

The Genesis of Electricity Reform in India and the UK, its Repercussions and the Way forward



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1 The First Phase of Reforms

The Indian power sector had reached the absolute dead end by the 1980s. The yearly commercial losses of the State Electricity Boards (SEBs) without subsidy had crossed Rs. 3000 crore.¹ The sector was facing peak and energy shortages in various parts of the country, and severe financial burden was imposed on the state governments because of the performance of the SEBs.² The distribution infrastructure had become outdated and badly needed upgradation for which no funds were available. The utilities were overstaffed with poor efficiency levels, and retail tariffs were stagnant. The consumers suffered by way of load shedding coupled with poor quality of power supply.

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¹This is equivalent to about US\$ 400 million on the basis of today's exchange rate of Rs 75 to US\$1.

²The peak deficit in the 1990s was about 10%, and energy deficit was about 7%.

1.1 Amendment of Electricity Laws

However, nothing really happened till 1991 when the existing electricity laws were amended to provide for private participation in generation. Specifically, the Electricity Laws (Amendment) Act of 1991 was enacted to encourage the entry of privately owned generators.³ The change in policy coincided with the fact that India was facing its worst ever balance-of-payments crisis and was on the verge of defaulting which would have reduced India's bond rating in international credit markets.⁴ Further amendments were carried out in 1998 when the transmission sector was also opened for private investments subject to the approval of the central transmission utility (CTU).⁵ It was the government's viewpoint that if additional generation capacity could be created with the assistance of the private sector, the malaise could be rectified. In order to encourage private sector participation, several other policy measures were also undertaken. The private investors were offered a guaranteed 16% return in equity with a full five-year tax holiday. Sovereign guarantees and escrow benefits were also offered in case there were defaults on part of the SEBs. By 1995, there were about 189 offers to increase capacity by over 75 GW involving a total investment of over US \$ 100 billion (Dubash and Rajan 2001). Eight projects were brought on the 'fast-track' route where government approvals were quickly expedited.⁶ However, very soon the investors realised the tiring nature of having to work through the India bureaucracy. Escrow could not be granted to all projects as there clearly was a limit, given the revenue stream of the SEBs.⁷ In fact, some of the banks like the State Bank of India, which gave overdraft facilities to the SEBs, refused to lift its lien on the receivables of the SEBs. The IPPs faced all kinds of problems, right from securing coal contracts to getting wagons from the railways for movement of their coal (Dubash and Rajan 2001). The failure of this policy to attract private investments was severely criticised domestically (Pillai and Krishnamurthy 1997). The private investors also realised that by providing incentives for additional capacity addition, the basic problem that is the bankruptcy of the SEBS does not get addressed. In fact, the problems would multiply as power from the new plants, if they do come up ultimately, would be a lot more expensive than the existing plants of the SEBs. (Purakayastha 1993). Reddy and d'Sa (1995) have stated that the energy cost

³This was followed up by a high-level delegation led by the Cabinet Secretary to the USA, Europe and Japan for seeking foreign investments in the Indian power sector.

⁴Apart from changing the policy for seeking investments in the power sector, other measures initiated during this period include measures to free currency and capital markets, reduce government control on banks, cut back on licensing requirements for industry, etc.

⁵The Powergrid Corporation of India (PGCIL) was the designated CTU, and it is felt that the PGCIL did not really allow private entities to come in fearing loss of its own monopoly position (Rao 2002).

⁶The eight projects were Dabhol (740+1440 MW), Bhadravati (1072 MW), Jegurupadu (235 MW), Godavari (208 MW), Vishakapatnam (1040 MW), Mangalore (1000 MW), Ib Valley (420 MW) and Neyveli (250 MW).

⁷To give an example, in Madhya Pradesh, the SEB had signed PPAs aggregating to 6500 MW, whereas the 'escrowable capacity' was fixed at 2561 MW by the financial institutions (D'sa, Murthy and Reddy, 1999).

from these projects frequently turned out to be one-and-a-half to two times more than that of comparable NTPC and SEB projects.⁸ The high tariff was because of assured high PLF, high return on equity, high capital cost of plants, high variable costs due to management fee, testing fee, insurance charges, etc. (D'Sa et al. 1999).

1.2 Tweaking the Role of the CEA

Though it was the Ministry of Power which was taking the lead role in the policy formulation for attracting private capital for new projects, similar enthusiasm did not emanate from the other Ministries like the Finance Ministry who were apprehensive that these concessions may actually lead to net outflow of resources rather than inflow (Dubash 2002). The Finance Ministry was of the view that while they would raise resources in the domestic market, the profits would be remitted abroad. Even the Ministry of Environment and Forests and the Central Electricity Authority (CEA) were not happy with the way some of the technical and environmental clearance for smaller projects was handled. In fact, the role of the CEA has been progressively eroded since the mandatory requirement of the techno-economic clearance for power projects was slowly done away with. In 1995, the Government of India made TEC mandatory only for projects exceeding the cost of Rs. 1000 crores. This was enhanced to Rs.5000 crore in 1999.⁹ Rumbblings were also felt in NTPC since the government's policy of bending backwards was creating an uneven playing field. What was equally frustrating was the government was giving away sites to independent power producers which were originally identified for public sector units. Further, the absence of any competitive bidding gave rise to suspicion of corruption. Environmentalists and social activists were also alarmed seeing the haste and secrecy with which MOUs were being signed (Dubash and Rajan 2001). After 1995 however, the central government enforced competitive bidding for acquiring new capacity by way of IPPs.

1.3 Common Minimum National Action Plan for Power

In the meantime, some kind of political consensus was taking shape regarding reforms in the power sector. It began in 1991 when a committee was set up for the establishment of a common minimum agricultural tariff. The matter gained momentum when in 1996, the chief ministers conference proposed that agriculture tariffs should be at least 50 paise per unit which should be increased to at least 50 per cent of the average cost of supply within a period of 3 years. It is another matter, however,

⁸Countries like Indonesia, Pakistan and the Philippines are other examples where tariff from IPPs were relatively high leading to social unrest (Rao 2002).

⁹Today the stipulation is that only the hydro projects above Rs 1000 crore need to get a techno-economic clearance from the CEA mainly because it has interstate issues.

that no state implemented it. It may be pertinent to add that the Indian agricultural community in fact was prepared to pay higher tariffs in exchange for a better quality of power (Reddy 2000). The small farmers, in any case, maintained that low agricultural tariffs only helped the big farmers who had access to power-driven irrigation facilities. (Sant and Dixit 1996). There is one study (Ahluwalia 2000) which states that the agricultural community was, in fact, capable of paying higher tariffs and gain by the incremental productivity.

2 The Second Phase of Reforms

2.1 *The Electricity Regulatory Commissions Act 1998*

While Orissa was the first state to enact their own reforms act, it was followed by other states like Haryana (1997), Andhra Pradesh (1998), Uttar Pradesh (1999), Karnataka (1999), Rajasthan (1999), Delhi (2000), Madhya Pradesh (2000) and Gujarat (2003).¹⁰ Each of these states, after passing their reforms act, unbundled their SEBs into separate entities of generation, transmission and distribution. The only difference was in the case of Orissa and Delhi which went a step further and privatised their distribution sector as well. In the meantime, around the mid-1990s, the Government of India too had come to realise that the distribution sector will have to be addressed first, and if the problems in the distribution sector can be addressed, investments in the generation sector will automatically flow. The Government of India therefore passed an Ordinance which later culminated as the Electricity Regulatory Commissions Act 1998. It was similar to the Orissa Reforms Act, and it paved the way for setting up of the Central Electricity Regulatory Commission. The states could also rely on this Act to set up their own state commissions or enact their own legislations for this purpose.¹¹ The functions of the CERC and the SERCs were clearly demarcated. While the CERC was responsible for all centrally owned stations and other stations having an interstate role, the SERCs were responsible for stations within their own state only. The primary intention for setting up of regulatory commissions was to ensure that tariffs were determined according to economic principles and that the entire process was free from any political interference. The role of the government was only that of a facilitator and catalyst which would lay down broad principles of policy.

The enactment of the Electricity Regulatory Commissions Act 1998 was only a partial step towards reforms. The Government of India had been mulling over a comprehensive reform act which would repeal all other existing electricity laws. The first draft of the bill was made in 2000 though there were some other steps taken by

¹⁰Some of these states also availed of loans from multilateral development banks, such as, Andhra Pradesh, Haryana, Uttar Pradesh and Rajasthan.

¹¹Maharashtra, Punjab, Tamil Nadu and Delhi are some of the states which have set up their regulatory commissions under the Central Act.

the government during this time period to improve the functioning of the distribution sector.¹²

2.2 *The Electricity Act 2003*

The Electricity Act 2003 (EA 2003) came into being in June 2003. This Act repealed all the existing electricity laws, such as, the Indian Electricity Act 1910, the Electricity Supply Act 1948, etc., but saved the various reform Acts of some of the states which were already in operation.¹³

The primary objective of the EA 2003 was been to promote competition in order to enable the consumers to have the best possible price and quality of supply. In order to have competition, one needs a large number of sellers and buyers, and this is exactly what the EA 2003 had attempted through its various provisions. Before speaking of various provisions to promote competition, one of the most crucial (and debatable) statute needs to be mentioned, i.e. restructuring of the existing SEBs in a time-bound manner. The EA 2003 mentioned that all SEBs have to be unbundled into separate entities of generation, transmission and distribution (Sections 131 and 172). The model to be adopted would be similar to the 'World Bank' model which had been followed by Orissa to begin with and thereafter emulated by some other states. This type of model is also called the 'the single buyer mode'. This directive of the EA 2003 had been criticised in many quarters where the opinion has been that restructuring need not be necessary and that vertical utilities have also done well in some cases in India and abroad. In order to enhance generation, licensing was done away with completely except that techno-economic clearance would be required for hydro projects (Sections 7 and 8). Captive generation was promoted, and in fact, the definition for captive has been kept very wide, making it easier for the industry to opt for captive power plants (Section 9). Open access in distribution, to be introduced in a phased manner, had been recognised wherein a bulk consumer could access power from any other source provided certain technical constraints were met (Section 42). The EA 2003 also recognised the existence of two or more distribution licensees in the same geographical area, with the proviso that each will have its own set of wires (Section 14). This, however, was a debatable concept given the monopolistic nature of the wires business and the need for duplicating network infrastructure. On the issue of pricing, the provisions of the Sixth Schedule of the Electricity Supply Act 1948 had been done away with, and the job of price determination has been handed over to the regulatory commissions. The constitution of the state regulatory commissions was mandatory (Section 82). Power trading was recognised as a distinct activity with the safeguard that regulatory commissions were authorised to fix ceilings on trading margins, if necessary (Sections 12, 79 and 86). For the benefit of consumers,

¹²The first draft of the bill was prepared by the NCAER on behalf of the Ministry of Power.

¹³The states were Orissa, Haryana, Andhra Pradesh, Uttar Pradesh, Karnataka, Rajasthan, Delhi, Madhya Pradesh and Gujarat.

certain institutions like the consumers redressal forum and their appellate body, the Ombudsman, had been envisaged (Section 42). There were other safeguards as far as the consumer is concerned with special emphasis on performance standards (Sections 57 to 59). At the same time, in order to plug revenue leaks, 100% metering was made compulsory (Section 55) and provisions relating to theft of energy had been made very stringent (Sections 135–150).

Ever since the enactment of the EA 2003, there has been no major amendments except for some minor amendments carried out in 2007. This is in contrast with the case in UK where major changes were carried out at regular intervals.¹⁴ The first major change which was tried in India in 2014 with the introduction of the concept of ‘carriage and content’.¹⁵ This concept basically means that in a given a geographical area, there would be only one owner of the distribution wires and there shall be several retailers who would compete against one another. This concept, however, could not be introduced because of stiff opposition from the states. The government has now come forward with another draft amendment bill where the concept of ‘carriage and content’ has been dropped.¹⁶ Why the concept of ‘carriage and content’ is not considered appropriate in the Indian milieu is dealt with later on in this essay.

Today, the structure of the power sector is that in all states, there are state generators, the state transmission company and finally, the distribution companies which may range from two to four depending upon the size of the state. All the distribution utilities are public sector companies except in the case of Delhi and Odisha where they are private utilities. There are a few other private utilities functioning in certain parts of the country, such as in Mumbai, Kolkata, Greater Noida (Uttar Pradesh), Ahmedabad and Surat. In addition, we also have the central sector generating companies like the NTPC which usually supply power to more than one state and further, the independent power producers (IPPs) who are spread all over the country.¹⁷ There are some variations across states, for example, in some states the transmission company purchases power on behalf of the distribution companies (discoms), but in most instances, the discoms do it directly from the generators since the PPAs of the erstwhile SEB have been redistributed amongst the discoms.

¹⁴Just to give an instance, in UK, just after passing the act in 1989, retail competition was introduced for big consumers in 1990, followed for medium consumers in 1994 and for all consumers in 1998. The wholesale market (called the Pool) was replaced by NETA in 2001, and this was replaced by BETTA in 2005. In between 1989 and 2005, several other measures were taken which clearly points to a keen regulatory oversight.

¹⁵This appeared in the Electricity (Amendment) Bill 2014. This bill was sent to the select committee for scrutiny which had submitted a report but nothing happened thereafter. It is said that the states had objected to various provisions of the bill, especially on the ‘carriage and content’ issue. The concept of ‘carriage and content’ which was the central subject of the bill has been dealt with later on this essay. The government in its budget speech for FY22 again spoke of having more than one discom in an area but details were not disclosed.

¹⁶Draft Electricity Act (Amendment Bill) 2020.

¹⁷There is a sizeable number of IPPs in India today and their share in capacity is as high as 47% today.

3 Restructuring of the Power Sector in Other Countries

The electricity industry in most countries is vertically integrated or linked by a common state ownership with the mandate to supply electricity to a well-defined geographical area. Along with this industry structure, there was usually some form of regulation to curb any monopolistic malpractice (Surrey 1996). In India, the electricity sector was initiated in the private sector in the early twentieth century but was slowly taken over by the government barring a few private utilities which exist even today. While India undertook reforms beginning from the early 1990s, there were various other countries who had already taken a proactive stand on reforms right from late 1970s. Notable among them are Brazil, Argentina, Chile in Latin America, the UK, some specific states in the USA, the Nordic countries, some of the ASEAN countries, etc. The reason for undertaking reforms, however, varied across countries and the organisational structure of the power sector, both before and after reforms were country specific. In the Latin American countries, reforms were initiated to raise resources for the Treasury. In the UK, reforms were undertaken for a different cause altogether, i.e to break the power of the trade unions and, simultaneously, raise resources for the Treasury. In the USA, reforms were undertaken since electricity tariff was high in some of the states, especially those states which did not have access to hydro resources. It may be also added that while the productivity of the power sector was poor in Latin American countries before reforms, the same cannot be said in respect of the power sector, both in the UK and USA. Further, while in the USA, the power sector was primarily in private hands before the reform movement, it was exactly the opposite in the case of UK. The crux of the argument is that there is no standardised notion of what the sector looked like in each of the countries which undertook reforms and that the position was completely country specific. Besides, any restructuring program that is carried out does not take place in a vacuum as it has to be in sync with the historical and local context, including political priorities (Dubash and Singh 2005). Moreover, choice of the market design depends upon the industry's current state. Significant changes should not be done too frequently as it hampers the growth of investments (Green 2005). Further, privatisation need not necessarily mean reforms (Thomas 2005). At the end of the day, while all countries seek a reliable, competent and efficient market, the mode of achieving the same has varied across countries (Dubash and Singh 2005). The reforms undertaken in UK are being described in detail in the following paragraphs.

3.1 *Reforms in the UK*

Before the power sector was privatised in UK, several other sectors were privatised which included the telecom (1984), gas (1986) and water (1989). The electricity sector privatisation, however, was considered to be the most complex where the assets were valued at 42 billion pounds in the 1980s. One primary aim of the privatisation

programme in UK was to break the power of the trade unions. In addition, the government aimed at generating revenues through the privatisation process and also ensure widening of ownership.¹⁸ The service of the industry as such was reliable and comparable to other European countries (Thomas 2005). Newbury (2004) was, however, of the view that the structure of the electrical supply industry was rigid, bureaucratic and inefficient. Supplies were at risk due to strike threats and fuel crisis. When the privatisation programme was launched in the UK, the country was in deep recession. Before privatisation, the electricity sector in the UK consisted of vertical, integrated structures. There was a two-part tariff (for both generation and transmission) to cover for capacity and energy charge. There were separate charges for peak hour capacity usage also.

3.1.1 Unbundling of the Utilities

There were six main elements to the British privatisation program (Thomas 2005) which were as follows:

- (i) Creation of a wholesale spot market as the main price setting arena.
- (ii) Creation of retail competition where consumers can choose their own electricity supplier.
- (iii) Corporate separation between generation and retail supply.
- (iv) Distribution of incentive regulation to set the prices to monopoly activities
- (v) Sale of publicly owned assets to private investors.

The government passed the Electricity Act 1989 whereby the Central Electricity Generating Board (CEGB) with its 74 power stations and the national grid was restructured into four separate organisations.¹⁹ There were two power generating companies, one transmission company called the NGC and a distribution network consisting of 12 regional electricity companies (RECs). The government, as part of the restructuring programme, split the CEGB into two generators, namely National Power (40 GW) and Power Gen (30 GW). A public-owned nuclear generating station called Nuclear Electricity (8 GW) was also created. The government actually wanted to privatise the nuclear generating stations also but realised later that they were not attractive to investors (Thomas 2005). The Electricity Act 1989 also created the post of Director General of Electricity Supply (DGES) to regulate the natural wires business of the NGC and the RECs and to set price caps, to be reviewed periodically every four to five years (Newbury 2004).

¹⁸Between 1947 and 1990, different governments followed different policies in respect of the power sector. The Labour Government in 1970s forced the electricity industry to curtail prices to control inflation, whereas in 1980s, the Conservative Government raised prices to reduce public borrowings (from the website of the Department of Energy, USA).

¹⁹The CEGB was established by the Electricity Act 1957. In 1983, the government had also passed the Electricity Act 1983 which was designed to encourage the growth of independent power producers. This act required the CEGB to purchase electricity from the private producers at avoided cost, something similar to PURPA, 1978 of USA.

3.1.2 Separation of Distribution and Retail

The RECs had to make an accounting separation of distribution and retail. The regulator was concerned with the cross-subsidy between retail and distribution because a significant portion of the staff and systems was common. The regulator, therefore, required legal separation of the business. Distribution business is the business of wires, i.e. the one who owns the wires, whereas retail business would be the business of buying/selling the power using these wires which do not belong to the retailer. The distribution side of the RECs business was to be regulated through RPI-X form of regulation. While RPI was the retail price index in Britain, X was the efficiency factor, a positive number to be decided by the regulator. Thus, RPI-X would mean that the real price should progressively come down.²⁰ RPI-X is not applied to the competitive segment of the industry where prices are expected to be decided by market forces. In late 1995, there was an eruption of mergers and acquisitions which saw a revival of the vertically integrated structure of the power sector. Thomas (2005) has mentioned that integration has lent an advantage since it gives a sure market to the generators. The fact that there are certain advantages of an integrated utility can also be gauged by the fact that, in Brazil, there was insufficient investment in generation which led the government to allow reintegration. In an unbundled structure, it is not just the generation investment which is adversely affected. The same can be said about investments in transmission. Earlier transmission investments were of integrated type and a mismatch can develop, post-restructuring (Joskow 1997).

3.1.3 Introduction of Retail Competition

Retail competition in the UK was introduced in stages. From Vesting Day, i.e. 1 April 1990, consumers with a demand greater than 1 MW (about 50,000 in number) could choose their own supplier. This limit was reduced to 100 KW in April 1994 (favouring another 50,000 customers), and by 1998, this facility was extended to small consumers also (about 23 million). This, according to Hunt and Shutteworth (1996), is the final step towards a complete electricity market. As a backup for those consumers who do not wish to choose a supplier, the local REC was obliged to offer supply to all consumers with demand less than 10 MW on a regulated, published tariff (Thomas 1996).

²⁰The X factor varied across segments of the industry with transmission companies assigned an initial value of zero. For the 12 RECs, the X value ranged from zero to 2.5. There has been criticism from certain quarters that the X factor has been favourable to the industry, allowing them to have excessive profits.

3.1.4 Creation of a Power Pool

One of the main components of the British privatisation programme was the creation of a wholesale market by way of a power pool.²¹ It was supply-side bidding only where all generating stations had to quote a price for its output. The NGC would stack up the offers and determine the market clearing price given the level of demand that it had estimated. The NGC also functioned as the ancillary service provider, the settlement system administrator and the Pool funds administrator. It is important to consider that there was no bidding from the demand side. It was thus a central dispatch system and all plants who had offered a bid below the market clearing price were directed to dispatch their schedule.

There were certain inherent problems in the functioning of the Pool. It was felt that the two main generating companies, i.e. National Power and the Power Gen were acting as a duopoly, and this was leading to a higher market clearing price than what could be dictated by market conditions. Green and Newbery (1992) feel that the scope of the exercise of market power has been seriously underestimated by the government, perhaps led by the notion that the Bertrand model is necessarily competitive, even in concentrated markets.²² The government tried to solve this problem by further subdividing the two main generating companies. The two generating companies were compelled by the regulator to sell off 6 GW of their plant capacity to bring an element of competition.

3.1.5 Contract for Differences (CfDs)

While the market clearing price was determined on a daily basis on the basis of day-ahead bidding, there were price fluctuations and the wholesale price was considered to be quite volatile. In order to bring in an element of certainty, the distribution companies made bilateral agreements with generators called contract for differences (CfD). Any difference between the contract price and the Pool price was settled bilaterally between the generator and the distribution company. It may be added that more than 90% of the electricity in the system was under the CfD and less than 10% was being determined through the market, i.e. the Pool. Before the Pool came into operation, it was thought that price competition would quickly cause Pool prices to fall to short-run marginal costs. However, it turned out that mean annual Pool price rose by 40% (nominal) in the first four years of its operation, and remained well above the marginal costs upto and including 2000/01. Spot markets attract a lot of attention due to the frequently changing price and any company that relies on it and

²¹For several reasons, the rate of return regulation was rejected in the UK, partly because it required detailed industry data which would in turn require a large bureaucratic structure (from the website of the Department of Energy USA).

²²The Bertrand duopoly model examines price competition among firms that produce differentiated but highly substitutable products. Each firm's quantity demanded is a function of not only the price it charges but also the price charged by its rival.

takes a lot of risks. Most companies prefer to have long-term contracts, not lasting decades but for a couple of years (Green 2005).

3.1.6 The New Electricity Trading Arrangement (NETA)

In October 1998, the government published a White Paper, accepting the recommendations of the regulator to replace the Pool with the New Electricity Trading Arrangements (NETA). NETA was finally introduced in March 2001 after developing and testing a new software. Thomas (2005) estimates that the cost of developing the system and running it for the first five years was around GBP 770 million. As mentioned earlier, the Pool had certain inherent problems like gaming being undertaken by the generating firms and also the fact that very high capacity payments were being made. There were other problems with the Pool system, for example, bids in the Pool were 'non-firm', i.e. the generators were not penalised if they failed to follow the schedule (Green 1999). Just before the introduction of NETA, Pool prices began to fall towards the end of 1999–2000 though retail prices did not. Pool price is the price at which bulk consumers buy, whereas retail prices are what they charge from the ultimate consumer. By the time NETA had completed its first year of operation, large industrial consumers were paying 15% less in nominal terms compared to 1990–91. Green (2005) is of the view that prices were low in the initial years of NETA because of divestitures by the major generators. Under NETA, generators and consumers had bilateral tie-ups for long-term power purchase and only a balancing mechanism was operated by the NGC for balancing the demand for power from technical considerations. It was thus a decentralised dispatch. The NGC was only involved in balancing the grid and had no role to play in the price being offered or accepted. Each generator and consumer had to inform the NGC its likely schedule called the Initial Physical Notification (IPN) for the following day. IPN is the initial requirement conveyed to the grid operator, i.e. how many megawatts of electricity is required for the following day for each hour. This would be a tentative estimate, and it could be altered while conveying the Final Physical Notification (FPN) till one hour before the actual schedule, called 'gate closure'. FPN is the final schedule conveyed to the NGC for the appointed hour, called gate closure. Any change in the final output vis-à-vis the final notification was balanced by the NGC. The entities were either required to pay or be paid for any imbalance in the system. If the entities needed more power, then they had to pay the system buy price (SBP) or if they had to sell, they were paid the system sell price (SSP). The SBP was always more than the SSP. This was not a zero-sum game and any profit or loss on this account was shared by the players operating in the system. To facilitate day-ahead and longer-term trading, two rival market operators (APX and UKPX) began operating screen-based exchange market where bids and offers could be anonymously posted. It may be added that a very small proportion of power flowing in the system was through the balancing mechanism and that almost all the power was through bilateral contracts. The replacement of the Pool with NETA was criticised by Newbury (1998) and Shuttleworth (1999) since they felt that it has been introduced without commissioning any

detailed analysis. In 2005, further changes were made to NETA by including Scotland too in the power market, and the new structure was called the British Electricity Trading and Transmission Arrangement (BETTA). It is said that Scotland produced 70% more electricity than what it required and by including Scottish generators in the market, there will be a further downward pressure on prices.

3.1.7 The Gainers in UK's Restructuring Program

Who has been the gainer from the restructuring of the British power sector? Many economists have analysed this issue and some of the major findings are elaborated upon. Newbury and Pollitt (1997) have found substantial efficiency gains from privatisation and restructuring in the UK. They have estimated an overall net benefit of GBP 6 billion and a 7.5% reduction in prices driven by a decrease in labour and operating costs. The authors, however, add that these gains have been unevenly distributed. While the new private utilities, whose share prices have tripled since floatation, have gained disproportionately, the government has gained moderately but consumers are paying more than what they would have under public ownership. De Oliveira (2004) is of the opinion that fuel suppliers and employees of the utilities were the big losers from reforms, while directors, management and shareholders were the big gainers.

Thomas (2005), however, doubts, whether the price gains can be attributed to competition and whether they are sustainable. Thomas adds that a large part of the reduction was actually obtained in the regulated sector, and further, it was the large consumers who actually gained. The other reasons for decrease in prices were because of lower coal and gas costs and because of the end of the government subsidy to nuclear plants. The fact that the drop in electricity rates was due to the decrease in the regulated sector and also because of the drop in nuclear power subsidy is also supported by Wright and Thomas (2001). In other words, competition was not the reason why there was a decrease in electricity rates. The authors further state that electricity prices were regressive in character and the prepayment rates (used largely by the poor consumer) were the highest. Green and McDaniel (1998) also subscribe to the view that the single largest cause for the decline in prices is because of decrease in fuel costs. It seems that though full retail was introduced by 1999, there were very few consumers who actually switched to a different supplier. The reason for this is high transaction costs. Green and McDaniel (1998), however, estimated that about 60% of over 1 MW consumers and about 40% of the 100 KW market actually changed their suppliers and all those who switched faced lower power bills. As far as the small consumers are concerned, it is debatable whether extending retail competition to them was worth the cost.

4 Difference Between Indian and UK Model

Now that one is familiar with the architecture of the reform program in India and the UK, one can study the similarities and differences between the two models. To begin with, both involved unbundling of vertical utilities into separate generation, transmission and distribution companies. The primary difference, however, is that in the case of India, a wholesale market was not created and competition in retail was also missing. In India, the distribution utilities had a defined geographical area where they had to serve and there was no other utility who could serve the same area. The EA 2003 does have a provision of another utility serving the same area but it has to lay down its own parallel network. Since the business of wires is a natural monopoly, it did not make much sense to have another utility in the same geographical area.²³ Competition in retail was also missing except that consumers with a load of 1 MW and above could access power from any source. However, to do that the consumer will have to pay for open access (OA), which would include a cross-subsidy surcharge and an additional surcharge to be determined by the regulatory commission concerned. The problem is that the regulatory commissions made these charges so stiff that it was uneconomical to go in for open access. So, in effect, the distribution utility had the monopoly to serve all consumers in the area. This is not to suggest that virtually there are no open access consumers. States having a sizeable share in industry do have open access consumers since the industrial tariff, which includes a cross-subsidy component, was exceedingly high compared to the cost of supply. The subject of open access by itself is huge with a lot of literature written on it but for the limited purpose of this essay, it would suffice to say that open access was successfully blocked by the regulatory commissions whose sympathy actually lay with the incumbent utility. In this context, it may also be added that there was no concept of open access charges in the UK.

In India, as opposed to wholesale markets, generation tariff continues to be determined by the regulatory commissions. The Tariff Policy, however, states that with the exception of hydro projects, all generation tariff beyond 2011 will be determined through a competitive bidding process, except in a few pre-defined situations. This means that the distribution utilities will float tenders and potential generators would give their bids. Since the process began only in 2011, even today, about 90% of generation has its tariff determined by the regulatory commissions on a cost-plus basis. There is a rumour that the EA 2003 did not allow for a wholesale market seeing what had happened in California in 2000 where generation tariffs went through the roof. However, there is no literature available on this issue.

When dealing with differences between India and the UK, one pertinent point is about the effectiveness of the regulatory bodies in both the countries. The British regulator, Office of Gas and Electricity Markets (OFGEM), is a very powerful body which is truly independent having access to large amount of resources in terms of both

²³There is a case of Jamshedpur, Jharkhand, where the regulatory commission granted a license for parallel distribution.

finances and manpower.²⁴ The same cannot be said of the regulators in India. Most of the regulatory commissions in India have skeletal manpower whose capacity is also suspect. As a result, they suffer from ‘regulatory capture’.²⁵ The independence of the Indian regulator is, perhaps, absent, and there are indications of constant bureaucratic interference especially when elections are around the corner. The manner in which regulators are selected is also a matter of concern, and there is a general apprehension that we are not selecting the best person for the job.

5 The Indian Experience

In an earlier paragraph, there was a brief overview of what had been the effect of the reform movement in the UK. Who were the gainers from the restructuring? Similarly, one needs to study who gained from the restructuring of the power sector in India. Did the restructuring at all help the distribution sector which was in the doldrums prior to the reform program? To answer the question whether the restructuring was helpful or not, one needs to answer some basic questions. The first question is whether the financial position of discoms is better today as compared to the situation prior to the restructuring process. Second, are the consumers better served today in terms of quality of power, lower outages, etc.? Has there been any improvement in the efficacy of the sector, post-restructuring? We shall answer each of these questions in the following paragraphs.

As far as financial performance is concerned, the discoms are in a much poorer state today than what they were in prior to restructuring. The Power Finance Corporation reports that the total losses (after tax) have reached about Rs. 39,600 crore (US\$ 5.2 billion) by 2017–18.²⁶ Audited figures for discoms beyond 2017-18 are not available right now. The tariffs determined by the regulatory commissions are non-remunerative and do not cover the full cost of supply. The primary reason for this is that the governments have been exerting pressure on the commissions to keep retail tariff at the barest minimum. The revenue gap is being filled by deferred tariff decisions amounting to additional borrowing which is popularly known as ‘regulatory assets’.²⁷ This means that the power sector is getting increasingly indebted to the banks, and there seems to be no avenue available as to how to either recover the

²⁴Earlier OFGEM was known as the Office of Electricity Regulation (OFFER). OFGEM is said to have more than 750 employees working in the organisation which is many times over the combined manpower strength of the central and state regulatory commissions in India.

²⁵This is a process where the regulated entity is better informed than the regulator, and hence, is in a position to influence the decisions of the regulator.

²⁶On a per unit basis, while the average cost of supply was Rs. 5.60, the average revenue (inclusive of subsidy received) was Rs. 5.33. Thus, for every unit, there is a loss of Rs. 0.27.

²⁷Creation of regulatory assets is strongly discouraged by the Tariff Policy unless there are extraordinary circumstances. The problem of regulatory assets is limited to about six to seven states only. The states/UTs are Uttar Pradesh, Rajasthan, Delhi, Tamil Nadu, Puducherry, Maharashtra and Chandigarh.

deferred costs or amortise these debts. In fact, these debts have become so huge that the banks today are not keen to finance the discoms any more, creating a massive liquidity problem for these utilities. The performance of the discoms also has not been praiseworthy since they have not been able to lower their commercial losses to any appreciable extent. Even today, the commercial losses are in excess of 22% on an average. At a granular level, it is seen that there were about 40 discoms whose loss levels were in excess of 15%, and out of this, 27 discoms had a loss level exceeding 20% and further, about 16 of them had losses in excess of 30%. There were 6 discoms whose loss levels were close to 40% or beyond!²⁸ This is despite the fact that the discoms have been receiving financial assistance from the centre for upgradation of infrastructure and also for metering.²⁹ The fact remains that in the public-owned discoms, accountability is an issue, and there is a clear nexus between the field level staff of the discoms and the consumers. On a simple issue like metering, most of the agriculture sector is not metered, and it is generally reported that a large proportion of metres actually installed do not work at all.

As compared to the distribution sector, the generation sector and the transmission sector have performed well, post reforms. They have been earning their rate of return on the equity invested. However, over the last few years, the discoms have been unable to pay the generators due to their poor financial position.³⁰ This phenomenon has now started crippling the generation sector as well and they are facing cash-flow problems and in some cases, unable to service their debts. Unfortunately, generators have to pay for coal and railway freight upfront but getting paid by the discoms can get delayed by 6 months or more. The renewable generators suffer the most since their bargaining power vis-à-vis conventional generators is much lower. In order to stem this problem of mounting dues to generators, the government mandated the power will be supplied to only those discoms who open 'letters of credit' with banks so that payment to generators is assured.³¹ It seems, by and large, this dictum of the government is being followed by all discoms.

²⁸These commercial loss figures relate to 2017–18.

²⁹There have been several schemes which have been implemented by the centre which began in the early 2000s. The first such scheme was the APDRP scheme which was later converted to what is now known as the Integrated Power Development Scheme (IPDS). The outlay for the IPDS was about Rs. 32,600 crores (US\$ 4.3 billion) out of which budgetary support was around Rs. 25,300 crores (US\$ 3.3 billion). The earlier scheme of APDRP had an outlay of about Rs 44,000 crore (US\$ 5.8 billion). In both these schemes, funds are provided for upgradation of infrastructure and also for metering.

³⁰According to the government portal 'praapti', as in May 2020, the discoms owed about Rs. 102,000 crores (US\$ 13.6 billion) to the generators. Out of the total amount due, about 36% is payable to the central generating stations, about 21% to state generating stations, about 34% to the private generators and about 9% to renewable generators. The renewable generators are also primarily private generators. In order to help the discoms to pay the central generators, the government has started a new scheme under the aegis of 'Atmanirbhan Bharat' wherein the discoms will receive soft loans totalling to about Rs. 90,000 crores (US\$ 12 billion). These loans will have state government guarantee.

³¹This has been under implementation since August 2019.

To sum up, the restructuring of the power sector has had little salutary effect on the finances of the distribution sector. In fact, the condition has deteriorated a lot more than what the situation was just prior to the enactment of the EA 2003. This brings us to the second issue of the quality of service. One of the duties of the regulatory commissions is to lay down performance standards which incidentally has been done by all commissions. However, there is no consistency across states since each regulatory commission has fixed its own standards in isolation.³² Whether these standards laid down are followed or not varied across states depending upon how proactive the commission is. There is no doubt, however, that consumers today are better informed about the service they are expected to receive, for example, in how many days a new connection should be given, in how many hours an outage is supposed to be fixed, etc. Not only that, the consumers are also proactive during the hearings which take place at the time the tariff petitions are heard though their numbers are still small.³³ The biggest boon the consumers have had is the sudden spurt in generation capacity which took place during the last decade or so. This happened because the spot price of power in the power exchanges shot up to about Rs 10 per unit around 2010–11. This encouraged potential investors to set up additional capacity, mostly coal based. There was so much excitement that banks no longer waited for ‘financial closure’ or fuel linkage and extended loans to investors.³⁴ The growth in capacity was much higher than the growth in demand leading to the inevitable, i.e. surplus capacity lying idle.³⁵ Another reason for surplus capacity was lack of fuel linkage since coal supply has always been short compared to demand.³⁶ This spurt in generation capacity has led to a steep reduction in shortages, both peak and energy. However, there has been a simultaneous rise in the non-performing assets (NPAs) of banks and other financial institutions like the Power Finance Corporation and the Rural Electrification Corporation. The economic downturn during the last

³²The CEA has been entrusted with the task of drafting a common performance standard which would be adhered by all discoms.

³³In order to help the consumers understand the complex tariff petitions, some regulatory commissions have in the past appointed officers who would discuss the petitions with interested consumers. One such commission was the Delhi Electricity Regulatory Commission.

³⁴This indiscriminate lending by commercial banks has led the way for creation of non-performing assets (NPAs). It is estimated that there were around 34 projects with an aggregate capacity of 40,000 MW who had been extended loans amounting to about Rs 2 lakh crore (US\$ 26.6 billion). About seven to eight such projects have been revived by giving them fuel linkages which they did not have.

³⁵While capacity in the last ten years grew at about 10% per year, the demand growth was only about 5% per year. The growth in the last two years, i.e. 2018–19 and 2019–20 was even lower due to the economic downturn and ever since the total lockdown from late March 2020, the growth was actually negative. The PLF of thermal power stations, due to all these reasons put together has been hovering at less than 50% during March–May 2020. Part of the reason for low PLF is also on account of the coronavirus.

³⁶To overcome the problem of coal linkage, the government introduced the scheme of ‘Shakti’ in May 2017 where coal is provided on the basis of auctions. The beneficiary plants are divided into various categories, such as those having valid PPAs, those not having PPAs, those which are owned by the government, etc.

three years or so also contributed to the growth in surplus capacity since the discoms facing demand shortages curtailed their scheduling.

Coming to the last point of efficiency in the sector, first let us revisit what happened in the UK. In UK, there have been divergent views expressed as mentioned in paragraph number 3.1.7. While some were of the view that there were efficiency improvements leading to lower prices, and there were others who felt that the reduction in prices was actually due to drop in fuel prices. Authors have also expressed the view that not everybody in society gained and that the gains were limited to a certain few like the directors, management and shareholders of the generation utilities. Some researchers had also expressed the view that the drop in prices was due to lowering of the regulated business rather than competition in retail. As far as India is concerned, we carried on with the cost-plus model of regulation, both at the generation and retail end. Given the strength of our regulatory institutions, we could not really expect a downward movement of real prices and that is exactly what happened. On the contrary, cost of generation continued to rise which ensured commensurate increase in the cost of supply also. Power purchase cost constitutes to about 80% of the cost of supply and any increase in this cost cannot really be offset somewhere else. Generation cost has been going up steadily on two counts, i.e. cost of coal and cost of railway freight. The Indian coal sector, in any case, is not really known for its efficiency, and all its inefficiencies are passed on to the power sector. When it comes to railway freight, coal is the main revenue earner, and the proceeds are used to subsidise passenger fares.³⁷ It may, however, be added that after introduction of tariff-based bidding in 2011, the market determined prices for generation were found to be much lower. Examples are of the Ultra Mega Power Plants (UMPP)³⁸ of Tata Mundra and of Sason and Krishnapatnam.³⁹ The Tata Mundra Plant, however, got into problems after the price of Indonesian coal went up substantially. There are not too many examples to quote since there has really been no bidding for fresh projects for the last several years since the discoms already have more power purchase agreements than what they need to meet their demand. Similar to generation, market determined prices for transmission are much lower than the cost-plus. Unlike generation, there are several cases of transmission projects which were bid out and most of them were cheaper than the regulated, cost-plus tariffs. Of course, there have been arguments that market determined prices may be lower but it is at the cost of quality of materials and design. In a nutshell, we can say that reforms in the power sector did not see any increase in efficiency because, primarily, we are still in the cost-plus regime.

³⁷ According to Brookings, India's fare to freight ratio is one of the lowest in the world at 0.24. The corresponding figures for Japan, Germany and China are 1.9, 1.5 and 1.2, respectively. Further, coal accounts for about 44% of the revenue earned through freight and about 60% of the coal used in power generation is transported through railways.

³⁸ UMPPs are large thermal plants of 4,000 MW which were entitled to certain tax benefits.

³⁹ The levelised tariff for the Tata Mundra Plant was Rs. 2.26 per unit, for Sason, it was Rs. 1.196 per unit and for Krishnapatnam, it was Rs. 2.33 per unit.

6 Way Forward

6.1 *Privatisation of Distribution Utilities*

It is quite evident that the restructuring of the power sector has not led us to a point that was envisaged. One had hoped that the restructuring would lead to a situation where the distribution sector would be financially healthy, would undertake regular upgradation of infrastructure, and where one would witness a progressive decline in the real cost of power. One should mention here that though the basic tenet of EA 2003 was promoting economy, efficiency and competition, the structure which emerged from the restructuring process was not conducive to competition. We did not create a wholesale market as done in the UK nor did we have retailers at the distribution end. We only unbundled our vertical SEBs and broke them down into separate companies dealing with generation, transmission and distribution. In the process, the entire burden of the sector fell on the distribution companies which emerged as inefficient and corrupt bodies with cultural legacies. So, despite restructuring, there was no change in the financial position of the distribution sector. A public sector discom is usually headed by a relatively young career bureaucrat who has no stakes in the organisation. In fact, he spends about two to three years in the organisation and moves on to some other organisation. There is no pressure on him to improve things since the apathy stems right from the government. Boards of these companies do not also have the optimum composition of functional and independent directors and, therefore, do not function autonomously. The discom chief is well aware that the state government is not too serious about reduction of commercial losses since that will disrupt their vote-bank politics. When it comes to determination of tariff, it is again vote-bank politics which forces the government to breathe down the necks of the regulatory commissions to ensure that there is no appreciable rise. It is because of these reasons that the discoms continue to be inefficient and loss-making bodies. Things, however, will change if the discoms are privatised. Privatised entities have accountability and immediate steps will be taken to lower commercial losses. True, the pressure on the regulatory commission will still be there not to raise tariffs but the privatised utilities are well-gearred to handle such issues through litigation, while being able to implement efficiency gains. A public discom does not even dare to file a petition before the appellate authority. There are various instances when the public discom did not even file a tariff petition before the regulatory commission, forcing a situation where tariffs could not be raised.⁴⁰

We have the case of privatisation in Delhi where the loss levels have been brought down from about 50% in 2002 to about 8% today. In fact, this loss level at a single digit figure has been there for at least the last seven to eight years. It is just not the loss levels but the quality of service which has seen a significant improvement.

⁴⁰The situation had become so acute that the APTEL, in 2011, issued an order that the regulatory commissions should initiate suo-moto proceedings under Section 121 of EA 2003 in case tariff petitions are not filed by the discoms.

The privatised utilities in Delhi have been very active in pursuing matters in the courts also. Several tariff orders of the Delhi Electricity Regulatory Commission (DERC) have been contested in the Appellate Tribunal for Electricity (APTEL), and they have been successful in getting relief. While speaking about the success in Delhi, one needs to mention the case of Odisha also where privatisation has not been successful. There are reasons for this, and the fact is that the Delhi model that was adopted was different from that of Odisha. One of the main reasons for failure of the Odisha model was that the regulatory commission was rather strict in determining the loss levels which would be allowed in the tariff. The actual loss levels on the ground were much higher than what was allowed by the regulatory commission, which in turn implied that a major part of the expenditure remained uncovered, and this led to financial problems in the distribution companies. There were certain other problems like the overvaluation of assets to an unreasonable level which led to high tariffs, unrealistically high receivables, bogus billing, etc. As opposed to this, the Delhi model ensured that the sale price of the three utilities was just based on the business valuation method. Further, the opening loss levels were correctly assessed by the DERC to a reasonable degree. Also, the new private discoms were given a clean opening balance sheet and the unserviceable liabilities were placed in the books of the holding company, a government entity. Most importantly, however, the government provided a transition support to the tune of Rs 3450 crore (US\$ 460 million) to help the newly created private discoms to tide over the losses in the initial years.

So, what is required is a good model for privatisation may be on the lines of the Delhi model but with transition support to enable the new entity to tide over the initial cash losses. It is not that the central government is not aware of the need for privatisation of the distribution segment to save the power sector from ruin. The central government has itself proposed privatisation of the distribution utilities in the union territories (which are under the control of the central government) while announcing its spate of measures under the aegis of 'Atmanirbhar Bharat'. However, privatisation of discoms takes time and can even take up to 2 years to become operational, but more importantly requires political consensus at the state level, electricity being on the Concurrent List of the Constitution.

6.2 Role of Regulatory Bodies

The Indian electricity regulators could never reach the stature of their counterparts in the UK. In UK, the regulatory institution is strong and has a lot of resources at their command. This is not to say that there was no criticism about the regulators.⁴¹

⁴¹To give a few examples, in the RPI-X regulation (mentioned in par 3.12), there were allegations that the value of X has been made favourable to the industry which allowed them to have excessive profits. Another criticism against the regulator was that the Pool was replaced by the NETA without any detailed analysis.

Several actions of the regulators were found to be flawed but they were definitely head and shoulders above the Indian regulators, especially at the state level. Part of the problem was on account of the constitutional provision in India. While there was a single regulator for the UK, in India, power being a concurrent subject and distribution being a function of the states, there is a separate regulatory commission in each state apart from a central regulator. Trivial as it may sound, the truth is that the state governments have to ensure a fair selection of regulators, keep the selection process above politics, maintain distance from the regulators and not interfere in their jurisdiction and create an environment where regulatory awards are implemented and not side stepped. The central government made an attempt to control the selection of regulators wherein a single composite committee was proposed for all regulators. This was mentioned in the draft Electricity Act (Amendment) Bill 2020 which was circulated, for comments in April 2020. As expected, the states have not found this to be favourable and have accused the central government of trying to interfere in the states' domain. What will be the final shape of the amendment bill, only time will tell.

6.3 Creation of Wholesale and Retail Markets

We finally come to the last recommendation that is creation of a wholesale and retail market in India, similar to what exists in the UK. However, let it be said upfront that this recommendation is for the future and cannot be implemented right away. The government made an attempt to introduce retail competition when it inserted the concept of 'content and carriage' in the Electricity Act (Amendment) Bill 2014. This provision never saw the light of day since it was forcefully opposed by the states. In the later amendment bill introduced in 2020, this clause of 'content and carriage' has been dropped altogether. This, however, is a step in the right direction, at least as of now, since 90% of the power generated is still linked to power purchase agreements (PPAs) where tariffs are determined on a cost-plus basis. Therefore, all retailers will face the same legacy costs of power purchase, and since power purchase accounts for about 80% of the cost of supply, there can be no competition and consumers will have nothing to differentiate from one retailer to another, unless and until retailers are given the freedom to source power and align their power procurement portfolio according to the market dynamics and changing consumer mix. In order to have an effective competition in retail, the existence of a wholesale market is imperative. This is only possible when we are able to dissolve the existing long-term PPAs and create deeper power markets allowing economic dispatch and flexible trades. This is a mammoth task which requires consultation pan India, and the cooperation of the

state governments is required since they or their successor public discoms are the signatories to the PPAs.⁴²

There is yet another reason why retail competition cannot be introduced right now and that is because of the existing cross-subsidies. A certain section of consumers, like the commercial and industrial sector, pays a tariff much higher than the cost of supply. This extra revenue is used to provide subsidised power to another class of consumers, such as agriculture and low end domestic, who pay below the cost of supply. If retail competition is to be introduced, management of this cross-subsidy program will become onerous unless the government steps in and provides more subsidy to the targeted consumers. All the state governments, put together, were already providing subsidy to the extent of Rs. 85,000 crore in 2017–18 (PFC 2017–18). Any further increase will put the state governments in severe financial pressure. It would be pertinent to add that in the UK, there was no concept of cross-subsidy, and therefore, introduction of retail competition could take place with ease. In 1990, retail competition was introduced for big consumers (1 MW and above), and in 1994, the limit was lowered to 100 KW. In 1998, all consumers, no matter how small, were given this privilege. Another major advantage that UK had when it comes to introduction of retail competition is that their commercial losses were very low. Therefore, they did not have to grapple with the problem of who is going to finance these losses, whether it shall be the retailers or the owner of the wires business.

6.4 Conclusion

In conclusion, it can be said that the Indian power sector restructuring exercise can at best be called ‘work in progress’ despite the fact that EA 2003 was enacted about 17 years ago. The restructuring exercise has not created markets, so competition which was one of the basic tenets of EA 2003 remains unfulfilled. Not only that, the regulatory commissions which are supposed to be the pillars in any reform exercise remain weak and stunted. Much of the blame for the plight of the regulatory commissions lies squarely at the doorsteps of the government. The government never wanted to create institutions of stature because they were apprehensive that they would lose control over the sector. Be that as it may, as things stand today, privatisation of distribution is the key and the only salvation available to us. Further, late as it may be, strengthening our regulatory institutions is something we cannot afford to delay any further. The final key, of course, is creation of markets, both at the generation and retail end. These markets will, however, have to be created simultaneously but this course of action should be pursued only after the power sector matures in India, and we get rid of the regime of cross-subsidies and also lower our commercial losses.

⁴²The CERC had floated a consultation paper entitled ‘Market-Based Economic Dispatch of Electricity’ in December 2018 for creation of capacity markets by redesigning the day-ahead market in India.

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