

# RETAIL COMPETITION IN POWER DISTRIBUTION

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*Ajay Shankar and  
TCA Avni*

DISCUSSION PAPER



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COMPETITION  
IN POWER  
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# INTRODUCTION

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Competitive markets are good for the consumer. Well-regulated competitive markets reduce allocative inefficiencies. Globally, increasing competition through opening up of markets, trade liberalization, de-regulation and reducing entry barriers have been the key elements of the economic reform agenda over the last few decades. Factors that reduce competition and consumer choice in the market need to be reined in by regulation and redesign of markets have been core propositions. A natural consequence of this conceptual framework has been the appeal of the idea of consumer choice and retail competition in the supply of electricity.

Market-based reforms have been promoted since the 1990s as a way to improve the performance of the power sector. After the early experience in the UK, the World Bank became a prominent advocate of a set of standard reform prescriptions that involved four distinct measures: the creation of independent regulatory bodies which would hold utilities accountable for financial and operational performance; unbundling of vertically integrated state-owned entities into distinct generation, transmission, and distribution entities; increasing private sector participation and investment; and enhancing competition (World Bank, 2017). The idea behind reforms was that by making electricity a commodity, market forces and competition



would lead to efficiency and productivity gains. This would allow consumers to access electricity at, or near, cost-reflective prices, reduce transmission and distribution losses, improve billing and collection efficiencies, and increase adoption of efficiency measures (Hall & Nguyen, 2017; Sen, Nepal, & Jamasb, 2016). Many countries in the developing world initiated power sector reforms along the standard 'textbook' format (World Bank, 2018). The experience of these reforms has been more mixed than had been initially anticipated. There are sharp differences in the extent of adoption of 'reforms' between developed and developing countries, but also within developed and developing countries. Many countries have had incomplete 'reforms', and even policy reversals.



In India too, introducing retail competition in electricity has been on and off the table since discussion on the Electricity Reform legislation began in earnest in 2000. A wide and in-depth consultative process led to the enactment of The Electricity Act 2003 with a broad bi-partisan consensus. It was crafted to suit the Indian realities and struck a fine balance. It provided for open access and choice for consumers with loads of 1 MW and above. The advocates of the separation of carriage and content and the opening up of the market for the entry of multiple

suppliers, consumer choice, and competition, believe that this would be the final step in the journey of power sector reforms in India. The more optimistic see this as the solution to all the immense problems of the power sector.

This paper examines the evolution of competition in the supply of electricity globally. It then analyses the implications of the introduction of full retail competition with separation of carriage, the wires business, and content, the supply business.



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# INTERNATIONAL EXPERIENCE

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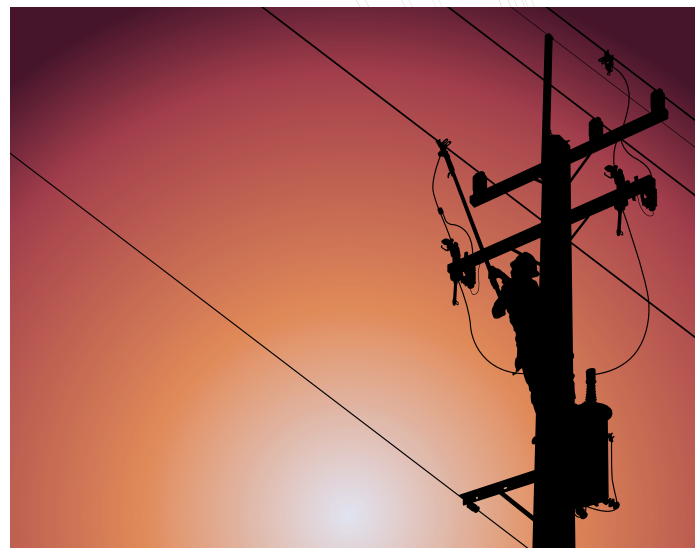
The first electricity supply companies emerged in the late 19th century to provide electricity in the larger cities in the world. They generated and supplied electricity to their consumers through the distribution network that they created and expanded<sup>1</sup>. As electricity could not be stored, generation and supply had to be constantly adjusted to meet demand, which varied both during the day and also through the seasons of the year. These characteristics made the electricity supply industry a natural monopoly. Vertically integrated monopoly entities which generated and supplied electricity to consumers in their area of supply proliferated as the use of electricity became widespread and drove industrialization. This remained so for about a hundred years.

Concerns over the misuse of monopoly power to overcharge consumers and profiteer arose early on. This led to social control through regulation of what came to be considered a public utility providing essential service even though it was privately owned. Alternatively, it was considered a public good which had to be provided by the state or by municipal bodies.

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<sup>1</sup> A networked good, electricity supply relies on wires being laid connecting generators to consumers. As a consequence, the early years in many countries were characterized by chaotic competition, as suppliers built capital-intensive-redundant infrastructure to compete for the same customers.

<sup>2</sup> What is interesting is that unlike in other countries where regulatory compacts were with nationalised entities and subsequent reforms were aimed at introducing privatization of public utilities, many utilities in the US have historically been privately owned.



The history of the electricity industry in various countries illustrates the balancing act that took place between the interest of consumers, governments and investors, and the trade-offs that ensued. We discuss these briefly in the subsequent sections.

## United States of America

The early years of the US electricity sector in the 1880s and 1890s were characterized by fierce competition between AC and DC power. AC power eventually won the 'war of the currents', but the chaotic competition that resulted led to numerous companies building redundant infrastructure to compete for the same customers, and ensued high capital costs (Blumsack, Apt, & Lave, 2005; Vactor, 2004). After a complex transition process, the electricity supply industry settled to create 'regulatory compacts', where vertically integrated utilities (often privately owned) became regional monopolies serving captive consumers, in return for having their prices and profits regulated<sup>2</sup>.

In the 1970s, as the cost of power began to rise<sup>3</sup>, the momentum for regulatory reform to control costs rose (Blumsack, Apt, & Lave, 2005). The price rise was precipitated by the sharp rise in oil prices. By 1977, there was a full blown energy crisis. The rising costs coincided with a slowdown in demand, turning utility investments into stranded assets. Policymakers passed the deregulatory reform legislation, the Public Utility Regulatory Policies Act (PURPA) in 1978. This allowed independent power producers (IPPs) to begin operations, and forced utilities to purchase power from IPPs under long-term contracts if their cost was lower than the utilities own 'avoided cost' from its own generation. The Energy Policy Act in 1992 expanded the field for eligible players by requiring utilities to meet additional power needs through competitive bidding and allowing generators to sell electricity at market determined rates. Critics of the law argued that the IPPs locked utilities into expensive long-term contracts. When oil prices went down, the utilities had to continue to fulfil these contracts which kept power prices high (Blumsack, Apt, & Lave, 2005).

Reforms to promote further competition were driven by the objective of lowering costs. They were introduced more rapidly in states that had high power costs, such as California and nearly the entire Northeast, than in those with abundant resources of low cost fuel, such as those in the Pacific Northwest, which had access to hydroelectric power, and Southeast, which had access to coal. California and Pennsylvania both established centralized spot markets for electricity, and opened retail markets to competition, allowing consumers to choose their electricity suppliers. While Pennsylvania's experience in retail competition was reasonably successful in keeping costs down (Blumsack, Apt, & Lave, 2005), a confluence of factors resulted in a crisis of unprecedented proportions in California. It resulted in a significant backlash against further

electricity restructuring, both in the US, where many states suspended restructuring plans, and across the world.

As of 2017, 13 US States and the District of Columbia had fully restructured retail electricity markets, 5 allowed partial retail electricity choice, and the rest have none. According to the Annual Electric Power Industry report published by the USEIA, of the 3000 electric distribution companies operating in the US in 2017, 1958 were publically owned companies (including federal-, state-, and municipal-run utilities), 812 were cooperatives (which are not-for-profit member run utilities), and 168 were investor owned. While investor-owned utilities accounted for only 5.7% of the total number of utilities, they served nearly 72% of all the electricity customers (U.S. Energy Information Administration, 2019).

### *California Electricity Crises*

Energy rates in California in the early 1990s were almost 50% higher than the national average, a scenario which was significantly influenced by the 'stranded costs' of past investments in nuclear energy and expensive long-term contracts with small generators which had been signed under the PURPA. Motivated by the high electricity prices, and influenced by the example of deregulation in the UK, the California Public Utilities Commission (CPUC) began to develop a restructuring plan in 1992, and in 1996 the restructuring legislation, AB 1890, was passed. Under the restructuring plan, electricity generation was deregulated, with substantial reduction in the ownership of generation facilities by utilities who were incentivized to divest their generation facilities; long distance transmission was to remain a regulated function, with operation of transmission networks handed over to an Independent System Operator (ISO); and local distribution was also to remain a regulated function, with consumers free



to choose among 'energy service providers'. The now restructured utilities remained regulated, while new electricity service providers were allowed to enter the market and provide their customers with power purchased from the open market. The ISO was to manage electricity dispatch and maintain system reliability by balancing the demand and supply of electricity in real time, and competitively generated power was to be sold through the newly created power exchange (PX), which ran auctions for day ahead and hour ahead markets. The plan also implemented a fixed retail rate by utilities while they sold their assets. Since the wholesale price was expected to be lower than the fixed price, it was assumed that the frozen rates would allow utilities to recover stranded costs, with rates expected to become market linked when the assets were sold (Weare, 2003; Borenstein, 2002).

Competitive markets for wholesale power were inaugurated in April 1998, and for two years the market appeared to work well with prices fluctuating between \$20 and \$50 per megawatt hour. In June 2000, however, the electricity sector began to malfunction with average prices increasing dramatically<sup>4</sup>. The ISO was unable to purchase as much power as it needed through the real time market, and the utilities were paying

wholesale prices that vastly exceeded the retail prices they were allowed to charge, leading to multiple large-scale blackouts. Forced to buy expensive wholesale power, and constrained by the retail rate freeze, the soaring wholesale prices wrecked financial havoc on the electricity utilities. By January 2001, two of California's three largest utilities had become effectively insolvent, and unregulated suppliers of wholesale power began to stop selling power to them, forcing the Governor to declare a state of emergency and for the state to purchase emergency power to avoid widespread blackouts. The crises officially ended when the state of emergency was brought to an end on November 13, 2003. (Borenstein, 2002; Weare, 2003).

California's electricity crisis was caused by a confluence of factors. The droughts in the Northwest, which severely reduced hydropower generation, reduced the amount of electricity available for import; while the rise in natural gas prices and the higher costs for pollution permits raised the costs of electricity generation (Weare, 2003). Additional supply-side constraints included the strong power demand growth in nearby states, which constrained California's ability to import power; and a shortage in generation capacity, which were aggravated by the delays in permissions for establishing new generation

<sup>4</sup> Prices in California's competitive wholesale electricity market increased by 500% between the second half of 1999 and the second half of 2000. For the first four months of 2001, wholesale spot prices averaged over \$300/MWh, ten times what they were in 1998 and 1999.

facilities (Sweeney, 2002; Weare, 2003). Moreover, since CPUC restricted the ability of the three main utilities to enter into long-term bilateral contracts<sup>5</sup>, as the utilities deregulated, they did not sign long-term contracts with their divested generation facilities. This increased the reliance on the short-term market, and increased the potential for market manipulation (Weare, 2003). Generators exercised market power by strategically withholding some capacity to push market prices higher, and traders, such as Enron, were found to have employed a number of trading strategies to game the market (FERC, 2005; Weare, 2003). [For more information on the crisis, see (Sweeney, 2002; Borenstein, 2002; Weare, 2003; Joskow, 2001)].

## United Kingdom

The power sector in the UK has seen multiple transitions. The early years of electricity supply in Britain were a patchwork of private companies and local authorities, with electricity being generated through a '...complicated mass of individual undertakings, each supplying a single area, each with its monopolistic rights and special privileges, with no connection between areas, and with no national coordinating agencies, either public or private, capable of formulating or directing a national policy' (Hormell, 1932). Electricity was generated and distributed by 'authorized undertakers' which, prior to nationalization, included '188 companies, 362 local authorities, 6 joint boards of local authorities and 4 joint electricity authorities...' (Katzarov, 1964). World War 1 in particular, exposed the challenges of a fragmented and inefficient supply and distribution system, and demonstrated the need for linkage

and coordination between the disparate parts of the electricity supply industry. While attempts were made to improve coordination through voluntary negotiation, especially through the 1919 and 1926 Acts, the failure to coordinate between fragmented distribution undertakings favoured central public ownership (Newbery, 1996).

Under the Electricity Act 1947, the industry was nationalized. The Act established the British Electricity Authority (later the Central Electricity Authority), which was responsible for the generation and transmission of electricity, as well as for the policy and finances of the supply industry, and constituted 14 regional area electricity boards-12 in England and Wales and 2 in Scotland. These were responsible for the supply of electricity in their own regions (Simmonds, 2002). The industry was further reorganized to introduce greater decentralization with the passage of the Electricity Act of 1957. The Central Electricity Authority was replaced by the Central Electricity Generation Board (CEGB), which was responsible for planning new generation and transmission capacity and supplying electricity to the 12 area boards in England and Wales; and the Electricity Council, which was responsible for advising on electricity supply and matters of industry-wide concern (Simmonds, 2002).

The structure created by the Electricity Act of 1957 remained largely intact until the 1990s. By the 1970s, however, concerns regarding the nationalized structure began emerging. A major criticism of the publicly owned electricity industry were the high costs of both investments<sup>6</sup> and domestic coal, where the monopoly by the National Coal Board and the miners<sup>7</sup>, and the lack

<sup>5</sup> The restructured markets had required that all electricity be bid through the spot market; the CPUC only gradually allowed utilities to enter into forward and bilateral contracts (Weare, 2003).

<sup>6</sup> Under CEGB, power stations cost more, took longer to commission, and rarely achieved the economies of replication (Newbery, 1996).

<sup>7</sup> The 1970s in particular saw a high degree of conflict with miners, whose strikes disrupted the supply of coal to power plants and raised concerns over the security of indigenous fuel sources.

of both depth and access to international coal markets, kept costs high and productivity low (Newbery, 1996). The push for privatization in the UK was led in substantial part by the apparent success of the private ownership model in some European countries and in the United States, and by the perception of large nationalized industries being inflexible and bureaucratic, with poor mechanisms to punish non-performance (Newbery, 1996).

The Electricity Act of 1989 laid the foundations for restructuring and privatization, providing for change in ownership from government to private investors, the introduction of competitive markets, and a system of independent regulation (Simmonds, 2002).

The UK became the pioneer in the design and implementation of the restructuring of the monopoly electricity supply industry into a deregulated competitive industry structure. The process involved breaking up the publicly owned, monopolistic electricity supply industry, the CEGB, into three generating companies and a transmission company, which were then privatized. Generation was further divided into separate generating companies which would then compete with each other in the competitive market that was being created. Transmission remained a monopoly. It was to act like a road highway giving free right of usage to all to carry goods. Non-discriminatory open access became the principle for the natural monopoly of transmission. The area boards were replaced by 12 regional electricity companies (RECs), which were obliged to supply on request all reasonable demands for electricity in its authorized area, and were floated in the London Stock Exchange to transition to private ownership. The supply market was successively opened up to competition, until all consumers became eligible to choose

their suppliers. Again, the carriage of electricity through wires was a natural monopoly like transmission. The principle of non-discriminatory open access was introduced here. Carriage was separated from content. The business of supply of electricity was made competitive with multiple suppliers. For the wires business, which was a natural monopoly, regulated rate of return on capital continued. The competitive parts of the supply chain, i.e., generation and supply became deregulated. Suppliers competed with each other for retail customers, who could choose from among the supply companies operating in their area. As supply had to match demand at each moment, a new market had to be designed. It took the form of all power being pooled for the day ahead market. All generators offered the quantity that they could supply for the next day and the price. This was stacked in ascending order in price. The suppliers indicated their demand. The market price became the price at which the bid of the quantity from the generator, in the ascending order of price, would be sufficient to meet the full demand of all the suppliers. This was a phased transition over a few years with learnings on the way. Markets for spare capacity for unforeseen demand and ancillary services for stability of grid operations had to be also created. This became the template for the fully deregulated markets in other parts of the world.

## South Korea

Formed by the integration of three private power enterprises in 1961, and then by purchasing 100% of the private stock in 1981, the Korean Electric Power Corporation (KEPCO) was a state-owned vertically integrated monopoly that managed all aspects of the country's power sector, including generation, transmission, and distribution. In order to improve management efficiency, the

government partially privatized the company<sup>8</sup> by listing it while retaining majority share. The Korean government and the Korean Development Bank together have constantly owned about 51%.

When South Korea began privatization reforms of state-owned entities (SOEs), opinion was divided over whether the network industries such as electricity and telecom should be privatized. The privatization reforms planned by the Kim Young Sam administration, elected in 1993, to eventually privatize KEPCO by 2010 were criticized, and had to be suspended due to the objections raised by the Ministry of Trade and Industry and the campaign pressure in the presidential elections (Tsai, 2016).

However, in 1997, the Asian Financial Crises hit Korea. To meet the conditions the International Monetary Fund's bailout plan had set (International Monetary Fund, 1998), the Korean government announced an ambitious restructuring plan, the 'Basic Plan for Electricity Industry Restructuring', for the power industry in 1999, which aimed to transform the sector into a privatized industry operating in a competitive manner. The key parts of the Basic Plan were to spin off several generation companies (GENCOs) from KEPCO's generation division, to introduce competition in the supply of wholesale power, gradually privatizing the GENCOs to improve efficiency of generation and thereby reduce costs; eventually unbundle the distribution segment from the transmission segment, introduce competition in the retail sales segment, and introduce open

access to the power system to enhance private sector participation and ensure fair competition between state-owned companies and private companies (World Bank, 2013). The original restructuring plan comprised a three-step strategy:

1. Divesting the generation sector from KEPCO to initiate the creation of a competitive wholesale market;
2. Divesting the distribution sector from KEPCO to complete the wholesale market; and
3. Creating a competitive retail market.

To begin Stage 1, in April 2001, KEPCO's generation division was divided into six separate generation companies which were wholly owned by KEPCO<sup>9</sup>. The Korean Power Exchange (KPX) was established, cost-based power pool started operation as a transitional power pool market, and the Korean Electricity Commission (KOREC) was established under the Ministry of Trade, Industry and Energy (MOTIE)<sup>10</sup>. KOREC, which reported to the MOTIE, was in charge of the remaining tasks of restructuring. Since the political administration was ultimately responsible for ensuring restructuring, KOREC was not an independent body. It was understood that it would be made independent when the restructuring was completed (Lee, 2011).

After three years of implementation, reforms were halted in 2004. The support for reforms remained strong while the Kim Dae Jung administration, which had initiated them,

<sup>8</sup> KEPCO was listed on the Korea Composite Stock Price Index in 1989 and in the New York Stock exchange in 1994. The government retained (and continues to retain) majority shareholding

<sup>9</sup> KEPCO was to be limited to being a grid company and a retailer (without engaging in generation), with the intention that distribution and supply would be opened to competition in later stages.

<sup>10</sup> The Ministry of Trade and Industry was merged in 1993 with the Ministry of Energy and Resources to create the Ministry of Trade, Industry and Energy (MOTIE). The ministry was reorganized in 1998 as the Ministry of Commerce, Industry and Energy (MOCIE) when its role in trade policy was transferred to the Ministry of Foreign Affairs and Trade. In 2008, the then administration launched the Ministry of Knowledge Economy (MKE), integrating key parts of the former Ministry of Commerce, Industry and Energy, Ministry of Information and Communication, and Ministry of Science and Technology. In 2013, MKE's trade policy role was restored and renamed as the Ministry of Trade, Industry and Energy (MOTIE) again (Ministry of Trade, Industry and Energy, n.d.).



remained in power. In 2003, in spite of the fact that the new government was formed by the same political party, the incoming President was more sceptical of the reform agenda. A combination of factors, growing domestic criticism of neo-liberalist restructuring, concerns of failure of electricity market reforms overseas, particularly the crisis in California and the continued threats of strike by labour unions if reforms were implemented led the new government to accept the Korea Tripartite Commission's<sup>11</sup> proposal to re-examine the restructuring plan (Lee & Ahn, 2006). The Joint Study Team (JST) set up by the KTC, which undertook an intensive nine month project, proposed that the alleged benefits of reform were uncertain while the costs and risks were substantial, and recommended that the government adopt a more secure and beneficial way to facilitate internal competition within KEPCO (Tsai, 2016). The KTC endorsed their recommendations, and the government acceded to the policy recommendations and officially announced that the restructuring plan would be ceased.

After the suspension of reforms in 2004, KEPCO has effectively retained monopoly control over transmission, distribution, and retail sale of electricity in South Korea, with minor exceptions in specific community areas or customers in industrial complexes, while generation is handled by 6 GenCos, 17 independent power producers, and the renewable energy producers. While the issues of privatization and resumption of reforms have subsequently been raised, no serious attempts have been initiated.

## Argentina

Following the success of Chile's privatization reforms, and given the situation in Argentina of hyperinflation being coupled to large fiscal deficits, Argentina began a massive privatization programme in the 1990s, which included the unbundling of its power sector, privatization of all of its transmission and most of its generating and distribution companies in which more than 80% of the generation sector and 60% of the distribution sector were privatized, and the establishment of a wholesale power market as part of a restructuring programme with the IMF and the World Bank (Pollitt, 2008). Retail competition was introduced for industry, but not for households<sup>12</sup> (Hall & Nguyen, 2017).

Privatization initially yielded substantial returns; raising \$19.4 billion, including \$14 billion of cash and \$13.7 billion of nominal debt repurchased with 80% of the revenue having been raised between 1990 and 1993; and reducing the losses of state-owned enterprises. After the early years of the 1990s, however the privatization revenue stream growth slowed down (Pollitt, 2008).

In 2001, the country then experienced a major economic crisis, which included a massive devaluation. To protect household consumers, the government regulated all transmission and distribution tariffs, and introduced a number of other price control measures, leading to disputes with the companies over the impact on profits. The government of Argentina refused to honour either the contracts or the arbitration rulings in favour of the companies because it felt that

<sup>11</sup> The Commission was composed of representatives from government, industry, and labour unions.

<sup>12</sup> Argentina, which started the liberalization of the energy market for consumers with demand greater than 5 MW, has successively reduced this, while having stopped short of deregulating the retail market to its present level of load under 30 kW (Pollitt, 2008). For regulated consumers, tariff is calculated by a formula that takes into account the wholesale prices, seasonality, capacity and local charges, if any [Argentina Case Study in (PwC, 2013)].

they would be unreasonably burdensome on a country whose citizens had suffered massive economic losses as a result of the crisis. Since the crises, there has been no further privatization or liberalization, and the fresh investments which the country needs for new generating capacity, especially in renewables, are expected to come mostly through public financing. Public finance has also been used to subsidize poor consumers and to extend the system, especially rural electrification, investment in transmission, and renewables (Hall & Nguyen, 2017).

The freezing of electricity tariffs massively eroded Argentina's fiscal deficit. Seven years after the freeze, the government began allowing increases in tariffs, with sharper increases in recent years in order to decrease the impact of massive deficits which the power tariffs generate (Raszewski, 2018; Mander, 2017).

## Brazil

Till the early 1990s, Brazil's power sector was operated by a single state-owned vertically integrated company: Eletrobras. However, by the late 1980s, the state-owned model was on the verge of collapse due to the heavily subsidized tariffs and revenue shortfall, which led to delay in the construction of about 15 large hydroelectric power plants owing to lack of investments (Larrea, 2012). Following the advice of the World Bank, Brazil began electricity reforms in the 1990s, privatizing some distribution companies

while retaining the transmission network under government control and setting up a regulator to help introduce liberalized markets (Hall & Nguyen, 2017), resulting in the extinction of the equalization of the tariffs, and the creation of supply contracts between generators and distributors (Larrea, 2012).

Introduced with the aim of allowing the participation of private capital, the reforms attracted investment from privatization of state-owned generation and in the form of greenfield private-generation projects, as well as in distribution. Even with reforms, however, installed power capacity from 1990 to 1999 increased only by 28%, compared to the growth in electricity demand of 45% during the same period (World Bank, 2013).

After the 2001 electricity crises<sup>13</sup>, institutions set up during the 1990s were preserved. However, the crises resulted in the withdrawal of most MNCs and the then president suspended the privatization and liberalization programme<sup>14</sup> (Hall & Nguyen, 2017).

Post-crises, 2004 onwards, energy auctions were established as the main mechanism for allowing distribution companies to acquire electricity to serve captive customers. A parallel market exists for large industrial consumers, who can choose their electricity suppliers and negotiate to acquire electricity directly from generation companies (Hall & Nguyen, 2017).

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<sup>13</sup> In 2001, an ongoing drought significantly reduced reservoir levels; since 90% the power supply in Brazil was hydroelectric, the country faced serious supply shortfalls. In response, the government imposed stiff rationing requirements for both residential and commercial customers, whose stringent electricity consumption restriction allowed the prevention of the kind of rolling blackouts California faced.

<sup>14</sup> The pending privatizations of three generation subsidiaries of the large state-owned utility, Eletrobras, were stopped.



# TAKEAWAYS FROM INTERNATIONAL EXPERIENCE

The Electricity Supply Industry has evolved across time with differences across geographies and time. Till the 1990s it was an area-based natural monopoly. The UK is an example of phases of major restructuring; from private to public, and then back to private again<sup>15</sup>. The UK led the restructuring of the sector by introducing competitive markets for generation and supply, and regulating the natural monopoly of the wires network of transmission and distribution. This model had intellectual appeal to those who believed in the allocative efficiency that ensue with greater competition. This model was embraced by the World Bank and became the cornerstone of their policy advice to developing countries. The European Union also saw the merits of opening up of national electricity markets and, with EU directives starting with the mid-1990s, has been mandating open access.

Competitive market structures can be better at choosing between competing technologies<sup>16</sup> and lowering costs. However, ensuring reliability of



supply, especially against adverse eventualities, requires over-investment in capacities to ensure redundancy, which is at variance with the competitive structure aim of lowering costs.

As (Newbery, 1996) writes, 'public ownership has a comparative advantage where coordination and restructuring are required [...] Private ownership on the other hand, especially when combined with competition, may be able to avoid some of

<sup>15</sup> One reason for these transitions in the power sector, and continual debates regarding its regulation, has been due to the need to balance the variety of different pressures the sector faces, and the continuous series of trade-offs required. An industry with a huge capital costs, electricity has fundamental linkages with other sectors, particularly manufacturing and agriculture. The sector also involves a variety of different players, utilizing often competing technologies, resulting in friction between different requirements.

<sup>16</sup> As state ownership faces greater conflicts between least cost technologies and political economy considerations.



the inefficiencies inherent in the lack of clear objectives that frequently go with the balancing of diverse interest groups under state ownership'. The implementation of 'reforms' has certainly been more complicated than had initially been conceived by its proponents and the World Bank. While the California crises created a tipping point in the US on the implementation of retail markets, the experience was not uniform- Pennsylvania's PJM market design, which introduced retail electricity concurrently to California, has proved to be more successful and kept prices lower (Blumsack, Apt, & Lave, 2005). Moreover, as a report by the Brattle group brings out, the further increases in rates in states with retail access have been generally lower post-restructuring than

in states without restructuring<sup>17</sup> (Pfeifenberger, 2016). However given the costs of introducing retail choice<sup>18</sup>, the question of whether the overall experience of enabling retail access has been sufficiently positive is less clear. The average rates in retail-access states are higher than in traditionally regulated states (Pfeifenberger, 2016), and states in the US with retail competition have tended to experience greater volatility in average electricity retail price. The increases in retail prices from 2003 to 2008, coinciding as they did with the movement of gas prices, have been much sharper in states with retail choice than in those without (Zhou, 2017). Scholars argue that while competition has brought considerable efficiency improvement at the plant level, the impact of natural gas price and new technologies has had a far larger effect (Borenstein & Bushnell, 2015).

The ability to take advantage of the benefits of lower prices that retail choice offers is contingent on the ability, ease, and willingness of consumers to choose. As the experience both in the US and in the UK have shown, switching of consumers from default plans to ones where they save money has been higher in industries and commercial organizations than by individual consumers. While it may seem like stating the obvious that retail markets benefit only those consumers who actively engage with it, a large majority of consumers do not switch to the cheapest tariff<sup>19</sup>, especially those belonging to the more vulnerable communities, such as the poor and the elderly.

<sup>17</sup> That is- while the extent of increase in rates in non-restructured states was around 60% post-1997, the same was closer to 40% in states with full retail access.

<sup>18</sup> Which include, at minimum, the costs involved in restructuring institutional frameworks, building consumer awareness, implementing new billing procedures, and metering.

<sup>19</sup> According to the UK's regulatory agency Ofgem, even though consumers on a standard variable tariff could save approximately 300 pounds by switching to the cheapest tariff, as many as 58% of consumers have either never switched or only switched once (Ofgem, 2017).

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# REFORM EXPERIENCE IN INDIA

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The Electricity Act 2003 created a new legal framework for the functioning of the power sector in India by replacing the then existing three laws: the Indian Electricity Act, 1910, the Electricity (Supply) Act 1948, and the Electricity Regulatory Commission Act (1998). The objective of the legislation is enunciated in the Preamble of the Act as ‘...taking measures conducive to development of electricity industry, promoting competition therein, protecting interest of consumers and supply of electricity to all areas, rationalization of electricity tariff, ensuring transparent policies regarding subsidies, promotion of efficient and environmentally benign policies’ (Electricity Act, 2003).

This legislation emerged after a long consultation process with all stakeholders and there was a broad consensus in its favour. It was enacted by the NDA government and had the support of the Congress party which was then in the opposition. When the UPA led by the Congress party came to power in 2004, they reviewed the law and only a few marginal amendments were made. The law took into account the movement towards competition in the electricity sector in other parts of the world and created a unique architecture

for the power sector in tune with the ground realities in India.

The Act mandated the unbundling of the State Electricity Boards, the erstwhile vertically-integrated state-owned monopolies which generated and supplied electricity in the states. This happened without disruption. The Act laid the basis for the transition to competition in generation, which was delicensed. This led to the emergence of a vibrant competitive industry structure in power generation. The private sector now accounts for 47% of the generation capacity in India (CEA, 2021).

Transmission and distribution were licensed and regulated. The Distribution licensee has the universal service obligation, the legal responsibility to supply power on demand to consumer in the license area. Consumer tariffs are determined by the State Electricity Regulatory Commission which is required to determine tariffs on commercial principles:

‘Section 61. (Tariff regulations):

The Appropriate Commission shall, subject to the provisions of this Act, specify the terms and



conditions for the determination of tariff, and in doing so, shall be guided by the following, namely...

- (b) the generation, transmission, distribution and supply of electricity are conducted on commercial principles;
- (d) safeguarding of consumers' interest and at the same time, recovery of the cost of electricity in a reasonable manner' (Electricity Act, 2003).

The Distribution Companies are meeting their power supply obligations primarily through long-term Power Purchase Agreements and supplementing these with short-term purchases from the Power Exchanges. There are currently two functioning exchanges, the India Energy Exchange (IEX) and Power Exchange India (PXIL),

with a third in the pipeline (Ranjan, 2021). The volume of power traded in the Exchanges has been rising in February 2021, the IEX traded 6769 MU volume, registering a 50% year-on-year growth (IEX, 2021).

The Act gives freedom to Consumers to generate their own electricity through captive and group captive power plants

'Section 9 (captive Generation)

- (1) Notwithstanding anything contained in this Act, a person may construct, maintain or operate a captive generating plant and dedicated transmission lines'

It also allows consumers having a load of 1 MW and above to avail of open access and buy their electricity directly by paying to the Distribution

Company its costs for carrying the electricity through its wires, along with a cross-subsidy surcharge.

'Section 42 (Duties of distribution licensee and open access):

- (2) The State Commission shall introduce open access in such phases and subject to such conditions, (including the cross subsidies, and other operational constraints) as may be specified within one year of the appointed date by it and in specifying the extent of open access in successive phases and in determining the charges for wheeling, it shall have due regard to all relevant factors including such cross subsidies, and other operational constraints:

Provided that such open access may be allowed before the cross subsidies are eliminated on payment of a surcharge in addition to the charges for wheeling as may be determined by the State Commission:

Provided further that such surcharge shall be utilised to meet the requirements of current level of cross subsidy within the area of supply of the distribution licensee

Provided also that such surcharge and cross subsidies shall be progressively reduced and eliminated in the manner

as may be specified by the State Commission....' (Electricity Act, 2003)

While captive and group captive power generation has been growing, the use of open access by consumers consuming above 1 MW has been modest. While overall electricity generation grew in approximately 15–17% each year from FY11–18, the overall open access transactions grew at a CAGR of only 6.3% and here too, the majority of OA transactions were by captive consumers, who contributed nearly 85% of the overall OA transactions (CRISIL, 2019).

As can be seen in the above provisions, the original intention was to provide for elimination of the use of cross-subsidies as a means of giving electricity below cost by the provision in the law requiring the state government to bear the cost of the subsidized supply of electricity. This provision was watered down, and the words 'and eliminated' from provision 3 of Section 42 (2) were omitted in the 2007 amendment. The Tariff Policy issued in 2006 required that 'the SERC would notify roadmap within six months with a target that latest by the end of year 2010–2011 tariffs are within  $\pm 20\%$  of the average cost of supply...' (Tariff Policy, 2006). However actual progress in reducing cross-subsidies across states has been insignificant. In the absence of progress in reducing cross-subsidies, the cross-subsidy surcharge for over 1 MW consumers has remained high impeding the use of open access provisions in the Act.

# IMPLICATIONS OF SEPARATION OF CARRIAGE AND CONTENT



Consumer choice through retail competition, starting with the UK, was introduced after decades of good quality reliable power supply with a robust distribution network having adequate safety margins, in good financial health and also with none of the governance issues that are so problematic in India. Meter reading, billing, collection and control of theft of electricity remain difficult challenges in many states. Privatization of distribution in Delhi has been transformative in terms of quality of service and reduction of technical and commercial losses. The induction of the private sector as franchisees in other places has also brought about a transformation in efficiency through better management. In many states where governance in the sector has been chronically weak, the induction of the private sector in distribution either through outright privatization or through franchisee arrangements may be the best way of transforming governance and overcoming the problem of avoidable and unacceptable levels of commercial and technical losses. Separation of the wires business from supply is not a better way of fixing what are essentially governance issues of the wires business. The business case for private sector participation in distribution through privatization of a state-owned distribution company would

become weaker with uncertainties and disruption that the separation process of carriage and content would entail.

One of the ideas for having a power market, similar to what was first done in the UK and then replicated with some variations in many places, has been to put all generation into a competitive pool and extinguish all long-term fixed price contracts. As is the case with other commodities, the market clearing price would be the one at which supply meets demand. One major implication of this would be that cheaper electricity from the older depreciated plants would rise to the market clearing price and the distribution companies would have to suddenly pay a lot more for the power they purchase. The experience so far has been that the State Electricity Regulatory Commissions have been finding it difficult to raise tariffs to cover the present cost of supply. The distribution companies are already in extreme financial difficulty needing another bailout after two earlier bailouts. As a result, abrogating existing long-term contracts and putting all generation in a power pool has not yet become a serious proposition for consideration and implementation. But this is conceptually the basic pillar of a competitive



deregulated power market. With free access to such markets for buying power in a level playing field, supply companies could emerge and these could then compete with each other in the retail consumer market.

It is important to bear in mind that India has had extraordinary success in increasing the share of renewables and is well on its way to achieving far more than its commitments under the Paris Agreement. This has been the result of private investment anchored in long-term power purchase contracts. These agreements made the investments in renewable energy generation projects bankable as offtake of power was fully de-risked. The attainment of the national goal of first reaching 175,000 MW and then 450,000 MW of renewable power capacity with private investment may well become unattainable if the anchor of long-term power purchase agreements ceases to be available with the disappearance of distribution companies as they exist and their conversion into companies which are in the wires business. There is already the back drop of a huge stranded asset problem of thermal power plants where projects were initiated without the anchor of long-term power purchase agreements with distribution companies. These constitute a significant part of the NPA (non-performing asset) problem of the banks in the country.

The distribution company has the legal responsibility of universal service obligation of fully meeting the power demand of all the persons in its area at all times. Great progress has been made in recent years with electricity being taken to all households. Reliable quality power supply is a goal which now seems attainable in the near future. With the separation of carriage and content and introduction of retail competition with the consumer having choice between different suppliers, the future of the universal service obligation becomes uncertain. Further, private

supply companies may not see financial gain in supplying electricity to consumers whose demand is low and for whom the cost of supply is high as is the case with rural areas. The State Electricity Boards were created with the objective of universalizing electricity access. This responsibility was passed on to the distribution licensee under the Electricity Act. They have the universal service obligation and the regulated tariff approved by the State Electricity Commission takes into account the costs of discharging this obligation. This was not an issue in the UK when retail competition was introduced. Universal access to electricity for all households had been a reality for decades. There was a large cushion of spare-generating capacity in the system created to ensure reliability of supply. Since the sector was deregulated, aggregate demand in the UK has not really grown. So, the robustness of the deregulated market system has not been tested in a situation where demand is expected to grow many times above present levels and at rates which are uncertain as would be the case in India.

The distribution company has the responsibility to anticipate demand and through a prudent mix of power purchase contracts with regulatory approval ensure reliable supply. Once the centrality of the distribution licensee and its statutory obligation of supply is removed, it is difficult to see how reliability of supply going forward would be ensured. The function of anticipating demand and ensuring investment for meeting it fully with spare capacity as a cushion is an essential requirement for a reliable system which supports rapid economic development. It would be imprudent to jeopardize this. It is also noteworthy that the private sector investment in generation has been one of the positive outcomes of the Electricity Act and this has been anchored in the long-term power purchase agreements with the distribution companies which made financing of these large capital investments feasible.

At any point in time, capacities in the system for driving change are limited and it is useful to prioritize and sequence what should be attempted. The disruption from separation of the wires business from supply would be enormous. The potential risks which have been analysed in this paper are quite grave. The potential benefits are,

at best, nebulous. The effort would be disruptive and divert scarce leadership resources away from resolving the severe financial crisis of the distribution companies, of achieving and maintaining reliable 24x7 supply going forward and the transition away from fossil fuels to a fully renewable energy-based system.





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