Uttar Pradesh Electricity Regulatory Commission

POWER DIARY

December 1999

Inaugural Issue

INSIDE THIS ISSUE:

MACROWATCH

- 6.9% industrial growth in April-October 1999 y-y.
- Infrastructure leads industrial revival.
- 2.6% inflation (WPI) during the week ending December 4, 1999.
- Cement production up by 17.3% in Apr.-Oct. 1999 y-y.
- Electricity Generation up by 8.1% in Apr.-Oct. 1999 y-y.
- Interest rates have softened during October 1999 y-y.

WELCOME ABOARD!

Even after more than fifty years of independence, power shortages are a frequent occurrence in India. Thus, the primary conundrum faced by India's power sector has been how to tackle acute power shortages. When the issue attracted ample attention in the early nineties, governments reacted by focusing on generation and invited IPPs to enter the sector, but discouragingly, only five IPPs have attained financial closure over the last seven years.

IPPs' reluctance to enter generation notwithstanding, India's experience has been quite good in power generation. The real problem is not generation, but distribution which is epitomized by high T&D losses. Thus, effective means of checking such losses will go a long way in turning the SEBs around. Also, with some guarantees in place, the viability of private generation will be greatly enhanced. The task of initiating distribution reforms is cut out for Indian regulators including UPERC. Immediate thrust should be on reducing non-technical losses. This can be achieved in a relatively short period of time and with relatively little resources. Non-technical losses can be reduced by better monitoring employees and consumers, improving metering, checking meter tampering, and improving billing and collection. All of these will create a more enabling environment for private players in the sector.

Needless to say, an equally important task is to improve information on electricity usage and demand, analyze them, and disseminate information in real-time to consumers and investors. Also, to the extent that macroeconomic developments directly and indirectly influence the fate of infrastructure, it is imperative that we not only track news on infrastructure—in particular, power sector developments, but also continuously monitor macroeconomic developments. Thus, the main objective of this diary is to keep the reader informed on both infrastructure and macroeconomic developments. This also sets the stage for reporting findings of research that UPERC is currently undertaking and will pursue in the future. For example, in this issue we have reported a summary of the recently prepared issues-paper (Discussion Paper No. 1) by the Commission.

Ultimately, well-informed consumers, investors, as well as regulators will expedite the establishment of a tariff regime that reasonably captures market realities and emits right signals. POWER DIARY is a modest endeavor in this direction.

POWER DIARY will strive to not only assimilate relevant information and report it here, but also analyze them in every issue. Occasionally, an issue will focus on a particular area. For example, we could devote a forthcoming issue almost entirely to matters relating to T&D losses. Also, as the present forum is intended to be interactive and open, comments and suggestions are very welcome; contacts are given in the last page.

J.L. Bajaj

UPSEB AT A GLANCE

With the exception of Greater NOIDA, Uttar Pradesh State Electricity Board (UPSEB) is the sole agency for generation, transmission, and distribution in Uttar Pradesh. UPSEB's installed capacity is 6,500 MW with net annual generation of about 22 billion units of power. The board imported 14.3 billion units of power. The average plant load factor of UPSEB's own thermal plants, which account for 76 percent of UPSEB's installed capacity, was slightly over 49 percent during 1998-99. This is considerably lower than the All-India average of 60.3 percent. Transmission & Distribution losses are estimated to exceed 40 percent.

MACROVIEW

As noted by the India Development Report 1999-2000—published by Oxford Press, the modest economic growth recorded in 1998-99 can be attributed largely to the turnaround in agriculture. Industrial performance was hardly anything to write about. The previous fiscal year witnessed industrial growth of only 3.5 percent. The primary reasons for the lackluster industrial performance in 1998-99 were poor exports, dwindling primary investment and depressed consumer demand for manufactured goods. Intense competition in the manufacturing sector—triggered by the opening of the sector to foreign players, economic slowdown worldwide, an unfavorable real effective exchange rate, and high inflation on account of excessive price rise of primary articles hindered the prospect for an early revival of Indian industry.

Also, much of the optimism raised by the record agricultural performance was perhaps misplaced. The impressive year-to-year growth in agriculture in 1998-99 was over a low base. Notably, in 1997-98, agricultural production fell by over 3 percent year-to-year. Thus, much of the gains in production in 1998-99 was an exercise in catching up.

To sum up, the economy treaded wearily during 1998-99. The question is whether prospects of an industrial revival have brightened in the current fiscal year. At the outset, the picture is encouraging. Industrial growth has improved markedly, inflation has continued to stay low, foreign exchange reserves are comfortably placed, exports have improved sharply, interest rates have come down, and the political milieu is relatively stable. Much of this turnaround is attributable to the buoyancy observed in infrastructure. Six core sectors including power, steel and cement recorded a strong 8.3 percent growth during Apr.-Oct. 1999 y-y, up from 2.6 percent last year. Cements production increased in Apr.-Oct., 1999 by 17.3 percent y-y. Electricity generation accelerated, i.e. from 6.3 percent in Apr.-Oct. 1997-98 to 8.1 percent in 1998-99 in the same period. The sops to the infrastructure sector may finally be paying dividends.

Amidst so much euphoria, however, caution is advised. First, some of the indicators noted above do not necessarily account for a positive outlook. For example, the present regime of low inflation is almost entirely an artifact of the high base last year, as 1997-98 was a bad year for agriculture. Notably, if inflation had continued during the last two fiscal years in the same vein as recorded on average during the last decade, WPI-Primary articles — the prime driver of inflation lately — would have currently touched a level not very different from the actual level observed now. Also., consumer non-durables have only posted modest growth during April-October 1999. Second, the high growth witnessed in October 1999 are to an extent a result of the near-zero growth figures registered during the same month.

Third, and more importantly, the fiscal situation continues to be grim, especially in the states. Unless reforms pick up and private players enter core sectors generously, the economy may succumb to fiscal compulsions and could lose steam. Some indicators already stare at us ominously. Non-oil imports, which by some estimates determine the fate of at least 40 percent of industrial output, have tumbled by almost 2 percent the first half of the current year y-y. Disconcertingly, imports of machinery have withered 18 percent during the same period y-y. Also, primary capital markets continue to disappoint. These developments suggest that Indian industry is still coping with the problem of excess capacity. To sum up, while numbers for October 1999 are encouraging, much of the euphoria may be misplaced.

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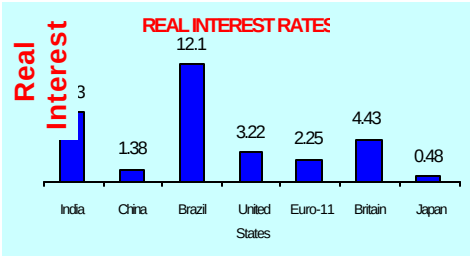
IN THE INTEREST OF INVESTMENT

A cross-country comparison of real interest rates is seldom a straightforward exercise in view of the lack of comparable data at any point in time; different countries report data with different lags. Recognizing that data on consumer prices for India, Japan and Euro are from September 1999, and for the USA, the UK, Brazil, and China are from October 1999, short-term interest rates are adjusted for inflation in consumer prices to calculate real interest rates prevailing in different countries. The short term interest rates are taken from "The Economist," and are dated 17th November, 1999. The findings are not expected to change much qualitatively if more time-comparable data or long-term interest rate data are used. The present exercise reveals that India's real interest rate (ROI) is generally higher than many of the world's important economies. Glaringly, India's ROI is higher than China by almost 6 percentage points. Such high interest rates discourage normal businesses, let alone infrastructure projects. In view of this, it is not surprising that many entrants into infrastructure projects press for substantial guarantees before they are prompted to dive into the Indian power sector. Albeit, there are fiscal compulsions that force states to fight tooth and nail any attempt to cut interest rates on small savings, but further delay in rationalizing interest rates will prove detrimental in the long-run. Infrastructure projects will find few takers and sponsors. Economic growth will consequently be hampered.



ISSUES IN ELECTRICITY TARIFF SETTING

1. INTRODUCTION

Reasons cited for power shortages and peak deficits in UP are the poor technical and financial performance of the Board, low average PLF, high T&D losses, poor bill collection and distorted tariffs. These ailments ultimately stem from the failure of the tariff structure to signal electricity-market realities. Below we examine the current state of UP's power sector. Section 3 covers power sector reforms and UPERC's agenda, 4 discusses electricity pricing, 5 raises other pertinent issues, and 6 concludes.

2. PRESENT POWER SECTOR SCENARIO IN UP

2.1 Present Tariff Setting Principles and Methodologies: The latest UPSEB tariff revision was made in Jan 1999. Following principles are used to set power tariff:

- Mix of historic cost to arrive at final cost at consumer's end.
- Development of norms of Plant Load Factor, fuel consumption and auxiliary consumption.
- Cost of purchase of power availed from other sources like NTPC, NHPC etc.
- Accounting of system losses in availability of power at consumer's end.
- To assess cost at consumers' end, O&M and establishment expenses and interest rates are determined.

2.2 Financial Performance of UPSEB: UPSEB is facing acute shortages of funds on revenue and capital accounts. Hitherto, electricity tariff has been established by ignoring underlying business considerations such as cost of supply, proper metering, billing and collection provisions. Tariffs charged are much below the average cost of supply.

- UPSEB's tariffs have failed to meet the cost of supply. Barring industry, commerce and railways, all categories have rates lower than the cost of supply.
- Categories whose share in connected consumer load has risen during nineties are domestic and commercial sectors. Share of agriculture – a subsidized sector – has actually fallen during this period. Industry– largest revenue source for UPSEB and a subsidising sector– has recorded a CAGR of only 1 percent during this period in load. Although, the load in the commercial sector – a subsidising sector – has grown by 9.6 percent CAGR, the sector's share in total connected load has increased by only 2 percentage points. These trends, disconcertingly, indicate that the revenue gap is rising.
- Unlike the perception that agriculture is the bane of UPSEB's finances, the major contributor to the waning finance of UPSEB is the domestic sector.
- The current regime has led to serious mismatch between trends in power consumption and cost recovery.
- Dispute over method/manner of subsidy calculation due to non-availability of unmetered consumption data has led to non-payment of dues by UP Govt.
- High tariff for industry has prompted a shift toward captive generation.
- Present tariffs deter quality step-up and demand management of power.
- T&D losses raise the cost of energy sale to consumers quite significantly .

3. POWER SECTOR REFORMS

Massive investments are required in T&D to increase supply of power and rehabilitate existing T&D systems. The Government has decided to reform its power sector to provide cost efficient and good quality electricity to all consumers and make the sector commercially viable so as to encourage private investment. UPERC is empowered to address fundamental issues in tariff setting through transparent formulation and development of tariff policies and procedures.

3.1 Agenda before the Commission

- Enable provision of cost efficient and good quality electricity to all consumers.
- Make the energy sector commercially viable by improving efficiency.
- Encourage Demand Side Management and efficient utilization of resources.

4. ELECTRICITY PRICING: METHODOLOGIES

Tariff structure depends crucially on the method of electricity-pricing chosen.

4.1 Rate of Return Regulation: ROR regulation involves pricing based on historic costs and needs data on:

- Capital costs (gross booked investment, current/accumulated depreciation)
- Operating and maintenance expenses
- Allowed Rate of Return, including interest on borrowed funds
- The Licensee's current tariff structure for different consumer categories:

Required Revenue = Expenses + (RR x RB). Expenses include Operation & Maintenance Expenses, taxes, Wages & depreciation. *RR* is the allowed ROR on investment and *RB* is Rate Base. Finally, *Rate of Electricity = Revenue Requirement / Estimated KWh Sale for ensuing year.*

4.1.1 Advantages of ROR Regulation

1. Prices in a test year are fixed till the next tariff-determining period.
2. Lower risk of licensees encourages investment needed in plant and equipment.
3. Non-economic goals like cross subsidy to a group can be achieved easily.
4. Existing practices closer to the ROR method.

4.1.2 Disadvantages of ROR Regulation

1. ROR regulation discourages cutting cost and performing efficiently.
2. The technology may over-utilize capital relative to other factors.
3. Historic-values based rate-base may lead to insufficient revenues for future investment.
4. Regulatory lags sometimes go against licensees or consumers.

4.2 Performance-Based Regulation (PBR): They include price-cap and revenue-cap regulations and their hybrids. As pure ROR regulation allows a fixed ROR on capital, it fuels over-capitalisation by utilities. Under price-cap or revenue-cap regulation, prices and revenues may be adjusted around performance benchmarks. Under PBR, rates are established on a benchmark cost of service and performance standards. It allows sharing of cost-savings between consumers and stakeholders on an ongoing basis.

4.2.1 Price Cap: Under price cap regulation, prices are fixed for longer period of time and are meant to provide incentives to reduce costs. Utilities are allowed to lower their prices to some consumers as long as prices stay within the cap. Initial rates are set for each class based on appropriate allocation of costs. The price cap is then allowed to increase yearly to allow for inflation. The entire rise in input price would not be compensated if productivity gains were also factored in. As long as prices are reasonably set to account for cost changes in the future, companies tend to streamline costs., thus, promoting efficiency. However, companies being exposed to greater risks of demand fluctuations may raise cost of capital.

4.2.2 Revenue Cap: Revenue caps are based on same principles as price caps. Revenue cap regulation (RCR) is better for companies that face high fixed costs: Price-cap regulation entails greater exposure to risks from demand fluctuations. Further, revenue caps are often easier to determine and monitor than price caps. Also, they are consid-

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ered conservation friendly and disentangle revenue from profits. Shortcomings are that estimates of more parameters are neededfor a proper working, and prices could be distorted under RCR.

4.3 Other Considerations:

- Price & revenue caps can be applied to individual classes.
- Productivity factors impact cost-recovery by limiting increase in prices.
- Targeted incentives can be combined with a price cap.
- PBR pegs tariffs to performance standards and regularly adjusts them.

4.3.1 Hybrid Approach: For a good PBR system, exhaustive, reliable and verifiable data is essential. Given the limitations of the two basic forms of PBR, a third option may be to use a hybrid till data b ecome available to affect a pure PBR.

4.3.2 A Pragmatic Approach: ROR method may be a good starting point for UP as India has fifty years experience in it. Yet, ROR method is more intrusive and data intensive than the UK type system of RPI minus X methodology. As both RPI - X and ROR methods require information on revenue requirement of efficient utilities, the approaches are similar. Of course, the RPI - X approach would benefit from the fifty years tradition of ROR approach in India. Also, the RPI - X approach uses whatever data is available and involves instinctive decision-making on consensual agreement of parties involved. ROR method, in contrast, requires more data and preciseness. The RPI - X approach leaves base prices unchanged for three to five years except for expected inflation which pushes prices up according to an agreed formula and the X factor which pushes prices down to account for expected improvement in efficiency. Since average cost of supply is greater than average revenue in UP, another adjustment, i.e. factor M, for efficient costs to be gradually recovered from revenue may be allowed. The formula RPI - X + M could operate till tariffs become entirely cost-based.

5. OTHER CONCERNS

5.1 Rate of Return on Rate Base: Success of ROR depends on rightly assessing what comprises "prudent" capital formation, i.e. rate base, and establishing a ROR that allows recovery of cost of capital used in financing the rate base.

5.2 Determining Overall Revenue Requirement: Cost of service includes all of a utility's operating expenses, plus a reasonable return on its investment . The total revenue a utility is authorized to collect is called the total revenue requirement (TRR) or the total cost of service. To determine this, it is essential to measure the total cost of providing the service by using accounting, financial and operating data. Three approaches to determine TRR; are based on actual historical accounting cost, future accounting cost and marginal cost respectively.

5.3 Determination of Asset's Value in Rate Base: The rate base represents the value of assets used for providing electricity service to the consumers. Thus, asset valuation is an important part of the tariff-setting process. Methods for measuring assets' value are Original cost less depreciation, Replacement cost less depreciation, Asset values decided by the Government on assets transfer from UPSEB (existing licensee) for G/T/D to a new Corporation less depreciation, Present market value of assets as determined by an independent certified valuer, and certified values produced by a New Corporation for privatisation.

5.4 Allowing Adjustment for Fuel & Power Purchase Cost: Fuel & Purchase power adjustment clause requires that an estimated base amount of Fuel & purchase power cost be included in calculating the Licensee's tariff and any actual costs above or below that base amount, either be collected from consumers or refunded to them by means of a per kilowatt-hour surcharge or rebate. Sometimes, sharing of cost changes is advocated to provide incentive to utilities to control fuel costs by increasing efficiency.

5.5 Subsidies and Cross- Subsidies in Existing Tariff: The current electricity tariffs in UP contain a large degree of cross subsidy, with some consumers like Industries/Commercial/Railways paying well above the supply cost as compared to other consumers like Agriculture, Domestic & Public utilities. The long-term tariff policy will entail:

- Determining the cross subsidies and short fall in revenue thereby caused.
- Developing a plan to reduce cross subsidies in electricity tariff

As costs of electricity from new generating plants are expected to be high, and costs being based on voltage of supply may warrant sharp hike in rates to certain consumers, pruning cross subsidies fully at one go will be difficult.

5.6 Allocation of Revenue Requirement to Different Classes of Consumers in Tariff Design: Broadly, all functional tariffs are based on embedded cost or marginal cost.

5.6.1 Embedded cost based Tariff is a more stable assessment of revenue requirement over time, but ignores economic costs imposed by consumers on licensees.

5.6.2 Marginal cost based tariff: Marginal cost (MC) based pricing is an alternative to the traditional cost based pricing. MC is defined as the incremental cost of providing an additional unit of power to the consumer. SRMC (short run MC) is the incremental cost of fuel and operations in existing facilities. The LRMC (long run MC) is the future cost of power, which takes account of additional investments, resultant capacities, and projected variable costs. MC-based pricing is forward-looking and provides efficient price signals to consumers, but does not ensure required cost recovery, as it may be difficult to reconcile with actual costs incurred. Thus, consumer class revenue needs can be assessed using an embedded approach, while tariff design may be influenced by MC approach, like determination of time-of-day tariff, demand charges etc.

5.7 T&D Losses & Strengthening of Metering: In UP a considerable part of T&D losses are non-technical and are due to power theft, improper estimation of non-metered consumption, tampered meters, problems of collection and corruption. Technical losses too have risen beyond the optimal level due to poor technical conditions and maintenance of transmission and distribution facilities. Non-technical losses can be reduced through proper control of employees and consumers to eliminate theft and check meter tampering and improve estimation, billing and collection procedures by using relatively little resource and in a short period of time. Reduction of technical losses is a long term and expensive process and can be undertaken only gradually. Initial investment projects should target areas where a relatively small amount of capital has a relatively major impact on technical losses. Metering, which is the core area of electricity industry, should be focused and needs attention.

5.8 Wheeling Charges: Fixation of wheeling charges should also be reviewed in case power has to be wheeled by UPSEB for bulk consumers through it's transmission network. Wheeling charges should cover all transmission costs and the incremental losses plus a return on the investments. Sometimes, MC pricing can be used to eliminate overloading on the system.

6. CONCLUDING REMARKS

This paper has raised some issues with regard to the role of UPERC in the present environment characterising the electricity industry in Uttar Pradesh. Given that the degree of uncertainty associated with future developments in the power sector is quite high, tariff setting will have to be an evolving process. The Commission will have to gear itself to accommodate such changes that impact the power sector in coming days. Rationalisation of the tariff structure crucially relies on proper assimilation of information, and as and when new information comes in, tariff structure will have to adapt. Given the present scenario, the task before the Commission is to recognise the importance of uncertainty and formulate regulations that optimise on the currently available information and strive for their improvement.

Uttar Pradesh Electricity Regulatory Commission

Contact Dr. Pradip Chattopadhyay for suggestions and comments.
522-301418, pradipkc@uperc.org

UPERC
2nd Floor, Mandi Bhawan
Gomti Nagar, Lucknow 226010

www.uperc.org

Edited by Dr. A. Wadhawan, Secretary and Dr. P. Chattopadhyay, Economist, UPERC.