The IPP Investment Experience in Argentina

Alejandra Nuñez-Luna *and*
Erik J. Woodhouse

Working Paper #44

August 16, 2005

The Program on Energy and Sustainable Development at Stanford University is an interdisciplinary research program focused on the economic and environmental consequences of global energy consumption. Its studies examine the development of global natural gas markets, reform of electric power markets, international climate policy, and how the availability of modern energy services, such as electricity, can affect the process of economic growth in the world's poorest regions.

The Program, established in September 2001, includes a global network of scholars—based at centers of excellence on five continents—in law, political science, economics and engineering. It is based at the Center for Environmental Science and Policy, at the Stanford Institute for International Studies.

Program on Energy and Sustainable Development
At the Center for Environmental Science and Policy
Encina Hall East, Room 415
Stanford University
Stanford, CA 94305-6055

http://pesd.stanford.edu

About The Experience of Independent Power Projects in Developing Countries Study

Private investment in electricity generation (so called "independent power producers" or IPPs) in developing countries grew dramatically during the 1990s, only to decline equally dramatically in the wake of the Asian financial crisis and other troubles in the late 1990s. The Program on Energy and Sustainable Development at Stanford University is undertaking a detailed review of the IPP experience in developing countries. The study has sought to identify the principal factors that explain the wide variation in outcomes for IPP investors and hosts. It also aims to identify lessons for the next wave in private investment in electricity generation.

PESD's work has focused directly on the experiences with IPPs in 10 developing and reforming countries (Argentina, Brazil, China, India, Malaysia, Mexico, the Philippines, Poland, Thailand and Turkey). PESD has also helped to establish a complementary study at the Management Program in Infrastructure Reform & Regulation at the University of Cape Town ("IIRR"), which is employing the same methodology in a detailed study of IPPs in three African countries (Egypt, Kenya and Tanzania).

About the Authors

Alejandra Núñez-Luna is a Juridical Science (S.J.D.) doctoral candidate at Harvard and a former research fellow at the Program of Energy and Sustainable Development in Stanford. She is currently doing research on the relationship between water rights and social conflict around river basins in Mexico. Her work also focuses on the political and distributional aspects of privatization of electricity and water in Latin American countries.

Alejandra holds a Master of Laws (LL.M) from Harvard Law School and a Bachelor of Laws (LL.B.) from the Instituto Tecnológico Autónomo de México.

Erik Woodhouse is a Post-Doctoral Scholar with the Program on Energy and Sustainable Development. His current research focuses on energy infrastructure investment in developing countries. Other recent research includes work in comparative corporate governance and law and international relations.

Mr. Woodhouse holds a J.D. from Stanford Law School and a B.A. from Emory University in International Studies and Philosophy.

Disclaimer

This paper was written by a researcher (or researchers) who participated in the PESD study *The Experience of Independent Power Investment in Developing Countries*. Where feasible, this paper has been reviewed prior to release. However, the research and the views expressed within are those of the individual researcher(s), and do not necessarily represent the views of Stanford University.

The IPP Investment Experience in Argentina

Erik J. Woodhouse and Ale Nuñez-Luna

I. Introduction

This paper is part of the wider Program on Energy and Sustainable Development study on the historical experience of Independent Power Producers (IPPs) in countries that are in the midst of transforming the industrial organization of their electric power sectors. The study seeks to explain the patterns of investment in IPPs and the variation in IPP experiences. The aim is not only to assess the historical record accurately but also to chart possible future paths for the IPP mode of power sector investment. This paper follows the research methods and guidelines laid out in the project's research protocol.[1]

The reform of the electricity sector in Argentina that began in the early 1990s was widely seen as an example for the developing world. Argentina quickly established a stable institutional design to govern electricity provision, considerably improved the financial and technical performance of the sector, and had one of the most advanced electricity systems in the developing world – with open access to the grid and competitive wholesale markets.

The recent macroeconomic crisis changed this picture. Fundamentally, the crisis exposed investors to enormous currency and market risk. However, the crisis has, in turn, sharply deteriorated the political and institutional context for private investors in the country. This case study presents the opportunity to examine the effect of macroeconomic shock in Argentina's "model" electricity market – a relevant comparison to similar experiences in South East Asia. Additionally, we examine whether the troubles in the IPP sector were primarily macroeconomic, or whether political and institutional factors also played a part.

II. Argentina: Investment Environment

A. The Macroeconomic Context.

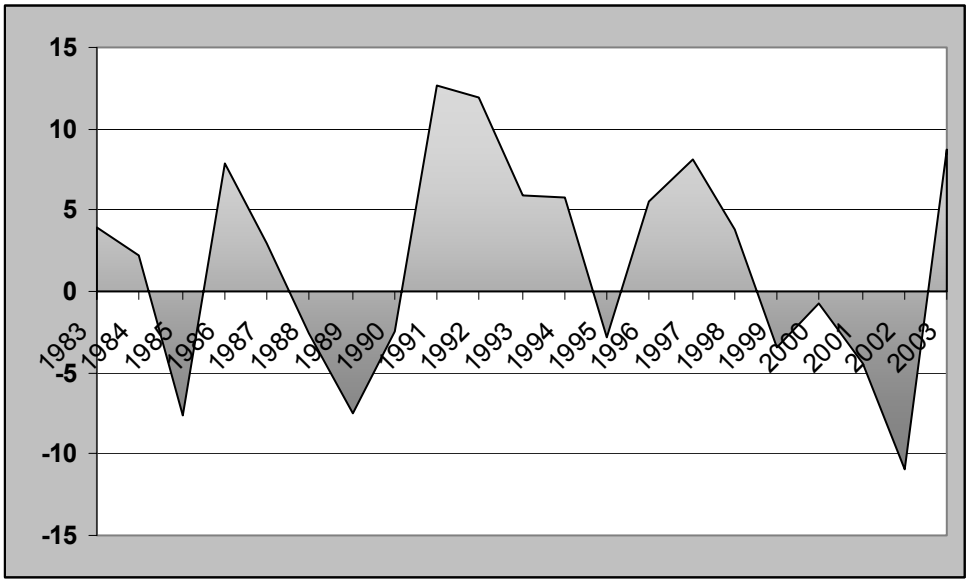
During most of the 1990s, the investment climate in Argentina was considered one of the best in the developing world. The low levels of risk reflected Argentina's political climate, the apparent dedication of its government to a program of macroeconomic stability, and the large growth rates forecast for the entire region. This was particularly true during the privatization of the electricity sector, which attracted intense interest from private investors.[2] The figure below details the annual growth rates of Argentina's GDP—from 1991 to 1998, the Argentine economy sustained robust growth, with the exception of a small hiccup in 1996.

---

[1] Victor, et al (2004). "The Experience with Independent Power Projects in Developing Countries: Introduction and Case Study Methods", PESD Working Paper #23, available at http://pesd.stanford.edu/publications/workingpapers.html.

[2] For example, when 90 percent of the Buenos Aires provincial electricity company was privatized during 1996, sixteen consortia made offers.

FIGURE 1: ARGENTINA – ANNUAL GDP GROWTH RATES, 1983-2003



After having been a model for developing countries, Argentina economy collapsed during a four year period from 1999-2003. The seeds of this collapse had been apparent for some time – for example in the ballooning external-debt-to-GDP ratio, which rose from 28% to 51% during the 1990s, while total debt service as a percentage of exports rose to 97% by 1999. In some analyses, this was driven by government borrowing to feed a patronage system that would have been starved of necessary funds under the fixed exchange regime.[3]

Internal consumption plummeted, fiscal policy contracted, and private investment has all but disappeared. In 2001, Argentina abandoned the currency peg that had maintained 1:1 parity between the dollar and peso throughout the 1990s, and watched its currency lose 200% of its value in a matter of months. As a result of this crisis, the political and institutional fabric of the Argentine state underwent drastic upheaval—in one period the country cycled through four presidents in a matter of months.

In response to the deepening economic crisis, the central government imposed a freeze on bank withdrawals, converted public utility contracts to pesos, froze utility tariffs, and restricted the expatriation of hard currency. In the context of the IPP sector, the most pressing policy issue is the renegotiation of public external debt. Some glimmers of hope exist though. The current president, Nestor Kirchner, has turned a weak presidential mandate into a strong popular support. The economy is growing again; in 2003, real GDP expanded by 8.7%, driven by a 38.1% increase in gross fixed investment and an 8.1% rise in private consumption. Annual inflation dropped from 36.1% in 2002 to below 3% since.

On the energy side, the renegotiation of contracts with privatized utilities will weigh heavily on investors' confidence. The IPPs have called for increases in the frozen public utility rates, but the Kirchner government is weary of allowing inflationary pressures. In the near term,

[3] Inter-American Development Bank, *Argentina Country Paper*, Washington DC (2000), 14-16.

cautious monetary policy should help to ensure that inflation remains under control and may allow for a modest increase in utility rates. The economic recovery may allow IPPs to resume limited investment in 2004.

B. The Social and Political Context.

The sustained growth and stability of the 1990s may have masked persistently weak social and political institutions, which may have contributed to the inability of Argentina as a state to mediate the conflicts and turbulence introduced by the 2001 crisis. Formally, the Argentine political structure resembles that of the United States, with separation of powers between three branches of government, a federal government structure holding together 24 provinces, and a constitution. However, the similarities end there, as Argentina grapples continually with corruption and a deep seated patronage system and institutional weakness.

In the political arena, the Argentine government is dominated by a powerful executive and characterized by deep and endemic corruption. Although technically autonomous, Argentina's provinces are deeply dependent on support from the federal government – support that is regularly manipulated to political ends. Politicians are elected to Congress via a system of proportional representation, meaning that party discipline and ability to compete in the patronage marketplace are the hallmarks of most representatives. The judiciary is also regularly manipulated, including "court packing" episodes under President Alfonsin (1983-1989) and under President Carlos Menem (1989-1999) reminiscent of the 1930s scandal in the United States – except in Argentina, President Menem was successful.

The institutional structure and history of the Argentine governance context has been criticized as unable to provide a credible commitment to private investment, in the case of telecommunications.[4] Although there have been periods of restraint towards private infrastructure investors, the ebb and flow of Argentine politics over the past five decades indicates that structural restraints on government are not sufficient. This pattern was notably in effect during the 1990 privatization of Entel, the state telecom company (*see below*).

These problems in the political sphere likely exacerbate a restive social makeup. The workforce is well-mobilized, and is generally better paid than counterparts in Latin America. However, high unemployment, and growing general dissatisfaction with the neo-liberal reforms of the 1990s, has engendered increasingly aggressive protests. In the aftermath of the 2001 crisis, this anger was increasingly directed towards foreign investors. Unions have set up roadblocks to prevent access to foreign-owned oil refineries, and unidentified protesters have set off bombs near the offices of foreign-owned electric utilities.[5]

These observations also make the electricity sector potentially very interesting. The market reform that Argentina implemented in the early 1990s has been cited as a model of electricity sector reform, and established an advanced merchant electricity system that was stable until the 2001 crisis. The aggressive reversal of policy in the aftermath of the crisis suggests a

---

[4] Brian Levy and Pablo T. Spiller, *The Institutional Foundations of Regulatory Commitment: A Comparative Analysis of Telecommunications Regulation*, 10 J. OF L., ECON. & ORG., 201 (1994).
[5] World Markets Research Council, Argentina Country Report (2004), p. 25.

continuation of the subordination of law and institutions to politics, consistent with Argentina's history.[6] Yet it also invites exploration into the apparently effective management of the electricity sector until 2001.

C. The Reform Experience and Foreign Investment in Argentina.

Argentina began a sustained reform process in 1989-1990, under the leadership of newly elected President Carlos Menem. This reform process was driven by the need to revitalize an economy that had grown an average of 1% per year since the 1970s, but without increasing the burden on public finance, as the government was largely broke at the time. At the time, Argentina's economy was in the grip of hyperinflation, and Menem took office with an overwhelming mandate to stabilize the country.

The reform experience is impossible to understand without a brief note regarding the Menem administration, which succeed in implementing a radical restructuring of the Argentine economy that paid dividends in the short run, but ultimately failed to foster a sustainable basis for growth. This is due in large part to Menem's failure to strengthen Argentina's political and institutional foundation, relying instead on patronage, emergency powers, and a powerful mandate to implement policy. Menem actually took office early as President Alfonsin sought to avoid a total implosion in the late 1980s – in exchange Menem secured a promise from Alfonsin (who led the soon-to-be opposition party) to keep his party out of votes on crucial legislation.[7] Subsequently, the authorization of emergency powers by Congress, the unprecedented use of executive decree, and a series of favorable rulings by the Supreme Court (to which Menem had appointed five of nine justices) removed almost any real restraint on the new president's authority.

In the economic sphere, Menem crafted a policy that focused on three components: the convertibility law that pegged the peso-dollar exchange rate, trade liberalization, and privatization. The *Convertibility Law* that established the fixed exchange regime was the centerpiece, and imposed constraint on government spending that had never before been enforced. Menem also rapidly dismantled many of the protectionist policies of the past, legacies of the era of import-substitution-industrialization in Latin America, although his policies in this arena are also criticized for being uneven and discriminatory.[8] The privatization of state owned infrastructure and utilities played a critical role in this process, but produced very different results across sectors. Generally, the privatization of telecommunications and transport was a disaster, while the privatization of the electricity sector was a success widely admired in the developing world.

The differences in the reform process between telecom and electricity are striking.[9] The telecoms privatization aimed explicitly at generating revenue for a cash strapped government,

---

[6] At the same time, the harshness of this conclusion may be tempered by acknowledging that the 2001 crisis was perhaps the most severe in the developing world in the last two decades.
[7] Luigi Manzetti, *The Argentine Implosion*, The North-South Agenda Papers, No. 59, Nov. 2002, at 9.
[8] *Id*. at 6.
[9] This description of the Argentine telecommunications privatization is taken primarily from Luigi Manzetti, *Privatization and Regulation: Lessons from Argentina and Chile,* The North-South Agenda Papers, No. 24 (April 1997).

rather than at improving economic or technical efficiency in the telecoms sector. The Argentine government at the time implemented no preparations in the industrial organization or the regulation of the telecoms sector. Rather than restructure the state telecommunication companies in anticipation of competition, or establishing a regulatory framework to oversee the new private market, the privatization was pushed through immediately. This produced predictable results in the privatization process, as the government changed policies repeatedly in response to various pressures from investors or the public.

At various points during the privatization process, the government divided the telecom SOE (Entel) into northern and southern regions to increase investor interest; reduced the guaranteed rate of return from 16% in response to political pressure; expanded monopoly rights and the length of the concessions for the two regional telecoms in response to pressure from investors upset with the chaotic handling of the process; introduced a plan for an independent regulator that did not actually come into being until two years after privatization was complete; and created a new price regime that was announced hours before the auction. Predictably, only three firms submitted bids, and Argentina was soon paying exorbitant prices for telecommunications services.[10] Problems in this sector have continued; in the mid-1990s the government fired by decree the entire board of the telecom regulator when they refused to approve a rate hike for private service providers.[11]

By contrast, the privatization of the electricity sector (described on pp. 5-7, below) has been regarded as an illustration of the benefits of a well-structured reform process. Despite this fact, and the benefits that flowed from electricity restructuring, the mixed history of privatization in Argentina may have played a role in eroding public support for private, and particularly foreign, infrastructure investors in the aftermath of the 2001 crisis. Additionally, the genesis of these reforms in the Peronist government of Carlos Menem, associated with cronyism and mismanagement, undoubtedly invited an explosive political backlash once things began to fall apart.

III. ARGENTINA: ELECTRICITY MARKET CONTEXT

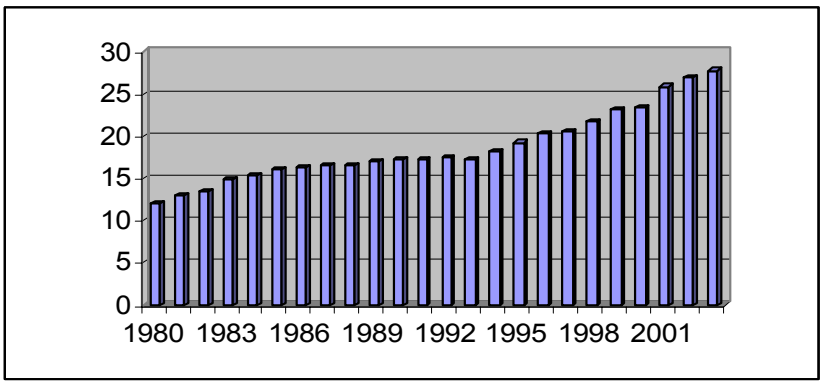
A. Electricity Sector Overview.

1. *Installed Capacity*.

In 2001, just before the financial crisis, Argentina had installed capacity of 25,000 MW with a yearly electricity generation of 90,181 GWh. Electricity consumption was 76,195 GWh, growing 5% per annum. In spite of the recent crisis, planners still expect electricity demand to continue growing at the same average throughout the decade.

[10] *Id.* at 4-5, 7-8.
[11] Manzetti, *The Argentine Implosion*, *supra* note 7, at 8.

FIGURE 2: ARGENTINA INSTALLED CAPACITY (GW)



Source: Energy Information Agency

2. *Domestic Fuel Markets*.

Argentina is a net exporter of fuel, primarily natural gas but also some domestic oil production. Oil resources include almost reserves of almost 3 billion barrels and annual production of 42 million m3 in 2003. Gas resources amount to proven reserves of 6.63 trillion m3 and annual production of roughly 50 billion m3 in 2003.

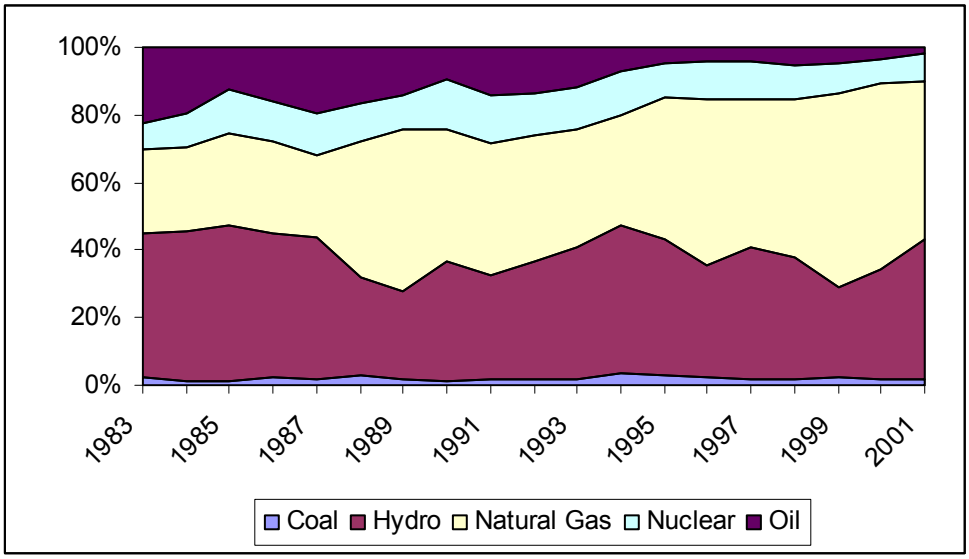
The oil and gas industry is almost entirely private. The upstream market is dominated by Repsol-YPF (formed in the 1999 merger of Spanish firm Repsol with state firm YPF), and ventures by ChevronTexaco, Petrobras, BP and other international oil/gas majors (sometimes in partnership with private Argentine firms).

Gas transport in Argentina is run through five major domestic pipelines, each of which connects to Buenos Aires. The domestic pipelines are owned by two privatized firms: Transportadora del Gas del Norte (CMS Energy, Total, Petronas, Techint), and Transportadora del Gas del Sur (Petrobras and Enron). Argentina has several privately owned pipelines connecting domestic gas supply to outlets in Chile (4 pipelines), Brazil (1 pipeline), Bolivia (1 pipeline), and Uruguay (1 pipeline).

3. *Fuel Mix for Electricity*.

Natural gas and hydro account for most of Argentina's electricity – roughly 50% from gas and 40% is hydroelectric, with limited nuclear capacity as well. The capacity additions contemplated for the coming years are mostly thermal, using natural gas-fired plants.

FIGURE 3: ARGENTINA ELECTRICITY GENERATION BY FUEL TYPE (% TOTAL)



Source: World Bank, World Development Indicators

3. *Performance of the Electricity Sector*.

Argentina has the most developed energy sector in Latin America, with electricity service covering around 95% of the total population, although the level of electrification in isolated areas are a more modest 70%. The efficiency of the generation market has improved substantially with reform – falling from a high of US$60/mWh in 1990 to US$22/mWh by 1995.[12] System loss reached a peak of roughly 20% in 1992-93 and declined to 13% by 2001.[13]

B. Electricity Restructuring.

1. *Industry Structure Prior to Reform*.

Until the early 1990s, Argentina faced a chronic lack of investment in its electricity industry, high demand growth (over 7 percent per annum) and frequent supply interruptions. The industry was entirely owned by the government, except for several small electricity cooperatives. Four large federally-owned utilities controlled close to 88% of the generation and transmission in the country, with the rest shared among 19 small provincial utilities and two dam joint-ventures with Paraguay and Uruguay.[14] Distribution outside of Buenos Aires was largely in the hands of provincial authorities.

2. *Preparations for Electricity Reform*.

The late 1980s and early 1990s in Argentina were a period of sustained crisis, characterized by persistent hyperinflation. Inflation during the 1980s was regularly between

[12] IFC report, 7
[13] Data taken from the World Development Indicators (World Bank, 2004).
[14] IFC report, 1

300-600%, and peaked at 3000% in 1990.[15] Thus, electricity reform came in the context of a widespread campaign to stabilize the economy. The *Economic Emergency Act* mandated fiscal and monetary constraint, while the *Convertibility Act* indexed the peso to the US dollar to stabilize the currency. These laws quickly improved monetary stability in the country, but also constrained public finance and required an alternate form of financing to meet the government's deficit. In this context, initial privatizations of federal utilities were pursued in order to limit federal expenditures and as a source of revenue to the Treasury. In response to a disastrous experience in the privatization of telecommunications, and to the lessons from the Chilean experience with electricity privatization, the Argentine government proceeded more carefully in the electricity sector.

During this time, Argentina also established a legal framework to encourage foreign direct investment. The *Bilateral Investment Treaty 1992* signed with the United States guaranteed to American companies the privilege to invest in terms no less favorable than those applied to domestic companies. Additionally, *Decree # 1853 of 1993* removed all restrictions on foreign investment, enabling 100% participation in privatized entities and full repatriation of profits.

3. *Privatization and the Electricity Act of 1992*.

The principal goals of the electricity restructuring were (i) to improve the economic and technical efficiency of the electricity market, and (ii) to ensure adequate long-term investment levels in electricity.[16] The government began by creating a legal framework for the restructuring. *Law Nº 24065 of January 1992* (the Electricity Act) established an independent regulator (ENRE) to oversee the sector, and unbundled the electricity industry into three sectors: generation, transmission and distribution, allowing private participation in each sector. In the process of unbundling, the major electric utilities were commercialized – in the case of SEGBA, this process has begun as early as 1989.[17] The original round of privatization was very competitive.

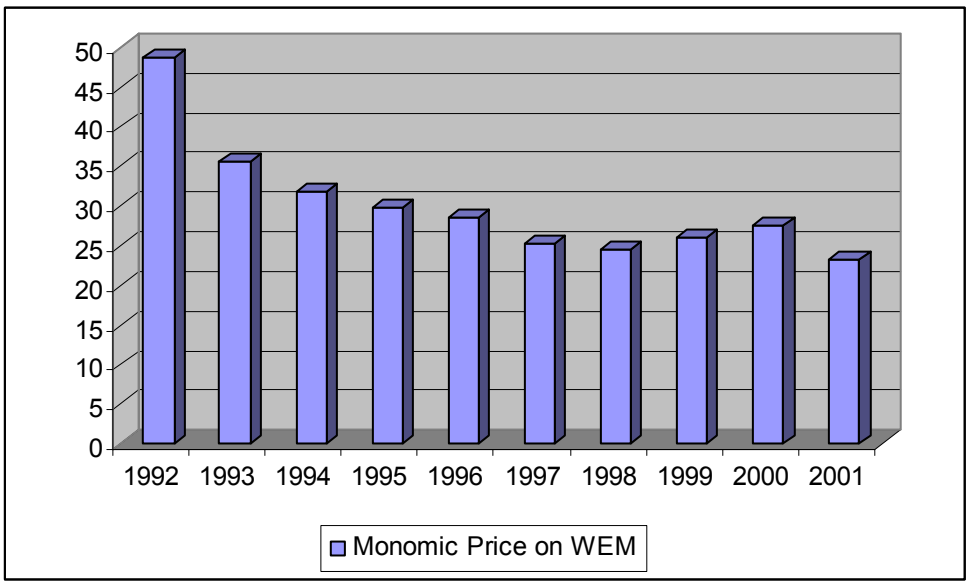
4. *Gains from Restructuring*.

The post-privatization spot price for electricity in Argentina decreased from (US) $41/megawatt-hour in 1992 to $22/megawatt-hour in 1995,[18] thermal power plant availability improved from 48 percent to nearly 70 percent,[19] and distribution losses were reduced by almost half.[20] Increased reliability of electricity service has been substantial in some cases. For example, the northern Buenos Aires distribution company reduced outages from 22 hours per year in 1992 to 6 hours per year in 1995.

---

[15] Data taken from the World Development Indicators (World Bank, 2004).
[16] Antonio Estache and Martin Rodriguez-Pardina, Light and Lightning at the End of the Public Tunnel: Reform of the Electricity Sector in the Southern Cone, Policy Research Working Paper, No. 2074 (World Bank, 1999), at 6.
[17] *Id*.
[18] Antonio Estache and Martin Rodriguez-Pardina, *Regulatory Lessons from Argentina's Power Concessions*, Viewpoint Note No. 92, The World Bank Group (Sept. 1996), tbl. 1.
[19] *Id.*
[20] *Id.*

FIGURE 4: EVOLUTION OF SPOT MARKET PRICES, 1992-2001 (US DOLLARS)



Source: Pedro J.A. Ferreira, On the Efficiency of the Argentinean Electricity Wholesale Market, Seminario No. 09/02 (June 6, 2002)

C. The Argentine Power Sector Post-1992 Reforms.

1. *Industry Structure*.

The Electricity Act of 1992 unbundled the electricity industry and laid the foundations for privatization. The resulting market organization included competitive generation markets, and transmission and distribution sectors organized into regional monopolies privatized via concession to the private sector.

The **generation sector** is almost entirely private and loosely regulated as a competitive market. The federal government retains control of the bi-national hydroelectric projects (Yaciretá, Salto Grande) and a nuclear plant (ENASA), while provincial utilities still own some of the smaller plants. Roughly 10,000 MW of Argentina's total installed capacity of 18,300 MW has been sold, leaving about ten power generators under the ownership of federal or provincial governments.[21] The privatization effort, combined with greenfield investment succeeded in increasing capacity from 15 GW to 20 GW in 10 years, while the number of generators increased from 14 to 45 (of which 40 are private).

Foreign investors hold a major ownership stake in these units (primarily from the US and Chile). However, most small capacity generation facilities were purchased by domestic companies, not for selling into the national wholesale market, but rather for self-supply. The industry is extremely competitive in relation to other countries generation sectors, the result of explicit government policy. Generators were legally restricted to a market share of 10 percent or

[21] The two large bi-national hydroelectric generators are still state-owned and the Argentinean government seems to have abandoned plans for its privatization in the near future. However, these two plants effectively act as IPPs, selling their electricity through the wholesale electricity market (any power they generate is always dispatched.)

less of the national electricity sales volume, and were not allowed to own a majority share in any transmission facilities.[22]

TABLE 1: GENERATING COMPANIES OPERATING IN ARGENTINA

Company	Number of Plants	Installed Capacity (MW)
Republic of Argentina	3	4410
Endesa (Spain)	4	3696
Gener (Chile) (*acquired by AES*)	4	3545
AES Corp. (USA)	5	1888
CMS/Duke (USA)	3	1054
Pecom (Argentina)	2	929
PlusPetrol	3	600
Capex (*El Paso and local partner*)	1	628
IPC (UK) / Camuzzi (Italy)	1	620
Electricite de France	2	605
FATLyF / IATE (Argentina)	4	465
APUATE / NECON / CHEDIAK (Arg.)	2	69
Other private	4	661
Local governments	4	1161

The **transmission sector** is largely private, with over 90 percent of Argentina's transmitted power is carried by private entities. Private investors enter the transmission market by winning a concession for a particular area. The sector consists of one national high-voltage grid controlled by Transener, and a series of regional monopolies. These companies are closely regulated, although some of the regional monopolies remain in the hands of provincial governments. Transener is owned by a joint venture between Petrobras and an Argentine equity fund, after the UK National Grid recently divested its interest in Transener.

Similarly, the **distribution sector** is also largely private, although closely regulated. All federal distribution assets have been privatized, although many provincial discos are still publicly owned. As in transmission, private investors enter the market by winning a concession for a particular area. In both transmission and distribution tariffs are set in US$, and prices are set according to a standard price-capping formula with full pass-through of energy costs.[23]

TABLE 2: ARGENTINA'S MAJOR ELECTRICITY DISTRIBUTION COMPANIES

Company	Service	Primary Investors
Edenor	Metro Buenos Aires	Electricite de France
Edesur	Metro Buenos Aires	Petrobras, Grupo Enersis
Edelap	Metro Buenos Aires	AES, PSEG
Eden	Buenos Aires Province	AES, PSEG
Edes	Buenos Aires Province	AES, PSEG

Source: World Markets Research Centre, Country Report: Argentina (Energy), 22 Nov. 2004.
Note: Grupo Enersis is a Chilean utility that is 65% owned by Spanish utility Endesa.

[22] *See also*, Estache and Rodriguez-Pardina, *supra* note 16, at 15 ("The Herfindahl Index for the three largest generating firms is 0.15, which results in a highly competitive market, where large customers pay up to 30 percent less for electricity than their Chilean counterparts").
[23] Estache and Rodriguez-Pardina, *supra* note 16, at 9.

The major distributors are the three companies serving metropolitan Buenos Aires, (Edesur, Edenor, and Edelap) and two others serving Buenos Aires province (Eden and Edes). These first three firms were created in the breakup and privatization of the integrated state utility SEGBA in the early 1990s.

2. *Market Regulation*.

The Electricity Act of 1992 established three entities with principal responsibility over the electricity sector. The *Secretariat of Energy*, within the Ministry of Economy, Public Works and Services, is responsible for formulates national energy policy and for overall management of the electricity sector, including defining dispatch criteria for the wholesale market.

The *Ente Nacional Regulator de Electricidad* ("ENRE") is the federal regulator with direct authority over the electricity sector in Argentina, from generation to distribution. ENRE mediates disputes and enforces federal laws, regulations, and terms of concessions, establishes service standards that distribution companies must meet, as well as price-cap regulations. The functions and responsibility of ENRE are set forth in the Electricity Act of 1992 – potentially limiting the capacity of the Executive to interfere with the regulatory agency. Further, ENRE makes and publishes its own budget annually, drawing revenue from fees charged to industry participants.

The *Compañia Administradora del Mercado Mayorista Eléctrico, S.A.* ("CAMMESA") is a nonprofit, independent agency established to manage the national transmission grid and competitive wholesale markets. CAMMESA is incorporated as a joint stock company jointly owned by the government (Ministry of Energy) and the power generation companies. CAMMESA allocates grid access, sets spot and seasonal prices, and is responsible for settlements in the wholesale energy market (described below).

3. *Electricity Prices and the Wholesale Electricity Markets*.

The competitive energy market was introduced in 1992, and is divided into two unconnected regional power pools. The main Wholesale Electricity Market (known by its Spanish acronym, "MEM") is the largest system in the country with a total installed capacity of 19,271 MW in 1998. The Southern Patagonia Wholesale Electricity Market ("MEMSP") operates the southern region and had an installed capacity of 831 MW in 1998. The wholesale market was created to establish a competitive market for generation with merit order dispatch such that the lowest cost generator is dispatched first. Competition is encouraged by open access to the wholesale market that is guaranteed by law.

The MEM consists of an Options Market (bi-lateral private contracts) and a Spot Market (regulated by CAMMESA). Prices fall into three categories, reflecting the different ways in which electricity is bought and sold. *Contract prices* in the Options Market reflect 1+ year agreements between generators and large users. Although large users can contract directly with generators, thus bypassing the commercial aspect of the MEM, they cannot physically bypass this system, but must run their private purchases through the transmission system. *Seasonal prices* are set by CAMMESA biannually, based on the prevailing supply-demand situation, and

include components for dispatched electricity, capacity and capacity related services. Distribution companies buying electricity above their contracted amount and generators who need to cover a capacity shortfall pay the seasonal price.

Spot prices vary hourly, and are determined according to the rules of the MEM (see below) and paid by generators or large users who need to acquire electricity beyond what they have contracted. Generators selling electricity into the spot market are paid a capacity fee and an energy fee. The energy fee is determined by multiplying the hourly dispatch of energy by the spot price at that time. The capacity fee is the sum of a base price per MWh (US$5) plus a reliability price, which is at least US$5 per MWh. Since 1994, the capacity price in the MEM has been US$10 per MWh.

CAMMESA is responsible for dispatch and for settlements. Plants are dispatched according to least cost supply until current demand is met. Settlement prices are set according to the highest cost plant that is dispatched. Use of the wholesale electricity market has increased substantially since its creation in 1992. The number of exchanges taking place in the market has greatly increased—for example from approximately 20 (between February and April 1994) to around 450 (between November 1995 and January 1996). The number of participants in the wholesale market has demonstrated similar growth over the same period, particularly by large users, as total participants increased from about 50 (between February and April 1994) to more than 500 (between November 1995 and January 1996).

Retail tariffs are regulated by ENRE, and include components for the purchase cost of electricity on the MEM (which include transmission costs) and for distribution costs. The distribution portion of retail tariffs is set for 5-year periods, under a "price-cap" methodology. The costs of wholesale electricity purchases on the MEM are entirely passed through to consumers *by law*. Cross-subsidies are prohibited, also by law. Direct subsidies are limited to a 50% subsidy for low-income pensioners in Metro Buenos Aires, paid by the federal government, and a 50% subsidy for electricity intensive industries, although provincial governments may provide subsidies on their own.

Prior to the 2001-2002 crisis, prices paid to electricity companies, including generators, transmission companies, and distribution companies, under any of the pricing schemes discussed above, were set and paid in US dollars.

IV. THE IPP EXPERIENCE IN ARGENTINA.

During the period 1992-2000, from the initial privatization until the recent national crisis, IPPs for the most part thrived in a strong market overseen by a stable regulatory regime. Since the crisis, IPPs (and all private infrastructure sectors) have been locked in ongoing disputes with the government regarding aggressive policies in the aftermath of the devaluation. These measures included freezing of tariffs and limits on expatriation of profits.

A. The Pre-Crisis Period.

Until the devaluation, the increasing number of participating investors and the proceeds obtained from power plant privatization attested to the attractiveness of the electric power business in Argentina. IPPs competed in a largely unregulated environment, where unimpeded market forces and regulatory protection from natural-monopolies like transmission ensured a more-or-less level playing field. Moreover, with wholesale supply entirely in the hands of foreign-owned companies, a healthy level of competition ensued. At times, the competition in this wholesale market overheated—in October 1994, spot market prices literally reached zero, before recovering thereafter.[24] One possible explanation for this striking result is the prevalence of gas companies in Argentina's IPP market—firms that are more interested in monetizing upstream resources than in profiting from electricity generation.

Several critical factors combined to ensure this competitive market environment for private generators. First, although IPPs assumed market and fuel risks in the absence of PPAs, generators whose production costs were too high to be dispatched by CAMMESA received a capacity payment for providing the system with reserve power, effectively creating a price floor for generators. Second, generation companies were not subjected to price-cap regulation, contrary to transmission and distribution companies; while transmission companies are also prohibited from generating or distributing electricity.

The restrictions placed in IPPs were largely to protect the competitive composition of the wholesale market. First, no single generation company was allowed to provide for more than 10% of national generation capacity.[25] Additionally, IPPs were prohibited from owning majority shares in electricity transmission facilities.

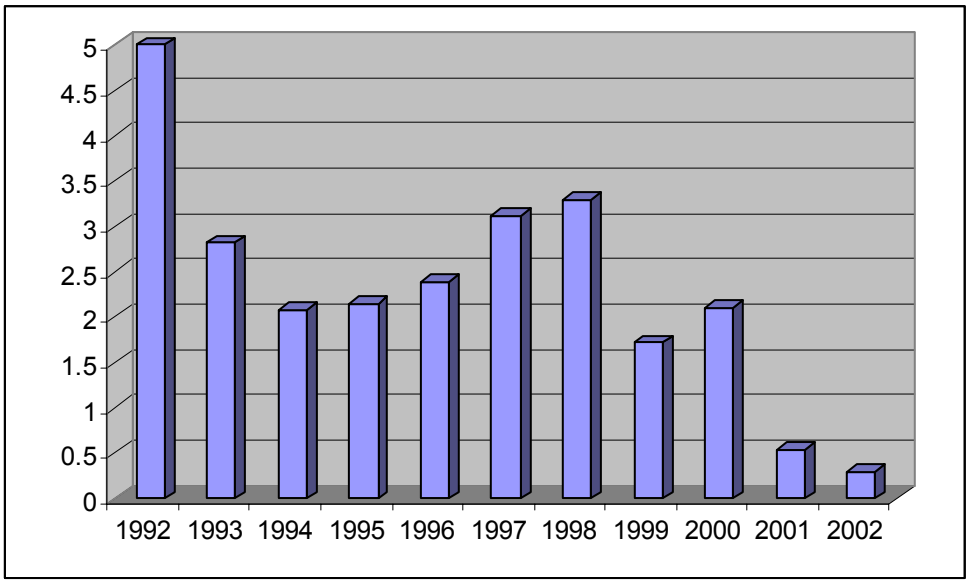
Private companies first invested in the privatization of Argentina's electricity industry for four main reasons: (i) *growth opportunities*: Argentina's electricity industry was expected to grow 8% per year from 1994 to 2000, against 2% in the United States; (ii) *learning experience with a deregulated market*: particularly in anticipation of similar deregulation in the United States and other developing countries; (iii) *strategic positioning*: to expand into investments in the privatized electricity industries of other Latin American countries; (iv) *to apply know-how* in electricity operations (*e.g.,* power generation) learned or acquired from somewhere else.

Growth in this new market remained robust until the 2001-2002 crisis; even with declining electricity prices, investment in the power sector was still attractive. New generation projects and efficiency improvement continue to occur, with construction of natural gas-fired power plants using state-of-the-art technology yielding much greater efficiency.

[24] Jonathan Friedland and Benjamin Holden, *Power Structure: Utility Deregulation in Argentina Presages Possible US Upheaval*, WALL ST. J. (June 19, 1996), at A1.

[25] The 10% limit, plus the limitation for transmission companies to enter the generation market are the two major differences with the Chile privatization program it was modeled after.

FIGURE 6: PRIVATE INVESTMENT IN
ARGENTINA'S POWER SECTOR, 1992-2002 (BILLION US$)



Source: World Bank, World Development Indicators

Most of the IPPs in Argentina were brownfield acquisitions from the large-scale privatizations of the early 1990s. (*Appendix A lists the greenfield IPPs and also identifies close to 40 privatized units that were sold to investors*). Under the Convertibility Law, the prices in the wholesale market, contract market and retail tariffs were all set in US dollars.

B. The Argentine Crisis of 2001-2002: Impact and Aftermath.

1. *The Argentine Crisis*.

The macroeconomic crisis that erupted in Argentina in 2001 is perhaps the most severe and most sustained among the country sample of the IPP study. Between 1999 and 2002, the Argentine economy experienced four consecutive years of negative growth, and in 2002 contracted by 10%.[26]

The crisis built during most of 2001. President De la Rua had been elected in 1999 atop a coalition of opposition parties aiming to unseat Menem's Peronist party. Once in office, however, the coalition proved unable to govern, and De la Rua stumbled through most of his term as economic crisis loomed. As pressure from the IMF mounted, investors and depositors grew nervous and billions of dollars began flowing out of the economy.[27] On December 20, President De la Rua stepped down from office and Argentina muddled through several provisional presidents until Eduardo Duhalde, a Peronist, to lead the country forward.

On December 6, 2001, the Argentine Congress already approved an emergency economic bill to address the growing crisis. This law abolished the artificial pegging of the Argentine peso

[26] Data taken from the World Development Indicators (World Bank, 2004).
[27] Manzetti, *The Argentine Implosion*, *supra* note 7, at 19.

to the US dollar. On January 6, 2002, President Duhalde announced a 29% devaluation of the peso as of January 9, and a free float of the currency four to five months thereafter.[28] Overall, the peso lost 200% of its value against the U.S. dollar in 2002 before stabilizing at about 3:1.[29]

2. *The Impact on Infrastructure Investors*.

The emergency economic measures included several other provisions that negatively impacted infrastructure investors, including IPPs.[30] First, utility tariffs were frozen pending further Congressional action. Second, the law abolished the denomination or indexation of utility tariffs and public service contracts in US dollars, mandating peso-based arrangements. Third, the law imposed limits on the repatriation of profits by foreign investors. Finally, the government forbade utilities from reducing services in response to deteriorating revenue.[31]

Thus, in the aftermath of the crisis, private power sector infrastructure investors were negatively impacted on several fronts. The elimination of US dollar-based sales imposed an immediate 29% reduction in revenue for foreign investors, with far more substantial losses to follow when the currency was floated. These losses could not be made up from retail tariffs because of the price freeze put into effect. Additionally, the crisis dampened electricity demand – total consumption in Argentina, which had been growing about 5% per annum for most of the 1990s, slowed in 2001 and fell by roughly one billion kilowatt hours in 2002.[32] Falling demand led in turn to lower prices on the MEM spot market.

Macroeconomic factors were not the only problems affecting the IPP investment experience. As in many other countries, macroeconomic crisis also exacerbated existing regulatory and other problems within the electricity sector. In Argentina, inadequate transmission capacity resulted (at least in part) from improper regulations discouraging private investment in transmission. Further, the incomplete privatization of provincial utilities provides ongoing opportunities for tariff manipulation by the provincial regulatory authorities.

Additionally, the government of Argentina displayed little capacity to manage the crisis effectively. The government began trying to renegotiate public service contracts ("PSC") in March 2002. The dispute continued throughout the year, consistently breaking upon the over utilities' demand to raise tariffs by 30% to offset the cost of the devaluation. Between November 2002 and February 2003, President Duhalde attempted to raise tariffs several times by 9%, but was blocked by a series of legal challenges. The emergency economic law of January 2002 forbade tariff increases unless accompanied by a renegotiation of the PSCs.

The unusually aggressive policy adopted by the government in the aftermath of the crisis, and the inability of successive administrations to resolve the dispute – despite renewed economic growth in 2003 and 2004 – has fueled cynicism on the part of foreign investors. Close to thirty

[28] World Markets Research Centre, Argentina Country Report (Jan. 14, 2002).
[29] Data taken from the World Development Indicators (World Bank, 2004).
[30] World Markets Research Centre, Argentina Country Report (Jan. 14, 2002).
[31] World Markets Research Centre, Argentina Country Report (Nov. 22, 2004).
[32] Data from the Energy Information Agency.

arbitration claims have been filed against the Argentine government in recent years, and power sector investors continue to rate the country very negatively.[33]

3. *The Current Situation*.

The settlement of the dispute with infrastructure investors was seen as critical to reaching agreement with the IMF on a relief plan. The IMF set a deadline of June 2004 to resolve the PSC dispute, however, the new Kirchner government has expressed little interest in moving quickly on this front. The deadline for renegotiation that Argentina itself set has been moved back twice – to December 2005 and to December 2005.

The government has managed to establish some exemptions that affect the power sector. Natural gas for export can be priced in dollars,[34] and electricity generation from "alternative" fuels (in Argentina these are fuel oil and coal …) can reflect international costs (although retail tariffs remain frozen and spot market prices are prohibited from reflecting the cost of alternative fuel generation).

In January 2005, the government reached accord with 22 generators (representing 72% of generating capacity) on a partial resolution of the dispute. Under this agreement, outstanding receivables to the generators, which have been accumulating at CAMMESA, would be used to fund additional thermal generating capacity, with the generators having an ownership share in the new plants in equal proportion to their share of credits with CAMMESA. The private firms would also be responsible for building and operating the projects. In exchange the firms would give up claims on 65% of their credits that accrue during 2004-06, while the government would commit to raise tariffs by 70% by 2007. The companies that have agreed to this arrangement include AES Corp., CMS Energy, Total, Petrobras Energía, and Endesa.[35]

V. CASE SELECTION AND HYPOTHESES.

In the context of the larger IPP study, we evaluate Argentina primarily on the country level. Based on the review in this paper, the major factors that determined the outcomes for private investors IPPs in Argentina seem to have been largely at the country level: first, the quality of the electricity sector privatization, reform and regulation, and second, the macroeconomic shock that destabilized the entire country in 2002. Additionally, the Argentine case reinforces the importance of broader reforms, in this case fiscal and political reforms that might have curbed the spending that invited the 2002 crisis, for sustaining power sector investment. Further analysis of the IPP experience in Argentina, particularly as it compares to other countries, is reported in the full report from the IPP study.

We have not conducted in-depth examination of any project cases in Argentina. As a suggestion for future research, projects seem to vary on two important dimensions: investor

[33] Lamech and Saeed (2003). What International Investors Look for When Investing in Developing Countries, Energy and Mining Sector Board Discussion Paper #6, May 2003, at 7.
[34] World Markets Research Centre, Argentina Country Report (Nov. 22, 2004).
[35] Global Power Report, *Argentine generators support gov't project fund in return for rate hikes*, Jan. 6, 2005.

composition and fuel choice. Both foreign and domestic investors were active in developing greenfield IPPs in Argentina; unsubstantiated interviews suggest that local investors, perhaps mistrustful of government in a way that foreigners were not, often reduced their hard currency exposure long before the crisis arrived, and thus weathered the conversion of public service contracts, previously denominated in US dollars, to pesos (pesification) more readily. Additionally, Argentina's electricity system is divided between two dominant fuels for electricity generation—hydroelectricity and natural gas. It would be important to compare the experience of IPPs in each category in order to understand the impact that fuel markets and differences in project economics had on outcomes.

Argentina: Universe of Greenfield IPPs

(Incomplete)

Project Name	Market	Fuel	MW	Investors
Enron	MEM		64	Enron
Pluspeterol (Ave Fenix)	MEM	Nat'l Gas	47	Charter Oak Energy; Merrill Int'l
C. Puerto (ex Neuquen)	MEM	Thermal	375	ChilGener SA (Chile); Chilectra Quinta Region (Chile)
C. Costanera (ex CTBA)	MEM	Thermal	322	Endesa Arg. SA; Inter-Rio Holding; Maipu Inversora; Entergy SA; "B" and "C" holdings
C.T.G. Roca	MEM	Diesel	124	
Pluspeterol (C. Tucuman)	MEM		447	Astra Capsa
Pluspeterol (San Miguel de Tucuman)	MEM		382	Charter Oak Energy; Merrill Int'l; Sideco Americana SA
Pluspeterol Norte	MEM		116	
CAPEX	MEM		662	
Filo Morado	MEM	Nat'l Gas	63	
C. Genelba	MEM	Diesel	674	Cia. Naviera Perez Compania, Petrobras
AES Parana	MEM	Nat'l gas	845	AES Corp; PSEG Global, Inc.
Consorcio Potrerillos	MEM	Hydro	96	
Energias del Sur	MEMSP	Diesel	78	Amoco; Camuzzi Gazometri SpA
Electropatagonia	MEMSP		63	

Market Specifies the wholesale electricity market into which the IPP sells power.
Based on the 2002 ENRE Annual Statement.

Fuel Specifies the type of fuel that fires the plant.
Based on 2002 ENRE Annual Statement and World Bank PPI Database.

Capacity (MW) Specifies the capacity of each IPP.
Based on the 2002 ENRE Annual Statement.

Investors Identifies principal project sponsors.
Based on ENRE publications and World Bank PPI Database.

Argentina: Universe of Brownfield IPPs

Federal Utilities (pre-1992)	Privatization	IPPs after Privatization
SEGBA (*greater Buenos Aires*)	**6 Thermal IPPs**	Agua del Cajón Central Costaneja Central Dock Sud Central Pedro de Mendoza Central Puerto SA Central Termo-Eléctrica Buenos Aires
Agua y Energía Eléctrica	**22 Thermal IPPs**	Agua del Toro Cabra Corral Centro de Alto Valle Central Guemes Central Sorrento Central San Nicolás Centrales Térmicas Noreste Argentino Central Térmicas Patagónicas El Cadillal El Tigre Escaba Florentine Ameghino Los Reyunos Pueblo Viejos Rio Grande Rio Reyes Sociedad del Estado Ullum
	4 Hydro IPPs	Hidroelectrica Ameghino Hidroelectrica Arroyito Hidroelectrica Diamente Hidroelectrica Los Nihuiles
Hidronor (*National dam system*)[36]	**5 Hydro IPPs**	Hidroeléctrica Alicura Hidroeléctrica Cerros Colorados Hidroeléctrica el Chocon Hidroeléctrica Piedra del Alquila Hidroeléctrica Pichi Picun Leufu

Most IPP investment in Argentina has been in the privatization of existing assets. These plants are regularly referred to as "IPPs" in Argentina, however, we do not include them in our study. The PESD study does not include brownfield plants.

Most of these brownfield plants grew out of the privatization of the major federal electric utilities – SEGBA, Agua y Energía Eléctrica, and Hidronor.

[36] The last hydro plant in the Hidronor system, Pichi Picun Leufu, had not been completed at the time of privatization. This project is expected to be one of the country's last two hydro plants for the foreseeable future, given the cost advantage held by thermal power alternatives. The other possible hydroelectric project to be developed is the Corpus dam in the Parana River, which is being discussed again after several years of having been put away in moth balls.