

# Reforming Electricity Distribution in India: Understanding Delicensing and Retail Competition

Daljit Singh and Rahul Tongia

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Centre for Social and Economic Progress (CSEP)  
CSEP Research Foundation  
6, Dr Jose P. Rizal Marg, Chanakyapuri,  
New Delhi - 110021, India

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# **Reforming Electricity Distribution in India:**

## **Understanding Delicensing and Retail Competition**

**Daljit Singh**

Fellow

Centre for Social and Economic Progress

New Delhi, India

**Rahul Tongia**

Senior Fellow

Centre for Social and Economic Progress

New Delhi, India

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## Executive Summary

In accordance with the announcement in the FY 2021-22 budget, the Ministry of Power (MoP) has developed draft legislation to delicense electricity distribution to allow multiple distribution companies (discoms) in each supply area. There is general agreement on the need for reforms in the power sector, particularly in distribution. Therefore, the Government's attention to this sector and its willingness to act are welcome. Given the importance of these proposed structural changes in the power sector, additional objective analysis and evaluation would be useful to deepen and inform the discourse. This note discusses several concerns and challenges with the proposed changes.

First, international experience suggests that, in the electricity sector, most of the economic benefits of competition come from effective wholesale markets and focusing on retail competition alone is likely to have very little effect on the overall price and efficiency in the distribution of electricity. In addition, effective wholesale electricity markets, in turn, require effective fuel markets. Unfortunately, the fuel markets in India are quite distorted. Furthermore, the benefits of retail competition for residential and small consumers are very limited. Instead, it exposes vulnerable groups to potentially exploitative marketing practices of retailers — an issue of special relevance in India with a large percentage of small consumers who are very price-sensitive. A better alternative to starting with full retail competition would be to continue to allow choice of supplier to large consumers but through improved open access provisions, as discussed in detail in this note, and let discoms continue to purchase power for smaller consumers. In addition, the threshold for open access can be progressively lowered to 50 kW or 100 kW of load, in order to allow almost all high-tension (HT) consumers choice of supplier.

Second, distribution is a natural monopoly. Making ownership and responsibility of the distribution network non-exclusive will lead to unnecessary duplication of resources and increase the cost of electricity. The experience in the Mumbai experiment with multiple licensees—endless litigation, planning and regulatory failures, and significantly higher tariffs—should be a sobering reminder of the perils of such an approach.

Third, delicensing of distribution is likely to lead to the neglect of distribution network operation, just when its importance for the sector is growing. The role of the distribution network operator will become more important and challenging in the future due to the increasing contribution from renewable energy; growing presence of distributed energy resources; new behind-the-meter technologies; and increasing use of smart meters. Delicensing distribution and spreading responsibilities for the network will dilute accountability and lead to finger-pointing, if not chaos.

Fourth, there will be very significant challenges in allocating legacy power purchase agreements (PPAs) and aggregate technical and commercial (AT&C) losses. If AT&C losses need to be socialized due to fundamental limitations of apportionment, this would obviate many of the benefits of competition. In addition, while the Government is mindful of the risks of suppliers cherry-picking the most desirable consumers and proposes solutions to this problem, these are unlikely to work. The outcome is likely to be a segregation of consumers, with the higher-paying ones being served by financially viable retailers, while the less economically attractive consumers (the smaller and poorer consumers) being served by a discom that is financially even weaker than today. Some of the cherry picking might occur not just within an area but also through the choice of geographies by the new entrants.

A better alternative to delicensing would be to pursue privatisation of discoms and harness the superior managerial and technical skills of the private sector but with competent and appropriate regulation and oversight. Private discoms would also be less likely to be susceptible to political interference in such a regulatory framework, although not completely immune from it. The Government has been promoting privatisation of distribution starting with union territories. Focusing on those efforts is likely to yield much greater benefits for the power sector. Parallel efforts

to delicense distribution are likely to impede the progress on privatisation because delicensing will increase the risk for potential investors and reduce their interest in bidding. In the pursuit of privatisation, it is important that before any decision the central and state Governments consult and negotiate in an open and transparent manner with all stakeholders, particularly the unions, to address their apprehensions. While a consultative approach may seem frustratingly long and slow, it is essential for having a thriving power sector that can propel the Indian economy on a high growth path.

## Introduction

In her budget speech in February 2021, the Finance Minister, Nirmala Sitharaman, announced that the Government would put in place a framework providing choice of supplier to the customers of electricity distribution companies (discoms) and thus provide competition in supply. Subsequently, the Ministry of Power (MoP) developed draft legislation to delicense distribution in electricity and allow multiple discoms in each supply area. In response to solicitation of comments by MoP, we had provided comments in March on the Draft Electricity (Amendment) Bill (EAB), 2021. According to news reports, the Minister for Power intended to introduce a bill in the monsoon session of Parliament that was scheduled to end August 13, 2021 but ended earlier on August 11, 2021. The bill purportedly was to have provisions for delicensing distribution and allowing choice to consumers. The Draft Bill is expected to be introduced in Parliament in the Winter Session, which begins November 29, 2021.

There have also been several reports or statements by stakeholders recently on the issues of delicensing distribution and introducing retail competition in electricity, both in favour of the proposed changes and against them. Given the importance of these proposed structural changes in the power sector, we think that additional objective analysis and evaluation of these proposed changes would add to the quality of the discourse. This discussion note aims to further deepen and inform the discourse. Much of this discussion note is based on our comments to MoP made in March 2021, and portions of this note appeared in an opinion piece (Singh, 2021).

Almost no one would dispute the need for reforms in the power sector, particularly in the distribution segment. One feature of the Indian power sector is the prevalence of high tariffs for industrial consumers, which affect the competitiveness of Indian industry. The practice of subsidising different sets of consumers such as small users in urban areas and agricultural consumers for social and political objectives has given rise to this compensatory mechanism. This issue assumes special importance as the country strives to accelerate growth, so as to recover from the economic consequences of slowing industrial growth over the past decade, now compounded by the pandemic. Joining global value-chains is an important component of that strategy. Therefore, the Government's attention to this sector for reforms is welcome.

As we evaluate the changes being proposed by the Government, it is important to keep two things in mind. First, the power sector consists of a number of components — generation, transmission, wholesale electricity markets, distribution network, and retail supply. Because of the interconnectedness of these components, piecemeal reforms are unlikely to succeed, and comprehensive reforms are needed. Second, the power sector is undergoing rapid changes which will impose increasingly greater challenges with a rapid increase in renewable energy (RE) in the resource mix, and a greater presence of distributed energy resources (DERs). Any proposed changes must not only solve today's problems, but also ensure that the power sector is ready to face these future challenges.

This discussion note is divided into three parts. Part I describes the changes being proposed by the Government. Part II deals with broad, conceptual issues dealing with the framework of the proposed changes. Part III deals with challenges of implementation of the proposed changes, based on the limited details available.

While there may seem to be a sharp dividing line between conceptual issues and implementation challenges, this is not so in reality. Many implementation challenges are not items that can be easily addressed; instead, they reflect limitations of the conceptual design. Our analysis and recommendations in the following sections combine our interpretation of international experience as applicable to India with an understanding of the fundamentals of Indian utilities.

We recognise that the bill proposed to be introduced in Parliament may be different from previous versions of EAB 2021. These comments do not cover all the planned changes for the power sector announced in the Budget, or subsequently in earlier versions of EAB 2021, or that may be included in the version of the bill to be introduced in the Parliament. Many of the other proposed changes that have been discussed previously by the Government are valuable initiatives. This discussion note addresses only proposals regarding delicensing distribution and introducing competition in retail supply.

## **Part I: Proposed changes to the Electricity Act 2003**

The proposed changes must be placed in context of today's system, which is summarized in Annex I, which provides the broad outlines of the organizational and regulatory framework of the sector. The Indian distribution system is, for the most part, unbundled into corporations, owned by the respective state government, and meant to operate on a costs-plus regulated rate-of-return regime.

The challenges facing the distribution sector are a combination of operational and financial challenges. Power supply is still not 24 x 7, especially in rural areas, despite an increase in supply capacity sufficient to meet present demand. One purported reason is some discoms not purchasing sufficient power for uninterrupted supply.

Many state-owned distribution companies are in very poor financial health – as of FY2019, they owed Rs. 2,29,000 crore of outstanding past dues just to generators, and a similar amount to other stakeholders (Rajasekhar & Tongia, 2020). One reason for this situation is that tariffs (retail prices) for residential and agricultural consumers have been kept low, usually for electoral gain. There are significant cross-subsidies generated by increasing the tariffs for commercial and industrial (C&I) consumers above the cost of supply. Yet, a revenue gap remains. These problems are exacerbated because of high losses, both technical and commercial. These losses are often shown as Aggregate Technical and Commercial (AT&C) losses. The poor financial health of distribution companies that results from this state of affairs is behind the changes that MoP is proposing. There is an expectation that competition will draw in the private sector, who are conventionally believed to be more efficient, professional, able to offer quality supply, and remain separated from political pressures that state owned discoms face.

There are additional changes proposed in the amendments spanning a range of issues including membership of the regulatory commissions, strengthening the mandates for renewables, etc., but those are not covered in this paper.

Currently, an entity can distribute electricity only if authorised to do so through a license. In the Draft EAB 2021, the Government proposes to delicense distribution and allow multiple distribution companies in the same area of supply. Consumers would be free to choose the distribution company for their electricity supply, and the Government expects that competition between distribution companies within the same area will lead to improvement in services.

### **Key facets of the proposed changes**

New entrants to distribution will need to register for each area in which they want to distribute electricity. The area of supply should be at least a municipal council, or a municipal corporation, or a revenue district, or a smaller area, as and if, notified by the state government. Registration will be done by the respective SERC, and an SERC will be required to complete the registration process within 60 days of receipt of registration request. Furthermore, an SERC will be able to reject an applicant company only if it does not meet the eligibility criteria. The eligibility criteria have not been articulated yet.



- **Distribution Network.** For providing supply, a distribution company will be able use its own network or use the network of another distribution company. Moreover, all distribution companies have to allow the use of their networks by competitors in a supply area on the payment of wheeling charges.
- **Sharing of PPAs.** The existing PPAs in a supply area will be shared by the distribution companies in an area as specified by the respective SERC, in accordance with rules developed by the Central Government. These sharing arrangements will be reviewed by the SERC periodically. A distribution company will be able to sign additional PPAs as the need arises, however, only after the existing PPAs' requirements have been met.
- **Tariffs.** SERCs will continue to set regulated tariffs. However, it is not clear if these will be area-specific tariffs or uniform for the entire service territory of the existing distribution company in a supply area. These regulated tariffs will serve as ceiling tariffs with distribution companies free to charge their customers less.
- **Universal Service Obligation (USO) Fund.** Whenever there will be more than one distribution company in a supply area, a USO fund will be created by the State Government which will also designate a Government company or entity to manage the fund. The Draft EAB 2021 states, "Any surplus with a distribution company on account of cross subsidy or cross subsidy surcharge or additional surcharge shall be deposited into such fund to fund deficits in cross subsidy in the same or any other area of supply."

## Part II: Issues with the framework of proposed changes

### Rationale for Proposed Changes

One reason often given for introducing retail competition is that electricity should be like any other commodity, and consumers should be able to choose their suppliers. Therefore, delicensing electricity distribution and reducing entry barriers is expected to remove the monopoly, mostly with state-owned companies. While new entrants can enter and compete, the Government reportedly proposes to have ceiling tariffs, as described earlier. The benefits it expects are improved service and responsiveness, increased innovation, and improved operations, especially collection efficiency.

In all these discussions, there has not been a mention of how success of these changes will be measured. Will it be lower prices, or better quality of supply, or profits of the new entrants or incumbent discoms?

### Relative importance of wholesale versus retail competition

Competition in any sector is expected to lead to greater efficiency, and hence lower prices for products or services from that sector. Therefore, greater competition in the power sector is certainly to be welcomed. In the power sector, the contribution of wholesale competition to efficiency gains and cost reductions is much greater than retail competition. Because 70-80% of the cost paid by consumers for electricity comes from the cost of generation, it would be much more beneficial to focus on developing well-functioning wholesale electricity markets in India. The Central Regulatory Electricity Commission (CERC) is working on developing wholesale electricity markets, and that work should be accelerated.

International experience reinforces the importance of wholesale electricity market reforms. Much of the economic gains from restructuring electricity sectors in various countries have come from wholesale markets (Fabrizio, Rose, & Wolfram, 2007; Morey & Kirsch, 2016). It has also been

found that effective wholesale markets are a pre-requisite for retail markets. As Professor Joskow of MIT notes, simply giving customers freedom to choose, does not result in much competition.<sup>1</sup> He points out that unless customers or their suppliers can obtain electricity from a 'well-functioning competitive wholesale market', there will be 'no meaningful opportunity to take advantage of this freedom' (Joskow, 2006).

Effective wholesale electricity markets require effective fuel markets. Unfortunately, the fuel markets in India are heavily distorted. For example, the price that a power plant pays for the same grade of coal at the same location can vary greatly depending on many factors, such as: ownership (public or private); presence or absence of a power purchase agreement (PPA) with a discom; allotment of a coal block; or allocation of a coal block won in an auction (Singh, 2020). Even though commercial mining is being introduced, change will be slow and initial impacts will be seen only at the periphery of the coal industry.

Other countries that have introduced retail competition in electricity have restructured their fuel markets first to ensure competitiveness in their wholesale and retail electricity markets. For example, in the United States of America (the US), the gas sector was restructured well before there was any discussion about restructuring the electricity sector. Until the 1980s, gas pipeline companies behaved as merchants of natural gas. But FERC Order 436 in 1985 and FERC Order 636 in 1992 unbundled transportation, storage, and sales of gas so that the local gas distribution company could choose its gas supplier and separately choose the pipeline to transport its gas (APGA, 2021). This mitigated monopoly control in gas transportation, making the sector more competitive (Jess, 1997). Therefore, if we want to have real competition in the electricity sector, work needs to be done to create well-functioning fuel markets and well-functioning wholesale electricity markets, before we turn to retail competition.

### **Questionable benefits of retail competition for small consumers**

The experience in developed countries indicates that while large consumers may benefit from retail competition, because of lower transaction costs and the ability to shop intelligently, the benefits for residential and small commercial consumers are limited (Joskow, 2006). Therefore, once effective wholesale markets have been established, it may be best to allow choice of suppliers for large consumers, but for small consumers, it may best for the incumbent discom to buy power in the competitive wholesale market. This is particularly relevant for India, where a large percentage of small consumers are very price-sensitive and may have difficulty handling the volatility in prices in the market.

Not only have the benefits of retail competition been limited for small consumers, their experience, at least in some countries, has been quite disappointing with many being victims of exploitation by unscrupulous retailers. In the following subsections, we describe the experience of small consumers in the UK and the US.

### **Experience of small consumers in UK**

Great Britain was a pioneer in privatisation and competition of the electricity sector, beginning with England and Wales in 1990. That model is, in fact, considered the textbook model (Victor & Heller, 2007).

British competition was introduced in a phased manner, starting with bulk consumers over 1 MW, with the retail market for small consumers opening up in 1998-99. More than a decade later, in

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<sup>1</sup> This observation was based on his review of the opening of electricity markets in Europe, where the focus was initially on retail markets (Joskow, 2006).

2010, Ofgem (the UK regulator) initiated a Retail Market Review (RMR) “due to concerns that the energy market was not working effectively for consumers” (Ofgem, 2021). In its report, it found that: (1) Prices for households were increasing in real terms. (2) The profits for the big 6 retailers were increasing. (3) Switching rates (between suppliers) were falling. (4) There was increasing distrust of retailers among consumers. (Ofgem, 2014; Ros et al, 2018)

Ofgem also found that the markets were segmented where there was a variation in prices paid by different segments of consumers. Consumers who chose to remain with their legacy supplier (“sticky consumers”) were paying higher prices. Unfortunately, the stickiest consumers were also likely to belong to vulnerable groups and were paying higher prices than more savvy consumers. It also found that competition was weak with “possible tacit coordination” (Ofgem, 2014).

Ofgem asked the Competition and Markets Authority (CMA) to investigate how to have further competition in the electricity and gas markets. Consequently, CMA found that one of the barriers to engagement for consumers was the lack of access to internet and price-comparison websites (PCWs). In order to remedy the situation, CMA suggested prompts for passive consumers to engage in the market (Ros et al., 2018).

One of the interesting features of the UK framework for retail competition is the tension between well-functioning markets and consumer protection. For example, UK wanted to reduce the entry barriers for new entrants in the supply business. However, the lowered entry barriers have resulted in the entry of new suppliers with unsustainable business models, resulting in difficulties for their consumers (Poudineh, 2019). Another example of this conflict between markets and consumer protection is when after receiving the RMR report, Ofgem mandated the Simple Tariff Rule. An unintended consequence was that suppliers began offering fewer and less innovative tariff plans (Ros et al. 2018).

Another problem with the UK framework has been the market share of the “Big 6”, the dominant firms. While the number of suppliers has been increasing rapidly, the market is still quite concentrated; although, it is improving. In 2004, the market share of the Big 6 was 100%, in 2018 it was about 75% (Poudineh, 2019).

### **Experience of small consumers in US**

Fourteen states in the US have full retail competition for the customers of their investor-owned utilities, and seven have implemented partial retail competition, with some having started full retail competition but then pulled back from some portion of the electricity market (Quilici et al., 2019). Studies from the US are illuminating, because of this mix, and therefore comparisons are possible between states based on the presence or absence of retail competition. The US also has a federal structure, similar to India. We do recognise that such comparisons should be carried out with caution, given the number of confounding factors, especially those related to fuel mix and changes in fuel costs driven by exogenous factors. Even with those reservations, it is quite striking that studies based on such comparisons indicate no proven benefit to retail competition in terms of prices, with additional concerns over issues of planning and reliability in the states with retail competition (Quilici et al., 2019). In one such study examining the effect of restructuring on electricity prices for industrial consumers, Prof. Jay Apt states that in the US the premise for market reforms was the successful experience (price reductions) in deregulating airlines, trucking, natural gas, etc., which he did not find in electricity, even for many larger consumers (Apt, 2005).

We reviewed two detailed studies that evaluated the experience in the US with retail competition for small consumers. We find an echo of the experience in the UK. The states with retail competition report many complaints. Most of the complaints are about the practices of retailers, and as in the UK, they have had “an undue impact on low income, elderly, and non-English speaking customers” (Quilici et al., 2019).

Many studies on the success of retail competition in electricity use rates of switching either between the incumbent and a competitive retailer, or between retailers, as a measure of the success of retail competition. However, high switching rates should not be the goal of public policy. Instead, success should be measured by reductions in consumers' bills (Morey & Kirsch, 2016).

Perhaps the sagest advice against the belief that more choice is always good, comes from a recent New York Times column by Paul Krugman, the Nobel laureate in economics (Krugman, 2021). The column was triggered by news reports that many people in Texas, following the freeze in February, owed their electricity retail suppliers huge amounts, up to many thousands of dollars. Asking how a simple choice of electricity supplier could lead to such financially disastrous results, Krugman noted that people do not have an unlimited capacity to do due diligence for every decision in life. Further, he noted that the poor face an even higher 'cognitive burden' because they have to make far more critical decisions than affluent people. As a result, they often make bad decisions, putting themselves at greater risk.

A recent in-depth analysis by the *Wall St. Journal*—of residential consumers across 13 states, between 2010–2019—reinforces such concerns. The analysis found that retail consumers who switched paid \$19.2 billion extra compared to prices the incumbent would have charged in the same coverage area. They also found this burden was disproportionately greater upon the poor and there were many instances of 'hard sells' that included misleading pricing, and bait-and-switch pricing (Patterson & McGinty, 2021).

This concern about vulnerable groups holds great relevance for retail competition in India because we have a much greater percentage of poor who may be more susceptible to paying too much to unscrupulous retail suppliers. Even if there is no malicious intent on the part of retailers, the barrage of marketing calls and pressure to change may lead to non-optimal choices. This is why it may not be wise to jump to retail competition for small consumers, and instead it may be better to do so for large consumers only, especially in the initial phase. Even with this model we have to examine how much of the savings for large consumers is a zero-sum-game that hurts smaller consumers.

Another reason for being cautious about introducing retail competition in the form outlined in the Government's proposed changes is that there are significant changes underway in the electricity sector, including at the retail end. The current model of retail competition has the retail supplier as the single point of contact between the customer and the power system — in a sense, a vertical link between the customer and the larger power system. Poudineh (2019) identifies several changes that are occurring, and are likely to accelerate, in the retail market such as: demand response aggregators; multi-service providers who bundle several services including electricity; switching-service providers who scan the market for better deals and switch a customer automatically; peer-to-peer trading of electricity; smart homes; and energy-management service providers. These new service providers are changing "the architecture of the retail market" (Poudineh, 2019). These changes imply horizontal links (customer-network-customer), and Poudineh (2019) argues that a vertical structure with the retail supplier as the only link will prove inadequate to provide these new services efficiently. Any changes in the power sector must be effective not just today, but also in the future.

### **Refinement of open access provisions to allow choice for large consumers**

We often forget that the Electricity Act (EAct) of 2003 allows choice of supplier through open-access (OA) provisions for large consumers (with loads greater than 1 MW in most states), although this aspect of the Act has met with limited success. Rather than introducing new measures to allow choice, it would be best to refine the OA provisions.

One problem has been the high cross-subsidy and other charges to OA consumers. In addition, these charges vary significantly from year to year making long-term decisions about power

procurement difficult for potential OA consumers. Prayas (2017) has suggested that regulatory commissions establish a trajectory for the cross-subsidy surcharge to provide medium-term certainty to both OA consumers and the discoms, and a uniform method across states for calculating the additional surcharge.

Another problem is the use of OA provisions by some consumers to game the system and move back and forth between the market and regulated rates seeking the lowest rates. Singh (2017) suggests a way of addressing this problem — requiring the consumer to shift its entire load when it opts for OA. In addition, Singh suggests that if such a consumer returns to regulated rates, then it should not move back to the market for a fixed period, say one year. This will ensure that consumers opting for OA are doing so as a long-term choice of supplier; not gaming the system or even seeking short-run arbitrage value that creates higher losses elsewhere, including on planning and procurement by the incumbent.

A better alternative to starting with full retail competition, and one that should be done regardless of delicensing or privatization, would be to continue to allow choice of supplier to large consumers but through improved open access provisions, as discussed above, and let discoms continue to purchase power for smaller consumers. In addition, the threshold for open access can be progressively lowered to 50 kW or 100 kW of load, in order to allow almost all high-tension (HT) consumers choice of supplier.

One last concern has been practical challenges faced by potential OA users in terms of approvals, paperwork, etc. After all, the discoms are loathe to lose their best customers. An important step would be the completion of the planned National Open Access Registry (NOAR), a system to help increase transparency and standardization across the country.

### **Problems with multiple distribution network operators**

Currently, discoms perform two functions: network operation ('wires' business), and energy supply. The distribution network has long been recognised as a natural monopoly and each service territory should have only one network operator.

The changes proposed by MoP in the earlier version of EAB 2021 allowed a competing discom to either set up its own network or use the network of an existing discom to supply electricity to its customers. Making ownership and responsibility of the distribution network non-exclusive could lead to unnecessary duplication of resources which will increase the cost of electricity for consumers.

Any additional infrastructure put up by a new entrant will need investment and statutory returns on that investment, which will increase costs for consumers. One additional challenge in the proposed changes is that the boundaries between competing discoms are not well defined. Distribution infrastructure spans the range from substation, medium-voltage feeder wires, distribution transformers, low voltage distribution, and then the meter, which is the handoff point to the consumer. In the earlier proposed changes, the point of handoff between competing discoms was not well-defined. If the hand-off point is at the consumer's meter, then this scheme would become "separation of carriage and content," and the new entrant would have no control over quality of service or loss reduction.

Mumbai is one of the few places that has operationalised multiple distribution licensees in the same geographical area. There was a conflict between RInfra and Tata Power Company (TPC), over TPC's right to distribute electricity in RInfra's service territory. There was a string of litigation, with the Supreme Court finally ruling that TPC could supply power to customers in RInfra's service territory using RInfra's network. Then there were allegations of cherry-picking, and disputes over various components of charges.



At the end of all this turmoil, the Mumbai experience turned out to be a story of endless litigation, planning and regulatory failures, and unfortunately, significantly higher tariffs for consumers (Prayas, 2016; Singh, 2016). While all aspects of the experience from the Mumbai experiment with multiple distribution licensees may not necessarily apply to the changes being proposed by the Government, it should be a sobering reminder of the perils of such an approach.

### **Diminishing the importance of network operation by delicensing**

Delicensing of distribution is likely to lead to the relative neglect of distribution network operation, just when its importance for the sector is growing. The distribution network operator (DNO) performs several functions —network planning, augmentation of the network, and operation and maintenance of distribution equipment. These tasks may seem mundane but are crucial to ensuring good quality electricity service for consumers.

The role of the DNO will become even more important and challenging due to the increasing contribution from RE in the resource mix; growing presence of DERs; new behind-the-meter technologies; and increasing use of smart meters. Instead of one-way flow of power from the transmission grid through the distribution network to the consumers, there will be bidirectional flow because of DERs. Forecasting of generation from DERs will be more difficult because much of the installation will happen behind-the-meter, based not on the utility's decisions but on consumers' decisions. Forecasting of this generation will be further complicated because of the vagaries of weather. Because of bidirectional flow of power, active management of the distribution network will be required to respond to possible congestion in the distribution network and to ensure quality of power. Managing purchase and sale of power between consumers on the distribution network (peer-to-peer transactions) will be another challenging task. In this new world, the DNO is expected to become the distribution system operator (DSO), requiring a far greater level of expertise within discoms.

Instead of adding to the loss of revenues and financial stress being experienced by incumbent discoms, it would be better to support them in enhancing the skills of their work force and being better prepared for future challenges. Furthermore, delicensing distribution and spreading these responsibilities across multiple companies will dilute accountability for distribution network and system operation and could lead to finger-pointing, if not chaos. Therefore, each service territory should have a single DNO/DSO with exclusive responsibility for the network in its service territory. Moreover, there are significant economies of scale in the work of DNOs and DSOs, and having exclusive service territories will help capture those economies.

A competitive landscape also reduces incentives for investments, especially ones with long horizons but uncertainty over who reaps the benefits of those investments. Today, the incumbent discom has the incentive to invest in its territory given a statutory rate of return that it expects to garner. Under delicensing, if there is a consumer on a feeder who has a sudden increase in demand which requires investment, it is not clear who would pay for it. The new entrant may want to invest (more so if it gets a statutory rate of return, whether explicit or implicit), but that investment would not be optimal from a system perspective.

### **Privatisation of distribution licensees is preferable to delicensing**

A better alternative than delicensing may be to pursue privatisation of discoms. Private discoms in Mumbai, Surat, Ahmedabad and Kolkata that have operated for a long time, and the more recent example of Delhi, have demonstrated that private companies can provide much better quality of service to their customers through better use of technology and superior managerial capabilities.

The Government has been promoting privatisation in distribution starting with union territories. Focusing on those efforts is likely to yield much greater benefits for the power sector, while parallel

efforts to delicense distribution are likely to be counter-productive because they will impede the progress on privatisation. Delicensing distribution will increase the risk for potential investors and reduce their interest in bidding. In this pursuit of privatisation, it is important that before any decision, the state Government consult and negotiate in an open and transparent manner with all stakeholders, particularly the unions, to address their apprehensions. The privatisation of distribution in Delhi, and more recently in Odisha, could provide an example of how this can be done.

### **Cherry-picking the most desirable consumers**

Every attempt to introduce some form of retail competition has raised concerns about competitive retailers cherry-picking the most desirable consumers and leaving the lower-paying and often poorer consumers for the incumbent discom. The incumbent discom is then left with most of the earlier cross-subsidised consumers with very few of the cross-subsidising (high-paying) ones.

In the earlier proposed changes, MoP seemed well aware of the issue, and proposed to limit the impact of cherry-picking through three measures: (1) making the minimum supply area large enough to have a range of consumers, reportedly equal to a district or municipality (at the same time keeping the areas small, perhaps to reduce barriers to entry); (2) mandating service provision to anyone in the area of coverage who requests it, and (3) establishing ceiling tariffs, and then using a Universal Service Obligation (USO) fund to share surpluses and deficits. There are likely to be problems with these measures, because the surpluses and deficits may not balance each other out, which would be a problem particularly if the deficits exceed the surpluses.

In fact, on the issue of using a USO to mitigate cherry-picking, there are two possible outcomes, depending on how surpluses and deficits are calculated. Given new entrants have to beat existing prices, and there would likely be a regulated price ceiling, they can only offer lower prices to consumers as they see fit, perhaps to some consumers. This would then lower the money available for social welfare redistribution through the USO. Alternatively, if the USO contribution will be assessed on normative tariff levels by type of consumer, then that would destroy pricing flexibility for the new entrant, because there is only so much that can be achieved through improvements in efficiency.

We think it would be unrealistic to expect competitive retail suppliers to not cherry-pick. They will enter the retail supply business to make a profit and therefore, will focus on higher paying customers with large loads, and those who are less expensive to serve, typically urban consumers, with stable demand patterns, located near existing infrastructure. Even in such areas, retailers are likely to select the better paying geographies and the better paying consumers. Even if they are required to be open to serve all consumers, they can design their tariffs and/or offer conditional discounts in a way to screen out the lower paying consumers. The outcome is likely to be a segregation of consumers, with the higher paying ones being serviced by competitive retailers, while the incumbent discom would have the less economically attractive consumers, which is likely to be the smaller and poorer consumers.

We also anticipate that out of over 700 districts in India, only a limited fraction of them would be attractive to new entrants. Even if the coverage area is made larger, say about equal to a discom, we would still find a split between areas which new entrants view with high level of interest and those where the interest is low. This is to be expected because in a delicensed world, with no statutory rate of return, it would be rational for entities to have a different level of interest in different geographic areas. Because of the difficulties in apportioning AT&C losses when there are multiple retailers in an area, (an issue we discuss later), the opportunity to increase profitability in an area by reducing losses is not likely to exist.

## **Provider of Last Resort (PoLR)**

The issue of cherry-picking naturally leads to the discussion of the PoLR. The PoLR would serve those consumers who are either unable, or unwilling, to seek out a competitive retail supplier. Most likely the PoLR will be the incumbent discom. Would there be any difference in the regulations for PoLRs? In case the same tariff caps as applicable to all the others are applicable to the PoLR, it is very likely that all the other retailers would have surpluses and the PoLRs would have deficits. While there is a planned compensation mechanism in the form of a USO fund, some questions remain. For instance, what would happen if the funds in the USO are insufficient to meet the PoLR's deficits?

It is likely that much of the direct subsidy would also go to the PoLR. It is also probable that the respective state might be late in providing the direct subsidy in time, not just based on its past track record but also because of financial distress caused by the Covid-19 pandemic. In that case, aren't we in the same situation as earlier, with the incumbent discom being in deficit? In fact, it is likely that the incumbent's deficit under these conditions (with retail competition) will be larger, while the other retailers will break-even or earn profits. Thus, the proposed changes with multiple retailers will end-up segregating consumers; with the richer ones being served by financially viable entities and the poorer consumers being served by a discom that is financially even weaker.

## **Incompatibility between the USO Fund and market provisions**

In an unfettered market, where regulation is often limited to preventing monopoly practices, no regulator would need to determine costs, profits, prices, etc. But the need for social welfare redistribution leads to mechanisms like the USO fund, with surpluses and deficits.

We know that industrial and, especially commercial, tariffs are high. New entrants can primarily offer such users lower tariffs to entice them. The first challenge becomes the role of the regulator to set a cross-subsidy surcharge (CSS). The CSS is supposed to compensate the distribution company for the lost cross-subsidising revenue due to the exit of a large customer. If they keep today's levels of CSS, then any provider would pass these through, lowering the scope for lower prices to at most efficiency gains. On the other hand, a private operator would have a greater need for maintaining profitability, something most government discoms don't achieve, which would raise prices. If regulators lower the CSS, then it leaves less cash for balancing under-paying consumers, who are likely to be disproportionately with the PoLR.

It remains a false premise that the new entrants would face just market forces. The role of the regulator remains paramount for many of the issues listed thus far, including USO, CSS, PPAs, etc. Regulatory issues are made even more complex by concerns over affiliate transactions by providers, especially for ones that have interests in generation. Even without this complexity, we would now increase the burden on the regulators manifold, since they would have multiple players in each of perhaps dozens of geographies within a state!

## **Differentiating Quality of Service**

It will be difficult for any retailer to guarantee better quality of electricity service—because that would be in the hands of the network operator — and thus it will be difficult for a retailer to attract customers by offering improved service.

One of the most critical aspects of service quality is outages. Outages include both load-shedding and faults. Load-shedding today occurs at a feeder level, and thus one cannot have selected consumers in a feeder opting for premium plans say, guaranteed zero-load-shedding, without either everyone enjoying such service, or through the use of smart meters. Smart meters go beyond just digital meters by adding bidirectional communications to enable not just meter reading but also the ability to help detect theft as well as disconnect consumers remotely if they do not pay their bills.



Smart meters are a necessary tool in India's power sector transition, but they have their own system design and pricing issues and it will take time to sort them out. The new central government scheme, RDSS – Revamped Distribution Sector Scheme: Reforms-Based and Result-Linked, has a target of installing 250 million smart meters in a few years. The aim is these would help cut down AT&C losses, but smart meters are a complex technology (rather, an ecosystem) that requires significant capital expenditure. This is a very accelerated and aggressive timeframe, especially considering the poor financial and human capacity status of distribution companies, which manifests itself in poor preparedness for integrating such technologies. In contrast, it took the US much longer to achieve about 60% coverage of smart meters by 2020.

Importantly, in a delicensed world, there are reports of planned new Metering Service Providers, who would sit between the wires owner and the retailer. Would such an entity simply be a contractor or would they also have some skin in the game, especially an incentive to reduce losses? Regardless of whether this does or doesn't happen, especially in light of RDSS, will there be a top-down mandate on metering technology and capabilities, to ensure compatibility and regulatory compliance? If so, this would limit the flexibility in metering system design that a retailer may need. Tongia (2020) points out various other challenges as well, with smart meters and pre-paid meters (especially if the latter are not fully-functional smart meters as well).

### **Need for a More Consultative Approach**

While we understand the Government's interest in addressing the problems in the power sector expediently, the accelerated process for introducing legislation has reduced opportunities for consultation on the proposed changes. The draft amendments proposed in 2014, 2018, and 2020 were all different from each other and from the changes being proposed now. Therefore, the comments and inputs on those earlier amendments may be helpful, but additional consultation on the new proposed amendments is still required. In contrast, the original Electricity Act went through extensive reviews between 1998 and 2003, first at the technocratic level, and then at the political level in Parliament.

It would help greatly if wide consultation is facilitated through greater participation of stakeholders: a wide range of inputs would become available for the changes that MoP may be contemplating. The availability of a discussion paper that outlines the changes being considered and provides the rationale behind them could form the basis of discussion. The consultation or discussion paper should list the pros and cons of different options available to address the problems. MoP could then solicit comments, as well as directly engage with a spectrum of experts, not just from industry or consulting firms. Based on those comments MoP could finalise proposed amendments to the Act, and then solicit comments on the new draft, leading to its enactment. While this process is likely to take longer, we believe the scale of the problems makes the delay a worthwhile investment. One possibility might be to also consider pilot projects to evaluate changes, and even a stage-gate approach.

While a consultative approach may seem frustratingly long and slow, it is essential for having a thriving power sector that can propel the Indian economy on a high growth path.

## Part III: Implementation challenges

### Handling of legacy PPAs and losses

All incumbent discoms have committed supply sources in the form of PPAs. In fact, many states are grappling with 'surplus' PPAs, a problem that is being exacerbated by the push for adding more RE, which too would be based on PPAs. The handling of these legacy PPAs is important because the method used to divide them between the incumbent and each of the competitive retailers, will have a significant effect on the cost structure, and ultimately on the retail prices for consumers, not to mention the profits and losses of each of these entities.

MoP is proposing to divide these PPAs on the basis of the total connected load of the customers signed up with each supplier. While this is a relatively straightforward and easy way to allocate the legacy PPAs, it could lead to sub-optimal results in two ways. First, the load shape of customers signed up with each entity could be quite different and that could affect the supply requirements of the entities. For example, assume a new entrant signs up mostly continuous process industries which have a flat load, and the incumbent has mostly residential consumers whose load occurs mainly between 6 p.m. and 10 p.m. Clearly, rather than dividing the PPAs in proportion to the total of each entity's load, it would be more efficient to assign more of the baseload plants to the new entrant and the cycling and peaking units to the incumbent.

The second way in which a straight division of the PPAs based on connected load leads to sub-optimal results is related to the first. The method of division proposed by MoP ignores the diversity in the timing of the peak of the total load of each entity. To take an extreme example, if a new entrant serves a commercial load of 10 MW that is on from 10 a.m. to 6 p.m., and the incumbent discom serves a residential load of 10 MW from 6 p.m. to 10 p.m., then the total supply requirement is not the simple addition of each of the peak loads which would be 20 MW. Instead, it is only 10 MW, because the same plant or PPA can serve the two loads as they occur at different times. Straight division of legacy PPAs, based on connected load, ignores the diversity factor of the total load. The arithmetic isn't just complex, but dynamic, with changes based on market share but also changing consumer load shapes based on rising use of consumer self-generation, and, eventually, storage and time-responsive loads. The situation is complicated further because of present skews in how retail tariffs have cross-subsidies across consumer types based not just on energy (kWh) charges but also on fixed or capacity charges (kW, of sanctioned load).

Legacy PPAs combined with ceiling tariffs could greatly limit the flexibility of retailers. Because the PPAs represent input costs and the tariffs determine the expected revenue, there is very little freedom for the retailers. Retailers aim to differentiate their service and can offer lower costs through creative approaches to purchases of power and/or innovative and attractive tariff designs. But if both these avenues for differentiating their service from others are hampered because of the legacy PPAs and the regulated tariffs, then it would significantly constrain the innovation a retailer could carry out. When competition was introduced in some states in the US, there was no socialization of existing power purchase agreements. In some states, the vertically integrated utilities had to divest their generation assets while in other states a firewall was created between generation and distribution for entities that had interests in both.

Another vexing issue is how losses (both technical and commercial) are to be divided between retail suppliers. The easiest way would be to divide the losses proportionate to load. But that would dampen any efforts by retailers to reduce losses in their service area. At the extreme, these become a moral hazard. We would end up continuing treating these losses just as a cost of doing business, with losses embedded in the tariffs for the most part. Beyond just the general problem of socialisation, there are other issues. In the previous cost-plus regulated system, aggregate technical and commercial (AT&C) losses were meant to be on a downward trajectory. In a competitive

system, one would have to use actual losses and propagate them through, instead of the target loss rate. Otherwise, it would be unfair and unviable for a new entrant, especially one who might claim that they are 'better than average'.

### **Confidentiality and Handling of Data**

Because network planning will be in the hands of the respective network operator, the retailers may be required to share the data regarding customer-usage patterns, and projections for the future, with the network operator. Protocols and confidentiality rules will need to be established.

Data is a key aspect of any future system, not merely because it is the primary tool for efficiency and loss reduction. Over time, data will help market differentiation, but asymmetric access to data can lead to strong imbalances between providers, more so if some have their own generation assets and others don't.

### **Preparedness of Discoms**

If the proposed changes are to come into effect, a great deal of preparation will be required in the data systems of the incumbent discoms. Some of the systems which will need to be updated or installed, if not already there are: a Geographic Information System (GIS), consumer information and location, standards-based billing systems, distribution assets. While this may appear to be merely an operational or execution challenge, lack of discom preparedness as well as poor databases were key factors in the lack of success of the original Odisha privatisation exercise and the Restructured-Accelerated Power Development & Reforms Programme (R-APDRP) targeted at reducing losses.

Any grand plan requires sufficient time for sequencing. Maharashtra, for example, already separates the cost for distribution between the wires and supply functions, though with the exception of Mumbai, they do not have retail competition just yet. Such accounting efforts should be started by all discoms to enable a smooth shift to any type of retail competition.

We also suggest that every plan have a trajectory listing all the steps necessary for success. These include not just discom preparedness as listed above, but also strengthening human capacity for change and upstream redesign of wholesale markets. The irony is that regions that are better prepared may be those that have lower losses anyway.

### **Conclusions and Recommendations**

The problems in the power sector, particularly regarding the poor financial health of discoms, need to be addressed as soon as possible. However, the changes being proposed by MoP for delicensing distribution and allowing multiple discoms in the same geographical area are unlikely to solve the problems. Of greater concern is the fact that they may create very serious operational and planning difficulties in the sector. Because many of the issues with distribution depend on challenges outside retail supply, one cannot simply apply radical surgery like retail choice at the endpoint of the chain.

Allowing new entrants to set up their own network would result in unnecessary duplication of resources, ultimately raising the cost of electricity for consumers. The Mumbai experience, with multiple distribution licensees in the same area, should be a sobering reminder of the problems that arise— endless litigation, planning and regulatory failures, and higher tariffs for consumers. The proposed changes, by removing exclusive responsibility for the distribution network, could lead to neglect of distribution network functions such as planning, augmentation, and maintenance. It may not be wilful neglect; any competitive discom may have no incentive to invest unless it has an assurance of earning a return on its investment.

Privatisation of distribution licensees is a better option because it harnesses the superior technical and management capabilities of the private sector to improve the distribution sector and provides adequate incentives to invest. Such entities are also less likely to be subject to political pressures. Delicensing of distribution is likely to slow down the Government's privatisation drive because it will increase the risk for potential investors and reduce their interest in bidding for discoms. While details on requirements for registration of new entrants have not been announced yet, the general thrust appears to be on maintaining low barriers to entry.

There will also be very significant problems with implementation if the changes are introduced in the manner being discussed. Allocation of legacy PPAs and AT&C losses will be difficult. There is no method that is both easy and technically sound. With the proposed changes, the ability of a retailer to differentiate services provided to clients will be difficult. All consumers on a feeder face the same load-shedding or technical faults. Smart meters may help but it will take time. The issue of cherry-picking, while mitigated to some extent by the measures the Government proposes, will not disappear completely.

Most of the measures that the Government has proposed in prior drafts EAB 2014, 2018, and 2020, rely on legislative solutions to the problems facing the distribution sub-sector. It is important to remember that the main underlying cause for these problems is that the tariffs for some classes of consumers do not fully cover the costs, resulting in cross-subsidy that raises the tariffs for commercial and industrial customers and poor financial health of the discoms. But this is a political problem, because states often keep tariffs low for the electoral advantage of such actions. We are not condoning these actions but simply pointing out such problems are unlikely to be amenable to legislative or regulatory fixes. Political problems are best dealt with at the political level. Therefore, a consultative approach needs to be adopted to seek a political solution using a deliberative, open and transparent approach to negotiate and arrive at solution that is widely acceptable by all the significant stakeholders.

We saw this play out in the past. When there is underlying resistance by the utilities, like for open access or even rooftop solar, they have used covert and overt means to resist losing premium customers. In contrast, when there is a strategic alignment of objectives, like for rural electrification, then central push (and funding!) brought us over the finishing line with record speed. While a consultative approach may seem frustratingly long and slow, it is a worthwhile investment for having a thriving power sector that can propel the Indian economy on a high growth path.

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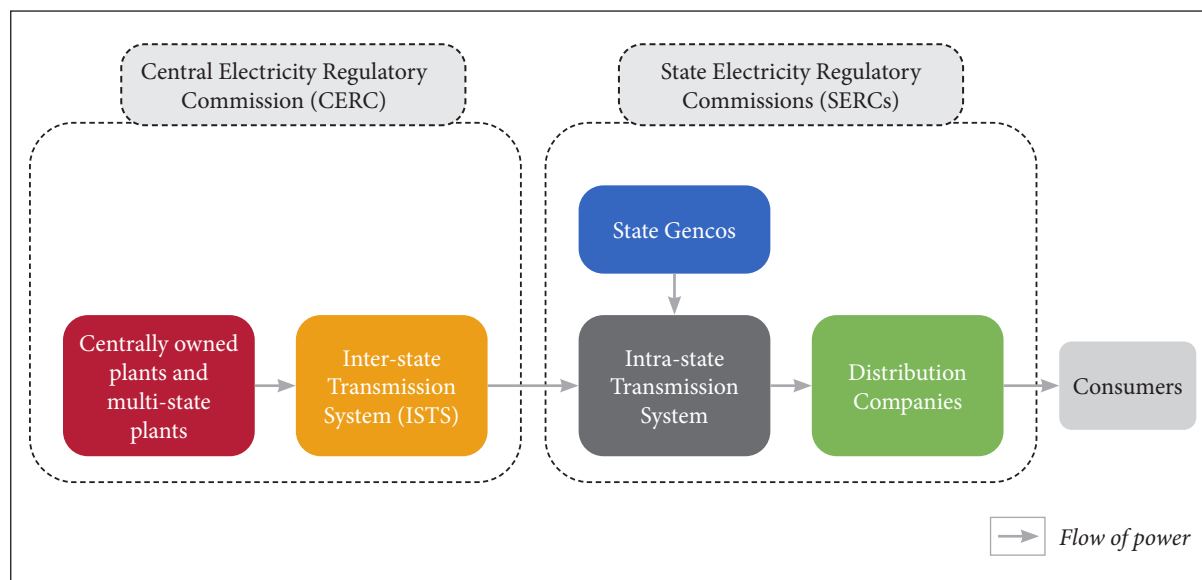


## Annex I: Overview of the Indian power sector

The electricity supply chain has a number of components which are typically segregated as generation, transmission, and distribution (the last of which also covers retail supply). Historically, these were vertically integrated, not just in India, but in most parts of the world. In 1996, the state of Odisha was the first to unbundle its erstwhile State Electricity Board (SEB), and also privatize some components of this chain. With the advent of the Electricity Act (EAct) of 2003, most states unbundled their SEBs into separate companies for generation, transmission and distribution, but these remain government owned corporations. New Delhi was an exception which also privatized its distribution companies. In Punjab and Tamil Nadu, generation and distribution remain bundled. Kerala has retained its State Electricity Board in its vertically integrated form. In a handful of areas, the private sector participates not as a licensee distribution company but as a contractor of sorts as a distribution franchisee.

A highlight of the reforms that unbundled electricity was the establishment of independent electricity regulatory commissions (ERCs) at both the central and state levels. Figure A1 shows the broad outlines of the organizational and regulatory framework of the sector. Two additional features of the sector are not shown on the figure. First, distribution companies can, and do, purchase power from privately owned generators and from the power exchanges. The purchase of power from private players is usually under long term power purchase agreements (PPAs). The second feature not shown on the figure is that large customers of the distribution with loads greater than 1 MW can obtain power from other entities through the “open access” provisions of the EAct. In such cases, in addition to wheeling charges, the customer also makes additional payments to the distribution company in the form of a cross-subsidy surcharge to compensate for loss of cross-subsidy revenues and an additional surcharge to cover the fixed charges for contracted generation by the distribution company.

Figure A1. Simplified Overview of the Regulation of the Indian Power Sector



Note: This is not a comprehensive view of the power sector, and, for example, doesn't show private sector generation, which could span a mix of regulated and non-regulated tariffs, varying by geography into central purview (crossing state boundaries) and state ERC purview.

There are two important functions among the many functions assigned to the State Electricity Regulatory Commissions (SERCs) (EAct, §86). First, the SERCs determine the tariff for generation, transmission, and supply of electricity in their respective states. Second, the SERCs regulate the purchase of power by distribution companies including the price paid for the power.

Consumer (retail) tariffs are set by SERCs on a cost-plus basis. The tariffs are supposed to reimburse distribution companies for legitimate and prudently incurred costs plus a return on the equity that the owner (most often the state government) has put into the company. About 70%-80% of the cost for electricity that consumers pay for their electricity comes from the cost of power procurement. However, this figure embeds inefficiencies such as high system losses which necessitate additional purchase of power. Distribution companies can sign power purchase agreements without regulatory pricing, as long as the agreement is the result of a competitive bidding process.



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