Open Access: Methods for Calculation of Cross-Subsidy Surcharge and Assessment of the Financial Impacts on Utilities

(This paper has been submitted to Economic and Political Weekly for publication.)

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Abstract

The Electricity Act 2003 allows open access to the T & D networks of the licensees with the payment of a surcharge (over the wheeling charge) to compensate the licensees for the loss of revenue. The surcharge will play a critical role in managing the transition to competition as the ERCs try to balance the conflicting requirements of: (1) making open access economically attractive for HT consumers; and (2) protecting the financial health of licensees.

The level of surcharge, method of its calculation, and impact on the utility are hotly debated issues. This paper takes an overview of the recommendations made by various parties regarding the calculation of the surcharge, and then discusses some concerns about the application of these recommendations. This discussion is followed by an assessment of the likely revenue loss for the licensees and the extent to which the various recommended methods compensate the utilities for the revenue loss. The paper points out the need for re-focusing to address broader concerns, if the transition to competition is to be made a little easier.

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Introduction

In order to promote competition in the electric power sector, the Electricity Act 2003 (E Act) mandates open access to the transmission and distribution network for any supplier of electricity. With open access, upon approval by the Electricity Regulatory Commission (ERC), competing suppliers will be able to provide electricity to certain categories of consumers and thus bring competition into generation and supply of electricity. A major complication in the transition to competition is the loss of cross-subsidy revenues that were being provided by the exiting consumer to fund the subsidized (below cost provision of) supply to the majority of LT consumers

The EAct has attempted to compensate the utilities by allowing State Commissions to impose surcharges on those consumers leaving the licensee and receiving power from competing suppliers. However, the wording of the Act on these issues is not clear regarding the level of the surcharges and the method of their calculation. For this reason, the EAct is subject to multiple interpretations and there have been several suggestions for how these surcharges are to be calculated.

In this paper, we first describe the recommendations made by various parties regarding the method of calculation and level of the surcharges. Then we discuss our concerns about these recommendations. Next, we assess the likely revenue loss for licensees due to open access and the extent to which the various recommended methods would compensate the utilities for the revenue loss.

At the end of the paper, we discuss the conflicting requirements for making open access economically attractive and protecting the financial health of utilities. We conclude with suggestions on other factors that need to be considered to make the transition to competition a little smoother.

Recommendations by Various Parties on Mechanisms to Calculate the Cross-Subsidy Surcharge

<u>Electricity Act 2003</u>

The EAct allows open access before cross-subsidies are eliminated through the payment of a surcharge but requires that the subsidies be progressively reduced in a manner

determined by the State Commission. Clarifying the purpose of the surcharge, the Act states that the surcharge is to "meet the requirements of current level of cross subsidy within the area of supply of the distribution licensee." While the Act is silent on the method to be used to calculate the cross-subsidy surcharge, it clearly states that the State Commission will determine the cross-subsidy surcharge and the manner in which it will be progressively reduced. However, the EAct requires that the State Commissions be guided by the National Electricity Policy, National Electricity Plan, and Tariff Policy which are to be notified by the Ministry of Power (MoP). Thus these policies will also have an influence on the calculation of the cross-subsidy surcharge to be decided by the State Commissions.

First Draft of Tariff policy paper by MoP

MoP prepared a Preliminary Discussion Paper on Tariff Policy with the assistance of CRISIL, which mentions that, the "*Commission would decide the surcharge such that the loss of cross-subsidy is shared between the consumer and the incumbent distribution licensee.*" This statement is an interpretation/ extension of the EAct, because the EAct does not mention any sharing of the cross-subsidy but simply states "…*such surcharge shall be utilised to meet the requirements of current level of cross subsidy…*"

Draft National Electricity Tariff Policy as recommended by the Task Force

The Report of the Task Force on Power Sector Investments and Reforms dated February 2004 included a draft tariff policy in which it recommended that the cross-subsidy surcharge for open access be computed based on the Long Run Incremental Costs (LRIC). In its recommendations, the Task Force said that the cross subsidy surcharge should represent the difference between the actual tariffs and LRIC. The Report went on to say that the appropriate Commission should conduct the necessary studies to determine LRIC or have the studies carried out by the licensees. It suggested that in the interim the costs of the most expensive generating unit (based on both fixed and variable costs) be used as a proxy for LRIC. In October 2004, the Ministry of Power (MoP) recommended to the Planning Commission that it take note of these recommendations of the Task Force while formulating policy on the cross-subsidy surcharge.

Other Recommendations

Sankar (2004) discusses two alternatives for determining the surcharge. He looks at the cross-subsidy as either: (1) the HT tariff minus the average cost of supply; or (2) the HT tariff minus the cost to serve the HT consumer class. Using the example of AP, he estimates the cross-subsidy surcharge to be Rs 1.65 per kWh and Rs. 2.05 per kWh based on the two methods respectively. He argues that simply using either of these approaches will result in a high cross subsidy surcharge that would make open access meaningless and stall reforms of the power sector. Mr. Sankar recommends that the National Electricity Policy or the Tariff Policy should define the cross subsidy paid by a consumer class as the difference between the tariff for that consumer class and the average cost of supply. He further recommends that the surcharge be only a fraction, say 50 percent, of

the present level of cross-subsidy. He considers it reasonable to fix the surcharge at a fraction of the cross-subsidy because according to him the consumer opting for open access is taking a greater risk than one that stays with the utility. Furthermore, he says that to make open access meaningful, the cost of supply from open access including the surcharge should be less than the grid tariff. As an alternative, Mr. Sankar suggests that the marginal cost of power purchase be used as the cost to serve in calculating the surcharge[1].

A Consultation Paper prepared by NCAER for CERC titled *Introducing Competition in Generation of Electricity*, recommends that the surcharge be subject to a ceiling determined by the following equation:

Max. Surcharge = Tariff for departing consumer – Marginal cost of supply for the discom

"As an alternative formulation" the paper recommends that the surcharge not be greater than 20 percent of the average price of power procured by the discom in the preceding financial year. In most cases, the alternate formulation would result in a much lower surcharge.

Concerns with Recommended Methods for Calculating the Cross-Subsidy Surcharge

Issues with the Use of LRIC

The Task Force Report does not give a reason for recommending that the difference between the actual tariffs and LRIC be used for calculating the cross-subsidy surcharge. Clearly, the LRIC do not represent the current cost to serve the exiting customer, but could be seen as a proxy for the costs that will be avoided by the utility.

Cross-subsidy revenues are equal to the difference between the revenue generated by a customer and the cost to serve that customer. Cost to serve is based on an allocation of total costs to different customer categories. In contrast, LRIC are akin to marginal costs. By using LRIC as a proxy for cost to serve, one is allocating the costs of new additions to a single consumer category (HT consumers). But actually while calculating the cost to serve, the cost of new additions is merged with existing costs so that the cost of capacity additions are spread across all categories of consumers. Therefore, by using LRIC as a proxy for cost to serve, one is overstating the cost to serve if LRIC is greater than the average of the existing costs, and one is understating the cost to serve if LRIC is less than the average existing costs. Usually LRIC is higher than the existing costs so the cost to serve would be overstated resulting in a smaller surcharge.

Furthermore, if HT load leaves the system much faster than the expected load growth, then capacity additions will not be required for some time but instead the utility may have to pay for existing fixed costs that cannot be avoided. In that case, the avoided costs will

[1] This alternative articulation would increase the cost to serve above the level based on historical costs; and would therefore, reduce the cross-subsidy surcharge.

be zero, and instead, there will be stranded costs. Thus we see that for cases of rapid departure of HT load, the use of LRIC (based on capacity additions) will significantly overstate the avoided costs and understate the surcharge required[2].

Issues with the Use of Marginal Unit Cost (MUC)

We have several concerns with the use of MUC to calculate the surcharge. First, MUC do not represent avoidable costs. Generally, the fixed costs of the marginal unit are not avoidable. If the licensee's load is reduced because of the departure of some customers, at best the licensee will avoid the highest variable cost of either its own plants or the plants from which it purchases power. In those cases where the marginal unit for a utility may be an unplanned purchase from a surplus area or the unallocated portion of a Central Generating Station (CGS), the utility may be able to avoid both the fixed and variable costs of the contract.

The second reason why it is inappropriate to use MUC to calculate the surcharge is that this assumes that for any utility, there is a single generating unit that is on the margin at all times, and that is not so. The generating unit on the margin changes with the time of day and season. During peak periods, peaking units with very high variable costs are on the margin while during off-peak periods, baseload units with very low variable costs may be on the margin, etc.. Thus generally the most expensive unit would be the one that operates only at the times of the system peak (and hence would have a low PLF) and applying that cost to all the 8760 hours[3] of the year would lead to a gross overstatement of the avoidable costs.

The third problem with the use of MUC to calculate the surcharge is that the highest cost unit is not applicable to the entire decrement of load. The use of a single unit (the highest cost unit) to represent avoidable costs for all the load that would go out due to open access is likely to be incorrect. As an example, consider that 1000MW of industrial load is expected to leave the licensee and get electricity from alternative suppliers. If the capacity of the highest cost generating resource is only 200 MW, then clearly it would be incorrect to assume that the costs per kWh of the 200 MW unit would be applicable to the entire 1000 MW load block. The avoidable costs for the remaining 800 MW would be lower. Therefore, the size of the decrement of load for calculating the avoidable costs must match the expected decrement in load due to open access. The avoidable cost would then be the weighted average of the costs of the generating units that would no longer be required.

These concerns with the use of MUC to calculate the surcharge are best illustrated by calculating the surcharge for different states by strictly following the recommendations for the use of MUC. For AP and Maharashtra, the total costs (fixed plus variable) of the

[2] Another issue with the use of LRIC is that estimating LRIC can be difficult because these are forward looking costs which are based on forecasts. There can be great variations in the forecasts made by different parties and the regulatory agency must decide whose forecast is the most reliable. This is often not easy.

[3] Most of the customers who avail of open access and seek an alternative supplier are likely to be industrial consumers whose load is expected to be largely flat and part of the baseload of the utility

marginal generating unit per kWh are higher than the tariff for HT industrial consumers. Therefore, if the recommendations for the use of MUC are strictly followed, we get a negative cross-subsidy surcharge. The main reason for this anomalous result is that the marginal unit operates for a very short time in the year and it is incorrect to apply its costs to a load decrement that covers most of the hours of the year.

Issues with the Use of the Average Cost of Supply

If the average cost of supply is used to calculate the surcharge, then the resulting revenues will not completely compensate the licensee for the loss of cross-subsidizing revenues. This can be seen from the following calculation:

Cross-subsidizing revenues provided by HT consumers
= HT tariff - Cost to Serve HT consumers

If the average cost of supply is used to calculate the surcharge, then

Surcharge using average cost of supply
= HT tariff – Average Cost of Supply

Therefore, the revenue deficit due to the use of average cost of supply is given by the following equation:

Cross-subsidizing revenue deficit = Average cost of supply – Costs to Serve HT Consumers

How large would be this deficit due to the use of average cost of supply instead of cost to serve? We consider the case of AP, where the HT tariff is 4.11 Rs/kWh; the average cost of supply is 2.82 Rs./kWh, and the cost to serve HT consumers is 2.61 Rs/kWh. Using the equations given above, we see that the revenue deficit would be Rs 0.21 per kWh. The total HT sales for Category I and II consumers for the year are projected to be 7297 MU, so if half the HT load opts for open access, then the revenue deficit will be Rs. 77 crores per year. If, for calculating the surcharge, the average cost of supply is reduced by 50% as suggested, then the losses will be Rs. 312 crores per year.

Issues with Implementing the Proposal in CERC Consultation Paper

While using the first proposal given in CERC's Consultation Paper, it should be remembered that the marginal cost that is used must be time-differentiated because the same unit is not on the margin at all times.

The paper's second proposal is to cap the surcharge at 20% of the average cost of power procurement in the previous year. If we assume that the difference between the HT tariffs and the cost to serve HT consumers is the cross subsidy contributed by HT consumers, then we need to compare this with 20 percent of the average cost of supply to evaluate the impact on the utility. This varies significantly from state to state. For

example, Table 1 shows the case AP, where the difference between the two, which represents the loss of cross-subsidy revenues is Rs. 1.09 per kWh.

Table 1
Impact of CERC Consultation Paper Proposal on Revenue Loss in AP
All costs are in Rs/kWh

HT Tariff	Cost to Serve	Avg. Cost of Power Procurement in Previous Year	Cross-Subsidy	20% Cap per Proposal	Loss of Cross-Subsidy Revenues
4.11	2.61	2.07	1.50	0.41	1.09

Estimation of Revenue Loss for the Utilities

So far we have focused on the loss of cross subsidy revenues and various recommendations to compensate the utilities, often partially, for the revenue loss. One shortcoming that we noticed with the various recommendations for calculating the surcharge is that the authors do not evaluate the impact of their suggestions on the financial health of the licensees.

Examination of the financial impacts on the utility due to the exit of HT consumers reveals that there are two reasons for the revenue loss: (1) as already discussed, the loss of cross-subsidy revenues that were being provided by the exiting consumers to fund subsidized supply to the majority of LT consumers; and (2) change in the consumer mix because the power that is freed-up will now be used to supply low paying consumers. The first reason is due to the reduction of cross-subsidizing consumers, and the second reflects the addition of more cross-subsidized consumers[4].

In this paper, we have assumed that HT consumers are most likely to avail of open access and the remaining consumers will most likely be LT consumers whom we also refer to as small consumers.

The revenue loss for the utility due to the exit of an HT consumer is given by the following equation:

[4] There could be revenue loss for another reason. In case the licensee is unable (or unwilling) to supply the freed up power upon the exit of an HT consumer, then it will have to bear the burden of unavoidable costs that were incurred by the utility to serve the exiting consumer. These costs would be an example of stranded costs. We have assumed that these costs would not be present because almost all the areas of the country are suffering from a shortage of electricity and so there will always be consumers who can be supplied with the freed-up power.

Revenue Loss =

Revenue from Exiting HT Consumer – Revenue from Sale to Existing (or New) LT Consumer - Revenue from exiting (open access) consumer for wheeling and backup charges

This revenue loss per kWh should be compared with the surcharge to see to what extent the utility is compensated.

How large is the expected revenue loss due to the departure of an HT consumer? In order to answer this question, we estimate the revenue loss for Maharashtra. Our estimate is based on "current conditions," by which we mean that that the tariffs and losses at the HT and LT levels remain at their current levels, and that the overall T&D loss remains at its current level of 37%. LT losses are considerably higher than the overall loss level. One kWh freed up at the HT level results in a sale of only 0.58 kWh at the LT level. Therefore, while the LT tariff is 2.69 Rs/kWh, the revenue realization from the freed up power is only 1.57 Rs/kWh. After accounting for the revenue that the utility will earn from wheeling charges and back-up (or standby) charges[5] from the exiting (open access) HT consumer, we estimate that the revenue loss is Rs. 1.51 per kWh[6].

In order to estimate to what extent the surcharge compensates the utility for this revenue loss, we estimate the revenue likely to be generated through the cross-subsidy surcharge by the utility using the different methods of calculation. Table 3 shows the results and also compares these revenues from the surcharge with the total revenue lost by the utility.

For our calculations, we have assumed that 50% of the HT load will opt for open access. This would be a block of about 8,000 MU. For purposes of illustration, we have assumed that the LRIC is the same as the cost of a new generating unit and is assumed to be Rs 2.25 Rs/kWh.

In its order on captive power plants[7], using data for 2002-03, MERC estimated that the cross-subsidy being paid by the HT industry was Rs 1.0 per kWh[8]. But while calculating the cross-subsidy surcharge applicable on the sale of electricity by captive plants to third parties, MERC applied a surcharge of only Rs 0.25/kWh. MERC stated that if the full

[5] The wheeling charges have been calculated using the function-wise break-up of expenditure in the MSEB Accounts Report for 2002-03. Only charges down to the HT distribution level have been included. Back-up charges are based on MERC's order *In the Matter of Power Purchase and Other Dispensation in Respect of Fossil-Fuel Based Captive Power Plants*. For conversion from a Rs/kVA charge to a Rs/kWh charge, the power factor and load factor for exiting consumers have been assumed to be 90% and 70% respectively.

[6] This calculation is based on the following data from MERC Order for 2003-04: HT tariff 3.50 Rs/kWh, LT tariff 2.69 Rs/kWh, HT Sales 16431 MU, LT Sales 23278 MU. With an overall loss level of 36.62% and assuming HT losses to be 10%, LT losses are calculated to be 48% of input energy. Further, this translates into a loss of 42% for every kWh freed up at the HT level. Thus the LT realization is 1.57 Rs/kWh. With transmission, distribution, and backup charges totaling 0.42 Rs/kWh, the revenue loss is calculated to be 1.51 Rs/kWh.

[7] MERC Order in the Matter of power purchase and other dispensation in respect of fossil fuel based Captive Power Plants, Case No. 55 and 56 of 2003, dated September 8, 2004.

[8] MERC estimated cross susbsidy as the difference between HT tariff and the average cost of supply

level of cross-subsidy of Rs. 1 per kWh was added to the purchase price for power by a third party from a CPP, then it would render the sale uneconomical and would act as a deterrent. In further justifying the surcharge of Rs 0.25 per kWh it said that in order to "fairly compensate the distribution licensees" and at the same time not "overburden" CPPs, the surcharge was being set at 25% of the total cross subsidy. We have also included the effect of this decision on the finances of the utility in Table 3.

Table 3
Effect of Alternative Methods to Calculate Surcharge on MSEB Revenues

Assumed Total Size of HT Energy Block Leaving MSEB 8,000 MU

Method for Calculating the Surcharge	**Avoidable Costs or Avg Cost of Supply** **Rs/kWh**	**HT Tariff** **Rs/kWh**	**Cross-Subsidy Surcharge** **Rs/kWh**	**Revenues from Cross-Subsidy Surcharge** **Rs. Crores**
Highest Cost Unit	6.74[9]	3.50	-3.24	0
LRIC (Assumed)	2.25	3.50	1.25	1000
MERC Order on CPP	2.97	3.50	0.25	200
Avg Cost to Supply + 50% reduction	3.07	3.50	0.22	172
Likely Loss	1.99	3.50	1.51	1208

In the case of MSEB we can see that the actual loss under current conditions is about Rs. 1,200 crores, while the cross-subsidy revenues collected by the utility range from zero to about Rs 1,000 crores depending on the method used to calculate the surcharge. Thus the net loss (actual revenue loss minus the revenue from the surcharge) from the various methods will range from Rs 200 crores to Rs 1200 crores. MSEB's revenue base will be about Rs 10,000 crores after this quantum of HT load leaves. Thus we see that the method used to calculate the surcharge has a dramatic effect on the revenues of the utilities and that none of the methods compensates the utility fully for its loss. For utilities that are already financially crippled, such a loss of revenue will not be sustainable. The only recourse left to the utility and the regulator will be to raise the tariffs for small consumers by large amounts, between a few percent to almost 20%. This financial burden on small consumers may lead to a backlash against the move towards a competitive electric power sector.

[9] According to MERC's order for 2003-04, the highest cost unit for MSEB is Kawas (NTPC). Rs. 6.74 per kWh is the total (fixed + variable) cost of that power to MSEB.

The revenue of Rs. 1000 crore from the surcharge is based on using LRIC. This amount could vary significantly depending on the value used for LRIC. As noted earlier, because LRIC are based on forecasts, different parties could have different estimates of LRIC.

Further, in our calculations of revenue loss, we have not included deviations from current conditions caused by the following factors that could affect the likely revenue impact:

- *Migration of Consumers to Captive Power Generation.* This will exacerbate the revenue loss problem for the licensees. Consumers who opt to get their supply from captive power producers do not have to pay a surcharge, and therefore, the departure of such consumers will result in an even greater revenue loss for the utility. In MSEB's service territory, about 550 MW of new captive power plants are to be set up (MSEB Order on CPP). These plants would support a consumption of above 4,000 MU. Migration of this load to CPP will halve the revenues from the surcharge and increase the losses to MSEB which will then be in the range from 700 crores to 1200 crores.
- *Freed-Up Power Sold to Agricultural Consumers Who Pay a Lower Tariff than the Average LT Tariff*: If this happens, little added revenue will be generated to mitigate the loss of revenue from the exiting HT consumer. So the revenue loss will be higher.
- *Reduction in LT Losses*: While this would be a desirable change, we have not included changes in the T&D losses on the LT side because significant reductions in loss levels will take time to achieve. Furthermore, even a dramatic reduction in losses is unlikely to affect the revenues to a great extent. For example, if the overall loss level was reduced from the current level of about 37% to 25%, the revenue loss from the departure of half the HT load will be about Rs 860 crores compared to the current level of Rs. 1200 crores.

The Tug of War Between Making Open Access Attractive and Protecting Utilities' Financial Health

So far we have reviewed the various recommended mechanisms to compensate utilities for the loss of revenue. As we have seen, the various mechanisms result in significant revenue losses for the utilities. We now look at the possibility of introducing open access from another viewpoint. Specifically, we ask ourselves what is the maximum level of surcharge that will be acceptable and then estimate the impact on the utility of that level of surcharge. We hope that such an endeavor will shed some light on what needs to be done to introduce open access.

If open access has to be encouraged, then any surcharge has to be small enough so that the resulting total cost to an HT consumer of getting supply from a competitive supplier is less than the HT tariff that the consumer would have to pay if he stayed with the licensee. However, the surcharge arrived at from these considerations will cause a large revenue loss to the utility. A numerical example using the case of Maharashtra helps illustrate the magnitude of the problem.

Cost of competitive supply in Rs./kWh = Generation cost + Trans cost + Dist cost + Back-up Cost

= 2.25 + 0.23 + 0.15 + 0.04

= 2.67

Maximum Surcharge (where the incentive to switch to a competitive supplier just disappears for a HT consumer) = HT Tariff - Cost of competitive supply

= 3.50 – 2.67

= 0.83 Rs./kWh

This maximum surcharge is to be compared with the revenue loss to the utility of Rs. 1.51 per kWh previously calculated.

From the above example, we see that in the case of Maharashtra , the maximum surcharge can only cover about 55% of the revenue loss that will occur for the utility, assuming that all the departing HT load pays the surcharge. If 50% of the departing HT load shifts to captive power generation, the surcharge will cover only 36% of the revenue loss. A loss of 45% (or 64% if the effects of migration to captive generation are included) of the revenue generated by a departing HT consumer would not be sustainable. At the same time a surcharge higher than the maximum will leave no incentive for HT consumers to switch to competing suppliers. Hence there is an inherent conflict between the two objectives of promoting open access and protecting the financial health of the utility as long as the the cross-subsidies are large, and this may lead to a tug of war between these two objectives.

Making the Transition to Competition a Little Easier

If we focus only on the level of the surcharge then, as we have seen from the numerical example above, there is a tug-of-war between encouraging open access and protecting the financial health of the licensees. Too large a surcharge discourages open access and too small a surcharge hurts the financial health of the utilities. We can make the transition to competition a little easier if we broaden our focus by looking at two factors in addition to the level of the surcharge: (1) the level of LT tariffs and efficiency; and (2) the level of HT tariffs.

<u>LT Tariffs and Efficiency</u>

Clearly, increasing LT tariffs and reducing LT losses will reduce the revenue impact on utilities. However, neither of these tasks is easy nor can it be accomplished instantly. Raising LT tariffs will be difficult because most States' LT consumers are already experiencing tariff increases and are likely to resist any further large increases in their tariffs.

In spite of the importance of LT tariff increases and reduction in losses in facilitating a smooth transition to competition, in the debates on open access there has been very little discussion of the required tariff increases and improvements in LT efficiency. We

surmise that the focus on the level of the surcharge only and the silence on the level of the LT tariffs and LT losses is based on the implicit assumption that putting financial pressure on the licensees and the State Governments will force them to improve their performance. However, past experience does not support this assumption. When there has been financial pressure on the licensees for long periods, the licensees and State Governments have not improved their performance in response to such pressure.

This point is made cogently by Sagar (2004) in his paper titled, *Why and When Do State Governments Reform: The Case Experiments in Electricity in Delhi*. He asserts that losses due to not reforming the electricity sector are not an adequate force to bring about change, because governments don't respond to financial losses the way businesses do. In support of his argument, he cites the behavior of SEBs and says, "SEBs have actually been able to survive, sliding comfortably downhill whilst cheerfully accumulating liabilities, for a surprisingly long period…..Not even the extremes of non-performance and the prospect of severe curtailment of power supply are necessarily sufficient by themselves to goad a state government into effective reform." He gives the example of UP where in the summer of 2003, electric supply was officially available for about 9 hours a day in most of the state, and for only 16½ hours a day in district headquarters. "Uttar Pradesh was restricting its own power purchases under financial compulsion, imposing heavy power cuts and even selling power to Delhi to improve the short-term liquidity of the state's transmission and distribution utility. This was done presumably because the government perceived the cost and inconvenience of genuine effective reform as being incommensurate with the possible benefits, that it could envisage as accruing to itself from such reform." State Government decision making on reforms in the power sector is based on a number of interrelated factors with political rather than financial pressures carrying greater weight.

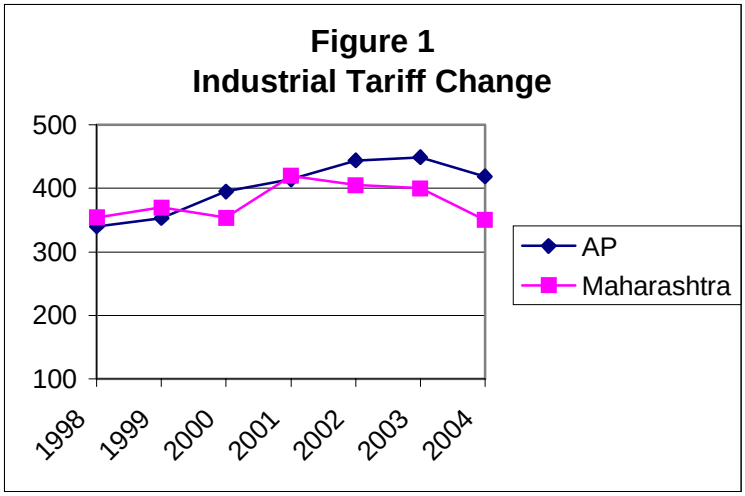
Furthermore, even if licensees and State Government purposefully undertake reforms and the performance starts to improve dramatically, it will take some time to reach a tariff and efficiency level where the revenue loss from open access disappears. During the transition period, the revenue losses for the licensees are likely to be very large.

While setting the level of the surcharge, SERCs must coordinate the reduction in the surcharge with realistic targets for improvements in LT efficiency and increases in LT tariffs. This will ensure that there are no large unexpected revenue shocks for the licensees or tariff shocks for small consumers.

HT Tariffs

While considering whether to switch to a competitive supplier, an HT consumer will compare: (1) the current and expected level of the licensee's HT tariff; and (2) the cost of supply from a competitive supplier which would include the surcharge. Thus the expected trajectory of the HT tariff and the surcharge play an important role in the decision making process of consumers thinking of moving to a competitive supplier. Talking about the trajectory of the surcharge alone is not sufficient.

The trajectory of the HT tariff has been different in different states. Fig. 1 shows the trend in HT tariffs in AP and Maharashtra in the last few years. In both states the industrial tariffs have been declining but at a substantially different pace. While deciding to switch to a competing supplier, HT consumers need certainty about the future levels of the HT tariffs. Declining HT tariffs will not encourage HT consumers to take advantage of open access and seek out alternative suppliers. We recognize that there is a need to rationalize tariffs and reduce cross-subsidies through reductions in the HT tariffs. However, the decrease in HT tariffs must be coordinated with the introduction of open access and increases in LT tariffs and efficiency[10]. One option is the recommendation in the draft tariff policy developed by MoP which does talk about maintaining the tariff of subsidizing categories constant in nominal terms. This will facilitate a smooth transition.



Conclusions and Recommendations

As our analyses show, there are concerns about the methods proposed so far to calculate the surcharge for open access. Most of them understate the cross-subsidy revenues and only partially compensate the licensees for the loss of these revenues. The application of methods based on marginal costs need to recognize that there is no single generating unit that is on the margin at all time. In addition, the use of MUC must match both in load-shape and size, the load decrement for calculating marginal costs and the size of the load block expected to opt for open access.

There are two reasons for revenue loss when HT consumers opt to get their supply from a competing supplier: (1) as already discussed, the loss of cross-subsidy revenues that were being provided by the exiting consumers to fund the subsidized supply to the majority of LT consumers; and (2) change in the consumer mix because the power that is freed-up will now be used to supply low paying consumers. The first reason is due to the

[10] The EAct says that where open access has been permitted for a category of consumers, the SERC shall determine only the wheeling charges and surcharge thereon, if any, for that category of consumers. It will not be practical to allow a licensee to charge unregulated rates for those consumers who are still with the licensee but for whom open access has been permitted. Therefore, we have assumed that tariffs will continue to be regulated for those consumers who are supplied by the licensee even though their consumer category has been permitted open access.

reduction of cross-subsidizing consumers, and the second reflects the addition of more cross-subsidized consumers.

Our calculations show that the magnitude of the revenue losses is large. In the case of Maharashtra under current conditions, the revenue loss is expected to be Rs. 1.51 per kWh of HT load that leaves the system. Furthermore, the maximum surcharge that can be imposed and still make open access economically viable is inadequate to compensate the utilities. In the case of Maharahstra, we have shown that the maximum surcharge will cover only about 55 percent of the revenue loss, assuming no shift to captive generation.

Thus, under current conditions, there is an inherent conflict between making open access attractive and protecting the financial health of the licensees. There is no easy way out of this conflict. However, the conflict can be reduced somewhat by broadening the focus to include factors other than the surcharge that affect the revenue loss during the transition to open access. As we have shown in this paper, in order to facilitate the success of open access, we need to consider the joint effect of three items: (1) trajectory of the level of the surcharge; (2) LT Tariffs and losses; and (3) trajectory of HT tariffs.

In making the decisions on these three variables, the State Commission should use an open process to solicit the views of all the stakeholders. This will result in greater transparency and consequently all possible solutions can be discussed. Such a process will build stronger support for any difficult decisions that will have to be made. Most important, focusing on all three variables and using an open process will reduce the chances of unanticipated revenue or tariff shocks, which in turn, will reduce the chances of a political backlash against the introduction of competition and open access in the sector.

From the numbers given above, it is also apparent that introducing open access immediately will result in very large revenue losses. Even if an ambitious program is undertaken to increase LT tariffs and efficiency, the required improvements will take some time to materialize. Therefore, it will take some time before open access becomes viable without significant damage to the utilities' health. In case, it is desired to make open access economically feasible immediately without damaging the utilties' financial health, then the Government will have to provide additional support to cover the revenue loss during the transition period. Otherwise, in order to minimize losses, the utilities may try to avoid increasing supply to the low paying consumers and instead supply the freed-up power to other states or industries at a rate lower than the HT tariff. Depending on the level of the surcharge and associated revenue loss, the utilities may even increase load shedding to mitigate losses.

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