

1 Argentina



1.1 Summary of Coal Industry

1.1.1 ROLE OF COAL IN ARGENTINA

Although Argentina is a significant energy producer and a net energy exporter, it has limited coal reserves. Its energy resources are dominated by oil and natural gas, with coal playing a minor role in the national energy mix. Only 1.5 percent of Argentina's primary energy supply came from coal and peat combined in 2011 (IEA, 2013). Argentina currently has only one power plant in the country that is partially coal fired; located in the Buenos Aires province, the San Nicolas plant (which also utilizes oil and natural gas to generate electricity) has a total installed capacity of 650 MW (PennEnergy, 2014). By the end of 2014, Argentina's first 100 percent coal-fired power plant—the 240 MW Rio Turbio power plant—was about 90 percent complete and will be the country's first to run entirely on coal.

As shown in Table 1-1, Argentina's coal reserves were 550 million tonnes (Mmt) in 2011 and coal production in Argentina amounted to only about 0.08 Mmt in 2012 (EIA, 2014a).

Table 1-1. Argentina's Coal Reserves and Production

Indicator	Anthracite & Bituminous (million tonnes)	Sub-bituminous & Lignite (million tonnes)	Total (million tonnes)	Global Rank (# and %)
Estimated Proved Coal Reserves (2011)	0	550	550	32 (0.062%)
Annual Coal Production (2012)	0.08	0	0.08	61 (0.001%)

Source: EIA (2014a)

Coal and related organic-rich deposits are widely distributed in Argentina; however, its coal reserves are not extensive (Brooks and Willett, 2004). Rio Turbio has the only operational coal mine in Argentina. Figure 1-1 shows the location of these coal deposits.

Figure 1-1. Argentina’s Coal Fields



Source: CIA (2014)

1.1.2 STAKEHOLDERS

Little information on business stakeholders in Argentinean coal mine methane (CMM) development is available. Other potentially interested parties include natural gas transmission and distribution companies and ENARGAS, the gas regulatory agency. Key stakeholders are listed in Table 1-2.

Table 1-2. Key Stakeholders in Argentina’s CMM Industry

Stakeholder Category	Stakeholder	Role
Mining Companies	<ul style="list-style-type: none"> Yacimiento de Carbón de Río Turbio (YCRT) 	Potential host mine
Natural Gas Transmission & Distribution Companies	<ul style="list-style-type: none"> Transportadora do Gas del Norte Transportadora del Gas del Sur (TGS) 	CMM pipeline distribution
Regulatory Agencies	<ul style="list-style-type: none"> National Gas Regulatory Authority or Ente Nacional Regulador Del Gas (ENARGAS) Department of Environment and Sustainable Development Department of Energy Department of Mining 	Permitting, gas sale & distribution

Table 1-2. Key Stakeholders in Argentina’s CMM Industry

Stakeholder Category	Stakeholder	Role
Developers	<ul style="list-style-type: none"> See http://www.epa.gov/coalbed/networkcontacts.html 	Project opportunity identification and planning
Engineering, Consultancy, and Related Services	<ul style="list-style-type: none"> See http://www.epa.gov/coalbed/networkcontacts.html 	Technical assistance
Professional Associations	<ul style="list-style-type: none"> Argentine Petroleum and Gas Institute Association of Sanitary Engineering and Environmental Sciences 	Facilitate government/industry interaction
Other	<ul style="list-style-type: none"> Natural gas T&D companies (e.g., MetroGAS) 	

1.1.3 STATUS OF COAL AND THE COAL MINING INDUSTRY

Only one underground mine is active in Argentina – the Rio Turbio mine – currently operated by Yacimientos Carboníferos Río Turbio (YCRT), a company owned by the Argentine National State. It was previously run by Yacimientos Carboníferos Fiscales, which privatized in 1994, but at a low production rate. The Rio Turbio mine produces sub-bituminous coal, some of which is consumed onsite in a rail car repair forge and the remainder is sent to Buenos Aires for power generation (Perczyk, 2006).

Annual production statistics reveal a decline in production over the past three decades, from a reported high of slightly over 500,000 tonnes per year in 1982 to less than 100,000 tonnes in 2012 (EIA, 2014a). Although five underground operations were actively exploiting high-volatile sub-bituminous coal at Pico Quemado in the 1950s (M2M, 2005), they are now closed.

Coal production is, however, projected to increase as Argentina is expanding its electric grid to connect the remote Río Turbio mine to Río Gallegos, a big city and potential consumption center for coal-generated power (Perczyk, 2006).

Gas reserves in place at the currently operating Rio Turbio mine are not known.

1.2 Overview of CMM Emissions and Development Potential

The Global Methane Initiative (GMI) International CMM Projects Database currently identifies no projects in Argentina, in operation or under development (GMI, 2014). Updates on future CMM projects in Argentina can be found at <https://www.globalmethane.org/coal-mines/cmm/index.aspx>.

1.2.1 CMM EMISSIONS FROM OPERATING MINES

Methane emissions in Argentina totaled 16.1 million cubic meters (m³) in 2000. Emissions are expected to decrease to 9.1 million m³ by 2015, and are then anticipated to increase to 13.3 million m³ by 2030 (see Table 1-3).

Table 1-3. Argentina’s CMM Emissions (million cubic meters)

Emissions	2000	2005	2010	2015 (projected)
Total CH ₄ Emitted	16.1	2.8	7.7	9.1

Source: USEPA (2012)

Previously, Argentina’s Department of Mining estimated the emission factor could be in the range of 0.8 to 1.2 m³ of methane per tonne of coal (Perczyk, 2006).

1.2.2 CMM EMISSIONS FROM ABANDONED COAL MINES

The five underground operations at Pico Quemado that were active in the 1950s but have ceased to operate could be a potential source of abandoned mine emissions. However, no data on the gassiness of the workings or quantifying methane emissions from these are currently available.

1.2.3 CBM FROM VIRGIN COAL SEAMS

No data is currently available on coal bed methane resources in Argentina.

1.3 Opportunities and Challenges to Greater CMM Recovery and Use

Argentina, a non-Annex I country, has signed and ratified the UNFCCC and the Kyoto Protocol, as indicated in Table 1-4. While Argentina has numerous Clean Development Mechanism projects underway of various types (e.g., biomass energy, landfill gas), none of them involve coal bed/mine methane.

Table 1-4. Argentina’s Climate Change Mitigation Commitment

Agreement	Signature	Ratification
UNFCCC	June 12, 1992	March 11, 1994
Kyoto Protocol	March 16, 1998	September 28, 2001

Source: UNFCCC (2014)

Argentina is currently in the process of developing a National Strategy on Climate Change to serve as the framework for mitigation and adaptation measures that reinforce the country’s commitment to fight climate change. During the two first stages of development from 2011 to 2012, a set of actions were agreed upon among different public agencies and various competencies (i.e., actions) were assigned to each agency (GMI, 2013).

1.3.1 MARKET AND INFRASTRUCTURE FACTORS

Argentina has come a long way from its financial crisis in 2002 when energy prices dipped dangerously low and the country’s economy declined. In response, the Argentinean government minimized the devaluation effect in the energy sector by freezing tariffs for gas and electricity and removing taxes from exports. Local producers benefited from frozen tariffs while devaluation

improved Argentina's competitiveness in the global market. The government committed to increase the regulated tariffs to industrial customers in an agreement signed with natural gas producers in 2004, allowing for gradual recovery of natural gas prices in the country. These strategies of controlling tariffs helped Argentina emerge as competitive, providing a favorable climate for investments (Perczyk, 2006).

Argentina also experienced an energy crisis in 2004 in which demand outstripped supply, leading to a default on a gas export contract with Chile. In an effort to avoid future such scenarios, the country instituted additional energy sector reforms. It established the Energía Argentina Sociedad Anónima (ENARSA), a state-owned energy company that will be involved in all aspects of the energy sector, while the government made plans to liberalize energy pricing and provide downstream investment incentives (Perczyk, 2006).

The business climate for energy enterprises in Argentina has also improved significantly from the regional integration of Latin American economies. MERCOSUR's (South American Common Market – Argentina, Uruguay, Paraguay, and Brazil) development in 1995 and its subsequent amendments have spurred the investment climate; MERCOSUR members have achieved the greatest degree of energy sector integration to date. Power system integration has occurred between Argentina and Brazil, thereby providing the physical infrastructure necessary to facilitate exchange of electricity between the two countries. Further, Argentina is a member of Organization Latinoamericana de Energia, a Latin American Energy Organization, which provides a framework for developing, integrating, selling, etc. of energy resources in the region.

Argentina has also initiated steps to conserve the environment. In 2011, Argentina was South America's second largest energy consumer and the second largest CO₂ emitter from fossil fuel consumption (EIA, 2014b). With environmental protection growing in importance, the government has entered into cooperative relationships with the industry to facilitate environmental restoration. Requirements to repair a legacy of abandoned drilling wells, production mud pits, and leaking natural gas infrastructure, and to reduce gas-flaring were put in place.

Currently, Argentina has one of the most competitive and deregulated power sectors in South America. Argentinian government has opened up generation, transmission, and distribution to the private sector, and guarantees suppliers access to the grid. In a bid to meet its increasing electricity demands, Argentina sought to expand its thermal generation capacity and released a tender in 2006 for a new 240-MW coal-fired power plant in Santa Cruz province, the Rio Turbio power plant (PennEnergy, 2014). The Rio Turbio plant will be the country's first 100 percent coal-fired power plant, and YCRT hopes to stockpile enough coal from its Rio Turbio mine to run the plant for two years.

These changes in business environment and government requirements are creating a favorable market for CMM development in Argentina. An added incentive is Argentina's substantial gas-in-place resources. With natural gas being Argentina's primary energy source and with the third largest gas reserves in South America, there is an extensive pipeline network not only domestically but to the neighboring countries of Chile, Bolivia, Brazil, and Uruguay that could provide access to both domestic and international markets for gas produced from coalfields (EIA, 2014b). Argentina already has several landfill methane projects on the ground. A starting point for identifying and quantifying CMM/abandoned mine methane development potential in Argentina would be gathering basic information on the methane content of Argentinean coals. Similarly, site-specific data on methane emissions from individual mines, active and abandoned, would be required.

1.3.2 REGULATORY INFORMATION

While ownership of most minerals in Argentina does not rest with the surface owner, the national government nevertheless is bound to grant a mining license to the discoverer of new deposits. In return, the licensee pays an annual royalty, invests a minimum amount of capital, and can execute reasonable exploitation (MEOSP, nd).

In the natural gas sector, gas distribution is enhanced by open access to the distribution pipeline system for producers and distributors, with transport rates regulated by ENARGAS (Natural Gas Regulatory Authority). 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 (MEOSP, nd).

The following federal bodies regulate environmental compliance: Secretaria de Minería (Department of Mining), Secretaria de Ambiente y Desarrollo Sostenible (Department of Environment and Sustainable Development), and Secretaria de Energía (Department of Energy). Provincial authorities also play a role in ensuring environmental compliance, having established their own policies that largely mirror the federal requirements.

1.4 Profiles of Individual Mines

Rio Turbio Mines

General Overview

Rio Turbio, an active mine located in the Austral Basin in Santa Cruz Province in southern Argentina, is considered to be developed in an extension of the Magallanes Basin to the west (in Chile).

General Information

Total mineable reserves (thousand tonnes)	750,000
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General Geologic Information

Number of coal seams above currently mined	None. Five coal-bearing units (mantos) are present: Manto Inferior (lowermost); Manto Superior, Manto B, Manto A, and Manto Doreta (uppermost). At present, only Manto Doreta (1.92 m thick) is being mined.
Aggregate thickness of coal seams above currently mined	None

Geologic and Mining Conditions

Rank of coal	Bituminous
Pitch, degrees	5 - 10 degrees, east dipping
Ash content, % (coal in place, run-of-mine)	12.05%
Moisture, % (coal in place, run-of-mine)	7.65%

Coal Production, Methane Emissions, and Degasification (and Use) Statistics

	1990	1991	1992	1993	1994	1995	1996
Coal Production (million tonnes)	0.28	0.29	0.20	0.16	0.14	0.30	0.31
Methane Emissions (bm ³)	0.13	N/A	N/A	N/A	N/A	0.007	N/A
	1997	1998	1999	2000	2001	2002	2003
Coal Production (million tonnes)	0.25	0.29	0.35	0.26	0.19	0.04	0.20
Methane Emissions (bm ³)	N/A	N/A	N/A	0.018	N/A	N/A	N/A

Source: Perczyk, 2006

Pico Quemado Mines

General Overview

This mine, located in the south central part of the country, is currently abandoned.

General Information

Total mineable reserves (thousand tonnes)	75,000 (estimated as regional total less Rio Turbio reserves)
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General Geologic Information

Number of coal seams above currently mined	N/A; volcanic intrusions overlay the coal seams
Faults?	Yes, minor

Geologic and Mining Conditions

Ash content, % (coal in place, run of mine)	47.03%
Moisture, % (coal in place, run of mine)	17.61%

Coal Production, Methane Emissions, and Degasification (and Use) Statistics

	1990	1991	1992	1993	1994	1995	1996
Coal Production (million tonnes)	None	None	None	None	None	None	None
Degasification	None	None	None	None	None	None	None
	1997	1998	1999	2000	2001	2002	2003
Coal Production (million tonnes)	None	None	None	None	None	None	None
Degasification	None	None	None	None	None	None	None

Source: Perczyk (2006)

1.5 References

Brooks and Willett (2004): *Update: World Coal Quality Inventory – Argentina*, William E. Brooks and Jason C. Willett, U.S. Geological Survey, Reston, Virginia, Open-File Report, 2004. <http://pubs.usgs.gov/of/2004/1022/1022.html>

CIA (2014): *The World Factbook – Argentina*, Central Intelligence Agency, accessed July 2014. <https://www.cia.gov/library/publications/the-world-factbook/geos/ar.html>

EIA (2014a): *International Energy Statistics*, U.S. Energy Information Administration, Washington, DC, data accessed July 2014. <http://www.eia.gov/cfapps/ipdbproject/IEDIndex3.cfm>



- EIA (2014b): Country Analysis Note – Argentina, U.S. Energy Information Administration, Washington, DC, last updated April 2014. <http://www.eia.gov/countries/country-data.cfm?fips=AR>
- GMI (2013): Argentina Country Update, presented at Global Methane Initiative Steering Committee Meeting, March 2013. https://www.globalmethane.org/expo-docs/canada13/steer_Argentina_March2013_SC_update.pdf
- GMI (2014): International Coal Mine Methane Projects Database, Global Methane Initiative, accessed July 2014. <https://www.globalmethane.org/coal-mines/cmm/index.aspx>
- IEA (2013): Share of Total Primary Energy Supply in 2011 – Argentina, International Energy Agency, 2013. <http://www.iea.org/stats/WebGraphs/ARGENTINA4.pdf>
- MEOSP (nd): Investment Opportunities, Ministerio de Economía y Obras y Servicios Públicos, The Consulate General of the Republic of Argentina in Montreal, not dated. <http://www.oceandocs.net/bitstream/1834/2606/1/Rev%20Invest%20INIDEP%2013.pdf>
- M2M (2005): *Methane to Markets Partnership, Argentina, Coal Mine Methane*, presented at the Methane to Markets Regional Workshop, Beijing, China, 2 December 2005.
- PennEnergy (2014): “Argentina’s first fully coal-fired power plant nears completion,” PennEnergy, 28 February 2014. <http://www.pennenergy.com/articles/pennenergy/2014/02/argentina-s-first-fully-coal-fired-power-plant-nears-completion.html>
- Perczyk (2006): Coal Industry Situation in Argentina, Daniel Perczyk, Instituto Torcuato Di Tella, 2006. https://www.globalmethane.org/documents/events_coal_20060525_argentina.pdf
- UNFCCC (2014): Ratification Status – Argentina, United Nations Framework Convention on Climate Change, accessed July 2014. <http://maindb.unfccc.int/public/country.pl?country=AR>
- USEPA (2012): *Global Anthropogenic Non-CO₂ Greenhouse Gas Emissions: 1990 - 2030*, U.S. Environmental Protection Agency, Office of Atmospheric Programs, Climate Change Division, December 2012. <http://www.epa.gov/climatechange/EPAactivities/economics/nonco2projections.html>