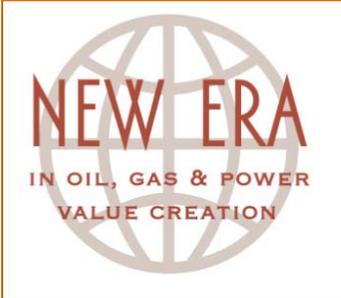


Case Study From



Results of Electricity Sector Restructuring in Argentina¹

Argentina is one of the leaders of economic liberalization not only in Latin America but also worldwide. The country was also one of the first to restructure its energy industries following the examples of Chile and the UK. Since reforms started in the late 1980s, Argentina's electricity industry has gone through significant changes. Integrated state companies were unbundled and privatized and a wholesale electricity market was created. Many more companies are now competing in the generation business, which led to mostly lower prices. Transmission losses are lower and service quality and reliability appear to have improved.

- *How did sector reforms proceed? How were they nested within the overall economic reforms?*
- *What were some of the characteristics of the Argentine model that yielded the positive results?*

Background

Argentina's population is 37.4 million people (2001) and the country's area is 2.8 million square km. Argentina benefits from rich natural resources, a highly literate population, an export-oriented agricultural sector and a diversified industrial base. For much of the 1990s, Argentina experienced solid economic growth that sprang from monetary, fiscal, and trade reforms, which included privatization of nearly all state-owned enterprises, and macroeconomic stability. The country experienced increased investments in new services and industry. Exports nearly doubled between 1992 and 1999 from \$12 billion to \$23.2 billion. Imports climbed from \$15 billion to \$25.5 billion over the same period.



Since the third quarter of 1998, Argentina's economy has been stalled in a recession. A series of external shocks, chiefly the Asian and Russian economic crises and their spread to Brazil, led to higher interest rates, reduced foreign investment, and a general weakening in the economy. While other countries in Latin America have rebounded from the 1999 economic downturn (Latin America countries as a whole had an estimated growth of 4.8% in 2000), Argentina recorded a 3.4% drop in GDP in 1999, and a further decline of 0.5% in 2000. The country is suffering under the strain of its debt, which is near 50% of GDP. The government must make

budget cuts to reach reduction targets set by the IMF as part of a January 2001 deal covering almost \$40 billion in loan and credit guarantees.

In December 2001 the country defaulted on its foreign debt, civil unrest was very high and the country had four presidents in the course of a month. The economic situation resulted in pressure for political action to support the economy. The measure taken was to devalue

¹ This case study was prepared using publicly available information.

the peso in January 2002 from its 1:1 relationship with the dollar with the currency falling to a 3.6:1 exchange rate. GDP contracted by 16% by mid year and unemployment was over 20%.

Energy Sector

Argentina, with around 3.0 billion barrels of proved oil and 27.5 trillion cubic feet of proved gas reserves, is a significant player in Latin American energy markets. Largely as a result of energy sector reforms, total reserves and production of hydrocarbons have doubled over the past decade, and total installed power generation capacity has increased by one-third. Total consumption of energy has risen by more than 30% since 1990, and has almost doubled since 1980. Argentina could become the major energy supplier of the Southern Cone region. With the recent economic crisis the government has imposed a 20% tax on exports which includes oil and derivative products.

Fossil Fuel Reserves, Production and Consumption in Argentina (2001)

	Proved Reserves	Production	Consumption
Oil	400 million t. (3.0 billion b.)	40.6 MT/yr (822,000 b/d)	19.0 MT/yr (404,000 b/d)
Natural Gas	0.78 tcm (27.5 tcf)	38.4 bcm/yr (3.7 bcf/d)	33.2 bcm/yr (3.2 bcf/d)
Coal	143 million short tons	0.37 million short tons	1.73 million short tons

Sources: Energy Information Administration, BP World Energy

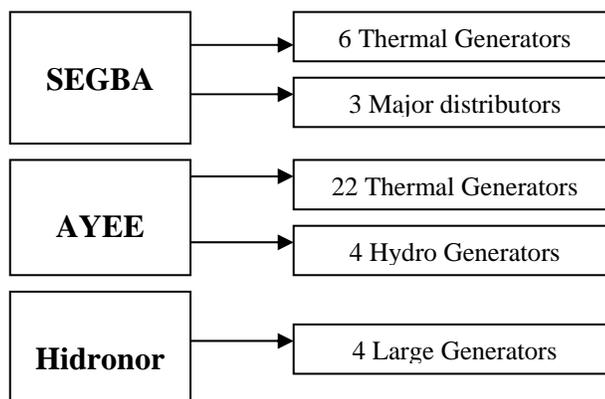
With more than 800,000 b/d, the country was the fourth-largest oil producer in Latin America in 2001, behind Venezuela, Mexico, and Brazil. The country was the region's third-largest oil consumer (500,000 b/d), after Mexico and Brazil, and also the third-largest exporter (more than 300,000 b/d), behind Venezuela and Mexico. Exports go primarily to Chile, Brazil, Uruguay and Paraguay, with small amounts also bound for the U.S. Gulf coast. The country also exported about 0.4 bcf/d of natural gas in 2000.

Argentina relies mostly on hydropower and natural gas to fuel its electricity sector. In 1999, the country had 21,800 megawatts (MW) of installed generation capacity, of which about 53% was fossil fuel-based (primarily natural gas), 42% hydroelectric, and about 5% nuclear. In the early 1980s, hydro capacity expanded but especially after the restructuring of gas and power industries in the early 1990s, gas-fired power has been preferred over hydro. Electric generation in 1999, which totaled 77 terawatthours (TWh), was 48% hydropower, 42% thermal, and 10% nuclear.

Restructuring and Privatization

Up to 1989 Argentina's electric power sector, regulated by Law 14.772 of 1958, was considered a public service provided by the state or state-owned companies. The main state-owned utilities at that time were Ayee (created in 1957), Hidronor (created in 1957), and Segba (created in 1962). Each of these companies provided bundled generation, transmission, and distribution services as integrated utilities. There were also nineteen provincial utilities – primarily distributors - and several electricity cooperatives. The main source of generation was hydroelectric capacity.

Argentina's Federal Utilities: Prior and After Privatization



Source: EIA

The industry was regulated by the federal government through the Secretary of Energy. The electric power sector, which suffered from poor management practices and insufficient investment, was suffering financial and operational difficulties. The absence of clear objectives, the political motives of the state-owned companies and an economic environment of hyperinflation (that reached 200% per month in 1989) affected the performance of the electricity industry. Blackouts, which worsened during dry seasons due to the heavy reliance on hydroelectric generation, and electricity theft were very common problems. Overall, federal utilities were losing more than 20% of their power to non-paying customers. Electricity prices averaged about \$60/MWh in the 1980s.

In 1990, the government passed a law removing the government from direct operation in the electricity industry and introducing basic principles of competition. The Electricity Act of 1992 (the Act) established the legal framework for further restructuring and privatization with the ultimate intention to stimulate competition and to benefit consumers both in terms of price and quality of service.

The Act divided the electricity industry into generation, transmission, and distribution sectors. Generation became competitive, and transmission and distribution became regulated private monopolies. Generation companies were then privatized. Conventional electricity (thermal and hydroelectric) facilities were sold separately, essentially making each privatized generation facility an independent power producer. The thermal generation facilities were sold outright, while concessions (averaging 30 years) were awarded for the hydroelectric plants (see chart above).

Between April 1992 and June 1995, over 25 state-operated power companies were privatized. By 2000, there were 43 generating companies owning 96 plants -- 60 thermal, 34 hydroelectric, and 2 nuclear plants. These 43 generating companies were owned by private companies and provincial and international joint ventures. The majority of Argentina's privatized generation capacity was purchased by foreign companies. Because foreign companies generally showed little interest in small capacity generation facilities, the small capacity generation facilities tended to be acquired exclusively by domestic companies. The domestic companies tended not to purchase generation facilities in order to sell electricity in the national wholesale market. Rather, the domestic utilities intended these generation facilities to be captive facilities, purchased to provide for the companies' own electricity needs.

The Law created an independent sector regulator (Ente Nacional Regulador de la Electricidad - ENRE), the Wholesale Electricity Market (Mercado Eléctrico Mayorista - MEM), and its independent operator (Compañía Administradora del Mercado Mayorista Eléctrico S.A. - CAMMESA). ENRE was charged with enforcing laws, regulations and concession terms, setting distribution service standards, resolving disputes between electricity companies, overseeing CAMMESA, and setting maximum electricity prices. CAMMESA administers the wholesale market. It is a non-profit corporation equally owned by the federal government and four associations representing generators, transmitters, distributors, and major users. It is in charge of scheduling and dispatching generators in accordance with the power demand, on the basis of using marginal costs and availability offered by generators, employing those generators offering the lowest marginal costs first.

Power generation companies are not allowed to own majority shares in Argentina's three transmission companies. The transmission companies have to provide open access to their systems for the power generators on a regulated basis. Transporters are forbidden to generate or distribute power, but permitted to charge a toll/tariff for their transmission services. Distribution companies are organized as regional monopolies and permitted to buy electricity from the MEM or through contracts with power generation companies.

Effects of devaluation on the Electricity sector

During the economic crisis rates were frozen in pesos for utility customers. Many utilities had gone to international capital markets and borrowed funds in dollars depending upon the fixed rate convertibility of the peso to repay the debits. The net result was the electricity sector quickly saw their dollar value of their revenues fall by 73% while their debit obligations remained constant.

Restructuring Outcomes

Argentina's electricity market is now characterized by numerous producers in a highly competitive generation market. The MEM is a power pool aggregating electricity supply from all generation sources, including independent power producers, federal generators, bi-national utilities, and foreign sources of power interconnected to Argentina's grid. There are multiple companies with more than 1,000 MW of installed capacity, the largest one with 1,400 MW installed, constituting only six percent of total installed capacity.

The MEM comprises (1) a term market consisting of agreements for which quantities, prices and conditions are negotiated directly between buyers and sellers; (2) a spot market with hourly prices taking into consideration economic production costs; and (3) a balancing market. Due to the apparent over-capacity in the system and its resulting low prices in the short-term, most transactions are occurring in the spot market. All entities participating in the market, regardless of ownership, are to follow the market operating and pricing rules. Accordingly, electricity sales by individual power generation companies are forbidden to exceed 10% of national electricity sales.

Large investments and reduced wholesale power rates resulted from the creation of a competitive MEM with transparent rules of operation. The MEM became very competitive as evidenced by the large number of participants.

Number of generating companies participating in the MEM

	1993	1994	1995	1996	1997	1998	1999	2000
Generators	25	32	37	43	44	44	44	43

Source: CAMMESA

After restructuring and privatization, generation of electricity, which is now in the hands of more than 40 private companies as compared to 25 in 1993, has grown. Increased generation allowed Argentina to meet its own electricity demand as well as export electricity. Argentina and Brazil agreed in 1997 to integrate their electricity markets with guaranteed free competition among power generation companies, no federal/state subsidies and a price system based on costs alone.

Grid open access is based on the rule of "merit order, or economic, dispatch" that requires the electricity generated by the most efficient supplier to be dispatched first. This rule encouraged a gradual but steady drive to upgrade existing facilities. There has also been a noticeable trend to install co-generation facilities, which tend to be more efficient.

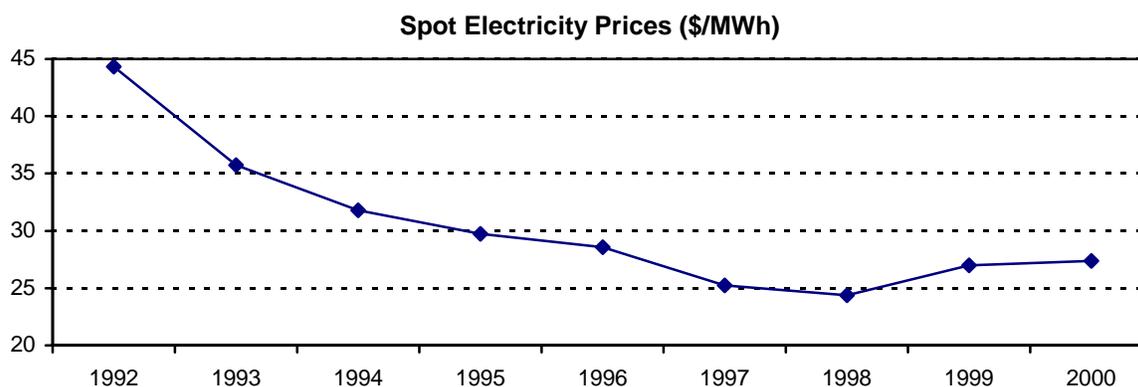
Argentina has also lowered barriers to entry of new independent power producers and supplier groups. Also, as set by ENRE and CAMMESA, it is far more difficult for generators to withdraw capacity from the dispatch queue. In addition, a series of new laws on foreign investments removed restrictions on foreign investments and allowed foreigners to acquire 100% of Argentine companies and to repatriate the profits and capital. The overall sector investment increased significantly from \$318 million in 1994 to a peak of more than \$2 billion in 1997. Between 1994 and 2000, a total of \$5.7 billion was invested into electricity sector.

Foreign investment in the Electric Power Industry (\$ Millions)

	1994	1995	1996	1997	1999	1998	2000	Total
Foreign Investment	318.3	607.6	475.6	2,003.5	981.3	545.8	770.2	5,702.4
	2	9	0	2	1	4	0	8

Source: Fundacion Invertir Argentina

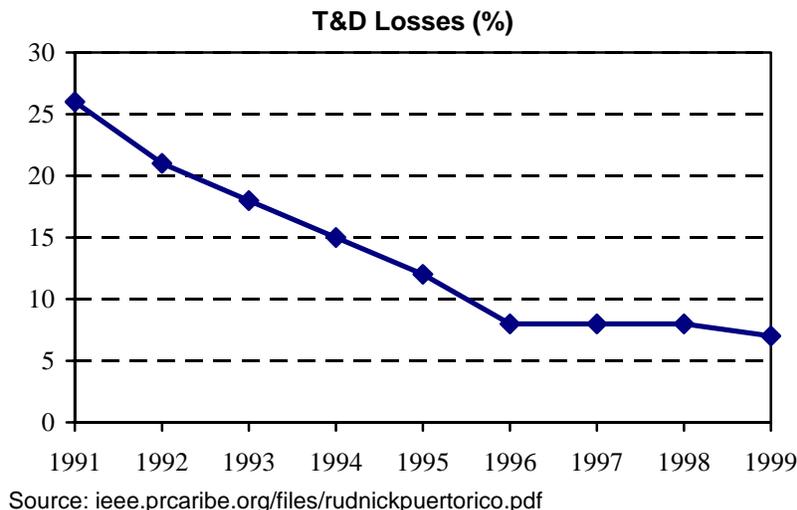
As a result of increased competition, MEM wholesale prices have fallen significantly. Such drop in prices is primarily due to the installation of increasingly efficient capacity and the improving operating efficiencies of former state enterprises. The price declined significantly in a short period from \$45/MWh in 1992 to about \$25/MWh in 1998 before increasing to \$27-28 range in 2000.



Source: Cammesa

Another improvement was observed in the area of transmission and distribution (T&D) losses, which used to be very high in the 1980s with 25 to 30% of all generation lost during T&D either due to lack of maintenance and upgrade of the grid or due to theft. The chart

below shows that T&D have been reduced from 26% in 1991 to about 7% in 1999, which is at par with the minimal system losses experienced in the U.S.



Service reliability has also increased as a result of reforms. For example, the northern Buenos Aires distribution company reduced outages from 22 hours per year in 1992 to 6 hours per year in 1995. Meanwhile, the southern Buenos Aires distribution company cut outages from 39 hours per year to 6 hours per year over the same period. Reliability also has been increased through the introduction of improved technology, by retrofit of generating plants with power system stabilizers. Once the stabilizers were in place, a system to automatically disconnect generating capacity could be designed. This way, problems in the transmission system were less likely to cause widespread outages because the automatic system disconnects as little generating capacity as possible, given the particular transmission problem.

2002 Postscript

Argentina experienced a dramatic reversal of economic fortunes during 2001-2002. The factors for this reversal – high levels of public sector spending and debt, a high degree of corruption and so on – have created great uncertainties around the country's future and its energy, and economic, restructuring efforts. Considerable concern exists that inherent and fundamental problems in the Argentine economy were routinely ignored by multilateral institutions as well as by the country's own leadership. Peso-denominated investments in the energy sector have suffered huge losses in terms of both market value and revenue streams. Opportunities may exist for new investors to enter, at bargain prices for assets. It is impossible to say what the outcomes might be. Overall, Argentina's strategy and intent with regard to energy sector restructuring appears to have been sound, although macroeconomic policy clearly was lacking in soundness. The situation demonstrates the integral relationship between governance of the energy sector and overall governance of a national economy with implications for foreign direct investment.

While some observers speculate that the worst of the financial collapse is behind the country, others project that the export tax will restrict those industries that could propel economic growth, namely agriculture and energy, and economic malaise will continue into the medium-term. Argentina's next elections are scheduled for March 2003. The ballot will include candidates for the country's Presidency, as well as half of the lower house and one third of the Senate.