The Pune Model

Mitigating load shedding in urban, industrial areas

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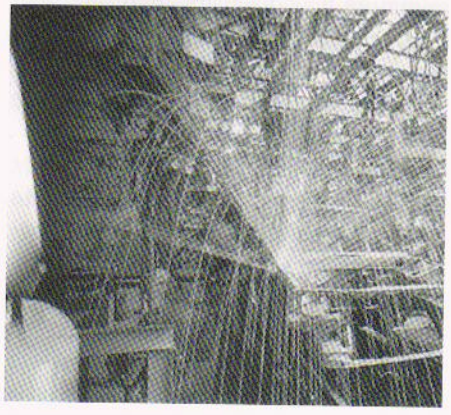
The demand-supply gap for power in Maharashtra started increasing around 2005. The lack of rational capacity addition planning was the primary reason for the huge gap. Though load shedding had been a routine affair in rural areas, during this period, urban industrial areas started facing load shedding of two to four hours every day. Along with the discomfort and inconvenience caused to domestic consumers, load shedding became a major financial issue for industries, as this was also a period of increasing industrial production as well as oil price increases. Large-scale load shedding in urban areas also increased the use of inverters, small diesel generator (DG) sets and other stand-by supply arrangements, which have very harmful effects on the grid as well as on the local environment. They also require significant investments by consumers. To manage the demand-supply gap, the Maharashtra Electricity Regulatory Commission (MERC) issued directives on "load shedding protocol". According to this protocol, load shedding would differ from division to division and would be based on distribution losses and collection efficiency, as well as on the consumer mix of the division. This resulted in load shedding of over 10 hours in agriculture-dominated divisions with high losses, and about two to four hours in urban industrial areas with low losses.

Against this background, on October 25, 2005, the Confederation of Indian Industry (CII)-Western Region, led by Pradeep Bhargava, came up with a proposal on the utilisation of the dormant liquid fuel-based captive power capacity available with a few large industries in Pune, for mitigating load shedding in the Pune Urban Circle of Maharashtra State Electricity Distribution Company Limited (MSEDCL). After the necessary regulatory process and public hearings, the proposal was accepted. This led to a significant reduction in load shedding in Pune city.

The initial model has evolved considerably over the past three years and has also expanded to other urban/industrial areas such as Thane, Navi Mumbai and Vashi. The objective of this article is to share the experience of this approach in mitigating load shedding in urban, industrial areas and the key lessons that may be learnt from this process.

Pune model version I

As per MERC's approved load shedding protocol of 2005, load shedding of two to four hours (0.54 MUs per day) was expected in Pune. The CII 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 the drawal from the grid. The additional energy available with the grid could be used to minimise load shedding in the city. The CII estimated that about 90 MW capacity could be made available through this route, which was nearly the same as that required for minimising load shedding in Pune (90 MW x 6 hours a day = 0.54 MUs a day). Since the cost of electricity generation through such liquid fuel plants (about Rs 11 per unit) is much higher than the MSEDCL tariff (about Rs 4.50 per unit), it was proposed that the excess cost be recovered through consumers of Pune in the form of a reliability charge for mitigating load shedding in the city. This additional revenue would be used to reimburse the incremental cost of participating industries. Initially, MSEDCL had estimated an additional reliability charge of Re 0.84 per unit. This would be levied on the total energy consumed by the consumer. It was also uncertain if the industries participating in the scheme would be willing to pay the required surcharge. MERC held several public hearings on this issue. Many consumer organisations, such as Sajag Nagrik Manch and Prayas, initially objected to the scheme. These objections were centred on apparently preferential treatment given to urban consumers, high reliability charges and neglect of broader issues of making the licensee and the government accountable for their failure to provide adequate power at reasonable cost, and so on. Finally, MERC approved the scheme in May 2006 and load shedding in Pune was stopped from June 2006. MERC estimated that the reliability charges would be of the order of 42 paise per unit as against 84 paise per unit, as estimated earlier by MSEDCL. This reduction was on account of lowering of the projected demand-supply gap and averaging of the additional cost over the entire year. Importantly, the reliability charge was also to be levied on industries participating in the scheme, but domestic consumers with monthly consumption of less than 300 units were excluded from the levy of reliability charges. These crucial changes implied that nearly 75 per cent of consumers of a total of 1.2 million consumers from Pune did not have to pay any additional charge and over 50 per cent of the additional charges would be borne by large industries in and around



Pune. These changes, coupled with bleak prospects of overcoming load shedding in the near future, ensured wider acceptability of the scheme.

However, by early 2008, MSEDCL started facing various implementation issues with the model. In its order dated May 16, 2006, the commission allowed MSEDCL to occasionally utilise power from the grid (that is, MSEDCL's supply sources) as a stand-by option. MSEDCL, however, pointed out that the generation from captive power plants (CPPs) was falling short of their committed supply obligations and as MSEDCL has been recovering a reliability charge from Pune consumers, it was forced to divert grid power to the Pune circle. CPPs, in turn, were finding it difficult to match generation to the constantly varying generation schedules of MSEDCL. The demand-supply gap in the Pune circle had considerably increased as well. Overall, it became clear that existing liquid fuel-based captive capacity was insufficient to bridge the demand-supply gap in highly urban, industrial areas like Pune. All parties including the commission, MSEDCL, CII and consumer groups like Prayas, strongly felt that it was inappropriate and unjust to divert grid power to a particular circle, as the entire state had a claim to it. Hence, it was decided to discontinue the CPP-based approach for mitigating load shedding in the city, effective April 2008, that is, after nearly two years. These two years gave the nearly 4 million people of Pune total relief from load shedding.

Pune model version II

The people of Pune were, however, keen to continue with the "no load shedding" status of the city. 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 the city. The interim franchisee would procure power specifically for the requirement of the city and MSEDCL would use this power to cut down load shedding. The cost of short-term power purchases in the country had increased significantly in the past few months and MSEDCL was not purchasing power on a short-term basis as a response to its weak financial position. Thus, the power to be purchased by the interim franchisee would be additional power outside MSEDCL's supply mix. The interim franchisee was appointed on the basis of lowest cost of power supply, which was Rs 8.54 per unit (quantum of 150 MW for 12 hours a day, 7 a.m. to 7 p.m.) delivered cost at the Mahatransco boundary. Similar to the first version of the Pune model, additional reliability charges were levied on all consumers, except domestic users consuming below 300 units every month, to recover the additional cost of purchasing high-cost power. This arrangement was approved by MERC in April 2008, with a reliability charge of 48 paise per unit. Under this arrangement, all distribution functions, including metering and billing, were with MSEDCL, with the interim franchisee's role being limited to procuring the additional power requirements of the city (essentially the role of a trader). Under this scheme, the commission also ruled that in case of interruption in power supply by the interim franchisee for a long time, for reasons such as annual maintenance shutdowns/outages, etc. of the generation source, load shedding would have to be undertaken and grid support would not be provided by MSEDCL at the expense of consumers in other regions.

At the time of finalising this arrangement in April 2008, MSEDCL had estimated zero requirement for additional power for mitigating load shedding in the four monsoon months, and 1.8 MUs a day (about 150 MW for 12 hours a day) after the monsoons (from October 1, 2008). This amounted to about 15 per cent of the total requirement of Pune. Unfortunately, due to delayed monsoons, the demand-supply scenario during the period became precarious, as there was little reduction in agricultural demand. Thus, as no additional power was tied up for the monsoons, the interim franchisee was procuring power largely through the Indian Energy Exchange on a day-ahead basis and, depending on the availability of such power, proportionate load shedding was carried out. During this period, MSEDCL further increased the load shedding hours for the state, resulting in doubling the demand for additional power for Pune from 150 MW to 300 MW. This increase in load shedding requirement is being challenged before the MERC, and the commission's order in this regard is awaited. But, without considering this increased quantum, the interim franchisee has been unable to supply the committed 1.8 MUs power every day at Rs 8.54 a unit. As a result, depending on the actual power availability, proportionate load shedding is carried out.

This arrangement is also being adopted in three other circles of MSEDCL – Thane, Navi Mumbai and Vashi – which are again highly urban, industrial areas near Mumbai. As per the original estimate, the total additional power requirement for all these areas is about 3.9 MUs a day (equivalent of 300 MW for 12 hours), which has nearly doubled in the revised load shedding protocol proposed by MSEDCL. Thus, at present, the over 8 million population of Pune, Thane, Navi Mumbai and Vashi is getting partial relief from load shedding, depending on the ability of the interim franchisee to procure part of the 600 MW requirement of these regions.

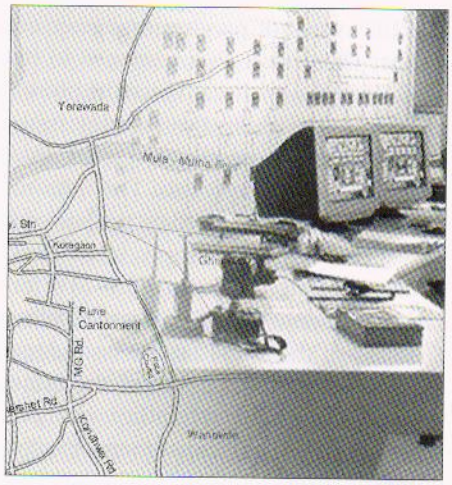
Key observations

The experience with the Pune model in the past two and a half years has several important lessons for a broader power sector policy. These are summarised below:

- **The willingness to pay in urban and industrial areas is high:** This experience has demonstrated that the willingness of higher-middle-class industrial and commercial consumers for getting reliable, good quality supply is high, provided there is credible assurance of good quality service. This is also proved by high-cost DG set parallel networks in Bihar and Uttar Pradesh – not just for shops but now even for households.
- **Operational issues – challenging but**

not insurmountable: In the first phase of the Pune model, the licensees' ability to manage, monitor and coordinate generation at so many industries while ensuring a proper mechanism for accounting and payments to industries was a major concern. Though some issues such as third-party audit of actual generation costs, final settlement of actual costs and revenue from reliability charges are still pending, it was observed that it is by and large possible to operationalise such an arrangement within the existing utility structure.

- **Utilising spare captive capacity to meet peaking shortages at the local level is feasible:** The experience of the Pune model version I also demonstrated that it is feasible to unlock local spare generation capacity to mitigate peak shortages, but large-scale, continued dependence on such options is highly undesirable from environmental and economic perspectives. So, as Pradeep Bhargava puts it, such an option is to be considered only as "a band-aid, that would work only if the wound is small enough".
- **Strong and continuous monitoring by regulatory commissions and civil society groups is necessary:** During the operation of this scheme for more than two years, there were several instances when licensees' claims on issues such as projected requirement of additional power and estimated reliability charges were found to be defective, and rigorous monitoring by consumer groups as well as the commission was required to ensure rational decisions on such issues. Unless there is strong and continuous monitoring by the regulatory commissions and civil society groups, there is a danger of such schemes leading to either excessive benefits to utilities or discrimination amongst different sections of consumers. This also raises concerns about the ability of regulatory agencies to continue effective oversight, especially if such a model is adopted at many places within the state.
- **Differential pricing offers significant potential to overcome shortages:** The



Pune model experience once again demonstrates that utilities are not very willing to purchase additional power on a short-term basis, at rates much higher than current average power procurement rates. This is due to their weak financial positions and highly stretched cash flows, large distribution losses, low collection efficiency and low recovery from certain consumer sections which would be primary users of any additional power in the large load shedding scenario. The Pune model experience demonstrates that differential pricing, that is, charging somewhat higher rates from certain consumer categories, has significant potential to help overcome peaking shortages.

- **Conditions precedent for replicating such a model:** It was possible to develop this model in certain areas of Maharashtra due to favourable conditions such as large industrial and commercial consumption. Another essential factor is the low level of distribution losses and high level of collection efficiency. Most of these areas have distribution losses of less than 18 per cent and nearly 100 per cent collection efficiency. This helps to maintain reliability charges at reasonable levels even though the cost of additional power is very high. In the absence of these three factors, the reliability charge could be significant.
- **Ensuring reasonable cost of power purchase is challenging:** By the very nature of this arrangement, several decisions such as requirement and rate of additional power need to be made in a dynamic scenario, and ensuring a reasonable cost of power purchase and preventing "gaming" possibilities is a major challenge. One of the key requirements to achieve this is credible and capable management of utilities and trading partners/power procurement agencies, as well as strong regulatory oversight.
- **Preventing a cascading effect of high cost of short-term power purchase is essential:** High cost of short-term power purchases is, at times, used to justify/demand high cost for long-term power purchases.
- **Collective civic action and role of media are important:** Apart from the above specifics of this model, the process also demonstrates that collective efforts of civil society can make a significant difference in ensuring improved service delivery to citizens. During the two and a half years of this process, several consumer groups, industry associations, trade bodies, energy experts and civil society groups worked together to find a widely acceptable solution to the problem of load shedding. The media also played a crucial role in ensuring that all developments were shared in a transparent manner with citizens of these areas and that decision-makers were made accountable.
- **Need to prevent long-term segmentation and neglect of rural areas:** Finally, any such arrangement to eliminate load shedding from a particular area should be looked at as a temporary solution that will give some breathing period to the distribution and generation utilities to plan better and address the more basic issues that have given rise to the current mess. Neither distribution/generation utilities nor society should look at this type of model as a long-term measure to meet the demand-supply gap. With most vocal sections of the society (urban/industrial areas) being spared load shedding, there is a danger of utilities and governments continuing their neglect of rural/non-industrial areas. ■