

The Role of New Regions and Areas in the Global Energy Markets: What can be learnt from the South American Experience?

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ABSTRACT

This paper discusses about the energy integration process within the *Mercosul* (the South American Free Trade Area constituted by Argentina, Brazil, Uruguay and Paraguay) and focuses on the experiences one can learn from this case to discuss other new international energy relations. Initially, we analyze the state-of-art on the energy integration process in the *Mercosul* on its different dimensions: the interconnection between electricity grids, the joint implementation of large hydroelectricity projects and the regional trading of fossil fuels such as crude oil and natural gas. We demonstrate the benefits of such regional integration. Then, we highlight the difficulties of building up an integrated energy market in a very unstable global economy and where regional political barriers still prevails. We end up by advocating for more energy integration initiatives in other parts of the world, trying to explore how the South American experience can help on this sense.

INTRODUCTION

The most remarkable characteristic of the contemporary energy world is the already very well discussed "globalization of markets". To a large extent, the globalization of the energy sector has triggered and impelled the same process in other economic activities. In the Latin-American dimension, the most important component of globalization is the construction of *Mercosul* (the South American Free Trade Area constituted by Argentina, Brazil, Uruguay and Paraguay).

Energy has been contributing to accelerate this regional integration. On the one hand, the integration of energy systems has substantially increased the commercial exchanges among those countries, including oil and electricity (1). On the other hand, the disposition of a larger and lower-cost energy base has great importance for the improvement of industrial and agricultural competitiveness in the region, which will be absolutely necessary for the integration of the region in the global economy.

Despite all the clear advantages of energy integration in the *Mercosul* area, one must recognize that there are many obstacles and even paradoxes for the consolidation of such integrated system. South America no longer enjoys economic stability and sustainable development. Actually, the region is again immersed into a deep economic crisis that does not spare the energy sector. The South-American countries must rather face economic instabilities that might have disintegrating components. Under this scenario, the regional energy game may become a generalized competition for markets rather than a friendly division of competencies.

In the following paragraphs, we will discuss about the major features of *Mercosul's* energy integration, focusing on its potential and benefits, but also on the difficulties and risks for its consolidation. By proposing and developing this paper, we expect the South-American experience can help other analysts to understand and also to advocate for more energy integration initiatives in other parts of the world.

THE ENERGY INTEGRATION IN THE MERCOSUL

Until the late 1980s, we have been talking a lot about energy integration in Latin America, but its materialization seemed distant and even utopian. The countries were still very closed and dominated by a very ingrained nationalist spirit, which privileged the self-sufficiency. The lack of cooperation among the Latin people as well as the control of the energy sector by giant national state-owned monopolies inhibited a great number of joint initiatives.

During the 1990s, the economic integration of South-American countries speeded up and seemed to have turned into an irreversible process. The energy industry has significantly contributed to accelerate this process. The integration of the energy markets opened room for substantial increases in the commercial and financial exchanges among the countries. Through joint approaches, *Mercosul's* member countries were able to widen their energy options. Integrated strategies seem to lead to declining energy costs as compared to the old strategy of self-sufficiency where each individual country preferred to go by its own. Less costly energy increases the regional industrial and agricultural competitiveness, improving the ability of South-American countries to enter competitively the global economy.

From 1988 to 1998, the level of political integration among *Mercosul's* member countries, as well as the volume of commercial transactions and the number of joint investments or binational energy projects expanded quickly. In an historic perspective, we should say that even the most optimistic integration hypotheses formulated before 1988 turned out to be extremely conservatives as compared to the real integration process that took place in the last decade. The process of economic and energy integration in South America has been overcoming all the expectations and it is still far away from exhausting.

Actually, considering the possibilities for energy integration, Latin America finds itself in an extremely privileged situation. Retaining more than 45% of all reserves of fluvial fresh water in the planet, the continent still possesses an immense competitive hydroelectric potential to exploit. Regarding fossil fuels, the fast development of Latin American oil and natural gas reserves may allow the region to increase its oil and gas exports to approximately 6 to 7 million of barrels/day until the year 2005.

There are multiple experiences that signal this tendency. Those more significant regard to the network industries (electricity and natural gas). Thus, Brazil intends to

buy electricity from Venezuela by the year 1999 or 2000 to supply the city of Boa Vista and the Center-north of the state of *Roraima* in the Amazon region (2).

However, it is in the ambit of *Mercosul* that the initiatives of energy integration are more impressive. Argentina and Paraguay are net energy exporters. The situation of Paraguay is *sui generis*. In spite of being the less developed *Mercosul*'s brother, Paraguay possesses the largest per capita electricity generation in the world. Thanks, mainly, to giant hydroelectric binational projects such as Itaipú (see table 1), Paraguay became a great exporter of electricity. The main markets for that energy are, evidently, Brazil and Argentina. Even so, despite its enormous hydroelectric abundance, Paraguay still has several countryside and poor communities, which are not connected to the national electricity grid and have to rely upon small, inefficient and not reliable diesel power plants, indicating that, even in Paraguay, the problem of full access to cheap and reliable energy has not been completely solved. As in the Brazilian North region, a stronger energy integration of Paraguay with the other *Mercosul*'s neighbors may improve the situation for those isolated communities.

TABLE 1: Mercosul's binational hydroelectric projects			
Project	Country	Capacity (MW)	Current situation
Itaipú	Brazil & Paraguay	12,600	In operation
Salto Grande	Argentina & Uruguay	1,890	In operation
Yacyretá	Argentina & Paraguay	3,100	In operation
Corpus Christi	Argentina & Paraguay	2,880	In project
Garabi	Argentina & Brazil	1,800	In project
Roncador	Argentina & Brazil	2,700	In project
São Pedro	Argentina & Brazil	750	In project

Source: (Mai, Santos, Meldonian; 1998)

Argentina has a huge hydroelectric potential and several large projects could still be developed in cooperation with its neighbors. Despite this privileged situation, the country has already 57% of its electricity generation based on gas fired power plants. After the privatization of its electricity sector in 1993 and the fast consolidation of a new market, totally private and very competitive, new investments in large and modern combined cycle and high efficiency gas fired plants took place, aiming mainly to substitute the old, inefficient and not competitive thermal park. Today, Argentina has a wide overcapacity in electricity generation (nearly 3,000 MW

available), explaining the strong Argentinean desire to intensify the energy integration process with the other *Mercosul*'s markets, particularly with the South and Southeast region of Brazil (3).

Starting from this first experience and with the advance of deregulation on electricity imports and exports within the Mercosul, the connection between Argentina and Brazil may well intensify in the near future. The Argentinean electricity system cannot quickly enlarge its energy transfers to the Brazilian market without expanding the transmission grid linking the two countries. By overcoming this bottleneck, Argentina could start a wide construction program to build up new gas fired power plants aiming the exports to Brazil. However, it is also worth mentioning that the construction of such transmission lines, with greater capacity, would also expose Argentina to the Brazilian excess of secondary energy generated at a very low cost in the country's hydroelectric system.

Alternatively, the energy integration between Brazil and Argentina should extend towards the natural gas sector. In fact, the natural gas as well as the electricity will likely become a major vector for energy integration in the *Mercosul*.

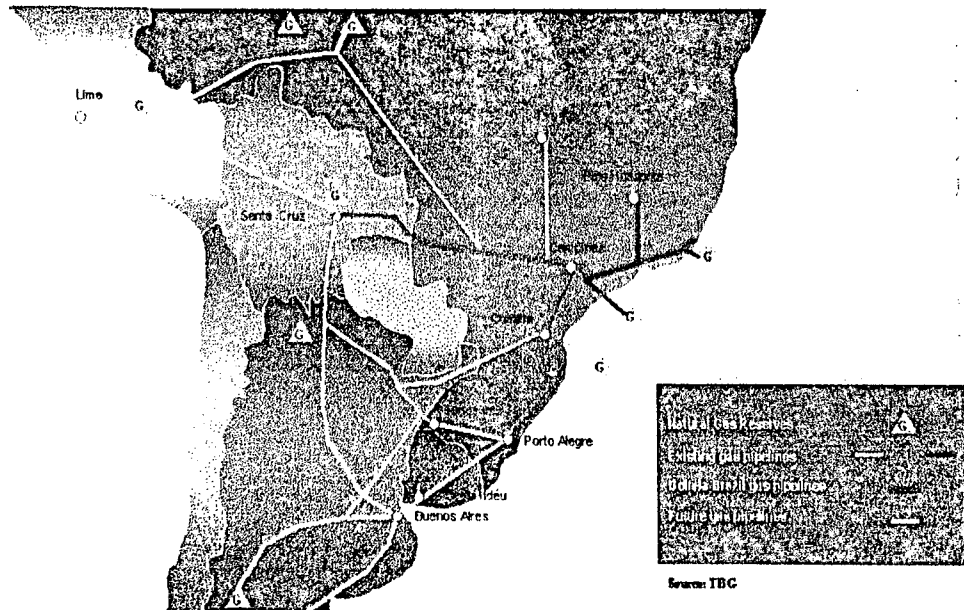
The Bolivia-Brazil gas pipeline constitutes the first great initiative in this process. Starting flowing gas (approximately 5 MM m³/day) from Bolivia to the Brazilian Southeast markets since February 1999, the natural gas industry in the *Mercosul* is expected to expand significantly in the near future.

By the year 2002, Brazil may be importing about 12 MM m³/day of Bolivian gas. In 2003, this volume will increase to 18 MM m³/day and Argentinean gas will likely be added into the pipeline, which has total capacity that amounts 30 MM m³/day expected to be achieved in the early 2010. With an extending project, the American company *Enron* intends to transport approximately 2.5 MM m³/day of Argentinean (or Bolivian) natural gas to the Brazilian city of *Cuiabá*, where it is building up a power plant. Finally, in the South of Brazil, in the state of *Rio Grande do Sul*, the American company *ALS* will import 2.5 MM m³/day of Argentinean gas to supply a gas fired power plant it is building up in the city of *Uruguaiana*.

Those first initiatives are just the beginning of a much busier scenario. As shown in the figure 1, there exist several other options for natural gas pipelines that might integrate the *Mercosul*'s member countries in the future. If built, those projects would allow the entrance of large amounts of Argentinean gas in the Brazilian market. The recent liberation of natural gas imports in Brazil has incited a kind of "natural gas fever". All together, Brazil could be importing by the year 2010 more than 55 MM m³/day from its neighbors. This would allow the country to increase the share of natural gas in the national energy matrix from the current 2.8% to nearly 12% as proposed by the government in its natural gas policy.

Moreover, the gas connection between Bolivia, Brazil and Argentina will make it possible to supply natural gas to the Uruguayan and Paraguayan markets. This process has already been unchained by the British company *British Gas*, associated with *Pan American Energy (BP-Amoco)* and the Uruguayan state oil company *Ancamp*, which won the bidding to build a 216 km gas pipeline from *Buenos Aires* to *Montevideo*. With this project, the consortium intends to extend the pipeline some more 700 km and transport about 15 MM m³/day to the Brazilian city of *Porto Alegre*, hooking the new pipeline to the Bolivia-Brazil gas pipeline, which will go Southward from *São Paulo* to *Porto Alegre*. This picture would not be complete

Figure 1: Natural Gas Integration Perspective in the Mercosul



without considering many other existing, under construction or planning projects, involving Argentina and Chile, but also a possible integration between Brazil and Peru to exploit the large Peruvian gas field of *Camisea*.

THE BENEFITS OF REGIONAL ENERGY INTEGRATION

The last paragraphs seem to confirm the role of energy as an essential vector of economic integration in the *Mercosul*. The fast development of energy resources in the region seems to boost the regional cohesion. The positive effects attached to this process are evident: a better use of natural and financial resources (those really scarce in the region). In addition, if energy integration can be translated into wide reductions of energy costs for final consumers, the whole region will likely improve its competitiveness in the global economy.

To a large extent, the effective energy integration of *Mercosul* is very similar to what has been taking place in the ambit of the European Union. In both cases, energy integration may be a decisive factor for the total integration of the region, propitiating economic and strategic advantages for all the member countries, favoring a balanced and sustainable development, attracting capital, technology and new managing approaches or diversifying the energy sector. Moreover, the supply of fundamental energy infrastructures through joint efforts will likely increase the ability of every member country to seek and accomplish a better human development with more social justice and environmental preservation.

It is true that this same process may also generate important negative outputs, which have been less emphasized by the literature. For example, the existence of many competitive projects trying to dispute for a larger share of the same market, in conjugation with a scenario of declining energy prices, may not contribute to the development of systematic efforts towards energy conservation and rational use of energy. The culture of energy wasting, already very present in the whole Latin America, could spread out even more over the whole region, leading to bad uses of energy and a overall wasting of natural resource. Avoid those risks become a new element for a joint energy policy (4).

DIFFICULTIES FOR BOOSTING ENERGY INTEGRATION

Energy integration in the *Mercosul* seemed to have become an endlessness process until 1997 when the Asian economic crisis broke, spreading distrust among international investors that were willing to invest in the energy industry of emerging countries. In 1998, with the Russian economic crisis followed by the Brazilian one, the shadows have definitively covered the Latin American skies. Long-term external investors disappeared, making it difficult for Brazil, for example, to pursue with its huge privatization program in the energy sector. Local investors have also disappeared, dived into financial crisis for those with high external debt or just with absolutely no access to cheap capital in the international financial market for new investments (5).

The economic crisis in the *Mercosul* area became a terrible issue with the devaluation of the Brazilian currency. Brazil's official unit of currency is the REAL (R\$). This currency was introduced on July 1, 1994. The initial rate between the Real and the US dollar was R\$1.00 for each US\$1.00. Since then, the Brazilian currency has

undergone continuous mini-devaluations, about 7% per year. By the very early of 1999, the exchange rate was approximately 1.21 R\$/US\$. Nevertheless, after the first ten days of this year, the Real started suffering a lot of speculative pressure and the Brazilian Central Bank was obliged to liberalize the control over the exchange rate, allowing a major devaluation of Real in relation to the US dollar and letting the national currency to fluctuate freely and quite wildly against other currencies, causing a lot of economic instability in the country, but also among the other *Mercosul's* partners. There are still a lot of doubts and huge expectations regarding the future evolution of this crisis.

With a major exchange rate devaluation, inflation is supposed to return in Brazil and, since historic government behavior has been to use the energy prices to control potential inflation spirals, creating all sorts of price distortions in the energy markets as well as financial issues for the energy companies, investors are certainly afraid of having to cope with such huge inflationary risk. On the other hand, recession is also previewed, postponing to an uncertain future the energy market increase, which was actually the major driving force to attract new investments in the regional energy sector.

The Brazilian total GNP is nearly US\$ 750 billion and the GNP per capita is approximately US\$ 4,500. From 1968 to 1980, the Brazilian economy expanded at high pace, an annual average rate of 7%. In the 1980s, the country underwent through a very unstable period, with annual GNP ranging from -4.2% to 6.9%, and marked primarily by a severe inflation that has disarrayed the national economy. Expectations for stability were met only in 1994, with the establishment of "*Plano Real*", the economic plan that introduced the new currency.

After the Mexican economic crisis of 1995 that has shaken Brazil's economy, the country experienced a small economic boom in 1996 and the first half of 1997. However, the Brazilian economic growth slowed down with the Asian crisis in the end of 1997, pushing downwards the other *Mercosul's* members. The economic situation in the region started becoming more dramatic with the Russian financial bankruptcy in the end of 1998, which threw all four South-American countries into the current recession and financial instability.

Moreover, conflicts between the *Mercosul's* partners have achieved dangerous levels. Until the devaluation of Real, the Brazilian deficit in the balance of payments was high; Argentina, Uruguay and Paraguay enjoyed high favorable trade balance vis-a-vis Brazil. This picture may change with the new Brazilian exchange rate. Exports from Brazil to the other three countries are supposed to augment while the Brazilian market will become less vulnerable against Argentinean, Paraguayan and Uruguayan products. To balance the bilateral trading, energy could play a key role, with Brazil importing more energy from its neighbors. However, since energy imports and exports are priced in US dollars, energy supply coming from Argentina, Paraguay or

Bolivia became much more expensive, making it difficult to forecast any major evolution of those transactions.

The international financial community looks determined to support the Brazilian policy and the economic recovery of *Mercosul*. Nevertheless, it remains to be seen whether that will prove enough. Actually, the price of such support is very high and can be measure by the stratospheric interest rates the region is obliged to sustain in order to attract short-term international capital that can relieve the short-term damages of the crisis. However, with such high interest rates, it is impossible even to dream about financing any long-term project such as energy investments. If the region is unable to reduce interest rates and resume the economic growth, it is very unlikely that economic integration and the energy integration in particular will advance in the following years.

The Latin American energy sector has always been marked by politics, nationalism and confront among the parts. It took long time before those differences could be livened up and a wide dialogue could be established, allowing a better understanding of the relationships of mutual dependence among the countries. The region lives now into a kind of "competitive cooperation" order among the nations and the energy companies. However, there are still many unsolved paradoxes in this new order. In the past, the access to the energy resources and the warranty of the national sovereignty were on the center of attentions. If the regional economic crisis gets worse, the debate will likely change in order to emphasize the problem of access to the energy markets.

In effect, all the energy integration processes discussed above had three main conditions to happen: (1) the geopolitical repositioning of Brazil, abandoning its past nationalist posture and defining itself as the leading country in the *Mercosul*, the one that would eventually pay the "integration bill"; (2) the strong growth of the Brazilian energy demand; (3) the inability of the Brazilian energy industry to maintain high level of investments compatible with the growth of its domestic demand. These three conditions are still absolutely necessary so that energy and regional integration can walk in the same direction, inducing high levels of cooperation among the partners. Any weakening in one of those parameters will drive these same agents to a larger competition, which can break into fragmentation of the national interests rather than a boost in the regional harmony.

If the economic crisis drives all the *Mercosul*'s countries to adopt the same strategy and to seek the same common objective of developing its energy resources the fastest possible in order to reduce its imports or even to increase its exports of energy products, the whole region will then have to face the problem of searching for energy markets, making it more difficult for the deepening of the regional energy integration.

CONCLUSION

In the last decade, the energy integration in the South America has been moved by powerful forces that were beyond the interests of the energy sector by itself. Local or individual aspiration that intended to inhibit this process was not supposed to resist in the long period. The advantages of more economic and energy integration seemed so evident that everybody in the *Mercosul* area realized the need to set up a new floor for dialogue and a more sustainable strategy for joint energy developments.

The integration of *Mercosul's* energy systems was observed in several dimensions: (i) the stronger connection of electricity grids and transfers of power; (ii) the commercialization of energy input such as oil and gas; (iii) the development of multinational projects.

However, with the present economic instability in the region, energy integration may be slowed down and the *Mercosul's* partners may actually become big competitors. Before energy can transform itself into regional complementary good that will benefit out from a stronger integration, it can be seen as a substitute good inducing more competition and fragmentation among the agents. In fact, if the past problems of access to the energy resources and the warranty of national sovereignty seem to be solved or, at least, politically diminished, the future focus of attentions, that may generate a lot of nationalism and hot debates, is the issue of market protection and expansion.

This paper aimed to present a clear example of "regional energy integration" describing its major features as well as its recent historical evolution. If anything, the South-American experience seems to highlight the advantages of a stronger energy integration between countries that share the same economic space as compared to individual self-sufficient approaches. In this sense, we advocate for more energy integration initiatives in other parts of the world, specially in the less developed world, who has to optimize its economic resources.

However, this paper also underlined the difficulties and risks of any integration process, specially when this has to develop under strong economic instabilities. Energy integration is not necessary a natural movement. It requires strong long-term political compromises, not only from the energy actors, but from the whole society, including the country's political and economic authorities. Misbalance in the economic relations between the countries may damage years of negotiation and efforts to build up the necessary trust among the partners.

We believe the topics presented in this essay may be very useful for the discussion and understanding of other energy integration processes elsewhere in the world. The South-American model is an important case study since it presents most parameters that will also characterize similar processes in other less developed regions, involving other emerging countries.

ENDNOTES

(1) If we consider a broader view of *Mercosul*, including neighbor countries such as Peru, Chile and Bolivia, we will see an increasing share of natural gas in the regional trade balance.

(2) *Roraima* is a small but fast-growing Brazilian state in the Amazon region. It disposes of approximately 80 MW of diesel power generation in more than 150 very small and costly plants. The system is insufficient to match the high repressed energy demand in the state, where just a minority of the overall population has guaranteed access to energy and where the needs for cooling and refrigeration are strong. The cost of power generation is very high, about 160 US\$/MWh and the reliability of the system is very poor due to the age of the equipment as well as to the difficulties in the fluvial transport of diesel. With the connection of *Roraima* to the *Macagua* plant, in the hydroelectric complex of *Guri* in Venezuela, Brazil expects to boost electricity supply in the state to approximately 200 MW of firm energy at much smaller cost, 26 to 28 US\$/MWh. Moreover, part of the current thermal system can also improve the supply of peak demand. Through this regional energy integration, the state will become more attractive for new industrial and agricultural investments, especially for companies that want to export into the North-American market.

(3) Recently, the consortium *Consórcio Interconexão Energética Brasil* (formed by the Spanish *Endesa* and the Brazilian *Inepar* and *Copel*) signed an agreement to import approximately 2,000 MW of capacity from Argentina to the Brazilian market. Offering an average price of 25.98 US\$/MWh for a 20 year-old contract, with operation beginning by September 1999, the imported energy will be destined to two major Brazilian generators *Furnas* (700 MW) and *Enersul* (300 MW), as well as directly to final consumers (1,000 MW). This energy will be supplied through the state of *Rio Grande do Sul* through a 470 km transmission line should be built between Brazil and Argentina. A substation for frequency conversion shall also be installed in the municipal district of *Garabi*.

(4) Although this seems a fundamental topic that should concern all energy specialists, we will not be able to develop this subject within the limit scope of this paper.

(5) Theoretically, the Brazilian financial crisis started with the declaration of "financial default" from the governor of third large state in the Federation, the state of *Minas Gerais*. However, many private and public *Mercosul's* energy companies are also experiencing financial difficulties and even declaring "default" for the payment of their external debts such as the Argentinean *Sociedade Comercial del Plata*, from the holding group *Soldati*, or the *Hydroelectric Company Alicurá* (*Gazeta Mercantil*, 1999).

REFERENCES

Gazeta Mercantil, "Argentinos lideram default na AL", 14 de April de 1999, front page.

Mai, L.A.; Santos, E.M.; Meldonian, N.L.; "Integração energética no Mercosul: a dimensão nuclear". Anais do III Congresso Brasileiro de Planejamento Energético, São Paulo, 23 a 25 de junho de 1998, pp. 239-243.

TBG; "Presentation of TBG's CEO in the University of São Paulo in October 1998".

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