

# **COAL INDUSTRY SITUATION IN ARGENTINA**

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## **1 SUMMARY**

The energy industry in Argentina has been dominated by the natural gas. But new conditions could change present situation.

The reserve production ratio is decreasing, and the country is planning to increase imports from Bolivia. The political instability in Bolivia is introducing a different scenario, in terms of increase the participation of local sources and coal could be one of them.

Only one power plant, located 200 km north Buenos Aires city could use coal. The only mine in operation, Río Turbio, is located in the south of the country, far from the consumption centres, but the electrical grid is now under expansion. It is estimated that in 2008, a 500 kV transmission line will arrive to Río Gallegos, big mayor city 400 km from the coal mine. The mine is connected with Río Gallegos by railway.

On top of this new two conditions: potential lack of supply of natural gas and possible connection of a new coal power plant to the main grid, the economy recovery is forcing the installation of new power plants.

The prices of the energy are recovering from the very low prices due to the 2002 crisis (300% devaluation of the Argentine peso).

The operation of the coal mine is run today by an Argentine National State owned company due to a low performance made by a private consortium that had a concession during the 90s. The government is now in the process to evaluate the new conditions, in order to increase the production from the present low levels to 1.000.000 tonnes per year.

## **2 ECONOMICAL & ENERGY BACKGROUND**

In spite Argentina has suffered a severe financial crisis in 2001-2002, the country's economy has now fully recovered to pre-crisis levels.

### **2.1. 2001-2002 CRISIS**

After nearly ten years of a fixed currency exchange-rate regime, Argentina faced a severe political and economic crisis at the end of 2001. President De la Rúa resigned on 20 December 2001. Within the next 10 days it defaulted on its international debts. On 6 January 2002 the congress passed a special law that gave "emergency" status to the economy and abolished the fixed currency exchange regime.

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Since most of the public and private contracts signed during the last decade were at prices and/or tariffs nominated in U.S. dollars, this law established the legal basis for unilateral government intervention on such prices, including tariffs of regulated activities. To meet the economic crisis, the peso was allowed to float. Within the first six months of 2002 it had fallen from parity with the U.S. dollar to 3.6 pesos/US\$1, although several months later it stabilized around 3 pesos/US\$1 with some intervention by the government in order to avoid a higher appreciation of the peso.

## **2.2. ENERGY POLICY AFTER THE CRISIS**

Under the umbrella set by the Emergency Act passed in early 2002, which is still in force, the Government made several decisions regarding the energy sector. It aimed to:

- Minimize the devaluation effects on end users' prices. In practice this meant frozen tariffs in the case of gas and electricity and the implementation of withholding taxes on exports, which reduced the market reference price for oil and gas exporters in order to avoid increasing domestic prices and, at the same time, increase government income.
- Guarantee end users' supply, ensuring the coverage of operational costs to existing producers but not fixed costs recovery and promoting new expansions, most of them still in project status.

Frozen tariffs of regulated activities were implemented subject to future renegotiation of concession contracts, which in practice has not happened yet.

Consequently, the devaluation increased the relative competitiveness of the Argentine economy with respect to the rest of the world. Local industry benefited from the frozen tariffs of gas and electricity and the distorted oil-derivatives prices.

An agreement between natural gas producers and the government was signed in 2004. The latter committed to increase regulated tariffs to industrial customers in order to allow a gradual recovery of natural gas prices (wellhead prices in the Neuquina basin had decreased from US\$1.40/million Btu in 2001 to US\$0.40 /million Btu in 2002).

The energy sector, with frozen or distorted prices, would undoubtedly contribute to financing the local industry's higher competitiveness in the postcrisis years.

## **2.3. CONSEQUENCES OF THE POST CRISIS - POLICY AND LATER DEVELOPMENTS**

The energy sector faced, and still faces today, an economic long-run mismatch between what the economy needs from the energy industry and what this industry can offer to the economy under the current "relative prices scenario." In practice, this meant a lack of investments in all energy subsectors since the end of 2001. Consequently, domestic demand growth was gradually absorbing installed capacity, including those investments originally committed to exportations, because the horizon of hydrocarbons reserves was significantly reduced, particularly on natural gas.

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These facts were evidenced in April 2004, when the government announced reductions on natural gas exports to Chile in order to avoid curtailments on domestic demand.

The consequences of electricity exportations to Brazil are still unknown since exportations contracts roughly have the characteristic of an option for Brazilian demand; while electricity prices in Brazil are lower than the price of Argentine energy, which works as a strike price, interconnectors are not dispatched. Given the fact that the Brazilian power market has had lower prices since 2002, Argentine options have not been significantly exercised. In case they are in the future, similar restrictions to those applied to gas exports to Chile should not be discarded.

But restrictions to exports were not enough to supply the domestic energy demand. In view of this situation, the government restarted permanent importations of natural gas from Bolivia in 2004 as well as occasionally importing electricity from Brazil. In addition, significant quantities of fuel oil and diesel were imported from Venezuela during 2004 in order to ensure full fuel supply for thermal power plants in case natural gas was not available.

Frozen tariffs and distorted prices blocked most of the investment recovery for those companies existing at the time the crisis started. In the particular case of the power market, the measures adopted led to a significant imbalance between what the demand paid and what generators had to receive, which resulted in a significant credit requested from generators. The government proposed to swap such credits with shares of a new company to be created for building and operating a new power plant.

A new state-owned company promoted by the government, Energía Argentina Sociedad Anónima (ENARSA), was created in October 2004. The primary initial assets of ENARSA were full exploration and exploitation rights of most oil in offshore areas, but its business scope covers all energy-related activities. It is argued in Argentina that the withdrawal of the government from the energy sector during the 1990s was excessive, and, consequently, a more significant presence is now required.

The government said that ENARSA will allow them to follow what happens in the energy sector “from inside” and, consequently, evaluate whether the private energy companies’ behavior is adequate or not. On the other side, many private companies see ENARSA as a tool by which the government may press them to agree to conditions which otherwise would not be accepted.

## **2.4. EVOLUTION AND CURRENT SITUATION**

### **2.4.1. ECONOMY**

In 2005, Argentina’s real gross domestic product (GDP) grew at an estimated rate of 8.7 percent, slightly lower than the 9.0 percent growth rate of 2004. Economic forecasts are for 7.0 percent growth in 2006.

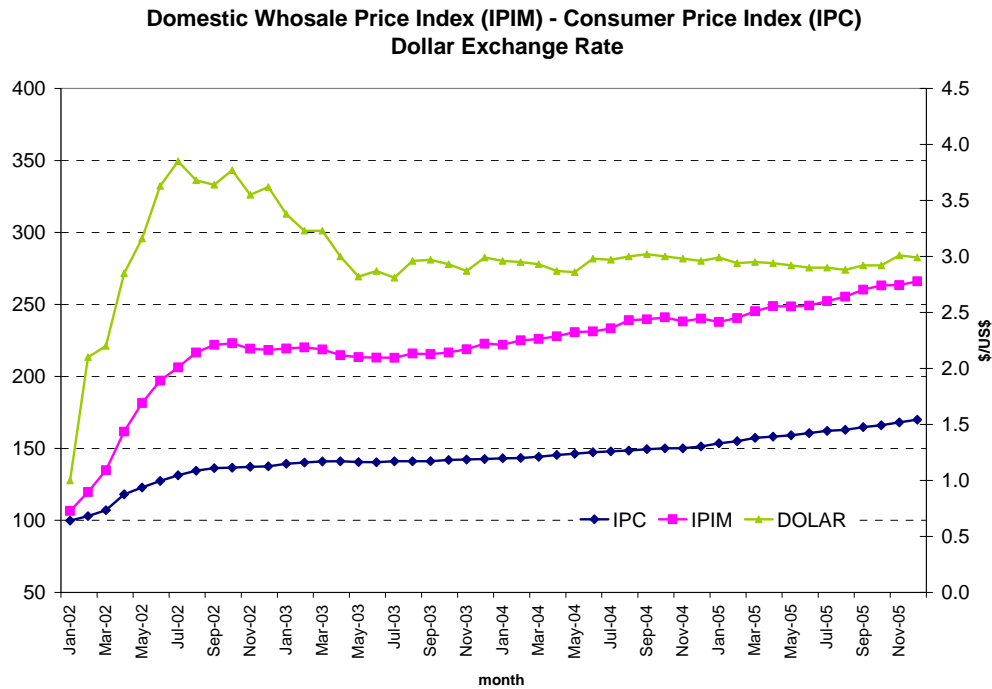
In the same year, the dollar exchange rate was around 3 pesos per dollar; wholesale domestic prices (IPIM: “Indice Precios Internos al por Mayor”) increases 10.7 %,

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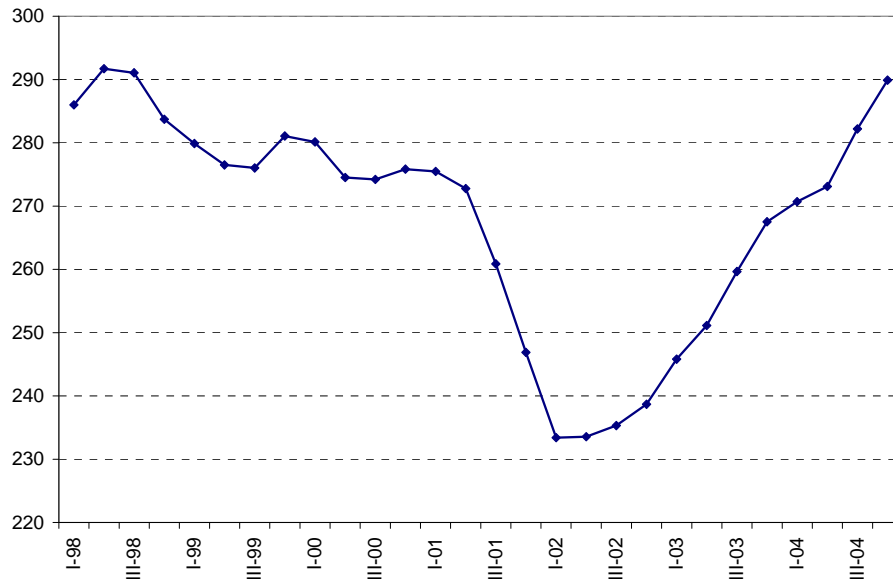
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whereas the consumer prices index (IPC: “Indice Precios al Consumidor”) grew 12.3 % compared to 2004.

Since 2002, GDP has accumulated a growth of almost 30 %. This economy evolution bears a substantial increase of the energy demand. In fact, electricity consumption grew 5.8 % compared to 2004. From 2002 up to present (2006), electricity demand has increased 21.7 %.



GDP (in 1993 10<sup>9</sup> \$)

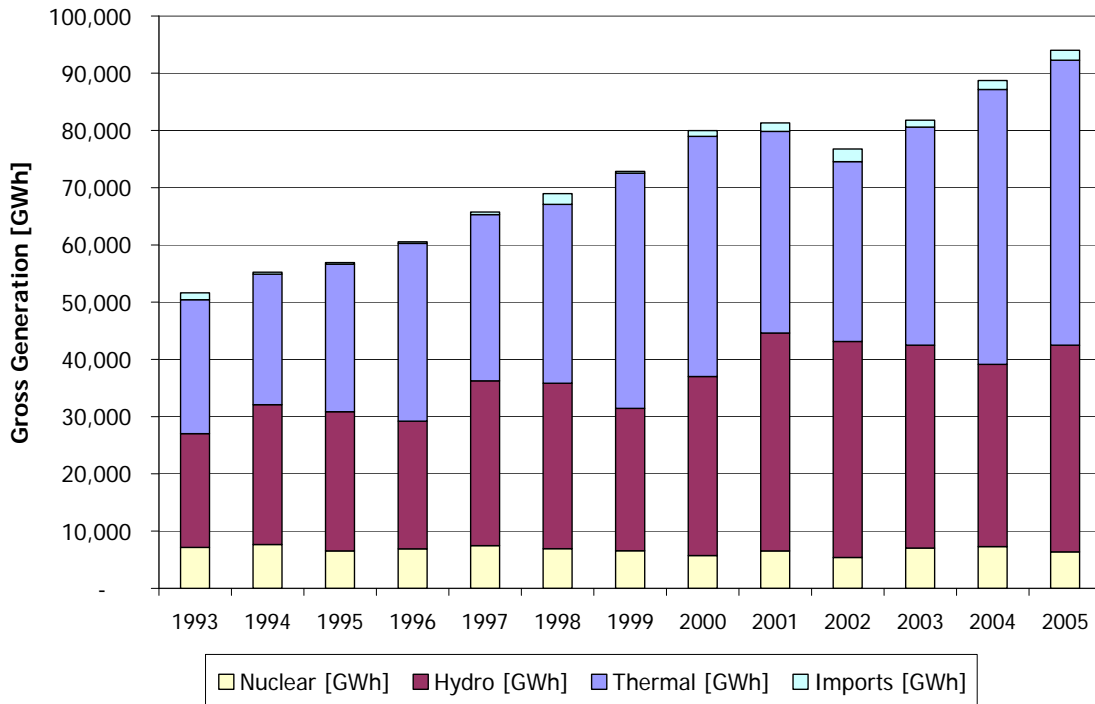


## 2.5. ENERGY

The following graphs show main variables of the energy sector in Argentina.

During 2005 electricity demand kept growing at similar rates as previous years, 5.8 % compared to 2004, totalizing almost 88 TWh of net demand and 92 TWh of gross generation (that includes losses and exports).

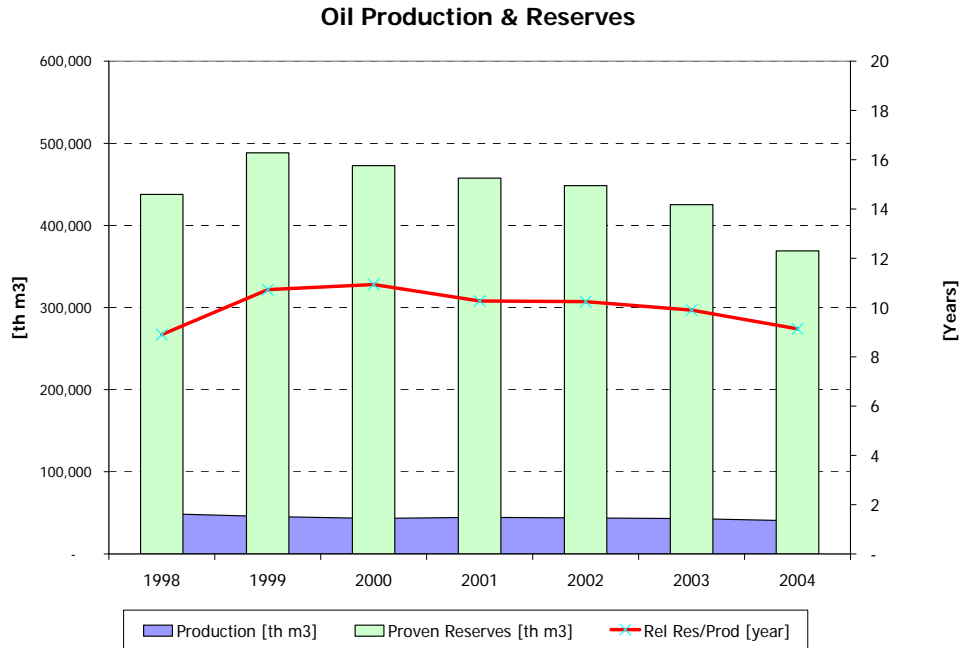
## Gross Electricity Generation Evolution [GWh]



Energy demand decreased only in, and it has accumulated a growth of 91.7 % since 1992. Demand is covered mainly with hydro and conventional thermal generation, where natural gas is the main used fuel (coal represents less than 2% of total thermal conventional generation, with only 1 generator).

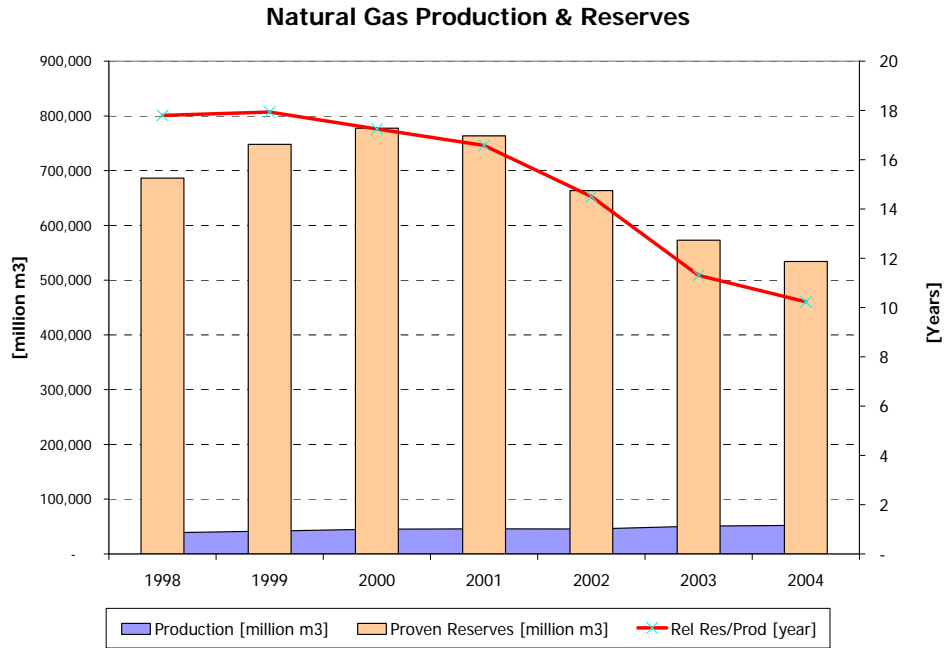
Regarding hydrocarbons, argentine energy matrix depends mostly in natural gas and oil, with one of the highest natural gas level all over the world.

Next diagrams show the evolution of production and reserves of both oil and natural gas.



Oil production and reserves are declining since 1999, and it is expected that in the medium term (2009) Argentine will be an oil net importer. Concerning natural gas, the relation Proven Reserves and Production decreased as well since 1999.

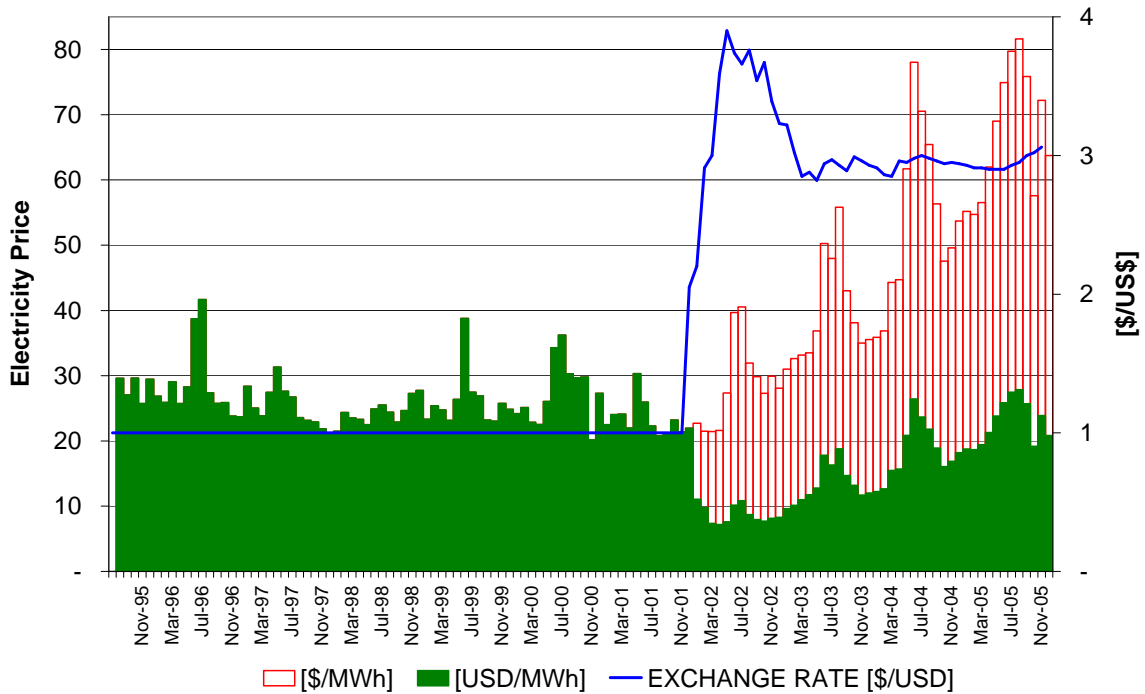
Summarizing, over the last 5 years it have not been invested to a large extent in hydrocarbon exploration, and nowadays remaining proven reserves would last for 10 years at today's production levels.



Electricity prices are shown in the following chart, where it is also included the peso exchange rate with the dollar.



## ENERGY + CAPACITY ELECTRICITY PRICE



In 2001, average wholesale electricity price was 23.2 US\$/MWh, due to the fact of extended use of natural gas with low gas prices for domestic demand. In 2005, in spite growing use oil in thermal generation, prices remained low because of Government energy policies.

Electricity Prices, measured in US\$/MWh, fell in 2001-2002 as exchange rate increase, as a consequence of Government policies. In spite of electricity prices have been recovered slightly, they are quite far away from a marginal pricing system.

### 3 COAL SITUATION IN ARGENTINA

Argentina has very limited coal resources, and coal is not a major component of the country's fuel mix. Natural gas, as noted before, is the most used fuel in the country.

In 2003 Argentina had 825 million tonnes of total reserves, mostly subbituminous. In the same year, coal production raised 0.23 million tonnes and consumption 0.66 million tonnes.

Almost 99 percent of Argentina's reserves are located mainly in two locations:

- Pico Quemado mine in Rio Negro Province (estimated reserves – 75,000,000 tonnes) –not in operation-, and

- Rio Turbio mine in Santa Cruz Province (estimated reserves – 750,000,000 tonnes)

Before 2002, Yacimientos Carboníferos Fiscales (YCF), previously a government agency that was privatized in the early 1990s<sup>1</sup>, continued to operate the Rio Turbio mine which produces sub-bituminous coal. Some of the produced coal is consumed onsite <sup>2</sup>with the remainder being sent to Buenos Aires province for power generation at San Nicolás power plant.<sup>3</sup>

On June 14, 2002, by means of Decree 1034/02, it is approved the rescission of the Río Turbio concession.

At present the Company Y.C.R.T. (Yacimientos Carboníferos Río Turbio) is operating with personnel transferred from the previous company.

Argentina experienced an energy crisis in 2004 in which demand surpassed supply, leading to a default on a gas export contract with Chile. In response, the country instituted additional energy sector reforms, including establishing Enarsa, a state-owned energy company that will be involved in all aspects of the energy sector, made plans to liberalize energy pricing, and provided of downstream investment incentives. In addition, a new investment framework in the mining sector resulted from Law No. 24.196 requires that Argentinean entities registered with the National Mining Bureau receive guaranteed tax stability, stable foreign exchange and customs treatment, and the ability to deduct prospecting and exploration costs, as well as an environmental conservation allowance, from income taxes.

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 executes reasonable exploitation.

### 3.1. PROFILES OF INDIVIDUAL MINES

#### 3.1.1. RIO TURBIO

Río Turbio, an active mine located in the Austral Basin in Santa Cruz Province in southern Argentina, is considered to be a developed in an extension of the Magallanes Basin to the west (in Chile). Most important characteristics are:

- **Total mineable reserves:** 750,000 thousand tonnes.
- **Number of coal seams above currently mined:** None. Five coal-bearing units (mantos) are present: Manto Inferior (lowermost); Manto Superior, Manto B,

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<sup>1</sup> With the award of a 20-year coal concession to a private consortium

<sup>2</sup> In a rail car repair forge

<sup>3</sup> With 350 MW installed capacity, that can burn natural, coal and fuel.

Manto A, and Manto Dorotea (uppermost). At present, only Manto Dorotea (1.92 m thick) is being mined.

- **Aggregate thickness of coal seams above currently mined, m:** None
- **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%
- **Methane Emission factor:** 0,8 to 1,2 m3 of CH4 per t of coal

	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 (bm3)	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 (bm3)	N/A	N/A	N/A	0.018	N/A	N/A	N/A

### 3.1.2. PICO QUEMADO

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

Main characteristics are:

- **Total mineable reserves:** 75,000 thousand tonnes (estimated as regional total less Rio Turbio reserves)
- **Number of coal seams above currently mined:** N/A; volcanic intrusions overly the coal seams.
- **Faults:** Yes, minor
- **Ash content, % (coal in place, run of mine):** 47.03%
- **Moisture, % (coal in place, run of mine):** 17.61%

## 4 COAL PROJECTS

Up to December 2005, Argentina electrical system were divided in two isolated systems: MEM (“Mercado Eléctrico Mayorista”: Wholesale Electricity Market, in the northern and central part of the country) and MEMSP (“Mercado Eléctrico Mayorista Sistema Patagonico”: Wholesale Electricity Market Patagonian System, in the southern part of the country).

In December 2005, it was commissioned a transmission line, linking Choele Choel and Puerto Madryn power stations. This project interconnects the MEMSP with the MEM, with 354 km of 500 kV line.

On January 2006 it was signed a contract for the construction of the second step of the Patagonia interconnection, which will link Puerto Madryn, in Chubut province, with Pico Truncado, in Santa Cruz province. This line will allow increasing the interconnection between both systems, where both thermal and wind generation would be installed in Santa Cruz. Commissioning is expected for November 2007.

The final step of this link is the line Pico Truncado- Río Gallegos, both in Santa Cruz province (264 km form Río Turbio). Works are expected to begin at the middle of 2006, and commissioning is projected during the second semester of 2008.

This interconnection would allow installing new coal-fired power plants near Río Turbio field (50 MW) and near Río Gallegos (500 MW).