Review of Maharashtra Power Sector Policy and Regulation: Lessons, Challenges and Opportunities

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<u>1. Objective and context:</u>

Maharashtra's power sector, which accounts for more than 5% of its Gross State Domestic Product (GSDP) and receives over 50%^a of the state's revenue subsidies, is of immense economic and political importance. Table 1 provides an overview of the largest distribution utility in the state to illustrate this fact. Regarded as one of the pioneers in the power sector in India, the state has experimented with many innovative models to tackle issues faced by most power utilities in India.

Number of consumers (in lakhs)	193
Installed capacity (MW)	24,008
Peak Demand (MW)	17,934
Sales (MUs)	83,488
Power Purchase (MUs)	99,068
% of non-electrified households	16%
Growth in Energy Demand (5 Year CAGR)	-1%
Average Power Purchase Cost (Rs/kWh)	3.61
Distribution Losses (%)	14.67%
Per Capita Consumption (kWh/person/year)	743

Table 1: Overview of Maharashtra State Electricity Distribution Company Limited (MSEDCL)

In order to address access issues, it undertook a large-scale capacity addition and village electrification drive in the 1970s with a special focus on pump-set energisation. In order to remedy severe power shortages in the past few years, it implemented several unconventional measures such as institutionalising the 'load-shedding protocol' to ensure equitable and transparent sharing of shortages, the 'Pune model' which used differential pricing to ensure uninterrupted supply for certain areas and demand management initiatives, such as single phasing and feeder separation. In parallel, the utilities also undertook large-scale capacity addition to allay shortages. It was also one of the leading states, which participated, in tariff-based bidding processes to procure generation capacity.

Due to some of these initiatives, Maharashtra no longer faces big shortage nor has severely cash-strapped utilities. Instead, it is considered to soon be a 'power surplus' state and its utilities suffer lesser financial losses than other states in the country. Another unique feature, partly by historical precedent, is that the state capital Mumbai, which is served by privately owned distribution companies, is the first city to have parallel distribution licensees offering small and domestic consumers the choice to select their supplier. Owing to these aspects, Maharashtra's power sector is looked upon as a model for tackling the problems plaguing the sector at large. It is therefore felt important to provide a comprehensive review of some of these initiatives undertaken by the power sector in Maharashtra. Such a review will point out the lessons to be learnt from these initiatives, which were successful due to large-scale public participation, civil society intervention and regulatory action. It will also show that some interventions, which were

^a State government subsidies for food grains accounts for 2% of the total revenue subsidies.

considered to be successful by the mainstream, need to be reevaluated. It is in this context that this paper presents a broad appraisal of the major policy and regulatory decisions that have shaped the nature and structure of the state's power sector. The focus is on state-owned generation and distribution utilities, while a brief section explains key developments in Mumbai.

We begin with an overview of the organisational and institutional structure followed by a brief history of developments leading up to the enactment of the Electricity Act, 2003 which brought about some fundamental changes in the sector. This is followed by a section on capacity addition, generation planning and performance. Next, the distribution sector is discussed, followed by a brief update regarding important developments pertaining to competition in Mumbai. While presenting all these developments there is a greater emphasis on the role played by the regulatory institution in shaping the outcomes. We conclude with a summary of the lessons learnt, major challenges and opportunities going forward.

2. Organisational and institutional structure:

Electricity is a concurrent subject with the states deciding all intrastate matters and the Centre dealing with interstate issues as well as overall policy formulation. Maharashtra's power sector can be roughly divided into two regions, Mumbai and the rest of Maharashtra. Three licensees serve the Mumbai region, whereas the Maharashtra State Electricity Board (MSEB), a vertically integrated utility, catered to the rest of the state. In June 2005, the MSEB was unbundled into three subsidiary companies, namely the Maharashtra State Power Generation Company Limited (MSPGCL), the Maharashtra State Electricity Transmission Company Limited (MSETCL), and the Maharashtra State Electricity Distribution Company Limited (MSEDCL) and a holding company. The Energy Minister and Principal Secretary, Energy are ex-officio members of the MSEDCL, the MSPGCL and the MSETCL. An independent regulatory authority, the Maharashtra Electricity Regulatory Commission (MERC), which was established in August 1999, regulates these utilities.

In 2003, the Central Government enacted the Electricity Act 2003 (hence forth referred to as EAct), which fundamentally changed the nature and structure of the power sector in the country. The EAct's main objective was to introduce competition and thereby increase the investments and efficiency of the sector. In order to achieve this goal, the Act mandated the establishment of an independent and autonomous regulatory body called the Electricity Regulatory Commission (ERC) at the state and central levels.^b The ERC has extensive powers and is entrusted with the responsibility of making all major decisions such as granting licenses, determining tariff, adjudicating disputes, promoting competition and efficiency, and most importantly, protecting consumer interests. Apart from this major institutional change, the EAct also mandated unbundling of the vertically integrated State Electricity Boards, delicensing generation and allowing open access^c. Similarly, for the first time an exclusive three-tier institutional structure was set up to deal with consumer grievances and to mandate a certain

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^b Before EAct, in 1998, the Electricity Regulatory Commission's Act was passed which laid out the framework for the regulatory institution. MERC was established under this 1998 Act. Even before this 1998 Act, states like Odisha had passed similar Acts and set up regulatory commission in 1996.

^c The EAct defines open access as: "non-discriminatory provision for the use of transmission lines or distribution system or associated facilities with such lines or system by any licensee or consumer or a person engaged in generation in accordance with the regulations specified by the Appropriate Commission". Thus, such a provision allows a consumer, or consumers of a certain category, to choose a generation source, while being assured free access to distribution and transmission systems for wheeling this power.

minimum quality of supply and service¹. The EAct also established an Appellate Tribunal for Electricity (ATE) to deal with any appeals against the ERC's decisions².

3. Period before the 2003 Electricity Act:

The state of Maharashtra was formed in 1960, the same year in which the MSEB was also established. Since its early days, the MSEB played a major role in developing a strong electricity network and furthering power supply and access in the state. As a result of the massive efforts of the MSEB, pump-set energisation and rural electrification made significant progress in the 70s. From the 1960s to 1980s, the rates of access and levels of consumption of electricity in the state increased more rapidly for agriculture than any other category³. As a result, villages were electrified rapidly, and by 1980s the grid had reached almost 90% of the villages. The MSEB also achieved an impressive feat on the capacity addition front. With an installed capacity of over 8000 MW, in the 1990s it was second only to the National Thermal Power Corporation (NTPC), the largest central generating utility in the country at the time.

3.1 Agriculture sales estimation:

Such remarkable progress was possible because of the strong support and patronage that the MSEB could garner from the state government. The electrification of villages and the spread of irrigation in Maharashtra are deeply linked with the rural representation in state politics and the emergence of the sugar industry in the western region of the state. While the MSEB was achieving these remarkable successes, it also took some important decisions, which in hindsight sowed the seeds of grave future problems. One such crucial decision was to not meter agriculture consumption and to instead bill farmers on the basis of a 'flat rate', which was determined by considering the pump's (horsepower) rating and assumed hours of usage.^d Given the social inequity and political patronage enjoyed by the rural and farming lobby, power sale to agriculture was also subsidised. Till date, unmetered consumption for agriculture remains a permanent feature of not just the state but also the national power sector, and is an inherent aspect of the power sector's political economy and is deeply connected with both financial and distribution losses of the sector.

At that time, however, since agricultural consumption was just picking up, this seemed like a reasonable measure and thus, a part of the sales reported by the MSEB were always estimated rather than measured. For a long period (from 1970s till 2000), the accuracy of the methods employed for agriculture sales estimation was not questioned or critically examined, and the MSEB used to report its losses in the range of 18-20%⁴. It thus enjoyed the top position in performance amongst various State Electricity Boards in the country. This myth was not busted until after its first tariff case before the MERC, when the Commission declared that the losses stood at a whopping 39% instead of 18%⁵ as reported by the MSEB. After a decade of this revealing judgement, the issue of agriculture estimation still remains a gray area, as we will see later.

3.2 The Enron saga:

Another major decision of the state government and the MSEB, which proved to be an almost fatal blow for the state, was the infamous power purchase agreement with the erstwhile Dabhol

^d It should be noted that this practice was not unique to the MSEB. A similar approach was adopted by most other states in the country.

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Power Company (DPC). The reform decade of the 90s witnessed a sudden mushrooming of private players in generation in the form of Independent Power Producers (IPP). This was also the decade when the World Bank sponsored the Odisha^e reform model, which pushed unbundling and privatisation. Under the IPP policy, a Memorandum of Understanding (MoU) was signed between the state government and the promoter for generation and supply. The IPPs were not chosen through a transparent bidding mechanism and the terms of contract were not made public. At a national level, very few of these projects actually materialised, and even the ones that did have been mired in litigation pertaining to tariff and financial viability.

It is against this backdrop that a MoU was signed for the Dabhol project in 1992 between the US based Enron Development Corporation and the Government of Maharashtra. Enron was supposed to build a combined cycle gas technology based thermal generation plant with an installed capacity of 2015 MW. The project was divided into two phases of 695 MW and 1320 MW. However, only the first phase was finalized in a legally or contractually binding manner, and the government had the option to accept, renegotiate, or reject the second phase⁶. Analysis of the power purchase agreement with Enron⁷ revealed lopsided nature of the contract in favour of Enron Corporation and highlighted grave financial implications, if the project actually materialised. There were also serious concerns regarding the choice of technology and capacity, considering Maharashtra's demand at that time and issues regarding fuel availability and affordability. The project became a major political issue during the 1994 state assembly elections. After the elections, the new government was formed by a party, which had campaigned against the project and promised to review it. Accordingly, post elections a committee was set up to review the project and it recommended that the contract should be annulled. However, after a series of convoluted twists and turns, the government reneged on its initial decision to scrap the project and instead renegotiated the contact with Enron in 1996 for both phases including the entire capacity.

In 1999, when the plant started running, per unit cost of generation shot to Rs. 7.5/kWh, primarily because there was no demand to run it at full capacity. As the contract was heavily lopsided in Enron's favor, and by 2000, it became clear that even if only Phase I was allowed to continue, it would lead to financial collapse of not just the MSEB but potentially of the state government as well.[†] The plant also failed to meet its technical commitments, which enabled the MSEB to rescind the contract in 2001. During this year, Enron also found itself engulfed in a major financial scandal and filed for bankruptcy in the US. Subsequently, following national and international litigation, the project was revived as the Ratnagiri Gas and Power Pvt. Ltd. (RGPPL) in July 2005. The cost of reviving the project was around Rs. 6,000 – 8,000 crores, which was borne by taxpayers⁸. The project became a joint venture of NTPC, GAIL (India) Ltd, MSEB (now MSEDCL) and some financial institutions. After revival, RGPPL started generation, initially on infirm basis (from Oct 2006 to June 2007) and later on signed PPA with Maharashtra State Electricity Distribution Company Limited (MSEDCL) in April 2007. RGPPL declared commercial operation (after revival work) of Block II and Block III in 2007, each of 663.5 MW. Block-I of the generating station of 640 MW was commissioned only in May 2009 after significant repair. Since its revival and subsequent commercial operation, the project has consistently failed to perform either on account of technical and operational issues or due to lack of fuel^g. Recently, because of

^e The state was formerly called Orissa. The name was officially changed to 'Odisha' in November 2011

^f For more details, please see 'Privatization or Democratization, the Key to the Crises in the Electricity Sector: The Case of Maharashtra', Prayas (Energy Group), March 2001.

^g Refer to MSEDCL tariff orders during this period. The section on power purchase records how RGPPL performed against the set norms.

gas shortages, the plant has been shut down since December 2013 and is feared to turn into a non-performing asset yet again.⁹

The most important lesson from the Enron saga was that there was a sheer failure of rational planning for capacity addition. The choice of the plant technology, capacity and (expensive) fuel were all extremely ill suited to meet Maharashtra's demand at the time. The governance issues inherent in a non-transparent, non-competitive procurement process with the government getting directly involved in deals with private players, made matters only worse. Sadly, in spite of this extraordinarily expensive and almost catastrophic failure, little seems to have been learned on the power procurement and planning front. This paper details how capacity addition and planning remains the Achilles' heel of Maharashtra's power sector, leading to several serious governance and operational challenges.

4. Managing shortages:

Power purchase accounts for more than 70% of the total costs incurred by a distribution company. Hence, any analysis pertaining to the economics of distribution must concern itself with power procurement and planning. Further, thermal (also large hydro) generation projects usually have long gestation periods, high up-front capital investments which need to be recovered over the life of the project and hence planning capacity addition in advance is of paramount importance. Generation capacity also requires other resources such as land, water, and fuel and has impacts on environment and livelihoods. If not planned properly, these scarce natural resources will not be utilised in an environmentally and socially responsible manner.

4.1: Need for planning

A rational and scientific demand forecast is at the heart of the issue of capacity addition, as also highlighted by the Enron example. However, despite these well-established facts and principles, distribution companies (henceforth referred to as 'discoms') in Maharashtra and the rest of the country do not undertake any medium or long-term demand forecast exercise to plan their capacity requirements. Instead of such planning, discoms rely on the demand forecast prepared by the Central Electricity Authority (CEA), a national level planning and coordination agency. However, the CEA estimates suffer two major gaps: a) within a state, the CEA does not undertake demand forecast analysis at each discom level, and b) it does not consider seasonal and peak variations. For a state like Maharashtra with a large residential and agricultural load, there can be major shifts in demand based on the season and the time of the day. It is also important to note that the CEA undertakes this study after every five years or so, whereas a discom needs to adjust its power procurement plan on an annual basis and hence should ideally have a rolling plan.

In spite of these obvious shortcomings, discoms do not undertake independent and more rigorous planning exercises. Power purchase planning failure leads to two outcomes:

- Surplus capacity: Depending up on the rates of the capacity contracted, this can prove to be a boon or bane. If the excess capacity is not expensive, the discom can make money by selling it in the market. However, if it is expensive (like say Enron) then it may turn into stranded asset and the consumers will have to pay for the fixed costs without getting any benefit from it.
- Demand supply gap: This leads to load shedding i.e. power-cuts and/or high cost shortterm power purchases from market. The gap can be met either by adding more

capacity, which is a supply side measure, or managing or curtailing demand, which are demand side measures.

Since 2005, Maharashtra faced major power shortage during which, MSEDCL heavily resorted to load shedding and demand curtailment whereas RInfra in Mumbai relied on high cost short-term market power leading to very high consumer tariffs. The following section details out the various demand and supply sides measures that were adopted during the shortage period by MSEDCL.

4.2: Maharashtra's power shortages

In the last decade, Maharashtra's demand increased at around 5-6% whereas its capacity increased at the rate of less than 1%. This led to serious shortages and large-scale load shedding. Figure 1 below shows how the demand-supply gap increased over the years.



Figure 1: Peak demand, availability and shortfall of MSEDCL over the last 10 years <*All figures in MW>*

As load shedding was gradually increasing, there was growing discontent among the public about erratic power cuts. Moreover, rural and semi-urban areas endured far more frequent and longer power cuts than the bigger cities, as MSEDCL's strategy was to supply power to areas with a higher revenue realisation rate and shed load in loss-making areas. As load shedding increased, it also became a major political issue. Once again, representation of rural and agriculture consumers in state politics played an important role in bringing these issues to the forefront of the regulatory debate.

4.3: Load shedding protocol

In order to address people's concerns about load-shedding, in June 2005, the MERC introduced a process¹⁰ for allocating shortages based on the distribution losses^h and collection efficiency of a given area through a mechanism that came to be called as the 'load-shedding protocol'. The protocol was finalised by MERC based on public hearings conducted in all six revenue headquarters of MSEDCL. The Commission divided the licensee's area into various divisions depending upon losses and collection efficiency and accordingly set up a ceiling on the number

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^h The distribution loss in this case is not just the technical loss but also includes theft and illegal usage. The protocol prescribed by the Commission was based on the principle that during shortages, the supply to low-loss areas would be prioritised over that to high-loss (especially theft prone) areas. It was hoped that this would bring about public pressure to reduce theft and illegal usage.

of hours for which load could be shed from that area. The fact that this mechanism was decided based on strong public consultation gave it credibility and public support. In due course the protocol has been revised, though the principle of allocating shortage based on losses and efficiency has remained. The protocol stands out as an example of the role of the regulatory institution in improving the transparency and accountability of distribution companies through credible participatory processes.

For the first time, the MSEDCL had to openly announce its load-shedding plans in advance. This necessitated that the discom come out with a detailed area-wise load-shedding schedule which gave people information about the duration of power cuts and more importantly enabled them to ensure that their area was not being discriminated against. However, for consumers and the general public, this was not to be an easy victory. The MSEDCL violated the protocol on several occasions¹¹, and even challenged the Commission's jurisdiction in issuing such a protocol before the Appellate Tribunal and also the Supreme Court. Fortunately, both the apex bodies upheld the regulatory jurisdiction ¹² for intervention to equitably distribute shortages. Further, compliance with the protocol was a hotly debated topic during all the MSEDCL to be accountable. Unfortunately, this good practice has not been followed to the same extent by other states plagued by shortages.

4.4: Limitations of the protocol and public pressure:

In April 2012, the MSEDCL unilaterally modified the protocol to increase the hours of load shedding in certain high-loss areas during the peak summer season. Although the issue was brought to the Commission's notice immediately, unlike on the previous occasions, the regulator failed to act at the right time. The company was given a free reign to unilaterally decide the load-shedding plan in the crucial summer months and in November, when the shortage issue had subsided, the Commission issued an order¹³ 'condoning violation' of the protocol. Subsequently, with more targeted load management measures and an increase in supply on account of capacity addition, load shedding was no longer a major political issue. Although the legality of the Commission's decision to 'condone violation' of its order was highly questionable, the civil society lost its enthusiasm to take the fight to the next level. Today, the MSEDCL continues to set the protocol, albeit with the Commission's approval, but with hardly any public scrutiny.

4.5 The 'Pune-Model':

Meanwhile, as the power shortage was on the rise, mere information and transparency in load shedding were not sufficient to assuage public anger. Certain segments of the society were willing to pay 'a little more' if it helped MSEDCL buy the necessary power and mitigate power cuts for them. The MERC provided a platform and space for debating such ideas, and based on a detailed public process, a scheme, which eventually came to be termed as the 'Pune Model' was implemented in 2005. The Confederation of Indian Industry (CII), Western Region proposed that about 30 industries in Pune, which have oil-based stand-by / captive power plants would generate electricity during the morning and evening peak hours, thereby reducing Pune's drawal from the grid. Since the cost of electricity generation through such liquid fuel plants (~ Rs. 11 / unit) was much higher than the MSEDCL's average cost of supply (~ Rs. 4.5 / unit), it was proposed that the excess cost be recovered through an additional 'reliability charge' from consumers in Pune for mitigating load-shedding in the city. Small consumers using less than 300 units per month were exempt from paying the additional charge. The MERC approved the

scheme in May 2006¹⁴ and load shedding in Pune was stopped from June 2006. With the increase in Pune's demand, several issues emerged during implementation and monitoring, and the model was officially withdrawn in April 2008. However, by that time, the people of Pune were keen to prevent any load shedding in their city.

The MERC and CII proposed another approach to mitigate load shedding in Pune. It was suggested that an 'interim franchisee' be appointed for supplying additional power to Pune city to mitigate load shedding. Again, small consumers were exempted from the burden of this additional charge, although the bracket for exclusion was eventually reduced from a monthly consumption of 300 units to 100 units. This arrangement was also adopted in three other urban and industrial circles of the MSEDCL, viz. Thane, Navi Mumbai and Vashi. Through such innovative measures, a population of over 80 lakh in Pune, Thane, Navi Mumbai and Vashi enjoyed partial or total relief from load shedding while protecting the interests of small consumers. The successful process was a testimony to the ingenuity of civil society in tackling such a complex issue. An open and fairly transparent regulatory institution helped to translate such ideas into tangible benefits.

Though the model was very effective in dealing with the shortage crisis in the short term, any such arrangement should be viewed with skepticism and can at best serve as a temporary solution that will allow some breathing space for planning and addressing the more fundamental issues that gave rise to such situations. Neither the distribution utilities nor the society should look at this kind of a model as a long-term measure to meet the demand-supply gap. With the most vocal sections of the society (urban/industrial areas) being spared of the menace of load shedding (though at a little additional cost), there is always a danger of utilities and governments neglecting rural and non-industrial areas and continuing with the old discriminatory practice of selectively allocating shortages.

4.6 Feeder separation and load management:

The breathing space that the protocol allowed enabled the MSEDCL to contract capacity, and to implement demand management schemes to segregate agriculture load from the rest of the rural load. By doing this, curtailing supply to agriculture would not lead to power cuts for other (mostly rural) consumers on those feeders. Table 2 shows how such load management helped to reduce load shedding.

Year	Demand	Availability	Agriculture load management	Shortfall/ load- shedding
2005-06	13290	9212	0	4078
2006-07	14252	9638	467	4614
2007-08	13934	10130	1002	3804
2008-09	13272	10203	2000	3069
2009-10	13662	10919	2200	2743
2010-11	14047	11917	2700	2130
2011-12	14931	12841	3000	2090
2012-13 (up to Sep. 2012)	14760	13286	3200	1474

Table 2: MSEDCL average peak demand, availability and shortfall <*All figures in MW>* Source: MSEDCL data submitted during tariff proceedings This project is called feeder separation and is now recommended by the centre for 'managing' agriculture demand. The MSEDCL spent around Rs. 3,782 crores¹⁵ on these schemes, which helped to significantly reduce load shedding for the rural areas, although farmers did not welcome this solution. The amount mentioned above also includes the funds spent on 'single phasing', a similar scheme aimed at segregating agriculture load, but which was not approved by the commission¹⁶ on the grounds of its ineffectiveness and safety concerns. Though the MERC did not allow this capital expenditure, the government sponsored it and the scheme was implemented in some villages.

The measures described in the above section could only help to temporarily allay public anger and served as stopgap arrangements to deal with the shortage issue. While the protocol was indeed an innovative and equitable way of distributing shortages, it could not lead to timely and rational capacity addition, which was indispensible for actually mitigating the shortage. Augmenting supply through rational planning was and remains, the real challenge. To understand what was done on this front, let us now look at the capacity addition measures undertaken by the MSEDCL since 2003.

5. Capacity addition and planning:

Under the EAct, capacity addition is envisaged to happen largely through private sector participation. The Act encourages distribution companies to procure power from the market through a fair and transparent bidding process. To facilitate such market operation, the EAct provides for guidelines to be issued by the central government¹⁷ to undertake a bidding process and mechanisms such as open access and trading of electricity (power exchanges). Following the Enron controversy, the MSEDCL became rather reluctant to procure any new power or add capacity of its own. From 2000 to 2005, the Commission made several efforts to force the MSEB to undertake a scientific demand forecast exercise. As power shortage became apparent in 2005, the state government (once again) signed MoUs with eight private companies to build a capacity of 12,500 MW. Half of this proposed capacity addition was meant for the state, and the companies were free to sell the rest in the market. The government claimed that with this 'revolutionary' scheme of capacity addition, load shedding would be completely eliminated from the state by 2010.¹⁸ Till 2013, only 300 MW from the said capacity has been contracted by the MSEDCL. Finally in September 2005, the MERC explicitly directed the MSEDCL to undertake bidding for procuring power¹⁹.

5.1: Framework for capacity addition through competitive bidding

The section 63 of the Electricity Act 2003 allows regulatory commission to directly adopt a tariff that has been discovered through a transparent process of bidding conducted as per the Guidelines issued by the Central Government for this purpose. Accordingly, the Government of India notified Competitive Bidding guidelines in January 2005. The bidding guidelines emphasize on a fair and transparent process for bidding and allow bidders to pass through risks by quoting various escalable and non-escalable charges. Under the bidding guidelines the central ministry also notifies standard bidding documents that are to be used by the discoms. Any deviations from these standard documents need regulatory approval. In scheduling generation capacity, principle of 'merit order despatch' is followed. Under this principle, the generation is stacked based on lowest to highest fuel cost. Depending up on demand for power, high fuel cost generation may or may not be despatched. 12

The reason for having a two-part tariff is to allow the generators to recover the fixed cost i.e. the capital investment, even if the generation capacity is not utilised because of cheaper (fuel based) power being available. Hence the guidelines provide a two-part tariff structure comprised of capacity and energy charge. Under energy charge, there are sub-components for fuel cost, transportation and fuel handling with the option of quoting escalable and non-escalable charges for each of these sub-components. The bids are evaluated based on the levelised tariff⁴ comprising of both fixed and variable charges (along with their escalable and non-escalable sub components) and power purchase agreement (PPA) is signed with the lowest (L1) bidder. More importantly, all components of tariff need to be quoted in Indian rupees, even if they are linked to imported fuel.

The indices, used to compute the escalable components (both for the purpose of bid evaluation as well as actual payment), and the discount rate for computing the levelised tariff are published by the CERC²⁰ and are updated every six months. As discussed further, the escalable components play a crucial role in determining tariff impact as well as competitiveness of a given bid. For the purpose of transparency, the procurer i.e. the discom buying power, must publish all the financial bids on its website after the PPA has been signed. The procurer is also required to publish notice with details of the PPA in at least two national dailies and also publish it on the company's website. The final signed PPA along with the necessary certificates and reports is to be submitted to the regulatory commission for the adoption of the tariffs. Thus, learning from the governance issues of the IPP era, emphasis is on enabling fair and transparent bidding process.

All the capacity contracted by MSEDCL under bidding is of case-1 type. The Competitive Bidding Guidelines define case-1 as a type of bidding, *"Where the location, technology, or fuel is not specified by the procurer"*. After repeated directions from the Commission and as the mounting demand-supply gap became a major political issue, the MSEDCL initiated a bidding process for power procurement in 2006. After a long delay and several flip-flops on the type and quantum of capacity needed, the first round of bidding was finally concluded in 2008 in which the MSEDCL signed Power Purchase Agreements (PPAs) for about 2000 MW of capacity in October 2008.

The table 3 shows the details of 6115 MW of capacity contracted by MSEDCL under the case-1 bidding route.

ⁱ The levelised tariff is defined as the ratio of the net present value of total capital and operating costs of a plant to the net present value of the net electricity generated by that plant over its operating life. The discount rate used for calculating the net present value is a crucial variable.

Bidding Round	Developer	Capacity (MW)	Levelised tariff (Rs/u)	PPA execution date	Tariff adoption Order
Case-1 stage 1	M/s Adani Power Maharashtra Itd	1320	2.64	Sept 8, 2008	Order dated 19 August 2013 Case No.24 of 2013
Case-1 stage 1	M/s Lanco Kondapalli Power Ltd	680	2.72	Sept 25, 2008	Order dated 19 August 2013 Case No.24 of 2013
Case-1 stage 1	M/s JSW Energy Ltd	300	3.21	Feb 23, 2010	Order dated Nov 27, 2009 Case No. 39 of 2009
Case-1 stage 2	M/s Adani Power Maharashtra Itd	1200	3.28	March 31, 2010	Order dated Dec 28 2010, Case No. 22 of 2010
Case-1 stage 2	M/s Indiabulls Power Realtech Limited (Amravati)	450	3.26	April 22, 2010	Order dated Dec 28 2010, Case No. 22 of 2010
Case-1 stage 2	M/s Indiabulls Power Realtech Limited (Amravati)	750	3.26	June 5, 2010	Order dated Dec 28 2010, Case No. 22 of 2010
Case-1 stage 2	M/s Emco Energy Limited	200	2.879	March 17, 2010	Order dated Dec 28 2010, Case No. 22 of 2010
Case-1 stage 2	M/s Adani Power Maharashtra Itd	125	3.28	August 9, 2010	Order dated 19 May, 2011 in Case No. 56 of 2010
Case-1 stage 2	M/s Adani Power Maharashtra Itd	440	3.28	February 16, 2013	Order dated 27 December 2012 Case No. 53 of 2012
Case-1 stage 2	M/s Indiabulls Power Realtech Limited (Nashik)	650	3.42	April 27, 2012*	Order dated 27 December 2012 Case No. 53 of 2012

Table 3: Details of MSEDCL capacity contracted under case-1 bidding rounds * The PPA was initialed on this date. Because of an on-going dispute between MSEDCL and the generator (MERC case no 79 of 2013), the final agreement is yet to be signed.

5.2 Tariff adoption of bidding stage-1 PPAs:

In the stage-1 bidding MSEDCL signed three PPAs: 1,320 MW at a levelised tariff of Rs. 2.642 per unit from M/s Adani Power limited, and a PPA for 680 MW at a levelised tariff of Rs. 2.70 per unit from M/s Lanco Kondapalli Power Ltd and an additional 300 MW from M/s JSW Energy Ltd. at a levelised tariff of Rs. 2.716 per unit. Both Adani and Lanco quoted fixed tariff trajectories for the entire 25 years term of the PPAs. JSW quoted escalable energy charge components. According to the bidding guidelines and section 63 of the EAct, the Commission must adopt the discovered tariff after satisfying itself that it is in line with the market rate. For some reason, the Commission did not explicitly undertake such adoption process for the stage-1 PPAs with Adani Power and Lanco power.

During the process of approving and adopting the tariffs discovered in stage-2, this issue of missing tariff adoption orders for stage-1 PPAs was categorically brought to the notice of both the Commission and the MSEDCL. The MSEDCL stated on affidavit that the said tariff for the

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Adani and Lanco stage-1 PPAs has been adopted through the order dated Nov 27, 2009 pertaining to the JSW PPA adoption in case no 39 of 2009. The Commission chose not to comment on this issue at all. Later, Adani Power terminated the said PPA in February 2011, but the MSEDCL failed to inform this to the Commission. Up on termination and the subsequent dispute, the project developer questioned legal validity of the PPA in absence of a tariff adoption order.

It is important to note that in the intervening period, before the termination and subsequent dispute was brought to the Commission's notice, questions regarding the status of the said Adani PPA were posed before the MSEDCL during the tariff revision process in May 2012. The MSEDCL in its reply²¹ to such questions stated on record that the said capacity would be commissioned as per the decided timeframe, without mentioning the termination notice it had received in February 2011. The MSEDCL chose to neither act on the termination notice nor bring any dispute to the Commission, in case it did not agree with the generator's claims. Finally, it was the generator who filed a case before the Commission pertaining to the said termination in July 2012.

5.3 Status of stage-1 PPAs:

Based on the MERC's directions, the MSEDCL team visited the site of M/s Lanco's plant at Mandva in Wardha district, Maharashtra in September 2009.²² As per the PPA, the project location was in Chhattisgarh. During the inspection, M/s Lanco informed that the proposed site would now be Mandva in Wardha district, Maharashtra and sought approval for this change after it was discovered by the MSEDCL. As per the PPA, the scheduled Commercial Operation Date (COD) was 4th September 2012. It was noted by the MSEDCL in 2009 that as on that date, the proposed land at Mandva was not in the possession of M/s Lanco and no construction activity had been initiated. The fuel supply agreement was also not in place. In spite of repeated queries regarding the status of the project during MSEDCL tariff proceedings, no concrete data is available on the latest status. More important, it is not clear whether the MSEDCL is exercising its legal rights under the PPA to protect itself from the possible adverse outcome of the capacity not materialising at all.

The JSW project with which the MSEDCL has a PPA for 300 MW is an imported coal-based coastal plant. In 2011, the JSW had filed a case before the MERC seeking a revision of its tariff on the grounds of a force majeure event. The purported force majeure event was that the Indonesian mining company with which the JSW had a Fuel Supply Agreement (FSA) lost its mining license. Further, the promulgation of the Indonesian regulation was also raised as a 'change-in-law' event. During the proceedings of the said case, it became apparent that the mining company was trying to acquire a mine for which the ownership rights were contested. This litigation was going on when the JSW signed the FSA and hence was aware of the possibility. Thus, the force majeure clause could not be invoked and the MERC refuted the claims for tariff revision²³ in 2011. However, through a shocking judgment dated 15th July 2014²⁴, the MERC has apparently considered the JSW's claims for tariff revision, subject to some additional proceedings, which are yet to be concluded. Although the JSW project is entirely based on imported coal, it has been considered by MERC in the said order dated 15th July 2014 while formulating a framework for pass through of costs on account of 'change-in-law' pertaining to the domestic coal, without invoking any legal principles for such a decision.

5.4 Revision of competitively discovered tariff:

As mentioned above, in the stage-1 bidding round Adani Power chose to quote fixed tariff in spite of the flexibility under the bidding framework to transparently pass-through fuel, transportation and handling related costs. Being the lowest (L1) bidder, it emerged as the winning bid and signed the PPA. Subsequently, in July 2012 the Adanis filed a petition before the MERC claiming termination of the said PPA on grounds of a supposed force majeure event. During the proceedings pertaining to this case, the Adanis submitted two main prayers before the Commission: a) acknowledge that the PPA has been terminated and relieve the generator from any duties bound under the said contract and b) allow increase in the discovered tariff to make the project viable for the generator. Thus, after opting to quote a fixed tariff for 25 years, even though the bidding framework provided the option of transparently passing through such costs at the time of bidding, the generator now wanted to be bailed out of the risk that was willingly undertaken to win the contract. After eliminating competitors, the generator was on the one hand claiming unilateral termination of the PPA and on the other demanding increase in tariff and signing of a new PPA without giving other competitors opportunity to compete on the same terms and conditions.

The termination of the PPA was hinged on the applicability of the force majeure clause, which as contended by the generator was not legally tenable¹. Hence, the Commission ruled²⁵ that since there was no force majeure event, the termination was not valid. The Commission also admitted the lapse on its part in failing to adopt the tariff at an appropriate time and belatedly issued tariff adoption orders²⁶ for both Lanco and Adani stage-1 PPAs. However, in spite of ruling that there is no force majeure and hence no provision under the PPA to revise the discovered tariff, the Commission still concluded (without establishing) that the project's financial viability was at stake and hence some relief needs to be granted. An ad-hoc additional charge of Rs. 0.57 per unit was allowed in the interim and a committee was set-up to look into the need and extent of the final compensatory charge needed. This order and the legality of the said decision have been challenged before the ATE²⁷. Choosing not to wait for the ATE judgement in this regard, MERC initiated a suo-motu process to revise this tariff. Through its order dated 5th May 2014, the Commission allowed a compensatory surcharge of Rs. 1.04 per kWh for 800 MW of capacity from this PPA. This decision of the Commission has imposed an additional tariff burden of Rs. 580 crores per year on MSEDCL consumers. The said suo-motu order has also been challenged before the Appellate Tribunal by MSEDCL and is yet to be heard by the ATE.²⁸

5.4 Status of capacity contracted in bidding stage-2:

In the second round of the bidding process, in 2010, the MSEDCL contracted another 2,600 MW from four suppliers at levelised tariffs ranging from Rs. 2.879 per unit to Rs. 3.28 per unit. An analysis of the PPAs signed between the MSEDCL and the selected bidders of stage-2 of the bidding process (i.e. involving EMCO Energy Ltd., Indiabulls Power Ltd., and Adani Enterprises) also revealed differences in certain important clauses of the PPAs.²⁹ In addition, another PPA for 125 MW of capacity with Adani Power Ltd. in round 2 discovered that a levelised tariff was also approved.³⁰ Further, while the disputes pertaining to the stage-1 PPAs mentioned above were

^j Prayas (Energy Group) also participated in this matter and contested the petitioner's claims. All submissions made by Prayas are available on our website at the following link and also documented in the commission's order dated 21st August 2013 in this case no 68 of 2012. <u>http://prayaspune.org/peg/publications/item/243.html</u>

going on, the Commission allowed³¹ the MSEDCL to sign additional PPAs for a capacity of 1090 MW (650 MW with Indiabulls Realtech Ltd. and 440 MW with Adani Power Maharashtra Ltd.). Instead of conducting a fresh round of bidding, these PPAs were signed in 2012 at rates discovered in 2010. Apparently, not all the bidders of the previous round were granted an equal opportunity to bid for this capacity. Aggrieved by this decision, one such bidder, M/s Wardha Power Company Ltd., has appealed against the said order of the Commission. The Appellate Tribunal is yet to decide this matter. Post this decision of MERC, MSEDCL signed a PPA with M/s Adani Power limited on 29th May 2013³². However, with respect to PPA with M/s India Bulls, there arose a dispute between the generator and MSEDCL. According to a petition filed by India Bulls before MERC, it is claimed by the generator that MSEDCL unilaterally modified tariff stream without the consent of the generator. The matter is before MERC and decision is still awaited³³.

All the PPAs mentioned above have been signed under the 'case-1' type of bidding under which the fuel procurement is solely the generator's responsibility. As mentioned before, the bidding framework allowed the generators to transparently pass through fuel-related risks by quoting appropriate escalable parameters.³⁴ The installed coal-based power capacity went up from 76 Giga watts (GW) in March 2008 to about 130 GW in March 2013, an increase of 71%. During the same period, production of steam coal, which is mainly used for the power sector, went up from 423 million tons per annum (MTPA) to 508 MTPA, an increase of only 20%³⁵. As this newly added capacity is getting commissioned, fuel availability related issues are increasingly becoming critical. Driven by the (mostly domestic) coal crisis, in May 2013 the Central Electricity Regulatory Commission (CERC)³⁶ issued an advise to the Ministry of Power (MoP) regarding revision of competitively discovered tariff. Based on the said advise, the MoP³⁷ wrote a letter to various state commissions³⁸ advising them to deal with these issues on a case-to-case basis and after considering public interest. It is important to note that under the EAct, the MoP cannot issue any directions to a state commission nor is a state commission bound to act on any advice provided by the central ministry.

Many of the projects mentioned above had stated in their bids that they would procure coal from all possible sources viz. linkages, captive coalmines or imports. Following the said letter issued by MoP, almost all the projects in Maharashtra (perhaps except EMCO Energy Ltd.) have filed cases before the MERC seeking revision of the discovered tariff under the change-in-law related provisions of the PPAs. During the proceedings pertaining to these matters, several submissions were made by consumer representatives challenging applicability of change in law provisions and thus, effectively questioning maintainability of the said petitions. In spite of this being the case, and without dealing with the applicability of the change-in-law provisions for individual contracts, or invoking any legal principles for its action, the MERC through its order dated 15th July 2014 developed a framework for pass-through of such costs³⁹ on account of change in law. In addition to this, the MSEDCL is also one of the procurers of the Coastal Gujarat Power Ltd. (Mundra Ultra Mega Power Project) and has a share of 800 MW in this plant. This project is also under litigation for revising the competitively discovered tariff. The CERC has allowed such an increase⁴⁰, though the order has been challenged before the ATE.

These developments highlight the fact that almost all the capacity contracted by the MSEDCL through the bidding route in under litigation and is seeking tariff revision. In some cases, for example, in the case of the Lanco project, there is a possibility that the said capacity may never materialise, and in the case of other projects, it may become available at tariffs higher than those agreed upon in the PPA. These events yet again highlight the need for a rational and scientific approach towards long-term capacity addition. The serious governance issues

mentioned above also underline the need for stronger regulatory and policy measures to prevent such issues from cropping up in the future. Now that we have looked at the status of capacity being added by the private sector, let us look at the performance and capacity addition plans of the state-owned Maharashtra State Power Generation Company Limited (MSPGCL) or the Mahagenco, which accounts for more than 40% of the MSEDCL's power purchase cost and quantum.

6: MSPGCL performance and capacity addition plans:

With an installed capacity of 10,737 MW (7480 MW of coal-based, 672 MW of gas-based and 2585 MW hydro⁴¹), Mahagenco is one of the largest state-owned generating companies in India. In 2012-13, the MSPGCL's power accounted for about half of the MSEDCLs power purchase cost. Coal is the primary source for generation and is a mainstay for meeting the base load^k. The presence of hydro greatly helps in managing peak demand as the hydro capacity can be ramped up or down very quickly, unlike the coal-based capacity. Also, as the hydro plants in Maharashtra are old and depreciated, hence this peaking power is available to MSEDCL at very economical rates.

While analysing the performance of a coal-based thermal generating station, the following key parameters should be considered:

- Station Heat Rate (SHR): This is an efficiency indicator measured as the calories or heat content needed to generate one unit of power. Its unit is kcal/kWh. As the fuel cost accounts for more than 70% of the total generation cost, it is essential to have as low heat rates as possible. Lower heat rates are also desirable on account of correspondingly lower emissions and pollution.
- Plant load factor (PLF): This is a ratio of the capacity actually utilised/scheduled during a year to the rated capacity of the plant or unit. Low PLF indicates a loss of capacity and hence a loss in generation to that extent. The normative PLF is 80%. However, an incentive is offered if a station can do better.
- Timely capacity addition: As mentioned earlier, timeliness is of great significance as delays can lead to either load-shedding or high-cost short-term power purchase. Further, delays in construction also add to the generation tariff, as the interest during the construction component increases on account of delay.

In the earlier section, we saw that bidding is done based on a two-part tariff. Similarly, for regulated capacity also, the Commission decides both fixed and energy charges and actual despatch happens based on merit order of energy charge. In general, if any capacity contracted on long term basis gets backed-down i.e. if it is not despatched on account of being costlier than other available options, even then the consumers have to bear the fixed costs. Therefore, high fixed charges can be a major issue in case there is surplus power. Frequent backing-down can also affect the heat rate and auxiliary consumption, thereby increasing overall cost of generation.

^k The demand that is more or less constant throughout the day is termed as base load, whereas demand that surges during certain periods of time, such as lighting load in the evening, is called peak load. Load and demand are terms that are often used interchangeably though they do not have exactly the same meaning.

Following the National Tariff policy guidelines, the Commission has notified Multi-year Tariff (MYT) regulations for generation, distribution and transmission in 2005 and later in 2011. Under the MYT framework, tariff projection for next few years (usually 3 or 5) is made in advance so as to provide certainty to both, utilities and consumers. Along with the tariff, performance norms and efficiency improvement measures are also decided. MSPGCL tariff is decided by MERC based on these principles. The MERC sets norms for heat rates, plant load factors, fuel cost, plant availability, etc. Let us now evaluate Mahagenco's performance with respect to these three parameters.

6.1 Plant load factor and station heat rates:

From Figure 2 below, it can be seen that over the past 10 years, the only variable showing a steady increase is cost, whereas the installed capacity has increased only marginally and the net generation has actually fallen quiet sharply. The more disturbing phenomenon is that despite a net capacity addition during this period, the actual generation has reduced. While this is the overall picture, let us look at station-wise performance parameters, as shown in Figures 2 and 3.



Figure 2: MSPGCL net generation, installed capacity and annual revenue requirement (ARR)



Figure 3: Station wise plant load factors (dotted lines indicate projections).

The figure shows that all the old units show a sharp decline in the Plant Load Factors (PLFs) as compared to 2006-07 levels, which to begin with were not at par with the normative level of 80, except for Khaperkheda and Chandrapur. For the new units viz. Paras 3 and Parli 6 commissioned in 2007-08, Paras 4 and Parli 7 commissioned in 2010-11, and Khaparkheda 5 in 2011-12, a comparison with 2010-11 or the normative PLF is more appropriate. Even these recently commissioned units have a very low PLF and there is a sharp deterioration in the performance in comparison with even 2010-11 levels. Shockingly, none of the new stations have been till date able to achieve normative PLF levels, unlike some of the old plans or most of the central sector stations¹. This partly explains why the net generation shows a decline in spite of net capacity addition.



Figure 4: Heat rates of old MSPGCL stations (dotted lines indicate projections).

¹ With a few exceptions, all central sector stations have a higher normative PLF for 85%. In 2012-13, almost half of the central sector plants achieved PLFs which were higher than their normative PLFs.

The Station Heat Rates (SHRs) as shown in Figure 4 tell a similar story. The SHRs for all the old stations except Khaparkheda and Koradi have increased in the past six years and are much higher than the normative levels prescribed by the Commission. The new stations are also far from achieving the normative SHRs. Such a sharp deterioration in the performance parameters has serious implications for the generation tariff, as fuel cost accounts for more than 70% of it. Failure in adhering to normative performance parameters has resulted in an additional fuel expenditure of Rs. 1,052 crores for FY 10-11 to FY 12-13⁴² alone. The reasons provided by the MSPGCL for such deterioration in performance are summarised below:

- <u>Age of Plants</u>: Some of the generating units are old and degradation of equipment over time has been cited as one of the main problems. However, this does not explain the steady deterioration in performance of the units Commissioned after 2000 such as Khaparkheda Unit 4 and Unit 5 as well as Parli 7. Also, NTPC units of similar or higher vintage continue to perform much more efficiently. Further, if vintage is indeed a major concern, it is surprising that the expenditure undertaken by the MSPGCL on repair and maintenance for plant and machinery has not changed much since 2006.^m
- 2. <u>Operational problems</u>: Mahagenco has very high level of auxiliary consumption, which is often attributed to vintage and backing down. However, the frequency of unscheduled outages for the MSPGCL stations is also much higher and is usually because of equipment failure, bunker choke up during monsoons, etc. which can happen due to inadequate repair and maintenance. Recently, water shortages at certain plants such as Parli have affected operations. As some of the units or stations frequently breakdown, the relatively better functioning ones have to make-up for this loss and cannot be taken down for their routine maintenance. This in turn makes these units susceptible for future performance issues. Recently, based on Central Power Research Institute (CPRI) studies⁴³, Mahagenco is undertaking extensive renovation and modernisation measures, though their benefits are yet to be realised.
- 3. <u>Quality and quantity of coal received</u>: MSPGCL plants procure a large proportion of their coal from Western Coalfields Ltd. (WCL), whose coal prices are about 10% higher than any other subsidiaries of Coal India Ltd. (CIL), due to the geological nature of its seam. Moreover issue of wet coal during rainy season is also more serious in case of the WCL. However, as coal has always been procured from the WCL, it does not explain the deterioration in performance since 2005-06. The reasons for deviation provided are not backed with specific unit level actual performance data, making it difficult to assess the MSPGCL's claims.
- 4. <u>Increase in fuel cost</u>: In the recent past, coal prices (mostly of domestic coal) have also increased. Further, poor quality or inadequate supply of domestic coal also add to increase in fuel cost on account of imports while also contributing to deterioration in heat rates and plant availability. However, there needs to be a clear understanding of how much of the increase in the fuel cost can be attributed to the following reasons:
 - a. Increase in the landed cost of domestic coal
 - b. Changes in the quantity and calorific value of coal received with respect to the FSA agreed terms

^m It has always remained between 4 to 6% of the total annual revenue requirement of MSPGCL. Source: MSPGCL Tariff orders.

- c. Share of MSPGCL in domestic coal shortage vis-à-vis other coal consumers of the same mines/Coal companies.
- d. Changes in price and quantum of imports
- e. Unit-wise design heat rate and heat rate degradation curve as per the original equipment manufacturer's recommendation
- f. Loss of generation on account of equipment failure, forced outages, backing down, etc.

Such data has not been provided to understand these issues, nor has the Commission insisted for it. Absence of such crucial performance data makes it difficult to take the issues pertaining to coal quantity and quality raised by the MSPGCL at merely face value. In any case, the costs arising out of the inability of the MSPGCL to enforce commercial contracts with its fuel suppliers cannot be passed through to consumers.

In 2011, the MSPGCL approached the Competition Commission of India (CCI) against Mahanadi Coal Fields, Western Coalfields and Coal India Ltd., citing abuse of their dominant position by these respective firms. The CCI found the CIL and its subsidiaries guilty of such abuse⁴⁴, imposed a fine of Rs. 1773 Crore, and also directed the coal companies to cooperate with generators to sort out issues related to the quality of coal. Following this decision, the MSPGCL expects that there shall be improvement in the coal quality and supply, and this is partly the reason for the more optimistic projections for the next few years in the above charts. One of the reasons that Mahagenco took such a drastic step of approaching the CCI was also because the MERC was not willing to pass-through costs on account of inefficiencies of its coal suppliers. Mahagenco's bold step has proved beneficial for not just its own fuel contracting issues but will go a long way in making coal companies accountable for their performance.

6.2 Delays in capacity addition:

Table 4 shows the date of commissioning, total capital expenditure, interest during construction (IDC) and cost per MW of the recently Commissioned Mahagenco units. All the units were delayed by at least two years than the planned date of commissioning. On account of delays, the IDC component is quiet high. Also, the cost per MW measure for these units is much higher than the benchmark rate for units of a similar size and type notified by the CERC.

Unit	COD	MW	Total cost Rs. Cr. (incl. IDC)	IDC Rs. Cr.	Rs. Cr./ MW
Parli Unit 6	1 st Nov., 2007	250	1462	108	5.85
Paras Unit 3	31 st Mar., 2008	250	1508	181	6.03
Parli Unit 7	31 st Jul., 2010	250	1416	194	5.67
Paras Unit 4	31 st Aug., 2010	250	1486	210	5.94
Khaperkheda Unit 5	16 th Apr., 2012	500	3377	667	6.75

Table 4: Unit-wise commissioning date (COD) and costs of recently commissioned capacity

As a result of these factors, the fixed charge of the newly commissioned units is quite high (on an average more than Rs. 2 per unit). This has serious implications if this capacity has to be backed down. Table 5 shows the status of the capacity that is about to be commissioned. It is important to note that while making the MYT business plan, the MSEDCL and the Commission have relied on 'realistic' estimates of the MSPGCL. Nevertheless, the Commission has predicted a demand-supply gap of 2,197 MUs in FY 13-14.⁴⁵ Further, based on the MSPGCL capacity addition plans of 3230 MW, and the capacity coming up from the private sector, the Commission has projected surplus generation of 17,400 MU in FY 14-15 and 23,900 MU in FY 2015-16. The projected surplus for FY 2015-16 is comparable to Maharashtra's present share from the central sector and is roughly 20% of the present total power purchase. Presently, delays seem inevitable, as none of the units has been commissioned yet. Due to this delay and the uncertainty regarding supply from the capacity contracted with private generators, instead of surplus, the state may once again face load shedding in the next few years. Even if all this capacity becomes available, it will be at a much higher cost than what was planned, making it difficult to sell such surplus, if at all, in the market.

Unit	MW	Realistic	Optimistic	Pessimistic	Current Status
Parli U 8	250	14 th Feb.	13 th Oct. 14 th Jun.		Not commissioned
Chandrapur U 8	500	14 th Mar.	13 th Dec.	14 th Aug.	Not commissioned
Chandrapur U 9	500	14 th Jul.	14 th Mar.	14 th Nov.	Not commissioned
Koradi U 8	660	14 th May.	14 th Jan.	14 th Sep.	Not commissioned
Koradi U 9	660	14 th Nov.	14 th Jul.	15 th Mar.	-
Koradi U 10	660	15 th May.	15 th Jan.	15 th Sep.	-

Table 5: Status MSPGCL capacity in pipeline in July 2014

6.3 Future capacity addition plans:

As per its multi-year tariff petition⁴⁶, the MSPGCL has listed ongoing schemes of 4320 MW and 8850 MW of projects. As shown in Figure 5, only the present ongoing schemes are equivalent to half of today's installed capacity. Most of the ongoing projects either expand or replace existing old unitsⁿ, whereas 7280 MW of the future planned capacity of 8850 MW is from new green field projects, for which there are still no firm fuel arrangements, land or other necessary clearances. Recently, the MSPGCL has filed a case for the 'economic shutdown' of about 1050 MW⁴⁷ of its coal-based capacity. Through the said petition, the MSPGCL is essentially arguing that it is not possible for it to meet the stipulated net generation target of 51,657 MU for FY 13-14 at Rs. 3.20 per unit. It is important to note this contradiction in the MSPGCL's ambitious coal-based capacity expansion plans, and at the same time, also note its serious reservations regarding the possibility of procuring good quality adequate coal supply.

These issues become even more serious in light of the perpetual delays in commissioning new capacity as well as the extremely high fixed costs of the newly commissioned units as stated above. If the MSPGCL is actually able to build and commission this capacity, the MSEDCL may indeed end up with surplus high cost power. Selling such surplus power in the market may not recover even the fixed costs, as it is understood that there is already a lot of stranded capacity⁴⁸, and more capacity addition may only depress the market price. Further, on account of the high

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ⁿ Please see Table 6 for details.

fixed charges, even backing down this capacity will impose high costs on the MSEDCL. All these concerns have been brought to the Commission's notice on several occasions, though there is no indication that they have been factored into the planning process in any manner.



Figure 5: MSEPGCL installed capacity, ongoing schemes and future projects

6.4 Managing environmental and social impacts of generation capacity addition:

The proposed capacity addition, by both private and state sector, has linkages with not just the real needs of the power sector but also with important and scarce resources like land, water, fuels and forests. For the sector at large, capacity addition in pipeline is far more than our need⁴⁹. If this large capacity is not utilized, we will face challenges of stranded assets and other associated economic burden but more importantly we would have wasted critical resources in setting up these plants, which otherwise could have been put to better use. Our track record has been extremely poor in dealing with issues concerning environment, pollution as well as displacement and associated social issues. Therefore, it is extremely important to set governance processes to evaluate not just need but appropriateness of setting up new capacity. Interventions are required to develop the criteria for minimising cost not just for the power sector but also to minimise social and environmental impacts, control regional concentration, and to make optimal use of water, land and other resources. In this regard there is need to initiate a transparent deliberative process to:

- a. Completely revamp the environmental clearance procedures of power plants
- b. Ensure a coordinated approach for different agencies to optimise fuel, land and water allocations
- c. Re-assess long term demand for power and measures to meet this demand in most optimal manner including energy efficiency and renewable energy

This, we feel is the most important role and mandate for today's government.

7: The Distribution Sector (MSEDCL):

Distribution is the key segment in the power sector as it has a direct interface with consumers, and all the costs involved in generation and transmission are finally recovered by the discom through the tariff it charges. Figure 6 shows the break-up of the costs that make-up the MSEDCL's annual revenue requirement.



Figure 6: MSEDCL's annual revenue requirement projection for FY 13-14 Source: MSEDCL MYT business petition, Case no. 134 of 2013

Figure 6 shows that power accounts for 3/4th of the distribution company's expenses, whereas the other major heads roughly account for an equal proportion of the remaining 1/4th part of the expenses. In the previous sections, we have dealt in detail with issues related to the power purchase cost and planning. This section focuses on the MSEDCL, the main distribution company which supplies to all of Maharashtra, except some areas in Mumbai. The chart below captures the trend in the MSEDCL's average cost of power purchase, distribution and supply.



Figure 7: MSEDCL average cost of power purchase, distribution and supply *Source: MSEDCL tariff orders*

As Figure 7 shows, the last few years have witnessed a steep rise in both the average cost of power purchase as well as distribution. We have already looked at the factors contributing to increase in the power purchase costs. Let us now look at distribution costs.

7.1 Capital expenditure:

One of the reasons for the steady increase in distribution cost is the rising capital expenditure, as can be seen from Figure 8.

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Figure 8: Change in capital expenditure related costs over the years. <All figures in Rs. Crores> Source: MSEDCL tariff orders

The power sector in India being regulated is an entirely cost-plus business with some checks and balances for ensuring efficient performance. Once the regulator approves a capital expenditure (capex) plan, the discom can raise debt up to 70% of the total expenditure but needs to invest 30% equity. The interest on this debt is entirely passed on to consumers through tariff. Additionally, the discom can claim depreciation to repay the principal (rather than create a sinking fund as is the practice in other businesses). Moreover, it gets a 16% return on the equity that it has invested. Thus, there is always a danger of over-estimating capex requirements or gold plating of the actual costs. Further, given the fact that our distribution network is largely old and overloaded, there is certainly a case for undertaking capex to improve supply and service quality. Unfortunately, the regulatory system that approves this expenditure does not undertake any post-facto cost benefit analysis or even inspection of the completed projects to check whether the stated objectives were met.

7.2 Loss estimation and agriculture sales:

The earlier section documents how the real loss levels of MSEB were discovered during the first tariff process before the MERC. Unfortunately, after about a decade of focused efforts to reduce losses and bring about transparency and accountability in un-metered sales estimation, the clock seems to have turned back in Maharashtra. The table below shows the change in unmetered agriculture sales over the last few years. Since 2000, the MERC has directed the MSEDCL (then, the MSEB) to stop issuing new unmetered connections to farmers. However, suddenly in FY 11-12, more than 1 lakh new unmetered connections have been issued and in the same year, unmetered agriculture sales increase by 30%, despite the ongoing load management measures. Numerous evidence-based and analysis backed submissions were made before the Commission in this regard, however, the MERC chose not to undertake any rigorous review of this issue. Lack of reliable hourly feeder data and the MSEDCL's refusal to share category-wise, slab-wise connected load and consumer numbers^o made it difficult to verify these estimates. In the same year, the MSEDCL was able to surpass its distribution loss reduction target and reported losses of 16%.

LT Agriculture	FY 08	FY 09	FY 10	FY 11	FY 12
Total agriculture sales in MU	11,853	12,214	13,431	15,779	20,943
Metered sales in MU	4,531	5,145	5,778	7,303	9,912

^o Importantly, before this year, the MSEDCL routinely submitted this information during its tariff revision process.

Unmetered sales in MU	7,322	7,069	7,653	8,476	11,031
Year-on-year increase in unmetered sales in %		-3%	8%	11%	30%
Distribution loss reported during the same year in %	24.09%	22.20%	21.20%	17.28%	16.03%

Table 6: MSEDCL agriculture sales Source: MSEDCL tariff orders

7.3 Supply and service quality:

The EAct tries to protect consumer interests by mandating the Commissions to: a) notify regulations for ensuring certain standards of performance (SoP) pertaining to supply and service quality⁵⁰ and b) monitor and publish data regarding compliance with these standards⁵¹. Additionally, the Act also introduced a three-tier institutional structure for handling consumer grievances. This includes Internal Grievance redressal cell (IGRC), Consumer Grievance Redressal Forum (CGRF) and an electricity Ombudsman, which is the apex body for grievance redressal. Consumers cannot approach the Commission with individual grievances. They can however, approach the commission with issues pertaining to non-compliance of either the Commission's orders or orders issued by CGRF and the Ombudsman.

Under the SoP regulations the discom has to perform certain designated operations within a specified timeframe and ensure certain quality of supply. If the required standard is not met, the discom has to pay certain compensation specified in these regulations. For example, if a new connection is not issued within the stipulated timeframe or supply is not restored after a fault within certain period, compensation as per respective standard has to be paid by the Discom to the consumer. Since it was the first time that such processes were being put in place, the EAct emphasises that the Commissions should publicise utility's compliance with such norms to help develop consumer awareness regarding these issues and regulations.

Accordingly, the MERC notified Standards of Performance (SoP) regulations in 2005 for all distribution utilities. In August 2010 the MERC decided to amend these regulations for MSEDCL and issued public notice inviting comments on the proposed draft. No action was taken on the comments and the public process for almost two years, after which a fresh public process was initiated in 2012. Finally, after delay of about 4 years, new SoP regulations were notified in 2014. However, little has been done by the MERC to publicise or indeed evaluate compliance with the said regulations. Only recently, some preliminary data is being published⁵² but without any analysis or directions for improvement. Further, recently there has been a steep increase in the number of cases filed before MERC regarding non-compliance of CGRF and Ombudsman orders. It is understood that any CRGF or Ombudsman order in favor of consumer is challenged by the discom before the High Court. Even in absence of any stay from the High Court, implementation is postponed. Consumers are thus forced to approach the Commission with a non-compliance petition, defeating the purpose of setting up locally accessible institutions such as the CGRF. Such experiences are already causing disillusionment amongst the few consumer activists who are working on such issues.

7.4 Tariff design:

In India, low-tension (LT) small consumers, including agricultural consumers, are charged a tariff that is lower than the average cost of supply, whereas high-tension (HT) industrial and

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commercial consumers pay higher than the average cost. This mechanism is called cross-subsidy and it exists at both inter-category and intra-category levels. Apart from this, there is an additional direct subsidy from the state government for a certain category of consumers such as agricultural consumers, power-looms, BPL households, etc. Since the establishment of the Regulatory Commission and after the EAct policy mandate, there has been a thrust to reduce the dependence on the cross-subsidy. Maharashtra has also tried to follow this guideline, but given the political implications of reducing the cross-subsidy, it is easier said than done. Hence, though the agricultural tariff has increased since the establishment of the Commission, it remains much lower than the average cost of supply even today.

However, the MERC has undertaken some other progressive tariff design measures such as defining the BPL category based on electricity consumption rather than on BPL cards issued by government. Earlier, this category was defined based on a monthly consumption of less than 30 units. However, if in any month a consumer consumes more than 30 units, he/she gets out of this bracket and cannot be reconsidered. Based on civil society interventions, this norm was changed to an annual consumption of 360 units, allowing households to occasionally exceed the limit during festivals, weddings or other major events. Similarly, in August 2012, the MERC set the same tariff for LT domestic, industrial and commercial consumers consuming less than 300 units. According to the EAct, if any consumer wishes to undertake commercial activity, they have to apply for a separate connection for this purpose. Often, small businesses such as groceries shops, repair shops for small electronic items, etc. are run inside the house without a separate connection. Such consumers can be booked for unauthorised usage under the EAct⁵³ with very harsh penalties and hence become susceptible to harassment by the utility officers. This move of the MERC to remove tariff distinction amongst these categories benefited over 3.5 lakh consumers to avail hassle-free supply⁵⁴.

7.5 Unique features of Maharashtra Tariff determination process:

Since it's inception, the MERC has undertaken many innovative and progressive measures such as, conducting public hearings in the licensee's area of operation, appointing consumer representatives as per section 94(3) of the EAct, conducting Technical Validation Sessions^p (TVS) for all important petitions and so on. In case of the MSEDCL, the MERC used to conduct public hearings at all the six revenue headquarters viz. Amravati, Aurangabad, Nagpur, Nashik, Navi-Mumbai and Pune. Also the authorized consumer representatives were by default party to all the matters, including TVS before the Commission and could participate in these proceedings without much procedural hurdles. All these measures greatly helped in shaping up the regulatory processes. However, recently the Commission has not shown the same level of commitment to these good practices and as result of this, the credibility of the institution has suffered a lot. In this context, the following section details out the manner in which the recent MSEDCL tariff revision process was conducted.

7.6 Recent tariff process of the MSEDCL:

The MSEDCL is the only distribution licensee in the state for which no multi-year tariff (MYT) order has been issued till date. The MYT regulations were notified in February 2011⁵⁵ and were

^p A Technical Validation Session (TVS) is a process undertaken before admitting any important petition and usually for all tariff matters. The main objective of the TVS is to scrutinise the data adequacy and completeness of the petition in terms of all the information necessary for analysing the given claims/issues. The MERC has a tradition of involving all authorised consumer representatives in the TVS process.

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supposed to cover a period of five years from 1st April 2011 to 31st March 2016. However, all licensees sought deferment of MYT implementation by one year, and the Commission allowed⁵⁶ it. After such deferment, MYT orders have been passed for all other licensees except the MSEDCL. In May 2013, the MSEDCL filed a petition for final true-up for FY 2011-12, and provisional true-up for FY 2012-13 under case no. 64 of 2013. During the Technical Validation Session (TVS) of this petition, consumer representatives sought specific data such as categorywise and slab-wise data, consumer numbers, connected load, sales and revenue. Similarly, division-wise and circle-wise energy audit data was also demanded. Such data is necessary to analyse the licensee's claims about sales estimation and reduction in loss.

One of the consumer representatives who were unable to attend the TVS requested the Commission to share the audiotapes of the said hearing, as the MERC routinely records all its proceedings. After some follow-up, the MERC reported that the said tapes were not available on account of some fault in the recording apparatus. Taking responsibility for this glitch, the Commission stated ⁵⁷ that failure to provide the said audiotapes has compromised the transparency of the proceedings and a de-novo hearing was scheduled. During this de-novo hearing, consumer representatives again made presentations highlighting lacunae in the said petition and reiterated their demand pertaining to the specific data mentioned above. The Commission directed the MSEDCL to submit all the data⁵⁸ that was demanded by consumer representatives. However, after such direction, the MSEDCL did not take any actions to comply with it, nor was there any follow-up from the Commission's office in this regard. Subsequently, it is understood that the said petition was withdrawn but there is no formal order available on the Commission's website indicating its status.

Subsequently, in September 2013, the Commission issued a suo-motu order to increase the MSEDCL tariff by around Rs. 3,789 crores⁵⁹ without undertaking any public process. This was a stark departure from the usual transparent and participatory approach of the Commission towards tariff determination. Naturally, the credibility of the institution suffered heavily and people took to protests⁶⁰ and chakka-jams to express their anger regarding the increased tariff. As the tariff revision process became such a politicised issue that the government had to intervene. A high level committee was set up and eventually based on the Committee's recommendation⁶¹, and the state government declared a subsidy support of Rs. 606 crores per month⁶² to offset the impact of the suo-motu order⁶³.

Further to this, a fresh petition for final true-up for FY 2011-12, and provisional true-up for 2012-13 was filed by the MSEDCL⁶⁴ on 6th February and a public notice was issued on 7th February. The public hearing was conducted only in Mumbai, making it difficult for people to participate. It is intriguing to note that the same Commission which believed that the transparency of the proceedings was compromised because of audio recordings not being available, decided to proceed even without a technical validation session or the usual public process. The Commission indeed treated this fresh petition (case no. 38 of 2014) as 'de-novo', delinking it entirely from the issues that were raised during the previous process in case no. 68 of 2013, and no mention was made regarding non-compliance of the MSEDCL with the previous daily order. The public hearing was conducted on 28th February, and before the general elections code of conduct could set in, an interim order allowing tariff increase of Rs. 5,022 crores⁶⁵ was expeditiously approved on 3rd March 2014. A final order approving an additional tariff increase of Rs. 1639 Cr was issued on 11th June, 2014. During these developments, the Commission chose not to use its suo-motu powers to initiate a transparent MYT process for the MSEDCL.

As we are already approaching the end of 2014, MYT has become a redundant issue. Given this recent regulatory experience and with the Maharashtra assembly elections slated for October 2014, it is unlikely that either the Commission or the MSEDCL will take up the tariff issue. The whole purpose of introducing a multi-year tariff (MYT) regime was that it will bring in some certainty in tariff changes and give utilities sufficient time to plan operations well and reduce the cost of inefficiencies. However, the experience of the MYT regime shows a complete failure on part of the MSEDCL and the Commission to control costs and/or provide any certainty in tariff changes. This is a serious concern for the next few years and is discussed in the last section on challenges and opportunities. Now let us quickly look at Mumbai's distribution sector.

8: Competition in Mumbai's power sector:

Mumbai has three distribution companies with the private company Reliance Infrastructure (RInfra, the erstwhile BSES) supplying in the suburban areas and the municipal body BEST (Brihan-Mumbai Electricity Supply and Transport) supplying in South Mumbai. Additionally, another private company, TPC (Tata Power Company) has licenses to transmit and distribute electricity in Mumbai, which have been amended from time to time. Historically, RInfra and BEST used to procure power from the TPC to meet a major part of their demand. In fact, from 1995-2010, RInfra had no other firm source of power other than 500 MW from its own plant at Dahanu and power supplied by the TPC. However, despite directions from the government, the insistence of the TPC, and repeated orders of the MERC, RInfra did not sign any firm contract with TPC for procuring power⁶⁶. This could be because RInfra had planned upcoming capacity and wanted to procure power from its own sources instead of from the TPC⁶⁷. BEST however, signed a PPA in 2007 for 800 MW with TPC-Generation (total capacity of 1777 MW). Similarly TPC-Distribution (TPC-D) signed a PPA for 447 MW with TPC-Generation (TPC-G), leaving no spare capacity for RInfra. This led to a dispute as RInfra deemed such an agreement inequitable and preferred an allocation. The matter was escalated to the Supreme Court, which ruled in May 2009 that a generator cannot be forced to supply power to a licensee in the absence of a PPA⁶⁸.

In June 2009, TPC-G decided to withdraw the 460 MW of power it was supplying to R-Infra at the time. Subsequently, the Maharashtra government issued a memorandum, which decided that power should be allocated to RInfra from TPC-G to protect consumers from high tariffs. TPC challenged this memorandum before the Bombay High Court, which ruled in its favour. As RInfra had no other firm sources of power during this period, it procured power from high cost market sources because it seemed preferable to exposing its consumers to load-shedding. In the year 2009-10, short term power purchase accounted for 21% of the total power purchased and 36% of the total power purchase cost. By 2011-12, almost 2/5^{ths} of the power was being procured from high cost short-term sources, which accounted for almost half the total power purchase cost. On an average, RInfra was paying Rs. 4.32/unit of power purchased by 2011-12. Consumers of RInfra, on an average, were paying Rs. 5.95/unit that year. With rising costs, RInfra managed to accumulate losses of around Rs. 3,377 crores, which is deemed as a regulatory asset to be recovered from the consumers from 2012-13 to 2018-19 through a regulatory recovery surcharge. The consumers also pay an annual carrying cost of 14.5% on the regulatory asset.

At the same time, as the tussle over power procurement continued, the TPC claimed to have the right to supply power in RInfra's license areas without needing a fresh license, a position that was challenged by RInfra (and later by BEST) through various fora, like the Maharashtra Electricity Regulatory Commission (MERC), Appellate Tribunal for Electricity (ATE) and finally the Supreme Court. The Supreme Court through its July 2008 judgment reaffirmed the TPC's right to

supply to consumers in RInfra's area of supply and all of Mumbai. It also suggested that in order to do so it can use RInfra's network for wheeling power. This judgment proved to be a watershed in Mumbai's power sector because for the first time in India even small consumers had the choice of selecting their distribution licensee. Subsequently, the TPC-D approached the MERC to formalise detailed operating procedures for implementing the order. The MERC through an interim order dated 15th October 2009, formalised the consumer switchover mechanism, allowed consumers the choice to use an RInfra, TPC or a third party meter, and ensured that wheeling charges accruing to RInfra were paid by the TPC which was responsible for metering and billing. As TPC-D's tariff at the time, was significantly lower than RInfra's, many large industrial consumers shifted to TPC-D. At this time, consumer savings from switching over to TPC-D were in the range of 13% to 41% of their electricity bills. By June 2011, about 1.6 lakh consumers (including 83,000 domestic consumers) migrated from RInfra to TPC. With the mass migration of high paying consumers, RInfra was left with a smaller consumer base to recover the regulatory asset.

Subsequently, the MERC through its order dated July 29, 2011 imposed cross-subsidy surcharge as well as regulatory asset related surcharge for all the migrated consumers receiving supply from TPC through RInfra's wires. This order was challenged by TPC-D before the ATE, which ruled in favour of the MERC. The matter is currently pending before the Supreme Court. With respect to changeover of consumers, RInfra accused TPC-D of cherry picking high-end consumers and therefore affecting its business. In order to provide a level playing field and protect the interest of small consumers, the MERC decided in August 2012 to allow only consumers from the residential category using up to 300 units per month to switch over to avail supply from TPC-D using RInfra's distribution network⁶⁹. All other consumers of RInfra in selected clusters can avail supply from TPC-D but only via TPC-D's distribution network. In order to meet its obligations as a licensee, the TPC was also directed to ensure that 11 identified clusters have a TPC distribution network by 2013.

By 2011-12, BEST had an average billing rate of Rs. 5.94/unit. Such high tariffs were aggravated by burgeoning power purchase costs as well as the fact that in 2011, the Supreme Court upheld BEST's position that BEST's electricity distribution business can subsidise its transport business.⁷⁰ This implies that at least 8-9% of the revenue required from BEST's electricity consumers is used to support BEST's transport business. Consumers of BEST also approached the MERC to introduce a similar changeover process to allow a switch to TPC-D for them. Through its order dated 22nd February 2010, the MERC allowed the TPC to supply to consumers in BEST's area of supply under a similar arrangement, and also allowed it to lay its own network for the purpose. BEST appealed against this order before the ATE, which upheld the MERC's decision. BEST then appealed to the Supreme Court, which in May 2014 reaffirmed the ATE's judgement.⁷¹

Today, Mumbai is the only city in India where consumers have a choice of selecting the distribution licensee, and this should ideally have benefitted many. However, consumers in Mumbai face significant barriers to change licensees and at present may not have any incentive to do so, as all licenses currently have really high tariffs. The average billing rate in Mumbai is about Rs.6.22/unit. TPC-D's power procurement costs approved for 2013-14 at Rs.4.48/unit is only marginally lower than that of RInfra. This coupled with the various surcharges to be paid and the decision to disallow use of RInfra's network leaves an average high-paying consumer without any incentive to switch network. Therefore, despite the choice, consumers are unable to exercise it to ensure affordable service.

In the earlier sections we have touched upon the role of regulatory institution in various aspects of the sector's functioning. One of the primary motives behind introducing such institution was to separate economic decision-making from immediate political considerations. It was hoped that an independent quasi-judicial body would be able to decide tariff in a more rational and transparent manner and thereby enforce economy and efficiency. Whether such depoliticisation is desirable or even feasible is a debatable issue, but it can be safely assumed that a regulator may at times be required to take decisions which may not be supported by either the concerned Government or a politically influential set of consumers. However, the experience so far belies this supposition or at least establishes that the institution will not be able to take such decisions on a sustained basis.

In the recent years when the regulatory institution was shaping up, the Commission did take some bold decisions such as restating loss levels, introducing regional indexing for estimating unmetered agriculture consumption, enforcing the load-shedding protocol, and so on. However, gradually there has been a kind of fatigue and the regulator slowly but surely has started being less forceful about compliance with its directives, and in more recent examples, even about issuing any directions. The change in the government's approach towards the institution can also be seen in the same context. For more than two years now, the Managing Director of the MSEDCL is also the Principal Secretary, Energy for the state. It is important to note that the crucial government decision of allowing subsidy to offset tariff increase has happened during this period. Prior to this, the Managing Director of Mahagenco was acting as the State Energy Secretary.

The MERC has had a reasonably good record in terms of timely appointments of its Members and Chairperson till about 2008. However, in 2009, a senior officer who was working with the MSEDCL was appointed as the technical Member⁹. There was hardly any lag between his retiring from the MSEDCL and joining the Commission. In fact, the appointment was made so expeditiously that the post he occupied was not vacant even for a week. As this person was earlier the officer in charge of certain important decisions/petitions filed by the MSEDCL, at times he had to recuse himself from some extremely important matters⁷². In contrast to this speedy appointment, when another member retired in 2012, the Government showed no eagerness to fill-up the vacancy for almost two years. Finally, a PIL was filed before the Nagpur bench⁷³ of the High Court, which had to direct the state government to fill up the vacancy. Subsequent to the court's direction, an appointment was made on the last date of expiry of the allowed time period of six months. Only once during the past 15 years has a member with a private sector⁷⁴ background been appointed by the state government.

As discussed in the Section 7.6 above, recently the Commission has stopped the good tradition of conducting public hearings in each licensee's area of supply. Besides making it difficult for more numbers of consumers to participate in the regulatory process, such a practice severely affects the credibility of the regulatory institution. Shrinking space for public participation, coupled with reduced faith in the regulatory process, will force people to adopt a more confrontational approach, which the state has already witnessed at the end of last year.

^q Unfortunately, in many states, these kinds of appointments are a standard practice. Even Maharashtra has seen Members who as a part of their previous work experience have had brief stints with the MSEB. However, this was the first time that an officer of the rank of Director Operations and someone who is very closely involved with the MSEDCL's day-to-day functioning was appointed as Member MERC.

10. Lessons, challenges and opportunities:

So far, we have tried to present a review of some of the important developments in the sector in the past two decades. As stated in the beginning, our focus was on the role of regulatory institution in dealing with these developments and challenges. This final section captures lessons and upcoming challenges and tries to offer a few suggestions going forward.

At the national level, the power sector is plagued by a severe financial crisis. The accumulated losses of the State Distribution Companies, including short term liabilities till March 2012 were estimated to be about 2% of the country's GDP at 2010-11 prices, with just four states (Tamil Nadu, Rajasthan, Uttar Pradesh, and Madhya Pradesh) accounting for more than 70% of the total losses. The debilitating finances of the distribution companies also limits the efforts made to meet the mammoth challenge of providing supply to nearly 30% of households (more than the total population of the US) which still lack access to electricity. Apart from this, there are several other challenges such as the declining efficacy of the regulatory institution, integration of renewable energy sources with the existing grid, stranded capacity and fuel sector issues, which also need to be dealt with.

While these challenges are important and need to be handled intelligently, so far the mainstream national policy understanding and focus has remained limited to only suggesting a timely tariff increase as a remedy for all ills of the sector. The Ministry has even tried to get ATE to pursue ERCs for suo-motu tariff increase.⁷⁵ However, this too has not worked very well because despite the tariff increase in recent years, many states and the sector continue to be besieged by the same issues, which the EAct was supposed to resolve.⁷⁶ In this context, however, the Maharashtra power sector review provides some interesting insights, which are listed below.

10.1 Lessons and insights from Maharashtra's experience:

The spectacular achievements of the MSEB in terms of village electrification, capacity addition and enabling access, were no doubt possible because of the strong support (both political as well as financial) of the state government, which in turn was possible because of the strong representation of rural interests in the state politics. This is a crucial lesson for several Indian states, which are yet to provide electricity access to many of their rural and poor households. The Enron failure highlights the need for rational and scientific demand estimation as well as the correct choice of fuel, quantum and type of capacity to be added. More importantly, it highlights the massive costs imposed by an opaque and ad-hoc decision-making processes.

The load-shedding protocol and the Pune Model are examples of the innovative solutions that can be implemented even in the face of major adversity. Despite massive shortages and long hours of power cuts, the MERC was still able to revise tariffs every year by 5-7%, thereby avoiding a financial crisis in addition to the supply crisis. This itself can be considered as an indication of the fact that if the regulator adopts a genuinely transparent and participatory approach, it will be able to garner support and credibility from the civil society. In the past, good practices such as appointing consumer representatives, undertaking technical validation sessions in presence of these representatives, holding public hearings at multiple locations, undertaking independent studies and issuing analytically strong and reasoned orders, have all contributed to communicating the Commission's genuine interest in public participation and making the utility accountable. Similarly, not allowing the MSPGCL to pass through costs on account of the inefficiency of its coal suppliers prompted it to take its dispute to the Competition Commission of India (CCI). The CCI ruled in Mahagenco's favor holding the coal companies guilty of abuse of their dominant position. This judgement is extremely important in not just protecting MSPGCL's legal and contractual rights, but also to enlarge the scope for governance improvements in the coal sector, as the CCI also issued directions to the Coal Ministry to put in place mechanisms for quality monitoring. Unfortunately, in case of the competitively bid projects, the Commission has failed to take a similar principled approach.

However, there are no short cuts to good governance and as soon as genuine efforts towards it are curtailed, institutional credibility will suffer. The recent MSEDCL tariff experience highlights that the moment open and participatory regulatory space is taken away, consumers will resort to protests and political maneuvering. The resulting politicisation can be misused to justify adhoc, myopic and un-sustainable policy measures often aimed at short term political gains, as is happening in Maharashtra at present. Restoring the credibility of the regulatory institution to enable meaningful public debate on power sector policies and issues is easier said than done. The commission will have to initiate the first steps to mend the current trust deficit.

10.2 Challenges before Maharashtra's power sector:

Given the developments of last decade, the major challenges before the state's power sector are as follows:

- 1. <u>Massive and potentially unsustainable tariff increase in the near future:</u> With the failure to implement MYT in a manner that would have improved efficiency coupled with the delay in undertaking true-up and tariff revisions, Maharashtra may have to face a massive increase in tariff in the near future, most likely after the assembly elections. Fuel shortage issues, inefficiencies of MSPGCL, revision of competitively discovered tariffs and the rising distribution cost will all lead to a sharp increase in the MSEDCL's revenue requirements. In addition to this, a regulatory asset of Rs. 1639 crores has been created, and the delay in deciding the tariff will add carrying costs. Further, except for agriculture and small domestic consumers, the tariff of the rest is already very high and hence there is very little room for expanding cross-subsidy. This would mean that either direct subsidy (like the present commitment of Rs. 7200 crores, in addition to an agriculture subsidy of over Rs. 4000 crores will have to continue from the exchequer). This is certainly not a sustainable model for the state government or the power sector, and may lead to serious political and/or governance issues.
- 2. Loss of HT sales on account of open access and renewable energy options: As the tariff continues to increase, the HT consumers will try to avail alternative low cost solutions. The tariff of many of these consumers is already much higher than the discovered rates of roof-top solar. Since the solar cycle matches most of the commercial demand, this may turn out to be a lucrative option for these consumers and is also perhaps desirable from a social point of view. However, loss of such high paying consumers will further cripple the MSEDCL's finances. Also, once the coal sector issues begin to get resolved, open access based on contracts with such generators may also take off. MSEDCL is not taking this perspective into consideration at all in its planning process.
- 3. <u>Uncertainty of capacity addition and possibility of load-shedding</u>: As highlighted before, almost all the capacity contracted through bidding is presently under litigation, raising serious concerns about both its availability and affordability. Secondly, delays in MSPGCL capacity addition may lead to shortages in the near future, instead of the surplus that has been assumed. Further, if indeed there is surplus, it will be at high fixed

costs making it difficult to either back down such capacity or sell this power in the market at high enough rates.

4. Loss of credibility of the regulatory institution: This perhaps is the biggest challenge before the state today. As the review highlights, all the positive and constructive actions that have happened were because of a credible regulatory institution which was committed towards ensuring participation and making discoms accountable. Institution building a long process will need strong demonstration of the Commission's commitment towards good governance. So far, there have been no steps taken by the MERC to bridge the trust deficit. If the present situation continues, in the long run this might turn out to the single most important policy failure in the state.

10.3 Suggestions for the way forward:

In light of these lessons, insights and challenges and based on our understanding of the state's power sector, we suggest the following measures going forward.

1. Certainty of tariff revision for small consumers: The real challenge for managing power purchase and distribution costs is to have some credible mechanism to increase tariff periodically, to at least adjust for inflation. However, the politicisation of this issue and the lack of credibility of regulatory commissions has made this task daunting. In this context, it would be desirable, for both consumers and discoms, if the tariffs were revised periodically but in a rational and reasonable manner. As the multi-year tariff framework failed to achieve this objective, a different approach needs to be devised. One way of doing this could be to create a separate 'LT General' tariff category by combining LT domestic and non-domestic consumers (presently their tariffs are the same for MSEDCL). As far as possible, cross-subsidy for these consumers should be managed with intra-category cross-subsidy keeping the discom revenue neutral on account of this change. The BPL tariff category should also continue within this category. Once formed, the tariff for this category (and for all slabs within it) should be indexed to say inflation minus 2%, i.e. the tariff of this category should automatically be revised on 1st April every year based on last year's inflation index. This will ensure periodic and timely tariff revision of this important segment while requiring the discom to ensure efficiency improvements. Additionally, it will also have the benefits of safeguarding small consumers running commercial operations from their houses from the potential harassment on account of 'unauthorised usage'.

While this measure by itself will not be sufficient to tackle the larger issue of overall revenue requirement, it will help in two ways: a) Reduce politicisation of tariff will ensure certainty of revenue increase, while not imposing tariff shocks on small consumers and b) As tariff for small LT consumers will be frozen, additional revenue will have to be recovered from industries and bigger consumers and hence they will demand and negotiate better efficiency from the discom. Further, this measure will have to be coupled with the model for open access suggested below to realise its full benefit.

2. Segregation of 1 MW+ consumers: The EAct envisaged open access as an important tool for realising benefits of competition. However, so far it has not taken off in spite of repeated efforts of the MoP. One way of achieving this objective could be to mandatorily separate all the 1 MW plus consumers from the discoms. All such consumers eligible for open access should be required to arrange for their own supply within a specified timeframe (say three years). During this period, if they choose to stay with the discom, they should be bound to sign a contract for at least a year and should

be charged a sufficiently high tariff to discourage such a choice. Short term open access should be seriously discouraged and should only be provided in the case of emergency or force majeure events. The 1 MW+ consumers who leave the discom should be charged a reasonable cross-subsidy surcharge which should be fixed in absolute terms for next five years or so, and should taper over this period^r. This is essential to wean off the utility from its heavy reliance on cross-subsidies. However, to ensure a fair deal for discoms and regulated consumers, least-cost generation sources out of the total contracted capacity of the discom should be reserved for the regulated consumers.

Once the demand of the regulated consumers is met, the utility should be allowed to sell its surplus in market. In order to reduce the gaming possibilities and associated regulatory burden of monitoring discom contracts with open access consumers, the utility should be mandated to sell the surplus through exchanges (on weekly, monthly, quarterly or yearly contract basis). Under this scheme, the MSEDCL will not need to contract any additional power, unless of course it is needed to meet the demand of its regulated consumers. To make this arrangement work, the regulator should be more strongly mandated with the responsibility of overseeing implementation of electrification programmes and monitoring of supply and service quality. To ensure fair market operation and to reduce information asymmetries, highest standards of transparency should be authorised to allow longer term trading of power (up to a year or more). Such an approach, coupled with the above mentioned mechanism of separate LT general tariff category, will have the following advantages:

- a. A time-bound plan to reduce cross-subsidy surcharge will enable easy transition of open access consumers from the discom to the market.
- b. A large number of open access consumers contracting power will deepen and broaden the power markets and enable efficient tariff discovery.
- c. Having a smaller consumer base allows discoms and regulators to focus more on improving planning, efficiency, and supply and service quality.

As the least, cost generation in the suggested approach would be reserved for regulated consumers. The discom's overall need for cross-subsidy would reduce, though it may not entirely disappear. Therefore, there may be a need for financial support during the transition period to the proposed approach.

3. <u>Managing the agriculture supply challenge:</u> Agriculture contributes almost 20-30% of total sales of the MSEDCL, though it hardly generates any revenue, leaving the discom heavily dependent on subsidies and cross-subsidies. The above measures by themselves do not help in solving this problem, but they will certainly help to bring the issue of agriculture sales estimation, supply and tariff to the forefront. Measures such as feeder separation have helped the MSEDCL to manage its agriculture demand but this by itself is not sufficient. Some of the essential measures such as monitoring actual supply hours to agriculture have been consistently neglected by the regulator. To address the issue of agriculture, along with the use of efficient pump-sets, following approaches can be tried^s:

^r Please refer to Prayas (Energy Group)'s submission to the MERC for more details regarding this approach: <u>http://prayaspune.org/peg/publications/item/179.html</u>

^s Please see the attached Prayas (Energy Group) report on 'Mini solar plants to address the agriculture power supply crisis' for more details.

- a. A pilot project to test the possibility of providing meter based supply and charging tariff in accordance with consumption can be tried in some areas (such as in Maharashtra, where farmers have shown willingness to be metered⁷⁷) for a few agricultural feeders.
- b. Solar pumping should be considered for catering to agriculture demand, as it entails only a one-time capital subsidy and would provide supply during the work hours on the farm. This can be implemented in the following ways:
 - i. In areas where the water table is reasonably high and new connections are being sought, the thrust should be on providing solar pumps instead of traditional electric ones.
 - ii. Even for areas where the water table is not high or where feeder separation has already happened, the feeder level small MW scale solar plants should be set-up to cater to the agricultural demand.
- 4. <u>Restoring credibility of the regulatory institution</u>: As stated before, this remains the single biggest challenge to be overcome in order to implement other measures listed above. As the trust deficit is at present low, the first step will have to be taken by the Commission. The Commission can do so by implementing the following measures:
 - a. <u>Restart the previous good practices</u> such as technical validation of important petitions in presence of consumer representatives, holding public hearings in the licensee's area of supply and at multiple locations in case of the MSEDCL, issuing analytically strong and well-reasoned orders, etc. This should certainly be the first step to start the process of the restoration of public faith in the institution.
 - b. <u>Review the compliance of all discoms with standards of performance</u> <u>regulations:</u> As per section 59 of the EAct, the Commission is mandated to undertake such a process. Focusing on supply and service quality issues could be a good start to initiate a dialogue with civil society.
 - c. <u>Review all discoms' capacity addition plans</u>: This exercise should involve the following steps:
 - i. Demand supply forecast for the next five to ten years,
 - ii. Make immediate, medium and long term power purchase plans along with details of already contracted capacity,
 - iii. Determine the current status of all contracted projects expected to be commissioned in next one to two years,
 - iv. Provide a rationale for procuring additional quantum, if any, in the context of the above measures.

Such an exercise will greatly help to achieve clarity about supply status as well as potential tariff increases in the future.

d. <u>Perform a third party independent audit of capital expenditure projects:</u> As highlighted before, capital expenditure is a major part of the distribution cost. Presently, there is detailed review of post-facto benefits or implementation. The MERC should initiate a third party independent audit at the division level, and based on its findings, initiate a public process to evaluate efficacy of the discom's capex plans and implementation.

For any of the above suggestions to be effective, the commission will have to demonstrate a strong commitment towards each of these issues. Mere tokenism can only make matters worse. Further, the highest standards of transparency and

participation will have to be followed in order to really make a difference and regain credibility of the institution.

Thus, the review highlights the possibilities and limitations of regulation, as a tool to improve the sector performance and governance. For more than two decades, the mainstream policy focus has been on ensuring financial viability while only paying lip service to governance issues. The Maharashtra case study shows that transparent and genuinely participatory measures may allow the regulator to revise tariffs in timely manner and ensure financial viability but such measures will only work if the regulator also addresses issues which concern the consumers e.g. load shedding, distribution losses, etc. Ultimately, even the most credible and effective regulator processes can only prevent bad decisions or mitigate the damages. Any constructive long-term changes will only happen when there is not only a strong regulatory will but also political as well as utility's support for such actions.

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