Electricity in Mexico: When doing the right thing is not enough

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Abstract

Latest evidence and research papers indicate that some electricity restructuring processes have focused on defining market rules to promote efficiency, taking as an uncontested fact that structural issues and the convenience of privatizing State assets are solved problems. The empirical evidence shows that in countries where restructuring has been successful a suitable industry structure was present. In those countries, the presence of public property has not been an obstacle to introduce competitive pressures. This is because in certain conditions public property is a solution for the naturally monopolistic portion of the industry. In addition, the existence of State owned enterprises in generation is not incompatible with the efficient outcome of competition, because market power problems arise from structural conditions that do not necessarily depend on the public or private nature of the participants.

In Mexico the proper conditions do not exist to guarantee the operation of private monopolies in electricity. If we add to this that the network expansion issue is not completely solved theoretically, the idea of maintaining public property in transmission and distribution is a suitable solution. Regarding the generation segment, a careful design can assure a competitive behavior of public and private participants. Thus, an electricity restructuring model with the participation of State owned enterprises is viable in Mexico in response to the political, social and financial costs that the country would incur in a sale of State assets.

Notwithstanding the above, a hybrid public and private power industry structure does not eliminate the budgetary restrictions that the State owned enterprises in Mexico are subject to. Such restrictions come from the impact of their finances on those of the Federal Government as a whole. As long as this situation remains, the restructuring process must contemplate new mechanisms to finance investment that do not affect public finances. This would require the review and removal of the State constitutional exclusiveness paradigm in electricity to replace total public property by corporate control, as it is only with capital instruments that investment in the power sector can be increased without affecting public finances.

Empirical Evidence and Change of Paradigm

After nearly fifteen years of power industry restructuring experiences (more than twenty if we consider Chile's privatization process) opinions about the benefits of restructuring are divided, and in recent years the initial enthusiasm for such policies has been replaced by skepticism and even rejection. The problems that triggered the need to implement restructuring policies are still present, but today it is frequently stated that those problems represent less of a threat than the consequences of a deregulation failure.

Three central factors contribute to this situation:

a) Some processes were implemented in a dogmatic way with a privilege towards privatization.
b) The results are so diverse, that almost any policy can be justified.
c) In many cases, structural issues and the physics of electrical power were not addressed appropriately.

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The British process is a clear case of a dogmatic approach, where the power industry restructuring process was part of a broader political platform that had the intention of reducing the State participation in the economy. This policy has two weaknesses: first, the sale of public assets is launched with the purpose of maximizing the sale revenue. This is incompatible with the establishment of an ex ante competitive structure, since it would reduce future cash flows of the acquiring parties, and consequently the sale price. Second, nothing guarantees that earnings from privatization will not be used to finance government's expenditure and not investment, therefore eliminating the benefit for public finances. The Argentinean case is a good example of this situation.

Although the California breakdown is commonly used as an example to cast doubt on any power industry restructuring process, there is no clear trend in the overall results at an international level. Notwithstanding, recent studies have shown the importance of structural issues. Countries like Norway or New Zealand, where there was no concentration in generation assets, the possibility for bilateral contracts was in place, and State owned enterprises coexisted with private companies, have had a much better price behavior than countries like Great Britain or Australia, where there were problems of concentration, with mandatory pool participation and mostly private ownership. Moreover, the fall of prices in Great Britain since 1998 is attributed primarily to the fall in concentration in generation and not to the changes in market rules.[1]

This doesn't mean that the power industry should be structured as a vertically integrated monopoly, but that many restructuring processes have ignored the fact that the most difficult and costly problems with new electricity markets are mainly matters of market structure as opposed to market architecture.[2] Therefore, in those countries where an adequate structure or the political will to implement it existed, these policies have been more successful. A clear example of this is the Spanish case, where the California model was implemented but with a stronger government and regulator intervention in order to compensate structural deficiencies.[3]

Given the above, we can conclude that a power industry restructuring effort has to begin with the analysis of the most relevant structural conditions, as well as an assessment of the possibilities to change them, in order to design the industrial organization that is the most adequate. Adding to this, the idea of an absolute nexus between private ownership and efficiency or public ownership and inefficiency must be eliminated. It is the successful implementation of competitive pressures, and not necessarily the nature of ownership, what finally generates benefits for consumers and society.

These considerations are especially important for Mexico, where the issue of public property and State intervention has become the central topic to be solved in the Mexican power industry reform.

Electricity and Network Industries

Some of the problems associated with the power industry are common to all network industries, which are those that provide services to final users through a fixed network. Besides electricity, other network industries are natural gas, water, fixed telephony and rail track facilities.

Network industries involve two types of activities: transport, which constitutes a natural monopoly, and service provision, that in most cases can operate in a competitive environment. Traditionally, the impact of the natural monopoly segment has caused these industries to operate in an integrated manner under conditions established by the State, either through public ownership or regulation, depending on the particular circumstances in each country.

When networks operate in an integrated manner, regulation faces serious difficulties given two apparently conflicting objectives. First, regulation has to guarantee that investors will be able to finance the

investments required to satisfy demand. The simplest way to achieve this goal is to give the utility a protected franchise monopoly or access to the use of public resources. Second, efficiency in operation and innovation must be assured. Competition is definitely a better solution for innovation and efficiency than regulation. However, if regulation could be confined to the core natural monopoly networks, and competition introduced for the services supplied over the network, then efficiency and innovation could be encouraged without discouraging investment.[4] If additionally vertical separation is implemented, regulation and its costs are minimized.

In practice, separation of the monopoly and competitive segment of a network industry faces problems associated with property rights and regulation, which are determined by the institutional endowment of each country. Also, the solution can be different according to circumstances and time. As a result, each country must gradually evolve satisfactory regulatory institutions to solve these problems.[5]

Because of all of this, a restructuring policy for a network industry must solve three issues: (1) how to ensure that investment can be financed and how to define, allocate and protect property rights; (2) what is the right structure for the utility, both vertically and horizontally; (3) how to guarantee the efficient use of the network. Until recently, economists tended to assume that the first two questions had already been answered, or could not be re-opened, so the theory of regulation concentrated on how best to achieve efficient outcomes for each utility.[6]

The Monopoly Segment of the Industry

Transmission and distribution networks are clear examples of natural monopolies. In fact, they comply with all the conditions of the classical concept, which includes, besides the presence of economies of scale, the intensive use of capital, lack of storage capability and demand volatility, rent generating local specificity, the provision of strategic services for the community and direct connection with final customers.[7] Since the only problem to be solved regarding the structure of these segments is the geographic scope of the monopoly, the remaining key issues to be addressed are property rights and the regulatory framework. When an industry restructuring process starts from a total public property scheme, the analysis of the conditions under which private ownership can operate successfully becomes essential.

The strategic importance of electricity in a modern society generates pressures for adequate service coverage and fair prices. This means that investors must expect that, after they have sunk their capital, the prices that they will be able to charge will be regulated and a set of obligations to supply and to guarantee reliability, stability and security could be imposed. How do you persuade someone to invest his money in an asset that cannot be moved and that will pay for itself in a long time span? The investors would have to be confident that they had secure title to future returns and that the returns would be sufficiently attractive. As a result, investments require certainty in property rights, which are a public good that has to be provided by the State. Thus, if network investments are to be financed with private capital, the regulatory framework must balance, in a credible way, consumer and investor interests.[8]

Under a private ownership arrangement, transmission and distribution operations require regulatory certainty. The investor must be confident that the regulator will allow him a fair return on his past investments. Credibility is enhanced if the regulator faces high costs of deviating from this commitment or is legally restrained from deviating. If regulatory institutions are not strong enough to provide an acceptable level of certainty, private ownership may be too costly and not feasible. Additional costs may translate into a higher rate of return required by the investors to cover regulatory uncertainty, a discount in the valuation of State assets subject to privatization or finally, into higher monitoring and renegotiating costs of the regulatory agreement or license. In this scenario, privatization will be socially profitable if the benefits of increased efficiency outweigh the extra costs of regulation.[9]

As empirical evidence of all of the above, a World Bank survey among international investors participating in the power sector of developing countries states three key factors that governments shall pay special attention to in order to attract investment: to ensure adequate cash flow in the sector, to maintain the stability and enforceability of laws and contracts, and to improve responsiveness to the needs of investors.[10]

The Competitive Segment of the Industry

Generation

The development of more robust transmission and distribution networks, as well as innovation in information technologies, have allowed the implementation of bigger electricity markets, which in turn have made possible the introduction of competition in generation. The reduction of the plant economic size also contributed to this purpose, although in a less significant way, since economies of scale still exist in the operation of a generation company.

However, supply and demand behavior in electricity do not allow the adequate operation of a completely deregulated market. The impossibility to store electricity enhances the importance of real time supply characteristics. The absence of real time pricing causes demand to be inelastic in the short term. Finally, the possibility for customers to use power without or beyond a contract requires a central dispatch mechanism to keep the system balanced. All of this creates the need for regulatory arrangements to guarantee reliability that could increase the market's vulnerability to the exercise of market power from generators.

To keep the electric system's balance and stability the market requires a regulatory demand that incorporates real-time energy, operating reserves and installed capacity.[11] An adequate regulatory policy will guarantee sufficient capacity and will provide the right price signals to encourage investment. However, it should be taken into account that price spikes not only increase uncertainty, and consequently the cost of capital, but they also have political repercussions and facilitate the exercise of market power.[12] In an isolated market, or in a region with uniform capacity-requirement regulation, energy price spikes are not needed to induce investment in generation.[13]

Concerning market power, concentration measures are not a reliable instrument in generation because they do not take into account all the key economic factors that determine the extent of market power.[14] The key factors that determine the level of competition in a power generation market are, besides the level of concentration: demand elasticity, long-term agreements and the possibility of adjusting supply bids according to market behavior.

In order to increase demand elasticity two actions can be implemented: real-time pricing systems and elastic operating reserve demand curves. Forward contracts substantially decrease the possibility of exercising market power and, when they are coupled with the supplier's obligation to serve native load, they reduce concentration effects, since the supplier will possibly hold a short position and this will reduce incentives to manipulate price. Finally, holding generator bids during long periods reduces the possibilities of market power and creates incentives to reveal costs.[15]

All these regulatory measures mitigate the effects of a concentrated power generation structure, which is a situation that most of the restructuring processes start from and represents one of the most difficult aspects to correct, regardless of the initial ownership system. If the starting point is private ownership, there are legal barriers that protect the rights of private ownership holders. On the other hand, if the starting point is public property, the incentive to maximize asset's value before privatizing may prevail or other political considerations should be taken into account.

Commercialization

Even though the electricity-restructuring paradigm initially contemplated full competition in the retail segment, several studies question the real potential benefits of such a regulatory policy to residential or small consumers.[16] A report by the National Audit Office from the UK's parliament suggests that the costs of introducing competition in the domestic supply business have virtually wiped out all the benefits. The study concluded that consumer benefits amounted to roughly £143 million each year. The costs of introducing competition, which have been passed on to consumers, totaled £121 million each year. The study points out that the resulting small net benefit is probably less than the costs that will be incurred to sort out the remaining problems with the domestic competition systems.[17]

A cost analysis of electricity shows that there are not a lot of possibilities of price differentiation in the retail market:

Generation:	Market price. Differentiation is only possible through forward contracts.
Transmission and Distribution:	Regulated price. The price is the same for any supplier or client.
Commercialization:	Market price. Differentiation is only possible for industrial or big consumers, given the possibility of long-term contracting with a fixed demand commitment.

Notwithstanding the above, by introducing competition in the big consumer segment most of the benefits of price differentiation can be attained. Competition would also incentive service differentiation strategies. If that is the case, the potential benefits of such service differentiation could be passed on to small consumers through regulation.

The Mexican Case

The Mexican power industry is organized as a vertically integrated State owned monopoly. Power supply is considered a general interest public service and all the activities necessary to provide it are exclusively reserved to the State. However, private individuals or corporations can produce electricity for self-supply or participate as independent producers selling electricity to the State. There are two State entities that provide the public service: The Federal Electricity Commission, which is in charge of covering most of the national territory and generates, transmits and distributes electricity, and the Light and Power Company, basically a distribution entity in charge of providing the service in the central region of the country.

As we have mentioned before, the first step towards defining a restructuring policy in a country that starts from a State ownership regime is to determine if the monopoly segments of the industry as well as the competitive segments hold the necessary conditions to produce real social benefits with State asset privatization.

Transmission and Distribution

In order to evaluate if asset privatization in these segments is an adequate solution for our country, three factors should be weighted: the presence of situations that could impact the assets' sale price, the level of certainty in the revenues or cash flow to be received, and the presence of regulatory institutions that guarantee, in a credible manner, a fair return over past investments in order to encourage new additional investments.

There are situations in Mexico that would influence negatively the State assets' sale price.

- State entities have a pension fund debt that, in 2002, amounts to more than 170 billion pesos[18].
- A high percentage of the networks lack duly legalized rights of way.
- There is a considerable lack of infrastructure maintenance.

There are also situations that could generate uncertainty over the amount of revenue to be received:

- Electricity rates still include a substantial level of subsidies that, in some situations, are handled with political criteria.
- There is a considerable problem with electricity theft and its solution is greatly complicated by political and social considerations.

A privatization process under these circumstances would have to expect a low asset sale price. The Federal Government would also have to guarantee private enterprises' cash flow in case external factors, such as insufficient public transfers to cover subsidies or the impossibility of implementing mechanisms to reduce electricity theft, reduce the amount of the agreed return over investment. This would imply that government funds should keep flowing to the power sector as long as these structural problems are not solved. In this scenario it is not clear that a privatization of State assets would have a positive impact on Mexico's public finances.

Adding to the above, if by any chance the Federal Government faced any obstacle to assign and transfer public funds to the sector, all the pressure would be shifted to the regulatory authority, which in turn would face the alternative of allocating the cost to the consumer or affecting the investor's return. Such a policy dilemma would surely be affected by the public service and general interest legal nature of electricity supply and there could be no guarantee that, in this situation, the investor's interest would not be affected by a regulatory decision or even a judicial decision favoring political considerations.

In order to launch a privatization process that would not cause additional costs for taxpayers and created the level of certainty required to finance investment with private funds, problems such as subsidies, rates and electricity theft should be addressed and solved in advance. However, once these problems were solved, it is not clear if privatization would be necessary or even the right path, since the vertical separation of the monopoly and competitive segments of the industry along with an adequate regulatory structure, could produce efficiency gains that not necessarily depend on the public or private nature of the owner.[19]

Generation and Commercialization

The benefits of restructuring generation and retail sales derive from the introduction of effective competition, which is obtained through a disaggregated structure, with as many participants as possible, and the presence of mechanisms to create incentives for proper behavior of all participants.

The problem is that State asset's privatization in these circumstances cannot expect a sale price higher than the present value of future marginal rents minus fixed and capital costs. Since there are in Mexico many State owned power plants that are too old, and the impact of pension funds has to be considered along with other situations that we have mentioned earlier, it is not clear that asset privatization in generation would have a positive effect in public finances.

Nevertheless, as the New Zealand and Nordic experiences have shown, if the proper measures to create the incentives for a competitive behavior are implemented, and an adequate structure is present, public ownership in generation and retail is not an obstacle to attain efficiency gains through competition.

Considering all of the above, we can say that to implement an industrial organization model in Mexico that includes the active participation of both public and private enterprises represents an adequate solution, as long as the following structural elements are considered:

- Legal separation of regulated and competitive activities in order to minimize regulation costs and to help transaction transparency.
- To give more power and autonomy to the regulator.
- Creation of an independent system operator and legal enforcement of network open access.
- If any, clear and direct subsidies.

All this implies that public entities shall undergo through a profound transformation to compete in this new arrangement. This includes harmonizing the public entities' tax regime with the general tax structure any other company would face, and seriously considering horizontal separation of generation and distribution segments.

However, even though the privatization of State assets does not automatically create a benefit for society in the case of the power industry, the truth is that the alternative of privatization did come up as a solution to the problems inherent to public ownership. Therefore, it is important to review if a restructuring policy such as the one suggested in this article, would contribute to the solution of those problems.

The first problem usually present when the government owns the power industry is that prices do not reflect the actual cost of electricity.[20] There can be cross subsidies and undervalued prices, as such policies work for the government as tools for rent redistribution that do not violate its budget constraint, and so avoids scrutiny and correction.[21]

An electricity industry restructuring policy that includes rate setting by an independent regulatory agency and a clear mechanism for assigning subsidies solves a substantial part of the problem by reducing the chances of discretional transfer of rents and political manipulation of rates. Notwithstanding, uncertainty will remain concerning the actual delivery by the government of the corresponding subsidy funds.

The second problem associated with public ownership is the lack of incentives to improve efficiency.[22] In this case, an adequate solution is the separation of the monopoly and competitive segments of the industry, and the introduction of effective competition in the latter.

A third problem arises from the lack of investment due to budgetary or public finance constraints. This problem is currently faced by public entities in Mexico and it is fair to say that it will not be solved with a restructuring process that does not consider the sale of State assets. Therefore, it is of critical importance to analyze the origin of these restrictions, and to determine the necessary measures to mitigate the problem and allow the electricity public sector to meet its future investment needs in order to compete in a restructured industry and to keep up with the expected electricity demand growth for the coming years.

Budget Constraints

Budgetary constraints that affect government owned power utilities in Mexico are mainly caused by the following situations:

- The significant impact that the electricity public sector budget balance has on the overall government budget balance.
- The existence of limited resources as well as multiple priorities and requirements of the Federal Government.

- The need of a last resource government guarantee for loans in all electricity investment projects.

Two actions have been frequently proposed, besides the privatization of State assets, to reduce the impact of the power sector on public finances:

- To treat power sector entities differently in the government account system, either by not including them in the Federal Budget or by using special accounting rules for electric projects. This so called solution has no real effect, since financial markets will make any necessary adjustments to correctly evaluate the country's debt level and its associated risk.[*]
- To use new financial schemes with different debt or capital instruments. Debt instruments do not solve the problem, since they affect the government overall debt level. Capital instruments, in contrast, do not have a direct impact on the Federal Government deficit.

Regarding the conflict of priorities involved in any investment decision by the Federal Government regarding the power sector, two possible solutions that do not require the sale of State assets have been proposed:

- To change the corporate government structure of the power sector entities. This policy would have only a limited impact, since any decision affecting the federal budget would ultimately need the approval of the ministry of Finance and the Congress, taking us back to the priorities problem.
- Private capital investment, keeping public control. If there were private investors participation in the capital of the power sector entities, the government would not be able, at least not easily, to make policy and regulatory decisions that could conflict with the financial needs of the public entities.

As to the need of a last resource government guarantee for loans, as long as projects are financed with capital instruments and not debt, investments in the power sector should not require a last resource government guarantee. Other elements that would contribute to this purpose would be an adequate industry structure and the quality and credibility of regulatory institutions.

According to all of this, the only measure that can effectively relax the power sector entities' budget constraint is to finance their projects with capital instruments. That is, unless the Federal Government revenues are increased, and a political decision is made to assign those extra revenues to the power sector in order to minimize the effects of these investments in the federal budget balance.

Doing the right thing is not enough

An electricity-restructuring model with the participation of State owned entities is viable in Mexico and responds to the political, social and economic conditions of both the country and the Mexican power industry. Such a model if appropriately implemented, could attain most of the efficiency gains derived from the introduction of competition without compromising the viability of networks expansion and would be totally compatible with the Mexican legal system.

However, a restructuring process that maintains public ownership does not eliminate the budgetary restrictions that the power sector entities are currently subject to and, therefore, does not completely solve the problem of ensuring sufficient investment levels to cope with the expected demand growth.

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[*] In fact, the Mexican ministry of finance issues a document known as the Public Sector Financial Requirements Report, which presents a budget balance report that eliminates the effect of special accounting procedures used to deal with public debt incurred to finance PEMEX and CFE projects as well as the emergency programs implemented to sort out the 1995 banking system and highway privatization breakdown.

Given the current state of affairs, unless there is a significant improvement in Federal Government revenues, the only mechanism that can effectively contribute to eliminate those budget constraints is to finance power sector entities' projects with capital instruments. Private investment would not affect public finances and would help to keep corporate decisions aligned with the best interest of the company and away from political considerations.

This does not mean that the State must necessarily give in corporate control over power sector entities, since legal instruments can be implemented in order to maintain Federal Government control even with the presence of private capital. (In this scenario, an adequate company structure should be in place to isolate these investments from risks associated with entities' current problems and debt.)

The implementation of a model of this kind would require a change in the current paradigm of State's exclusivity from total government ownership to corporate control. This will require Constitutional amendments and legislative reform, as well as a profound transformation of the way public entities have traditionally done business in the Mexican power industry.

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