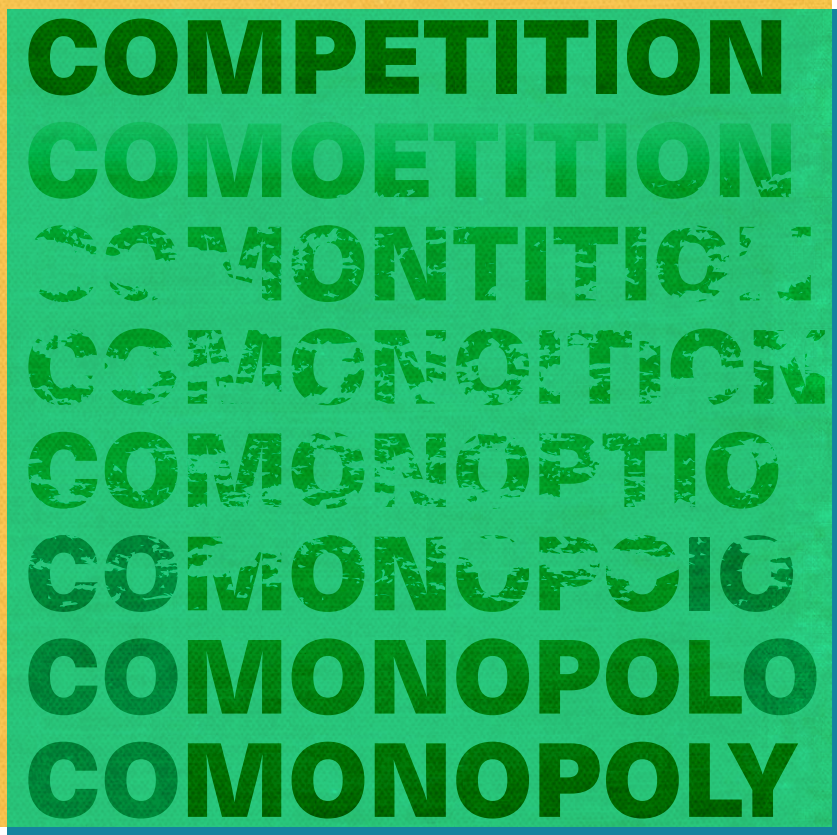
In the Name of Competition

The annals of 'cost-plus competition' in the electricity sector in Mumbai

Prayas (Energy Group)



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February 2017

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Executive Summary

With low unmetered consumption, near-universal access, and very low distribution losses, Mumbai was considered to be the perfect candidate for introducing competition in the retail supply of electricity. With the declaration of Tata Power Company Ltd. (TPC) as a parallel licensee, competition did arrive in Mumbai, not through concerted policy effort but through litigation. While the introduction of a parallel licensee (with lower costs) piqued interests and raised expectations of gains for the consumer, much of the experience that followed in Mumbai failed to meet these expectations.

This report reviews the history and evolution of the parallel licence arrangement and the role played by various institutions in shaping the outcomes. The objective is to enable a deeper understanding of the Mumbai experience, with emphasis on the operationalisation of the parallel licence mechanism and the lessons, if any, that it can offer for reforms aimed at furthering competition in the electricity sector. For this purpose, the report looks at the experiment largely through the lens of regulatory process and its impact on consumers.

Genesis of the parallel licence issue

The report shows that both the state government and the regulator were mindful of the challenges in operationalising a parallel distribution licensee, especially under a legal framework that requires distribution companies to supply electricity to the consumers using their *own* wires. The state government, aware of the issue since 1998, was wary of such an experiment. In spite of having the powers to avert such a situation by modifying the licence conditions, it chose to offload this responsibility on to the Maharashtra Electricity Regulatory Commission (MERC). This was before the Electricity Act, 2003, and hence the MERC could not amend licences. The MERC, on the contrary, was more optimistic about Mumbai's preparedness for embracing reforms, and was willing to experiment with the parallel licence arrangement as a new reform measure. However, soon the matter went beyond the control of either the state government or the regulatory commission, and after five long years of legal battles, the parallel licence became a *fait accompli* in 2008 as a result of a Supreme Court judgement.

On the one hand, Reliance Infrastructure Ltd. (RInfra) had a large number of residential suburban consumers and high tariff on account of high cost of its power purchase. On the other hand, TPC was a generator and a bulk supplier in Mumbai with a significant generation capacity at its disposal and costs lower than those of RInfra. It was against this backdrop that the MERC had to operationalise the parallel licence arrangement.

Operationalisation of the parallel licence arrangement in Mumbai

Highlighting the benefits of switching to the low cost supplier, the MERC allowed RInfra's consumers to migrate to TPC via a process called 'changeover'. The consumers who opted for changeover remained connected to RInfra wires network, but received electricity supply from TPC. In spite of the stark differences in the consumer mix of the two companies, crucial issues such as the loss of cross-subsidy and recovery of regulatory assets were not dealt with immediately. In addition, uncertainty regarding the need and extent of TPC's parallel network continued.

With the choice to select an alternate supplier being enabled, many consumers opted for changeover. However, as listed below, a series of regulatory decisions led to sub-optimal outcomes and left many consumers disillusioned:

- 21 months after the operationalisation of changeover and after more than 1.54 lakh (mostly large) consumers chose to migrate to TPC using changeover, the MERC belatedly introduced a cross-subsidy surcharge and a regulatory asset charge.
- Amidst allegations of cherry-picking of consumers by TPC and in an attempt to balance the consumer mix, given that only large consumers were migrating, the MERC imposed restrictions on migration and modified tariffs of both the licensees such that changeover became uneconomical for large consumers but lucrative for small consumers.
- Given the regulatory certainty for recovery of most of the claimed costs under the cost-plus regime, both the competing licensees failed to significantly reduce their costs. While relying on the short term bilateral market for procuring power up to 20–25% of their demand, both licensees also avoided bidding for long-term power procurement and signed cost-plus power purchase agreements only with their sister concerns.
- The uncertainty regarding the need and extent of the parallel network continues as of February 2017, since the MERC is yet to decide a protocol for this purpose.
- Failure on part of the MERC to rein in costs of the companies combined with its inability to enforce prudent power purchase planning led to further increase in tariffs for both the licensees and added to the accumulation of regulatory assets. The MERC also failed to resolve the issues pertaining to transmission constraints, which further limited options for economical power purchase. In addition, delayed decisions by the MERC on some key issues coupled with continuous litigation by the licensees significantly contributed towards information asymmetry.

However, in spite of these and many other shortcomings, in Mumbai around 5.7 lakh consumers opted for changeover. This is a significant development as it shows that once they had a choice, around 19% of suburban Mumbai consumers opted for a more economical supplier.

Key findings and suggestions for a way forward

One of the crucial learnings from the Mumbai study is that so long as the companies are provided with regulatory certainty for recovery of the claimed costs, there will be little incentive for them to optimise their operations. Therefore, the report suggests an alternative approach, implementable within the existing legal and regulatory framework, for dealing with the multiple problems faced by Mumbai.

This approach is guided by the need to provide tariff certainty to consumers and relies on the provisions of the Electricity Act, 2003, which empower the regulator to set tariff ceilings in case there are two or more distribution companies operating in the same area. Additionally, it allows the regulator to focus its attention on issues concerning supply and service quality, while also providing the distribution companies the necessary flexibility to optimise their costs and operations, so long as they are able to operate within the ceiling limits and adhere to standards of performance. The key objective of the proposed alternative is to put an end to the cost-plus approach and the regulatory assets regime. In contrast to the current arrangement, the proposed scheme offers no guarantee for recovery of costs arising on account of inefficiency.

As the electricity sector gears up for more competition resulting from the increase in open access, reducing costs of renewable generation, greater role of markets, and proposed reforms such as separation of carriage (wires) from content (supply), the Mumbai experience offers useful lessons and insights to ensure that it translates into real benefits for consumers and the public at large. In this regard, the relevant lessons from the analysis of the Mumbai experience for the broader power sector can be summarised as follows:

- **Creating a conducive environment for competition**: Efforts towards ensuring the essential preconditions for competition, such as clearly defined and unambiguous entry and exit criteria, non-discriminatory open access to the transmission and distribution systems, stringent norms for supply and service quality, and robust mechanisms for redressing consumer grievances, should precede reforms aimed at furthering competition.
- **Defining clear and unambiguous rules**: Policies should be backed by a clear and enforceable regulatory and legal framework, with rules and regulations as clear and unambiguous as possible. This will significantly reduce litigation in the implementation phase; and it will also enable better risk management. The network rollout process in Mumbai clearly shows that not having a clear road map supported by appropriate laws and regulations can cost dearly. The price of not having such clarity is often paid by the consumers and the public at large. More importantly, the government and the regulator must enforce the laws and regulations strictly and consistently and at times, take the necessary harsh steps, such as amending the licence conditions to ensure a level playing field.
- **Abolishing the cost-plus tariff approach**: This is the single most significant lesson that emerges from the study of Mumbai's electricity sector. Apart from not providing any significant incentives for companies to optimise their costs, cost-plus regulation is also time and effort intensive on the part of the regulator. Hence, in case of multiple suppliers, it is absolutely essential to move to category-wise tariff ceilings. While deciding the ceiling, interests of small consumers need to be protected. The regulator should focus on ensuring adherence to supply quality and performance standards, and on preventing anti-competitive behaviour.
- **Ensuring supply obligation**: With only two parallel licensees, relatively high paying capacity, and near-universal access, Mumbai faced challenges in ensuring its supply obligation. This problem can become particularly severe if the number of suppliers increase. Unfortunately, most commissions in India have taken a hands-off approach towards access and supply quality issues as far as rural and poor households are concerned. Hence, without an explicit and strong regulatory mandate to ensure supply obligation, small consumers are likely to miss out on the benefits of competition.
- **Bridging information asymmetries**: One of the key reasons that the changeover process left so many consumers disillusioned was that they did not have the crucial information regarding the manner in which their tariff was going to change. Carriage and content separation, if introduced, would require greater transparency, clarity on tariff structure and charges as well as effective enforcement of provisions dealing with information sharing. These can include steps such as developing a policy roadmap based on extensive public consultations, creating public repositories for crucial data and information regarding the sector's functioning (losses, regulatory assets, etc.), defining clear and unambiguous rules and processes.
- **Continuous learning**: In Mumbai, so many opportunities, such as licence amendment and renewal, approval of new power purchase contracts, transmission planning and a review of the changeover, were lost for want of regulatory ability to respond swiftly to such changes. For any policy to be effective, it is absolutely essential to have a regulatory system that responds to a dynamic phenomenon like competition in a nimble and agile manner.

As the complexity of the sector is bound to increase, it will need a regulatory and policy framework that has much greater capacity to effectively engage with the emerging challenges. In this regard, it is extremely important to re-evaluate the effectiveness of the present regulatory system and to enhance its capacity to deal with such new challenges.

1. Introduction

Mumbai was one of the earliest cities in India to be electrified and has a long tradition of private companies supplying electricity. Unlike electricity consumers in the rest of the country, those in Mumbai get quality supply that is also reliable: outages or power failures are rare. The distribution companies in Mumbai benefit from the dense consumer base, with mostly metered connections, a greater ability to pay, and low distribution losses. Given these features, the city was viewed by many, including the Maharashtra Electricity Regulatory Commission (MERC), as an ideal candidate for introducing competition in the retail supply of electricity.

Competition, albeit in a limited form, did eventually come to Mumbai and today it has parallel distribution companies competing for consumers in the same area. This 'parallel licence' arrangement was operationalised in Mumbai through a unique protocol termed 'changeover', which allowed consumers to move from one distribution company to another for electricity supply, but remain connected to the wires of the incumbent company. This competition was not a result of any concerted policy effort but of litigation. As this report shows, implementation of the parallel licence arrangement has seen many twists and turns.

The Mumbai experience therefore makes an interesting case study to understand how the parallel licence arrangement has played out for all stakeholders, namely the companies, the regulator and especially, the consumers.

1.1. The electricity geography of Mumbai

Mumbai today is served by four electricity companies, namely Tata Power Company Ltd. (TPC), Brihanmumbai Electric Supply & Transport Undertaking (BEST), Reliance Infrastructure Ltd. (RInfra), and the Maharashtra State Electricity Distribution Company Ltd. (MSEDCL). As can be seen from Figure 1, for the purpose of electricity distribution, Mumbai is broadly divided into the following three parts (MERC 2011d):

- South Mumbai (the island city) : roughly from Colaba to Sion and Mahim;
- Suburban Mumbai (northern and western) : roughly from Bandra to Dahisar, Mira Bhayander and Chunabhatti to Mankhurd and Vikhroli; and
- Suburban Mumbai (eastern) : Bhandup, Mulund, etc.

Figure 1: Electricity geography of Mumbai

Source: Map Data ©2016 Google; Demarcation lines by PEG using distribution licences of the three companies (MERC 2007b; MERC 2011g).

Both BEST and TPC have the licence to supply in the area of south Mumbai; however, the parallel licence arrangement has not been operationalised there and the area is served primarily by BEST. RInfra and TPC have the licence to supply in the northern and western suburban areas, and the parallel licence has been operationalised here. The eastern suburbs are served by MSEDCL, the state-owned utility of Maharashtra, which has the exclusive licence for supply in that area (MERC 2011d). Thus, TPC has a parallel licence for the island city and the area served by RInfra in suburban Mumbai.

Since MSEDCL's licence area is not subject to parallel licences[1], this report concentrates on the other three distribution companies party to the parallel licence experiment, and particularly, on the two suburban Mumbai licensees — RInfra and TPC — where the parallel licence arrangement has been operationalised. Thus, all references to 'Mumbai' in this report are to all areas except those served by MSEDCL, while references to 'suburban Mumbai' refer to the northern and western suburban areas where RInfra and TPC both have a licence.

Before operationalisation of the parallel licence arrangement, TPC was largely functioning as a bulk supplier and catering to large consumers while also providing generation for BEST and RInfra, which supplied to small retail consumers. Table 1 provides a summary of the sales, consumer numbers, and peak demand for the three licensees for 2008–09 and 2015–16, i.e. spanning the years before and after the operationalisation of changeover.

Table 1: Changes in consumer mix, sales and peak electricity demand in Mumbai

Company	Area (km^2)	Type of consumer	2008-09			2015-16		
			Consumer numbers	Sales mix (MU)	Peak demand (MW)	Consumer numbers	Sales mix (MU)	Peak demand (MW)
BEST	~70	Small and Medium (LT)	9.6 lakh	3566	646	10.3 lakh	3848	890
		Large (HT)	121	537		180	711	
RInfra	~384	Small and Medium (LT)	26.9 lakh	7305	1381	23.7 lakh	6980	1538
		Large (HT)	458	925		563	1027	
TPC	~454	Small and Medium (LT)	0.25 lakh	523	345	6.62 lakh	2952	996
		Large (HT)	134	1945		306	2803	

Source: MERC orders for multiple years.

Note: Figures are as claimed by the distribution company; figures for 2015–16 are estimates by the companies. TPC figures for 2015–16 include TPC's direct consumers, as well as changeover sales.

As can be seen, in 2008–09, RInfra and BEST had a large number of small and medium consumers, as well as some large industrial and commercial consumers. Given the larger size of RInfra's supply area, its small and medium consumers were almost three times that of BEST. TPC, on the other hand, was primarily catering to large consumers, with a few small and medium consumers.

By 2015–16, the scenario looks a little different. BEST, where the parallel licensee arrangement could not be operationalised, remains mostly unchanged. RInfra's small and medium consumer base has shrunk by around 3 lakh consumers. TPC's consumer numbers have increased

1. MSEDCL has its licence area in Mumbai (Bhandup, Mulund, etc.), but this does not overlap with the licence area of RInfra or that of TPC. The only overlap is the Chene and Vesave areas, which were added to the licences of RInfra and TPC in 2011 and 2014 respectively, when their licences were renewed (MERC 2016a).

substantially: it is now serving almost 7 lakh small and medium consumers and around 300 large consumers. Around 0.6 lakh consumers have been added to TPC's own network, while the majority came through changeover.

1.2. Mumbai within the larger electricity sector in India

Electricity is on the Concurrent List in the Constitution of India, which means that the central government as well as the state governments can pass legislation on the subject. Prior to independence, electrification was limited to important urban and industrial areas of the country (Kale 2014b). After independence, the government's push for providing electricity took the form of vertically integrated electricity boards, one in each state, which catered to the generation, transmission, and distribution needs of that state; later, this was expanded by adding national generation stations and regional transmission companies. Such structuring of the electricity sector was in line with the then prevailing global wisdom, which considered the electricity sector a natural monopoly necessitating vertical integration. The state electricity boards were thus monopoly electricity service providers in their respective states. Nationalisation following independence also saw several private electricity companies being taken over by electricity boards and, by the 1980s, apart from private distribution companies in a few cities such as Mumbai, Kolkata, Surat and Ahmedabad, the rest of the country was being served only by the state electricity boards.

During the economic reforms of the 1990s, the generation sector was opened up for private investments.[2] This was followed by the Electricity Act, 2003 ("the 2003 Act"), which emphasised 'unbundling' of the state electricity boards into distinct and separate companies carrying out one or more of the key functions, namely generation, transmission, and distribution.[3] Privatisation of the distribution business was the next step. However, it was undertaken only in a few places, such as Odisha, Delhi, and Greater Noida (Uttar Pradesh). Competition in the other segments was on the agenda but did not receive as much traction.

Through all this, Mumbai's electricity sector remained more or less insulated from the reforms sweeping the country. It retained its extant companies and much of its original sector structure — TPC generated electricity to supply to BEST, the Bombay Suburban Electric Supply Ltd. (BSES, now Reliance Infrastructure or RInfra) and other large consumers. BEST distributed electricity to consumers in south Mumbai, while BSES (RInfra) did so in suburban Mumbai.

At the turn of the new millennium, Mumbai found itself with parallel electricity distribution companies: TPC's licence was interpreted to mean that it could distribute electricity to retail consumers, making it effectively a parallel distribution company for all of Mumbai. Mumbai is the only major city in India where parallel distribution licensees exist.[4]

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2. Companies (private or otherwise) were allowed to set up new generation plants and sell electricity to the existing state electricity boards. While each state electricity board continued to have its own generation plants, new entrants could operate their own generation plants and sell to the boards. These new companies came to be referred to as Independent Power Producers (IPP).
3. For example, in 2005 the Maharashtra State Electricity Board (MSEB) was restructured into four companies: the MSEB Holding Co. Ltd., the Maharashtra State Electricity Distribution Co. Ltd. (MSEDCL), the Maharashtra State Power Generation Co. Ltd. (MSPGCL), and the Maharashtra State Electricity Transmission Co. Ltd. (MSETCL).
4. The Jamshedpur Utilities and Services Company (JUSCO), a Tata enterprise, has a parallel licence to provide electricity supply to the Seraikela-Kharsawan district of Jharkhand, which is contiguous to JUSCO's service area of Jamshedpur. Thus, both the Jharkhand state electricity company as well JUSCO can supply electricity in the same area, and the consumers have a choice of electricity supplier. JUSCO was granted a distribution licence in December 2006 to distribute power by building its own parallel network (JSERC 2006).

Existence of a parallel licensee, although allowed by the legislation (MERC 2003),[5] was never encouraged. The distribution business was viewed as including both the provision of wires and the supply of electricity to consumers. A parallel distribution company then would mean a *parallel* distribution network. The components of the electricity business involving wires (transmission and distribution) are considered natural monopolies: their physical multiplicity is considered a waste of resources and in many cases is also not feasible. To bring in competition in the retail supply of electricity, two changes are usually required: one, a complete separation of the wires component of the distribution business from the electricity supply component (referred to as the separation of *carriage* and *content*) and two, a guarantee that everyone will enjoy non-discriminatory access to the transmission and distribution wires (referred to as *open access*). The wires business then acts as a carrier for all retail supply companies who compete for consumers by offering lucrative tariffs and other services.

For operationalising changeover in Mumbai in the absence of 'carriage and content' separation, a unique arrangement was introduced. This arrangement, termed *changeover* allowed suburban Mumbai consumers to move to TPC for electricity supply but remain connected to RInfra wires. Thus, Mumbai is the only city in the country where an experiment along the lines of 'carriage and content' separation can be said to have been undertaken.

1.3. 'Cost-plus competition'

Before the Electricity Act, 2003, the state electricity boards were authorised to set tariffs so as to achieve 3% surplus on fixed assets. In practice, the state governments determined the electricity tariffs without seriously considering the electricity board's costs and efficiency. For privatisation, and particularly to attract private investors, it was felt necessary to have institutions that could regulate the sector based on techno-economic principles, but were also at a sufficient distance from the government. This led to the establishment of regulatory commissions in several states and with the 2003 Act, the mandate of the regulatory commissions was significantly widened. It included ensuring quality supply at reasonable prices, protecting consumer interest, and gradually moving towards a model where the tariffs for different types of consumers would reflect the cost incurred by the company to supply electricity to them.

Considering the fact that most of the electricity sector was under state ownership, it was felt that a transition to a more competitive sector could only be gradual. The regulatory commissions therefore were to perform the twin role of providing transparency to the tariff fixation process and, through improved efficiency, move towards a more competitive environment. Different approaches and methods can be adopted for regulating electricity tariff. In the Indian context, cost-plus regulation, with certain performance based measures[6], is most prevalent (For more information on cost-plus tariff regulation, please see Annexure 1).

In spite of having competing distribution companies, the tariff of suburban Mumbai distribution companies (TPC and RInfra) continues to be determined by the regulatory commission under a cost-plus system. Thus, ostensibly, electricity distribution in suburban Mumbai is competitive, but the tariffs are set under the cost-plus framework. Mumbai thus, is a case of 'cost-plus competition'.

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5. Legislation refers to the Indian Electricity Act, 1910 and the Electricity (Supply) Act, 1948, which regulated the grant of licences by the appropriate government. The Electricity Act, 2003, superseded these acts, and gave the power of licensing to the regulatory commissions. The 2003 act continues to regard the distribution business as wires and retail supply, although it explicitly allows for parallel licensees.
6. For the purpose of the discussions in this report, reference to cost-plus tariff implies tariff determined by an electricity regulatory commission as per the provisions of sections 61, 62 and 64 of the Electricity Act 2003.

While there may be many aspects of interest in the Mumbai experiment, the two aspects of interest in this study are how the parallel licence mechanism has been operationalised and what lessons, if any, does it offer for broader reforms aimed at introducing competition in the retail supply of electricity. For this purpose, the report looks at the experiment largely through the lens of the regulatory process and its impact on consumers.

The objective of this report is to enable a deeper understanding of the Mumbai experience. More specifically, the report seeks to answer these and similar questions: How has the presence of competing distribution companies impacted efficiency? How have the companies and the regulator responded to the exigencies of such competition? What tangible benefits has the arrangement offered to the consumers and the companies?

To answer such questions, the report analyses three major issues in detail, namely

- power procurement planning and strategies (as power purchase accounts for more than 70% of the cost of supply for distribution companies);
- the operationalisation of parallel licensees, including rollout of the parallel network (which largely determines how consumers exercise their choice), and
- the roles played by key stakeholders, as well as other institutions such as the state government and the Appellate Tribunal for Electricity (APTEL) in shaping the outcomes.

The report is structured as follows: Chapter 2 briefly traces the history of the electricity sector in Mumbai and the operationalisation of changeover; Chapter 3 gives a snapshot of suburban Mumbai's experience with parallel licensees, such as consumer migration and response to key regulatory decisions; Chapter 4 examines the power procurement planning undertaken by the distribution companies; and Chapter 5 looks at the implementation challenges and how they were dealt with. Chapter 6 examines the role of the electricity regulatory commission, the state government and other institutions. Lastly, Chapter 7 offers a few suggestions for the way forward in Mumbai and culls out the lessons to inform the wider policy debate in the sector.

Before going further, a disclaimer: the report focuses primarily on the two distribution companies, namely TPC and RInfra, operating in suburban Mumbai, where much of the action has taken place. Consumers in south Mumbai, where the parallel licence arrangement is yet to be fully operationalised, are largely being served by BEST. BEST is not mandated to provide open access; it is exempt by virtue of its status as a local authority under the 2003 Act, nor has it provided open access of its own volition. Therefore, issues pertaining to south Mumbai and BEST are beyond the scope of this study and are dealt with only where necessary.

2. A tale of two utilities

In 1930, Bombay (as Mumbai was known then) was served by three private electricity companies, TPC, Bombay Electric Supply & Tramways Company Ltd. (now BEST Undertaking), and Bombay Suburban Electric Supply Ltd. or BSES (now RInfra). A convenient arrangement existed between them: TPC, with its generation plants, acted as the bulk supplier and supplied electricity to BEST, BSES, and other large consumers such as the Western Railways (Supreme Court 2008); and BEST and BSES bought electricity exclusively from TPC and supplied it to retail consumers in their licence areas of the island city and suburban Mumbai respectively. Whereas TPC and BEST had a power purchase agreement, which was renewed from time to time, TPC and BSES had no formal written agreement (Supreme Court 2009). BEST was taken over by the Bombay Municipal Corporation in 1947; the other two privately owned companies, however, escaped the post-independence nationalisation (Kale 2014a). The arrangement between these three players continued well into the 1990s; for BEST and TPC, it continues to this day. To better appreciate the changes in Mumbai's electricity sector, a brief history of the same is attempted in this chapter.

1995–2009

In 1995, with the commissioning of its 500 MW thermal power station in Dahanu (DTPS), BSES (RInfra) began to generate its own electricity; as a result, the quantum of power it purchased from TPC decreased by approximately 54% (Supreme Court 2009). With excess power available for sale, TPC began looking for more consumers. BSES (RInfra) alleged that around this time TPC began supplying to industries and commercial establishments in its licence area; BSES (RInfra) also claimed that the 'poaching of remunerative consumers by TPC is affecting the business of the BSES and thereby threatening its commercial viability' (MERC 2002).

TPC, on the other hand, claimed that it had a licence to supply to *all* consumers and that 'BSES has been reducing its power off-take from TPC over the years, and hence, it is imperative [for TPC] to diversify its consumer base to improve utilisation of its assets' (MERC 2004).

Things came to a head in 1997–98 when, according to BSES (RInfra), TPC introduced a separate tariff for low-tension (small commercial and domestic) consumers (MERC 2003). The dispute was first raised before the Government of Maharashtra and, upon its creation, before the Maharashtra Electricity Regulatory Commission (MERC).[7] BSES (RInfra) contended that by supplying to retail consumers, TPC was in contravention of its licence and of the government policy. BSES (RInfra) also alleged that TPC's supplying to retail consumers in its licence area was affecting BSES (RInfra) financially. On the other hand, TPC contended that it had always been supplying power to consumers in BSES's (RInfra) area of supply, but BSES (RInfra) had never complained earlier.[8]

This issue was debated in various forums and culminated in a judgement by the Supreme Court in July 2008, which upheld the right of TPC to supply electricity to all retail consumers in its licence area (Supreme Court 2008). By this time, BSES had been taken over by Reliance Energy.[9] The judgement, in effect, declared TPC as a parallel electricity distribution company for all of Mumbai, both in the island city and in the suburbs.

2009 onwards

Being monopolies in a given region, distribution companies have a supply obligation, i.e. they are required to supply electricity on demand in their licence areas. As discussed earlier, the 2003 Act views the distribution business as a unified business comprising of both wires and supply and hence, meeting the supply obligation typically takes the form of connecting a consumer to the network of a distribution company. The 2003 Act defines a distribution company as an entity that supplies electricity to a consumer through *its own* network.[10] Having largely functioned as a bulk supplier, TPC did not have much of a distribution network; this has had, and continues to have, serious implications for its ability to fulfil its supply obligation.

The changeover protocol

Under the 2003 Act, competition in retail supply is envisaged in only two ways: through 'parallel distribution licensees', that is more than one distribution company is given the licence to supply electricity in a given area, each with its own distribution network;[11] and through transmission and distribution 'open access'.[12] Under open access, the consumers enter into a contract for electricity supply with generators or other licensees but use the wires of the existing distribution company on payment. The tariff charged by any distribution company, including parallel distribution companies, are decided by the commission. In the case of open access, the commission determines only the charges to be paid for the use of wires and the additional surcharge, if any. For electricity supply, the open access consumer is free to negotiate the rates with the supplier it chooses.

On account of the Supreme Court judgement in 2008, Mumbai had a parallel licensee overnight; however, some issues needed to be attended to before such an arrangement could

7. The Maharashtra Electricity Regulatory Commission (MERC) was established on August 5, 1999 under the Electricity Regulatory Commissions Act, 1998. This act was subsequently superseded by the Electricity Act, 2003, which is currently in operation (MERC 2016).
8. TPC stated to the Supreme Court that as on January 1, 1998, it had approximately 114 direct consumers in the city of Mumbai, of which 51 consumers were in the area common with RInfra, of which 14 had a sanctioned maximum demand of less than 1000 kVA (Supreme Court 2008).
9. BSES was taken over in 2002 and became Reliance Energy Ltd. In 2008, Reliance Energy Ltd. changed its name to Reliance Infrastructure Ltd. (RInfra).
10. Section 2(17) and Section 2(19) of the Electricity Act, 2003.
11. Proviso 6 to Section 14 of the Electricity Act, 2003.
12. Section 42 of the Electricity Act, 2003

be implemented. The primary issue was that TPC did not have a distribution network wide enough to meet its supply obligation.

In its judgement, the Supreme Court made the following observation regarding TPC's network or, rather, the lack thereof: 'The concept of wheeling has been introduced in the 2003 Act to enable distribution licensees who are yet to install their distribution line to supply electricity directly to retail consumers, subject to payment of surcharge in addition to the charges for wheeling as the state commission may determine (sic)' (Supreme Court 2008). This observation became the foundation for operationalising competing distribution companies in Mumbai. This judgement can be interpreted in two ways: 1) that a parallel network is not required (and may not even be feasible in a city like Mumbai) and a distribution company could use the existing network to supply electricity to consumers by way similar to open access, or 2) that the distribution company is required to have its own network but may use the existing network until it develops its own.

After the Supreme Court judgement, TPC proposed a network rollout plan to the MERC. The commission suggested that TPC should explore the possibility of supplying electricity using RInfra's wires for meeting its supply obligations and for optimising costs (MERC 2009c). However, the decisions regarding the need and extent of a parallel network remained unclear.

In October 2009, the commission, through an interim order, operationalised what came to be known as the 'changeover' protocol, wherein a consumer connected to RInfra's network could receive electricity from TPC while remaining connected to RInfra's wires (MERC 2009g). The changeover protocol is unique in that it uses open-access provisions to operationalise parallel electricity distribution licensees. In other words, the protocol allows the use of RInfra's wires network by TPC to supply electricity to any RInfra consumer who demands it. Changeover thus created four kinds of regulated consumers in suburban Mumbai as explained in Table 2.

Table 2: Consumer categories created by changeover

Wires		Supply		Type of consumer[13, 14]	Metering	Billing	Customer services and complaints
From	To	From	To				
RInfra	RInfra	RInfra	RInfra	Direct consumer of RInfra	RInfra	RInfra	RInfra
RInfra	RInfra	RInfra	TPC	Changeover consumer	TPC	TPC*	TPC
TPC	TPC	TPC	TPC	Direct consumer of TPC	TPC	TPC	TPC
RInfra	TPC	RInfra	TPC	Switchover consumer	TPC	TPC	TPC

* Although TPC raises the bills for changeover consumers, the bills include the wheeling charges of RInfra: TPC collects the amount from consumers and then pays the wheeling charges to RInfra for the use of its wires.

In a way, changeover is similar to the separation of carriage and content in that it allows a new distribution company to effectively function only as a supplier by catering to the consumers using wires of an existing company. In such a system, the supply company is paid for the electricity and the wires company is paid for the use of its wires (called wheeling charges). The distinction is that in Mumbai, the content can be provided by only two suppliers who are the identified licensees, both have a supply obligation towards all consumers in that area, and their tariff for both supply and wires is determined by the regulatory commission.

Thus, changeover arrived in suburban Mumbai, its fate as uncertain as that of the many migrants to the city.

13. These terms have been used as defined consistently throughout the report. Thus, a 'changeover consumer' always means a consumer moving from RInfra to TPC for supply, but remaining on RInfra wires. Similarly, a 'switchover' consumer always means an erstwhile RInfra consumer who has moved to TPC for wires and supply.
14. In south Mumbai, BEST's consumers continue to rely on BEST for wires and retail supply. Thus, there are no changeover consumers in south Mumbai. However, a 'switchover' may be possible in south Mumbai in places where TPC has its wires.

3. On the highway of reforms : Changeover in Mumbai

The fact that TPC became a parallel licensee with supply obligation for the city of Mumbai may be viewed as the result of a legal tussle, but for many, it was an idea whose time had come. It was received favourably by the MERC, which had, even before introducing the changeover protocol, calculated the gains to consumers from moving to TPC from RInfra in its tariff order for 2009–10 (MERC 2009f).[15] Thus, changeover was expected to lower tariffs and raise efficiency through competitive pressure. What happened is a different story.

3.1 Cost of supply in suburban Mumbai

Table 3 compares the average cost of supply — the cost incurred by a distribution company to provide one unit of electricity to consumers — for five distribution companies in five Indian cities. Table 3 shows that RInfra's cost of supply is the highest even in comparison to other similar urban areas, some also managed by privately owned distribution companies such as CESC in Kolkata.

Table 3: Average cost of supply (Rs. per unit) of different urban electricity distribution companies

Year	Mumbai (RInfra)	Kolkata (CESC)	Hyderabad (TSSPDCL)	Greater Noida (NPCL)
2016–17	7.59	7.02	5.84	6.68

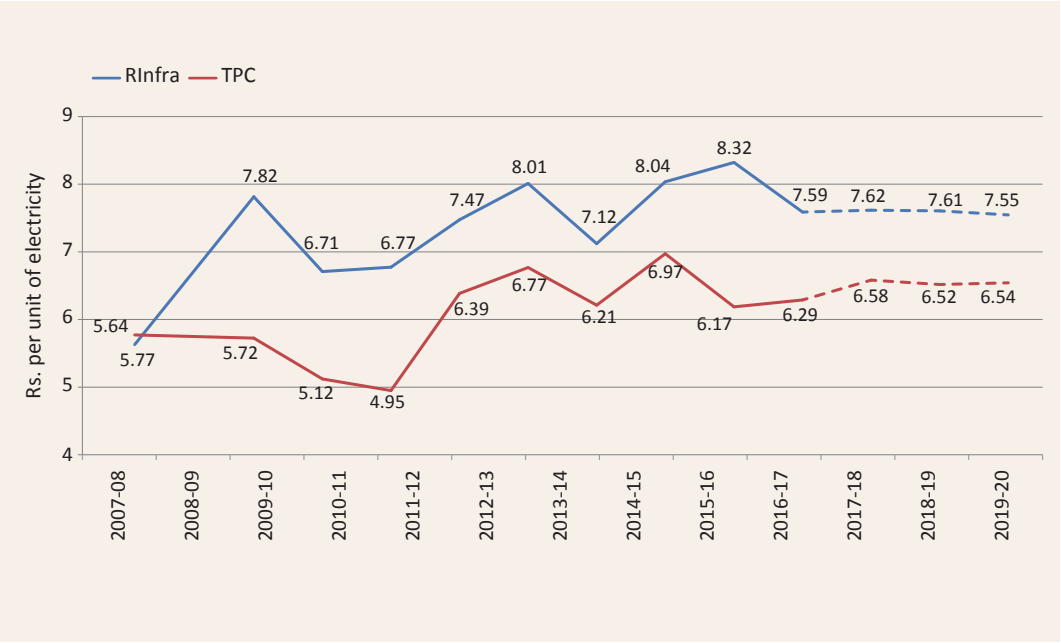
Source: Figures as approved by the appropriate commission in tariff orders for 2016-17 (WBERC 2016; GERC 2016; TSERC 2016; UPERC 2016).

Note: TSSPDCL is Telangana Southern Power Distribution Company Ltd; and NPCL is Noida Power Company Ltd.

15. The MERC estimated the savings to consumers who move from RInfra to TPC for supply on RInfra wires at 13%–41% (MERC 2009f).

By comparing the cost of supply of RInfra to that of its competitor, TPC, Figure 2 shows that RInfra is more expensive of the two and, curiously, has remained so in the years following changeover. Overall, the cost of supplying electricity to suburban Mumbai has been increasing. Starting from about the same level in 2007-08, the costs of the two utilities have diverged. In recent years, however, the costs appear to be converging again, the difference between them being largely on account of the difference in the cost of procuring power. Still on the basis of average cost of supply, TPC is the cheaper option.

Figure 2: Cost (Rs. per unit) of supply for TPC and RInfra: 2007–08 to 2019–20



Source: MERC tariff orders, various years.

Note: Values up to 2015–16 are the audited actual values declared by the licensees, and from 2016–17, values are as approved by the MERC. Please see Table A 1 of Annexure 2 for details on calculations.

Thus, RInfra is more expensive than similar urban distribution companies and more expensive than its competitor in suburban Mumbai, TPC. In addition, the costs of both, TPC and RInfra have been increasing over time.

3.2 Exercising choice

From 2009–10 to 2015–16, the total number of suburban Mumbai consumers increased from around 28 lakh to more than 30 lakh consumers. By 2015–16, 19% of them were changeover consumers. Table 4 gives the total number of changeover consumers in suburban Mumbai from 2008–09 to 2015–16. As can be seen, the number of changeover consumers has been increasing continuously; it more than doubles within three years, from 2011–12 to 2014–15. Thus, changeover made available the choice of supplier to suburban consumers and an increasing number of them exercised that choice.

Table 4: Changeover consumers in suburban Mumbai: 2008–09 to 2015–16

Item	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Consumer numbers	0	22,703	1,04,657	2,34,750	3,26,804	4,30,704	5,43,475	5,73,745
As percentage of suburban Mumbai consumers	0	1%	4%	8%	11%	15%	18%	19%

Source: Consumer numbers are as reported by TPC in its audited actuals.

Table 5 looks at certain consumer categories to examine this continuous increase in changeover consumers in depth. As can be seen, the number of commercial and industrial consumer (LT and HT) peaked in 2012–13 and then fell, while the number of domestic consumers has kept on increasing. Thus, while industrial and commercial consumers started moving out of changeover from 2012–13 onwards, the tide of domestic consumers moving into changeover continued unabated.

Table 5: Composition of changeover consumers in suburban Mumbai

Category	Year	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Small and Medium (LT) Commercial and Industrial	Number	5,465	21,033	36,756	42,099	37,912	31,330	29,150
	Percentage of total suburban consumers in the category	1%	5%	8%	9%	8%	7%	6%
Large (HT) Commercial and Industrial	Number	138	280	339	356	82	26	24
	Percentage of total suburban consumers in the category	22%	40%	47%	49%	11%	4%	3%
Domestic	Number	17,084	83,245	1,97,565	2,84,265	3,92,552	5,11,993	5,44,395
	Percentage of total suburban consumers in the category	1%	3%	8%	12%	16%	20%	21%

Source: Consumer numbers are from the audited actuals as reported by TPC.

Around 19% of suburban Mumbai consumers (5.7 lakh consumers) opted for changeover by 2015-16. For domestic consumers this figure is close to 21%. This in itself is a remarkable achievement for changeover and parallel licensee arrangement, since small domestic consumers, who are thought to be reluctant to move, opted for a more economical supplier once they had a choice. Thus, changeover succeeded in providing a choice to consumers.

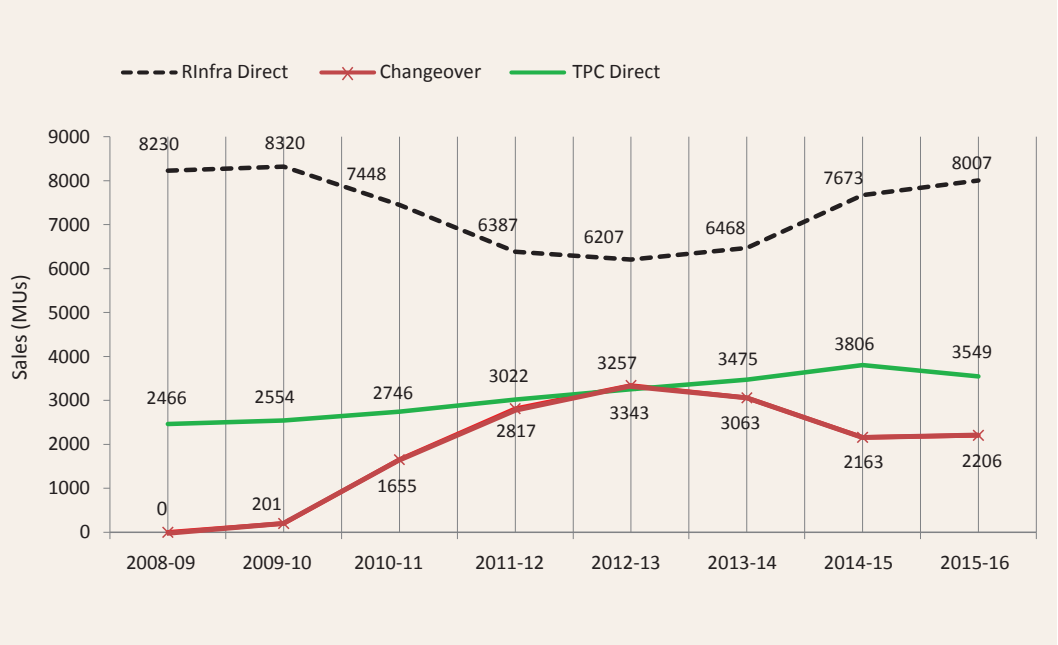
3.3 Changeover sales

While it is important to understand the trend in changeover consumer numbers, it is equally important to see the trends in consumer sales, since these determine the revenue received by the distribution companies and the level of cross-subsidy. From 2009–10 to 2015–16, suburban Mumbai's electricity sales increased from 11,000 million units (MUs) to around 13,800 MUs.

After the operationalisation of changeover in suburban Mumbai in October 2009, changeover sales kept increasing until 2012–13 and eventually surpassed TPC's sales to its direct consumers, as can be seen from Figure 3. In 2012–13, changeover sales touched 3343 MUs against TPC's 3257 MU, and accounted for a quarter of all suburban Mumbai electricity sales. However, after 2012–13, the trend reversed and changeover sales decreased by more than 1100 MU in the next three years to touch 2206 MU in 2015–16.

Direct sales of RInfra follow an opposite pattern, as expected; the sales decreased until 2012–13 and then began to recover. RInfra's direct sales currently stand at 8007 MUs. TPC's direct sales increased continuously, albeit with different intensities, falling only in 2015–16, to reach 3549 MU.

Figure 3: Movement of electricity sales in suburban Mumbai: 2008–09 to 2015–16



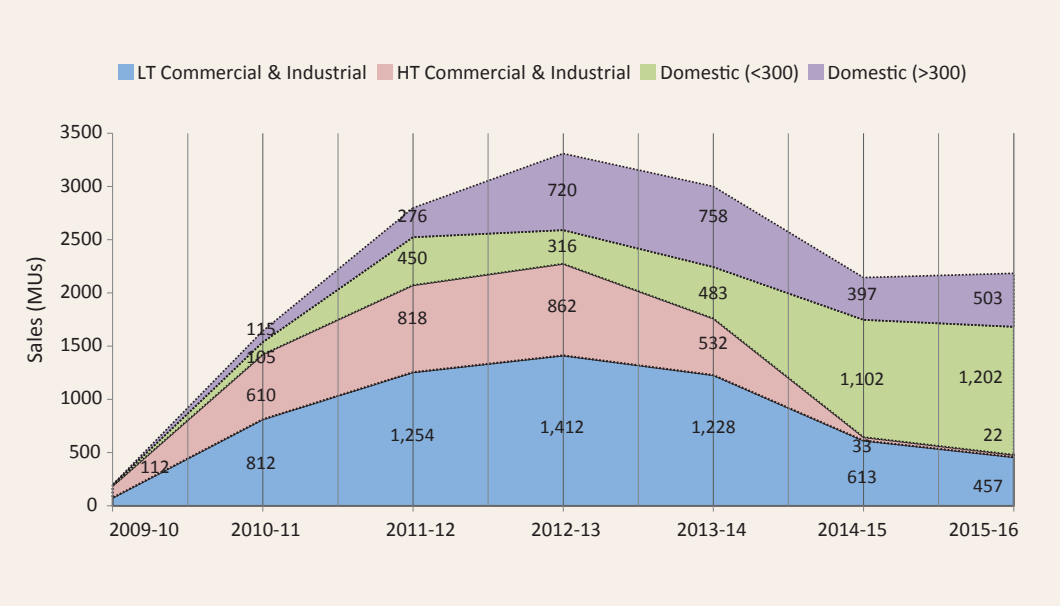
Source: Sales figures are from audited actuals as reported by TPC.

The trend of sales in suburban Mumbai suggests that around 3000 MUs of sales migrated from RInfra to changeover, and then, after 2012–13, around 1000 MUs migrated back. Thus, while the number of consumers moving into changeover was increasing throughout (Table 4), from 2012–13 the sales to changeover consumers were falling. These aggregate numbers do not allow for this trend to be unravelled, as it does not show which category of consumers opted in and out of changeover and when. To examine these trends further, we need to look at sales numbers at the dis-aggregated level.

Figure 4 shows the composition of changeover sales from 2009–10 to 2015–16. As can be seen, the sales composition changed drastically. Industries and commercial establishments were the first to take advantage of changeover, followed by large domestic consumers (with monthly consumption more than 300 units). These categories accounted for 68% and 22% respectively of all changeover sales in 2012–13. After 2012–13, industrial and commercial consumers began opting out of changeover, and changeover sales to large domestic consumers also decreased. Sales to small domestic consumers (with monthly consumption below 300 units) increased significantly.

Thus, changeover consumers in 2009–10 were primarily industrial and commercial consumers; whereas by 2015–16, they were mainly domestic consumers. This is also reflected in the category wise consumer numbers given in Table 5.

Figure 4: Composition of changeover sales in suburban Mumbai



Source: Sales figures are from the audited actuals as reported by TPC.

Given that TPC was and continues to be the cheaper of the two licensees, it is intriguing to see such wide fluctuations in the composition of changeover consumers and the decrease in the changeover sales as a whole. The phenomenon of increasing costs in an ostensibly 'competitive' scenario as well as the complete turnaround in the composition of changeover sales within six years need further analysis. Since a distribution company's costs are linked to various components of its business, examining the trends in the major cost components should help in understanding this phenomenon better. To aid this analysis, the next three chapters analyse the three main themes — power purchase, operationalisation of competition, and the role of key stakeholders — to understand their impact on costs and competition in Mumbai.

4. Goal without a plan: Power purchase for Mumbai

Power purchase accounts for more than 70% of the cost of supply of distribution companies in suburban Mumbai. Thus, the cost of power purchase is an extremely important factor, especially because in a cost-plus system it reflects the ability of distribution companies to secure the most economical supply for its consumers. This section looks at how power purchase planning has been undertaken in Mumbai, with particular emphasis on the constraints on importing electricity into Mumbai, long-term contracts and short-term purchase of power.

4.1 The constraint on importing power

For historical reasons, Mumbai has its own independent electricity grid, which is connected to the Maharashtra state grid through the transmission network. The transmission capacity connecting Mumbai to the rest of the state grid determines the quantum of electricity that Mumbai can import or export. As of March 2016, Mumbai's power demand is around 3400 MW (for TPC, RInfra and BEST). With the current transmission capacity, Mumbai's system can import around 1500 MW of power, 600 MW of which is used by RInfra to bring power from Vidarbha Industries Power Ltd. (VIPL) in Nagpur. The remaining 900 MW is used by all the three distribution licensees to bring in power from the short-term and bilateral market, and for procuring renewable energy (MERC 2015d; MERC 2016e).

During the summer of 2014, due to a forced outage in Unit 8 of TPC's Trombay generation station, an additional capacity of 250 MW was required to be imported to meet the city's demand. However, given the transmission limit, only about 1500 MW could be imported. In light of this constraint, all three distribution companies were forced to purchase power from Unit 6 of TPC, which runs on low sulphur oil and Regasified Liquefied Natural Gas (RLNG) and is extremely expensive (MERC 2015a; TPC 2013). Thus, the constraint on transmission forces the distribution companies to buy expensive power generated within the city. It is also the reason for maintaining Unit 6 as a standby option in spite of its very high cost.

The physical constraint on importing power has also affected the ability of the distribution licensees to sign economical Power Purchase Agreements (PPAs), and this issue has been brought up before the MERC time and again, as can be seen from Table 6.

Table 6: The transmission constraint and power purchase planning in Mumbai

Case No.	Date	Details	Capacity	Comments
27 of 2005	July 2006	PPA between BEST and TPC	800 MW	When asked by the MERC to substantiate that this PPA is the most cost-effective and the best option, BEST submitted that one of the reasons was 'severe constraints on transmission system for purchase power from other regions' and thus, 'it is prudent for BEST to adopt TPC as supplier of power till such time as economic and reliable alternative is identified (sic)' (page 5 of 9).
1 of 2010	September 2010	PPA between BEST and TPC	Additional 100 MW	'BEST's move to tie-up the additional capacity of 100 MW from TPC with effect from April 1, 2010, will actually help to protect the interest of its consumers in Mumbai Island city, and shields them from the fluctuations of the power exchanges, since this power is being sold by TPC-G to BEST at regulated rates determined by the Commission. Further, had BEST not contracted this additional capacity from TPC-G, then the capacity may have become spare capacity, and may have been contracted by TPC-G to sources outside the State, which would not have been in the best interests of Mumbai city (sic)' (page 13 of 14).
76 of 2011	October 2011	PPA between TPC (Generation) and TPC (Distribution)	Additional 400 MW	'The Petitioner further submitted that if the power to the extent of 400 MW is procured through Case 1 bidding route from outside Mumbai, there will not be adequate transmission line corridor availability to bring such power. … Hence this 400 MW capacity offers a positional advantage over any other capacity outside Mumbai (sic)' (page 18 of 26).
47 of 2016	October 2016	Tariff for 2016-17 to 2019-20		TPC's PPA with its generation company will expire on March 31, 2018. TPC intends to extend the PPA further, stating that 'the transmission corridor is not sufficient to meet the overall Mumbai peak demand, utilisation of embedded generation of the Mumbai system is essential to meet the overall Mumbai peak demand' (page 187 of 458).
34 of 2016	October 2016	Tariff for 2016-17 to 2019-20		RInfra's PPA with its generation company will expires on February 23, 2018. RInfra intends to extend the PPA further, stating that 'purchase of power from DTPS is not only a commercially more viable option, but is also technically unavoidable due to the islanding requirement of Mumbai' (page 237 of 508).

Curiously, however, the licensees have raised this issue of transmission constraint only to justify signing identified contracts with sister concerns (which are often claimed to be the best option in the light of the existing constraints) and extending them, but never as an issue that needs to be resolved so as to allow more options for power procurement. Nor has the MERC taken adequate steps to address the issue of transmission planning from a long-term planning perspective. In fact, as can be seen from Table 7, the commission has been dealing with this issue for over ten years without making much headway.

Table 7: Transmission constraint — 10 years of MERC responses

Month and year	Response of the Maharashtra Electricity Regulatory Commission
March 2006	'The shortage in the city of Mumbai is expected to continue for some time to come, till such time as either additional generation capacity is set up or additional power is available from outside the State, and the transmission corridor issues are resolved'.
December 2010	Following grid disturbances that affected power supply to a large population in suburban areas, the MERC held a suo motu hearing on the issue. The commission constituted an expert committee to review and investigate the reasons for the system disturbances and to suggest remedial measures to avoid such occurrences in future.
December 2010	It was noted in the 16th meeting of the State Advisory Committee (SAC) that drastic improvement in transmission network are urgently needed to cope with the increase in demand for power.
October 2011	The Commission observed that there are severe constraints in bringing in power into Mumbai, which cannot be removed until further augmentation in the capacity of the interconnecting EHV network is carried out which may take some time. As all the consumers of TPC are located within Mumbai area, overloading the existing transmission links can make the supply system unreliable
December 2011	In the 20th meeting of the SAC, the issue of strengthening the transmission network in Mumbai with a view to bring in more power into the metropolis was discussed again. Based on an expert committee report and in order to aid transmission planning, a standing committee with Director (Operations), MSETCL, as convener was constituted by the commission in August 2011 to prepare a 5-year business plan and a 15-year prospective plan for Mumbai Metropolitan Region and for the entire Maharashtra state.
August 2016	'Moreover, sourcing of power from outside for Mumbai, in particular, is still constrained by transmission availability. This also limits the quantum of power which can be procured through competitive bidding'.

Source: MERC orders in Case no. 46 of 2005, Case no. 76 of 2011, and Case no. 32 of 2016.

It is unfortunate to note that instead of finding ways to ease the constraint, the commission and the companies have presented it as part and parcel of Mumbai's islanding scheme. As a result, any increase in transmission capacity has happened only in a piecemeal manner which allowed purchase of short-term power, but did not provide economical alternatives to existing long-term power procurement from sister concerns.

4.2 Planning for power

Until 2005–06, of its total generation capacity of 1777 MW,[16] TPC was selling about 750 MW to BSES (RInfra), about 650 MW to BEST, and the rest to its own consumers. Figure 5 shows the change in allocation of TPC's generation over the years. TPC and BSES (RInfra) made attempts to sign a PPA but were unable to reach an agreement. Towards the end of 2003, BSES (RInfra) even contended that 'TPC has neither provided any legal justification nor any tenable reason to substantiate need for a PPA between TPC and BSES' (MERC 2004) and no PPA was signed.

The Electricity Act, 2003 and the MERC's 2005 tariff regulations made a firm contract for power procurement obligatory. Towards the end of 2005, the commission directed RInfra to sign a contract with TPC within three months (MERC 2005). In 2006, TPC entered into a PPA with BEST and with its own distribution arm for 800 MW and 477 MW respectively; it offered the balance 500 MW of capacity to RInfra; however, RInfra declined the offer because it wanted a higher quantum, and again no PPA was signed. RInfra contended that it had been procuring power

16. This was the total capacity in 2005–06 and included units 4, 5, 6, and 7 (1330 MW of thermal generation) in Trombay and TPC's hydel generation from Khopoli, Bhivpuri, and Bhira (total 447 MW) (MERC 2006). Please see Table A2 of Annexure 2 for an overview of generation stations feeding Mumbai.

from TPC for the last 80 years and that this long-standing arrangement with TPC 'has the force of a valid contract, which creates a right' of RInfra to receive power from TPC (MERC 2007c).

Since at the time, the two PPAs (of TPC with BEST and its own distribution arm) had not been approved, the commission allocated TPC's generation in proportion to the demand of the three companies for 2006–07 (MERC 2006). The agreements were not approved in time even for the next tariff order,[17] and hence the commission repeated this exercise in 2007-08 as well (MERC 2007a).

In November 2007, the commission approved the two PPAs of TPC (with itself and with BEST) and stated that from the beginning of 2008–09, the capacity allocation of TPC's generation would be as per the contract. However, the commission also asserted its power to issue directions 'despite the existence of any or all the approved PPAs' to 'ensure that the consumers of all three distribution licensees in Mumbai city are treated equitably and for equitable distribution of electricity' (MERC 2007c).[18] Appeals were filed against this order by TPC and BEST challenging the MERC's interpretation of its power to issue such directives, as well as by RInfra over the approval of the contracts of TPC with BEST and its own distribution arm. While the appeals were pending, the commission allocated the generation as per the contracts, which meant that only 500 MW was left for RInfra. TPC agreed to provide this capacity to RInfra without a contract for 2008–09 and 2009–10, until such capacity was tied up elsewhere (MERC 2008, MERC 2009b).

It appears that until 2007–08, TPC and RInfra were in talks to sign a contract; however, RInfra refused to sign one until April 2007, and TPC refused to do so subsequently (MERC 2009b). Finally, the Supreme Court gave its judgement in the matter and, in May 2009, held that generation was a de-licenced activity under the Electricity Act, 2003 and that, without a contract, TPC cannot be forced to supply power to RInfra (Supreme Court 2009).

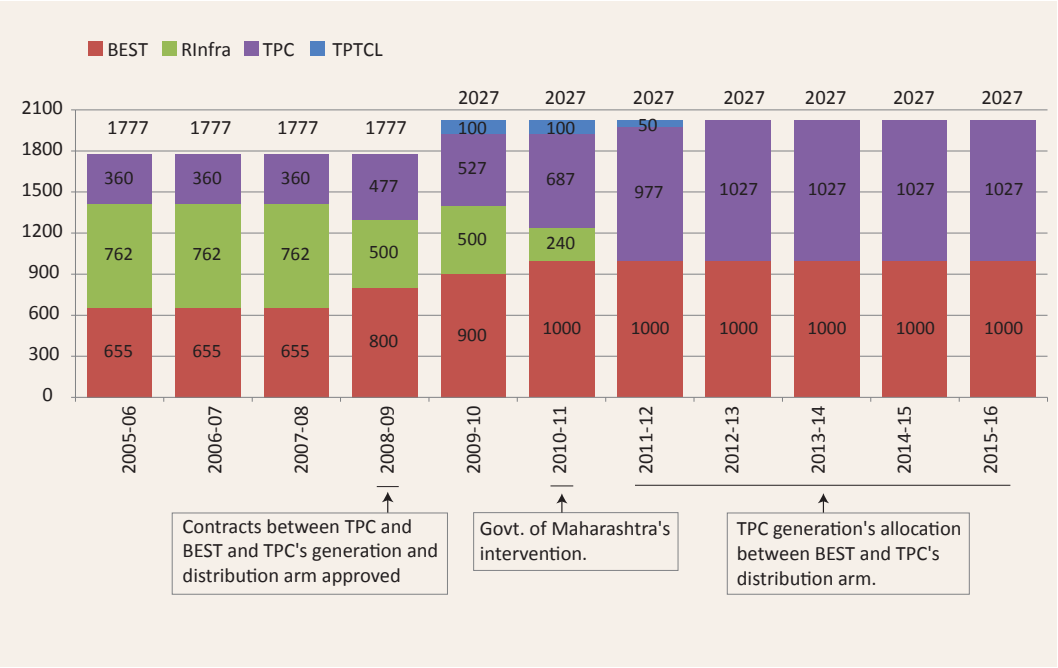
By a letter dated June 25, 2009, TPC informed RInfra that it intended to withdraw the 500 MW supply with effect from April 1, 2010 (ASCI 2010). At this time, RInfra had no firm contracts for power purchase except with its own generating station in Dahanu, which accounted for 500 MW out of its total demand of about 1500 MW. TPC's refusal to supply power rendered RInfra's power purchase situation highly precarious, as it had to depend on the short-term market for almost two-third of its power procurement. Because the rates for short-term power were very high during this period, it also made RInfra's tariff significantly higher than that of the other two companies. It is important to note that even when TPC was supplying RInfra with 500 MW of power, RInfra was still short by a third (500 MW) of its power requirement, which it was procuring from market sources at rates exceeding Rs. 7–8 per unit (MERC 2009d).

With an increase in its sales and energy requirement by around 5% in 2007–08 and 2008–09, RInfra's power purchase from the market had already increased from 5% in 2007–08 to approximately 21% by 2009–10.

Sensing the huge impact on consumer tariff of TPC's decision to discontinue the supply of 500 MW from April 1, 2010 to RInfra, the state government (belatedly) intervened; it issued a memorandum on May 7, 2010, stipulating an interim arrangement in the 'public interest' which forced TPC to continue supplying a certain quantum of power to RInfra till the end of 2010–11. By 2010–11, the share of short-term power in RInfra's total power purchase basket was around 38%.

17. By this time, BEST had submitted its revised PPA, and TPC had submitted its PPA with its own distribution arm for approval. The commission decided to pass the order for allocation of power before approving the PPAs.
18. The MERC stated that its power was derived from Section 23 of the Electricity Act, 2003, which states that 'if the Appropriate Commission is of the opinion that it is necessary or expedient to do so for maintaining the efficient supply, securing the equitable distribution of electricity and promoting competition, it may, by order, provide for regulating supply, distribution, consumption or use thereof.'

Figure 5: Allocation of TPC's generation across years



Source: MERC's tariff orders and orders approving power purchase agreements from various years.

Note: The increase in generation capacity in 2009–10 was due to the commissioning of Unit 8 (250 MW) of TPC's Trombay plant. While TPC's installed capacity is 2027 MW, its Unit 4 (150 MW) is no longer in use. Hence, the operational capacity is 1877 MW, with TPC's share at 945 MW and BEST's at 932 MW. At present, Unit 6 (500 MW) of TPC is also under economic shutdown.

Thus, by 2011–12, the electricity landscape of Mumbai had changed even if its main actors had remained the same. TPC could supply to retail consumers; it had stopped supplying to RInfra. RInfra had only one long-term firm power source, namely its own generation plant in Dahanu (500 MW), and faced competition from TPC in suburban Mumbai where changeover had also been operationalised. BEST was purchasing electricity from TPC for power generation and faced competition from TPC in south Mumbai; however, changeover could not be operationalised there.

RInfra: buying short, forgoing long

Although the MERC had directed RInfra to enter into a firm contract for power purchase as far back as 2005, no long-term contract was signed until 2012–13.[19]

With the approval of the two PPAs — between TPC and BEST and between TPC's generation arm and its distribution arm — RInfra challenged these PPAs in every available legal forum, but did not make any other firm long-term arrangements for its power procurement. Finally, in December 2012, RInfra signed a long term PPA with Vidarbha Industries Power Limited (VIPL), a sister concern, on a cost-plus basis for electricity supply commencing in April 2014 (MERC 2013a; MERC 2013c).

19. It is noteworthy that although RInfra had been procuring power from its own generation station in Dahanu (DTPS) since 1995, it entered into a formal long-term PPA with DTPS only in February 2008 (MERC 2009a).

TPC: once a generator, always a generator

In 2002, during its legal battle over its licence with RInfra, TPC stated the following:

> 'The reason why TPC for many years supplied energy only to the distributing licensees and a few large consumers was because the entire power generated by them was being consumed. However, since BSES started drawing energy from their Dahanu plant, TPC had a surplus of about 200 MW, thereby prompting them to start supplying other consumers as well. In response to a query from the Commission regarding the feasibility of TPC selling surplus power to Power Trading Corporation and MSEB, Counsel submitted that MSEB are already taking power from them as and when required. MSEB's off-take has reduced as their own revenue collections are weak. ***Power Trading Corporation have been offered power by TPC. However, the rate offered by them is much less than TPC's generation cost.*** Moreover, MSEB's high wheeling charges are a deterrent (sic) (MERC 2003)'. [Emphasis added]

That TPC did its best to secure the sale of its generation and that its business, as a generation company, centred on its generation assets, comes as no surprise. What is more relevant to this study is the aftermath of TPC's becoming a distribution company: How effectively was it able to meet its obligations (of quality supply at economical rates) to its consumers as a distribution company?

TPC had tied up part of its generation capacity with its own distribution arm and with BEST in 2007–08.[20] The 500 MW it was supplying to RInfra became free at the end of 2010–11. After the Supreme Court judgement in 2009 allowed TPC to sell its power to anyone, it chose to sign contracts for the untied 500 MW with BEST (100 MW) and subsequently with its own distribution arm (450 MW) (MERC 2010a, MERC 2011h).[21]

Thus, after successfully asserting its right to sell power to *anyone, anywhere* in 2009, today TPC sells its entire generation capacity in Mumbai to BEST and its own distribution arm on a cost-plus basis. TPC's distribution arm, for its part, has only this one long-term PPA, which accounted for 61% of its total power requirement in 2015–16. The rest of the quantum is procured through infirm sources such as market and short-term bilateral trade.

Similarly, BEST relies entirely on TPC for its firm power purchase and has done so for the last eight decades. Although such a long relationship has not resulted in BEST softening its stand on the changeover, neither has it affected the commercial relationship between the two companies. In fact, the PPA for an additional 100 MW was signed between the two companies at the same time when a legal battle was raging between them over whether TPC could supply in south Mumbai as a parallel distribution company (Supreme Court 2014). It is also interesting to note that BEST plans to extend its PPA with TPC after the agreement expires on March 31, 2018 (MERC 2016g).

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20. In addition to the two PPAs signed between TPC and BEST (800 MW), and TPC and TPC's distribution business (477 MW), TPC also signed PPAs for allocation of TPC's Unit 8 (250 MW) with BEST for 100 MW, with its own distribution business for 50 MW and the remaining 100 MW with Tata Power Trading Company Ltd. (TPTCL), an inter-state trading company (MERC 2008; MERC 2010a). Subsequently, TPTCL's 100 MW was also tied up with TPC's distribution business.
21. The PPA between TPC and its distribution arm was approved for around 350 MW from April 1, 2011 to September 30, 2011, and for 450 MW (including the erstwhile 100 MW of TPTCL's share of Unit 8) from October 2011 (MERC 2011h). Thus, Figure 5 shows TPTCL's share as 50 MW (6 months of 100 MW) for 2011-12.

Power purchase costs

The average per unit cost of TPC and RInfra's coal-based generation is much higher than that of other coal-based generators. Table 8 shows the average power purchase cost for coal-based thermal capacity contracted by various states between 2012 and 2017. In case of most states, with the exception of Uttar Pradesh and Bihar, the average cost of such capacity is below Rs. 4 per unit. As against this, the (approved) cost of generation for TPC's newest coal-based Trombay unit, Unit 8, is Rs. 4.44 per unit, while that of VIPL is Rs. 4.42 per unit for 2016-17 (MERC 2016c; MERC 2016b).

Table 8: Average power purchase cost for coal-based thermal capacity added by various states between 2012 and 2017

State	Average power purchase cost approved for the 2016-17 (Rs per unit)	Share of private capacity in the total capacity added between 2012 and 2016
Punjab	3.11	91%
Gujarat	3.11	38%
Madhya Pradesh	3.44	50%
Rajasthan	3.46	59%
Maharashtra	3.66	64%
Haryana	3.72	66%
Bihar	4.05	30%
Uttar Pradesh	4.44	70%

Source: PEG compilation from various state regulatory orders. Power purchase costs as approved by the respective commissions.

4.3 Competitive bidding in Mumbai

None of the distribution companies in Mumbai has ever signed a long-term PPA based on competitive bidding. And yet, they have all approached the MERC at one time or another seeking its permission to conduct a bidding process. In fact, the only contracts signed based on bidding were RInfra's medium-term contracts,[22] which it sought to terminate later, only to be compelled by the commission to honour them.[23]

For *long-term* power procurement, RInfra initiated competitive bidding for 1500 MW in 2009–10, and discovered tariffs between Rs. 3.4 and Rs. 4.5 per unit. Wardha Power Company Ltd. emerged as the least-cost bidder (referred to as L1), and RInfra's sister concern, Chitrangi Power Private Ltd., was next (referred to as L2). However, citing certain irregularities, the MERC declared the process as vitiated (MERC 2011a). RInfra then wanted to sign a PPA with Chitrangi Power, the L2 in the now-vitiated process. The MERC did not accept this proposal, because the bidding process had been scrapped (MERC 2011c).

22. Medium-term implies a period greater than 1 year but less than or equal to 7 years whereas long-term refers to a period longer than 7 years.
23. RInfra received an approval from the MERC for procurement of 1000–1200 MW through competitive bidding for the medium term (MERC 2009e). In mid-2010, it signed PPAs with Wardha Power Company Ltd. (WPCL), Abhijeet MADC Nagpur Energy Pvt. Ltd. (AMNEPL), and Vidarbha Industries Power Ltd. (VIPL). Subsequently, citing various reasons, RInfra sought to terminate the PPAs with WPCL and AMNEPL and procure an increased quantum from VIPL. However, the MERC ordered RInfra to honour its original PPAs (MERC 2011e).

Finally, RInfra signed a long-term (25 year) PPA with another sister company, namely VIPL, for supply starting April 1, 2014 on cost-plus basis. At the time of the approval of the contract, RInfra claimed that VIPL's tariff was competitive: 'RInfra-D submitted that given the numerous challenges, the overall bidding scenario for power procurement is in turmoil and the prices are likely to be higher if the bidding is conducted on a long-term basis under the present industry circumstances …Thus, the twin objectives of reliability of receiving the power and affordability of the cost are unlikely to be realized in the competitive bidding process. RInfra-D submitted that in view of the foregoing, RInfra-D has accepted the offer of VIPL for procurement of power on long-term basis … RInfra-D submitted that it strongly believes that the VIPL offer is competitive compared to the Case-1 tariffs recently discovered in India and is in the best interest of the consumers (sic)' (MERC 2013a). Since its approval, the tariff for VIPL has increased by 61%, as can be seen from Table 9.

Table 9: Increase in VIPL's tariff (Rs. per unit)

Particulars	Notation	2014-15	2015-16
VIPL claimed (March 2015)	A	4.06	4.32
MERC approved for VIPL (March 2015)	B	3.92	4.14
VIPL claimed (June 2016)	C	6.28	5.78
MERC approved for VIPL (June 2016)	D	4.79	4.65
Increase in tariff claimed (%)	E= (C-B)/B	61%	40%

Source: MERC orders in Case nos. 115 of 2014 and 91 of 2015.

Similarly, TPC approached the commission twice, in 2011 and again in 2012, for medium-term competitive bidding (MERC 2011b; MERC 2013b). After filing a petition for approval of competitive bidding the first time, in March 2011, TPC entered into a contract for an additional 400 MW with its own generation company. As mentioned before, this quantum had been freed since TPC was no longer obliged to supply to RInfra. The commission approved the cost-plus contract citing transmission constraints (MERC 2011h). TPC stated that it would undertake competitive bidding for the remaining power that it needed, but no contract based on competitively discovered tariff has been signed so far.

In May 2015, TPC approached the commission for approval of a long-term contract with Ideal Energy Projects Ltd. (IEPL) for 170 MW, again on a cost-plus basis, ostensibly to reduce its excessive dependence on short-term power. The commission approved the contract in November 2015 (MERC 2015d). By February 2016, TPC wanted the contract with IEPL to be put in abeyance (MERC 2016d).

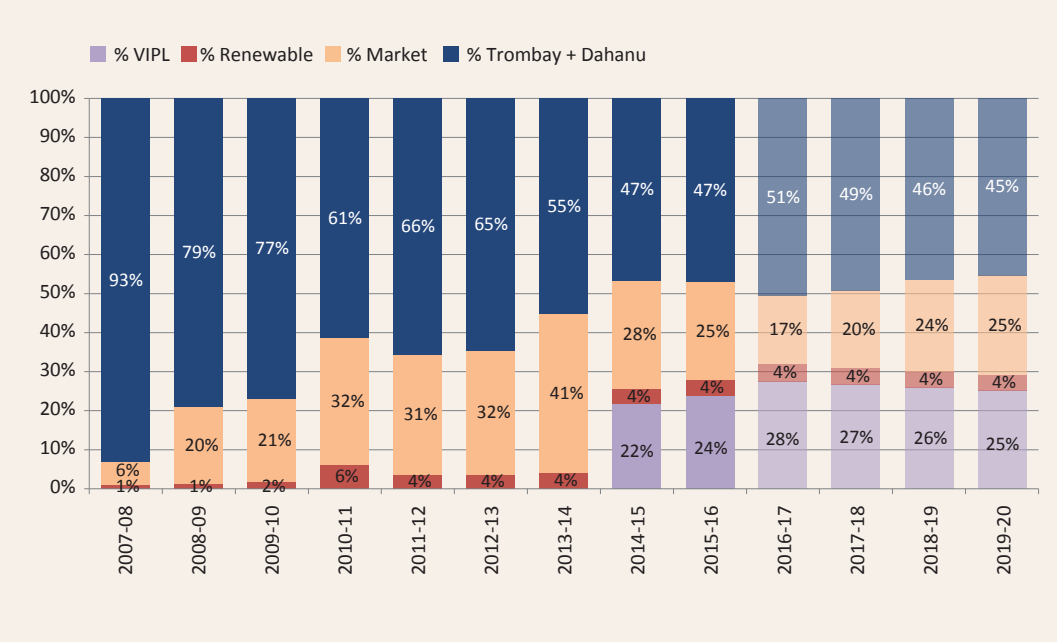
According to media reports, TPC had entered into a share purchase agreement to acquire 100% stake in IEPL, but the deal fell through (Business Standard 2014; Livemint 2016). Thus, for one reason or another, utilities in Mumbai have been unsuccessful in contracting power through bidding; instead, they have relied on cost-plus contracts with sister concerns.

It is interesting to note that between 2008 and 2012, MSEDCL contracted more than 5000 MW of capacity through the bidding route at levelised tariffs between Rs. 2.5 and Rs. 3.5 per unit. These rates are more economical than any medium-term or long-term power procurement undertaken by the Mumbai companies during the same period. Notwithstanding the fact that many of these projects are at different stages of litigation, it is clear that MSEDCL has been able to secure substantially cheaper long-term power compared to private utilities in Mumbai through the competitive bidding route.

4.4 Dependence on short-term power purchase

Nearly half the electricity consumed in Mumbai (including south Mumbai) is imported from outside Mumbai. For suburban Mumbai, as seen from Figure 6, imported electricity accounted for 53% of electricity consumed in 2015–16. Without VIPL, the figure still stands at 29%.

Figure 6: Share of imports in suburban Mumbai's electricity supply



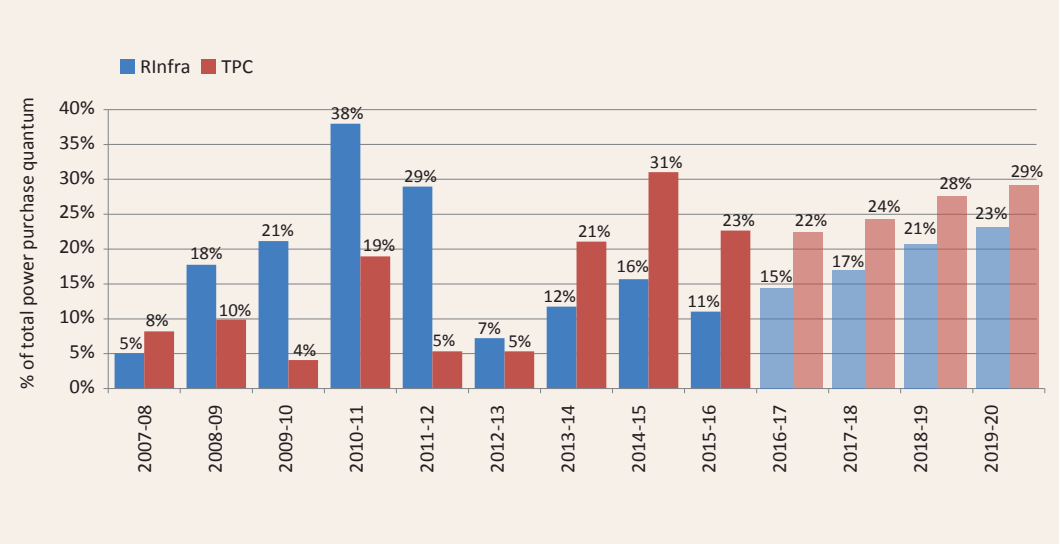
Source: MERC tariff orders for multiple years. Note: Power purchase figures are audited actuals as approved by MERC; from 2016-17, they are as approved by MERC based on estimates of licensees. 'Imported from outside Mumbai' is the net electricity coming into suburban Mumbai through the transmission network, and includes VIPL, medium-term power purchase contracts, short-term market purchases, sales outside licence areas, and the imbalance pool purchases.

Both TPC and RInfra have sourced a significant share of their total power requirement from the short-term bilateral market, as can be seen from Figure 7. Short-term power purchase from 2008–09 to 2011–12 resulted in high costs and the creation of huge revenue gaps for RInfra. For TPC, the increased dependence is more pronounced from 2013–14 onwards, when the cost of power in the short-term market fell below that of TPC's contracted power.[24]

Thus, even after contracting power, both companies continue to rely heavily on the short-term market to meet their demand. Since their long-term procurement on a cost-plus basis is more expensive than the short-term market rate, it is also being backed down, which further increases the share of short-term power in the total power purchase (MERC 2016e; MERC 2016c). The two utilities are expected to procure approximately 23% (RInfra) and 29% (TPC) of their power from the short-term market by 2019–20.

24. For the period 2009–10 to 2015–16, short-term power prices fell from an average of Rs. 4.62 to Rs. 1.93 per unit for deviation and settlement mechanism, from Rs. 5.26 to Rs. 4.11 per unit for bilateral power purchase, and from Rs. 4.96 to Rs. 2.72 per unit for power purchased from exchanges (CERC Market Monitoring Report 2016).

Figure 7: Short-term power purchase as a percentage of total purchase for RInfra and TPC



Source: MERC tariff orders for multiple years. Note: Power purchase figures are audited actuals as approved by MERC; from 2016-17, they are as approved by MERC based on estimates of licensees.

Two concerns should be noted here: First, there is no certainty that the short-term market rates will remain low, although that seems to be the basis for the forecasts of the companies for power purchase until 2019–20. This results in significant uncertainty of tariff for consumers, especially because the distribution companies are unwilling to absorb the risk of purchasing such power. Second, even when the distribution companies buy cheaper power from the short-term market, consumers continue to bear the fixed cost of their contracted generation.

Thus, power purchase in suburban Mumbai displays the following features: the distribution companies have contracted power only with their sister concerns; the power so contracted is on a cost-plus basis; and the companies depend on the market for meeting any shortfall. The continued operation of two private distribution companies as vertically integrated utilities is to be expected in a cost-plus setting, because it offers no incentives for them to procure power at the most economical rates. Whatever be the cost of power, it can be passed on to the consumers in such a system. In addition, the transmission constraint, which has been a long-standing problem, remains unresolved. It thus limits procurement options and helps justify pre-identified cost-plus contracts.

5. Living in interesting times: Operationalisation of changeover

Given the many challenges and legal imperatives, the task of operationalising parallel licence in Mumbai was an unenviable one—but it was also an opportunity. As it prepared to operationalise changeover, the regulatory commission was aware of the fact that any such arrangement would have to deal with the following challenges:

- Loss of cross-subsidy: Since RInfra had most of the small consumers, it needed subsidising consumers such as large industries and commercial establishments. As large consumers were more likely to migrate, it would result in a loss of cross-subsidy for RInfra.
- Revenue gaps: In a cost-plus tariff setting, any past gaps (i.e. difference between the costs and revenues) of a distribution company are recovered through an increase in tariff in subsequent years. With changeover and consumer migration, recovery of RInfra's past revenue gaps needed to be dealt with.
- Network duplication: With the operationalisation of changeover, the need and extent of a parallel network would become a critical issue. Providing clarity in this regard was paramount.
- Effective monitoring of supply obligation: For revenue maximisation, licensees may be more interested in attracting larger consumers, even to the exclusion of small consumers. Such behaviour, also called cherry-picking, was to be expected and needed to be guarded against.

As this chapter discusses, these and other important issues, with far-reaching consequences, were not dealt with adequately.

5.1 Regulatory Assets

As discussed in Chapter 3, operationalisation of changeover initially resulted in many consumers moving from RInfra to TPC. Already by that time, RInfra had large revenue gaps due to inefficient power purchase planning. Since the recovery of the gap in one particular year would have led to a tariff shock, the revenue gap of RInfra until 2011–12 was turned into a regulatory asset (See Box 1). As can be seen from Table 10, RInfra's regulatory asset increased from a mere Rs. 25 crore in 2006–07 to over Rs. 3,300 crore in 2011–12, and this was to be recovered from 2013–14 to 2018–19 (6 years).

Table 10: RInfra's cumulative regulatory asset (Rs. crore) with carrying cost until 2011–12

Item	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12
Regulatory Asset	25	70	428	1,836	2,611	3,377

Source: MERC order in Case no. 9 of 2013. Note: These figures are as approved by the commission.

Box 1: The creation of regulatory assets

The tariffs are supposed to be set by the regulatory commission in a manner that allows for the full recovery of approved costs. Additionally, any increase in costs is met through an increase in tariffs. If in any year the commission considers the required tariff increase as too high (a tariff shock in regulatory jargon, usually referring to an increase of 10% or more from one year to the next), it may defer a part of this recovery to future years. This deferred amount then becomes an asset for the company (similar to a loan to consumers) on which it also earns interest (called carrying cost). This asset is called a regulatory asset. It is similar to a revenue gap in that it is also the difference between the approved costs of the company and the revenue allowed to be recovered by the commission through tariff. Whereas the difference between the revenue required and revenue earned (which can be a revenue gap or surplus) is calculated every year and usually recovered in one year, regulatory assets are often so large that they need to be spread over more years and hence also attract carrying costs.

Deferring recovery to avoid tariff shock, though at times necessary, often leaves the consumer unaware of the real increase in cost. While depoliticising the issue, it lets the commission and the companies remain unanswerable for the inefficiencies. It is worth noting that in the past regulatory assets have also been used to avoid politically unacceptable tariff increase. The reform measures of the last decade have strongly discouraged such a practice and the National Tariff Policy clearly states that 'the facility of a regulatory asset has been adopted by some Regulatory Commissions in the past to limit tariff impact in a particular year. This should be done only as a very rare exception in case of natural calamity or *force majeure* conditions (sic)' (Ministry of Power 2016).

At the end of 2015–16, the regulatory asset remaining to be recovered for RInfra stood at Rs. 2,300 crore; in addition, RInfra also has a revenue gap of Rs. 700 crore (MERC 2016e). Similarly, the combined regulatory asset and revenue gap for TPC stood at Rs. 1,200 crore at the end of 2015–16 (MERC 2016f).

One of the most striking features of the Mumbai experience with parallel licence arrangement is the creation of regulatory assets, for *both* RInfra and TPC: over the course of eight years, suburban Mumbai moved from zero to regulatory assets of more than Rs. 3,500 crore, which is more than one-third of the combined revenue requirements of TPC and RInfra for 2015–16 alone.

5.2 The consumer is ka-ching!

Regulatory asset charge

Although the commission allowed for the creation of regulatory assets, its recovery in the face of changeover and migration of consumers was not decided upon immediately. Normally, the regulatory asset is borne by the consumers of the distribution company. However, the peculiar status of changeover consumers led to a great deal of uncertainty over how RInfra was to recover its regulatory assets.

In March 2011, the APTEL, reacting to an appeal by RInfra on this issue, directed the commission to consider the issue of regulatory asset and cross-subsidy within 120 days, which was further extended to July 2011 (APTEL 2011). Finally, in July 2011, 21 months after the operationalisation of changeover and after 1.54 lakh consumers had chosen to change their electricity supplier, the commission decided that the consumers have to pay for the regulatory asset of the distribution company on which they were dependent for wires. The changeover consumers, thus, would pay for the regulatory asset of RInfra (MERC 2011f).

To add to the confusion, in the initial years, the commission treated the regulatory asset of TPC differently from that of RInfra (MERC 2015c; APTEL 2014c): whereas TPC's regulatory asset was to be recovered in the usual manner, by adding it to its revenue requirement and increasing the tariff, RInfra was allowed to recover its asset through a separate charge on all consumers connected to its wires (called regulatory asset charge, or RAC). As a result of this, in 2013–14 and 2014–15 changeover consumers ended up paying for the regulatory asset of both distribution companies: TPC's through tariff and RInfra's through the RAC (APTEL 2014b). Thus, the recovery of regulatory assets within Mumbai's parallel licensee setting has been controversial, to say the least.

Cross-subsidy surcharge

Tariff in India is designed such that industries and high-tension consumers cross-subsidise domestic and agricultural consumers, i.e. the tariff for a particular consumer category includes an in-built 'cross-subsidy' component. For open-access consumers who use the electricity system only for wires, the cross-subsidy is collected through a separate charge called the cross-subsidy surcharge (CSS).

As the large subsidising consumers were the first to take advantage of changeover, this resulted in loss of cross-subsidy for RInfra. RInfra raised this issue before the MERC right from the beginning, since with changeover it was unclear who was to compensate for this loss.

The commission, along with the decision on regulatory asset recovery, also allowed cross-subsidy surcharge to be recovered from the changeover consumers (MERC 2011f). According to the commission's order, the changeover consumers were to be treated as open-access consumers for the purpose of recovering cross-subsidy. However, because cross-subsidy is built into the supply tariff, changeover consumers in effect pay the cross-subsidy twice: as the subsidy built into TPC's tariff, and again as a separate surcharge to RInfra.

Thus, the operationalisation of changeover has resulted in a complex system composed of multiple charges and multiple recipients. Table 11 lists the different charges applicable to different consumers.

Table 11: Charges applicable to different kinds of consumers in Mumbai

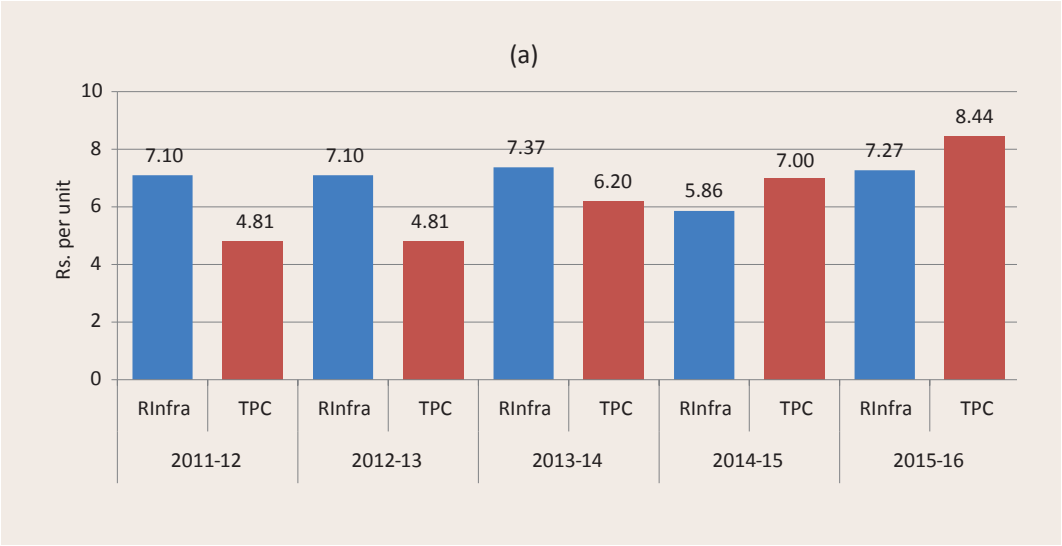
Payments		Type of consumer			
		RInfra's direct consumers	TPC's direct consumers	Changeover consumers	Open-access consumers
Supply tariff	Fixed charge	RInfra	TPC	TPC (with in-built cross-subsidy component)	Negotiated with generator
	Energy charge/ fuel adjustment charge	RInfra	TPC	TPC (with in-built cross-subsidy component)	
Wires tariff	Wheeling charge	RInfra	TPC	RInfra	Payable to the licensee whose wires the consumer was on at the time of moving to open access
Other applicable charges	Cross-subsidy surcharge (CSS)	No (because it is built into the tariff)	No (because it is built into the tariff)	RInfra	
	Regulatory asset charge (RAC)	RInfra	TPC	RInfra	

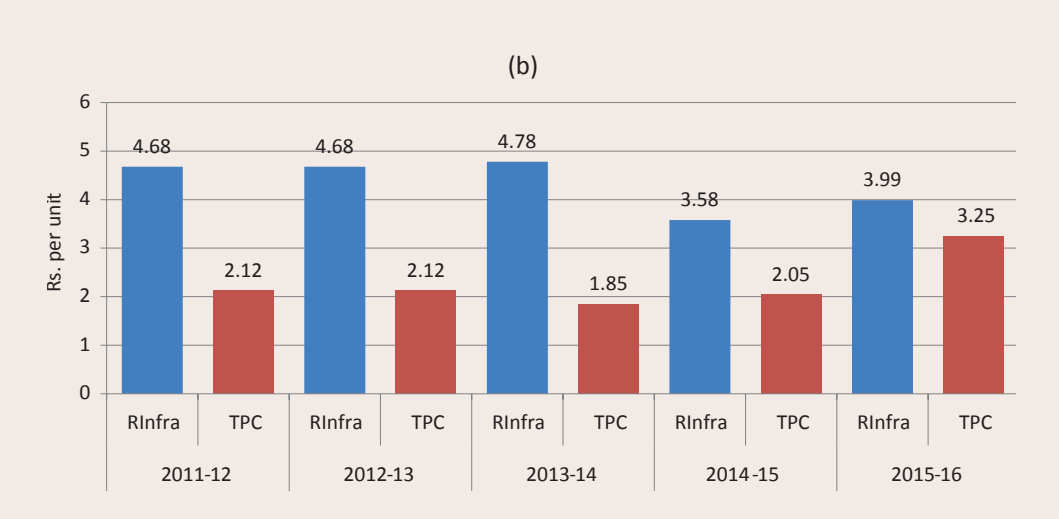
5.3 Tariff design and the elusive gains of competition

As discussed earlier, the regulatory commission decides the retail tariff. On account of cross-subsidy, the tariff for any single category of consumers may not directly reflect the costs incurred by the distribution company to serve those consumers. Thus, the consumer mix dictates both the need and extent of cross-subsidy that can be built into the tariff.

The average cost of supply of TPC is lower than that of RInfra, although the costs of both the distribution companies have been increasing over the years. With this background, it is important to see how these costs got translated into tariffs for different categories of consumers. To understand this by way of example, the charges for large (HT) industrial consumers and for small (LT) residential consumers consuming 101–300 units a month are compared in Figure 8 (a) and (b).

Figure 8: Energy charges (Rs. per unit) for (a) HT (industry) and (b) LT (residential) consumers (101–300 units a month)



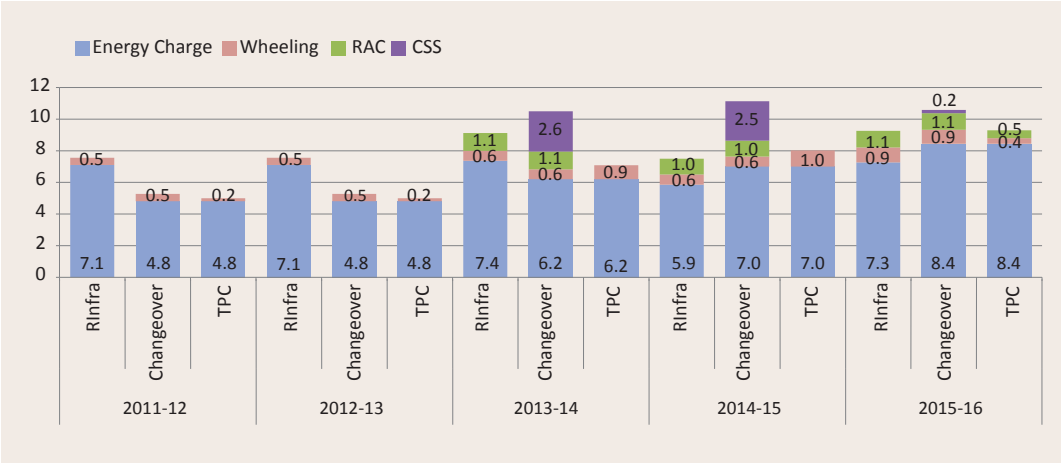


Source: Compiled from various TPC and RInfra petitions.

As can be seen from Figure 8(a), from 2013–14 to 2015–16, the energy charge for large industrial consumers of TPC increased and became higher than that of RInfra. This is unusual considering that TPC had fewer subsidised consumers than RInfra. Figure 9 and Figure 10 show the changes in tariff charges and sales to large consumers. By 2011–12, changeover sales for HT (industry) consumers had surpassed those of RInfra's direct HT consumers, touching 264 MU, because changeover offered a more lucrative deal to HT consumers. In 2013–14, however, the combined impact of CSS, RAC, and increased energy charges made changeover an expensive option. It made more sense either to move back to RInfra or to 'switchover' to TPC, which is exactly what happened. In 2015–16, when the commission revised the CSS formula thereby reducing the CSS, 211 MUs of HT (industry) opted for open access.[25]

Similarly, as can be seen in Figure 8(b), the energy charge for residential consumers of RInfra decreased from 2013–14 to 2015–16, whereas that of TPC increased. Figure 11 and Figure 12 give the tariff and sales to LT (residential) consumers who consumed 101–300 units a month.

Figure 9: Charges (Rs. per unit) for HT (industry) consumers: 2011–12 to 2015–16

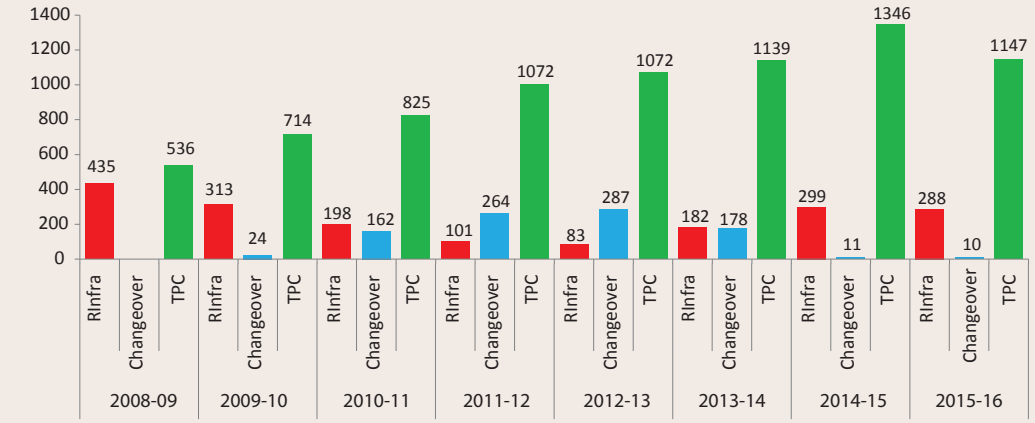


Source: Compiled from various TPC and RInfra petitions.

Note: The above charges include the energy charge, wheeling charge, regulatory asset charge (RAC), and cross-subsidy surcharge (CSS). It does not include the fixed charge and the Fuel Adjustment Cost (FAC).

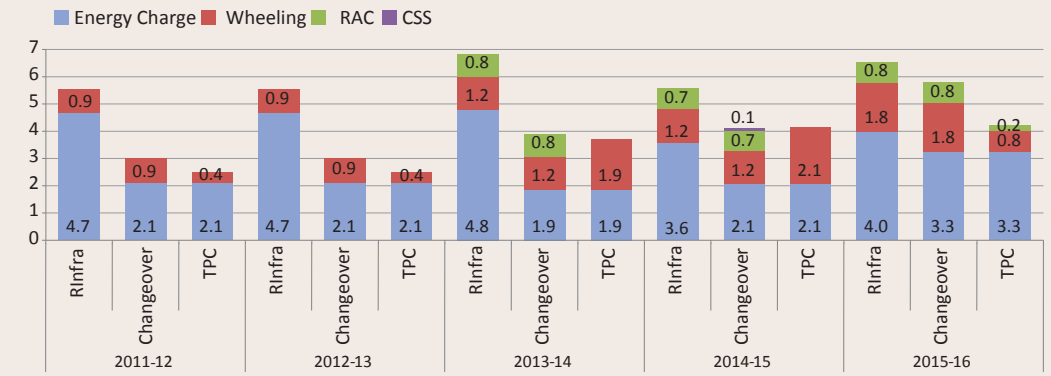
25. MERC used a different formula for calculating the CSS for 2015-16. The CSS for the years 2016-17 to 2019-20, however, has been calculated by MERC using the formula in the Tariff Policy 2016, with some modifications (MERC 2016f; MERC 2016e).

Figure 10: Sales (million units) to HT (industry) consumers: 2008–09 to 2015–16



Source: Compiled from various TPC and RInfra petitions. Sales figures are actuals given by licensees.

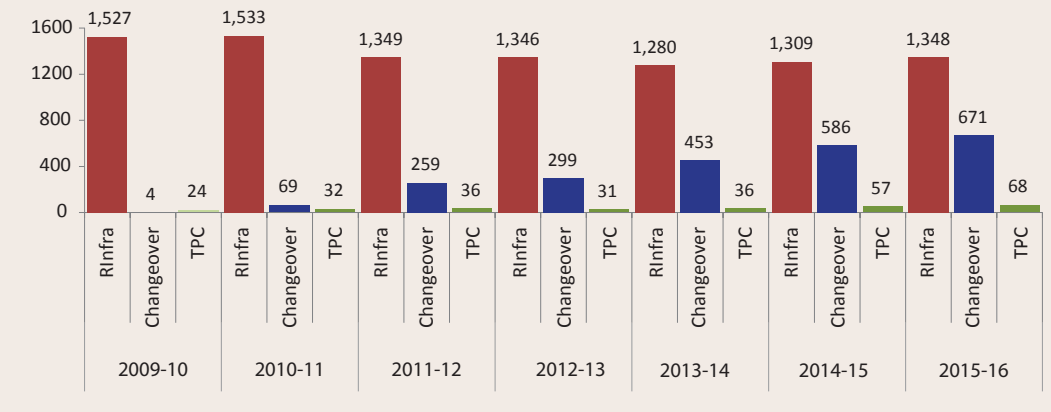
Figure 11: Charges (Rs. per unit) for LT (residential) consumers with monthly consumption of 101–300 units: 2011–12 to 2015–16



Source: Compiled from various TPC and RInfra petitions.

Note: The above charges include the energy charge, wheeling charge, regulatory asset charge (RAC), and cross-subsidy surcharge (CSS) but exclude the fixed charge and the Fuel Adjustment Cost (FAC).

Figure 12: Sales (million units) to LT (residential) consumers with monthly consumption of 101–300 units: 2009–10 to 2015–16



Source: Compiled from various TPC and RInfra petitions. Sales figures are actuals given by licensees.

It would seem that the tariff was designed by the commission to encourage large consumers to move back to RInfra and small consumers to move to TPC. The variation of the energy and other charges, with no apparent link to the cost of supply of the companies, points to the fact that a consistent approach had not been used to determine tariffs. The commission, concerned about the skewed consumer mix, tried to manage tariffs with the hope that it can balance the number of large and small consumers for both the distribution companies. Thus, tariff design as well as (belated) introduction of RAC and CSS made changeover lucrative for some consumers and expensive for others.

Using tariff design as a tool for managing competition is nothing new in the power sector. Regulatory commissions across different states have routinely used surcharges for regulating open access. Particularly, in the case of Mumbai, back in 2003, the commission had justified such an approach by saying that it had 'determined the tariffs in such a way that the bulk supply tariffs (BST) applicable to BSES and BEST are significantly lower than the tariffs applicable to TPC's retail HT and LT consumers. … This will also facilitate healthy competition between the different Licensees on a more even footing (sic)' (MERC 2004).

The skewed consumer mix and its possible impacts after changeover should have been obvious to the MERC from the start, especially since RInfra had brought up these issues in 2009 and later (MERC 2009g). Given that the commission had at its disposal better tools, such as licence amendment and the power to formulate regulations, use of tariff design to balance consumer mix was a sub-optimal strategy. It was also not in the spirit of competition as it led to consumer migration that was not reflective of costs.

5.4 The network effect: Flip-flops on parallel network

The commission had asked TPC to explore the possibility of using RInfra wires to meet its supply obligations and eventually, in October 2009, changeover was operationalised to achieve this. Although many consumers opted for moving to TPC on RInfra wires, TPC also managed to increase the number of its direct consumers, i.e. those connected to its own wires. Between 2008–09 and 2011–12, the number of direct consumers of TPC increased from 25,355 (2,466 MU) to 41,114 (3,000 MU). Although the commission had not fully resolved the issue of parallel network, it still allowed TPC to spend on network expansion.

In October 2011, RInfra approached the commission alleging that TPC was cherry-picking consumers, i.e. it was *indulging* in (a) selective changeover of high-end, *subsidising* consumers, while creating obstacles for small, *subsidised* consumers to move, and (b) selective laying down of wires to facilitate a complete switchover (supply and wires) of the subsidising consumers so that such consumers did not have to pay CSS and RAC to RInfra. RInfra stated that as per its interpretation, TPC should be allowed only one of the two choices to fulfil its supply obligation: either using the distribution network of RInfra to supply to both changeover and new consumers in the common licence area or by building its own entire parallel distribution network. TPC, on the other hand, claimed that it had the right to decide where and how it lays down its network, because it is a business decision based on demand (MERC 2012).

Finding merit in RInfra's claims of cherry-picking by TPC, in August 2012, the commission concluded that TPC cannot fulfil its supply obligation by using the wires of RInfra, and that the use of RInfra wires was only a temporary arrangement until it develops its own network (MERC 2012). Accordingly, the commission modified the changeover protocol and directed as follows:

1. Parallel network: TPC to complete its network expansion in 11 identified clusters (which mostly had residential consumers) within one year of the order, by which time the commission would review its decision.
2. Restriction of changeover: Only those consumers with monthly consumption up to 300 units would be allowed to migrate to TPC. No restriction was put on new consumers.

A year later, in October 2013, the commission found that the network rollout in the identified clusters was lagging behind target. In yet another (belated) attempt to correct the consumer mix and deal with the allegations of cherry-picking, the commission decided to expedite the process by declaring that all consumers consuming up to 300 units a month in the identified 11 clusters would be considered 'direct' consumers of TPC (MERC 2013e). Both RInfra and TPC challenged these orders of the commission before the APTEL.

In these matters, the APTEL delivered its judgement in November 2014. It declared that the commission had exceeded its jurisdiction by mandating the transfer of about 7.92 lakh consumers consuming up to 300 units a month to TPC and that its directions were in violation of natural justice (APTEL 2014e).[26] The tribunal also set aside the commission's observations on cherry-picking and its order restricting changeover (APTEL 2014d). It stated that it was in the overall interest of changeover consumers that they continue to get supply from TPC on RInfra's wires and that there be no unnecessary duplication of network.

However, before this judgement, in August 2014, the MERC had renewed TPC's distribution licence for another 25 years, and had already revoked the restrictions on its network expansion and supply to certain categories of consumers (MERC 2014).[27]

Thus, the commission ordered TPC's network expansion in 11 clusters and then mandated the transfer of 7.92 lakh consumers from RInfra to TPC. Within 10 months, it revoked all earlier restrictions on network expansion and changeover, having achieved neither the expansion in the 11 clusters nor the migration of those 7.92 lakh consumers to TPC.

In light of the APTEL judgement, the commission asked TPC to submit a new rollout plan, which TPC did in February 2015. On account of conflicting interpretations of the APTEL judgements by the parties involved, the MERC in November 2015 constituted a committee to come up with a criteria for network expansion as well as a procedure for consumer migration (MERC 2015e). The committee submitted its report in March 2016 and based on this report, the MERC undertook a public process in June 2016 (MERC 2016a). However, as of January 2017, the MERC is yet to issue an order in this regard.

Thus, the uncertainty regarding the need and extent of a parallel network continues. The only thing that can be stated for certain is that eight years into the operationalisation of changeover details of TPC's network and the manner in which it will fulfil its supply obligation remain unclear.

26. The APTEL through an interim order on November 29, 2013 stayed the implementation of the MERC's directions to move RInfra's 0–300 units-a-month consumers in the 11 clusters en masse to TPC (APTEL 2013b).
27. The APTEL did put a stay on this volte-face by the MERC in its judgement dated September 4, 2014 (APTEL 2014a)—only to vacate the stay on April 28, 2015 in light of its own judgement given in November 2014 (mentioned above) (APTEL 2015).

6. Role of institutions: The visible hand

Operationalising parallel licence mechanism was never going to be an easy task and to be sure, both the government and the regulator were mindful of this fact. Considering the challenges it posed, the government was not in favour of such an arrangement, whereas the regulator, initially, saw it as an opportunity to introduce competition in the retail supply of electricity. Ultimately, the government, the judiciary and the regulatory institutions — through a series of actions (or inactions) — played a role in shaping the mechanism as it stands today.

This section discusses the role played by some of these institutions along with the opportunities that came their way to mend things — but were not capitalised. It also highlights the need for a policy and regulatory framework that is more nimble and agile in responding to a dynamic phenomenon like competition.

6.1 Competition as a choice

Even before the MERC came into existence, the state government was aware of the problems posed by TPC's distribution license. The parallel licence issue was raised before the government in 1998, and in 2003 the state government issued the following clarification on its policy to the commission:

> 'GOM has issued licences to the TPCs and also the BSES Ltd … Both Tata & BSES have been given specific areas for distribution of power and also requested them to adhere with their jurisdictions. … BSES & Tata both have complained to the Govt. that consumers in their respective areas are switching over to other area … ***This issue was seriously under consideration of GOM from long back and on 23rd March 1998, Govt. issued specific directions to both Tatas and BSES explaining Govt's standing policy in this issue.*** The intention of the GOM behind this standing policy was that not to allow any such change over of suppliers because it ensured efficient use of existing infrastructure and avoids duplication & also it leads to

reduction in the unnecessary expenditure of the licensees which ultimately leads to avoiding extra burden on the consumers …

Duplicate infrastructure would obviously, impact the tariff rates which in turn would result in a burden being placed on the consumers. To prevent this, the Government has consistently followed the policy of not allowing multiple licensees in the same area for the same category of consumers.

If TPC were to be enabled to supply to consumers of BEST and BSES directly at rates which are lower than their rates then TPC being the bulk licensee the consumers will be tempted to switch over. This will render the existing infrastructure idle and will also affect the finances of the Distributing Companies. This is also another reason why GOM has a standing policy of not allowing consumers to change supplier … It clearly shows that the root caused of this issue is the rate of tariff only … The MERC has a legal statute, hence Govt. thinks that it is proper to handle tariff problems by the MERC itself (sic)' (MERC 2003). [Emphasis added]

In the above excerpt, the state government has clearly articulated the potential concerns with respect to parallel licence operation, such as consumer migration, network duplication and its potential impacts on tariff. In spite of being aware of such impacts since as early as 1998, the government's response was simply to discourage opportunistic consumer migration. Much before the parallel licensee became a fait accompli, the government had the choice to eliminate this possibility by suitably amending the licences of TPC and BSES. It is unclear why the government, since it had the powers to do so, did not choose this option. Curiously, it instead chose to offload the responsibility of dealing with the issue of parallel licence on to the MERC, which at that time was operating under the Electricity Regulatory Commissions Act, 1998. The 1998 Act did not give commissions the power to amend licences, unless the state government explicitly delegated such powers. No such powers were delegated.

In light of the evidence placed before it, the MERC in 2003 held that TPC had a licence to distribute electricity in Mumbai.[28] Given this finding, the commission stated that it had two options for dealing with the issue of parallel licensees: it could either advise the state government to amend TPC's licence so that TPC would not be allowed to supply electricity to any new consumers, or it could start a process to determine how competition is to play out in Mumbai.

The commission chose the latter option. It opined that '… against the backdrop of a not too bright national picture, the city of Mumbai is uniquely placed: there is surplus power available, two utilities (namely, TPC and BSES) have overlapping distribution networks in many areas of the suburbs, and both are technically and financially well-equipped to enter the phase of a competitive electricity market. ***It would, therefore, be a very short-sighted step to select the first option of amending TPC's licenses to make them restrictive. Since Mumbai is well ahead of others on the highway of reforms in the power sector, the Commission proposes to implement the second option'*** (MERC 2003). [Emphasis added]

Highlighting the need for further study on the issue of operationalising parallel licence, the commission in 2003 restrained TPC from offering new connections to consumers with contract demand below 1000 kVA. This order of the MERC was first challenged before the APTEL, which overturned it, and then before the Supreme Court, which held that TPC had a licence to distribute electricity in Mumbai and hence could not be restrained in any manner.

28. The MERC gave its order on July 3, 2003. The Electricity Act was notified in June 2003, but after the hearings in the MERC case had been completed.

6.2 Missed opportunities

With the Supreme Court order of 2008 declaring TPC a parallel licensee in Mumbai, the matter came back to the commission after five long years. Based on the judgement, the commission had to decide a framework to operationalise functioning of the parallel distribution companies in Mumbai.

Functioning under the Electricity Act, 2003, the commission was now empowered to grant, modify, and renew licences for generation, transmission, and distribution companies. Once the existence of the parallel licensee became a fait accompli, the commission could have used these powers to address some of the implementation issues. For example, before implementing changeover, it could have tried balancing the consumer mix through licence amendments. In 2012 and 2014, when the licences of RInfra and TPC came up for renewal, the commission could have made changeover a permanent feature through these processes. This would have also ensured compliance with the supply obligation without network duplication.

Unfortunately, the MERC brought in changeover through an interim order, leaving its status in doubt and without immediately dealing with the issues concerning differences in the consumer mix and cross-subsidy in any significant manner. With the continuation of cost-plus tariff determination, the problems of revenue gap and regulatory asset recovery cropped up, as expected, and these costs were eventually allowed to be recovered even from the changeover consumers. While using RInfra wires, TPC was also allowed to expand its network, but without much clarity on its need and extent.

It is interesting to note that the Central Electricity Regulatory Commission and the Forum of Regulators approached the Solicitor General of India in 2011 for legal advice on the issue of parallel licensees in distribution and parallel networks. One of the queries was whether the observations of the Supreme Court in its 2008 judgement regarding TPC's licence was confined to that case alone, or whether it could be applied to other cases in the electricity sector. The Solicitor General stated as follows: 'This is not a case where TPC is a subsequent applicant to procure a distribution license for an area for which the existing licensee was BSES. In fact, TPC was granted three licenses for that area long before a separate license was granted in favour of BSES. … As it can be seen that this was not a case where TPC was a subsequent applicant for a distribution license under the Electricity Act, 2003, ***the requirement of supplying electricity through one's own distribution system***, as expressly laid down in the sixth proviso to section 14, ***need not be adhered to***. … Hence, the ratio in this judgment is specific to the facts of the case' (Solicitor General of India 2011)[29]. [Emphasis added]

In light of this opinion, the entire emphasis and insistence on the need for a parallel network seems unnecessary. It also suggests that the possibilities of operationalising parallel licence mechanism without physically duplicating the network were not sufficiently explored by the MERC.

With hindsight, it becomes clear that the commission miscalculated the potential risks in operationalising parallel licence. In the absence of a well-defined strategy to deal with all the associated issues, the commission's view of Mumbai being "well ahead of others on the highway of reforms in the power sector", proved to be a case of misplaced optimism.

29. Proviso 6 to Section 14 of the Electricity Act 2003 states, "Provided also that the Appropriate Commission may grant a licence to two or more persons for distribution of electricity through their own distribution system within the same area, subject to the conditions that the applicant for grant of licence within the same area shall, without prejudice to the other conditions or requirements under this Act, comply with the additional requirements relating to the capital adequacy, credit-worthiness, or code of conduct as may be prescribed by the Central Government, and no such applicant, who complies with all the requirements for grant of licence, shall be refused grant of licence on the ground that there already exists a licensee in the same area for the same purpose."

6.3 Belated interventions

By 2007-08, the dispute between TPC and RInfra over generation allocation had already reached the Supreme Court. It was clear that one possible scenario was RInfra being denied the share it claimed, which in turn would mean disruption in power supply to a large number of consumers in suburban Mumbai in the peak summer season. However, neither the commission nor the government took any pre-emptive steps. In May 2009, the Supreme Court declared that a generator cannot be forced to supply power without a PPA. Following this, TPC decided not to sell power to RInfra from April 1, 2010. This decision would have resulted in an additional shortfall of 500 MW for RInfra in the peak summer season.

Acting belatedly after the Supreme Court order and TPC's decision, the Government of Maharashtra issued a memorandum dated May 7, 2010, directing TPC to continue supply of power to RInfra. As per the directions of the memorandum, TPC was to supply 360 MW to RInfra from April to June of 2010 and 200 MW from July 2010 to March 2011 (MERC 2011d). The state government issued another memorandum dated May 19, 2010, directing the Maharashtra State Load Despatch Centre (MSLDC) to maintain status quo in scheduling of power. Hence, the MSLDC refused to schedule power as per TPC's contracts.

TPC challenged both the memoranda in the Bombay High Court. The state government failed to own up to its decision before the court. It took the stance that the memorandums were merely advisory in nature and not issued under Section 11 or Section 37 of the 2003 Act.[30, 31] Had the government acted under these specific provisions of the 2003 Act, it would have been obliged to compensate the generator for the adverse financial impacts, if any, of such a decision. Finally, in January 2011, the Bombay High Court quashed both the state government memorandums. The MSLDC, however, still refused to schedule power as per TPC's contracts.

TPC challenged this decision of MSLDC before the MERC and claimed compensation for the same. Initially, based on the memorandums, the MERC upheld the MSLDC's decision (MERC 2010b), however, even after the memorandums were quashed by the High Court, the MERC still refused to grant any compensation to TPC. Subsequently, TPC challenged the MERC order before the APTEL, which set it aside and directed the MERC to pass a consequential order to have the MSLDC compensate TPC for the period subsequent to the High Court quashing the government memorandums. Unfortunately, these legal pronouncements came almost three years after the Bombay High Court judgement (APTEL 2013a).

The government and the MERC thus got away with their decisions without any accountability for the consequences. In the process, the autonomy and credibility of independent institutions such as the MSLDC and the regulatory commission also suffered.

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30. Section 11 of the Electricity Act, 2003 states that '(1) the Appropriate Government may specify that a generating company shall, in extraordinary circumstances operate and maintain any generating station in accordance with the directions of that Government (Explanation - For the purposes of this section, the expression "extraordinary circumstances" means circumstances arising out of threat to security of the State, public order or a natural calamity or such other circumstances arising in the public interest); and (2) The Appropriate Commission may offset the adverse financial impact of the directions referred to in sub-section (1) on any generating company in such manner as it considers appropriate.'
31. Section 37 of the Electricity Act, 2003 states that 'the Appropriate Government may issue directions to the Regional Load Despatch Centres or State Load Despatch Centres, as the case may be, to take such measures as may be necessary for maintaining smooth and stable transmission and supply of electricity to any region or State.'

6.4 The myth of uniform tariffs

On many occasions, especially when suburban Mumbai tariffs being high became a political issue, the state government has proposed uniform tariffs for Mumbai to deal with such problems. Electricity tariffs are supposed to reflect costs, and the fact that the three different companies operating in Mumbai have different tariffs, reflects the differences in their respective efficiencies in conducting their business. Uniform tariffs take away such crucial differences, and the resultant de-politicisation of the matter is likely to further weaken public pressure on the companies to improve their relative performance. Apart from defeating the very purpose of competition, such a measure also flies in the face of the larger political rhetoric of the government, which is championing for greater role for the private sector and moving towards a more competitive sector.[32] Thus, the only solution offered by the state government for Mumbai power sector woes is also a measure that erodes the very essence of competition.

6.5 Endless litigation

The Electricity Act, 2003, empowers any person aggrieved by an order of the electricity regulatory commission to appeal against it before the APTEL.[33] In the case of Mumbai, both utilities have been the most active litigants across forums. Almost every tariff order for the distribution businesses of TPC and RInfra since 2008 has been challenged before APTEL.[34] In fact, the two companies have sought reviews even for the latest tariff orders for 2016-17 to 2019-20. Not surprisingly, as far back as in 2006, the APTEL had remarked that for RInfra and TPC, '*electricity means eternal litigation from forum to forum in the game of generation and distribution of electricity*'(APTEL 2006).

Some of these appeals have resulted in the MERC's decisions being overturned by the APTEL. How the tribunal's rulings have impacted the functioning of the regulatory institution or the furthering of competition in the sector, is a larger issue beyond the scope of this study. The limited attempt here is to see how some of the APTEL judgements have affected consumer tariff in Mumbai and the operationalisation of parallel licence arrangement.

In 2009, three judgements by the APTEL on appeals filed by RInfra led to a cumulative tariff increase of Rs 1,000 crore for its consumers in Mumbai (PEG 2009). As of April 2016, RInfra and TPC's appeals pending before the APTEL, if decided in their favour, are likely to have a cumulative impact of Rs. 842 crore and Rs. 228 crore respectively on consumer tariffs (MERC 2016f; MERC 2016e). As discussed in Section 5.4, the ambiguity arising out of the APTEL's judgement on TPC's parallel network led to multiple proceedings, which are yet to be concluded. Similarly, Box 2 provides an example of the kind of implications that the APTEL's ruling can have on the tariff determined for cost-plus generation projects.

Although companies have the right to appeal against the commission's orders, unending litigation highlights deeper problems. Firstly, the regulatory commission provides a forum for informed deliberations amongst multiple stakeholders. This process requires the commission to issue reasoned orders documenting all suggestions and objections. Such litigation then reflects a lack of faith in the regulatory process and the inability of the stakeholders to find any common ground. Secondly, the legal expenses of the companies are recovered through

32. For more details, see 'A commentary on the Electricity (Amendment) Bill, 2014' at http://prayaspune.org/peg/publications/item/293.html.
33. Section 111 of the Electricity Act, 2003
34. The only order that has not been challenged is in Case no. 113 of 2008, which was the tariff order for 2009–10 for TPC.

tariff, but the more significant cost to the consumer is that of increasing uncertainty. The companies have the wherewithal to wage long legal battles, but the consumers find it difficult to participate in such proceedings. Both the APTEL and the Supreme Court are located in New Delhi and the cost of travel alone can be prohibitive. Thirdly, unlike the regulatory commission, effective participation in these forums often requires legal expertise, which can be a handicap. Finally, while the MERC does make efforts to defend its orders, if every order is challenged, the regulatory proceedings are reduced to a mere formality. Ultimately, such litigation makes it highly difficult for concerned citizens to inform themselves and participate effectively in regulatory matters.

Box 2: Power purchase costs of VIPL

After a failed attempt at competitive bidding for long-term power purchase, RInfra signed a 25 year PPA with its own generating company, VIPL on cost-plus basis. Concerned over the competitiveness of the tariff proposed, the MERC asked RInfra to present analysis to support its claim of VIPL being competitive vis-à-vis other generators. In response, RInfra submitted energy charge computation under various scenarios and claimed that it was more economical than tariff discovered through the bidding process. As per RInfra's analysis, the energy charge for VIPL would range from Rs. 1.30 per unit to Rs. 1.74 per unit for 2014–15 and between Rs. 1.40 per unit to Rs. 1.79 per unit for 2015–16. Even in the most pessimistic scenario, RInfra assumed that Coal India Ltd. would supply 65% of the committed coal in 2014–15 and 70% in 2015–16, and that VIPL would be able to arrange for the remaining coal from market sources such as e-auction or imports.

However, once the plant started operation VIPL failed to secure fuel supply arrangements that were assumed at the time of seeking PPA approval. As a result of this, the tariff increased sharply. Through its order dated June 20, 2016 the MERC disallowed excess fuel related costs claimed by VIPL. Table 12 gives the changes in generation tariff for VIPL for 2014–15 and 2015–16.

VIPL appealed against this order, and the APTEL in its judgement held that the commission had to allow the cost of fuel for Unit 1 of VIPL (for which there was no fuel supply agreement) to the extent it had allowed for Unit 2 (which is covered by a fuel supply agreement for about half of its capacity) (APTEL 2016). The judgement stated as follows:

> "The State Commission while examining the various fuel scenario may have identified any ceiling/ ratio of coal use as specified under various scenario, which is not the case under present consideration. Once the State Commission has approved the PPA under Section 62, the basic principles of Tariff determination as per Section 62 have to be followed by the State Commission (sic)."
>
> "… Commission while applying its prudence check must allow the actual fuel mix used by the Appellant while determining the Energy charges for FY 14-15 and FY 15-16. While giving this observation, we would like to underline the fact that it is the prime responsibility of the Appellant to ensure supply of domestic linkage coal from CIL to have most competitive energy charges for the supply of its power ...(sic)"

Table 12: Increase in VIPL's energy charge (Rs. per unit)

Year	MERC 09.03.2015	VIPL 10.07.2015	MERC 20.06.2016	APTEL judgement* 03.11.2016
2014-15	1.91	3.62	2.24	~2.68
2015-16	1.91	3.16	2.11	~2.50

Sources: MERC Order in Case no. 91 of 2015; APTEL judgement in Appeal no. 192 of 2016.

* Estimation of the impact of APTEL's judgement by PEG.

The APTEL clearly acknowledges that the responsibility to ensure an adequate fuel tie-up rests solely with the generator. However, saying that because the commission did not impose a tariff ceiling at the time of the PPA approval, it cannot hold the generator accountable for its tariff claims made at the time, negates the MERC's efforts to ensure accountability of the generator. It also absolves the generator of the responsibility to meet the performance it guaranteed at the time of the PPA approval process.

It should be noted here that in spite of not having coal supply for 75% of its requirements, VIPL did not participate in the coal block auctions conducted by the Government of India in 2015. Nor has it taken any legal actions against the entities that are supposedly responsible for the delay in fuel supply.

7. Lessons and the way forward

Irrespective of its fallout, operationalisation of the parallel licence mechanism in Mumbai remains a unique experiment in the history of India's electricity sector. Although many of the expectations from it were not met, the experience has a great deal to offer in terms of learning as the power sector deliberates the separation of the carriage (wires) from the content (electricity supply) as the way forward.

In light of the analysis so far, this chapter provides a few insights into what can be done to deal with the many challenges before Mumbai's power sector and also draws several lessons from the Mumbai experience for the larger electricity sector.

7.1 The way forward for Mumbai

The elephant in the room

In 2003, the commission took the bold step of favouring competition, but when competition became inevitable, it was ill-prepared to deal with the task. In 2009, following the Supreme Court judgement, the MERC introduced changeover to allow consumers to avail of lower tariffs without dealing with the associated issues. It would seem that the commission hoped that the mere presence of a parallel licensee (albeit with lower costs) will lead to competitive pressure and lower tariffs. Clearly, this did not happen; introducing a new company in the old cost-plus system could not change the dynamics, as the incentives and disincentives remained the same. As a result, both the companies continued their old way of functioning — signed cost-plus PPAs only with sister concerns and overall did not make too many efforts to lower costs — as revenue recovery continued to be guaranteed. Therefore, any proposal for Mumbai going forward, has to move away from this cost-plus system to a competitive setting.

Criteria for an effective solution

Based on the understanding of the issues in Mumbai as highlighted in this report, any proposal aimed at dealing with Mumbai's electricity issues would need to meet the following criteria:

i) Quality service at competitive rates

ii) Protecting the interests of small consumers and ensuring tariff certainty for them

iii) Allowing for choice of supplier to consumers, including open access and net metering, to ensure that consumers get to choose the most optimum supply options

iv) Putting an end to (further) regulatory asset creation

v) Allowing for more power purchase options to distribution companies

vi) Allowing greater flexibility in operations to distribution companies, especially, to meet supply obligation in the most optimum manner

vii) Requiring no major legislative change (within the existing jurisdiction of the commission)

While there may be many potential alternatives that meet these criteria, here we discuss in some detail *one* potential alternative.[35] The proposed scheme is restricted to the consumers in suburban Mumbai and hence, excludes the south Mumbai region. This is because the licensee in that area, namely BEST, continues to refuse open access and the changeover option to its consumers. In such a situation, the operationalisation of parallel licensees would result in network duplication, which is not desirable. Instead, it would be prudent to amend TPC's licence and remove south Mumbai from its jurisdiction.

Workings of the proposed scheme

To implement the proposed scheme, the following steps will have to be taken by the regulator:

- **Freezing regulatory assets**: The commission will need to freeze the regulatory assets and revenue gaps up to a given year, 2015–16, for example, and put them in a separate regulatory asset account for each licensee. After that year, no true-ups or approvals of revenue gaps should be granted.
- **Recovery of regulatory assets**: The regulatory asset which has been frozen for the companies will be combined to compute the uniform regulatory asset charge, which is to be paid by all suburban consumers (including open-access consumers) over the next four years. Since the recovery of the regulatory asset is a fait accompli as far as consumers are concerned, this measure will eliminate the regulatory asset once and for all and will resolve the confusion over who pays for which regulatory asset. The proceeds from the uniform regulatory asset charge will be divided between the distribution companies in proportion to their regulatory asset size.
- **Tariff ceilings**: The commission should set category-wise ceilings for energy charges below which the licensees should have the flexibility to offer different charges to different consumers[36]. This would protect the interests of the small consumers and provide tariff certainty to all consumers.
- **Cross-subsidy**: Because the interests of small consumers must be protected, it follows that they will need to be subsidised to some extent. The required amount can be raised in the form of a cross-subsidy surcharge imposed on all other (i.e. non-subsidised, including open-access) consumers.

35. The scheme was also submitted to the MERC during the proceedings pertaining to Case no. 90 of 2014. See http://prayaspune.org/peg/publications/item/323.html.
36. The proviso to Section 61(1)(a) of the Electricity Act, 2003, states: 'in case of distribution of electricity in the same area by two or more distribution licensees, the Appropriate Commission may, for promoting competition among distribution licensees, fix only maximum ceiling of tariff for retail sale of electricity.'

- **Ceiling on wheeling charges**: The commission should also set a uniform ceiling for wheeling charge for *all* retail consumers. Within this limit, the distribution companies should be free to offer different rates to different consumers. This also addresses the issue of network expansion, since the companies will now only duplicate the network if the costs are below the ceiling.
- **Choice of supplier:** All consumers, including non-subsidised consumers, should have the freedom to choose suppliers willing to supply at rates lower than the ceiling. They should be allowed to enter into contracts to avail of such supply under open access.
- **Operational freedom:** Within these ceilings, the distribution companies should be given full flexibility in terms of managing their power procurement, capital expenditure and operations and maintenance costs, so as to maximise their sales and revenue. However, the licensees should not be allowed to enter into contracts with consumers for periods longer than the control period considered by the commission for the purpose of this exercise.
- **Power purchase**: The long-term power purchase contracts of the distribution companies can prove to be an issue. In the case of Mumbai, however, PPAs for all the capacity, except VIPL, are expiring in 2017–18. Thereafter, the decision of power procurement will be left to the companies: the companies will have to function under the ceiling and hence, any power purchase cost over and above the ceiling cannot be passed on to consumers. The commission on its part, should focus on having adequate transmission capacity for Mumbai to allow for greater power procurement options.
- **Ensuring Universal Supply Obligation (USO)**: To ensure that the USO is met, the commission should mandate that both companies make their wires available for changeover. For this, the MERC should amend the licence conditions of TPC and RInfra to make changeover permanent. Such an amendment should also enjoin both the licensees to meet their respective supply obligation using either their own wires or those of the other licensee, whichever is more economical.
- **Regulatory process and regulations**: The commission should publish a white paper detailing all the issues related to the implementation of such a scheme and seek comments and suggestions from the public and from all stakeholders in this regard. Based on the white paper and after undertaking due public process, the commission should formulate new regulations for putting into effect such a scheme for at least the next four to five years. The commission should also amend the regulations related to open access and any other regulations, such as those related to standards of performance, tariff determination, consumer grievance redressal, etc. for Mumbai licensees, as may be necessary.

Competitive pressure to maximize sales and revenue should encourage the companies to offer more lucrative tariffs by optimising their costs. If the companies choose to stick to the ceiling, they can recover their costs without any improvements in efficiency, but they may eventually lose consumers either to the competing licensee or to open access. Therefore, it would be necessary for the commission to periodically review the ceiling limit and to revise it from time to time.

Box 3 provides an illustrative example of the workings of this scheme. As can be seen from Table 14, the proposed limits ensure that most consumers do not face any significant tariff increase vis-à-vis their existing tariffs. The scheme also eliminates regulatory assets, ensures competitive pressure on tariffs, and avoids uneconomical network duplication.

Thus, if the proposed scheme is implemented properly, both licensees and consumers stand to benefit. Here it is important to note that for the success of the proposed scheme, all dimensions discussed above need to be implemented in a comprehensive and coordinated manner. Selective/ partial implementation could lead to more complications and adverse implications for consumers.

Box 3: Illustrative example of the workings of the proposed scheme

To understand how such a scheme may work, illustrative figures for the distribution sector in suburban Mumbai are shown in Table 13. The figures assumed in the table are of the same order of magnitude as those of the two suburban Mumbai distribution companies combined.

Table 13: Illustrative figures for the distribution sector in suburban Mumbai

Particulars	Value
Total aggregate revenue requirement (including regulatory asset with carrying cost)	Rs. 11,500 crore
Total sales	13,000 million units
Cost of supply	Rs. 8.85 per unit
Total number of consumers	Approximately 31 lakh

Calculations based on the proposed workings for a simple structure comprising four categories of low-tension consumers and three categories of high-tension consumers is shown in Table 14.

Table 14: Proposed tariff structure based on illustrative figures for suburban Mumbai consumers for the first year of the control period

Consumer category	Sales	Total (non-power) supply charges*	Power supply charge	Ceiling tariff	Total revenue
	MU	Rs. per unit	Rs. per unit	Rs. per unit	Rs. crore
	A	B	C	D = B + C	E = D × A/10
LT (0–100 units per month)	2,400	2.6	3.0	5.63	1,351
LT (101–300 units per month)	2,200	2.6	4.5	7.13	1,569
LT commercial (0–20 kW)	2,000	4.5	5.5	9.98	1,996
Other LT	3,700	4.5	6.5	10.98	4,063
HT industry	1,000	4.5	6.5	10.98	1,098
HT commercial	1,200	4.5	6.5	10.98	1,318
Other HT	500	4.5	6.5	10.98	659
Total	13,000			9.19	11,943

Source: Calculations by PEG.

*Uniform wheeling charges of Rs. 1.33 per unit and uniform regulatory asset charges of Rs. 1.3 per unit are assumed for all categories of consumers; all except low-tension consumers consuming up to 300 units a month also pay a uniform fixed cross-subsidy surcharge of Rs. 1.85 per unit. These three charges make up the total (non-power) supply charges in column B. Thus, all consumer categories except the first two LT pay Rs. 4.5 per unit as (non-power) supply charges, while the first two categories pay Rs. 2.6 per unit.

What the proposed scheme can accomplish

The key objective of the proposed scheme is to put an end to the cost-plus approach and the regulatory asset regime, which offers no incentive for the licensees to reduce costs or to improve planning. In contrast, the proposed scheme offers no guarantee that future costs due to inefficiency can be recovered.

The scheme gives the distribution companies complete flexibility to optimise their operations so long as they operate within the ceiling and adhere to standards of performance. The scheme also offers consumers the choice of negotiating better terms with the companies or other suppliers without compromising the interests of small consumers. Most important, while providing flexibility to the licensees and the *subsiding* consumers, the proposed scheme ensures tariff certainty for the small (*subsidised*) consumers.

Such an approach reduces the need for regulatory scrutiny of individual cost components of each licensee; instead, the regulatory commission can focus on more important issues, such as transmission planning; ensuring that the licensees fulfil their universal supply obligation and meet the stipulated standards of performance; and that non-discriminatory access to distribution wires and the transmission system is ensured for free and fair competition.

7.2 Lessons for the electricity sector at large

It may be tempting to attribute the issues faced in operationalising parallel licensees in Mumbai to the legal requirement of supply through 'own' wires under the Electricity Act, 2003. Such an argument would then proceed to claim that with a formal separation of carriage and content such issues would not exist. However, such a line of reasoning betrays a lack of understanding of not only the Mumbai situation, but of the Indian electricity sector as a whole. In reality, the changeover mechanism, as implemented in Mumbai, is indeed a form, albeit limited, of carriage and content separation. Since, at the sector level the carriage and content separation framework under consideration has similarities with Mumbai, the changeover experience can offer lessons in this regard. The relevant lessons from the analysis of the Mumbai experience are given below.

- **Need for creating a conducive environment for competition**. Competition requires clearly defined and unambiguous entry and exit criteria, non-discriminatory open access to the transmission and distribution systems, stringent norms for supply and service quality, and robust mechanisms for redressing consumer grievances. Efforts towards such policy and regulatory measures should hence precede any move towards competition. Healthy competition requires the participation of many players: if the number of players is too low, the pressure to improve performance will also be substantially less. The Mumbai experience demonstrates how a constraint on transmission or non-mandatory open access (such as in south Mumbai) can negate the potential benefits of competition. To avoid such pitfalls and subsequent litigation, it is essential to first address all such issues and to clearly spell out the rules of the game right from the beginning.
- **Need for clear and unambiguous rules**. For any policy to be effective, a roadmap for the policy goal is absolutely essential. It is not enough, however, to have a well-intentioned policy; such a policy should be backed by a clear and enforceable regulatory and legal framework, with rules and regulations as clear and unambiguous as possible. For bringing in further competition, creating a level playing field by clearly defining the rules and reducing information asymmetries is of critical importance. This will allow for better decision-making by all stakeholders; it will significantly reduce litigation in the

implementation phase; and it will also enable better risk management. More importantly, the government and the regulator must enforce the laws and regulations strictly and consistently and at times, take the necessary harsh steps such as say amending licence conditions to ensure a level playing field. The network rollout process in Mumbai clearly shows that not having a clear road map supported by appropriate laws and regulations can cost dearly. The price of not having such clarity is often paid by the consumers and the public at large.

- **Need for continuous learning**. Even after putting in place a clear roadmap, the government and the regulators should review it periodically and be ready to make any mid-course corrections, if required. In Mumbai, so many opportunities, such as licence amendment, approval of new power purchase contracts, transmission planning, review of the changeover, etc. were lost for want of the regulatory ability to swiftly respond to such changes.

- **Need to abolish cost-plus tariff approach**. Apart from not providing any significant incentives for efficiency improvement, cost-plus regulation is also time and effort intensive on part of the regulator. Instead, the regulator should focus on ensuring adherence to supply quality and performance standards, and preventing anti-competitive behaviour. The Mumbai experience shows that in case of multiple service providers, it becomes imperative to abolish the cost-plus system for tariff determination. Failure to do so would lead to consumers paying for the inefficiencies of not one but multiple supply licensees. Hence, in case of multiple suppliers, it is absolutely essential to move to category-wise tariff ceilings. While deciding the ceiling, the interests of small consumers need to be protected.

- **Need to ensure supply obligation**. With just two competing licensees, relatively high paying capacity, and near-universal access, Mumbai faced serious problems in ensuring supply obligation. Many Mumbai consumers repeatedly complained about the refusal by one or the other company to supply power to them. This can become a particularly severe challenge as the number of suppliers increase, and as suppliers enter areas with significant disparities in tariffs and ability to pay. It is important to note that most commissions in India have taken a hands-off approach towards access and supply quality issues as far as rural and poor households are concerned. Hence, without an explicit and strong regulatory mandate to ensure supply obligation, small consumers are not likely to benefit from competition.

- **Need for reliable data and monitoring mechanisms**. Mumbai's example highlights that availability of crucial data and information is not merely a product of metering and billing infrastructure; it also needs strong regulatory will as well as robust accountability mechanisms for both, the licensees and the regulatory commission. In spite of having some of the lowest distribution losses and no unmetered consumers, the data available in the public domain to evaluate the changeover process in Mumbai is woefully inadequate. It is important to note that neither the regulatory commission nor the state government has undertaken any independent evaluation of this process. With serious issues of high distribution and transmission losses and the presence of significant number of unmetered consumers, these challenges can increase exponentially in the case of many other states.

- **Bridging information asymmetries**. One of the key reasons that the changeover process left so many consumers disillusioned was that they did not have the crucial information regarding the manner in which the claimed costs were going to be recovered. Initially when more than 1.54 lakh consumers chose to change their electricity supplier, they were unaware of any additional future charges to be levied on them. Eventually, the

MERC imposed several additional charges, which negated the benefits from changing the supplier: in fact, the imposition forced many people to move back to their original supplier, although its costs had not been lowered in any way. In the proposed separation of carriage and content, the commission will continue to set tariffs of the incumbent licensee and hence would decide the need for and the extent of various surcharges. Thus, it will continue to influence the decision of consumers to switch between supply licensees. If these decisions are taken ad hoc, as in the case of Mumbai, the consequences can be disastrous.

Finally, any reform or change can only be as effective as the institutions responsible for its implementation. In this regard, it is crucial that all key stakeholders agree on certain ground rules and that the regulator ensure compliance with the agreed-upon rules in a consistent and predictable manner. Otherwise, as in the case of Mumbai, incessant litigation can only lead to chaos and confusion. With the increase in open access, reducing costs of renewable generation, and changes such as the proposed carriage and content separation, which seek a larger role for the market, the complexity of the system will increase. Hence, there is a need for high level of transparency and democratic governance for such a system to be successful. Therefore, it is extremely important to significantly overhaul the capacity and the autonomy of the regulatory institutions to deal with such challenges.

For now, consumers must be content with the fact that parallel distribution companies are operational in suburban Mumbai, even as the wait for competition continues.

Annexure 1

Cost-plus regulation

The basic idea behind the cost-plus regulation is that the tariff should be such that all 'prudent' costs of the utilities (i.e. generation, transmission, or distribution companies) are recovered. Under this type of regulation, the regulator scrutinises all the costs and decides whether they are permissible. Unreasonable costs are disallowed and do not form a part of the revenue to be recovered by the company, whereas prudent costs are allowed to be recovered through tariff. The term cost-*plus* means that the companies are allowed a fixed rate of return (profit) on their investments. Approved costs *plus* the rate of return make up the total revenue requirement of the company, which is recovered through tariff.

The cost-plus framework has advantages and limitations. For example, although prudency check avoids obvious adverse outcomes, it is difficult for the commissions to identify all inefficient expenditure, especially given the regulated company's informational advantage. On many occasions, since the commission can monitor the performance of a utility only imperfectly and that too post facto, the threat of disallowing inefficient expenditure lacks credibility, and the utility has little incentive to improve efficiency or to sign better contracts (Joskow and Schmalensee 1986).

Performance based regulation differs from cost-plus, as in this case, in order to improve efficiency the regulator sets targets for key performance parameters. These could include targets for parameters such as distribution losses, availability of the transmission system, the heat rate and plant load factors for electricity generation. Based on its actual performance vis-à-vis the targets, a company can make a profit or a loss. Appropriate provisions are included to allow sharing of such profits or losses between the consumers and the company. The company is expected to only partly share such profits and losses with the consumers, and hence has some incentive to improve efficiency and achieve the target norms. However, for this approach to be effective, the regulator should have an in-depth understanding of both the costs as well as potential gains from efficiency improvements.

Consumer tariffs and cross-subsidy

For an electricity *distribution* company, once the revenue requirement is determined, the regulatory commission decides how the approved costs are to be allocated amongst various consumer categories through tariff design (Bhattacharyya 2011). If there were no consumer categories and everyone paid the same tariff, each person will be charged the average cost that the distribution company incurs in supplying electricity to all its consumers. In India, small

consumers, farmers, agriculture-based enterprises, and a few other types of consumers pay a tariff lower than the average cost of supply, whereas large industries pay a tariff higher than the average cost of supply. Thus, the tariffs are designed in such a manner that the loss to the distribution company from supplying to consumers with a low tariff is made up by the tariff charged to industrial and commercial consumers. Such a subsidy between consumer categories is referred to as 'cross' subsidy (Sreekumar and Sant 2006).

From the above discussion, it is clear that by its very nature, the cost-plus approach depends on the ability of the regulators to ensure prudent expenditure and compliance with performance norms, because ultimately the consumers have to bear these costs.

Generation tariff: competitive bidding versus cost-plus

In setting the tariff for electricity *generation* companies, the cost-plus system can be contrasted with competitive bidding. For procurement of power under the Electricity Act, 2003, a distribution company has two options: it can either enter into a cost-plus contract to purchase power with a generation company, or it can undertake competitive bidding to discover a generator willing to supply electricity at the lowest rate. In the former option, the contract needs to be approved by the commission after due scrutiny since the generation tariff is cost-plus; in the latter option, the regulatory commission has to approve the resultant agreement between the distribution company and the lowest bidder, if the bidding process is found to be valid.

Under the 2005 bidding guidelines, the bidders (generation companies) are allowed to state which components of the bid are escalable (i.e. increase or decrease to match any increase or decrease in the market price of a given component) and which are non-escalable (fixed for the duration of the contract). Thus, the generation company is expected to either assume the risks associated with some components, such as quality and price of fuel, or to pass them on to consumers transparently at the time of bidding.

Once the power purchase agreement is signed, the discovered tariff can be modified only under limited circumstances such as change in law and/or *force majeure* events. The extent to which the tariff can be revised under these circumstances is also defined in the contract. Thus, the bidding system provides a level of certainty regarding tariff to the distribution company and hence to the consumers. In the recent past, quite a few projects that have won contracts through bidding have sought revision of discovered tariffs by citing *force majeure* and change in law. These claims have been contested by distribution companies and consumer representatives, and many of these matters are pending before various forums

In contrast, for cost-plus generation projects the commission needs to evaluate the prudence of each and every cost claimed by the generation company as well as stipulate performance standards for them. Generation companies often claim an inability to comply with performance norms owing to time overruns, fuel quality and price, and other issues. The regulatory experience so far suggests that cost-plus generation projects are normally unable to limit the costs to the level specified by the regulator or claimed by the generator at the time of seeking approval for the project.

Annexure 2

Table A1: Average cost of supply (Rs per unit) for direct consumers of TPC and RInfra and for changeover consumers

Licensee and category of cost	Notation	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
RInfra: wires	A			0.97	1.01	1.07	1.32	1.32	1.42	1.49	1.39	1.38	1.35	1.32
RInfra: supply	B	5.64	7.82	5.74	5.76	6.40	6.70	5.80	6.61	6.83	6.20	6.23	6.25	6.22
RInfra: distribution	C = A + B	5.64	7.82	6.71	6.77	7.47	8.01	7.12	8.04	8.32	7.59	7.62	7.61	7.55
TPC: wires	D					0.59	0.74	0.82	1.00	0.98	1.18	1.26	1.26	1.26
TPC: supply	E	5.77	5.72	5.12	4.95	5.79	6.03	5.39	5.98	5.19	5.11	5.32	5.25	5.28
TPC: distribution	F = D + E	5.77	5.72	5.12	4.95	6.39	6.77	6.21	6.97	6.17	6.29	6.58	6.52	6.54
Changeover	G = A + E			6.09	5.96	6.86	7.34	6.72	7.40	6.68	6.49	6.70	6.61	6.60

Source: Audited actuals as claimed by the distribution companies; commission approved figures for 2016–17 onwards.

Note on calculations: As a result of changeover, different consumers pay for the wires revenue requirement and the supply revenue requirement for RInfra and TPC. Thus, for the above calculations we have taken separately the stand-alone (gross) revenue requirement for wires and supply for the companies. Gross revenue requirement has been taken since it gives the total actual cost to the company for providing the service. The revenue requirements for wires and supply are separately converted into a per unit figure using the respective consumption/use of each by different types of consumers. These are then combined to get the per unit rate for a direct consumer of RInfra, a direct consumer of TPC and a changeover consumer. Please note that MERC calculates the average cost of supply without segregating consumers based on wires and retail supply.

Table A2: Overview of the generation stations feeding Mumbai consumers

Company and plant	Unit	Capacity (MW)	Fuel	Year of commercial operation	Notes
Tata Power (Trombay)	4	150	Oil and RLNG	1965	This is a stand-by unit: no fixed cost has been paid for it since 2014-15. TPC is in the process of retiring the plant.
	5	500	Coal, Oil, and Gas	1984	
	6	500	Oil and RLNG	1990	This unit is under economic shutdown due to the high cost of generation at the request of its beneficiaries, TPC (Distribution) and BEST. However, it is operated under the directions of MSLDC to address system constraints.
	7	180	Gas and RLNG	1993	
	8	250	Coal	2009	
	Bhira, Bhivpuri and Khopoli	447	Hydro stations	1915-1927	
Total (MW)		2027			
Reliance Infrastructure (Dahanu)	1	250	Imported coal	1995	
	2	250	Imported coal	1996	
Total (MW)		500			
Vidarbha Industries Power Ltd (Butibori)	1	300	Coal (multiple sources)	2014	
	2	300	Coal (multiple sources)	2012	
Total (MW)		600			

Source: MERC Orders in Case nos. 14 of 2016, 32 of 2016 and 91 of 2015.

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Abbreviations

AMNEPL	Abhijeet MADC Nagpur Energy Private Ltd.
APTEL	Appellate Tribunal for Electricity
BEST	Brihanmumbai Electric Supply and Transport Undertaking
BSES	Bombay Suburban Electric Supply Ltd. (now RInfra)
CSS	Cross-Subsidy Surcharge
DTPS	Dahanu Thermal Power Station
EHV	Extra High Voltage
2003 Act	Electricity Act, 2003
GoM	Government of Maharashtra
HT	High Tension
IEPL	Ideal Energy Private Ltd.
kWh	kilo-watt hour
kVA	Kilo-volt ampere
LT	Low Tension
MERC	Maharashtra Electricity Regulatory Commission
MSEB	Maharashtra State Electricity Board
MSEDCL	Maharashtra State Electricity Distribution Company Ltd.
MSETCL	Maharashtra State Electricity Transmission Company Ltd.
MSLDC	Maharashtra State Load Dispatch Centre
MU	Million units
MW	Mega watt
PEG	Prayas (Energy Group)
PPA	Power Purchase Agreement
RAC	Regulatory Asset Charge
RInfra	Reliance Infrastructure Ltd.
SAC	State Advisory Committee
TPC	Tata Power Company Ltd.
TPTCL	Tata Power Trading Company Ltd.
USO	Universal Supply Obligation
VIPL	Vidarbha Industries Power Ltd.
WPCL	Wardha Power Company Ltd.

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With low unmetered consumption, near-universal access, and very low distribution losses, Mumbai was considered to be the perfect candidate for introducing choice for consumers and competition amongst suppliers. Competition was eventually introduced in suburban Mumbai through a unique protocol called 'changeover'. Today, Mumbai is the only major city in India where two electricity distribution companies operate in the same area and compete for consumers, and as of 2015-16, 19% of suburban Mumbai consumers are exercising this option through changeover. This 'competition' in retail supply, however, has not succeeded in meeting the expectations of increased efficiency and reduced costs.

This report attempts to understand this unique experiment and chronicles Mumbai's experience with competition under a 'cost-plus' tariff regime. It analyses three themes in detail, namely, power purchase planning, operationalisation of the parallel licence arrangement, and the role played by key stakeholders. Highlighting some of the key regulatory and operational challenges in implementing the arrangement, the report also shows the impacts of the regulatory and policy decisions on consumers. As the electricity sector becomes increasingly complex with an increase in open access, greater role of renewables and markets, and the proposed separation of the carriage (wires) and content (supply), Mumbai's experience offers useful lessons and insights to ensure that policy keeps pace with these changes and translates into real benefits for consumers.

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