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Institutional Designs and Regulatory Reforms in the Energy Industries

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1. Introduction

In recent decades, many countries reformed their infrastructure industries, referring to these reforms as deregulation policies. Thus, it seems quite paradoxical, that regulatory issues became more important after the introduction of so-called "deregulation" policies. For the purpose of this paper, deregulation means simply the end of institutional barriers to entry that have protected monopolistic utilities from competition. According to Majone (1998, p.212) "this paradoxical combination of deregulation and re-regulation is what is usually meant by regulatory reform". From this point of view, deregulation is just one element in the structural and institutional reforms of the infrastructure sector.

During the 1990s more than one hundred countries promoted institutional and structural changes in the organization of energy industries. These reforms reduced the barriers of entry and raised an impressive movement towards revision of the regulatory frameworks. Despite the diversity of the implemented institutional arrangements, it is observed two common lines in these reforms:

i) Increasing of the number of players as a result of introducing competition and attracting private investments;

ii) The creation of new regulatory bodies acting on behalf of government and seeking the consolidation of the new forms of State's intervention.

This process is very far away from being ended. However, it already offers interesting lessons that can serve as an element for the improvement of the organizational structures of the new regulators.

The main difficulties for the construction of a comparative approach on the energy regulators are mainly related to three main points:

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i) although the regulatory matters are not new, the practices in energy regulation in a competitive environment are quite recent and, for that reason, there is a limited set of bibliographical references and information about regulatory experiences;

ii) the reforms have been object of several revisions; under these circumstances, it is not easy to define regulatory benchmarks;

iii) the variety of existent regulatory frameworks and institutional designs

The debate over energy regulation today focuses on the appropriate level for regulatory institutional designs as a consequence of the variety of regulatory functions from country to country. Notwithstanding the importance and the specificity of the juridical and institutional context of each country, the lessons from those experiences can be held as a complementary element for regulatory decision-making process in the energy sector.

In this paper we are concerned with the variety of regulatory frameworks in the energy sector. What are the principal elements to understand this variety? To what extent does an energy regulatory agency also deal with competition (or antitrust) matters? How are the governments defining competences among ministries, regulatory bodies and competition authorities?

We attempt to draw a comparative approach to deal with these key issues and to better understand the energy reforms in different countries. We consider that the set of regulatory attributions may vary according three particular issues: the institutional arrangements, the market structures and the regulatory instruments.

In the section 2, we examine the different theoretical approaches in regulation. We focus especially on the reasons for creating new regulatory bodies and on the regulatory tasks in a competitive environment. Section 3 provides an assessment of different energy regulatory frameworks. We propose a typology from a sample of twenty (20) energy regulatory frameworks in order to identify different aspects that could be helpful to understand the variety of institutional designs. The last section concludes the paper.

2. The different approaches on regulation

The literature on economic regulation has traditionally been based on USA’s experience on regulating natural monopolies. For more than a century, the presence of natural monopolies provided the main reason for imposing a set of regulatory mechanisms, such as entry barriers, obligations to serve, price and quality controls. Under natural monopoly conditions the competitive duplication of facilities would be inefficient. Thus, the rationale for regulation is to remedy market failures and to avoid monopoly power.

Baldwin, Scott and Hood (1998) and Baldwin and Cave (1999) emphasize the trend in the recent literature on regulation towards the attempt to establish inter-disciplinary approaches based in studies of Law, Political Science, Economics, Social Sciences and History. They notice, however, that the need of theoretical bridges inside of each one of those fields has been contributing to make this subject more diffuse, harming the definition of an exact object of study. This aspect also contributes to explain the conceptual imprecision of the term 'regulation'.

In its broadest sense regulation can be seen as all government instruments of social control, because the institutional framework and modes of government intervention have varied from country to country. This paper will not approach this debate. Here, the term regulation is refers to a set of rules and mechanisms established by an independent regulatory agency to limit market power of infrastructure utilities.

The creation of regulatory bodies plays a crucial role in this process. It is clear, that one of the main reasons for the guarantee of the autonomy of regulatory action is the attempt to limit political interference. That aspect seems to constitute a fundamental sign in the process of attraction of private capitals. In that sense, governments have viewed regulation as less interventionist than public ownership and have created new regulatory agencies to oversee privatised utilities sectors.

Although the reasons given for the creation of the so-called independents agencies are similar from country to country, their independence or autonomy is a matter of degree and depends on the institutional design. Under these circumstances, it is easier to understand the wide range of regulatory frameworks.

Despite the different legal and institutional contexts can largely explain the variety of regulatory frameworks from country to country, the main difficulty for regulators consists on the

need of regulating industries in which different market structures can be observed. The main consequence of that process concerns the inadequacy of the traditional instruments to regulate natural monopolies (Pinto Jr., 2001a).

Therefore, the simple creation of new regulatory bodies does not assure automatically execution of public interest functions. In this new context, those tasks request a double learning process about the market structures evolution as well as the strategic behaviour of energy companies.

One of the most important tasks of regulators in a competitive environment is to establish an incentive regime for encouraging long-term investments. In the energy industries, the economic characteristics of investments are the long asset lives, the presence of sunk costs and the economies of scale. The funding of long-term investment projects has no simple solutions. These depend on the restructuring process of the sector and on the return to private investment.

Moreover, the entry of new actors in the power sector does not assure automatically a higher investment level. As pointed out before, the restructuring process requires substantial changes on market structure, on regulatory mechanisms and on the management of energy companies, both the remaining state-owned and the private ones.

Given these characteristics it is quite rational for companies to want to sign long-term contracts with customers in orders to reduce the risk of investing. These contracts reproduce many characteristics of vertical ownership (Helm and Jenkinson, 1999).

However, according to Joskow (2001), the reform programs of energy industries were many times developed by assuming the inexistence of: a) economic efficiency reasons that justified, in all countries, the adoption of vertical integration business strategies and b) the configuration of long-lived sunk investments and specific assets.

The author focused on four common problems in the processes of implementing reforms in energy industries:

i) market power of companies;

ii) management of network (transport) congestion problems;

iii) market performance problems when supplies of generation service are very tight;

iv) coordination of in production/ generation and transmission/transport investments.

In most of countries reforming energy sector the incumbent company, state or private, always tries to use access conditions to its networks in order to maintain (and eventually to abuse) its dominant position (Curien, 2000). It is precisely why the vertical de-integration has been implemented in several countries.

Under these circumstances, it is fundamental for energy companies to have access and to maintain a captive market to reduce the uncertainty associated to the technical-economical characteristics of the industry. Therefore, even after the unbundling of industry, it is expected the attempts, from the energy companies, to maintain the access to the market ration through merges/acquisitions, strategic alliances or still long term contracts, in order to reset the competitive advantages of vertical integration positions.

In other terms, the institutional design of the regulatory framework influence directly the companies’ strategic decisions[2]. Therefore, it is not by coincidence that the ‘Regulatory Takings’ began to dominate the recent debate in the USA (Sidak and Spulber, 1998).

The challenge of the new regulatory frameworks is to guarantee the achievement of four objectives:

i) to increase investments;

ii) to improve the microeconomic sector performance;

iii) to seek the reduction of prices;

iv) to avoid market power of the principal players.

However, those objectives can become contradictory due, especially, to the incomplete contracts. For these reasons, as observe Sidak and Spulber (1998), relationships among regulator-regulated tend to become a situation of permanent bargain. This has become evident in USA,

[2] Smith (1997) suggests that the regulators performance can even affect financial markets utilities ratings. This argument introduces another important issue to be explored between regulation and the financing of the investments.

where institutional changes raised a wave of lawsuits by the existing companies, whose economic arguments are based on the stranded costs problem.

The vertical de-integration, the reduction of barriers to entry and the new forms of supply both products and services create new contractual relationships on short and long run. In other words, vertical integration used to be the main governance structure in the energy sectors. With the unbundling of the different activities, transaction costs tend to be higher and the exercise of regulation tend to be much more complex. Therefore, the creation of new regulatory bodies does not assure automatically the achievement of public interest functions.

It should be pointed out that many energy companies are becoming multi-utilities companies, combining simultaneously:

(i) diversification of their core business and

(ii) multinational expansion.

Those companies are characterized for acting in more than one industry, directly as operators or through stock participation in consortia or strategic alliances. The technical progress, especially on energy commercialisation techniques, caused a revolution on the operating conditions in energy sector.

Policy-makers must pay attention in the establishment of the transition path rules in order to achieve the main objectives of the reforms. This task requires not only a consistent institutional design, but also a high degree of coordination of new institutions and investment decisions. Particularly in the energy sector, the institutional designs must take into account:

i) the structural changes, i.e., the structural policies which include break-up decisions such as the allowed (or not) degree of vertically integrated activities, privatisation, merger controls and others scope-of-business restriction (Vickers, 1998);

ii) the convergence of the energy markets, specially, electricity and gas networks.

The meaning of convergence is the potential for gas and electricity to be offered by the same company. The diffusion of the gas turbines for electricity generation has deeply changed the demand for natural gas and power generators are now one of the most important distribution gas’ s customers. This aspect is directly related to the recent mergers and acquisitions in these

industries: electric companies are taking over gas utilities and vice-versa. In this context, regulatory tasks become more complex because the existence of plenty of new players.

Is it possible to combine regulatory and competition mechanisms in the energy industries? After reforming process, relevant changes have been emerging in the industrial organization, property rights and governance structure of energy industries. In fact, this subject suggests a set of important considerations on the type of institutional designs to be adopted, on the relationships of the regulator with the regulated companies and equally with the aspects regarding the development of the energy market structures.

As mentioned above, it is important to emphasize that the introduction of competition and the unbundling of energy industries requires regulatory mechanisms allowing the access of competitors to the incumbent companies networks.

Even after the end of institutional barriers, difficultly the competition will be guaranteed with the presence of a company with strong market power. Under these circumstances, the presence of the regulator will be indispensable not only to deal with traditional regulatory aspects (price, quality, entry), but also with a new key issues as anti-competitive practices.

However, as mentioned by Mayer (2001), there is a crucial conflict between control of monopoly abuse and providing incentives to invest and innovate which existing regulatory frameworks have failed to resolve. Consequently, it is important to combine traditional regulatory mechanisms with anti-trust responses.

Not surprisingly, the institutional designs after reforms have been conceived in order to take into account regulation and competition issues. It requires the co-existence of regulatory agencies and competition authorities. The effectiveness of that type of institutional arrangement depends, in fact, on the hierarchical relationships that can be established. It is worth to remind that in the European countries, the creation of the agencies of antitrust regulation precedes the creation of specialized regulatory agencies. In the developing countries, that process of creation of new institutions is practically concomitant. and the regulatory agencies have received strong political support and financial resources from multilateral institutions, as World Bank.

All these aspects mentioned above are primarily related to the energy and economic policy-making decisions and must be defined before the implementation of the new regulatory frameworks. It is important to remind that an orderly way in the reforms may facilitate the risk analysis (Pinto Junior, 2001). During the 1990's the World Bank underestimated the complexity

and the institutional timing to create and organize a new regulatory framework. Recently, the World Bank recognized this failure in the approach proposed for institutional changes in the power sector (World Bank, 2003)[3]

Regulatory agencies and competition authorities should be seen as complements, rather than substitutes. It suggests that energy industries regulations becomes more complex and requires inter-institutional coordination mechanisms. It may be based on formal or informal cooperation agreements among the different authorities. However, it is important to remind that coordination means also increasing costs and difficulties for enforcing regulation.

It is important to remind that coordination means also increasing costs and difficulties for enforcing regulation. Baldwin and Cave (1999, p. 189) emphasize that “where coordination is attempted but fails, it may produce the worst of many worlds with rules that are insipid compromises, with divergences of enforcement that undermine the apparent consistency offered by the published rules, and with increased costs all round”.

All these aspects can largely explain the variety of institutional designs for regulating the energy industries after the reforms. In order to identify the main aspects of this variety, the next section provide an insight into the new energy regulatory frameworks in different countries.

3. The Variety of Institutional Designs for Energy Regulation

For the purpose of this paper, we establish a typology of energy regulatory agencies, as following:

Type I - Specialized Regulator: agencies regulating a single industry;

Type II - Energy Regulator: agencies gathering competences of different energy industries;

Type III - Multi-Services Regulator: agencies gathering competences of different infrastructure industries;

Type IV - Quasi-Judicial Multi-Services Regulator: agencies combining legislative, administrative, and judicial competences of different infrastructure industries.

Type V – “Super” Regulator: agency gathering not only the competences of different infrastructure industries, but also the attributions of competition authorities.

[3] “... power sector reform process is complex, time-consuming, resource-intensive, and requires

Table 1 presents twenty different institutional designs in the energy sector, with special reference to the role of regulatory agencies, ministries and competition authorities. It is possible to see that there are different hierarchical relationships among these institutions. Thus, it suggests different forms to deal with energy policy, regulatory tasks and antitrust matters.

Some interesting observations can be obtained from table 1:

a) The existence of specialized agencies (type I) is not predominant. Argentina, Finland, France and Portugal adopted this design for the electricity industry. Brazil also created an agency of the type I for the electricity industry, but in this country one can observe the presence of other types of regulatory agencies: ANP (oil and gas industries) is characterised as an agency Type II; furthermore, agencies type III were created in several brazilian states.

b) Germany, Austria, Japan and New Zealand are examples of countries that didn't create regulatory agencies for energy regulation. In those countries competition authorities have the responsibility for the application of competition law on the energy sector. In the case of Germany and of Austria, the main reason for the adoption of this type of institutional design is the historical role played by local and regional authorities (Länders). In the case of Japan, the ministry (METI) is responsible for all regulatory tasks.

c) After creating Type I energy regulatory agencies for electricity and gas, United Kingdom and Denmark recently have decided to merger them and to introduce a single Type II agency for energy. This movement for gathering regulatory attributions under a single authority is interesting to be followed in other countries. As it is known, United Kingdom constitutes a reference of the process of institutional and regulatory reforms in the infrastructure sectors. Important changes have been introduced in order to correct institutional failures. This movement can be interpreted as a form of institutional response for technological convergence matters which have been changed the strategic behaviour of energy companies towards diversification and multi-utilities activities. These aspects show that regulatory and anti-trust tasks are rapidly becoming even more complex as energy markets change.

d) It is possible to identify a large variety of inter-institutional relationships that implicates an “overlapping” of competences. This issue is directly related to coordination matters mentioned above. The attempt to establish voluntary agreements for inter-institutional

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phasing and good sequencing to create the conditions for sector transformation” (World Bank, 2003, p.ix)

cooperation has been observed in many countries. However, inter-institutional coordination is not a simple task at all. Not surprisingly, conflicts among different government bodies may delay regulatory decisions and reduce the transparency of decision-making process.

e) The most powerful regulatory agencies are in North America and Australia. In the USA, it exists a variety of institutional designs across sectors and states. As it had already been mentioned, the concentration of different competences, including quasi-judicial powers, is the most important aspect of American regulatory framework. The Australian model - Type V - attributes a wide range of competences to ACCC. It is interesting to notice that it is, until now, the only institution gathering simultaneously regulatory and anti-trust tasks. Examining the organizational structure of ACCC, it can be also noticed that its departments are highly specialized. Besides, ACCC has the responsibility for regulating other infrastructure services (telecommunications, transport...).

4. Conclusions

This study overviewed the variety of regulatory frameworks of energy and examined the main regulatory challenges faced by the regulatory agencies. The current regulatory problems require an important revision of the instruments and of the traditional practices of regulation.

Despite the variety of regulatory frameworks and types of reforms in the energy sector, it has been observed that the main difficulties are related to regulate competitive energy markets. The problems of antitrust legislation emerge as new and important issue in the agenda of specialized regulatory bodies. It requires a high degree of coordination to deal with elements inter-institutional relationship with the antitrust regulation agencies and with the Executive, Legislative and Judiciary.

It seems that an institutional design, separating regulatory bodies and competition authorities, becomes common. However, the effectiveness of that institutional arrangement has not been proved yet. In the developed countries, the tendency in the infrastructure sectors has been the intervention *ex ante* of so-called specialized regulators (telecommunications, electricity, gas, water, etc.) and the action *ex post* of the antitrust regulators.

Two main problems could be pointed to understand the regulatory challenges for creating a competitive environment: cross-subsidies and contracting problems. Both are related to the investment characteristics, as asset specificity, sunk costs and degree of vertical integration. Regulators have struggled to identify and then to eliminate these problems among the different activities of vertically integrated companies.

These problems raised from the new regulatory framework in the energy industries design are related to the convergence of network industries. The convergence of network industries implies also that the regulation of each sector can be no longer accomplished in an isolated way given he presence of multi-utilities companies which have assets in both electricity and gas markets. This has been justifying the changes in the institutional designs towards regulatory agencies of Type II or Type III, from the merger of competences of Type I agencies. However, until now, it is not possible to prove that is a trend that would be followed by many countries.

The variety of institutional designs will remain important because the inter-institutional and hierarchical relationships among ministries, agencies and other administrative bodies are very different from country to country. Policy-makers must expect overlaps of competences and conflicts among different institutions. And it requires a high degree of coordination and, unfortunately, implies the increasing of regulatory costs.

Table 1 – Institutional Designs and Regulatory Frameworks in the Energy Industries

Countries	Energy Regulatory Body	Competition Authority	Ministry Responsible for Energy Issues	Inter-Institutional Relationship
Argentina	Ente Nacional de Regulación de Electricidad (ENRE) – Type I; Ente Nacional de Regulacion do Gaz (ENAGAS) – Type I	Secretaria de la Competencia, Desregulación y da Defensa del Consumidor; Comisión Nacional de Defensa de la Competencia (CNDC)	Ministerio da Economia	Undefined; conflicts between the Dual System of Competition Regulation and ENRE
Australia	Australian Competition and Consumer Commission (ACCC) –Type V; State regulatory agencies: ex:Victoria Regulator General (Type III); Tasmanian Electricity Regulator (Type I)	Australian Competition and Consumer Commission (ACCC)	Department of Industry, Science and Resources	“overlapping” among the competences of ACCC and state regulators / exchange of information for decision-making process
Austria	No	Kartellgericht	Ministry da Economia	Competition law applies to the energy sector
Belgium	Commission de Regulation d’Electricité et du Gaz (CREG) – Type II	Conseil de la Concurrence	Ministère de l’Economie	CREG play an advisory role to Ministry and as referee for dispute resolutions
Brazil	Agência Nacional de Energia Elétrica (Aneel) – Type I; Agência Nacional do Petróleo (ANP) – Type II; Comissão de Serviços Públicos de Energia de São Paulo (CSPE) – Type II; other State regulatory agencies - Type III	CADE – Conselho Administrativo de Defesa Econômica; SDE – Secretaria de Direito Econômico; SAE- Secretaria de Acompanhamento Econômico	Ministério das Minas e Energia; Ministério da Fazenda	Coopration agreements among regulatory agencies ; (Ministry of Finances regulate petroleum products prices
Canada	National Energy Board (NEB) – Type II; Provincial State regulatory agencies : ex: Ontario Energy Board (Type II), Alberta Energy and Utilities Board (Type IV);) Public Utilities Board of the Province of Manitoba (Type IV)	Federal Competition Bureau (FCB)	Ministry of Natural Resources	FCB has no interference in provincial markets ; cooperation agreements between NEB e FCB for implementing reforms at federal level

Table 1 – Institutional Designs and Regulatory Frameworks in the Energy Industries (cont.)

Countries	Energy Regulatory Body	Competition Authority	Ministry Responsible for Energy Issues	Inter-Institutional Relationship
Denmark	Energy Supervisory Board (ESB) – TypeII (created in 1999 – merger of former Type I gas and electricity regulators)	Konkurrencestyrelsen	Danish Energy Agency –DEA (department of Ministry of Energy and Environment)	Cooperation agreements between ESB and competition authority; ESB staff is composed by employees from DEA and Konkurrencestyrelsen
Finland	Electricity Authority Market - Type I (Sähkömarkkinakeskus-SMK)	Kilpailuvirasto - OFC (Finnish Competition Authority)	Mini sitry of Trade and Industry	Cooperation agreements between SMK e OFC; overlapping of competences
France	Commission de Régulation d’Electricité (CRE) – Type I	Conseil de la Concurrence	Ministère de l’Economie, desFinances et de l’Industrie	Conseil de la Concurrence is an advisory body of regulatory agencies
Germany	No	Bundeskartellamnt (federal); Landeskartellamt (regional-Länders)	Federal Ministry of Economy	Competition law applies to the energy sector
England and Wales	OFGEM – (Office of Gas and Electricity Markets) – Type II	OFT (Office of Fair Trading) e Competition Commission (CC)	DTI- (Department of Trade and Industry)	Competition law applies to the energy sector; merger and acquisitions under responsability of OFT and CC; Overlapping in the analysis of anti-competitive practices
Italy	Autoritá per l’energia elettrica e il gas (AEEG)– Type II	Autoritá garante della concorrenza e de mercato (AGCM)	Ministry da Indústria e Minsitério do Tesouro	AEEG reports to AGCM the cases of anti-competitive practices in the energy industries
Japan	No	Japan Fair Trade Commission	Ministry of Economy, Trade and Industry (METI)	METI is responsible for all regulatory tasks

Table 1 – Institutional Designs and Regulatory Frameworks in the Energy Industries (cont.)

Countries	Energy Regulatory Body	Competition Authority	Ministry Responsible for Energy Issues	Inter-Institutional Relationship
México	Comisión Reguladora de Energía (CRE) – Type II	Comisión Federal de la Competencia (CFC)	Secretaria de Energia (SENER)	CRE reports to CFC the cases of anti-competitive practices in the energy industries
Netherlands	Dienst Toezicht en Uitvoering Electriciteitswet (DTE) – Type I	Nederlandse mediddingsautoriteit (NMa)	Minsitério da Economia	DTE under Ministry authorithy; joint decisions with about prices and access
New Zealand	No	Commerce Commission	Ministry of Economic Development	Competition law applies to the energy sector
Norway	NVE- Water Resources and Energy – Type II	NCA –Norwich Competition Authority	Ministry of Oil and Energy	NVE under Ministry authority
Portugal	Entidade Reguladora do Setor Elétrico (ERSE) – Type I	Direcção Geral do Comércio e da Concorrência	Direcção Geral de Energia	Cooperation agreements between Direcção Geral do Comércio e da Concorrência and ERSE
Spain	Commisión Nacional de Energia (CNE) – Type II	Tribunal de Defensa de da Competencia	Ministerio da Economia	CNE is an advisory body and as referee for dispute resolutions; Tribunal may apply directly anti-trust law
Sweden	NEA- National Energy Administration – Type II	Konkurrensverket	Ministry of Industry, Employment and Communications	NEA under Ministry authority
United States	FERC (Federal Energy Regulatory Commission)- Type II Public Utilities Commission – Type IV	Federal Trade Commission (FTC); Antitrust Division - AD(Department of Justice)	Department of Energy	Overlapping of competences between FERC, FTC and AD on federal level; the foormers play an advisory role to FERC in M&A issues

Sources: Bergman, Newbery et alli (2000) , IEA (2001), Pinto Jr. (2001) , Finon (2001) e websites of government bodies

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