INFRASTRUCTURE:

THE REGULATORY AND INSTITUTIONAL DIMENSION

By,

Ashley C. Brown

I. CHARACTERISTICS AND INSTITUTIONAL FRAMEWORK OF INFRASTRUCTURE SERVICES

Infrastructure services are generally thought to be those that are basic to the economic and social well being of society including energy, particularly electricity and combustible fuels, water and sanitation, telecommunications, and transportation. Because those industries are so closely tied to societal well being, they are often viewed as something more than simply economic activities similar to other lines of business. Rather, in addition to being a business, they are viewed as being charged with the “public interest.” In addition, much of infrastructure has, for much of its history, been characterized, either in whole, or in part, by monopoly characteristics. As a result, of both its social and economic characteristics, governments have always sought to exercise significant control over these basic industries. That control has traditionally been exercised by either outright ownership or through the exercise of regulatory oversight, and, in some cases, by both.

For a variety of reasons, state ownership has been common in infrastructure in many parts of the world. The reasons for this have varied, but they include ideology, the need to making certain that public policy objectives are achieved in core areas of the economy, monopoly characteristics, and, particularly in developing countries, and the inability of parties other than the state to attract capital sufficient to build out infrastructure. In addition, the fact that so much of infrastructure had monopoly characteristics led many policy makers to view infrastructure as quite different from those business sectors where private, usually competitive commercial activity seemed appropriate. Because so much of infrastructure was state owned, there was not a widespread perception of need for separate regulatory institutions. The prevailing, although not universal wisdom was that state ownership eliminated any need to control profit maximization because state owned institutions would be held politically accountable, and that appropriate economic incentives were unnecessary for non-profit institutions. While control over state owned infrastructure varied from direct governmental oversight to quasi independent, commercially oriented governance, independent regulatory oversight beyond that was largely absent.1

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1 An interesting exception to this was in Costa Rica, which established an independent regulatory agency to oversee the state owned electric and telecommunications company in the 1920s. While that company is generally regarded as a reasonably successful parastatal enterprise, it is impossible to determine with any degree of certitude what role the regulatory regime played in that perceived success. It is also fair to note that there are other widely regarded parastatal success stories that occurred where independent regulation was non-existent. Examples would certainly include CEMIG and COPEL in Brazil, as well as EPM in Colombia.
The predominance of state ownership in infrastructure began to change in the 1980’s and 90’s. The reasons for these changes varied a bit from country to country, but generally resulted from governments trying to relieve heavy debt burdens, inability to manage effectively, labor problems, ideological views, pressure from multi-lateral and unilateral lenders and aid organizations, the need and desire to access broader capital markets, a need to shift governmental resources to pressing social needs, efforts to install more effective management and greater productivity in operations, and, perhaps, the notion that privatization will reduce politicization in infrastructure policy and decision-making. In addition, and not unimportantly, it was widely perceived that certain infrastructure services, heretofore regarded as natural monopolies, were, in fact, no longer natural monopolies and were ripe for conversion to fully or partially competitive markets. Most notable as an industry ripe for competition, was telecommunications, where the technology, especially wireless and internet, made reliance on a single, land-based, monopoly anachronistic and unsustainable. In other infrastructure industries, aspects of monopoly were no longer necessary. Other examples of this might include generation in electricity, the commodity itself in natural gas, and perhaps rolling stick in railroads. Thus, as a matter of policy, the existence of, or potential for, competitive markets, made privatization and the introduction of competition a logical step. While one can debate whether privatization, in and of itself, accomplished all of the objectives listed above, or was appropriate for the circumstances, there is no doubt that many countries privatized, or, at least, allowed for the entry of private capital, into infrastructure sectors that had, heretofore, been the exclusive domain of the state.

The trend toward privatization, and/or allowing the entry of private capital, must be understood in the context of the nature of infrastructure services. Most, if not all, of these industries have been viewed over time as natural monopolies at one point or another. While some of them have clearly emerged from monopoly status, most of them either remain monopolies or have essential bottleneck facilities that retain monopoly characteristics while other parts of the sector may have become competitive. An example of this is in electricity where the wires part of the business (i.e. transmission and distribution) is widely viewed as monopolistic while generation and supply are viewed as competitive, or, at least, potentially competitive. Because of the two key elements, the essential nature of the service provided, and the lack of competitive options for consumers, privatization does not equate to open markets. A system of regulation is required. While state ownership of infrastructure may function without an independent regulatory overlay because of the political accountability of the stewards of the service and assets, private providers of essential services, particularly monopolies, lack such political constraints. Profit maximization may well

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2 The use of the term, “privatization,” in this introductory section is meant to apply to a broad array of options that include, but are not necessarily limited to full privatization of assets. The term also encompasses private-public partnerships, privatization of management but not assets, leasing arrangements, and perhaps other institutional arrangements that allow for the deployment of private capital and/or resources.

3 While it is beyond the scope of this paper, it should be noted that there is considerable debate among economists as to what constitutes a competitive, or potentially competitive, market. This debate has significance in regard to what form of regulation, if any, is applicable to the sector and the players within it. Some discussion of the regulatory implications will follow later in the paper, but the specifics of the debate over what constitutes a competitive market, for policy making purposes, is a subject of more than a little controversy among economists.

4 There are many examples of independent regulation being deployed to regulate state owned infrastructure companies, as well as privately owned ones. Electricity regulators in India, Brazil, Zambia, Mozambique, South Africa, Ukraine, Russia, Israel, Nigeria, Argentina, Tanzania, Mexico, and the U.S., for example, exercise such powers. The problem with regulating state owned companies, which are, after all, not for profit, is that it is very
breed efficiency in a competitive market, but in a monopoly context, profit maximization is highly problematic from a variety of perspectives. Accordingly, a regulatory regime must be put into place to assure that there is no abuse of monopoly power, that incentives are put in place for private service providers that reasonably align the otherwise conflicting interests of both consumers and investors. There are, as the discussion that follows makes clear, a variety of options that countries confront as they construct their infrastructure regulatory regime.\(^5\)

It is also quite important to put infrastructure regulation in full context. Generally speaking, economists prefer to allow markets to operate unconstrained by intervention from the state. That, it is often argued, will produce the most efficient result for society. To do so, however, requires that the markets suffer from no significant flaws, such as lack of competition, serious asymmetries of information, or major bottlenecks. There is also the additional question of how important the economic activity is to society to be considered in regard to whether state intervention into the market is warranted. In regard to essential infrastructure on which societies rely, however, the importance of the products being sold is affected with the public interests and market failures will inevitably require the state to intervene to compensate for those failures. That does not mean that markets should not be permitted to operate, but only that it is important for those markets to operate without any significant failures.\(^6\) Once it is determined that there is a significant market failure in an essential infrastructure market, then the questions are how that regulation is best carried out, at what cost, how to tailor it to be in proportion to the nature of the market failing, and toward what purpose. In addition, there is the question of how these decisions are taken, who takes them, and how they are implemented.

Before delving into regulatory issues, it is important to set the context in which reforms have been initiated in infrastructure services.

II. CONTEXT FOR RESTRUCTURING INFRASTRUCTURE SERVICES SECTORS

Private investment is sought out in infrastructure in developing countries, as noted, for a variety of reasons. They generally fall into four categories, or combinations of those categories. The first category is the result of factors internal to the infrastructure sectors affected, such as an inability to effectively manage assets because of labor difficulties, corruption, or human resource limitations. The second category is where attracting private capital is motivated by economic or resource factors completely external to the infrastructure sector, such as dealing with an economic crisis, or simply seeking relief from crushing levels of debt, reaching the state's limits in terms of borrowing the amounts of money required to keep up with increasing demands for services, or perhaps even a need to divert resources to other pressing social needs. Third is where the motivation is simply pressure from creditors or foreign aid donors who make privatization a pre-condition for making loans or extending. Finally, there are cases where governments simply

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\(^5\) For the interested reader summaries of country-specific mid-level and in-depth regulatory evaluations which present principal findings and principal recommendations of each evaluation can be found in Evaluating Infrastructure Regulatory Systems, by Ashley C. Brown, Jon Stern, and Bernard Tenenbaum, with Defne Gencer (The World Bank, 2006).

\(^6\) In some cases, such as a “natural monopoly,” there is a complete absence of meaningful competition, so regulation in that circumstance is generally regarded as being necessary.
take an ideological position to forego state ownership and promote private investment in the belief that such moves serve the best interests of the country. The motivation is quite important as a measure of gauging a country’s commitment to providing an appropriate environment for attracting and retaining private investment. Perhaps, even more importantly, it heavily influences the method in which privatization is carried out.

While it seems intuitive that the more a Government is committed to the success of attracting private capital to a nation’s infrastructure, the more likely it is that the political will exists to make the effort successful. While it may be intuitively true that privatization compelled from outside the country is less likely to succeed in the long run than if there is strong domestic support for the effort, there is no clear evidence that privatization failed simply because of resentment of outside pressures, such as from the IMF or The World Bank. On the other hand, political commitment to privatization or attracting private capital is no assurance of success either. The problem is because governments have an inherent conflict of interest in privatizing. The conflict is between selling state owned assets for the maximum price and optimizing circumstances for the long term optimization of the sector. Absent effective management, those two, perfectly legitimate, objectives, are at odds with one another. It is also important to note that governments privatizing infrastructure services for the first time, have another obstacle with which to contend, namely risk adversity among prospective investors who find no precedents for assessing the risks posed by the offers being made. To overcome these concerns, governments often try to “sweeten” the initial concessions being offered in order to gain investor confidence. There is some history that these deals turn out to be too “sweet” to be sustainable over the long run. Three examples, drawn from Brazil, Argentina, and Zambia, illustrate these problems.

Before discussing the three examples, it is important to set the context beyond privatization. Privatization is just one component of restructuring an infrastructure sector. Indeed, it is not even an indispensable element of restructuring. Perhaps more important in restructuring is to design and make the rules for the new market model, and to formulate the regulatory regime. The failure to complete, or, at least to embark, on those two efforts is an almost certain guarantee of

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7 Where outside lenders pressure governments to privatize, there is more likely to be passive resistance to the pressure than outright sabotage of the process. An example occurred in Zambia in the 1990's where the IMF insisted on a loan condition requiring that the country’s two major hydro power plants, Kafue Gorge and Kariba, be severed from ZESCO, the state owned utility and turned into competitive enterprises. The Zambians accepted the conditionality, but never actually did what the IMF demanded. Ultimately, several years later, the futility of that conditionality was acknowledged and removed. Many close observers, including the author of this paper, regarded the condition as an excess of ideological zeal by the IMF given that the two plants provided over 95% of the country’s electricity and would thus constitute a duopoly that would not constitute a competitive market. There was, however, another part of the electric distribution system that was privatized, but it will be discussed further below.

8 This pattern is sometimes called the “Dance of the Virgins” between governments trying to privatize for the first time and investors looking to invest for the first time is a particular country’s infrastructure. This pattern of “sweet” deals and governments later “rolling back” some of the “goodies” has been repeated many times. The price cap for regional electricity companies (RECs), discussed elsewhere in the paper is a classic illustration, as is the Brazilian distribution tariff controversy, also discussed herein. Another notable example was in the Australian state of Victoria, where the government substantially altered the tariff regime for distribution.

9 Norway is an excellent example of a country which restructured its power sector during the 1990's from a monopoly to a competitive model. Similarly, in many countries, private investors were sought out to build power plants, but existing plants and wires companies were not privatized. In telecommunications, there are many examples of countries which allowed private capital into the market (e.g. in cellular communications) without privatizing existing landline carriers.
creating enormous difficulties in privatization. It seems intuitively obvious that both the host country and the private investors putting their capital at risk would be well served by knowing at least the contours of the regulatory and market environment before large sums of capital are committed. As will be demonstrated by the Argentine and Brazilian examples, the difference between setting that context before trying to deploy private capital and leaving it for a later date is enormous.

The Brazilian and Argentine examples are excellent studies in contrasting ways of carrying out privatization. Prior to privatization in the early 1990's, the Argentine power sector had suffered from significant under investment, and was somewhat physically deteriorated and low in efficiency and productivity. It was widely believed that the strategic injection of capital and installation of new management would yield very significant productivity gains in generation, transmission, and distribution. In Brazil, the pre-privatization condition was quite different. While many, although not all, distribution entities, suffered from lack of investment, the transmission and generation sectors were generally regarded as well maintained and reasonably efficient. It is also worth noting that the generation sector in Brazil at the time privatization was begun, was about 90-95% hydro, while Argentina was roughly 50% hydro and 50% thermal.

In Argentina, privatization was viewed in the context of a total restructuring of the sector. Prior to undertaking privatization, the Argentine authorities determined that they wanted to create a viably competitive generation sector, establish price cap regulation for the distribution companies which provided powerful incentives for increasing productivity, and develop a transmission network that enabled that vision. In connection with that vision, they intended to sell off the state assets in the sector to private investors, most of them foreign. In order to establish the optimal circumstances, considerable efforts were expended in order to learn from mistakes elsewhere in creating viably competitive electricity markets in order to avoid repeating them. Competition in generation was essential because they envisioned minimalist regulation, primarily anti-trust regulations, for generation. Needless to say, they wanted to attract significant revenues from selling the state’s property. That desire, however, was tempered by their intention

10 In addition to the problems enumerated below in the Brazilian case, there are the prime 1990's examples of the Dabhol Plant in India and the PLN dealings with Edison Mission Energy in Indonesia. In both cases, Governments, or their proxies, attempted to bring in private generators without creating a regulatory or market context to provide the requisite level of discipline over the transaction. The transactions turned out, not surprisingly, to be very costly failures.

11 The comparison here is of the initial privatization and market restructuring. Most observers regarded Argentina as a model of how to get it right, while the Brazilian effort did not have the expected consequences. The initial successes and failure are ironic because the Argentine model has, as is noted in a subsequent footnote, largely collapsed, while the Brazilian model went through significant reforms and has emerged in workable form. The subsequent failure in Argentina, however, was not at all due to a failure in privatization, regulation, or market design. Rather, it was the result of macro-economic breakdown. Indeed, Argentina stands as the embodiment of a critical fact to keep in mind in regard to the role of regulation. While bad regulation will likely assure bad results, good regulation cannot assure good results. There are too many other variables that can trump even the best regulation. Clearly, macro-economic disaster is a prime example.

12 In both countries, most, although not all generation and transmission was owned by entities controlled by the national government, while most, although not all of the distribution assets were owned by state governments in Brazil and provincial governments in Argentina. In Brazil, there were a few privately owned entities as well in the power sector. It is also perhaps worth noting that the process of nationalizing the power sector had only been completed in the 1970’s, so the privatization was occurring within 20 or so years of the state having acquired control of the sector.
to assure that the electric market was sustainable and enduring. In short, profit maximization from the sale of assets was not the objective. The desire to capture revenues for the state was tempered by the wish to for an optimal market, post-privatization. As a result, the three basic components of reform, market design, establishment of independent regulation, and privatization were carried out somewhat contemporaneously during the early 1990’s.¹³

Brazil, during the period 1995 to 1999, in notable contrast to its southern neighbor, turned over privatization efforts in the power sector not to energy officials, but, rather, to BNDES, the national government’s development bank. The first task to be undertaken was the privatization of the distribution companies. There were two reasons for this decision. The first was purely financial. Most of the distributors were owned by state governments which were deeply indebted to the national government. By turning over those assets to BNDES for privatization, the revenues received could serve double duty, repayment of state debt to the national government, and to enable the national government to ease some of its very significant debt burden. BNDES then spent considerable effort talking to potential foreign and domestic private investors to see how they could package the distribution company sales in ways that would be most attractive to them.¹⁴ Rather than replicating the earlier Argentine effort to contemporaneously design a new market and to implement a regulatory system, those decisions were deferred. At least part of the reason for deferring those decisions was that fear of competition or anxiety about regulation would reduce the amount of money investors were willing to spend to buy the distribution assets. There was a side effort to engage key figures in the power sector in strategic discussions about market design and regulation, but that effort, unlike what happened in Argentina where all of the activity related to restructuring the sector was integrated, took place in almost complete isolation from the privatization efforts. Indeed, even though promises were made to privatize generation at some unspecified time in the future, serious efforts to carry that out never fully evolved.¹⁵

¹³ It is also worth noting that similar reforms were being carried out at the same time in the natural gas sector, so that a competitive natural gas market would come into existence to facilitate the operations of thermal plants in a competitive generation market.

¹⁴ Among the measures added to make the distribution companies more attractive to private investors were to not include any X factor to the annual RPI adjustment, to not reference future regulation in the concession documents, and to offer BNDES financing. The omission of the X factor is particularly important because X is the minimal productivity gain expectation imposed on the regulated company which is automatically assumed to occur, the benefits of which are passed back to consumers. Any gain in excess of X go to the company's bottom line, while productivity gains below X amount to a loss for the company (There is a more detailed discussion of X factors below in the Ratemaking Section discussion of price cap regulation). The latter was particularly interesting because it meant that “privatization” was being largely financed by a state owned bank and so called “investors” were not being required to inject a great deal of their own capital. Some cynical observers came to view the so called privatization as an accounting exercise that left the state holding the same ultimate risks that it had borne as the owner of the assets. It should also be noted that, in regard to the X factor, some of those who made the decision not to impose one, contended that requiring a company to share some of it own productivity gains with its customers amounted to confiscation of some of what the company had earned.

¹⁵ Many observers believed that of the five large hydro generating companies, only one in the south of the country was capable of privatization. The largest, Itaipu, on the border with Paraguay, had to remain state owned under the terms of international treaty obligations. The second biggest, Chesf, was primarily composed of dams on the Rio Sao Francisco, most of which were multi purpose for electricity, transport, and most importantly in the arid Northeast of Brazil, for irrigation. The other two generators presented other significant obstacles to their privatization. As it turned out, only the southern generator was privatized.
result was that the government did, in fact, sell distribution assets for prices far in excess of the established minimum price, but that the seeds of sector failure were planted.16

Whereas the Argentine market functioned quite well until the entire economy collapsed several years later (2000-2002), the Brazilian market plunged into service reliability problems and then severe shortage. The service reliability problems, manifested in the blackout of 1999, resulted from incentives provided in one of the earliest privatization, that of Rio Light. The price caps regime not only had no X factor to assure a sharing of productivity gains between consumers and investors, but was accompanied by a complete absence of regulation of the quality of service until ANEEL subsequently came into existence.17 The result was that the company was not rewarded for increasing productivity, but rather for merely cutting costs, a rather simple task that was accomplished by not investing in infrastructure, already deteriorated at the time of privatization, and then laying off or moving into early retirement, the skilled and experienced workers who knew how to make the system to work. The two week blackout of Rio de Janeiro, Brazil’s second biggest city, in 1999, began just as ANEEL was setting up shop.18 The Chairman and his secretary had been in place barely a week when they received word of the blackout. To make matters even more complicated, when ANEEL did take action, the companies contended that it had no jurisdiction because their concession pre-dated the law creating ANEEL, and because their concession said nothing about quality of service standards. The regulatory agency, not surprisingly, had a rough birth. Its credibility was not enhanced by the shortage which occurred just a few years later, the causes of which were multiple, but significant among them was the complete failure to design a market scheme within which there were incentives for building thermal generation. Thus, one dimensional focus on privatization proved costly.19

16 It is also worth noting that, unlike in Argentina where the natural gas market was concurrently restructured, in Brazil, which had the objective of developing thermal generation to offset the risk of drought in its predominantly hydro generating fleet, restructuring natural gas was deferred, and never fully implemented. To be fair, at the time Brazil had far fewer known natural gas reserves than Argentina, and the state owned gas monopoly in Brazil, Petrobras, carried more political clout in its country than did its Argentine counterpart, YPF.

17 For a full discussion of X factors please see Footnote 14 as well as discussion of price caps in section on ratemaking below.

18 The blackout was not only at Rio Light, but also at the other electric utility in the State of Rio de Janeiro, CERJ. The latter’s incentives, while not identical to Light in all details, were substantially similar.

19 It is important to note the postscript to both countries' experiences. In Argentina, the macro-economic collapse of 2001-2002 led to the government interfering with energy contracts and largely pre-empting the regulators' independent powers to set tariffs. The Government's motives, of course, were to reduce inflationary pressures and to maintain affordability of rates for the large number of households suffering severe economic stress. The steps taken by the Government, however, turned out to be more than emergency measures, but, have become permanent features of the country's energy markets. In Brazil, Government also preempted ANEEL to deal with the crisis by appointing a special committee to manage the crisis. As the crisis eased, however, the electric regulators slowly regained their authority and the Committee was disbanded. When the new Government came to power, however, longer term post shortage reforms, beyond mere crisis management had yet to be implemented, so the new Government, over the course of its first year in office, completely restructured the market. ANEEL was able to regain most of the decision making powers it had seen preempted during the crisis.
In Zambia, there were two state owned electric companies. The larger one was ZESCO, the vertically integrated, state owned utility. The other was a distribution company, Copper Belt Energy, that was owned by the nationalized copper mining operation and served the heavy load centers in the country’s Copper belt region. In search of revenues for the treasury, during 1991-1996, Zambia decided to privatize Copper Belt Energy. In order to make the sale more attractive, the Government hit upon the idea of having ZESCO assume the supply risk for Copper Belt’s customers rather than assign that risk to the entity serving the customer - as is typical with electric utilities. Further skewing the incentives, the concession indicated that in circumstance where the customer paid less than his full bill, Copper belt had first call on the money paid before ZESCO was to be compensated. The arrangement, much like that of privatizing distributors in Brazil, was perfectly suited for attracting significant amounts of money to bidding for the concession, but when the copper mines fell behind on their electric payments, Copper Belt Energy was largely held harmless, while ZESCO, the state owned company responsible for serving the bulk of the country’s electric consumers, was pushed into an deeper financial abyss. The ERB, Zambia’s energy regulator was with the dilemma of a company that was largely precluded from recovering its costs, yet which was obligated to serve most of the country’s demand for electricity. Once again, one dimensional privatization rendered the regulatory task extraordinarily difficult.

The point to derive from these experiences is that regulators are inherently creatures of the environment within which they must operate. When the privatization occurs in a balanced, nuanced way, keeping in mind the multiple objectives of such an effort, regulators will be able to operate in a smoother, more stable environment, than when they are handed the residual damage from deeply flawed privatization efforts. It is also worth noting that there are other contextual issues regarding privatization that further define the regulatory challenge. Governments, in order to build political support for privatizing state assets sometimes overstate the expectations for productivity and service quality gains. Sometimes, as in the case of Argentina, significant gains are attainable. In cases such as Brazil, that is not at all clear. In fact, there is something of a debate among experts about whether it is best to build up assets prior to privatization in order to attract a higher purchase price, or, rather, to sell the asset "as is" and let the investor value it
appropriately, and then go about making improvements as it sees fit. Finally, there is the question of clearly defining what is expected of the private investor (e.g. expansion of service, quality of service, safety, etc), so that the investor, government, consumers, and regulators all have similar expectations. As is obvious, it is critical that the incentives provided to the investors be consistent with the attainment of those expectations, as well as congruent with the policy objectives of the state and its regulators.

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**Universal Access to Service**

The effort to provide universal access to service is an important example of how privatization may provide incentives or disincentives for the attainment of universal access. An excellent example occurred in the Brazilian State of Bahia in the mid 1990's, when the state electric distribution company, COELBA, was privatized. There were serious issues as to how to extend service into the vast, relatively under served, interior of the state. The Governor was given three choices in that regard as they related to privatization. The first was establishing dates certain for universal service as part of a statewide monopoly concession, a requirement that would allow prospective investors to internalize those costs into their bids. The second option was to grant a concession only where service then existed and then put unserved areas out to separate bid, thereby injecting a bit of competition into the equation. The third option was to provide a state wide monopoly concession with no service extension requirements, unless funds were made available to the company by third parties, such as the state. The Governor chose the third option for the obvious reason, that it would attract the biggest prices from bidders. Nevertheless, just a few months after Iberdrola, a private Spanish utility, acquired the concession with no obligation, absent state funding, to expand service availability, the company found itself heavily criticized for not providing a service, the concession explicitly did not require.

While the example relates to universal service in the context of privatization, the provision of universal service is an extraordinarily important part of infrastructure regulation in developing economies, with or without privatization. Market penetration rates for electric service in developing countries, particularly in rural areas, can be very low. In some sub-Saharan African countries the rate is in single digits. The attainment of universal service is both a policy and regulatory issue. The options for achieving it range from, as in the Bahian example, internalizing it into privatization, creating governmental subsidies from the state treasury within rates to attain it, devising cross subsidies to finance it, and variations of each. Each approach has disadvantages. Internalizing it into privatization might be efficient, but is, as the example points out, it may not be appealing to governments or politicians who are looking to maximize revenues from the sale of assets. Governmental subsidies are reasonable in the economic sense that they allow for a wide spreading of the costs, but have the downside putting even greater pressure on governments to spend money from treasuries that are already bare and often deeply in debt. Cross subsidies have the advantage that they are relatively easy to put into effect and that they are "hidden taxes" that impose less political costs to the government. They are problematic, however, in the sense that they often become too burdensome, as in India, where rural subsidies are widely regarded as poorly targeted, extremely costly, and distorting of price signals to customers. They are often politically contentious, as in Namibia, where efforts to impose cross subsidies from urban to rural customers ran into protests from the country's cities.

There are also efforts to universalize electric service through micro grids. In Cambodia, for example, many villages have local entrepreneurs who provide local service of electricity to villagers, but who are not connected to a national grid. There are numerous efforts in many countries to utilize renewable resources, such as solar, wind, bio-mass, or small hydro, to create micro-grid service. Universalization of service is a major issue in developing economies, and regulators in those countries are likely to be called upon to play a major role in accomplishing it.
III. REGULATION: JURIDICAL, INSTITUTIONAL, AND SUBSTANTIVE ASPECTS

Regulatory regimes in both design and operation must be understood in at least three dimensions, the legal construct, the processes, as well as institutional and governance framework, and arrangements, and, of course, its substance, in terms of rules and pricing. Stated in somewhat different terms, these are the questions of Who? How? and What? of regulation. There are a number of models in each of these dimensions, as are explained below.

A. Juridical Models

There are essentially two quite different juridical models for regulation. They are generally known as “regulation by rule” and “regulation by contract.” While each of these models has a variety of variations, including some hybrid models combining elements of both, they are the two dominant models in use today.

Regulation by rule, which originated in the United States, and which is still in use there, as well as other jurisdictions, is a regime wherein the regulators is delegated enumerated powers from the Government, and is empowered to exercise them unilaterally (i.e. without the formal consent of the regulated entities). In contrast, under regulation by contract, which is used in a majority of jurisdictions with formal infrastructure regulation, concessions are granted to licensed entities to do business under specified circumstances and conditions, and those rules remain in effect, like any contract, until such time as they expire by their terms, of the parties to the arrangement mutually agree to alter the terms. The degree of difference between the two juridical contexts may be slight, or may be quite significant depending on the explicitness of the terms of the concession documents.

The basis of concession regulation is that a concession is granted to a licensee, often a private company, but perhaps a state owned enterprise, to engage in a particular business activity. The concession sets out the terms under which the concessionaire will do business. Typically, although not always, concessions might include such terms and conditions as the price paid for the concession, pricing methodology, provisions setting out when and how tariffs might be changed, monopoly or non-monopoly status, service expectations, degree of regulatory discretion to which the company is subject, definition of territory to be served, length of concession, capital investment expectations, potential liabilities and other risk exposures, and a host of other requirements. From a legal perspective the concession is a contract between the government and the regulated company, the terms and conditions of which can only be altered by mutual consent. Concessions are usually granted by the government and enforced by the regulator, but, in some jurisdictions, the regulator does both. It is important to note, however, that the degree of explicitness in concessions is critically important, because the terms and

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21 The discussion of the models will be of a fairly general, conceptual level, but Appendix A will set out, in summary form, case study evaluations of regulatory regimes in various countries that have, within the last decade or two, implemented new infrastructure regulatory regimes.

22 “Regulation by rule” is often referred to as “discretionary regulation.” The two terms are synonymous and may be used interchangeably.

23 Concessions are often referred to as licenses or franchises. The terms are synonymous and may be used interchangeably.
conditions are legally binding and limit subsequent regulatory discretion.\textsuperscript{24} For that reason, investors often prefer contract based regulation because they are in a better position to know what regulatory risks they are likely to encounter. Left to their own devices, presumably, many regulators would prefer to have more discretion that that afforded by contract regulation. For governments, the selection of which method is deployed is often the result of ascertaining which method will allow privatization to proceed most smoothly, and, perhaps, most profitably. It may also be the result of the country's legal system.\textsuperscript{25}

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\textbf{Granting Concessions: A Governmental or Regulatory Function}
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There is a debate over who should grant concessions. Some argue that the regulator should not grant concessions because it would then have a stake in how subsequent performance by the licensees is assessed. Furthering that argument is the idea that if the concession is granted as part of a privatization scheme, the government, as custodian of the asset, should determine to whom it should be assigned and under what terms and conditions. Proponents of the government being the concession granting entity also argue that the terms and conditions of a concession to an infrastructure provider are broad statements of public policy which only a government, and not a specialized regulator, can perform. Those who believe that the regulator should grant concessions contend that the process would be less politicized and less subject to manipulations, that regulator will have to enforce the concession, so it makes sense for them to grant it also, and finally that the regulator is better equipped professionally to handle the concession granting process.
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Regulation by rule also includes the granting of concessions to companies, but the terms of those concessions are often little more than a mere license to do business. The substantive conditions under which a concessionaire must do business, such as pricing, service rules, subjectivity to competition, liability and other risk exposures tariff changes, etc. are left to the discretion of legislative and regulatory authorities, who possess the power to change any or all of the rules at their discretion, without having to obtain the consent of the regulated entity. Typically, however, that discretion is limited in a number of significant ways. Those limitations typically include prohibitions on the arbitrary taking of property, requirements that pre-existing contracts be honored and contractual; rights of parties be respected, including but not limited to arbitrary diminution of the value of property, requirements that all rule changes be applied prospectively and not retrospectively, prohibition against unreasonable barriers to recovery of costs prudently incurred in providing acceptable levels of service, prohibitions against changing rules without some form of consultation with those affected, as well as other statutory or constitutional limits of the exercise of state regulatory power.\textsuperscript{26} Thus, while the regulatory risks for a concessionaire may seem far greater than they might be under contract regulation, depending on the limits imposed on the exercise of regulatory discretion, that may of may not be the case. It is important to note that the limits of regulatory discretion in a regulation by rule regime may be heavily dependent on the existence of a strong legal system which includes competent, independent

\textsuperscript{24} In this case, regulatory discretion is meant in the broadest sense. It is not limited to what regulators themselves do, but also what the government might do in regard to laws applicable to regulation.

\textsuperscript{25} In Ukraine, for example, concessions are not necessarily a contract between the state and the regulated entity, but rather a means by which the government, not the regulators, can impose changes.

\textsuperscript{26} Apart from legal constraints that may limit regulatory discretion, political reality also serves to limit the exercise of regulatory powers. Concessionaires, both public and private, as well as the unions representing their workers, often exercise considerable political clout and employ effective lobbying techniques to protect their positions and advance their interests. Thus, those wishing to exercise regulatory discretion may often find themselves politically constrained even before they reach their legal limits.
judicial oversight or review. In the absence such a strong legal system, nominal constraints on
the exercise of regulatory discretion may be more illusory than real. For that reason in particular,
investors often find contract regulation preferable to discretionary regulation in less developed
countries. That being said, however, it may also be that the seeming certainty of contract
regulation may be less than meets the eye. It is useful to consider a couple of examples to
illustrate the issue.

Perhaps the best example of instability in the supposedly certain regime of contract regulation
was found, ironically, in the United Kingdom, hardly an immature or uncertain legal or political
environment. The rules in England and Wales for the distribution companies (regional electricity
companies (REC’s)) after their privatization, was that they were subject to RPI – X price cap
regulation, the details of which will be further explored later in this paper. That meant, in
practical terms, that the tariffs would be set for a period of five years, subject only to annual
adjustments to reflect both inflation and the attainment of an assumed level of productivity gain.
Those rates were premised on assumptions about costs and opportunities for productivity that
turned out to be significantly off the mark. The result was that when new investors began
exploring the possible acquisition of various REC’s the rates of return being earned were
disclosed. Those rates were quite high and led to considerable consumer backlash. All of this
played out against the backdrop of elections as well as allegation of “excessive” profits being
earned by the REC’s proved to be a considerable embarrassment for the Government.  

The

problem was that the regulatory contract in place explicitly prohibited any tariff changes, other
than the automatic RPI-X annual adjustment, during the five year life of the tariffs in effect. The
question for the regulator was to fully honor the concession contract terms and risk the political
unraveling of the pricing methodology and perhaps even more of the enacted reforms, or to break
the contract and rescue the overall paradigm. Given that choice, the contract was broken and
high earning REC’s were compelled to reduce their tariffs to more “acceptable” levels. For
contract regulation to be fully sustainable, it needs to “right” at the outset. In the case of
distribution tariffs, the initial tariffs were not guided by a full understanding of the underlying
costs and potential gains in productivity. That failure to be correct at the start, almost inevitable
given human frailties, has enormous potential, as the example demonstrates of making contract
regulation less certain than the theory would make it appear.

A Government’s Dilemma: To Interfere or Not Interfere

It is not entirely clear what action the Government could have taken without clearly intruding onto the independence
of the regulator. The Government faced a serious dilemma in terms of signals to investors. On one hand, it did not
want them complaining about unfavorable rate treatment that other private investors would be discouraged from
investing in the power sector. On the other hand any political interference with supposedly independent regulation
would also be likely to discourage investors by demonstrating the government’s ability to politically manipulate
tariffs. While political intervention in this circumstance might be beneficial to private investors, with the new left
wing Government about to take power, investors might simply see the risk of political intervention over the long
term as substantially increasing regulatory risks.

27 While the regulator was independent of the Government and presumably outside of politics, no regulator can be
entirely deaf to politics. That was particularly the case here because the Government was held accountable not
merely for the prices, but for having enacted the entire reform package of which the REC prices were one result.
The regulator, Professor Stephen Littlechild, a very well respected and prominent economist, was one of the chief
proponents, intellectually at least, of those very reforms, so his sensitivity was quite understandable. .
Another example of uncertainty with supposedly certain contract regulation occurred in Brazil at the expiration of the initial terms for distribution tariffs in Brazil. The problem in Brazil emanated not, as in England, from a less than full appreciation of the costs, but, rather from another common contract problem, namely an incomplete document that fails to set out all of the relevant terms. At the time of initial distribution company privatization, the concessions being offered to bidders set out, among other things, a tariff methodology for the initial tariff period, but were silent as to what would happen at the expiration of that period. They were also silent in regard to the regulatory regime within which the concessionaires would be doing business. Thus, when the initial tariff period expired, ANEEL, the regulatory agency, lacked any legal or policy guidance as to how to set tariffs for the next period of time. Particularly vexing for the regulators was the fact that concessions did not even give any basis for the ascertaining the rate base which would serve as the cost foundation for tariffs. The companies, not surprisingly, contended that the rate base should be based on the purchase price they paid for the assets. They contended that that was what the government had promised them at the outset. The problem was that nothing in the concession, or, for that matter, in Brazilian law, supported that contention, and the regulatory agency itself, did not exist at the time, so it was clearly not a party to any such understanding. Moreover, regulators had alternatives for establishing a cost basis, such as reconstruction costs, original construction costs minus depreciation, or application of some benchmark set of costs. When ANEEL did not use the purchase price, the private owners of the distribution companies protested to the Government that the regulatory compact had been broken. While there were divided views in the government ultimately no action was taken to undermine what the regulators had done.

Ultimately, on reconsideration, and with considerable consultation with both the Government and The World Bank, ANEEL put in place a benchmark based foundation for establishing costs, which, along with a series of other, somewhat unrelated reforms implemented by the Government, salved the complaints of the distributors. The problem, however, of the incomplete contract, points out the fact that the initial terms of a concession not only need to be based on full information, but must also be complete and comprehensive if it is to achieve the level of sustainability and certainty for which many risk adverse investors look.

Regulation by rule, almost by definition has within it a number of serious regulatory risks. The mere fact that government or regulators can change rules without the consent of the regulated might make many investors fearful, despite the limitations on that discretionary authority noted above. The fact that such changes can occur at either a regulatory or political level, of course, does little to quell those anxieties. The fact that regulation by rule is primarily used in the U.S.,

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28 Many distributors were privatized prior to the enactment of the relevant regulatory statutes, including the creation of ANEEL, the electric regulatory agency. Many suspect that the curious timing was also the result of efforts to maximize prices from sale of the distributors by not arousing any fears of regulatory risks from prospective bidders. The chronology of privatizing first and then worrying about regulation and market design, is now widely regarded as having been a major mistake, not only by policy makers, but also by investors whose due diligence efforts failed to include a demand to know “up front” what the regulatory system and market design would be.

29 Interestingly, that methodology did not include, as the English did, an X factor. The theory was that all productivity gains would inure to the benefit of the investors whose management had achieved it. In fact, it was part of a effort by the Government to maximize the revenues to be paid for the asset by making the concession as favorable to the investors as possible. Some of the other flaws in the concession documents may also be explained by the same motivation. The initial terms for the tariffs in the concession varied from 5 to 7 years, by company.
with its strong, independent judiciary, and well established legal system, does little to provide confidence to investors in jurisdictions with weaker legal systems and less independent judicial institutions. On the other hand, the flexibility afforded regulators and legislators in a regulation by rule regime can allow for changes such as occurred in the English system without posing a threat to the entire fabric of the regulatory arrangements. Investors, for example, who are inflexible in the face of economic or other crises that demand deviations from regulatory norms in a regulation by contract regime, can, in many instances, lead to more problems for investors than rule changes unilaterally made by regulators in the face of very trying circumstances.

While drawing a clear dichotomy between "regulation by rule" and "contract regulation" is useful as an analytical or pedagogical tool, as made clear by the tariff disputes in Brazil and by the fact that concessions do actually exist in the U.S., the reality is that almost no system is conceptually "pure." Contract regulation is only as constricting as the concession language requires it to be. In Zambia, for example, nominally a "contract regulation" regime, some of the original temporary concessions in electricity were little more than a vesting of the right to do business for those entities to whom they were granted. That lack of substance in concession documents, left a great deal of discretion in the hands of the regulator. Indeed, it somewhat resembled the juridical model for regulation in the U.S., despite the fact that it was nominally a contract model. Thus, while few, if any countries, other than the U.S. and perhaps Canada, are explicitly "regulation by rule" jurisdictions, in many "contract regulation" jurisdictions, the concession documents are sufficiently vague as to create a de facto hybrid regime that is partly "rule" and partly "contract". Finally, it is common in many "contract" regimes to incorporate certain rules, quality of service or safety standards, for example, into the concessions, so if the regulator changes those rules, it also, in effect, changes the concession.

B. Regulatory Governance: Institutions And Processes

Institutional arrangements and decision-making processes, alone, do not guarantee a fully successful regulatory system, but defects in each can assure a seriously flawed system. Whatever the structures and processes are, they need to be fully credible, legitimate, and transparent to be successful and gain widespread acceptance. Credibility means that investors, both prospective and actual, must have confidence that commitments will be honored and that they will be dealt with fairly. Legitimacy requires that consumers are satisfied that the regulatory system will protect them from abuse, including unreasonably high prices and unacceptable levels of service quality. Finally, the system must operate in a fully transparent way that allows all interested parties to see an open, honest, fully informed, intellectually respectable decision-making process that affords interested parties a meaningful opportunity to participate. 30

1. Institutions

There are a range of institutional arrangements for regulatory agencies, ranging from none at all, to fully independent, free standing agencies, with a variety of options between those two poles.

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30 For a full and complete description of institutional and process arrangements, see: Evaluating Infrastructure Regulatory Systems, by Ashley C. Brown, Jon Stern, and Bernard Tenenbaum, with Defne Gencer (The World Bank, 2006).
The two basic models, however, are those of the independent regulators and the public service concession model. They provide the best context for discussing institutional arrangements.

The independent regulatory model is largely derived from the Anglo-American experience, although it is probably now the most widespread model in use. The regulators have significant financial, administrative, and decision-making independence. While their powers are limited to those delegated to them by legislators, or by terms of concessions, within that area of competence, they have considerable discretion. Typically, although not always, the regulatory agency is headed not by an individual, but, rather by a multi-member Board which makes its decisions based on majority rule. The Board members (often called Commissioners) are typically appointed for fixed, and staggered terms to protect them against political interference, and cannot be removed from office without showing full cause of doing so. The agencies are generally, although not always, funded by fees assessed against regulated companies and then passed on to consumers, in order to provide independent funding free of ordinary governmental appropriations. In most such agencies have the power to make decisions in their area of delegated powers without having to obtain consent from any other governmental agency.

31 It is important to note that independent regulatory bodies can be deployed in both of the juridical models discussed, contract or regulation by rule, but the public concession institutional model can only exist in the context of contract regulation.

32 In the U.S., the substance of regulation is found primarily in the law, whereas, in the U.K., the substance is generally found in concession documents.

33 The appointing authorities vary from country to country. In the U.S. federal regulatory appointments are made by the President. In the states, most are appointed by Governors, although they are elected directly in eleven states. In most Latin American and African countries, the appointments are by the President, although Cabinets and/or sector Ministers often have a great deal of influence in selecting regulators in that same sector. In some countries, Parliamentary approval is also required for appointees.

34 Staggering of terms (e.g. if you have 5 Commissioners each serving 5 year terms, then absent a vacancy, only one term comes open each year) serves two important purposes. It affords institutional memory for purposes on continuity and sense of precedence. Secondly, it prevents a change in government from immediately compelling dramatic changes in regulation, thus making the system more stable and predictable.

35 Outside of Africa, regulatory Commissioners generally serve on a full time basis. In Africa, for reasons that are not entirely clear, there is a pattern of Commissioners serving on a part time basis only.

36 Some so-called independent regulatory agencies lack the power to make decisions and are only empowered to make recommendations to a Minister or other governmental agency. An example of that is CNELEC, Mozambique’s electricity regulator. It might be characterized as a “strong advisory” regulator because it makes it decisions on what to recommend independent of any other agency and then makes it recommendation in a very public way, so that if a decision is taken contrary to the CNELEC recommended outcome, the Government will likely be called upon to explain its rationale. There are some other regulatory bodies which might be characterized as “weak advisory” agencies because they are either parts of ministries, or are only empowered to provide confidential advice to Ministers or the Government.
Resource Adequacy for Regulatory Agencies

Many regulatory agencies suffer from being under-resourced. This has been problematic from the standpoint of attracting and retaining competent staff, but it has also led to inability to engage consulting expertise, and acquire needed equipment, particularly in information technology. There are many examples of these problems. In Guatemala, for example, the electricity regulator's budget was such that about 25% of the total was consumed by the salaries of three commissioners alone, not because they were over paid, but because the budget was so small. In Brazil, ANEEL's budget, nominally under the law, .5% of sector revenues, has not been able to actually receive all of the funds legally allotted to it, because the government has routinely retained as much as 60% of the funds to use for other government priorities. In Zambia, the energy regulator was not, in its early years, able to collect the .49% of electric revenues to which it was legally entitled, from Zesco, the country's largest utility, which simply failed to pay its assessments. Zambia's ERB was also in charge of providing for rural solar systems through a special funding mechanism. Unfortunately, for many years, the funds collected were retained by the Treasury for other government priorities. Many other regulatory agencies have been forced to rely largely on donors and lenders to support their work efforts either because sustainable funding was not provided for, or because the funds were diverted to other purposes by the Government. Thus, stability in funding regulatory agencies is not an insignificant issue in many developing countries.

The theory of independent regulatory agencies is that they are insulated from short term political pressures and can, therefore, take both a longer term view in decision-making, but can also make tough decisions without fear of political repercussions. They are also charged with maintaining the relevant professional expertise to make decisions on a highly professional basis. To maintain that technical competence, agencies have often experienced difficulties in recruiting and retaining competent staff members. The problem can be quite severe because agencies often are required to adhere to civil service compensation rules, which are, particularly at senior levels, significantly below the salaries and benefits paid by regulated companies with whom the agencies have to compete for talent. The result has been attrition rates for senior staff at ANEEL, in Brazil, for example, as high as 20-25% per year. The Russian electricity regulator has suffered from similar attrition rates as well. Some countries, Zambia, for example, and Brazil, in recent years at some agencies, have been able to pay staff at levels that are competitive with regulated company compensation packages. The issue of retaining staff is not only a question of maintaining competence, but also one of ethical and credibility dimensions. If the regulatory agency staff are planning career paths that mean they acquire expertise and experience in their early years at the regulatory agency and then move to more highly rewarded positions at regulated companies, then staff’s motivation in decision-making can easily be called into question, perhaps leading to cynicism among the public in regard to the agency’s credibility, and, in the case of a staff member trying to curry favor with a regulated company, raising very serious ethical issues as well.37

In regard to independent regulatory agencies, there are two very common controversies, one concerning its mission versus that of line ministries in the same sector (e.g. telecommunications regulator versus Communications Ministry), and the, other, as to how to hold the agency accountable. In regard to the first controversy, it would appear to be an inevitable result of shifts in bureaucratic responsibilities. Line ministries, which, prior to the creation of regulatory agencies, had full authority in the sector, including proprietor of the state assets in the sector, policy maker, regulator, and administrator of government programs, have lost some of those powers. Certainly, regulatory powers, as well as policy making matters subsidiary to regulation,

37 The ethical rules vary considerably from jurisdiction to jurisdiction. In some countries, Commissioners, and perhaps staff, are prohibited from moving immediately from the regulatory agency to a regulated company. Typically, although not universally, there are rules against conflicts of interest, required financial disclosures, and not surprisingly, rules governing the receipt of gratuities and other favors.
have been shifted to the regulator. In some countries, the change was done without controversy, particularly where Ministers were instrumental in making the changes. In others, there have been bureaucratic controversies and maneuvering.

Two disputes, in Colombia and Zambia, are particularly instructive. In Colombia, the Government created CREG to be the regulator in both gas and electricity. In doing so, it apparently struck some sort of political compromise by mandating that CREG’s Board be composed of four independent members and three Ministers, which, in and of itself not only raised questions about agency independence, but also created something of an impasse at the Board level. What became particularly problematic was when the four independent Board members began to set policy regarding international trade in natural gas, a responsibility claimed by the Energy Ministry. The result was a confused set of affairs in regard to the natural gas market, and, ultimately, led to changes in personnel at CREG. In another country when the telecommunications regulator was created, there was an odd provision in the law that permitted the Minister to remove Commissioners at the regulatory agency and make regulatory decisions until such time as a sufficient number of Commissioners were back in place, which had, among other powers, the authority to grant licenses to new entrants in the industry. The Minister proceeded, for reasons not fully explained, to remove Commissioners from office at a time when applications were pending for licenses to engage in the cellular telephone business, grant the licenses himself, and then reappoint the Commissioners to office. In both of these cases, the laws allowed for sufficient ambiguity, or open manipulation, so as to fully blur the distinction between what regulators do and what Ministries do. Beyond mere bureaucratic turf wars, the role of regulators is not always easily understood because regulatory agencies perform functions that had not, prior to their creation, been seen as discreet tasks. Moreover, the idea of independent agencies that are part of the state but not, per se, part of the government, gives rise to confusion and concern. As a result, the powers of the regulator are almost always a subject of controversy.

The second, almost universal, controversy is defining the meaning and limits of independence. In the words of a prominent, former member of the Brazilian Chamber of Deputies, “Independence, why, from whom, and for what?” summarize the controversy. Because regulators typically exercise executive, legislative, and judicial, powers. As such, they do not fit neatly into any single branch of government, thus, they are more difficult to hold accountable than other agencies of the state. Two countries, Tanzania and Peru, tried to settle the accountability issue by requiring performance contracts between the government and the regulators. Attempts to impose such contracts, as in Brazil, have so far failed because they could potentially compromise agency independence. Nonetheless, regulatory agencies are frequently subject to parliamentary inquiries and enactments, legal actions challenging agency actions, and often intense public scrutiny. While some of these actions result from substantive disagreements, others stem from misunderstanding and confusion about the role of the regulator. While it is tempting to suggest that such controversies will subside, once the regulatory agencies have had sufficient time to establish themselves, it is important to point out that even in the U.S., with its more than 100 years of history of independent regulation, these issues continue to be debated. Indeed, the question of who should set which policies is always a source of contention between regulators and legislators, as is the scope of judicial review of regulatory decisions. While it is clear that

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38 Miguel Rossetto, former member of the Brazilian Chamber of Deputies from Rio Grande do Sul.
39 The performance contract in Peru is confined to administrative matters and does not pertain to substantive issues.
regulator must comply with the laws under which they operate, there is another question about whether legislators and courts ought to defer to the technical expertise of regulatory agencies, or forge ahead with decision they may be empowered to make, but perhaps less well informed upon.

Part of the reason for the controversy about independent regulators stems from fears that a truly independent agency cannot be held accountable. The question is often posed: “Who regulates the regulator?” To assure accountability, regulators are, as noted above, subject to governmental or parliamentary inquiries, is certainly a frequent target of public criticism and debate, are subject to having their powers altered by the government, and are, as will be discussed below, subject to having their decisions reviewed by an appellate process. In addition, some have suggested that before regulators take major policy decisions that are within their powers, they should be subject to a form of “cost-benefit” analysis before being permitted to go forward. The idea has some currency in the Europe and the U.S., although there is less discussion of it in developing countries. Proponents of the idea argue that it would assure that regulators act proportionately (i.e. regulate proportionate to the actual need for intervention in the market), would temper what some perceive as a propensity by regulators to regulate rather than let markets operate with minimal interventions, and would assure that overall cost of regulation to society be no more than needed. Opponents of requiring that such a study be undertaken contend that it would politicize regulation, that it would inject broad ideological debates into the relatively discreet forum in infrastructure debate, and that regulators themselves, are always conducting such analyses in a transparent and participatory fashion. Opponents also argue that requiring such reviews would reduce flexibility to respond to dynamic circumstances, and could, rather than reduce the costs of regulations, actually add to them.

Standing in contrast to the independent regulator model, is the public service concession model, largely drawn from the French experience in water and sanitation, although variations of it can be found in British rail and subway regulation, as well as in some public-private partnership arrangements. The system was derived from the fact that French municipalities are barred by law from privatizing water and sanitation facilities they own. As a result, authorities lease the assets they own to concessionaires to whom they delegate the public service obligation. The details are fully captured in the concession contract. In effect, it is regulation by contract without...
a regulator, because there is no regulatory body to oversee the arrangement. The contract can take two different forms, a concession contract where the operator has both operational and investment responsibilities, or alternatively, an *affermage* contract where the operator has operational but no investment responsibility. The concession document serves two purposes, one assigning operational (and perhaps investment) rights, and secondly to impose regulatory obligations. In assigning operational responsibilities and imposing regulatory obligation, the government is acting as the *de facto* regulator. In fact, the third major characteristic of the public concession model, is that there is no regulatory agency at all. There is merely a legally binding contract that is legally enforceable by the courts. The arrangements may also be governed by an extraneous body of law, which in France, include the right to obtain tariff adjustments for adverse governmental actions (*fait du prince*), hardship (*imprevision*), and unanticipated constraints (*sujets imprevues*). In France, the *Conseil d’Etat* has also assumed a bit of the regulatory role by taking on the responsibility of resolving disputes between the regulated company and its customers (i.e. municipalities), and by pronouncing on some tariff provisions.

The Independent Regulator (IR) and Public Concession (PC) have some fundamental differences in philosophy, although the differences may not, in practical terms, be so huge in practice. Two of those differences merit specific mention.

The IR model tries to “depoliticize” economic regulation, by removing line government agencies, such as ministries, from the business of regulating. In contrast, the PC model appears to start with the presumption that the notion that the notion of an independent regulator is naïve and impractical. Government, it might be contended, simply cannot and should not be removed from the business of specifying public service obligations. Instead, the PC model precisely spells out in some detail the obligations of the government and the concessionaire and adds to that a dispute resolution mechanism that affords both parties some level of assurance that commitments will be carried out.

The second key difference in the two models is that the PC model assumes that, while public service obligations might be delegated to a manager, government cannot escape ultimate responsibility for it. The IR model makes no such assumption. It merely lays out public service obligations, but is decidedly agnostic on whether the ultimate responsibility is with the government or can be vested in a private company with appropriate incentives to carry out public service obligations. That being said, one critical role of the regulator in the IR model is to make sure that private companies rendering public service do, in fact meet there obligations. The methods for assuring that they do so include carefully designing company incentives so that they are aligned with the public interest, by making and enforcing rules regarding quality of service

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44 These two functions, assigning operational rights and imposing regulatory responsibilities, can be done, as is common in France, in a single document, or could be set out in separate documents, as is done in Turkey, Uganda, and Lesotho.

45 Curiously, it is sometimes contended the independent regulatory model is a common law phenomenon while the public concession model is a civil law construct. There is, for example, a decision of the Colombian Supreme Court that suggests that to be the case. That common perception, however, is contradicted by the facts. Many civil law countries in Europe, Latin America, and Africa have fully functional independent infrastructure regulatory agencies, while one can find examples of the public concession model being deployed in such common law countries as Uganda, Lesotho, Tanzania, and even the UK.
and other critical matters and other such matters, and by providing a forum for consideration of consumer complaints.46

1.a. Transitional Regulatory Arrangements

Although the IR and PC models are widely accepted as mature models of regulation,47 it is often argued that it is unrealistic to expect that it can be adopted immediately in all countries and at all times. Transitional regulatory systems (with and without commitments for further reform) are likely to be needed for three reasons48. First, a country may be unable to implement the independent regulator model because it lacks capacity or commitment, or both. Second, the full independent regulator model may simply be too risky a first step in creating a new regulatory system (that is, it is a “big jump”). Third, some aspects of the ideal model may be incompatible with established and accepted legal or cultural norms in a country. When one or more of these conditions exist, they are often manifested through the following:

- Unwillingness or inability to move toward commercialization with cost-reflective prices to small consumers.
- Unwillingness or inability to transfer regulatory decision-making powers.
- Weak and slowly operating law courts and regulatory appeals.
- Uncertainty about the nature and strength of regulatory commitments.
- Limited regulatory capability.
- Popular concerns that consumer interests are being ignored relative to investors’ profitability.

In addition, all these weaknesses tend to worsen when there is a macroeconomic crisis.49

1.b. Capacity Building and Performance

The ability to build regulatory capacity is an essential element to making regulation effective. The World Bank, regional development banks, and various donor countries have devoted resources, or made conditionalities for loans or grants, that developing countries retain the services of consulting experts to work with and to train regulators. Specific training programs have evolved, such as the one at the University of Florida’s PURC program, to do intensive regulatory staff capacity building. Regional regulatory associations, such as ABAR (which includes both state and federal regulators) in Brazil, AFUR in Africa, ERRA in Eastern Europe, and SAFIR in South Asia have evolved to provide both training and meaningful networking.

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46 Much of this discussion is drawn from Brown, Stern, Tenenbaum, supra.
47 It should be noted that the independent regulatory model, in one form or another, is, by far, the predominant model in place today. That being said, however, many countries deploy the model in ways that resemble aspects of the public concession model.
48 “Transitional” regulatory regimes may be defined as a system set up to regulate infrastructure that is something short of fully independent regulation, but is a step removed from overt governmental control. Examples would be a regulatory agency which is part of a ministry, or a regulatory agency that is independent of the government, but possesses only advisory powers. Transitional regimes often result from a government's uncertainty regarding commitments to independent regulation, or from lack of confidence in the institutional arrangements or human resources required to implement a fully functional regulatory regime.
49 Brown, Stern, Tenenbaum, supra.
opportunities for regulators. Some universities in developing countries, such as the University of Cape Town in South Africa, UNIFACS in Brazil, and others have established regulatory studies programs to try to build an intellectual infrastructure to support regulation within countries that have embryonic regulatory systems. In addition, USAID has established formal partnerships between regulatory agencies in developing countries and state and federal regulatory agencies in the U.S. There are, of course, frequent meetings of regulators in various regions of the world and there are some world forums devoted to exchanges among regulators, mostly on a sector specific basis (e.g. telecoms, water, and energy).

All of these programs are useful, but is fair to say that, with a few exceptions, most of them are not fully sustainable on their own. Moreover, there is a common critique that neither multi-lateral lenders nor donor agencies have devoted sufficient effort to do the job effectively. It is important, therefore, for countries with functioning regulatory systems, or even contemplating them, to fully support the requisite intellectual infrastructure that will not only assist in the building human resource capacity, but will also enrich the debate, as well as the parties to the debate, on regulatory matters, provide a intellectual discipline to regulatory arguments and decision-making, and to make arbitrariness or even dishonesty in regulatory matters more transparent. An appropriate intellectual environment will also act as an antidote to "regulatory capture." "Capture" defines a situation where the only key actors in the regulatory arena, the regulators and the regulated, become so intertwined that they begin to think alike, a stultifying situation. Antidotes to "capture" include the involvement of more parties into the arena, the injection of new ideas into debates, and the offering of perspectives from "outside of the box." Thus it would be advantageous for governments as well as donors and lenders to support the creation and maintenance of such organizations and programs. The same is also true, of course, in maintaining strong contacts between and among regulators in various jurisdictions encountering similar issues and problems. Agencies rarely have the financial resources to engage in these activities themselves, so external support is essential.

While there are, as noted, regional organizations and networks of regulators, it may also be possible for regulators to coordinate in more formal ways as well. Within NARUC, the association of state regulators in the U.S., for example, regulators from multiple jurisdictions, work together to develop a joint manual on regulatory accounting, common practices on service quality information, common filing and reporting requirements, and other matters. That avoids the need for each agency to "reinvent the wheel," and can reduce the work burden on individual regulatory agencies ands personnel. That type of formal cooperation might be very useful for regulators in developing countries. It might also lead to more meaningful interaction between regulators than is customary in the formal or network interactions to be had at the conferences they might attend. Another means of interaction that has begun in southern Africa is a peer review process where a team of regulators from other countries, visit a regulatory agency and evaluate their performance, processes, structure, and issues. While the process is too new to be able to fully assess its effectiveness, the concept holds promise.

Similarly, another approach recommended is to periodically retain the services of outside consultants (from both inside and outside the country) to provide an independent assessment of

50 There are, of course, counterpart organizations in developed countries such as NARUC in the U.S. and EER in the European Union.
regulatory systems. The idea would be to assess not only performance of regulatory agencies, but of the entire regulatory system, including the relevant laws, processes, resources, governmental actions, institutional arrangements, substantive provisions such as ratemaking and tariffs, market rules, and other issues. Such assessments have been carried out in Brazil, Jamaica, and Russia, and are being contemplated elsewhere.51

In assessing regulatory performance, it is important to, as noted, look not only at what the regulators themselves have done, but what the system enables them to do or not to do (e.g. laws, legal power, political interference), as well as how they conduct their business. It is important to keep reviews in the perspective of how regulators did with what they were given, and how they might do better if they were enabled to do so. It is critically important to keep in mind what regulators control and what they cannot control. Similarly, in evaluating substantive results, it is important to know that while bad regulatory actions or inaction can have negative consequences, good regulatory actions do not guarantee positive results. Argentina, as noted above, is a classic example of a reasonably well functioning regulatory system being unable to prevent bad outcomes in the regulated sector that resulted from macro-economic collapse.

2. Processes

The processes that are followed to make regulatory decisions are critically important for a variety of reasons. The first is that the process is vital to making regulation legitimate and credible. The more transparent the process, the less likely it is that investors and consumers will come to take a cynical view of regulators and their work. Secondly, a thorough open process will increase the likelihood that regulatory decisions will be fully informed. Finally, a fully transparent decision-making process should provide a disciplinary framework that increases the probability that intellectual rigor, technical competence, and integrity will be characteristic of the decisions made.

It is also important to note the types of decisions that regulators are called upon to make. The specific processes may vary depending on whether the agency is being asked to exercise its legislative, executive, or judicial functions. Legislative decisions would include all matters that are generally applicable to society on a prospective basis, and include making rules (e.g. quality of service, market structure), setting tariffs, and establishing policies within the agency’s scope of authority. Executive functions include enforcement of rules and decisions, administrative tasks, public outreach and education, and personnel decisions of various types. Judicial powers would include adjudicating disputes between parties on matters within the agency’s jurisdiction and handling consumer complaints. It is important that agencies (or the law) establish the rules for processing each of these types of decisions in advance of having to make decisions, so all affected parties have a full opportunity to participate and advocate for their interests before the agency.

51 See Brown, Stern, Tenenbaum, supra. The book also provides suggestions for Terms of Reference for three different levels of assessments.
The general criteria for such a process were laid out, as follows, in *Evaluating Infrastructure Regulatory Systems*, as follows:52

1. Except for defined emergency circumstances, no decision should be taken by a regulatory agency until the following have occurred:
   a. proper legal notice has been given notifying all parties that a matter is under formal consideration;
   b. the public notice should identify the matter being considered, the initiator of the action being contemplated53, and a full schedule for the consideration of the matters;
   c. all parties who wish to do so have been afforded a meaningful opportunity to provide input to the agency;
2. In cases of emergencies, actions may be taken, but interested parties should be afforded a fair opportunity to participate *ex post* in any review of the matter. The criteria for defining an emergency should be stated in law.
3. No decision should be taken by a regulatory agency without it being set down in a publicly available written document. The document should include:
   a. a clear statement of the decision;
   b. a description and analysis of all evidence taken into consideration;
   c. a summary of the views offered by participants to the proceeding;
   d. a full discussion of the underlying rationale for the decision.
4. All regulatory agencies should have clearly defined, published procedures under which they take, announce and publish regulatory decisions and their justification.

Multi-member regulatory agencies normally take their decisions either
   (i) by majority voting or
   (ii) by consensual, non-voting methods.

(i) If a multi-member regulatory agency decides to use a formal voting process for making decisions, the result of the vote should be made publicly available at or soon after the date of the decision.

When a formal voting process is used, the following procedures should be followed:
   a. all decisions should be taken at a meeting at which or following which the votes of all members should be made public;
   b. board members voting “no” should have the option to file formal opinions expressing the rationale for their vote;
   c. board members who concur in the result, but do so for different reasons set forth in the decision, should have the option to file concurring opinions expressing the rationale for their decision.

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52 Brown, Stern, Tenenbaum, supra. The book has an extensive discussion of regulatory processes that are designed to provide guidance for appropriate standards in each of the types of decision-making discussed herein.

53 The initiator, in some regulatory models might be a specific party. In other models, the initiator might not be a party but, rather, the fulfillment of a legal or contractual requirement by the regulatory agency.
(ii) If the regulatory agency decides to use a consensus approach for decision-making, the following procedures should be followed:

a. A record of the discussion should be made, reflecting the range of opinions expressed, supporting and dissenting;

b. A summary of the discussion should be made publicly available along with or soon after the publication of the regulatory decision and its justification;

c. Board members should have the right to state their views concerning the decision publicly and on an attributable basis.

5. All documents in the possession of a regulatory agency, particularly those being relied upon in making decisions should be presumed to be available for public inspection, unless the regulator rules otherwise (e.g., on the grounds of commercial confidentiality)\(^54\).

a. No document should be treated as confidential unless the regulator finds that the document (or some part of it) falls specifically into a category that the law or binding articulated policy deems legitimately confidential (e.g. personnel matters, verifiable trade secrets, draft decisions not yet finalized or documents related to pending litigation). Confidentiality issues, it must be noted, only involves the question of how the regulator treats the document. Claims of confidentiality do not constitute grounds for a party to withhold a document from the regulator.

b. The primary law (or, failing that, the regulatory agency) should publish in advance its criteria for judging whether documents (or some parts) will be treated by them as confidential and also establish systems for handling and storing confidential material.

6. The procedure the agency will follow in making decisions should be set out in clearly defined rules and made publicly available.

There must be ample opportunity for all affected parties who wish to participate meaningfully (i.e. in a time and form that will reach the regulators in such fashion that they could take it into account before rendering a decision) in regulatory proceedings to do so. Regulatory agencies, should take all reasonable steps to facilitate and encourage public participation.

The degree to which regulators carry out their work consistent with these principles varies widely from one jurisdiction to another, but, ironically, whereas the independent regulatory model is sometimes described as “Anglo-American”, the two virtual poles on processes are the U.S. and U.K. The U.S. model follows a highly judicialized, decision-making process. All evidence submitted to the regulators for their consideration in making a decision is put into a formal, fully public,\(^55\) record. All information in possession of any party is subject to discovery

\(^{54}\) The requirement for public availability of documents need not, and perhaps should not apply to internal documents drafted by regulatory agency personnel for purposes of making specific decisions. Thus, for example, early drafts of decisions being circulated internally within the agency for comment, edits, etc., need not be made publicly available.

\(^{55}\) There are narrow, statutory exceptions in regard to what must be made public, but those are generally limited to confidential personnel matters, pending litigation, genuine trade secrets, security matters, and sensitive information, the premature disclosure of which might affect stock prices in a misleading way. There is, in most but not all jurisdictions, a general bias that information provided to regulators for their consideration in making decisions is public. It is also important to note that even if information is deemed to be non-public, that determination goes to
rights by other, often adverse parties prior to public hearings. All witnesses offering information are subject to cross examination by representatives of other parties which decide, as is their right, to formally participate in regulatory proceedings, have the right to declare themselves as formal parties and fully participate. Moreover, the regulators, themselves, are constrained to base their decisions entirely upon information that is in the formal record before them. In addition to the trial-like, adversary hearings that are a fixture of U.S. style regulation, there are also open hearings where all members of the public, regardless of whether they formally intervened in a matters, are afforded the right to provide their input to the regulators. The U.K. model, is considerably less formal than in the U.S. Regulatory proceedings are public, in the sense that anyone can provide written or other input to the regulators, but public hearings are less common, judicial formats are not used, and public hearings, while possible, are not required. In addition, regulators are not nearly constrained in the U.K. as they are in the U.S. in terms of where they derive their information and with whom they are permitted to converse. The result is that the UK system is easier and has fewer transactions costs that the U.S, system, but is not nearly as transparent as the American system.

The process in developing countries is, for the most part, similar to the U.S. in the sense that public participation is generally sought out, and in that there is a bias toward greater transparency. On the other hand, few, if any countries replicate the judicialized decision-making model of the U.S., with its very heavy transaction costs. Some regulatory agencies, such as ANEEL in Brazil, make very effective use of the internet and achieve a high level of transparency through a combination of its website and frequent public hearings. One common shortcoming of regulatory processes in developing countries is the lack of systematic and sustained input from consumer groups. While both the U.S. and U.K. have specific provisions for consumer representation most developing countries lack the resources to provide adequate consumer representation. That lack of representation can pose a credibility problem for the regulatory process. In terms of the regulated companies, the ability to meaningfully access the regulatory process does not appear to be lacking. Ultimately, the decision-making process needs to be compatible with locally acceptable norms, and, where international investment, is being sought, with commonly accepted international norms as well.

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56 In regard to what they can and cannot consider, regulators are, to a large extent, obliged to use the principles set forth in the Rules of Evidence applicable in the courts. Ex parte communications, such as informal, off the record, conversations, between regulators and regulated entities on pending matters in the U.S. are strictly forbidden, and, in some cases, may be subject to criminal prosecution.

57 The U.K. model is also the one generally utilized in Australia as well.

58 The U.S. and U.K. models on consumer involvement differ substantially. In the U.S., several states have either government agencies whose mission it is to advocate for small consumers, or have mechanisms for funding NGO’s to engage in such activities. In the U.K., each distributor has to provide for a Consumer Council to hear consumer concerns and complaints

59 Contrary to small consumer, large users of infrastructure services, such as industrial companies, are frequently well organized to represent themselves in regulatory proceedings. In many Latin American and African countries, apart from the regulated entities, themselves, they are the most active participants in regulatory proceedings.
The final process consideration is the nature of appellate review of agency decisions. In the Brown, Stern, Tenenbaum book, the recommended appellate process is as follows:

1. All appeals from a regulatory agency decision should be directed to a single, independent appellate forum, the decision of which would, in the absence of a constitutional issue, be final.
2. The appellate forum should either be a specifically designated court or a specialized appellate tribunal with the authority to review the decisions of one or more infrastructure regulatory agency(ies). In either case, the forum should possess relevant expertise in regulatory matters.
3. The regulatory agency must provide parties with an opportunity to seek rehearing or de novo review by the agency itself, or, if called for by law, by some other duly designated body (e.g., a competition agency). The time deadlines for filing an appeal should be suspended during the rehearing application and/or process.
4. Any party who believes he/she is adversely affected by an agency decision should have the right to take an appeal from that decision within a reasonable period of time after that decision has been taken (e.g. 30 days). That right, however, should only belong to a party who formally participated in the agency proceedings on the matter in question, and who raised that issue in the regulatory proceeding (including any rehearing process).
5. No interested party should be able to put forward new issues or new evidence on appeal which was not first raised in the proceedings at the regulatory agency (including any rehearing).
6. Regulatory agency decisions should be affirmed on appeal unless the agency acted unlawfully or exceeded its lawful authority, failed to follow the required process(es) in making its decision, or made decisions that were clearly flawed in the light of evidence presented at the appeal.
7. The decision of the regulatory agency should remain in effect for the duration of the appeal, unless the agency or the appeals tribunal decides otherwise. Such a delay should not be granted without a demonstration of irreparable harm to the appellant and a likelihood that the appeal will succeed.
8. If the appellate forum reverses or changes the decision of the regulatory agency, the preferable course is for the matter to be sent back to the regulatory agency to conclude a remedy consistent with the decision of the appellate forum.

The appellate process, at a minimum, is largely designed to accomplish three things, assure that the regulator adheres to and does not exceed its legal authority and powers, to protect against arbitrary exercise of its powers, and to assure that all required legal processes were followed. Sometimes, as noted below, the scope of appellate bodies is broader than those three criteria. There are basically three types of appellate processes, judicial or quasi-judicial, governmental, and arbitration. They are sometimes exclusively one of those forms, but in some cases they are

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60 *supra*
61 Adhering to legal authority includes both following the law and adhering to the terms and conditions et out in relevant concessions.
62 Arbitrariness would include acting without cause, decisions which are contrary to or unsupported by the evidence, or actions which are simply unreasonable.
not mutually exclusive. In addition, there is the question of the scope and criteria for appellate review.

In regard to the scope and criteria for review, there are a number of options, ranging from a full scale *de novo* proceeding, to a limited review that accords some deference to the regulatory agency and looks only to see if the agency acted unlawfully or exceeded its lawful authority, failed to follow the required process(es) in making its decision, or made decisions that were clearly flawed in the light of evidence presented at the appeal. The criteria are important because where the appellate criteria are broad (e.g. *de novo*), then the appellate process is, in effect, a second layer of regulation. One could view that as increasing transaction costs and uncertainty, or might, alternatively, see that as a safeguard against unreasonable regulatory decisions. The more limited review criteria, conversely, probably provide for a greater level of certainty, while providing parties with protections against the potentiality of unfairness, or legal or factual error by the regulator. Generally speaking, regulators themselves, prefer the more limited review, not only for the obvious reason that it is more protective of regulatory discretion, but, more importantly, because it provides for more certainty, discards "frivolous" appeals, allows for regulation to evolve in a more steady and stable framework based on experience and precedent, and that it accords greater deference to the expertise that resides at the agency. Investors and other parties are of mixed opinions about the scope of appeal, usually varying dependent on views of the regulators, on the judicial system, and on the general political environment.

The judicial or quasi-judicial model for appeals is the most common model. It has the advantage of being an established form of adjudicating matters and the rules are generally known. Courts are, in theory, of course, independent and non-political. It also has the advantage, in many but not all countries, of being a known and respected institution whose decisions have an established aura of credibility or acceptance. Courts also tend to be relatively transparent, or at least, in comparison with more political institutions. The general problem with the judicial model is that it relies on lawyers with general and not regulatory or sector specific knowledge. As a result, as has happened in the U.S., they tend to impose a level of rigidity to the decision-making process that may not always be beneficial. On a less general basis, of course, in many countries courts may be slow, inefficient, not independent, political, and, in some cases, perhaps even corrupt. Thus, whether courts are the best appellate bodies may depend on some country specific factors.

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63 *De novo* proceedings essentially require a repeat of the proceedings at the appellate level with all issues raised on appeal open for another review.

64 Precedents, of course, in a common law systems, can be legally binding, or, at a minimum, establish an effective framework for decisions. In civil law systems, precedents generally do not bind future decision makers, but they are sometimes quite influential. As an a side, and in specific regard to regulators, as opposed to appellate bodies, parties often complain, justifiably or not, that the decisions of today's regulators do not bind future agency decision makers. The complaints are often aired regardless of whether the agency operates in a common law or civil law system.

65 Quasi judicial appeals refer to appeals taken to bodies that are not necessarily a part f the judicial system, but, which, nevertheless, are formal legal bodies with judicial-like decision-making powers. One example is the special appellate tribunal that has been established in Tanzanian regulatory statutes to hear appeals from EWURA and SUMATRA, the country's two infrastructure regulators. Another example is found in the U.K., where appeals from the infrastructure sector regulators go to the Competition Commission, another regulatory agency with somewhat broader powers than the sector regulators.
The second alternative form of appeal is to the Government. This is always the case where the regulator, as in Mozambique, possesses only advisory powers. This form of appeal, of course, has the benefit of political accountability, but has the disadvantage of directly injecting political considerations into the regulatory decision-making. While the public concession model assumes politics pervades such decisions, the independent regulation model tries to depoliticize regulation, to the extent possible, and, therefore, sending appeals to the government would seem to run contrary to that objective. Where some of the regulated assets are still state owned, of course, a government hearing appeals will have an inherent conflict of interest as both the proprietor of regulated assets and the appellate adjudicator of disputes impacting those same assets. In some cases such as the U.K. and Argentina, appeals go first to the government and then to the courts.66

The arbitration model of appeals is one that has been proposed in places where there is a desire to remove regulatory decisions even further from politics, and where there are concerns that the judiciary is ill equipped, either for competence of behavioral reasons. The proposal s generally to establish an arbitration body, often international, to hear appeals from regulatory decisions. One can easily understand why an investor would find comfort is such a process, particularly in the context of uncertain politics and judicial inadequacies. The problem , however, is that, unlike commercial disputes between two business entities (whether state owned or private), regulation involves the exercise of political sovereignty, not merely commercial activity, so it is almost impossible politically for a government to cede some of it sovereign powers to an international or any other non-state tribunal. Even if it were to do, there would also be the very real difficulties of enforcing any decisions that would be made. For that reason the arbitration model is rarely, if ever, deployed.

3. Market Structure and Ratemaking

There are two essential elements to the economics of regulation, market structure and ratemaking methodology. Market structure provides the overall framework of rules governing the behavior of market participants and the degree to which that behavior is subject to the discipline of rules and/or competition. Thus, it is reasonable to look at market structure issues first and then examine ratemaking methodology.

3.a. Market Structure

The traditional market structure of infrastructure industries, as already noted, is vertically integrated monopolies. That structure has already broken down in telecommunications, driven largely by wireless technology that permitted bypass of bottleneck, landline wire networks. In electricity, while transmission and distribution remain monopolies, generation has become, to varying degrees from one country to another, either competitive, or, at least subject to market mechanisms in lieu of full regulation. In natural gas, commodity sales of gas, and to a lesser degree, storage and pipeline aspects of the business have been open to competition in various forms. Transport, has in some respects, been open to market pressure independent of regulation. Perhaps only in water and sanitation, have monopolies remained largely intact. The issue for

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66 In the U.K., as noted previously, the first level of appeal is to the Competition Commission and then to the government and, finally, to the courts.
policy makers and regulators, in most cases is determining whether to promote market forces, and, if so, how to do so. In many cases, it is not policy makers in the lead, but rather, a case of them having to adjust to new circumstances that have led to the evolution of competition even without policy makers intending for that to happen. That was almost certainly the case with telecommunications, and, to some degree in electricity and transport in several countries. Typically, such new circumstances are the result of technology change, uneconomic charges built into monopoly tariffs (e.g. cross subsidies), inefficiencies in the operations of incumbent utilities, or some other "chink in the armor" of monopolies, such as the ability of large customers to move their businesses to other locations where infrastructure services are less expensive.

In many countries, however, it is the prevailing policy to promote competition where viable. There are many reasons for this. They include the notion that competitive markets will increase productivity and efficiency more than regulation, that competitive markets tend to be more transparent and less easy to manipulate than regulation, and that market forces will generate more development and growth than regulated markets. One can debate the accuracy of those views, but they are commonly held, and developing countries find themselves under considerable pressure from lender and donors, to open up their markets, including those in infrastructure, to the extent that it is feasible. The accuracy of the notions has been challenged by recent regulatory failures and therefore put new emphasis on the role of government and regulation.

Regardless of the origin of competitive markets in infrastructure, policies, either pro-active or reactive, have to be put into place to deal with new market realities. The options for poorer countries in that regard, are, for a variety of reasons, fewer than they are for wealthy countries, except, perhaps in telecoms, where the cellular revolution and the internet have created options for less developed countries that, heretofore, not existed. That developed in part because the bottleneck, landlines, was successfully bypassed by wireless communications. That has yet to happen on that kind of scale in other infrastructure industries. Developing countries tend to have less dense populations, consumption levels usually do not reach levels where innovative markets are attractive to customers, and where consumers possess the incentive and/or capabilities to take full advantage of what might be offered in a fully competitive market. Nevertheless, regulators and infrastructure policy makers need to provide a framework that allows for innovations and which puts investors on notice of how the markets may evolve. In that regard, it is probably best to use electricity as an example.

While fully competitive electricity markets, with multiple suppliers competing to serve end use consumers, with multiple generators competing to dispatch on a real time basis with real time locational prices for the burden each generator imposes on the grid, and with customers bidding in demand reduction to compete with supply, economic realities in parts of North America and Europe, does not seem to be in the offing in sub-Saharan Africa, for example, but some forms of competition certainly are possible. Competition to provide off-grid service in rural areas (e.g. using renewable solar, wind, biomass, and/or small hydro generation) and competitive bidding to secure new generation are certainly options which can be, and are bring, deployed. Similarly, although fully competitive markets may not be fully viable in many developing countries today

67 Non-connected micro-grids, distributed generation, and perhaps even batteries or other storage technology in electricity hold some potential for bypassing land line bottlenecks as well, but, as of the time of writing this paper, such possibilities lack anywhere near the scale that has been reached in the telecoms revolution.
because the economies of scale and scope are missing from small economies, there are significant efforts underway in West Africa, Southern and parts of East Africa, Central Asia, as well as in Central America, to build interconnections for both reliability purposes and for the longer term possibility of more robustly competitive electricity markets. Regulatory and development policies that promote the development of these interconnections are evolving, although they are immensely complicated by issues of national sovereignty and security, market power concerns.

Southern Africa Power Pool: Opportunities and Challenges in Interconnected International Markets.

In Southern Africa, the SAPP (Southern Africa Power Pool) has evolved into a significant factor in the region's electricity markets, but its full evolution into a fully competitive bulk power market is clearly stymied by concerns related to ESKOM, South Africa's electric utility. Eskom's size dwarfs that of all other companies in the region. This raises concerns regarding energy security, potential for monopolistic control and pricing implications. Those concerns have not been mitigated by the problems with reliability of supply within South Africa, which led to fears of energy being less available in the region, as ESKOM pulled back to serve its country's own domestic needs. To put the issue fully in context, it is worth noting that ESKOM's generating capacity exceeds that of all of the rest of the entire continent of Africa.

Many countries are trying to attract new generation investment and are seeking to use competitive bidding to do so. One of the problems prospective bidders have is the solvency of the potential purchasers for the output of the plants they build. Countries such as Nigeria, of example, are offering sovereign guarantees to new generators to assure investors that contractual obligations to pay will be fully backed up if purchasers default in their payments. Brazil, when it implemented reforms after the supply crisis of 2001, effectively pooled all the distributors into a single buyer modality to proved generators with the comfort of knowing that they were not exposed to the risk of non-payment in the event of an insolvent purchaser. Another problem of prospective bidders is the demand for long term contracts, especially in illiquid markets. Regulators are often called upon to approve such contracts, putting them in the awkward position of committing ratepayer money to long term arrangements that may or may not turn out to be economic over time.

Another aspect of electricity markets in developing countries is the "free customer." Large industrial customers, such as mines or energy intensive industries such as aluminum producers are often given the freedom to procure their own energy supply independent of the local distributor. There are several reasons for this. From the customer's point of view, there is a real

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68 It is a source of some controversy as to exactly how long a buyer has to agree to make payments in order for the seller to be able to attract sufficient capital to build a generating plant. While a generator might want a life of plant commitment (i.e. approximately 40 years), buyers and their regulators are understandably loath to commit themselves for such a long period of time. It is not clear just how long bankers and other financiers will require guaranteed revenue stream in order to advance the capital. The more liquid a market, the less time is likely to be demanded, because there will inevitably be other potential buyers. In illiquid markets, particularly single buyer markets, where alternative buyers are not an option, sellers are likely to demand contacts of longer duration.

69 While, of course, regulators themselves are not committed to make payments, they have the power to commit consumers to having to make them.

70 An example of such an arrangement is the MOZAL Aluminum plant in Mozambique, which purchases its own electricity supply, mostly from ESKOM across the border in South Africa, completely independent of EDM, the
benefit to making their own contractual arrangements for energy supply and not be fully reliant on the vicissitudes of local utilities, whose service may not be reliable, and whose tariffs may be loaded up with taxes and cross-subsidies. For the local utility, the obligation to serve load where one or two customers constitute a large percent of overall demand, is a risky business. They will be required to invest significant amounts of money, which they may be hard pressed to raise, to serve customers whose demand curves is often quite volatile, especially if large customers are selling their products into volatile global markets. Demand might be quite high one year and decline steeply the next. Nonetheless, the utility has to build sufficient capacity to serve that customer at the time of its peak demand. From the standpoint of economic development, allowing large customers to procure their own supply of energy is often very attractive to prospective investors in mines or large industrial plants because it allows them to tailor energy supply arrangements specifically for their own needs without undue regard to many other external matters. Finally, for policy makers, large customers can provide a reliable revenue source that will attract investment in generation that might not otherwise be made. Indeed, in terms of revenue streams that assure sufficient supply of electricity, apart from local distribution companies, whose financial condition in developing countries is often insolvent or close to it, large industrial customers are the only alternative, absent sovereign guarantees, to attract investment.

Finally, in regard to market circumstances, it is important to note some critical characteristics of market circumstances in electricity in developing countries. The first is that most residential consumption is very low intensity, especially among the poor. It usually consists of lighting, radio or television, and perhaps some kind of refrigeration, and little else. Market penetration in electricity is very low in some countries, especially in sub-Saharan Africa, where, in a few countries, the percent of households with access to electric power is at single or low double digit percentage rate. There are high levels of "non-technical" losses, a euphemism used to describe non-payment or theft, some of which is due to inability to pay, but much of which is due to inability or unwillingness to collect. Finally, in most developing counties, where there is so much low intensity use of electricity, programs to promote efficiency tend to be few and, where they do exist, tend to be inadequately funded.

In summary, the market context for infrastructure in developing counties can be quite challenging from a variety of perspectives. Developing regulatory regimes in such circumstances is not a trivial problem.

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It is important to note that the social externalities associated with many infrastructure services are much more compelling than they may be in other industries. Access to electricity, for example, is more than an economic issue, it directly affects health, ability of children to do school assignments, quality of life, especially for homemakers, and other very important social conditions. Water and sanitation pose similar issues. In Lusaka, Zambia, for example, one of the poorest sections of the city sits atop a large aquifer. Many residents of that neighborhood are unable to pay for water sewage service, but cutting them off risks polluting the aquifer, so the external cost of disconnection may exceed the internalized cost of allowing them to obtain service without paying. It is a difficult dilemma.

This phenomenon is not unique to electricity. Water companies experience similar problems. The difficulties in collection are due to many factors including violence, lack of political will, inability to locate the source of the theft, and a variety of reasons for not wanting to disconnect service, some of them related to very legitimate externality concerns. There are a variety of mechanisms being tried to address such concerns, including pre-paid cards (similar to Sim cards for cell phones), creating peer pressure for payments, prosecutions for theft, and other mechanisms.
3.b. Ratemaking

As noted in the previous section, attracting capital to basic infrastructure is dependent on developing revenue streams capable adequate to compensate for the investment. That flow of money is, of course, the result of customer payments. How those payment obligations are formulated is through the ratemaking process. For the "free customers", described in the previous section, markets largely determine the prices paid for basic infrastructure. That is also the case in such areas as cell phones, when there is a sufficient level of competition allow the free market to determine the price. For customers subject to markets with monopoly constraints, however, it is the regulators who set the prices through the methodologies they follow.

For basic infrastructure services, there are three basic methodologies that can be used, rate of return, price cap, and revenue cap. While price cap is the predominant method used in developing countries, it is useful to examine all three, because each highlights areas of concern for regulators.

There are some commonalities to each methodology that should be noted. They all depend on clear accounting rules that define how revenues and expenses should be categorized. They are all premised on some notion of costs, although how exactly those costs are actually determined may vary. All of them also establish an overall revenue requirement that company needs to conduct its business in a sustainable fashion and then allocates the responsibility to pay to customers proportionate to what its costs to serve them. The tariffs actually formulated can take a variety of different formulations. Each methodology determines what a company's overall revenue requirements are and then endeavors to establish tariffs that provide the company with a reasonable opportunity, assuming reasonably efficient performance. In addition, tariffs under all three methodologies often contain a variety of taxes and cross subsidies that are, in defect, "hidden taxes." All of the methodologies require some degree of periodic regulatory review, the initiation of which can be automatic (i.e. by terms of law or concession), by the company, by customer complaint, or by the regulators themselves.

Rate of return regulation (ROR) is probably the methodology that has been in longest use. It is still the predominant form of electric and water regulation in the U.S. Its basic formulation is:

73 Costs are theoretically assigned to customers by the actual costs incurred to serve them. Because that is extraordinarily difficult to do on a customer specific basis, it is customarily done on the basis of customer class, typically including, at a minimum, residential, commercial, and industrial classes.

74 Tariffs, for example, often have two parts, one to reflect fixed costs, such as capital investment and back office equipment, and the other reflecting variable costs such as fuel in electricity, or chemicals for treating water in the case of water companies. There are also frequently special purpose tariffs, often used, for example, to serve the need of low income customers.

75 It is important to note that none of these methodologies guarantee that a company will meet its revenue requirement. The methodologies, when properly administered, should strike the appropriate balance between not erecting arbitrary barriers to regulated companies being able to achieve their revenue requirements and providing appropriate incentives for management to perform competently and efficiently.

76 The "hidden taxes" can be very significant components of the customer's bill. In Brazil, for example, they sometime compose more than 50% of what the customer is obliged to pay. They include not only taxes, but also cross subsidies to finance such activities as providing subsidies to help pay for the cost of diesel fuel to run generators in remote towns and villages of the Amazon Basin.
Regulated companies recover their capital investment in the form of annualized depreciation payments over the life of the capital asset. Each year they are also allowed to recover an authorized rate of return for the remaining asset base (i.e. that portion yet to be depreciated). In addition, companies are authorized to recover their operating expenses. It is important to note that operating costs are recovered on a cost basis. There are important caveats on what costs, capital or operating, companies can recover from their customers, namely that those costs be prudently incurred, and that their recovery is not precluded by law. The rate of return that is established by the regulators is based on the cost of debt plus an allowed return on equity based on a variety of factors including company performance and investor expectations. Typically, regulators will require companies to have a capital structure that is appropriately balanced between debt and equity. All of these determinations are made in the course of rate cases, which are fact intensive examinations of the companies' finances and performance.

Price caps (PC) developed as an alternative to rate of return. Critics of the latter argued that rate of return regulation provides incentives to utilities to over-invest in capital assets since the return on capital assets, and not productivity gains, offer the only opportunity to earn a profit, and that ROE rewarded poor performing companies by pegging ROE to investor expectations. Another criticism of ROE that PC was designed to alleviate, is that the transaction costs, in terms of rate cases, are quite heavy and the regulatory burden should be reduced. The formula for PC is: Cost Basis adjusted by (RPI-X). The cost basis may actual costs, in which case, the PC depends of periodic rate cases (whenever the concession or law, whichever is applicable, requires the formula to be reviewed), or it may be a benchmark or hypothetical set of costs. The costs are then used to formulate tariffs that go into effect for a period of years. The rates are frozen for the stated period, subject only to annual adjustments to effect inflation or some other index.

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77 Prudence is usually defined as being reasonable business decisions that are consistent with good industry practice. Typical prudence disallowances might include cost overruns caused by poor management, supplies procured at above market prices because of inappropriate purchasing practices, or acquisition or retention of assets not needed to serve the company's customers. Utilities often describe prudence reviews as "second guessing" or "micro-management" by regulators. Regulators, quite naturally view prudence reviews as an important element of consumer protection.

78 Typical of costs whose recovery is precluded by law are lobbying and political expenditures, charitable contributions, and costs incurred which are not necessary to serve customers.

79 The debt equity ratio required is usually in a range of 60/40 to 40/60, and is premised on trying to establish the proper balance between the cost of attracting capital and the appropriate exposure to risk.

80 This criticism is accurate in a technical sense. In practice, however, because of the timing of rate cases, productivity gains sometimes go directly to the company's bottom line, as well.

81 This criticism is correct, to the extent that regulators set higher ROE's for less well managed companies in order to entice investment in companies whose management was viewed in a lesser light by investors. Conversely, lower returns were required of well run companies because investors had more confidence in the company. The flaw in the criticism is that poorly run companies were more likely to have a reduced asset base on which to earn a return, and to have costs that cannot be recovered. Because of a higher probability of prudence disallowances

82 ROE does, indeed, have significant regulatory costs, but it is not always clear that PC reduces them, or, if it does so, at what cost in terms of the flow of needed information.

83 Benchmark or hypothetical costs are usually based on some notion of a model distribution company cost structure. They are often used where it is impossible to ascertain the actual costs, usually because of inadequacies in accounting records, or where, they are part of an incentive scheme to improve productivity. Choosing what benchmarks or hypothetical costs to employ is a complicated and usually controversial matter.

84 Five years is typical, but there are examples of shorter and longer periods of time being used.
(RPI). In most cases, the RPI is adjusted by the X factor, an expected increase in productivity. The X factor is meant to divide productivity gains between the company and its customers. Every year a certain amount of productivity gain is assumed and returned to customers. If the company fails to achieve those gains, then it loses that portion of the RPI adjustment, but, if it attains productivity gains in excess of the X factor, it keeps the money.\(^{85}\) PC, unlike ROR, which analyzes all costs, and to the extent that they are deemed prudent, allows them to be recovered, internalizes all costs into the formula and they are not adjusted to reflect variations in different cost components. Some costs, the control of which is beyond the control of the company, are allowed to be recovered through a separate mechanism. Typically those costs might reflect currency fluctuations, fuel costs, increased taxes, or changes in environmental or safety regulation. PC is the most commonly used tariff methodology in developing countries because it works well where it is difficult to ascertain precise cost levels, and because many investors believe it to be less subject to regulatory or political "tampering." Because of its subjectivity, its necessitating the regulators being correct at the outset\(^{86}\), and relative inflexibility, however, it is not without its risks to both consumers and investors. The other risk, as was shown in the Brazilian privatization discussion, above, is that regulators will fail to scrutinize service quality. Doing so is essential if one is to distinguish between cost cutting and productivity gains.

The final methodology but the one least utilized.\(^{87}\) is beginning to gain some traction because of environmental and energy efficiency concerns. It is revenue cap regulation (RC). It resembles price cap except that, rather than capping the price per unit of consumption, it caps the overall revenue a company may collect. For example, in both ROR and PC regulation, the more energy a company sells, the more money it makes. The result is that companies have no incentive to assist their customers to consume energy or water more efficiently. In fact, the more customers conserve or consume inefficiently, the more sales and profits the regulated companies make. Thus, while energy and water efficiency and conservation are in the public interest for both environmental and overall efficiency reasons, the incentives for regulated companies in water energy are designed to discourage companies from helping customers to conserve. RC regulation is designed to align the interest of the regulated companies with the public interest in end use efficiency. By capping revenues and not prices per unit of consumption, regulated companies become financially indifferent to their overall sales volume and can find it just as profitable to promote conservation and efficiency as it is to sell energy or water.\(^{88}\) The focus is on what the customer uses energy or water for, as opposed to buying the commodity itself.\(^{89}\) To the extent that a company's sales are reduced and revenue requirements are not met, the company’s rates are adjusted to permit them to attain the revenue needs. The potential problem with RC is that it

\(^{85}\) As noted in the discussion of privatization in Brazil, above, X factors are sometimes not adopted in order to “sweeten” incentives for investors.

\(^{86}\) The example cited above in regard to distribution tariffs in the UK, and the regulator's failure to fully understanding the cost structure of the regulated companies, is an example of the risks inherent in a failure to grasp all relevant information at the outset of the rates.

\(^{87}\) At present, it is being utilized in electricity in Norway and in some U.S. states, most notably California.

\(^{88}\) In California, in fact, the regulations in place may make it more profitable to get customers to conserve and to be more efficient in their use of energy than they would be if they simply encouraged customer to consume more.

\(^{89}\) An example in electricity is that customers do not want to buy electricity as a commodity, but want to enjoy what electricity can provide, such as lighting. If customer can receive the same lighting quality with less electricity because he/she uses more efficient bulbs, they are just as content, and perhaps more so, because they are saving money and energy.
is not always easy to ascertain if the revenue requirements were not attained because of efficiency gains, or because of other factors. As a result, critics of RC argue that many costs are being socialized, even those that ought not be socialized, like weak management performance, economic downturns, or abnormal weather patterns. In the context of developing countries, it is also sometimes contended that the potential efficiency gains from end users are insufficient to warrant the transaction costs of adopting the RC methodology. On the other hand, of course, it can well be argued that poorer countries are the ones who can least afford to be wasteful in their consumption of energy.

The question of which methodology is optimal for deployment in any country is dependent on a variety of questions. Rate of return regulation, for example, is probably the most rigorous in its examination of facts such as cost structure. That requires considerable discipline and thoroughness in the regulatory approach, and might be advisable for new regulators. On the other hand, if the accounting or accounting standards have been lax, it may well be impossible to achieve an acceptable level of precision. That may well lead to erroneous results and stimulate fears of arbitrariness among investors or prospective investors. Price caps tend to be a little less rigorous (although in theory they need not be so) and offer investors the perception of greater stability over time. As noted, however, that stability may be more apparent than real, and if the calculations are too wide of the mark, they could lead to more instability than anticipated. Revenue caps promote efficiency and conservation, but involve a level of regulatory uncertainty in terms of how adjustments are made that make many investors and consumers a bit skeptical. Nonetheless, the exercise of selecting the appropriate methodology is an excellent one to ferret out issues early and to allow for a full airing of all relevant factors.

CONCLUSION

Developing appropriate institutions, processes, and resources to adequately regulate the provision of infrastructure services is a critical task. We now have a vast amount of experience to draw upon to analyze what has worked and what has not worked, to understand the scope of opportunities and the potential pitfalls. It would be very useful for a reputable international body to establish some basic criteria for assessing infrastructure regulation, to set appropriate standards and norms in regulation, and to assist countries in developing the capacity to fully implement effective regulation. The task is an important one, and as touched upon in the body of this report, a multi-dimensional one. If regulation is to be successfully deployed and implemented, it cannot be done "on the cheap," so the effort will require the dedication of sufficient resources to accomplish the task. There are also some broad lessons that have been learned from those jurisdictions that have attempted to reform critical infrastructure services. These lessons would include the following:

1. It is vital to manage the inherent conflict of interest that government has in privatizing state assets between maximizing the sale price and long range sector optimization;
2. Privatization is best accomplished after the establishment of the market rules and the regulatory regime;
3. Pricing for infrastructure services should be reflective of costs, but also provide incentives for efficiency in supply of service and the use of the service provided;
4. Transparency and public participation is essential for the credibility and effectiveness if the regulatory process;
5. The independence of regulatory agencies to make decisions in their areas of jurisdiction significantly enhances the transparency and credibility of the process;
6. A regulatory regime, to be sustainable and credible over time, has to find the appropriate balance between predictability and flexibility;
7. Market intervention by regulators should be designed to compensate for market failures and to replicate what a competitive market would have produced had there been no market failure;
8. Where viable, regulators should promote competition and competitive mechanisms as a means for achieving economically efficient outcomes;
9. Where regulated companies are required to serve certain social objectives (e.g. universal service, service quality standards), those objectives should be clearly articulated and understood.

While these lessons are not comprehensive in their scope, they are certainly sufficient to provide guidance for countries embarking on reformation of basic infrastructure sectors of their economy.

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