STRATEGIC ALTERNATIVES FOR POWER GENERATION AND TRADING IN THE MERCOSUR

Domingos Laudisio y Marcelo Paganini
Booz, Allen & Hamilton

Abstract

This paper presents a framework to identify, analyze and select a company most suitable strategic positioning alternatives in power generation and trading in the Mercosur countries. Special emphasis is given to risk assessment in the search for a solid positioning.

Initially we describe the power and gas systems in the largest Mercosur countries, specifically those from Brazil and Argentina.

We analyze demand in the major consumption points of the region and its probable future evolution. We analyze as well the nature of the different supply sources for power generation and the current plans for its expansion, including the transportation infrastructure and its major expansion plans. We also study the natural gas availability in different Mercosur areas, as well as its probable evolution.

We then describe the institutional and regulatory environment of the different countries and discuss probable scenarios for its future developments. Moreover we consider macroeconomic aspects of each sub region and its influence in the evolution of the power sector.

In this context we discuss the studies and analyses that should be done for a specific company that has the intention to participate in the power generation and/or trading markets in the region within its specific conditions such as financing availability, cost of capital, existing capabilities and positional assets and that is willing to take a certain risk level in businesses within this sector.

Introduction

I - The Brazil and Argentina Power Systems

Brazil consumed 348,000 GWH per year with a power peak of 53,700 MW in 1998. Almost 80% of this demand is located in the South and Southeast regions of the country where the largest cities and industries are located, as shown in Fig. 1.

Daily power demand patterns do not change significantly from summer to winter time but experiments large changes during the day, as shown in Fig. 2. Consequently, there is a large peak demand in the evening.

Electricity demand has been growing at 5% a year for the last ten years and future growth rate is estimated at 4.7% per year for the period 1999-2008, as shown in Fig. 3. The main driver for this growth are the commercial and residential sectors.

Hydro-generation represents today more than 95% of the total power supply in Brazil; the rest is nuclear and fossil fuel plants. The most important plants are located in the Southeast, not always near the consumption centers.

Supply capacity and demand are almost in balance but in dry years Brazil faces the risk of not being able to satisfy its power demand, as shown in Fig. 4.

Most projects under way are hydro, however thermal generation based on natural gas will play a significant role in new upcoming projects within the next years. Moreover, the Brazilian Government is encouraging these thermal plants through PPA's (Purchase Power Agreements) assurance to project developers and regulation of gas prices at a stable level; therefore strongly decreasing projects risks. The government goal is to make the country less dependent on hydro generation and lower the risk of lack of supply during dry seasons. The planned projects for the next years in Brazil are shown in Fig. 5.

Brazil is a large country and as such has an extensive power transmission system: more than 65.000 km of lines above 230 KV, linking the large hydro power plants with the markets of Rio and Sao Paulo. Moreover, there are other very long transmission lines above 130 KV, as shown in Fig. 6.

This figure also shows that Brazil has two large interlinked systems – one for the North/Northeast and one for the South/Southeast/ Center West. These two systems represents approximately 98% of energy consumption in Brazil. A transmission line of 500 KV with almost 1,300 km will be built to make the interconnection between these two systems stronger.

In the next ten years more than 17,000 km of lines above 230 KV will be added to the national grid.

Argentina consumes about 69,000 GWH per year with a power peak of 12,700 MW in June 1999. More than 95% of the demand of the system is interconnected. Most of the demand (about 70%) is located in the Pampeana region. Argentina also presents a daily consumption pattern with a power peak in the evenings --similar to the one in Brazil.

Electricity demand has been growing at approximately 4% a year for the last ten years and future growth rate is estimated at 3.6% per year for the period 1999-2008, as shown in Fig. 7.

Thermal-generation represents today more than 56% of the total power supply in Argentina; the remaining is 34% hydro and 9% nuclear generation. The most important plants are located in the GBA (Greater Buenos Aires) --next to the largest demand node-- and Comahue areas.

Supply capacity exceeds demand peak by approximately 7,000 MW, which creates a potential to export power to neighboring countries, more specifically to the supply-short Southern / Southeast Brazil.

Most projects under way are thermal (CCG) and some of them dedicate not only to the internal but also to export market.

Argentina has a transmission network of approximately 8,000 km of lines of 500 KV and a dense network of smaller lines as shown in Fig. 8.

In the next ten years approximately 3,000 km of lines of 500 KV need to be added to the system. Among the most important projects are the interconnections with neighboring countries Brazil and Chile.

II – Gas Availability and Consumption in Argentina, Bolivia and Brazil

Natural gas is a relatively mature and successful industry in Argentina. The usage of natural gas increased significantly from 1.2 bcm in 1954 to 27 bcm in 1998, and transport capacity increased from 5 M m3/day to 66 M m3/day in the same period.

Argentina has become a natural exporter of natural gas and will be able to help the needs of Brazil, Chile and Uruguay as shown in Fig. 9. It has 24.2 tcf of proven reserves and its projected yearly gas demand will be 1.7 tcf by the year 2005. Brazil proven gas reserves rise to 8.1 tcf, mostly located in the North / Northeast part of the country and therefore far from the South / Southeast consumption nodes. Brazilian projected gas demand for year 2005 will be 0.8 tcf – out of that, 0.6 tcf are expected to be imported from Bolivia and Argentina.

There is an extended network of pipelines in Argentina and new pipelines are being constructed to link the Bolivian and Argentine reserves to the Brazilian market as shown in Fig. 10. More than 5,000 km of gas pipelines will be linking Brazil, Argentina and Bolivia.

III – Institutional and Regulatory environment

Power generation is totally open for competition in Argentina. Private local or foreign investors are allowed to participate in hydro and thermal generation without constraints. Power dispatch is made on short term marginal cost merit by CAMMESA, the company that administrates the Argentine power market. Consumers over 50 KW are allowed to purchase energy directly from the market, bypassing local distribution companies.

Most of the power generation system has been privatized between 1992-1995, but nuclear generation and the bi-national hydro-plants are still in the state hands.

Power generation is also open for competition in Brazil. However most of the large Brazilian generation companies are still owned by the government, either federal or state governments. Power generation privatization has started in 1999 at a very accelerated pace in the state of Sao Paulo and it is expected to expand to all over Brazil in the years 2000/2001. The Federal Government will keep ownership and operation of the nuclear power plants of Angra dos Reis as well as Itaipu binacional, the largest hydroelectric in the world with 12,000 MW.

About 60% of distribution consumption is already in private hands. Distributors are required to provide open access for traders, generators and retailers to free consumers – today those above 3 MW; this will probably be lowered in the next 3-5 years to 0.3 MW. Distributors and generators are still tied by contracts that will expire at a rate of 25% per year starting in 2003.

Power dispatch is currently moving from government controlled GCOI to ONS, a multi-party organization of basically generators, distributors and large consumers. MAE will hold Brazil energy trading and the contracts will be administered by ASMAE. Energy trading is just starting in Brazil and five players are already in place – one of them has recently got a contract to import 1,000 MW from Argentina.

Framework for analyzing business opportunities

There are several evidences of discontinuities in the Mercosur power market:

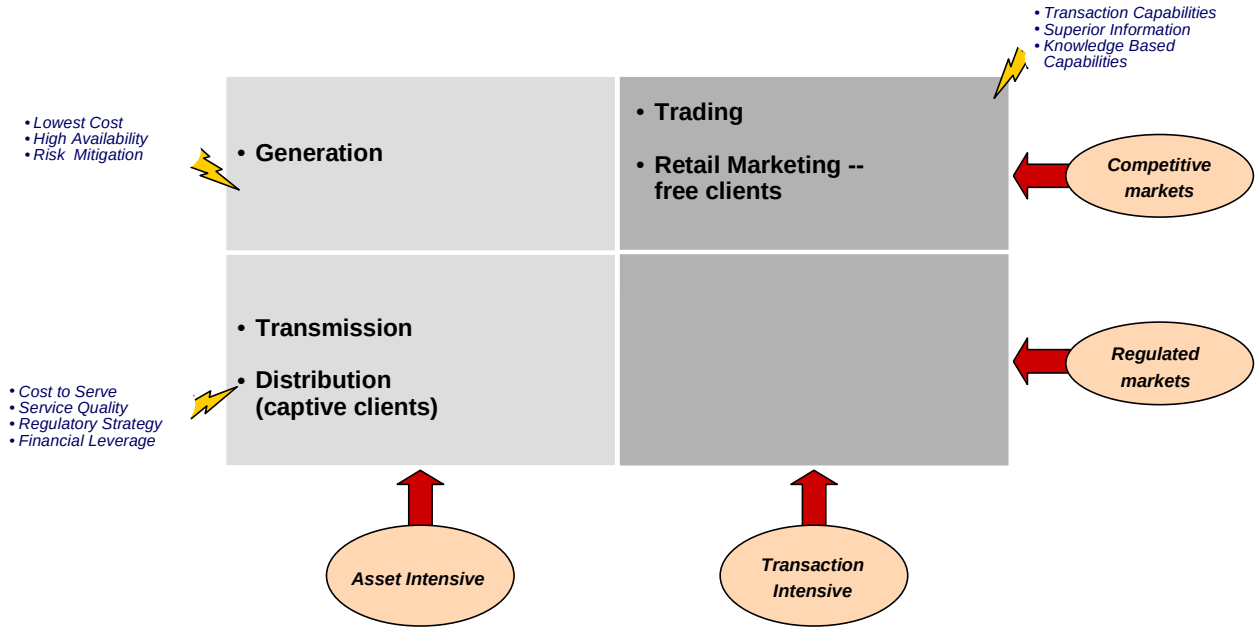
- Ongoing privatization of the Brazilian power generators
- Evolving definition and implementation of a new regulatory framework in Brazil, deriving uncertainties and risk perception to the market players
- Increasing integration between the energy sectors of Brazil and Argentina
  - The Mercosur agreement encourages economic integration between both countries in their best interest
  - Brazil natural gas demand in the Southern / Southeast can be supplied economically from Argentina
  - Brazil industrial Southern / Southeast power needs can be supplied by the excess Argentine generation capacity

This discontinuities may create opportunities for investors who want to participate in the energy supply at different levels, for instance:

- Acquiring power generators to be privatized in Brazil
- Building thermal power generation units in Brazil
- Building small hydro power generation plants in Brazil
- Building transmission lines both in Brazil and Argentina to make use of excess capacity at the country and regional level
- Trading power between Argentina and Brazil and within each country
- Building dedicated gas pipelines to generate thermal power

The business portfolio, capabilities and key success factors should be analyzed altogether in the design of the power business strategy for each particular investor as showed below.

Key Success Factors in Energy Business Portfolio Strategy



Four interrelated issues should be approached for the design and review of a portfolio strategy in energy:

- Geographic positioning of the businesses encompassing:
  - Business scale
  - Business scope
  - Demand growth
  - Client base profile
  - Potential competitors
- How the future developments in the regulatory context may impact different businesses and different companies within the energy sector
- Business format
  - How the business format will enable a company to become a market leader, for instance
    - Generation, trading and distribution integration
    - Multi-utilities
    - New businesses based on the power business positional assets, client base and capabilities
  - How to manage the existing assets and client base in order to maximize the business return
- Risk / return analysis
  - Different business opportunities bear different risks, investors in general demand higher returns for higher risks
  - Corporate finance theory enables us to design a capital efficiency curve linking what should be the minimum expected returns for different risks levels
  - Therefore, the expected internal rate of return of different projects / investments should be different based on the risk level of each project / investment

In our experience many local and foreign investors do not use this approach in designing their portfolio strategies and, consequently, experience significant shareholder value destruction. Some of the most evident pitfalls are:

- Coping exactly what other successful companies have done in more developed markets, mainly in Europe
- Building a large scale business in a specific part of the energy value chain, for instance distribution, without considering the weaknesses of this business format and positioning
- Establishing a single hurdle rate to discount the cash-flows of different types of investments / projects with very different risks
- Assuming that the future developments of the regulatory context will follow similar pattern of other countries, not taking into account specific local social, political and economic characteristics
- Not assessing adequately which capabilities will be necessary to develop and operate the new investments / projects and how to acquire and deploy them
- Not building adequate systems to manage the business risks, because it starts from a premise that the power business in general is a very low risk business

Conclusions

Indeed, the power sector has been offering exciting opportunities for investment and project development in the Mercosur. However many companies which have invested in this sector in the region have experienced significant shareholder value destruction. Some of them have already sold out their business positions assuming that a wrong decision had been made. There are many others which are analyzing at a very hectic pace if they should increase their business position in the region or if they should leave it.

Our final point is that opportunities enabling significant shareholder value creation do exist. However, it is mandatory to apply the right frame for analysis, using the international experiences but adapting it to the local context, and finally, being objective, independent and keeping always a very broad encompassing vision of all the issues involved.

References

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Figures

Figure 1: Energy Consumption per region in Brazil

REGION	ENERGY CONSUMPTION (GWH / YEAR)	% OF TOTAL	POWER PEAK ('000 MW)
S/SE/CO	270,000	77.4	41.8
N/NE	69,000	19.7	10.4
Isolated systems	9,000	2.9	1.5
TOTAL	348,000	100	53.7

Figure 2: Daily typical demand curve (MW) for Brazil

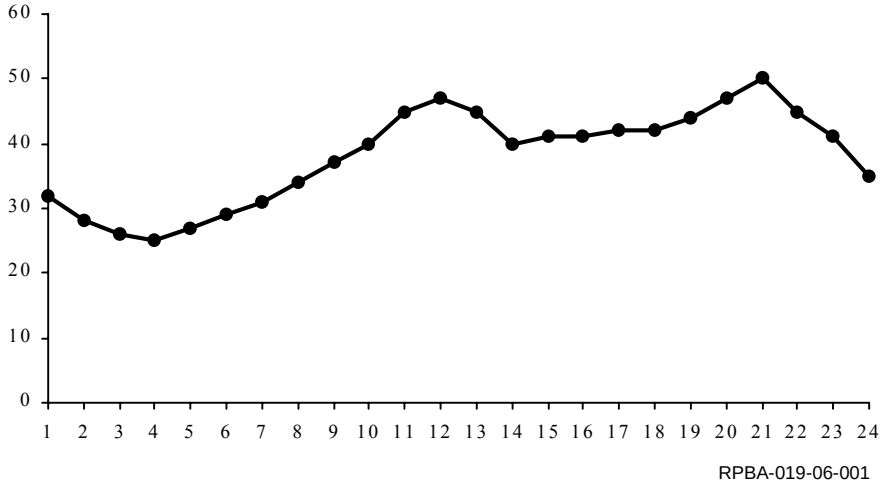


Figure 3: Electricity demand growth in Brazil

Figure 4: Power Supply and Demand in Brazil ('000 MW)

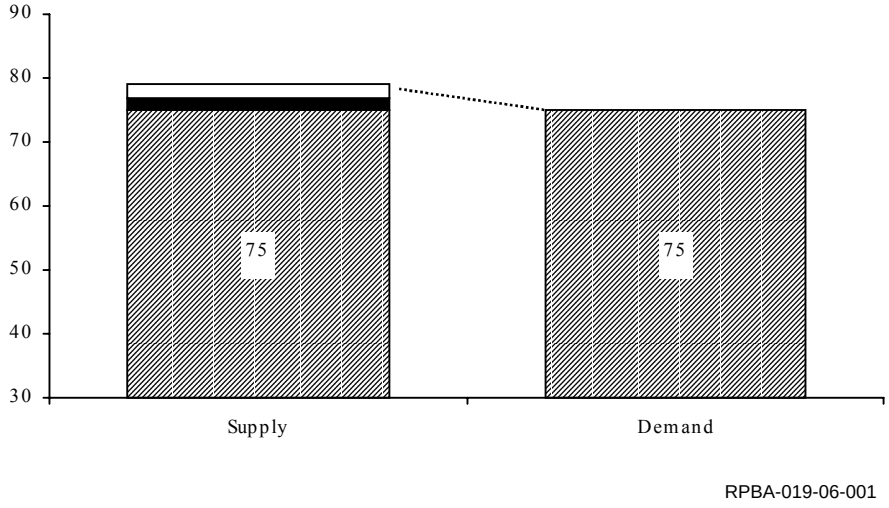


Figure 5: Main power projects in Brazil

PLANT	POWER (MW)	COMPANY/STATE	BEGINNING OF OPERATIONS
South/Southeast/ Center-West			
Hydro			
Porto Primavera	1.814,4	CESP	Dec/98
Tres Irmaos – 5º (a)	161,5	CESP	Jan/99
Sobragi – 3º (a)	20	CPM	Dec/98
Santa Branca	58	LOGHT	Dec/98
Canoas I	82,5	CESP/CBA	Dec/98
Igaparava	210	CEMIG/CONS	Dec/98
Canoas II	72	CESP/CBA	Jan/99
Salto Caxias	1.240	COPEL	Dec/98
Lajeado	850	INVESTCO	Dec/01
Ita	1.450	GERALSUL/ITASA	Jun/00
Rosal	55	PARANAPANEMA	Dec/99
Palmeiras ampl.	7	CELESC	Mar/99
D. Francisca	125	DFESA	Dec/00
Queimado	105	CEMIG/CEB	May/01
Manso	210	ELETRONORTE	Dec/00
Itiquira I	61,2	TRIUNFO	Sep/00
Itiquira II	94,8	TRIUNFO	Jan/01
Cubatao – Sul	45	CUBATAO	Oct/01
Guapore	120	SANTA ELINA	Jun/01
Cana Brava	450	MERCOSUL	Jul/02
Santa Clara	60	QUEIROZ GALVAO	Jun/01
Machadinho	1,140	GERASUL/GEAM	Set/03
Thermal			
Angra II (N) (b)	1.309	ELETRONUCLEAR	Nov/99
Cuiabá I (GN) (c)	330	ENRON	Jan/00
Uruguaiana I (GN)	600	AES	Nov/00
Campo Grande II-1 (GN)	40	MS	Feb/99
Campo Grande II-2 (GN)	40	MS	Jul/99
Campo Grande II-3 (GN)	40	MS	Feb/00
North/Northeast			
Thermal			
Pecém (GN)	240	COELCE	Set/00
TOTAL: 29 projects	**11.030,4**		

Figure 6: Main transmission lines in Brazil

Figure 7: Electricity demand growth in Argentina

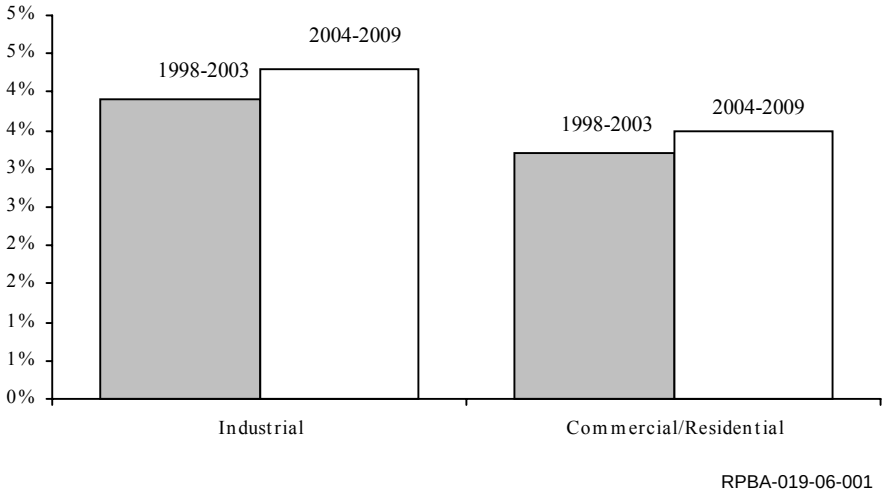
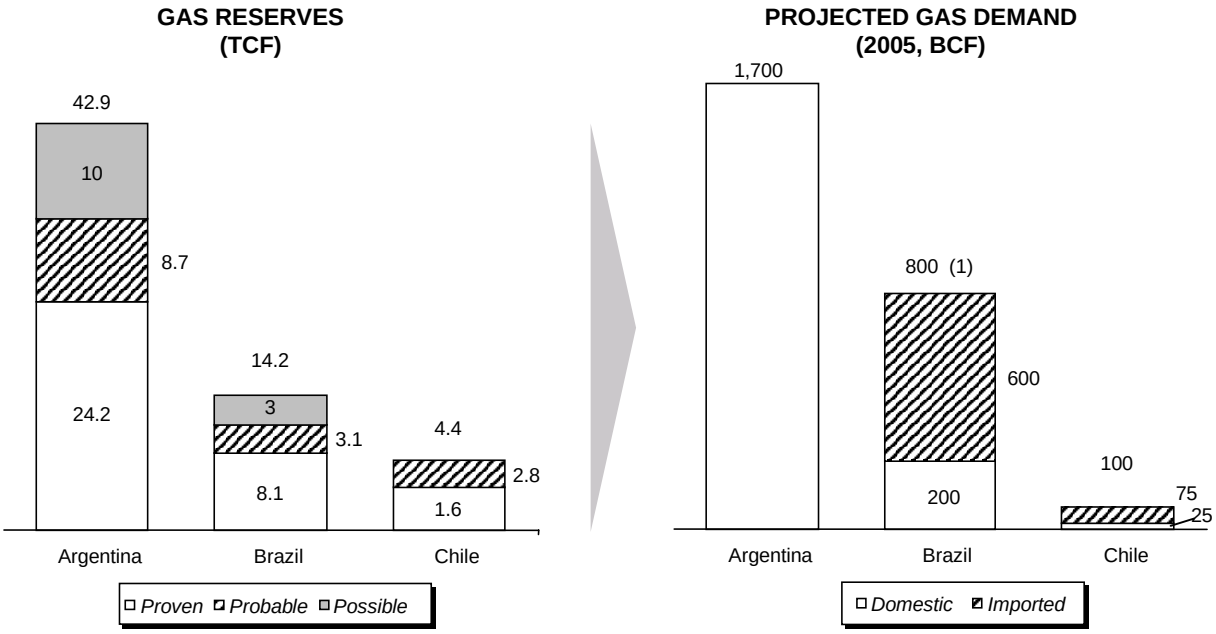


Figure 8: Main transmission lines in Argentina

Figure 9: Gas Reserves and Demand in the Mercosur



(1) Part of this demand is today unsatisfied demand, since several gas export pipelines to Brazil are still under construction

Source: OLADE, public information from presentations

Figure 10: Pipelines in the Mercosur