Assessment and proposals on environmental policies in the Argentinean liberalized electricity market

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CONTENTS

1) Introduction
   1.1) The effects of the crisis on the sector’s policies

2) Actors and Drivers of electricity policies

3) Institutional Framework and Actors in Environmental policy

4) Lessons Learnt
   3.1) Lessons learnt from Liberalization and Energy Policy
       3.1.1) Investments
       3.1.2) Tariffs
   3.2) Experiences and lessons learnt on Environmental policy
       3.2.1) Physical Restraints to the installation of new units of generation in Argentina
       3.2.2) Evaluation of Current Tools and new Proposals
               ~ Emission Standards
               ~ Environmental Impact Assessment
               ~ Risk Assessment
               ~ Public Hearings
               ~ Renewable Subsidies
               ~ Environmental Certification
               ~ Risk Assessment
               ~ Heat and Power Generation

5) Conclusions
INTRODUCTION

The main purpose of this written work is to educe conclusions regarding the application of environmental policies to the electricity sector and to learn form the faced experiences. We consider that Argentina’s situation deserves special attention and interest, because the modifications that took place in the electricity sector were considered as an example, at least until the political-economic crisis of December 2001. Furthermore, this breach introduces the interesting challenge of analysing the liberalization process from a whole perspective. Being the ENRE part of the Grenelem Group, we assigned a special emphasis on the regulatory normative applied to the sector.

The effects of the crisis on the sector's policies

At the beginning of Grenelem's project, Argentina's conditions were substantially different from what they are nowadays. The economic and institutional crisis in Argentina at the end of the year 2001 represents a breakpoint to the process of liberalization of the electricity market. The financial constraint together with the absolute powerlessness to credit access, restricted investments. Furthermore, the drop in production all across the country in addition to the uncertainty regarding the country’s future, produced the same reaction towards private investment in the sector.

The main obstacle affecting the sector's development is a combination of the following factors: 1) the lack of profitability as a result to the devaluation of the Argentinean peso (leaving behind the convertibility 1 Argentinean peso = 1 US Dollar), 2) the current analysis of the concession contracts of transport and electricity distribution, 3) negative rates of electric consumption growth and 4) the delay of the delineation of the tariffs’ framework to be applied in future time.

Nevertheless, the institutional and legal outlines of the electricity sector remains the same as were depicted in previous documents. The assigned roles to the national administration institutions (Energy Secretariat, ENRE, ARN) and to the national administrator of economic transactions (CAMMESA) were not modified. But dispatch rules were modified affecting the market conditions. Yet, a modification that must be highlighted compared to the preceding situation is
the tendency of establishing a new order model where the State recovers its capacity of conducting investment operations, especially through fiduciary founding, particularly in sectors where some expansion in not covered areas is needed.

DRIVERS AND ACTORS OF ELECTRICITY POLICIES

Previously to the Crisis, the planning activities were mainly managed by business groups. The market’s signals guided the enterprises’ decision making with reference to both, the enlargement of the generation park and transport and energy distribution systems. Regarding the transport sector, these signals were not enough though so as to encourage investment in some specific points of the net to accompany demand.

In May 2003 the Ministry of Federal Planning, Public Investments and Services was created. This entity is aimed at recovering the State’s planning role. Until present day and because of its short existence, this Institution does not present any documents that illustrate the strategies to be followed regarding this topic. The following stage presented a framework where the lack of concrete and defined outlines prevailed.

Meanwhile, the Secretary of Energy, which forms part of this new Ministry, continue playing along with the ENRE and the ARN their former roles that were previously described in WP1. Other actors, playing an advisory role, are independent institutions specialised on electric matters.

The Federal Energy Council plays a significant role by representing the provinces’ interests plus it is in charge of the administration of funds that the State destinies to the public infrastructure development in electricity affairs.

INSTITUTIONAL FRAMEWORK AND ACTORS IN ENVIRONMENTAL POLICY

At both levels, national and provincial, the State counts with organisms that act as the application authorities of the environmental legislation. The Environmental and Sustainable Development Secretariat (SAyDS), within the
Ministry of Health, is the agency that deals with national environmental policies. The Constitution established that the National authorities must set minimum standards and rules that should be complemented by provincial and municipal authorities. In fact, within an scenario that lacked of a national criteria with regard to environmental policies, the provincial legislations were urged to promulgate their own environmental legislations, appealing to their own criteria and standards. The recent law 25675 institutionalises the Federal Council for the Environment (COFEMA), which is responsible for the coordination of the different jurisdictions of the country.

The Secretary of Energy deals with the establishment of environmental policies and rules at a national level with regard to the electricity sector. The ENRE (National Electricity Regulatory Agency) manages all matters concerning the reinforcement of the law applied to all kinds of members of the Wholesale Electricity Market (WEM), which includes the thermal and hydro power generators, and the transmission system. The regulation and surveillance of nuclear power is in charge of the Nuclear Regulatory Agency (ARN), entity that administrates, operates at a national level under the outlines established by the Convention on Nuclear Safety.

The parties responsible for the establishment of the policies concerning the environment were created simultaneously with the liberalization process during the 90’s. During the first half of the decade, while the new environmental authorities were traversing their formation process, the electricity sector presented a strong dynamism that urged its members to play a pioneer role regarding environmental legal affairs. This was performed under the outlines of a previous rather general national legislation. In some circumstances the framework established by the electricity sector was put into practice by other organisms, except for some particular issues that were not undertaken by none of them and nowadays form part of the sector’s responsibilities, though handled inadequately. This situation tends to revert itself after the promulgation of a set of legislations known as Minimal Budget during the last year, which was determined by the amendment of the National Constitution voted in 1994.

The rest of the actors that take part as opinion groups in the definition of environmental policies, especially in the electricity sector, are the following:
~ The generators’, distributors’ and the transporters’ associations that build up CAMMESA together with the big consumers.

~ The independent institutions specialised in environmental or electricity matters (NGO, Research Institutions related to Universities or to the National Scientific and Technological Research System) and the organisms responsible for the defence of consumers. The Citizens’ Protectionists, instituted at all levels as independent from administrative structures by the Constitution, plays an active role in the canalisation of the community’s concern towards environmental issues.

The consulting mechanism via public hearings was established by the ENRE. This technique has permitted legal or physical individuals, that are related to legitimate interests affected by a particular project, to present their point of view about the proposals concerning the enlargement or modification of the electricity system.

LESSONS LEARNT FROM LIBERALIZATION AND ENERGY POLICY

The important transformation of the electricity sector commenced at the beginning of the 90’s, as a response to important offer difficulties, mainly in generation and distribution, urged by a significant agreement about the extreme necessity for change. The accelerating factor that brought about the renovation was the important crisis that the sector suffered in 1989 on account for a series of successive failures in the administration sector of the State (Legisa 2001).

The reformation’s characteristics, the abundant natural gas availability and the introduction of new technologies for combined cycles, favoured the generation of competence within the wholesale electricity market. During the 90’s, the State finished the construction of two huge hydro power plants financed with public funds that were to assure a secure, constant supply of electricity at least until the end of the decade. In spite of this, the new private actors installed an important amount of thermal power plants (gas turbines and combined cycles) that originated a surplus of available equipment. Nevertheless, the setting up of such capacity permitted the sector to overcome the subsequent draft period during the last years of the decade of the 90’s.
without encountering any problem of provision, including an important amount of electricity exported to Brazil. Other positive features to highlight would be an improvement in the quality of the service.

**Investments:** The decisions regarding investment followed the logic of profitable projects considered separately from the rest, and not one that would consider a global coordination. Contrastingly to important private investments performed in generation, some people believe that the transport sector did not receive as much investment as other sectors did. Nevertheless, this assumption must be contrasted with the increase in the gas transport capacity and the setting up of thermal power plants located close to the source of demand. The transport capacity was traditionally associated to a rise in demand, though the role played by gas together with the introduction of combined cycles modified this situation.

**Tariffs:** The decreasing tendency of prices within the wholesale market is another proof of the model’s success. This was the result of the competence among the thermal power generators, and to a higher degree, to the incorporation of combined cycles. In the matter of final consumers, the big clients were the ones that greatly benefited from the tariffs’ diminution, while small consumers suffered from a slight increase. What did take place was the transference of the generators’ income to the distributors.

**EXPERIENCIES AND LESSONS LEARNT ON ENVIRONMENTAL POLICY**

From an environmental point of view, the transformation process put forward diverse aspects to be considered:

1) In regard to generation, we passed from the hydro-nuclear power tendency followed during the previous phase to liberalization to the installation of gas turbines (GT) and combined cycles (CC) that burn natural gas.

2) During the 1988 crisis, in the face of a shortage in resources, we turned to the rushed installation of thermal power plants with high emission of
pollutants. The liberalized market neutralized this situation, as every single one of this units left the market gradually because of their low performance.

3) The incorporation of GT and CC burning natural gas diminished the total emissions of $SO_2$, $NO_x$(* ) and particulate matter..

With reference to atmospheric emissions, this change of direction that implies abandoning the hydro option represents a negative impact, especially in what concerns Nitrogen Oxides and Carbon Dioxide. On the other hand, the discarded nuclear option as regards greenhouse gases also represents a

(* ) This tendency was modified in 2002 due to the crisis; therefore it must not be taken into consideration as a tendency indicator.
negative impact; still it may be a positive result in the long term taking into account the management difficulties associated to nuclear waste.

Physical restraints to the installation of new units of generation in Argentina

The city of Buenos Aires and its surroundings consume approximately 45% of the electric energy generated in the country. The main sources of energy are located at a distance of 1,000 Km away from Buenos Aires, such as Salto Grande’s, Yaciretá’s and Comahue’s hydro power plants, and the gas fields of the areas of Comahue and Austral. Therefore, any new offer of thermal power generation units should strongly evaluate its location taking into consideration two alternatives:

a) in close proximity to the oil well, damaging the environment in low populated and impacted areas, but needing extensive systems of transmission, or

b) in Buenos Aires, avoiding the construction of the transmission system.

The second alternative requires an additional analysis. The city lies next to the La Plata River, which acts as an abundant water resource for refrigeration of the units. Thus, this advantage induces the selection of the shore as the location site for new utilities, though affecting negatively the environment in downtown Buenos Aires. The possible alternative of transferring the plant to the close surroundings of the city, further away from high densely populated areas, is faced with huge increases in refrigeration costs. Moreover, this possibility is restricted by the city’s present subtransmission grid configuration: they were designed assuming that downtown’s thermal power generation would meet the city’s demand, hence there are not enough grids in order to supply the city from somewhere.

Therefore, the investor finds itself in a scenario where he must choose between:

1) building a wide-ranging transmission system,

2) assuming the costs of air refrigeration and reinforcing the transmission in the city centre, or
3) settling in the centre of Buenos Aires, adjacent to the river, increasing the load of atmospheric pollutants.

Even though Buenos Aires city does not suffer from pollution problems, thanks to its geographic characteristics, as other important cities do, such as Mexico FD, Santiago de Chile and San Pablo, it is an important urban nucleus with 7,000,000 inhabitants where traffic is the most significant source of air pollution.

**Evaluation of Current Tools and New Proposals**

Within the framework of new tendencies where the State would reassume its role on the subject of strategy planning, we still need to know if the state is going to built new facilities on his own, or if it is going to be helped by private companies, under the first alternative there are more chances of incorporating “Command and Control” tools rather than the economic tools or incentives. Based on previous experiences in the implementation of environmental policies to the sector during former years, a series of proposals that could improve their efficiency are presented.

**Emission Standards**

It proved out to be an efficient tool for reducing pollutants’ emission levels in those circumstances where limits were exceeded. Part of its success was achieved due to ENRE’s possibility of performing surveys, monitoring and imposing sanctions whenever it was necessary. However this was not the course followed by the rest of the sectors in general, such as Transport and Industry

**Proposed Improvements**

1) The incorporation of standards to those units that use non-conventional fuels (wastes, field gas, oven gas, etc.)

2) The incorporation of other parameters to the control of emissions of SO₂, NOₓ and Particulate Matter, such as:
- Non Methane Volatile Organic Compounds (NMVOC) in TV
groups that consume solid or liquid fuels.
- Radionuclides for units that burn coal.
- PM10 and heavy metals for units that burn solid or liquid fuels and
are located in urban areas.

3) Nowadays, there are uniform standards for any location of thermal power
plants, leaving unconsidered neighbouring emission sources together
with the area’s meteorological conditions. There has been strong
discussions regarding this topic for two extreme situations:

a) A thermal power plant located in the centre of Patagonia (in the
south of Argentina) that had to install an expensive control
equipment due to its high Nitrogen Oxides emissions.

b) There has been an important enlargement of Buenos Aires City’s
Thermal Generation Park.

An answer to this dilemma would be the incorporation of the
concept of atmospheric basins through different approaches, such as:

- restricting the total emission by basin (emission ceiling)
- limiting inmission values, which currently rule in Environmental
Impact Assessment (EIA) presentations, though adding a
background concentration value predefined by the regulating
agency for each zone. This line would have the advantage of
concurring with the outlines followed by other environmental
authorities, but in this case, for toxic compounds. Nonetheless, it
is cost-restricted, for it would rely on high costs of concentration
data for each one of the regulated pollutants.

- By means of a survey that would estimate the direct damage
caused by thermal power plants and taking into consideration
some criteria with respect to the threshold damage accepted.
This approach has two advantages: on one hand, it does not
require expensive concentration data of every contaminant, and
on the other, it can be put into practice in an independent way
within the electricity sector. It would require an accurately defined methodology.

Some advantages of incorporating the concept of basin:
- It permits a regional approach regarding periodic revisions of the current emission standards.
- The enlargement or new units could be installed in replacement for pre-existing, non-functioning units.
- Promoting the construction of new units or the enlargement of previous ones in locations close to the basins or fuel refineries.
- It incentives other sources of contamination, non electrical, to propose voluntary agreement that would make the total emission by basin remain unchanged.

**Environmental impact Assessment (EIA)**

The main success associated to this tool is its capability to assess and analyse the interrelationship between the components of the physical environment with the project itself by means of the elaboration and discussion of the document. Furthermore, the implementation of this technique together with public hearings made possible some modifications based on the users’ suggestions.

**Recommended Improvements:**

1) Incorporate increasing requirements according to the project’s dimensions. Its principal goal is to reduce the uncertainties generated by subjective qualifications; all of which require the demarcation of specific assessment procedures for certain impacts. Particularly, with reference to the Transport and Distribution sectors, it would be interesting to define an assessment criteria for the following:
   - Visual impact
   - Impact on the propriety's value
   - Estimation of cultural goods
   - Estimation of the modifications performed on the landscape

So far, the estimations carried out by every proponent in each one of these situations represented the main source of conflict.
2) Improve opportunities and participation mechanisms of NGOs and local or jurisdictional organizations/institutions in the procedure of an EIA (read improvements in the Public hearings’ section)

Public Hearings

This tool was proposed as part of the EIA, within which was widely applied. Moreover, it was designed for the discussion of particular issues and topics concerning the community, though this latter possibility has not been put into practice yet. Notwithstanding, the implementation of this mechanism has not been successful.

Proposed improvements:

- Incorporate the legal institution to the hearings’ process. Institutions selected, and invited, should be from those who used to present legal resources more frequently. This would permit:
  1) the reduction of the number of legal resources that are presented after the hearing,
  2) to build the capacity of the members of the legal authority so as to become familiarized with the environmental dilemma

- Improve the NGOs’ development by means of:
  1) direct training programs
  2) creating a special fund to be used by the consumers’ associations for their instruction.

- Incorporate the concept of “prehearing” so as to oblige the interested ones together with the proponents to interact among themselves before the final presentation of the document to the ENRE.

Renewable subsidies

The promotion regime for projects on the subject of solar or wind energy generation has not produced any effect in the incorporation of new projects. The main discussion concerning this tool is the lack of national producers of these technologies. Therefore, it acts as a subsidiary of foreign companies.
This is why this situation requires some sort of modification, perhaps through the incorporation of a reduction in taxes.

**Environmental Certification.**

This mechanism was incorporated to the ENRE rather recently, in April 2003. Because of its short experience and practice we can not withdraw any conclusions yet regarding their success. At least 80% of the controlled agents have already completed their certification process, and the rest are working on their instatement and have requested a prorogation of their due date until the end of the current year.

**Risk Assessment**

From the recent promulgation of the law 25675 an onwards, an insurance for environmental damages is incorporated as a specific requirement that copes with the civil responsibility of the activity’s owners. This has not been regulated yet; notwithstanding, it does implicitly incorporate an Environmental Risk Assessment study as a previous step to the employment of those insurances. So, the conditions and assessment proposed by the insurance company and accepted by the owners should be public.

**Heat and Power Generation**

The liberalized market did not leave any margin for neither the incorporation of cogeneration projects nor the promotion of the demand side management. Under this new political framework it is worth to explore new tools that promote its incorporation.

**Conclusions**

Once privatised, most of the public facilities enterprises improved their services’ quality significantly, especially regarding the parameters recorded at the late 80’s. They augmented their microeconomic efficiency and fundamentally their productivity.
The significant private investment performed upon generation during the
decade of the 90’s together with important hydro power schemes, whose
construction began previous to the Liberalization, produced an
overdimensioned system with a high response capacity.

The liberalization process produced concrete improvements regarding
the general electricity system’s total emissions and the environmental
management of the companies. If we consider that the liberalization process
took place simultaneously to the installation of the environmental theme to the
society in general (the adoption of the environmental topic by the society in
general), it would be incorrect to conclude that this success is the result of the
new market legislations imposed in 1990. Nevertheless, by comparing the
electricity sector with the rest, such as industry or services, it is easily observed
the huge gap among them that highlights the former when considering
investment on environmental improvements. This surely represents the positive
impact of the liberalized electricity market upon the environment.

Argentina’s present socio-economic situation does not present any
margin for the reduction of the economy’s rhythm, which inflicts the
incorporation of new taxes. Furthermore, it does not seem possible the transfer
of taxes from one sector to another. Nevertheless, there is a good tendency
towards the incorporation of other variables from other sectors that until now
have not been considered and do not imply spending intensive capital. Facing
the prospect of adding new point sources of high emission, as are thermal
power plants, to the city of Buenos Aires it is necessary to take into
consideration the possibility of incorporating new tools. The definition of
atmospheric basins appears to be a new road worth to be explored. Within this
outline, the possibility of incorporating the transport sector to the generation
market by means of some kind of market mechanism turns out to be appealing.
The main obstacle presented to this proposal is the fragmented characteristic of
the transport sector, which has acted until now as a barrier in its incorporation to
environmental management plans.
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