectors in 1997. The largest share of emissions is released as a result of road transportation activities.

TableA.3 Emissions of GHG from mobile sources in 1997 (in percentages)

Type of transport		Class	Type of fuel	CO <sub>2</sub>	NO <sub>x</sub>	CH <sub>4</sub>	CO	NMVOC	N <sub>2</sub> O
Civil aviation			Jet fuel/JP1	2.6	0.5	1.4	1.1	1.2	2.8
Road transportation	Passengers	Automobiles	Gasoline	24.5	17.6	9.7	31.2	69.7	11.9
			Gas-oil	2.7	0.9	0.0	0.7	0.3	4.9
			CNG	0.9	0.5	14.0	0.8	0.2	0.0
		Bus (urban)	Gas-oil	3.8	4.3	0.6	3.2	1.4	4.9
	Bus (inter-urban)	Gas-Oil	3.8	4.3	0.6	3.2	1.4	4.9	
	Cargo	Smaller than 4Tonnes	Gasoline	2.9	2.4	1.1	23.6	7.7	1.4
			Gas-oil	10.8	4.8	0.2	4.0	1.9	19.6
			CNG	4.3	2.4	65.6	3.7	0.9	0.0
Larger than 4Tonnes		Gas-oil	22.2	24.9	2.6	18.3	7.9	30.1	
Subtotal for road transportation				78.5	62.6	95.9	89.7	92.6	80.4
Railways			Gas-oil/diesel	0.8	1.5	0.1	0.4	0.2	0.7
Navigation			Gas-oil/Diesel/fuel-oil	4.0	7.8	0.6	0.7	0.4	3.5
Agriculture/Silviculture			Gas-oil	16.8	28.1	3.4	9.2	6.8	15.4

Source: Revision of the First Communication of the Government of Argentina to the UNFCCC, October 1999

**Notes:**

1. NO<sub>x</sub> – Nitrogen oxides; CO – Carbon Oxide; NMVOC – Non Methane Volatile Organic Compounds.

**Emissions from the Agriculture and livestock sectors**

Approximately 68% of the total methane emissions in Argentina are released by the agriculture and livestock sectors. Methane is emitted during animal digestion by the microorganism in the animal's digestive track. Cattle, for instance, releases approximately 92% of the methane emissions liberated from enteric fermentation.

Manure may also release methane if stored and allowed to ferment. Only emissions from cattle and pork manure are of relevance in Argentina. Agricultural soils may release nitrous oxides through microbial processes of nitrification and denitrification. Agricultural activities may add nitrogen to the soil increasing the amount that can be released to the atmosphere. Nitrogen addition takes place in various forms, among which: i) application of fertilizers; ii) cultivation of nitrogen fixing crops; iii) manure spreading; iv) grazing livestock; and v) runoff waters with high nitrogen content. The contribution of agricultural soils to the GHG balance of Argentina, and specifically to the release of nitrous oxide is considerable, amounting to approximately 21% of the total NO<sub>2</sub> emissions in 1997.

Enabling Activity Commitment	Work Done Under first enabling activity Work Done under other projects	Work proposed in preparation of second national communication			
		Planning and execution	Capacity Building		
			Data gathering and Research	Institutional Strengthening	Training and Education
1. National Circumstances	First National Communication (FNC) described national circumstances, presenting relevant information related to climate, population, economy, agriculture, stockbreeding and forestry, energy, and transport	Systematic information and indicators about population, social and cultural characteristics economic circumstances and institutional setting (Component E)	NA	NA	NA
2. GreenHouse Gas Inventories ( see table A2 as completed) 1. Energy Sources 2. Industrial Processes 3. Agricultural Processes 4. Land Use change & Forestry 5. Other Sources 3. Improvement of emission factors for preparing GHG inventories ( relate this activity to item 2 above, as appropriate)	FNC reported on 1990 and 1994 inventories. Gases included in the inventories were: carbon dioxide (CO <sub>2</sub> ), methane (CH <sub>4</sub> ), nitrogen oxide (NO <sub>x</sub> ), nitrous oxide (N <sub>2</sub> O), carbon monoxide (CO), and non-methane volatile organic compounds (NMVOC). In 1999 revised versions of 1990 and 1994 inventories were presented together with 1997 GHG inventory. Updating added HFC, PFC, SO, and SF <sub>6</sub> . In the updating most IPCC emission factors were used, but in the energy sector some were adapted to national circumstances, as the ones for NO <sub>x</sub> and SO <sub>x</sub> from power generation.	A methodological revision of the previous inventories will be performed and a new inventory with 2000 data will be conducted. Previous inventories will be updated with 2000 data, using same methodology, to allow trend analysis.	National emission factors for future GHG inventories and analysis will be developed, in particular for energy sector, land-use and forestry, and review and adjustment of national emission factors with emphasis in methane emissions from cattle enteric fermentation  Information gathering from relevant sectors using IPCC methodological tools	Review IPCC new methodologies and identify national gaps  Evaluate modifications needed for National Energy Balances to make them compatible with GHG emissions inventories, in what respect to emission source categories	Training on new guidelines and improvement of methodologies
4. General Description of steps taken or envisaged to implement the convention					
(a) Program related to Monitoring systems			NA		

Enabling Activity Commitment	Work Done Under first enabling activity Work Done under other projects	Work proposed in preparation of second national communication			
		Planning and execution	Capacity Building		
			Data gathering and Research	Institutional Strengthening	Training and Education
(b) Policy Options for Monitoring Systems and Response Strategies fro Impacts		Periodic continuous monitoring of national emission conditions, using newly available guidance material by IPCC, which will provide for improved assessment of emissions from all sources and a better definition of appropriate monitoring systems	IPCC assessment and guidance material set basis for required monitoring system.	Improvement of monitoring capacities	
(c) Policy Frameworks for Implementing Adaptation Measures and Response Strategies		Development of policy and strategic framework for Adaptation	Several vulnerability studies in complementary vulnerable areas identified according to the water, agriculture, food security, coastal zones, forests, human settlements, and social economic systems		

Enabling Activity Commitment	Work Done Under first enabling activity Work Done under other projects	Work proposed in preparation of second national communication			
		Planning and execution	Capacity Building		
			Data gathering and Research	Institutional Strengthening	Training and Education
(d) Building Capacity to Integrate climate change concerns into planning			Generation of regional scenarios of climate change in Argentina		Pilot plan of public awareness education for opinion and community leaders and stakeholders, in order to offer methodology and experience to GOA authorities at national, provincial, and local levels, as well as to NGOs
(e) Programs to address climate change and its adverse impacts, including abatement and sink enhancement	A study was developed including two scenarios: (i) Baseline Scenario, which did not have explicit policies to mitigate GHG emissions nor to improve sink capacity; and (ii) Mitigation Scenario, which set climate change mitigation options	Design and formulation of National Mitigation Program, which would include voluntary measures	1. Opportunities for Energy Efficiency Measures (EEM); 2. Opportunities for energy efficiency; 3. Opportunities for substitutions of fuel and energy sources; 4. Opportunities for changes in the relative distribution of transportation modes; 5. Renewable Energy Technologies; and 6. Opportunities for carbon sequestration and substitution		Education and training resulting from programs
5. Other Information					

Enabling Activity Commitment	Work Done Under first enabling activity Work Done under other projects	Work proposed in preparation of second national communication			
		Planning and execution	Capacity Building		
			Data gathering and Research	Institutional Strengthening	Training and Education
(a) Material relevant for calculation of global Emission trends			Provision of indicators to show evolution of specific emissions with relation to population and economic activity (GDP). A comparison of Argentina and other nations' performance will be made		
(b) Financial and Technological needs and constrains for : Project Financing National Communications Vulnerability Assessment and Adaptation		Elaboration of portfolio of adaptation strategies, policies, and measures to support appropriate policy interventions.		Following the assessment of vulnerability factors, the activity will evaluate policy to develop/increase adaptive capacity.	

Enabling Activity Commitment	Work Done Under first enabling activity Work Done under other projects	Work proposed in preparation of second national communication			
		Planning and execution	Capacity Building		
			Data gathering and Research	Institutional Strengthening	Training and Education
6. Planning for Adaptation <sup>11</sup> Stage I/Stage II	<p>Three vulnerability studies were conducted under FNC: i) Argentine coast to sea-level rising; ii) Oasis if Andean Mountains; iii) Agriculture.</p> <p>EPA Project on Climate Change Impacts (2001) mainly devoted to a historical analysis of links between climate variations and extreme events and food production, and floods and ecosystems vulnerability in the Pampa region</p>	<p>Assessment of possibility to develop and apply an Adaptation Policy Framework for preparing adaptation strategies, policies and measures. Elaboration of portfolio of adaptation strategies, measures, and policies.</p>	<p>Analysis of other vulnerabilities to facilitate design and adaptation policies: 1. Coastal zone in the area north of Bahía de Samborombón, including Gran Buenos Aires and Paraná Delta. 2.Pampa Bonaerense. 3. Vulnerability of water resources to climate change. 4. Effects on agriculture production in the humid Pampa region 5. Economic impact of climate change. 6. Impact assessment on precipitation increases in Patagonia. 7. Vulnerability of energy and infrastructure systems</p>	<p>Strengthening capacity of stakeholders to adapt to impacts of climate change and risks</p>	
7. Capacity building to asses technology needs, modalities to acquire and absorb them, design, evaluate and host projects		<p>Building block for developing National Mitigation Program</p>			
8. Identification and submission of prioritized technologies needs		<p>Building block for developing National Mitigation Program</p>			

Enabling Activity Commitment	Work Done Under first enabling activity Work Done under other projects	Work proposed in preparation of second national communication			
		Planning and execution	Capacity Building		
			Data gathering and Research	Institutional Strengthening	Training and Education
9. Capacity Building for Participation in systematic observation networks		NA	NA	Development of projections if climate change variables over the southern continent and to improve information on climate conditions. High resolution scenarios will consist of downscaling through selecting time-slices from a global model (LMDZ) and nesting a regional model (MM5)	Additional training will include collection, processing and validation of proxy data
Compilation and production of Second National Communication			NA	NA	NA