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Country Study – Argentina

Contents

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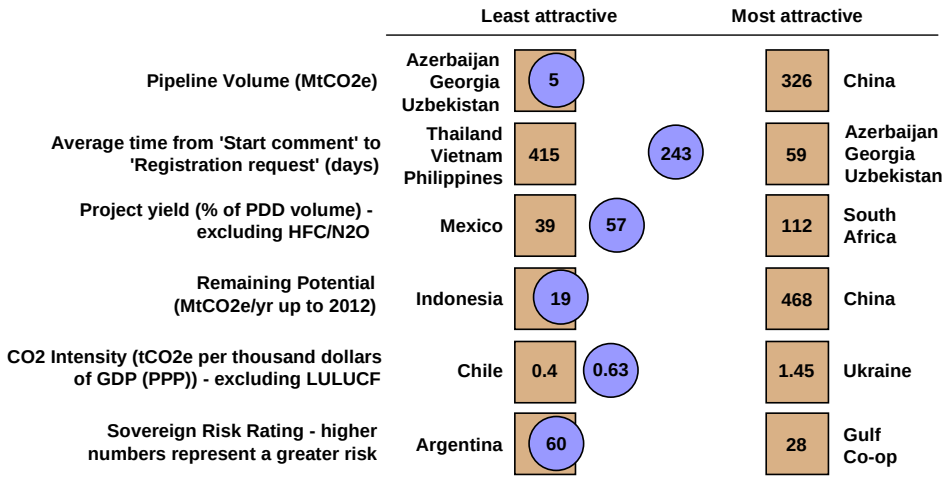
Executive Summary

Despite the Argentinean government's efforts to generate interest in CDM projects and investment, inertia remains and this is unlikely to change in the short/medium term. This stems from local entrepreneurs' reduced financial and technical capacity to implement CDM projects and also from foreign players diminished interest due to the country's high commercial risk and the abundance of more favourable CDM opportunities elsewhere in the region. In detail:

- Extrapolating historical trends, we estimate 2008 emissions at 327MtCO2e, maintaining Argentina as the third-largest GHG emitter in Latin America behind Brazil and Mexico.
- Positive drivers include the country's energy shortage, the wide removal of barriers to foreign investment and Argentina's recent high economic growth (8% to 9% annually over the past five years).
- However, the global financial turmoil has already led to the revision of national GDP growth to a maximum of 2% in 2009. Furthermore, subsidies in the energy sector reduce the attractiveness for investing in energy efficiency and energy generation including renewables.
- The deterioration of an already fragile and risky economy provides few incentives and makes Argentina an uninviting environment for CDM activity.
- Finally, the performance of Argentina's CDM infrastructure is also negative for investors with lower than average yields, particularly for landfill projects

Figure 1: CDM summary for Argentina (country acronyms in appendix)



Source: New Carbon Finance, UNEP Risoe, IMF, EIU

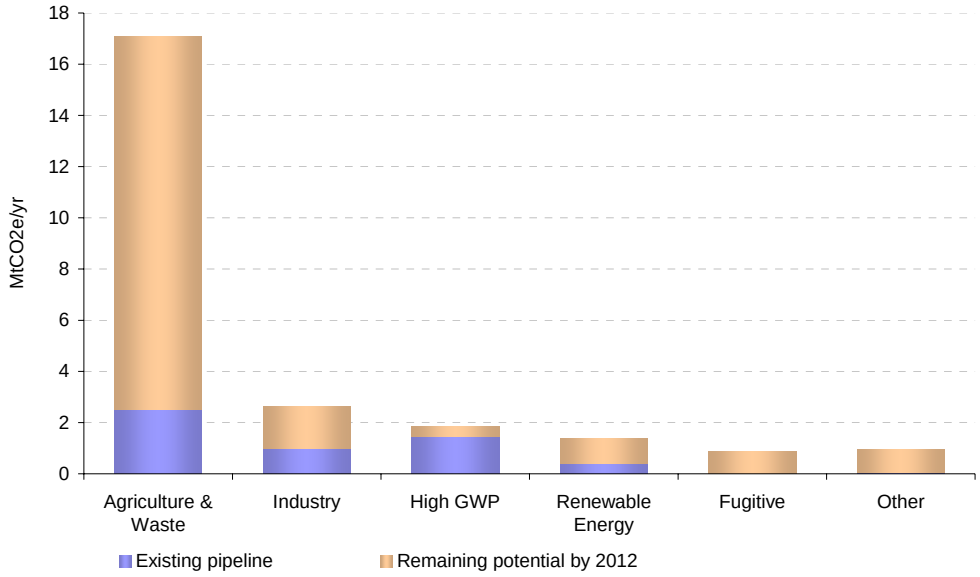
1. Remaining PDD potential

Argentina has a remaining PDD potential of 24.7MtCO2e/yr up to 2012. 75% of this remaining PDD potential is expected to come from agriculture and waste sectors.

New Carbon Finance assesses countries on the basis of their future potential for project development, which we quantify in terms of annual PDD volume potential which is shown in Figure 2 along with the existing project volume in the UNFCCC pipeline. For a detailed description of the methodology, please refer to Section 2.

We calculate a PDD reduction potential for Argentina of 24.7MtCO2e/yr up to 2012. As only 21% of the PDD potential is already in the CDM pipeline we estimate a remaining PDD potential of 19.4MtCO2e/yr up to 2012. The majority of this remaining potential exists within the agricultural and waste sectors (75%) and within the industrial sector (9%), but we also calculate that there will be contributions from the renewable energy sector (5%).

Figure 2: PDD potential of CDM projects in Argentina by 2012



Source: New Carbon Finance

- The most attractive prospect for CDM projects is within the agricultural and waste sector, particularly with landfill projects. Argentina can implement further CDM projects in these sectors equivalent to 14.5MtCO2e/y by 2012.
- Improving energy efficiencies within the power and industry sectors presents the next largest CDM opportunity. There is already 1MtCO2e/y in the pipeline, but there is a remaining potential of 1.7MtCO2e/y.
- Most of the potential projects related to high GWP gases are already in the pipeline. A small potential remains, particularly to abate emissions from PFC and N20.
- The fourth-largest potential for CDM projects relates to renewable-energy projects, which we estimate to be 1.3MtCO2e/y. There have been only a few small projects in this sector to date corresponding to 0.4MtCO2e/y leaving a remaining potential of 1MtCO2e/y by 2012.
- There is a remaining PDD potential of 0.9MtCO2e/y by 2012 for fugitive projects, most of which is within the gas distribution network.
- There is PDD potential of also 0.9MtCO2e/yr for other sectors, mainly within the forestry and transport sectors.

Table 1: Positive and negative drivers for CDM projects in Argentina

	PDD potential by 2012 (MtCO2e/yr)	Remaining PDD potential by 2012 (MtCO2e/yr)	Positive drivers	Negative drivers
1) High GWP Gases	**1.9**	**0.4**	**High reduction potential**	
HFC	1.4	0		No plants left to develop
PFCs/SF6	0.3	0.2		No plants left to develop for PFC; small scale for SF6
N2O	0.2	0.2		Decreasing production
2) Renewables	**1.3**	**1**	**Favourable natural conditions**	**Subsidies to conventional energy**
Biomass energy	0.1	0	Availability of agricultural residues	Logistics, reliability of supply
Geothermal	0	0	Long terms studies	Appropriate locations are too populated
Hydro	1.1	0.9		High capital costs; long lead times
Solar	0	0		Government support for isolated systems only
Marine/tidal/wave	0	0		No local technology or research
Wind	0.1	0.1		Low feed-in tariff and restrictions to local equipment
3) Agriculture and Waste	**17**	**14.5**	**Programmatic CDM**	
Biogas	0.7	0.7		Low winter temperatures; small scale
Landfill gas	16.3	13.8	Concentrated population	Large proportion of non-sanitary landfills
4) Fugitive	**0.9**	**0.9**	**Energy shortages**	
Coal-bed mine methane	0.2	0.2		Decreasing production; isolated location of sole mine
Oil	0	0		Poor economies of scale
Gas distribution	0.7	0.7	Growing consumption	Dispersed opportunities
5) Industry	**2.7**	**1.7**		
Cement	0.5	0.5	Concentrated industry	Efficient dry process in place
Energy efficiency	1.7	1.2	Energy shortages	Small and fragmented industry
Power sector- EE and FS	0.5	0	Energy shortages	Low energy prices
6) Other	**0.9**	**0.9**		
Energy distribution	0	0	Energy shortages	Distribution losses halves
End use (residential/commercial)	0	0		Additionality
Forestry	0.7	0.7		Lack of buyers
Transport	0.2	0.2		Implementation and methodologies difficulties
TOTAL	**24.7**	**19.4**		

Source: New Carbon Finance

Table 2: Practical and PDD potential for CDM projects in Argentina in 2012

	Existing PDD pipeline (MtCO2e/yr)	Practical potential by 2012 (MtCO2e/yr)	PDD potential by 2012 (MtCO2e/yr)	Remaining PDD potential by 2012 (MtCO2e/yr)
1) High GWP Gases	**1.44**	**1.9**	**1.9**	**0.4**
HFC	1.4	1.4	1.4	0
PFCs/SF6	0.04	0.3	0.3	0.2
N2O	0	0.2	0.2	0.2
2) Renewables	**0.4**	**1.4**	**1.3**	**1**
Biomass energy	0.15	0.1	0.1	0
Geothermal	0	0	0	0
Hydro	0.22	1.1	1.1	0.9
Solar	0	0	0	0
Marine/tidal/wave	0	0	0	0
Wind	0.03	0.2	0.1	0.1
3) Agriculture and Waste	**2.53**	**70.1**	**17**	**14.5**
Biogas	0.07	51	0.7	0.7
Landfill gas	2.46	19.1	16.3	13.8
4) Fugitive	**0**	**4.1**	**0.9**	**0.9**
Coal-bed mine methane	0	0.6	0.2	0.2
Oil	0	0.1	0	0
Gas distribution	0	3.4	0.7	0.7
5) Industry	**1**	**5.1**	**2.7**	**1.7**
Cement	0	0.5	0.5	0.5
Energy efficiency	0.46	3	1.7	1.2
Power sector- EE and FS	0.53	1.6	0.5	0
6) Other	**0.05**	**9**	**0.9**	**0.9**
Energy distribution	0	0.2	0	0
End use (residential/commercial)	0	2.7	0	0
Forestry	0..05	0.7	0.7	0.7
Transport	0	5.4	0.2	0.2
TOTAL	**5.42**	**91.61**	**24.7**	**19.4**

Source: New Carbon Finance

2. Supply potential methodology

The purpose of country study reports is to provide a quantitative and qualitative framework to show what CDM project potential remains in the country or region. The quantitative analysis starts with the total sector emissions and works down to the remaining PDD potential through several stages, each of which is defined in Table 3 below. A worked example, of landfill gas flaring, is used alongside the definition to assist the explanation.

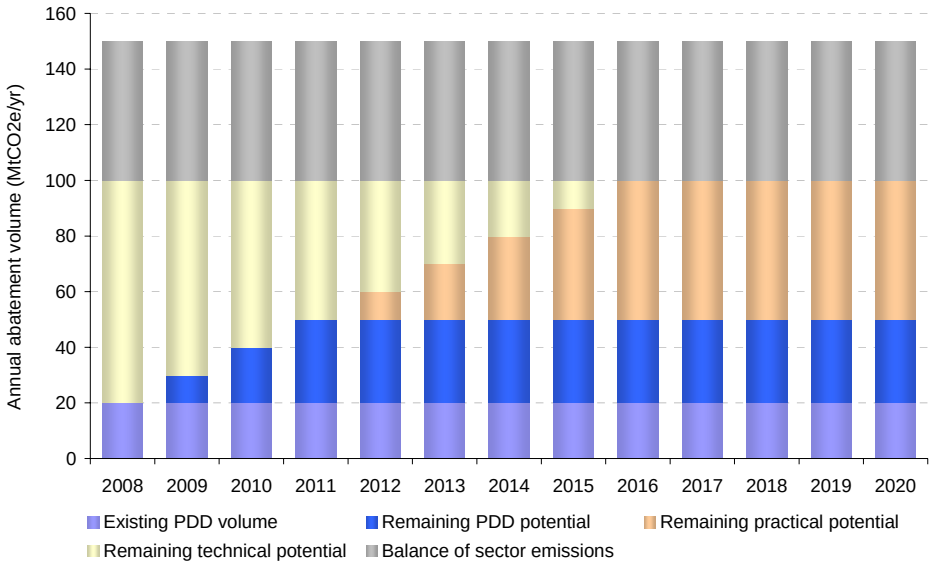
Table 3: Definitions of remaining potential by stage

Term	Definition	Worked example for landfill gas flaring in Country X
Total sector emissions	Total sector emissions	Landfills in Country X emitted 150MtCO2e/yr in 2008 and this is not expected to change over the period to 2020
Technical potential	The fraction of total sector emissions of which it is technically possible to abate	After considering leakage rates and the difference in GWP between methane and CO2, 66% of the total sector emissions are technically able to be abated. This gives a technical potential of (150*66% = 100) 100MtCO2e/yr over the period to 2020.
Practical potential	The fraction of the technical potential that could be constructed, assuming a build rate unconstrained by economics	We judge that it would take 10 years to realise the technical potential, which therefore allows the practical potential to grow by ((1/10)*100 = 10) 10MtCO2e/yr each year. This build rate would be referred to as 10% in the country study – 10% of the technical potential could be added to the pipeline each year.
PDD potential	The proportion of the practical potential that could be included in the CDM pipeline, given considerations of CDM methodology coverage, local government support and economics.	There is an relevant CDM methodology that could be used for 100% of these sites over the entire 2008-20 period, however 50% of the landfill sites are very small and unlikely to be economically attractive, so (100%*50% = 50%) 50% of the technical potential is deemed PDD potential. This provides a cap at 50MtCO2e/yr in Country X, which is reached in 2011.
Existing PDD volume	PDD volume already in pipeline – before risk adjustment	Project developers in country X have already put several PDDs in the pipeline, which have PDD totals of 20MtCO2e/yr.

Source: New Carbon Finance

The worked example from Table 3 is shown below in Figure 3 to demonstrate the methodology.

Figure 3: Illustrative PDD potential example of landfill gas in Country X



Source: New Carbon Finance

The underlying analysis extends out to 2020; however these reports will refer to a forecast for 2012 in tables and throughout the text, as this timeframe was considered to be more relevant to

project developers making decisions about investments over the next couple of years. New Carbon Finance performs its price forecasting within models that consider supply and demand fundamentals out to 2020 as important demand centres such as the EU ETS increasingly adjust their buying profile to push more demand into the 2012-20 period.

Table 4: Sample PDD potential reporting format for Country X

Sector	Existing PDD pipeline (MtCO2e/yr)	Practical potential in 2012 (MtCO2e/yr)	PDD potential in 2012 (MtCO2e/yr)	Remaining PDD potential in 2012 (MtCO2e/yr)
Landfill gas (as in example)	20	60	50	30
HFC	125	130	130	5
N2O	10	50	45	35

Source: New Carbon Finance

A summary of the factors that influence each stage of the calculations are shown below in Table 5, showing the successive reductions that are applied at each stage of the volume adjustment process.

Table 5: Criteria considered at each stage of supply potential calculations

	Physical constraints	Time constraints	Economic constraints	CDM methodology constraints
Technical potential	Yes	No	No	No
Practical potential	Yes	Yes	No	No
PDD potential	Yes	Yes	Yes	Yes

Source: New Carbon Finance

Throughout this report, technology specific tables are included to reflect the estimates that have been made to carry out the supply potential calculations. Table 6 below shows what this looks like for a specific technology, in this case for HFC gases in Country X, where it is possible to see that although any available volume should be quickly exploited, the bulk of the opportunity has been taken already.

Table 6: Sample technology specific summary for Country X (HFC)

	2008	2012	2016	2020
Practical potential (MtCO2e/yr)	1.5	1.9	1.9	1.9
Methodology coverage (%)	100%	100%	100%	100%
PDD potential (MtCO2e/yr)	1.5	1.8	1.8	1.8
Current volume in the UNFCCC pipeline (MtCO2e/yr)				1.4
Technical potential as fraction of total sector emissions				95%
Annual uptake/build rate as a fraction of technical potential				50%
Fraction of the technical potential that will become CDM/JI				90%

Source: New Carbon Finance

2.1. Methodology for renewable power sources

For most sectors, abatement opportunities arise from the reduction of existing emissions through the application of a more efficient technology, by flaring a high-GWP gas into CO2, or by replacing a high carbon intensity fuel with one of lower carbon intensity. For renewable power abatement is achieved through the displacement of fossil fuel power production with zero-carbon electricity production. With many developing countries struggling to build enough generation capacity to keep up with very high growth rates in power demand growth, in many cases the displacement is not of power from existing power plants (which might still need to run at full capacity to meet peak demand) but from displacing new build carbon intensity and many CDM methodologies reflect this accounting when calculating emission reduction baselines. For

countries with drastically different carbon intensities between existing and new build power generation fleets (such as Brazil with its large installed hydro base) this is a particular issue.

While within other sectors the existing sector emissions provide a natural cap on the abatement potential available in the sector, for renewable power it is mostly an economic decision about how much abatement is desired at what cost. The approach that these country studies take is therefore to use government forecasts or targets for their build rate, which are assessments that are developed in conjunction with New Energy Finance, the parent company of New Carbon Finance, which specialises in this area of forecasting. This installed capacity is combined with a country specific load factor and grid intensity (weighted to reflect a balance of existing and new entrant plant) to determine the carbon abatement.

A technology specific summary for renewable power generation is summarised in the format of Table 7 below.

Table 7: Sample technology specific summary for Country X (Wind)

	2008	2012	2016	2020
Practical potential (MtCO2e/yr)	0.6	3.0	5.2	7.4
Methodology coverage (%)	90%	100%	100%	100%
PDD potential (MtCO2e/yr)	0.6	2.0	3.3	4.6
Current volume in the UNFCCC pipeline (MtCO2e/yr)				0.5
Fraction of these projects that will become CDM/JI				60%

Source: New Carbon Finance

3. Key actors

3.1. Government – Designated National Authority (DNA)

Argentina is fully qualified to supply CER credits to the CDM market.

The country's first DNA was created in 1998 and was called the Argentine Office for the Clean Development Mechanism (OAMDL in Spanish). It was succeeded in 2002 by the Secretary of Environment and Development (SAyDS in Spanish), the country's current DNA.

Though the OAMDL is not the country's DNA, it still has the important role of co-ordinating all CDM-related activities under the guidance of the SAyDS. As demonstrated in Figure 4 the OAMDL, is formed by three different entities:

(1) The Executive Committee (CE in Spanish), which is formed by representatives of other ministries, but is chaired by a senior SAyDS civil servant appointed by the Secretary of Environment and Development. The CE´s responsibilities are to:

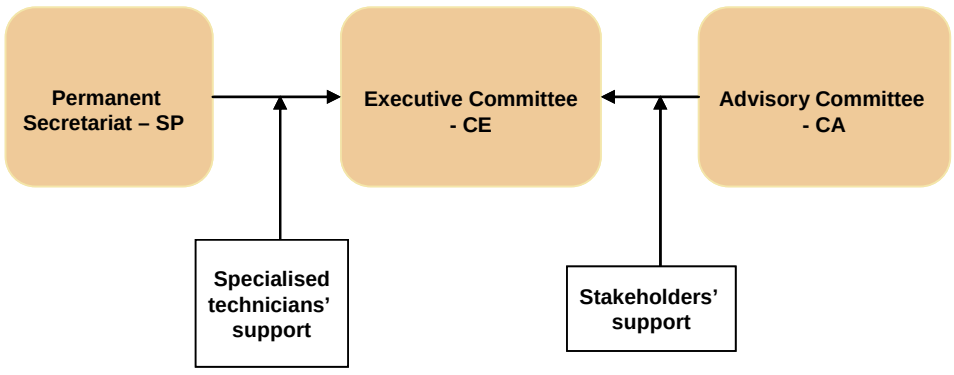
- Analyse the pre-evaluation statements elaborated by the Permanent Secretary on the projects
- Approve CDM projects
- Determine the procedures of project identification
- Design procedures for the approval of CDM projects
- Advise the SAyDS on policies related to climate change

(2) A Permanent Secretariat (SP in Spanish), which is formed by specialised experts of the SAyDS, and its responsibilities are to:

- Identify specific areas to develop mitigation activities
- Develop activities for project evaluation
- Identify financial sources for the CDM projects
- Transmit CDM information to interested parties via their website, and by organising workshops

(3) An Advisory Committee (CA in Spanish), which is formed by a variety of businesses, academia and representatives of non-governmental organisations with an interest in CDM projects and sustainable development. Its main purpose is to provide relevant technology and scientific guidance to the CE in order to enhance the government's design and decision-making capacity. To be more effective, it is divided into seven sectoral commissions: residues, energy and industry, transport, forestry, agriculture and livestock, legal issues and transversal issues.

Figure 4: Structure of the OAMDL



Source:Secretary of Environment and Development, New Carbon Finance

3.2. The Buenos Aires Stock Exchange and the Argentinean Carbon Fund

The Buenos Aires Stock Exchange (BCBA in Spanish) has been active in building capacity and raising awareness about the opportunities in the CDM market through seminars, courses and bilateral events organised in conjunction with foreign governments' embassies. The British Embassy has been particularly active in promoting CDM project development by co-organising

three events between British and Argentinean market players. Such efforts eventually led to the first CER transaction on the Buenos Aires Stock Exchange.

If the Argentinean CDM market picks up steam, the BCBA may become a national trading platform for carbon credits. The BCBA may also have a role in identifying prospective projects and facilitating contacts and relationships between national and foreign players. However, its stated aim to become a regional platform maybe too optimistic, especially as the Brazilian market has been much more dynamic in the region.

The national government created the Argentinean Carbon Fund (FAC in Spanish) in 2005 to facilitate the development of CDM project investments through public-private partnerships. However, this initiative seems to have yielded only PIN analyses and other pre-investment assistance. It was hoped the initiative would attract funds from both national governments (especially those with which Argentina has signed Memorandums of Agreement, such as Spain, Italy, Denmark, Netherlands, France, Canada and Austria) and private carbon funds.

Despite good intentions, and the expert guidance of the World Bank and PricewaterhouseCoopers in structuring the fund, the bidding process for projects that have undergone pre-feasibility studies by the fund is inadequate. Bidders pay a fee to access the project's details, initially knowing only the total amount of possible CERs for the type of project. If parties are interested in the project, a bid should then be made to take the project through its entire implementation process. The lack of bidding activity could be attributed to investors' preference that the fund be managed by private enterprises, as they are still wary of the country's weak institutional framework.

3.3. Project Developers

Though in terms of volume Frio Industrias dominates, PwC and Ecosecurities are the main developers in the number of projects

As of December 2008, only 32 projects have been submitted to the CDM Executive Board. Due to the low number of CDM projects being developed in Argentina, leadership in project development remains unclear. Of the 32 projects, one has been rejected as the project started before 1 January 2000. Furthermore, the only two biodiesel projects in Argentina have been withdrawn by project developer Mitsubishi UFJ due to the lack of approved methodology. 15 projects are being validated and the remaining 14 are registered, of which four have been issued CERs with varying issuance rates (10% - 83%).

The initial issuance rates of CERs tend to be smaller than predicted issuance rates and also smaller than predicted rates for future periods. This is due mainly to a range of procedural delays during the project cycle, human error during operating and monitoring projects, and most importantly, the underperformance of technologies.

Frio Industrias SA is the largest project developer in Argentina (in terms of total emission reductions). As Frio's facilities are the only source of industrial HFC emissions in Argentina, it has developed its own HFC-elimination project at its facilities.

Most project developers, however, have focused on landfill projects (10 in total), mainly due to their potential for high returns and ease of implementation. **PricewaterhouseCoopers** acted as the sole consultant in three diversified projects (hydro/biomass/EE) and partnered with Ecoayres in a third project (landfill gas). **Ecoayres Argentina SA** belongs to a large regional waste management company (CLIBA), and has the objective of developing CDM projects focusing on their areas of expertise, which include treatment of municipal waste and industrial streams (such as food and hazardous waste).

Conestoga Rovers & Associates is a large engineering group from Canada with technical expertise in a range of disciplines. The firm's early participation in Argentina is probably due to the Memorandum of Agreement between the Canadian and Argentinean governments, rather than its technical credentials.

BGP, a Dutch project developer, claims expertise in various biomass-to-energy technologies.

Asja Ambiente Italia has invested in two landfill-gas sites, but as the opportunities fade in such projects, the company is more likely to focus on its area of expertise (wind, solar).

Table 8: Key project developers

	Project Type	Project Number	2012 ktCO2e	% of Emissions Reductions
Frio Industrias	HFC	1	8361	24%
Conestoga Rovers & Associates	Landfill	1	5703	17%
BGP	Landfill	1	5300	15%
Pricewaterhouse Coopers	Various	4	4821	14%
Ecosecurities	Various	5	2676	8%
Asja Ambiente Italia	Landfill	2	2584	7%
Others	Various	18	5028	15%
	Total=	32	34473	100%

Source: New Carbon Finance, UNEP Risoe

Energy for Sustainable Development Ltd has three other projects around the world in the pipeline (all in wind energy), and is part of the Camco group (one of the top-20 private buyers in the world). Camco is recognised for concentrating investments in energy efficiency for industrial projects. These projects make more efficient use of waste streams (such as gas, heat or pressure) and transform them into energy for the use in industry.

MGM International developed the only possible PFC project in Argentina with Aluar Alumio Argentino SA, as this is the country's sole producer of primary aluminium, in addition to a small scale EE project in industry.

3.4. Credit Buyers

Endesa, BCG and the World Bank are the largest off takers.

Spanish energy company **Endesa** is the largest credit buyer in Argentina, even though it only buys credits from project developer Frio's one project. As a compliance buyer, Endesa's choice could be explained in terms of its need to achieve a large amount of low-risk credits such as those from HFC projects. Endesa has, in the past, shown interest in investments in renewable-energy projects such as wind energy, and may consider financing such projects, so long as they are compatible with the plans of its Argentinean affiliates.

BGC International and **IXIS** are a large investment broker and investment fund, respectively, hence their preference to allocate funds to low-risk, high-return projects (despite the possibility of high initial costs) and its investment in Conestoga-Rover's landfill-gas project.

The third-largest credit buyer is the **World Bank** (either through the IFC or the IBRD). The World Bank has a long history of pioneering projects in the CDM market, making a commitment for investment under the different criteria of its various funds, including buying in partnership with Annex-I countries.

Ecosecurities normally buys credits from the projects it develops. It is likely to become a major buyer in the future, especially given its experience in the global CDM market and its expertise in designing emission-reduction purchase agreements (ERPAs).

Table 9: Dominant credit buyers

	Country	Project Number	2012 ktCO2e	% of Emission Reductions
Endesa/Comercio Internacional Proserdi	Spain	1	8361	24%
BGC International/IXIS	Canada / UK	1	5703	17%
World Bank	Various	1	5437	16%
Gestión de Actividades Tecnológicas	UK	1	3247	9%
Ecosecurities	UK	5	2676	8%
Asja Ambiente Italia	Italy	2	2584	7%
Others	Various	21	6465	19%
	Total=	32	34473	100%

Source: New Carbon Finance, UNEP Risoe

4. Regulatory Environment

4.1. Approval Procedures

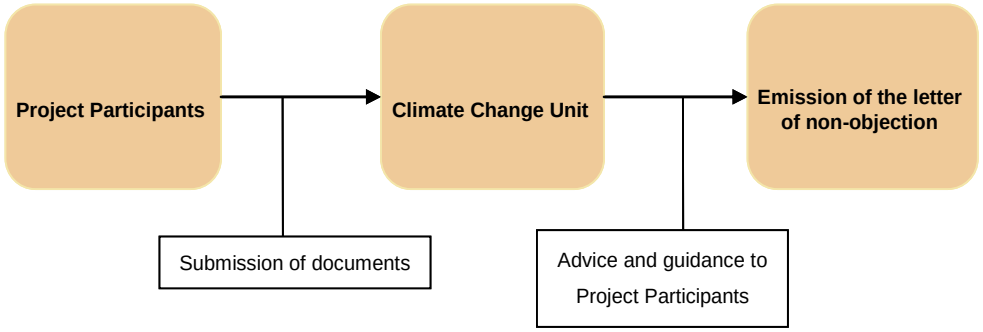
Any project with environmental impacts in Argentina needs to comply with all pertinent legislation, including the submission of an environmental impact assessment (EIA). If applicable, the EIA may also require an analysis of trans-national impacts with bordering countries. In both cases, the EIA and all accompanying documents must be included in the application with the PDD.

As the country's DNA, SAyDS establishes norms and procedures for the national approval of CDM projects, in addition to procedures related to the consulting mechanism (mecanismo de consulta previa). The latter is an optional mechanism that aims to encourage the presentation of CDM project ideas (nota de idea the proyecto) [PINs].

If the project has real CDM potential, a letter of non-objection (carta de no objeción) will be issued. The objectives of the consulting mechanism are to assist project proponents at no cost and to generate a portfolio of potential projects that might be of interest to international investors. These PINs are then available at the SAyDS website and at international seminars.

Figure 5 below illustrates the process of the consulting mechanism, which requires the use of an appropriate form (formulario de informacion de proyecto) if is to benefit from the free advice initially offered at the Climate Change Unit (Unidad de Cambio Climático) and currently offered by the Argentinean Carbon Fund.

Figure 5: Consulting mechanism process



Source: Secretary of Environment and Development

Application

Projects should be presented to the OAMDL office in Buenos Aires with all due documentation, which includes the EIA and any other document required by national, regional or municipal legislation, such as:

- A form for the PDD evaluation (Nota de Solicitud de Evaluación)
- A form explaining the contribution to the sustainable development of the country (Nota de Fundamentación de Contribución del Proyecto al Desarrollo Sostenible) [FCDS]
- Original PDD, plus seven copies in Spanish, one copy in English, and one digital copy

Approval process

Upon receiving the documentation, the SP has a maximum of 20 working days to:

- Pre-evaluate the project
- Send it to the local authority, where the project will be opened for comments
- Publish on its website and send it to the CE

As Figure 6 demonstrates, the local authority has 10 working days to comment on it, and the project should be available online for the wider audience 10 days thereafter.

The CE also has 20 days to perform its role and recommend a decision to the secretary of the SAyDS, who will then sign the letter of approval (LoA). During this time, the CE can, if necessary, designate an evaluating institution (Institución Evaluadora) [IE] to assess specific aspects determined by the CE. The IE has a maximum of five working days to work on the specialised

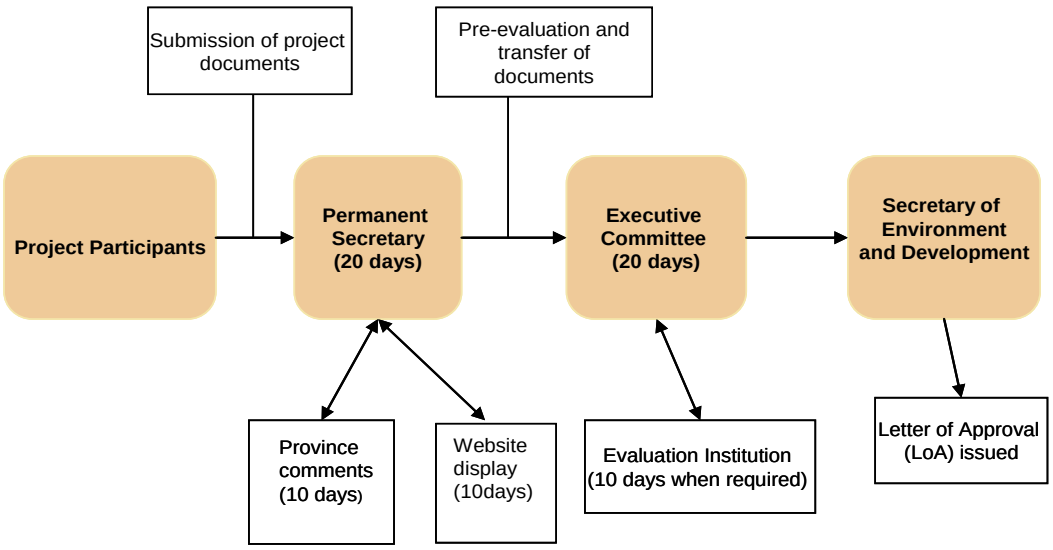
assessments. Furthermore, the SP has a maximum of five working days to communicate the CE's decision to the project participants (proponente del proyecto) [PP]. This could make the whole process very efficient, as in the best-case scenario (whereby the CE decides it does not need the opinion of the IE) it would take a maximum of 30 working days for a project to gain its letter of approval, and possibly less.

If the project goes to the IE, the SP has a maximum of five working days to provide a copy to and inform the IE about the aspects that require evaluation. The IE consists solely of pre-selected non-governmental organisations and/or public institutions, which will charge pre-agreed fees for their services. The cost of this service (if deemed necessary by the CE) is borne by the project participants (PPs). After notification, the IE has a maximum of 10 working days to conclude its analysis. In this scenario, a decision would be made after 40 to 45 working days, depending how fast the SP can communicate the decision to PPs.

A project could be rejected due to any non-conformity with the approval requirements. The IE criteria could be one or all of the following, depending on the CE's request:

- Technical aspects: additionality issues, appropriate baselines, proven emissions reductions, crediting period, monitoring plan and feasibility
- Economic aspects: financial viability and financing sources

Figure 6: Argentinean approval process



Source: Secretary of Environment and Development

Approval criteria

Although the process was made more efficient and transparent since its latest adjustment in 2004, projects need to emphasise certain aspects in their FCDS form, such as:

- Environment: Management of the project's local environmental impacts in comparison to current conditions and in reference of the projects EIA.
- Social: Job creation, work conditions and capacity-building. Programmes related to corporate social responsibility in areas of health and education should be emphasised too, if any.
- Economic: Direct and indirect impacts of project activities, including benefits from technology transfer and the projects expected profitability.
- Institutional: Long-term viability and, thus, support from project participants.

4.2. Government Policies

Climate-change / CDM policies

Without an end to the price controls and subsidies on energy provide little incentive for investors exist, particularly for renewables and energy efficiency.

Argentina has, for a number of years, been developing a consolidated strategy to mitigate climate change (Estrategia Nacional de Mitigación del Cambio Climático) [ENMCC], as part of its wider strategy for sustainable development (Estrategia Nacional de Desarrollo Sustentable) [ENDC]. Meanwhile, a range of policies in different sectors have been put in place, especially in areas where there is a perception that mitigation can also foster the country's economic development. As a consequence, the focus of Argentinean climate-change strategy is to highlight these 'win-win' opportunities to developed countries in order to gain support for the implementation of such emission-reduction projects.

As such, the government has been actively trying to promote on national and international platforms its potential as a host country for CDM projects thorough publications and seminars organised by the OAMDL, and also by the Buenos Aires Stock Exchange. The launch of the Argentina Carbon Fund is yet another attempt to capitalise on this market and find support for the government's priority sectors, which include: (1) demand-side energy management, (2) transport, (3) renewables, (4) carbon sinks, and (5) emissions from enteric fermentation.

The fund is targeting other national countries' carbon funds (especially those with which Argentina has already signed MoAs) in order to help projects gain access to capital and become operational. However, such efforts have yet to reap much reward.

Through its consulting mechanism (now run by the Argentinean Carbon Fund), SAyDS has generated a portfolio of possible projects and PINs, many of which have already been granted a letter of non-objection and are available for download from their website[1]:

Policies relating to economic sectors / technology

Tax system

There are no distinctions between CDM projects and any other investments in terms of taxation, which will be applied according to the project participants' circumstances.

Energy sector overview

Argentina's current energy shortage stems from its refusal to lift price controls on utilities, which were originally imposed during the financial crisis of 2001 to avoid social unrest. These fixed prices have discouraged new investment in the country's ample natural-gas fields, leaving Argentina dependent upon Bolivian imports, even as economic growth in the region exacerbates energy shortages. This has led to shortages for both power plants and factories, who have increasingly substituted natural gas for diesel and other petroleum-based fuels in those facilities capable of using multiple fuel types. However, this has led to diesel shortages that have affected Argentine farmers.

Future policies from the newly elected president will have to deal better with this unsustainable situation and either relax price controls or provide economic incentives, such as tax breaks or subsidies, for investment in the sector. Under this scenario, there seem to be more opportunities arising for investments for those wishing to invest in CDM projects involved in the Argentinean energy sector. Obviously, the international community's concerns about investment risk in the country are significant, not only because of Argentina's payment default in 2001, but also because investment projects in Argentina's power sector require high capital costs and long lead times. If the Argentinean Carbon Fund really gains the support of Annex-I countries' carbon funds, then CDM projects in Argentina could grow substantially and allow for Argentina to achieve its potential, as its emissions have been growing steadily following the deep slump during the economic crisis.

Energy efficiency

Though there are few energy-efficiency regulations that exist for environmental purposes, and their application is often made difficult by the diversity of organisations responsible for their enforcement, energy-efficiency regulation has been very active and, in some cases, quite innovative since 2004. The stimuli for this active energy regulation can be attributed to the

1 http://www.medioambiente.gov.ar

dramatic energy shortage created by the combination of strong economic output, and many years of under-investment in the energy-supply sector.

The main regulation affecting is the Energy Efficiency Law (Ley de Eficiencia Energética) of 2004-2005, which supports a system of bonus/penalty for households based on the comparison of monthly consumption with the previous year. This law had an immediate effect on sales of energy-efficient light bulbs throughout the country and is still contributing to improving efficiency in household power consumption. In support of this law, the following programmes have been implemented:

- Rational Use of Natural Gas Energy Programme (Programa de Uso Racional de Energía) [PURE] and Rational Use of Electric Energy Programme (Programa de Uso Racional de Energía Eléctrica) [PUREE]. The programmes intend to reduce consumption of natural gas and electricity respectively, using the economic incentive of lowering consumer's utilities bills if they reduce their energy consumption, while also penalising over-consumption. These programmes only affect residential consumers. The objective is to redirect energy towards economic activity.
- Energy Efficiency Savings in National Public Buildings (Programa de Ahorro y Eficiencia Energética en Edificios Públicos en el ámbito nacional PAEEP) is a programme that aims to save energy in public buildings of the national administration by way of demand management, selection of more efficient equipment, behavioural change and the design of new buildings.

Renewable energy

A 2006/7 law established a renewable-energy fund that will provide the additional funding of 0.015 AR$/kWh produced by all new renewable-energy projects, aside from solar projects, which will receive 0.9 AR$/kWh.[2]

The government target is that by 2016, a total of 8% of the national consumption of electricity will be produced by renewable sources. However, only projects generating up to 30MW are accepted.

Wind

In the past ten years, there have been government initiatives to promote the use of wind energy. In 1999, a decree stipulated a subsidy of $0.01/KWh of wind energy be paid to the wholesale electricity market or to the public services. This mechanism was then replicated at the provincial level. The province of Chubut offers a payment of $0.005 KW/h of wind energy generated in the province and the province of Buenos Aires decreed a similar $0.01/KWh subsidy in 2000, using an exemption for ten years of the property tax and the establishment of preferential credits.[3] These mechanisms are surrounded with restrictions and thus had little impact on new developments.

Forestry

Law 25.080 of 1998 aims to foster investment in new forestry projects through guaranteed fiscal stability over 30 years (with a possible extension to 50 years), VAT return on goods and services related directly to the forestry project, patrimonial tax exemption and capital-gains-tax benefits. Capital-gains-tax benefits include a 60% amortisation in the first year and 40% in the following two years in relation to project-related infrastructure investments. Investments unrelated to infrastructure would benefit from a 33% amortization rate per year, upon commencement of operations.[4]

[2] http://infoleg.mecon.gov.ar/infolegInternet/anexos/50000-54999/53790/texact.htm
3 http://energia3.mecon.gov.ar/contenidos/verpagina.php?idpagina=2540
4 http://infoleg.mecon.gov.ar/infolegInternet/anexos/55000-59999/55596/texact.htm

5. PDD Potential by technology

5.1. High Global Warming Potential (GWP) gases

HFC

There is one HFC project already in the pipeline, which is the only possible project that can abate HFC-23 emissions from the production of HCFC-22 in Argentina, there is no remaining potential under the methodology. We estimate **a practical potential of 1.4MtCO2e/yr by 2012 and we calculate a PDD reduction potential of 1.4MtCO2e/yr by 2012**.

Table 10: Reduction potential of HFC in Argentina

	2008	2012	2016	2020
Practical potential (MtCO2e/yr)	1.4	1.4	1.4	1.4
Methodology coverage	100%	100%	100%	100%
PDD potential (MtCO2e/yr)	1.4	1.4	1.4	1.4
Current volume in the UNFCCC pipeline (MtCO2e/yr)				1.4
Technical potential as fraction of total sector emissions				95%
Annual uptake/build rate as a fraction of technical potential				50%
Fraction of the technical potential that will become CDM/JI				80%

Source: New Carbon Finance

PFC

All possible projects for both HFC and PFC emission reductions have been developed.

There are two methodologies for the abatement of PFCs, AM30 and AM59. Both apply to primary aluminium smelting facilities. While the latter is used by one project developer in India, the former has 3 projects in the pipeline at the validation stage (2 in Brazil and 1 in Indonesia) and one registered in Argentina at Aluar Aluminio. This project has a practical potential to reduce emissions by a maximum of 196ktCO2e until 2012. Primary aluminium smelting in Argentina has been roughly steady at about 270.000 metric tonnes from 2002 to 2005 [5]and Aluar Aluminio is the sole smelter in the country. As this is the only possible project in Argentina, there is no remaining potential under this methodology. We estimate a **practical potential of 0.3MtCO2e/yr by 2012 and we calculate a PDD reduction potential of 0.3MtCO2e/yr by 2012**.

Table 11: Reduction potential of PFC (Aluminium) in Argentina

	2008	2012	2016	2020
Practical potential (MtCO2e/yr)	0.1	0.3	0.3	0.3
Methodology coverage	100%	100%	100%	100%
PDD potential (MtCO2e/yr)	0.1	0.3	0.3	0.3
Current volume in the UNFCCC pipeline (MtCO2e/yr)				0.04
Technical potential as fraction of total sector emissions				95%
Annual uptake/build rate as a fraction of technical potential				100%
Fraction of the technical potential that will become CDM/JI				80%

Source: New Carbon Finance

SF6

Low emissions and dispersed sources eliminates PDD potential of SF6 projects

There are two approved methodologies, AM35 and AM65, for the abatement of SF6. While the former allows credits to be created via reductions of emissions from electrical grids through the recycling or leakage reduction of SF6 from an electric utility, the latter allows credits to be generated from the replacement of SF6 with alternate cover gas in the magnesium industry.

As 80% of SF6 production is used in gas insulated switch gear and about 5-7% in blanketing molten magnesium, most of opportunities would be within the methodology AM35. However,

5 http://www.aluminiocaiama.org/anuario_estadistico/anuario2007/anuario2007eng.pdf?v=3

currently, there are 3 projects in the global CDM pipeline that reduce emissions from magnesium smelters, but none from electrical grids. Argentina's Globe Metals is the sole producer of Ferro-magnesium alloys, however there is no information related to the associated release of SF6.

According to the second National Communication, emissions from this gas were equivalent to 49ktCO2e in 2000. The growth in total production of electricity between 2000 and 2006, according to the Argentinean Energy Secretariat, has been about 30%. As such, associated emissions from distribution could be now as high as 65ktCO2e. The practical potential would also be very low due to the high number of agents in the distribution network of Argentina's energy matrix. We estimate **there is neither practical potential nor PDD reduction potential.**

Table 12: Reduction potential of SF6 in Argentina

	2008	2012	2016	2020
Practical potential (MtCO2e/yr)	0	0	0.1	0.1
Methodology coverage	0/50%	50/100%	50/100%	50/100%
PDD potential (MtCO2e/yr)	0	0	0	0
Current volume in the UNFCCC pipeline (MtCO2e/yr)				0
Technical potential as fraction of total sector emissions				95%
Annual uptake/build rate as a fraction of technical potential				50/10%
Fraction of the technical potential that will become CDM/JI				25/20%

Source: New Carbon Finance

N2O

Industrial production of nitric acid represented 0.1% of N2O emissions or 145ktCO2e in 2000.

Nitrous oxide emissions in 2000 were equal to 68MtCO2e[6] or 28% of net emissions (including LULUCF), which is just over a 30% rise since 1990. Nearly 97% of the total is derived from the agricultural sector, followed by the energy and waste sectors with 1.5% and 1.4%, respectively. Industrial production of nitric acid, which represented 0.1% of the emissions or 145ktCO2e in 2000 are estimated to have grown from 1990 by 15%. Applicable industrial process includes the production of adipic and nitric acid and also caprolactam. We estimate a **practical potential of 0.2MtCO2e/yr by 2012 and we calculate a PDD reduction potential of 0.2MtCO2e/yr by 2012**

Table 13: Reduction potential of N2O in Argentina

	2008	2012	2016	2020
Practical potential (MtCO2e/yr)	0	0.2	0.3	0.3
Methodology coverage	75%	100%	100%	100%
PDD potential (MtCO2e/yr)	0	0.2	0.2	0.2
Current volume in the UNFCCC pipeline (MtCO2e/yr)				0
Technical potential as fraction of total sector emissions				95%
Annual uptake/build rate as a fraction of technical potential				50%
Fraction of the technical potential that will become CDM/JI				80%

Source: New Carbon Finance

5.2. Renewable energy

Biomass

Large amounts of agricultural residues exist, but low tariffs make projects unappealing

Biomass represents a small fraction of the total primary energy production[7]. While the use of wood for energy purposes has fallen by 2% between 1970-2003 (accounting for 1% of total energy generation in 2003), energy from bagasse and other non-discriminated agricultural sources have been stable at around 3% of total primary energy production. This can be better understood in terms of the growth in total generation rather than in terms of a reduction in the use of wood (mainly charcoal at a steel facility in the province of Jujuy) or bagasse and other sources,

[6] According to the second National Communication. Available from www.unfccc.org
[7] Second National Communication

which have grown substantially especially in sugar-cane processing plants where tonnage has grown from 570,000 in 2004 to 800,000 in 2006[8].

Five projects are currently in the pipeline involving the use of agricultural waste to energy generation. One project, at a cement plant, involves substituting fossil fuels with peanut shells. Another, at a vegetable oil plant, uses sunflower husks to generate electricity, while at a saw mill plant, saw dust is used. The peanut project uses perhaps one-eighth of available shells, so more projects under this methodology are, in principle, feasible. As the electricity price controls keep tariffs too low for investments in new boilers and generation equipment, we estimate **a practical potential of 0.1MtCO2e/yr by 2012 and we calculate a PDD reduction potential of 0.1MtCO2e/yr by 2012.**

Table 14: Reduction potential of Biomass energy in Argentina

	2008	2012	2016	2020
Practical potential (MtCO2e/yr)	0.1	0.1	0.2	0.3
Methodology coverage	70%	90%	90%	90%
PDD potential (MtCO2e/yr)	0.1	0.1	0.1	0.2
Current volume in the UNFCCC pipeline (MtCO2e/yr)				0.1
Fraction of these projects that will become CDM/JI				70%

Source: New Carbon Finance

Geothermal

The overlap of geothermal resources with existing residential areas restricts the geothermal potential that can be exploited.

According to the Secretariat of Energy (Secretaría de Energía en el Estado Nacional in Spanish), although Argentina has been investigating the possibility of geothermal energy generation since 1972, there is only one such facility in the country, with a capacity of 670kw. The main barriers have been the high costs of this type of projects and the fact that most potential sites overlap with built up residential areas. Therefore, we estimate **there is neither practical potential nor PDD reduction potential.**

Hydro

116 projects of up to 30MW of capacity were estimated to have a total potential capacity of 434MW or 2% of the national capacity in 2006.

According to the Argentinean Energy Secretariat (Secretaría de Energía en el Estado Nacional in Spanish), hydroelectric generation represented 37% of the 2006 total, mainly from large installations.

Table 15: Reduction potential of Hydro energy in Argentina

	2008	2012	2016	2020
Practical potential (MtCO2e/yr)	0.2	1.1	2.1	2.1
Methodology coverage	50%	100%	100%	100%
PDD potential (MtCO2e/yr)	0.2	1.3	2.1	3.2
Current volume in the UNFCCC pipeline (MtCO2e/yr)				0.2
Fraction of these projects that will become CDM/JI (small hydro / large hydro)				70%

Source: New Carbon Finance

There is one hydro project in the pipeline, accounting for 222ktCO2/yr of emission reductions, but this project has not been validated by the DOE and it is unlikely to be registered as the justification for non-validation was that the starting date of the project was before 1 January 2000.

A 2006 study[9] commissioned by the Secretariat of Energy and elaborated by PROYNSA (Proyectos de Ingeniería SA) into small hydro projects, looked into 116 projects of up to 30MW of capacity. These projects are all at different stages of development, and were estimated to have a total potential capacity of 434MW or 2% of the national capacity in that year.

Considering only, the small hydro potential, we estimate **a practical potential of 1.1MtCO2e/yr by 2012 and we calculate a PDD reduction potential of 1.3MtCO2e/yr by 2012.**

[8] Secretariat of Energy
[9] http://energia3.mecon.gov.ar/contenidos/verpagina.php?idpagina=2539

Solar

The installed capacity of solar energy in the country is very low and has shown no sign of development during the last 15 years. Currently, it stands at 26KW in isolated systems[10], The Renewable Energy in the Rural Market Project (PERMER in Spanish) is a government programme to provide rural populations with access to modern energy via isolated systems.

Argentina's favourable natural conditions for renewable energy sources may not suffice to overcome the price controls on energy.

There are about two million Argentineans, representing 5% of the population, that are not currently served by the grid system. Depending on the fuel used by this population, it could be possible to use programmatic methodologies to create CERs. Due to the challenges involved in implementing such projects and because PERMER may threaten additionality, we estimate **there is neither practical potential nor PDD reduction potential**.

Tidal/Marine/Wave

Although Argentina, especially in the far south, could present opportunities for marine energy conversion due to the high wave power in that area of the Atlantic Ocean, the technology is not mature enough; there are no local studies or local technology development, so we estimate **there is neither practical potential nor PDD reduction potential.**

Wind

New Energy Finance believes only 170MW of Wind energy will come online in the short to medium term.

Argentina has favourable conditions for the generation of electricity by wind power, especially in Patagonia, where population density is low but there is continuous high wind intensity. The total national installed capacity in 2000 was 14MW, most of which was run by municipal co-operatives. Since then, the total installed capacity has grown to 27MW in 2006, most of which (17MW) is in the Province of Chubut (Patagonia). There is one wind project in the pipeline in the above mentioned province, which has an installed capacity of 11MW[11].

In recent years, the Argentine government has expressed an interest to promote investment in the expansion of wind capacity. A national strategic plan was devised in 2006 and the first project for a 60MW wind farm in the province of Chubut opened for bids in mid-2007. Other projects envisaged under this scheme, located in the north of Santa Cruz province and in the region of La Rioja, bring its total potential capacity to 300MW.

Table 16: Reduction potential of Wind energy in Argentina

	2008	2012	2016	2020
Practical potential (MtCO2e/yr)	0	0.2	0.2	0.2
Methodology coverage	90%	100%	100%	100%
PDD potential (MtCO2e/yr)	0	0.1	0.1	0.1
Current volume in the UNFCCC pipeline (MtCO2e/yr)				0.03
Fraction of these projects that will become CDM/JI				70%

Source: New Carbon Finance

The main barrier to the realisation of this potential is the national subsidy and price control of electricity alongside the protection given to domestic suppliers of machinery. The retribution of $5/MWh of wind energy offered by the Chubut province only applies to projects where 100% of equipment is produced or assembled locally. However, neither the additionality requirement nor the viability of such projects seems under threat, as the first of its kind has already been issued with its CERs. As New Energy Finance believes only 170MW will come online in the short to medium term, **we estimate a practical potential of 0.2MtCO2e/yr by 2012 and we calculate a PDD reduction potential of 0.1MtCO2e/yr by 2012**.

[10] http://energia3.mecon.gov.ar/contenidos/verpagina.php?idpagina=2599
[11] UNFCCC

5.3. Agriculture and Waste

Biogas (agriculture)

Emissions from the agriculture and livestock sector represented 44% of total national emissions, equivalent to 125MtCO2e in 2000.

Emissions from the agriculture and livestock sector represented 44% of total national emissions, equivalent to 125MtCO2e. Out of this total, 59MtCO2e pertain to methane with the remainder coming from nitrous oxide. While most of N2O emissions originate from the use of soil (CM), methane emissions for the most part (equivalent to 58MtCO2e) come from enteric fermentation (EF) from beef cattle[12]. However, as the dominant form of rearing cattle is extensive or semi-extensive, the theoretical potential for emissions reductions is much lower than 58MtCO2e[13].

Furthermore, a 2006 report from the Universidad Nacional del Centro de la Provincia de Buenos Aires[14] claims these estimates must be observed with care, as the calculations are very complex and thus uncertain. Some of the most relevant problems are that emission factors do not necessarily reflect the regional variation of production characteristics, the dispersion of production systems, and their unequal use of technologies. Given the slow pace of projects in this sector, the dispersed and extensive nature of the production system, few if any projects are expected to be implemented in this sector.

Table 17: Reduction potential of Biogas (CM/EF) in Argentina

	2008	2012	2016	2020
Practical potential (MtCO2e/yr)	0.3	51	81	98
Methodology coverage	0%	100/50%	100/50%	100/50%
PDD potential (MtCO2e/yr)	0	0	0	0
Current volume in the UNFCCC pipeline (MtCO2e/yr)				0
Technical potential as fraction of total sector emissions				80/10%
Annual uptake/build rate as a fraction of technical potential				20/20%
Fraction of the technical potential that will become CDM/JI (CM / RC)				0%

Source: New Carbon Finance

Programmatic methodologies could be used to increase the scale and potential for biogas projects, especially in projects from manure-management (MM) systems in the pig-farming and poultry industries. Only 10% of dairy cattle excrement finds its way to anaerobic lagoons, while 75% of residues from pig farming end up this way.[15]

A final consideration relates to how the low winter temperatures in most parts of the country limits the extension of simple anaerobic digestion practices, as they have no insulation or heating systems, so less methane is generated.

Table 18: Reduction potential of Biogas (MM) in Argentina

	2008	2012	2016	2020
Practical potential (MtCO2e/yr)	0	0.9	1.1	1.1
Methodology coverage	75%	100%	100%	100%
PDD potential (MtCO2e/yr)	0	0.7	0.8	0.8
Current volume in the UNFCCC pipeline (MtCO2e/yr)				0.03
Technical potential as fraction of total sector emissions				80%
Annual uptake/build rate as a fraction of technical potential				20%
Fraction of the technical potential that will become CDM/JI (CM +RC)				70%)

Source: New Carbon Finance

Therefore, we estimate **a practical potential of 0.9MtCO2e/yr by 2012 and we calculate a PDD reduction potential of 0.7MtCO2e/yr by 2012** for manure management only, as it can be seen on Table 18. It is possible to notice by looking at Table 17 that in comparison enteric

[12] Second National Communication
[13] Ibid
[14] Mitigacion de las emisiones atraves de la reduccion de las emissions de metano enterico (2006)
[15] Second National Communication

fermentation is considered to have a much lower technical potential than both crop management and manure management. Measures such as changing the animal feed could reduce emissions, but not in a country where extensive farming practices prevail. Vaccines are also being developed that could avoid the production of methane; however these are yet to move from research. The technical fraction of crop management projects is higher as such offsetting is common in the voluntary market in the US, for instance. Nonetheless, as the environmental integrity may be questioned, especially under the UNFCCC principles that require reductions are measurable and verifiable, the fraction of the technical potential that will become CDM is considered to be nil for the time being.

Landfill

Even though a third of Argentinean pipeline projects are involved with landfill gas, there is still further potential for such projects.

There are currently 10 landfill-gas projects in the pipeline, of which 7 are registered and three are in the process of validation. Only one is generating electricity with all the remaining 9 flaring gas only. Delays at various stages of project development, as well as inappropriate emission factors, are the commonest causes for discrepancies in yield. Indeed, even within Argentina itself, there are significant regional differences in landfill composition. According to Ricardo Vicari of the Universidad de Buenos Aires, organic fraction can vary from 61% in Rosario province to 90% in Olavarria.

Annual emissions from landfill methane were estimated at 13MtCO2e per year in 2000[16] . Considering the general economic growth and the related consumption that follows, emissions from this sector can be considered much higher in the current period.

Even though approximately a third of Argentinean pipeline projects are involved with landfill gas, there is still further potential for such projects. This is because most of the population is concentrated in urban areas, with 14 cities producing 77% of waste residues. However, of the 273 towns and cities with more than 20,000 inhabitants, only 14 have controlled landfill sites[17], whereas, the rest of the country uses open air sites. Landfill projects involved with open air sites have a limited CDM project potential, as these projects increases both the risks and costs of landfill-gas projects. Nonetheless, there still remain four other urban landfills to be developed and other projects could apply composting methodologies such as AM25 and AM39. We estimate a **practical potential of 19.4MtCO2e/yr by 2012 and we calculate a PDD reduction potential of 6.3MtCO2e/yr by 2012.**

Table 19: Reduction potential of Landfill Gas in Argentina

	2008	2012	2016	2020
Practical potential (MtCO2e/yr)	2.6	19.4	28	28
Methodology coverage	75%	100%	100%	100%
PDD potential (MtCO2e/yr)	2.5	6.3	6.3	6.3
Current volume in the UNFCCC pipeline (MtCO2e/yr)				2.5
Technical potential as fraction of total sector emissions				100/80%
Annual uptake/build rate as a fraction of technical potential				100/20%
Fraction of the technical potential that will become CDM/JI				70%

Source: New Carbon Finance

5.4. Fugitive emissions

Coal Mine Methane

The dwindling production and the isolated nature of the sole coal producing mine the PDD potential is considered small.

In 2000, Argentina consumed 632,000 tonnes of coal. However, as over two-thirds of consumption is imported, methane emissions from coal are lower than one would expect from such consumption. According to Methane to Markets[18], consumption in 2003 equated to 662,000 tonnes. Annual coal production declined by 300,000 between 1982 and 2003, and at the end of this period only 200,000 tonnes was being produced annually.

As of 2003, only one underground mine in the Santa Cruz province (called Rio Turbio, and which is operated by YCRT) is active in Argentina, and it too has a low production rate. The Department

[16] Available from www.unfccc.org
[17] Ibid
[18] http://www.methanetomarkets.org/index.htm

of Mining of Argentina estimates that the emission factor could be in the range of 0.8m^3 to 1.2m^3 of methane per tonne of coal.

Table 20: Reduction potential of CMM in Argentina

	2008	2012	2016	2020
Practical potential (MtCO2e/yr)	0	0.6	0.6	0.8
Methodology coverage	75%	100%	100%	100%
PDD potential (MtCO2e/yr)	0	0.2	0.2	0.2
Current volume in the UNFCCC pipeline (MtCO2e/yr)				0
Technical potential as fraction of total sector emissions				40%
Annual uptake/build rate as a fraction of technical potential				20%
Fraction of the technical potential that will become CDM/JI				20%

Source: New Carbon Finance

This would generate at a minimum 160,000m^3 of methane. The other five underground operations that once were active at Pico Quemado have no data addressing the composition of gases of the workings, or quantifying methane emissions.

There are no projects in the pipeline and due to the isolated location of the Santa Cruz mine, decreasing mining activity and the relatively low gas and electricity prices caused by the government's price controls, we estimate **a practical potential of 0.6MtCO2e/yr by 2012 and we calculate a PDD reduction potential of 0.2MtCO2e/yr by 2012**.

Oil

Despite the need to expand the power sector's capacity, the combination of a lack of economies of scale and high capital costs could prevent more projects from progressing.

In 2000, emissions from the oil industry were a total of 249ktCO2e, with 181ktCO2e coming from production, 32ktCO2e coming from transport, and 36ktCO2e coming from the refining process.[19]. The sector has grown significantly during the period 2000-2006 to then decline by some 10% in 2007[20]. There are three major oil companies in Argentina. According to the US Department of Energy[21], Repsol-YPF accounts for about half of the country's total refining capacity. Other companies with significant refining capacity include Shell (about 15%) and Esso (7%).

Table 21: Reduction potential of Oil in Argentina

	2008	2012	2016	2020
Practical potential (MtCO2e/yr)	0	0.1	0.1	0.1
Methodology coverage	50%	70%	70%	70%
PDD potential (MtCO2e/yr)	0	0	0	0
Current volume in the UNFCCC pipeline (MtCO2e/yr)				0
Technical potential as fraction of total sector emissions				20%
Annual uptake/build rate as a fraction of technical potential				20%
Fraction of the technical potential that will become CDM/JI				50%

Source: New Carbon Finance

There are no projects in the pipeline, and despite the need to expand the power sector's generative capacity, the combination of a lack of economies of scale and high capital costs could prevent projects from progressing. Therefore, we estimate there is a low **practical potential of 0.1MtCO2e/yr by 2012 and we calculate there is no PDD reduction potential.**

[19] Second National Communication
[20] http://www.eia.doe.gov/emeu/cabs/Argentina/Oil.html
[21] http://www.eia.doe.gov/emeu/cabs/Argentina/Oil.html

Gas distribution

Fugitive emissions increased at about 3% annually between 1990 and 2000, even though natural gas production increased by 90% in that period.

In the gas sector, the previously state-owned entity Gas del Estado has been divided into two transport and eight distribution companies. A regulatory structure provided open access to gas transmission and distribution, and established a price cap on tariffs. Gas reservoir concessions were transferred to private businesses, with five currently producing more than 75% of the country's natural gas. Gas distribution operates with open access to the pipeline systems for producers and distributors, with transport rates regulated by the Natural Gas Regulatory Authority (Enargas in Spanish). Gas users may build a pipeline at their own cost, connect it to the distribution network, and purchase gas directly from producers to avoid distribution costs.

Table 22: Reduction potential of Gas Distribution in Argentina

	2008	2012	2016	2020
Practical potential (MtCO2e/yr)	0	3.5	5.1	5.7
Methodology coverage	10%	30%	30%	30%
PDD potential (MtCO2e/yr)	0	0.7	0.8	0.9
Current volume in the UNFCCC pipeline (MtCO2e/yr)				0
Technical potential as fraction of total sector emissions				90%
Annual uptake/build rate as a fraction of technical potential				20%
Fraction of the technical potential that will become CDM/JI				25%

Source: New Carbon Finance

Natural gas is responsible for 53% of CH4 fugitive emissions[22],, followed by oil by-products with 45% and coal with 1%. These emissions totalled 12MtCO2e in 2000. The transportation and distribution of gas was responsible at that time for 4MtCO2e. Furthermore, fugitive emissions increased about 38% between 1990 and 2000, even though natural gas production increased by 90% in that period, on account of a strong decrease in venting practices. Taking also into account the dispersed nature of projects, the number of actors involved and the few projects on a global scale under the methodologies available, we estimate **a practical potential of 3.5MtCO2e/yr by 2012 and we calculate a PDD reduction potential of 0.7MtCO2e/yr by 2012.**

5.5. Industry

Cement

Emissions from Cement have been growing strongly However, efficient dry processes dominate the sector.

It is estimated by the Cement Association in Argentina (AFCP in Spanish) that cement production grew by nearly 43% between 2000 and 2006, with a comparable increase in emissions. In 2000, the cement industry was responsible for emissions of only 3MtCO2e[23], therefore in 2008 emissions are estimated to be 4MtCO2e.

Table 23: Reduction potential of Cement in Argentina

	2008	2012	2016	2020
Practical potential (MtCO2e/yr)	0	0.5	1.1	1.8
Methodology coverage	50%	70%	70%	70%
PDD potential (MtCO2e/yr)	0	0.5	0.5	0.5
Current volume in the UNFCCC pipeline (MtCO2e/yr)				0.005
Technical potential as fraction of total sector emissions				25%
Annual uptake/build rate as a fraction of technical potential				10%
Fraction of the technical potential that will become CDM/JI				50%

Source: New Carbon Finance

[22] Second National Communication. Available from www.unfccc.org
[23] Ibid

However, as the cement industry in Argentina already predominantly uses efficient dry processes, there are few energy-efficiency and process-change projects that can be implemented in this sector. The clinker/cement ratio has decreased from 0.98 in 1990 to 0.85 in 2000, due to the use of alternatives in the clinker production[24]. ACFP estimated in 2004 that 517 kg of CO2 are emitted per metric tonne of clinker produced on average in Argentina. Therefore it is possible, albeit difficult to institute CDM projects that reduce the ratio of clinker to cement. There is one small scale project in the pipeline that aims to reduce emissions by installing a vertical mill as opposed to a ball mill in the grinding process. We **estimate a practical potential of 0.5MtCO2e/yr by 2012 and we calculate a PDD reduction potential of 0.5MtCO2e/yr by 2012.**

Industry – Energy Efficiency

It has been estimated that emissions from industrial activities (excluding energy generation, transmission and distribution) were 15MtCO2e in 2000 from the use of fossil fuels and 11MtCO2e from processes, mainly cement and iron/steel.[25] Given Argentina's economic growth, these emissions are estimated to be over 20MtCO2e.

Table 24: Potential cogeneration by sector

	MW
Chemical	407
Petrochemical	429
Food	472
Metal	454
Distillaries	457

According to a report commissioned by the SAyDS and elaborated by the La Plata National University (UNLP in Spanish)[26], the theoretical potential for cogeneration in Argentina can be divided by sector as shown on Table 24.

The economic crisis in 2002 created a loss of confidence in the financial sector and a contraction of bank credit for investments in new equipment. This situation was most dire for small and medium enterprises that could not finance their own investments. Therefore, most opportunities will be within these five under-invested and fragmented industries, in which small to medium projects (22-60MW) are the most viable. However, such projects tend to lack the economies of scale to be popular with developers in this market.

The iron and steel sector is a particularly interesting sector, as emissions from these sources accounted for 5MtCO2e in 2000. Iron is produced either in a blast furnace from the reduction of iron oxide ores with coke, or with natural gas in direct-reduction processes. Steel is produced from pig or crude iron (in blast furnaces), or from direct-reduced iron (in electric-arc furnaces). Most of the CO2 emissions generated during iron and steel production are due to the use of the reducing agents, and to a lower degree to the carbon removal from pig iron. In addition, the combustion of blast-furnace gas generates CO2 emissions from the oxidisation of the carbon monoxide contained in this gas.

It is expected that growth in this sector follows wider economic growth patterns, correlating especially with the cement industry, which also had a corresponding growth in CO2 emissions. In Argentina Siderar and Acindar (part of the AcellorMittal group) account for 90% of national production and use coal as reducing agent[27].

Table 25: Reduction potential of industry in Argentina

	2008	2012	2016	2020
Practical potential (MtCO2e/yr)	1	3.6	6.7	9.5
Methodology coverage	60%	80%	80%	80%
PDD potential (MtCO2e/yr)	1	1.7	1.9	2.3
Current volume in the UNFCCC pipeline (MtCO2e/yr)				1.0
Technical potential as fraction of total sector emissions				25%
Annual uptake/build rate as a fraction of technical potential				10%
Fraction of the technical potential that will become CDM/JI				30%

Source: New Carbon Finance

Nonetheless, considering only SAyDS estimates that up to 25% of emissions reductions related to non-process manufacturing activity could be achieved, we estimate **a practical potential of**

[24] Cement Association in Argentina
[25] National Communication
[26] Actividades habilitantes para la Segunda Comunicación Nacional de la República Argentina a la Convención Marco de las aciones Unidas sobre Cambio Climático"
[27] Argentinean Institute of Metallurgy (http://www.siderurgia.org.ar)

3.6MtCO2e/yr by 2012 and we calculate a PDD reduction potential of 1.7MtCO2e/yr by 2012.

Power sector – energy efficiency and fuel switch

Argentina has two alternatives for generating the extra 15TWh of electricity it needs in 2018: one is to invest in energy efficiency at a cost of US$1.8 billion, and the other to invest in new power generation at a cost of US$5.6 billion.

In 2000 emissions from the energy generation were estimated at 36MtCO2e[28], and it is estimated that it increased by 10MtCO2e to 46MtCO2e in 2006. This growth is reflected in the fact that electricity generation not only grew from 81TWh to 103TWh between 2000 and 2006, but its composition changed with:

- Reduced use of natural gas (from 52% to 47%)
- Increased reliance on fuel oil (from 3% to 6%) and gas oil (from 0.5% to 1.6%)
- Small change in the hydroelectric generation (from 36% to 37%[29])

There is very little regional variation of energy sources in percentage terms between provinces. However, Corrientes and Entre Rios provinces are the two exceptions as they are the home of the two bi-national dams (on the Brazil border) that together provide most of Argentina's hydroelectric power. The installed potential is controlled by the following groups in 2006: private firms (19.4GW), provinces (2.6GW), bi-national (2.5GW), national (1GW), co-operatives (164MW), and municipalities (2.4MW)[30].

Table 26: Reduction potential of the Power sector in Argentina

	2008	2012	2016	2020
Practical potential (MtCO2e/yr	0.0	2.2	4.7	7.6
Methodology coverage	60%	80%	80%	80%
PDD potential (MtCO2e/yr)	0.0	0.5	0.5	0.6
Current volume in the UNFCCC pipeline (MtCO2e/yr)				0.6
Technical potential as fraction of total sector emissions				10%
Annual uptake/build rate as a fraction of technical potential				5%
Fraction of the technical potential that will become CDM/JI				10%

Source: New Carbon Finance

According to IDB, Argentina has two alternatives for generating the extra 15,100GWh of electricity it needs in 2018: one is to invest in energy efficiency at a cost of US$1.8 billion, and the other to invest in new power generation at a cost of US$5.6 billion[31].

Currently, two projects are in the pipeline. Both involve the conversion from single- to combined-cycle power generation at thermal power plants. Although the SAyDS estimate that a 10% [32]improvement in efficiency in the sector is possible, due to the low uptake of projects and Argentina's price controls that perpetuate the low traditional fuel prices and thus the lack of interest in energy efficiency projects, we estimate **a practical potential of 2.2MtCO2e/yr by 2012 and we calculate a PDD reduction potential of 0.5MtCO2e/yr by 2012**.

Energy Distribution

Distribution losses have been already reduced from 22% in 1993 to 12% in 2004, virtually eliminating CDM potential in this sector.

Reforms of the Argentinean energy sector in the 1990s made the power and gas sectors among the most competitive in South America. In the power sector, there was significant new investment in generation, and distribution losses were halved. Indeed, the SAyDS estimates the distribution losses stood at 12% in 2004, a significant improvement from 22% in 1993, we therefore **there is neither practical potential nor PDD reduction potential.**

[28] National Communication
[29] Secretary of Energy
[30] Ibid
[31] How to save US$36 Billion worth of electricity. A survey of energy productivity in th eAmericas
[32] Secretary of Energy

End Use (residential and commercial)

Price controls, energy savings light bulbs distribution and the inadequacy of CDM for this type of project reduces the CDM potential to zero.

For both the electricity and gas sectors, the major reforms of production, transmission, and distribution were not accompanied by similar efficiency improvements on the demand side. According to the World Bank, this resulted in higher energy use for the Argentinean economy and greater energy consumption for consumers.

However, considering the price controls on energy, the difficulties in implementing demand-side projects, the free distribution of energy saving light bulbs, and the general apathy in the Argentinean CDM market, New Carbon Finance expects few, if any, projects in his sector. The development and dissemination of programmatic methodologies could counterbalance this situation, if additionality is not threatened by government policies and the World Bank/GEF Argentina Energy Efficiency Project, which aims:

"To significantly influence the efficiency of energy use in Argentina by supporting government plans for regulatory and policy changes to support energy efficiency and to strengthen the market by building private sector and financial sector capacity".

We estimate **a practical potential of 2.8MtCO2e/yr by 2012 and we calculate a PDD reduction potential of 0.0MtCO2e/yr by 2012.**

Table 27: Reduction potential of End Use in Argentina

	2008	2012	2016	2020
Practical potential (MtCO2e/yr)	0.0	2.8	6.1	10.2
Methodology coverage	10%	30%	30%	30%
PDD potential (MtCO2e/yr)	0.0	0.0	0.0	0.0
Current volume in the UNFCCC pipeline (MtCO2e/yr)				0
Technical potential as fraction of total sector emissions				25%
Annual uptake/build rate as a fraction of technical potential				10%
Fraction of the technical potential that will become CDM/JI				0%

Source: New Carbon Finance

Forestry

In 2000, the LULUCF sector was estimated to cause the net absorption of 44MtCO2e and this figure will continue to grow at between 6-13MtCO2e per year for the period 2008-2012, according to the government.

Argentina should have an advantage in the CDM market regarding forestry projects, given its:

- Extensive availability of land (20 million hectares according to government data)
- The low competition in terms of land use in some areas (Patagonia)
- Its research and co-operation with the Japan International Co-operation Agency

However, local barriers to CDM activity in the country are compounded by the complexities surrounding LULUCF methodologies, inherent accounting difficulties of this type of project and the lack of demand for credits generated by this type of project (brought on by EU-ETS restrictions). Furthermore, government support may threaten additionality. Since the scheme's inception, according to research from Group Arrayanes, trees have been planted at a rate of 100,000 hectares per year. JICA, which started to provide technical advice and build capacity in late 2007 for a period of two years, may counterbalance this situation by investigating projects that could be additional.

Table 28: Reduction potential of Forestry in Argentina

	2008	2012	2016	2020
Practical potential (MtCO2e/yr)	0	0.7	4.9	12.7
Methodology coverage (AR)	80%	90%	90%	90%
PDD potential (MtCO2e/yr)	0	0.7	4.9	12.7
Current volume in the UNFCCC pipeline (MtCO2e/yr)				0.05
Technical potential as fraction of total sector emissions				100%
Annual uptake/build rate as a fraction of technical potential				5%
Fraction of the technical potential that will become CDM/JI				80%

Source: New Carbon Finance

In 2000, the LULUCF sector was estimated to cause the net absorption of 44MtCO2e[33]. One project using the methodology AR-AM05 (reforestation for industrial use) entered the pipeline in Q3 2008. The project developed by First Climate in conjunction with GMF Latino-Americana S.A. (which is a local forest plantation company) is to have its credits, bought by Novartis (one of the big 5 pharmaceuticals company) to offset its own emissions voluntarily.

A/R CDM projects could be welcomed in a range of industries, including the iron and steel industry. In Argentina Siderar and Acindar (part of the Acellor group) correspond to 90% of national production and use coal as reducing agent[34]. Planted trees could be turned into charcoal for coal replacement, however this type of project have very long lead times and as such depend on the right incentives and/or patient money, which is scarcer than ever as early 2009. We estimate **a practical potential of 0.7MtCO2e/yr by 2012 and we calculate a PDD reduction potential of 0.7MtCO2e/yr by 2012**.

Transport

30% of passengers cars are fuelled with compressed natural gas making the Argentinean vehicle fleet a relatively low-emitting one.

In Argentina, diesel use in public passenger transport is subsidised. In private transport, 30% of passengers cars[35] are fuelled with compressed natural gas for economical reasons, making the Argentinean vehicle fleet a relatively low-emitting one.

In addition to that, there are the difficulties in developing projects in this sector, such as the diffuse nature of sources, the large number of participants and the few global initiatives involved in the development of methodologies for the transport sector. We estimate a **practical potential of 5.5MtCO2e/yr by 2012 and we calculate a PDD reduction potential of 0.2MtCO2e/yr by 2012.**

Table 29: Reduction potential of Transport in Argentina

	2008	2012	2016	2020
Practical potential (MtCO2e/yr)	0.0	5.5	11.4	16.1
Methodology coverage	10%	30%	30%	30%
PDD potential (MtCO2e/yr)	0.0	0.2	0.2	0.2
Current volume in the UNFCCC pipeline (MtCO2e/yr)				0
Technical potential as fraction of total sector emissions				25%
Annual uptake/build rate as a fraction of technical potential				10%
Fraction of the technical potential that will become CDM/JI				5%

Source: New Carbon Finance

[33] National Communication
[34] Argentinean Institute of Metallurgy (http://www.siderurgia.org.ar)
[35] Secretary of Environment and Sustainable Development

Conclusion

The most significant prospects for CDM in Argentina lie within the agricultural and waste sector, particularly with landfill projects and improving energy efficiencies within the power and industry sectors, especially as most of possible projects related to High GWP gases are already in the pipeline. Although the country is endowed with significant renewable energy resources, the potential for CDM projects related to renewable-energy projects is greatly reduced due to the price controls on energy.

Despite the Argentinean government's efforts to generate interest in CDM projects and bringing in foreign investment, inertia remains and this is unlikely to change in the short to medium term. This stems from local entrepreneurs' reduced financial and technical capacity to implement CDM projects and also from foreign players diminished interest due to the country's high commercial risk, and the abundance of more favourable CDM opportunities elsewhere.

The deterioration of an already fragile and investment risky economy provides little incentives and the lower than average yields of CDM projects combines to make Argentina a relatively uninviting environment for CDM activity.

Appendices

Appendix A. Primary sources

Government

Secretary of Energy (http://energia3.mecon.gov.ar/home/)

Secretary of Agriculture, Farming, Fishing and Food (http://www.sagpya.mecon.gov.ar)

Biofuels program (http://www.sagpya.mecon.gov.ar/new/0/agricultura/otros/biodiesel/index.php)

Secretary of Environment and Sustainable Development (http://www.medioambiente.gov.ar)

Climate Change Unit (http://www2.medioambiente.gov.ar/cambio_climatico/default.htm)

Methane to market (http://www.methanetomarket.org)

Non-governmental organisations

PROTEGER Foundation (http://www.proteger.org.ar)

BIOSFERA Foundation (http://www.biosfera.org/)

ASADES – Argentinean Renewable Energy and Environment Association (http://www.asades.org.ar)

IICA – Inter-American Institute for Cooperation on Agriculture (http://www.iica.int)

Bariloche Foundation (http://www.fundacionbariloche.org.ar)

Project developers

Conestoga Rovers & Associates (http://www.craworld.com/en/)

BGP (http://www.bgpengineers.nl/)

Ecoayres / Cliba (http://www.cliba.com.ar/)

Asja Ambient (http://www.asja.biz/)

Energy for Sustainable Development (http://www.esd.co.uk/)

Credit buyers

Endesa (http://www.enher.es)

Cement

Asociacion de Fabricants de Cemento Portland (http://www.afcp.org.ar/)

Iron & Steel

Argentinean Institute of Metallurgy (http://www.siderurgia.org.ar)

Appendix B. Acronyms/abbreviations

Country study regions

AGU – Azerbaijan, Georgia and Uzbekistan

GCC – Gulf Corporation Council

(Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, United Arab Emirates)

TVP – Thailand, Vietnam and the Philippines

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