



Round Table

Power Sector Reforms in India: Issues Relating to Agriculture

Agricultural Sector: Pricing and Subsidies – A Dialogue

T L Sankar

Q: Why do utilities charge different rates to different consumers?

A: Firstly, the cost-to-serve for each category of consumer varies depending on several factors. There are technical reasons such as power factor, voltage of supply and so on which are set out in the Electricity Supply Act, 1948. There are also commercial reasons. In some situations, the total quantity of power available could not be sold, unless some categories of consumers are charged a lower tariff. There are also considerations of equity or the need to meet the merit wants of the poorer population, which prompted differential pricing.

Q: In effect, there is a base level called appropriate tariff and if the actual rate charged is kept lower, the difference from the base level can be called a subsidy.

A: Correct. Of all the Electricity Regulatory Commis-

sions (ERCs) that have given tariff orders only two, namely Andhra Pradesh and Haryana, have adopted the concept of cost-to-serve whereas other ERCs, on the basis of same level data availability, have stated categorically that the data was inadequate to estimate the cost-to-serve. So if one talks with reference to long-run marginal cost as base level cost then every consumer in most states would be considered as getting a subsidy. But if the average cost is taken as the base level, tariffs for agriculture and small households are below the base level and they would be called subsidised categories. Whereas if cost-to-serve is taken into consideration, agriculture may not be getting any subsidy at all in view of the supply being restricted to specific hours, including mostly non-peak hours of the day. If all factors are taken into costing the actual cost-to-serve, agricultural demand may be lower than the average cost!

Let us begin with the differential pricing based on technical characteristics of the supply. The Electricity Supply Act 1948, suggests that tariff to the consumer should be determined with reference to the voltage of power supply, the power factor and other technical details. Supplies which are taken at high voltage such

as 133 kV or 33 kV are subject to limited number of transformations and lower transmission loss while supplies which are to be effected at LT i.e., low tension levels require to be stepped down and distributed through a system with further technical and non-technical losses.

Q: But some say that supplies should be charged differently for different hours of the day which is called Time of Day (TOD) tariff.

A: Yes. In any power system, especially in India, during the late night and early hours of the day, say from 10 pm to 5 am, the power supply is in excess of demand, while during the morning hours supply is inadequate to meet the demand. During certain hours like 6 pm to 9 pm the demand is the highest due to the lighting needs of households and commercial establishments and these are called the peak hours.

Q: Supply at night time, then, should be priced very low. Agriculture gets supplies mostly at night.

A: Yes. There is another way of looking at it. Electricity charges have two parts – capacity charge and energy charge. Capacity charge is the fixed costs which are related to the costs of setting up and maintaining the power plants, transmission and distribution lines. This capacity charge should be borne by those who use the system during the peak hours as their demand cannot be met without the requisite capacity. But during the off-peak hours only the variable costs or the energy costs may be collected, as the capacity charge has already been collected from peak hour users.

Q: So for agricultural consumers, cost-to-serve would be much lower than the average cost of supply.

A: There is another reason to charge agriculture less. Agriculture does not get supply for all the 24 hours of the day but only at times fixed according to the convenience of the utility. Such supplies, called ‘interruptible supplies’, should be charged about 25% to 30% lower than the rates for guaranteed supply for 24 hours. I have calculated that in most states if you take away the fixed costs or the capacity charge and give a further 20% reduction we end up with the agriculture tariff at about Re1/- or less.

However, some ERCs like Andhra Pradesh have esti-

mated it at just below the average cost. Such ERCs have a duty and responsibility to explain the method used and details of consumption pattern assumed for different categories of consumers to all consumers. The data and methodology on the basis of which any agency arrives at the cost-to-serve in respect of different users should be put to open debate.

But I feel that this controversy regarding cost-to-serve and cross-subsidy will keep on arising at different points of time and will be interpreted by different people and different judicial courts differently.

The Calcutta High Court and Supreme Court interventions introduced a situation whereby cross-subsidy should be eliminated totally. Now the power entities

would take the stand that the cost-to-serve if properly interpreted would lead to differentiations in the prices between consumers. There are no universally accepted principles or procedures on which cost-to-serve could be calculated. I therefore feel that we should find a lasting solution to tariff determination which would serve fully our ideas of efficiency as well as equity.

Q: Is such a solution possible at all ?

A: Yes. Especially in the context of our unbundling utilities into generating companies, transmission companies and distribution companies. What has been done is only the first step. The full advantages of competition, which alone can bring about efficiency in a sustainable manner can be obtained if we unbundle the generat-

ing companies into smaller generating units competing with each other to market the power produced by them.

Let us visualise what happens when there is no single utility to service the needs of all consumers in a specified area. If the power market becomes a free market, where each producer can sell to any consumer at a price mutually negotiated, and the entities which operate the transmission and distribution become only transport agencies to take power from places where it is produced to points where it is consumed, there should be no need to aggregate all the power produced by state generating companies. The consumer will have to pay to the producer of power the cost of production and to the distribution companies the charges for transport which will include the cost of

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power which is lost in the process of transmission and distribution. That is the ultimate system we want to achieve but to begin with, this would be possible only for consumers who use only the transmission system and take power at high voltage. (Distribution wires will not be open for competition for some more time.)

This is the power scenario visualised in the Electricity Bill (now Act). The Bill expressly prohibits the transmission company from dealing with power purchase or sale. In such a system neither economic theory nor efficiency imperatives suggest that the generating costs of all generating plants should be pooled and the sale should be at the average cost. The correct measure to improve efficiency is to enable each generating plant to sell power at a different price with reference to its costs of production.

For example, the National Thermal Power Corporation (NTPC), the largest single power producer in India, has old power stations, like Singrauli, where the cost of generation as per our normal commercial principles is very low. NTPC also has recently commissioned plants where the costs of generation are as high as Rs.2.3 per kWh. But each plant has separately contracted to supply its production to different electricity boards. In fact many SEBs get power from NTPC stations at the same location at different rates.

Q: Will not such a system create disincentives to the producer?

A: You must have been listening to a clever 'free market economist'. In the power industry, each power plant is set up after a power purchase agreement is settled with the persons/agencies who will purchase that power. The buyer agrees to a price which covers all the costs of production and usually it varies each year with the changes in capital cost with gradual depreciation. Since the consumers have paid for the total costs, as and when they were incurred, they cannot be denied the benefit of having a lower price from the generation in the old plants where depreciation brings down the value and interest on loans.

Based on the generation cost, if we group together power plants into 'low cost', 'medium cost' and 'high cost' supply groups, each of these groups can negotiate and sell power to a selected group of consumers. Better still, the power generation plants can be dis-

gregated so that each project becomes a profit centre and can sell directly to the consumers.

Q: Will this not create a lot of problems? Technically, if you segment the power system into small groups of power stations, the operation of the power system cannot be done at the optimal level by the systems operator.

A: The separation of the generating system and linking each sub-system to a group of consumers is only for the purposes of costs. The system operation will continue on the existing lines using the best rules for optimal system operation and grid regulation. Even now it is being done because power from different power stations which have different costs are fed into the system and the consumers are charged differently. Different consumers can pay for power on the basis of the source of supply. This is done in all 'wheeling agreements'. A system operator will have no new problems in operating what is proposed here.

Based on the generation cost, if we group together power plants into 'low cost', 'medium cost' and 'high cost' supply groups, each of these groups can negotiate and sell power to a selected group of consumers.

Another way of putting the proposal is to use the terminology of the Maharashtra Energy Review Committee, July 2001¹. They have suggested that some of the existing contracts for power supply to the SEB including from state owned Genco could be 'assigned' to certain discoms. We are proposing the same thing.

Q: What is the purpose of such a new proposal which does not change any technical features of the power system ?

A: It does change drastically the commercial aspects of power sector management with government managing its power resources in a manner which would meet some public policy objectives. The cheapest power available with the government is 'assigned' permanently to the category of consumers considered deserving of a cheap supply of power on grounds of equity or to promote socio-economic development.

Q: Why cannot the current system, where all costs are billed together and ultimately the deserving categories are supplied power at lower rates by cross-subsidisation, be continued by declaring that the low rates would continue on a long-term basis ?

A: What we now call now as cross-subsidisation is an illusion. It is the result of an accounting system that

we have adopted when the utility was specifically defined as a single, sole monopoly supplier of all power needs in a designated area and had a responsibility to supply all demand. Pooling of only some parts of the generating station has no logic when unbundling is effected, and the 'single buyer' model is to be abandoned.

Q: But will not the solution you propose, deny cheaper sources of power to the other consumers ?

A: Not in actual practice. No government or ERC is actually charging the agricultural consumers a tariff anywhere close to what the government advisers compute as the cost to serve the farmers. As of now, the non-agricultural consumers pay much more than what they might have to pay under our new proposal. The present tariff policies only threaten the farmers that anytime their tariff could be increased from the current tariffs, which are very low !

No government today denies the responsibility of a welfare state to provide minimum needs at affordable prices to poor households. But regarding poor farmers, have you ever asked a farmer what is the tariff he would like to pay?

Q: Yes, several times, and the answer is the same always. He would like to pay that amount which the canal irrigation farmers pay for supply of water of the same quantity. Irrespective of whether farmers get water from canal-irrigation or well-irrigation, they face the same market and other economic conditions. In fact, the pump irrigation farmer usually operates in more hostile soil conditions and has taken a high risk in digging a well and investing in the pumpset etc. He feels that a just and fair government should provide water or electricity at a reasonably low rate so that both kinds of farmers get equal benefits or costs.

Further, no farmer expects the power companies to subsidise power but would like the government to run the power companies efficiently and provide the subsidy to the required extent, and operate it just like the fertiliser subsidy or kerosene subsidy. But the government says it does not have the money to take up this subsidy. Also, eminent economists advise that subsidy is bad and should be done away with, especially in the context of globalisation. Are these views wrong?

A: Both the contentions are wrong. If the need for a subsidy is real, any government worth the name should find the resources. It is the duty and responsibility of the government. All governments in the world give large subsidies to agriculture. The French and Japanese subsidies to agriculture are well known. Recently a World Bank study has brought out in detail the large extent of subsidy to the US farmer.

Further, if the government accepts our suggestion to 'assign' the low cost power generating stations to agricultural consumers and poor households, it will not have to raise these additional resources to provide electricity services at low and affordable prices to farmers.

There are several ways of doing this. Some very detailed proposals for Andhra Pradesh and Karnataka have been published². There is a very lucid exposition on the new proposals by Dr A K N Reddy³.

Let us take the Karnataka power sector, for example. Of the total 'sale' to all consumers in 2002-03 of 21997 MU, the subsidised sales is for Kutir Jothi (KJ) and Bhagya Jothi (BJ) households who have only one bulb, and to agriculture. The number of KJ/BJ households was 2.06 million and they consume 446 MU. The number of agricultural pumpsets was 1.22 million and they consumed 8270 units (estimates are as made by Karnataka Electricity Regulatory Commission).

In subsidising power to agricultural pumpsets, the correct procedure would be to separate out small and marginal farmers and supply them with least expensive power. But the data is

not available to do so. Therefore, of the average consumption of each pumpset assessed as 6779 units per year, we may supply only 4000 units per pumpset which might be adequate for the small and marginal and even middle class farmers. The least cost power supply to agriculture would need 4880 MU and supply to KJ/BJ households another 446 MU, making a total of 5326 MU. There would be a further consumption of 3390 MU (which could be called Agriculture II) by the agricultural sector which could be charged a tariff equal to the cost to serve, calculated along with all other categories of consumers.

Q: How does one compute the appropriate tariff for this special category who would be charged a special rate?

In subsidising power to agricultural pumpsets, the correct procedure would be to separate out small and marginal farmers and supply them with least expensive power. But the data is not available to do so.

A: The innovativeness of our proposal lies only in the fact that we propose to segment the power supply system into least cost supply system and the normal supply system. To reach the KJ/BJ households and the agricultural pumpsets power has to pass through the Karnataka Power Transmission Corporation (KPTCL)'s transmission and distribution system and the loss of 28% in this should also be provided along with the final consumption of 5326 MU. We also intend to propose some long-term tariff for the special category. We assume the loss due to transmission and distribution to be 20% as it is planned to be achieved in three to four years.

So we have to segment from the supply system of generating plants, those which have the least generating cost per kWh upto 6658 MU. In Karnataka, we are able to identify hydel stations of old vintage which can provide power to the extent of 6658 MU or more at Rs 0.466 /kWh. If we add the operating cost of the power entity which is Rs 0.606 /kWh and allow for the 20% loss, the delivered cost to the farmer would be Rs1.34/kWh.

Q: This is about the same as the cost-to-serve, according to the principles discussed earlier.

A: Correct. Rich farmers or all those who use above 4000 units per pumpset might have to pay the cost-to-serve which might be a little over Re 1/- per kWh. Upto 4000 units, let us assume the government feels that on grounds of equity – vis-à-vis, the canal farmer and any other consideration, should be only Rs 0.50 per unit. The government would then have to bear the subsidy to the extent of 83 paise per unit on 5326 units. This would amount to Rs.442 crores (4.42 bn).

Q: Do you think these proposals would make farmers accept 'metering' of pumpsets?

A: Yes. If farmers are not only assured that the tariff would not be increased but maintained at say Rs 0.50 /kWh for 10 years, and shown how the procedure of assigning them the low cost generating plants 'empowers' them, they would agree. Farmers would further be enthused to maintain the meter in working condition, if the tariff instead of a flat tariff for 4000 units, is arranged as a progressive tariff starting at 25 paise and ending at 60 paise per unit. Farmers, especially small farmers would attempt some conservation efforts

too.

Sidharth Sinha

Tariff and Subsidy Regimes for Power Supply to Agriculture

The two fundamental issues in supply of power to agriculture are:

- metered tariff vs flat rate unmetered tariff
- direct subsidy vs tariff subsidy

The question of flat-rate vs metered tariff should be seen in the context of two part tariffs with a fixed 'access' charge and a per unit charge.

In the single product situation instead of setting price equal to average cost an access/usage tariff can be designed to mimic the first best marginal cost pricing and subsidy scheme. If access demand is fixed and not sensitive to the access price, the usage fee is set at marginal cost and the access fee at whatever level is needed for the firm to break even when it minimises cost. With usage price based at marginal cost, the first best consumption levels are attained. The access fee basically covers the fixed cost. This is also known as the Coase result.

However, if access demand is price sensitive then the firm must be seen as providing two goods — access and usage. The two goods have separate and inter-related demand and there is a marginal cost associated with each good separately. Without a break-even constraint, first best optimality would be attained by setting the access fee equal to the marginal cost of

access and the usage fee equal to the marginal cost of usage. In the presence of a break-even constraint the second best solution would be Ramsey prices. The Ramsey prices would depend upon the assumptions about usage and access elasticities.

- Fixed access, sensitive usage: Since access is fixed (zero elasticity) all the mark-up for break-even would be derived from the access fee. Usage would be priced at marginal cost. This is the Coase result.
- Sensitive access, sensitive usage: Now both access and usage would be priced above

The two fundamental issues in supply of power to agriculture are metered tariff vs flat rate unmetered tariff and direct subsidy vs tariff subsidy. The former should be seen in the context of two part tariffs with a fixed 'access' charge and a per unit charge.

Exhibit 1: Tariff Regimes

	Full cost tariffs (direct subsidy possible)	Tariff subsidy
Metered tariff (metering costs)	A Ideal	B ₁ Quantity entitlements
		B ₂ No entitlements (rationing)
Flat Rate tariff (cost of monitoring pump capacity)	C Difficult to achieve (rationing)	D Status Quo (rationing)

marginal cost. The access fee would be lower and usage fee higher than in the case of the Coase result.

- Sensitive access, fixed usage: The access fee is set at the marginal cost of access and since the elasticity of demand for usage is zero, the usage fee is set sufficiently higher to allow the firm to break-even. This implies that a zero access fee will be second best optimal only if usage demand is fixed and the marginal cost of access is zero — an unlikely situation. Simple gains can, therefore, be expected from moving towards more reliance on access fees.

In this context a flat rate charge would be optimal only if consumers are insensitive to the access charge and the marginal cost of usage is zero.

In the case of power, where marginal cost is quite significant, a flat rate tariff results in an inefficiently high level of consumption. Flat rate tariffs will, therefore, have to be accompanied by rationing. Additionally, with flat rate tariffs subsidies will be inevitable since with the break-even, no subsidy tariff would be so high as to cause a significant number of users to drop out altogether.

In the presence of measurement costs, flat rate tariffs may be optimal if the cost of measurement exceeds the efficiency loss resulting from zero usage charge. However, measurement may be necessary in any case for other purposes, such as energy accounting and measurement of losses.

In the direct subsidy regime while tariffs cover full cost, subsidy is provided through cash transfers, either directly or through coupons, based on certain qualifying characteristics.

In the case of a general subsidy through below-cost

tariffs, consumers with a higher level of consumption would enjoy a higher absolute level of subsidy. Tariff subsidies can be targeted in several ways. The most common and easy to implement is by limiting below cost tariffs and subsidies only to units of consumption below a certain level. This requires only measurement of individual consumption. Tariff subsidies can also be made available on the basis of consumer or end use characteristics. However, this would entail information on the

consumer or the end use, and monitoring to ensure that supply is not transferred to other consumers through a secondary market, or to other uses by the same consumer. Such subsidies can be controlled by providing 'entitlements', i.e., limiting the subsidy to only a specified number of units. This would require measurement of individual consumption

General subsidy through tariffs, without a system of entitlements, will require rationing in order to cap the total amount of subsidy. Rationing will not be required in the case of a tariff subsidy with entitlements and in the case of direct subsidy.

Tariff Regimes

Exhibit 1 explains the tariff and subsidy combinations.

A Ideal: metered consumption with full cost, possibly two-part, tariffs. If necessary government can provide direct subsidies.

B Second best: metered consumption with tariff subsidy, subject to entitlements (B₁). Since aggregate subsidy is capped by entitlement, rationing may not be necessary. In the absence of a system of entitlements (B₂) rationing will be necessary.

C Infeasible: flat rate with no tariff subsidy. This requires rationing and very high flat rates.

D Status Quo: flat rate with tariff subsidy. With no metering, entitlements are not possible, and hence rationing is necessary.

During the transition from D to A, the system is likely to be in B or C.

Alternatives B, C and D require rationing. For energy accounting and measurement of T&D losses, alternatives C and D require measurement of aggregate consumption

Exhibit 2: Power Costs and Subsidies

Pumpset Rating (hp)	Annual Cost (Rs)	Power used (kwh)	Cost/kwh (Rs)	AP Transco cost at Rs.2.57/kwh	Subsidy
3	750	4294.5	0.17	11036.8	10286.8
5	2000	7197.2	0.28	18496.9	16496.9
10	5000	14590.1	0.35	37496.4	32496.4
15	9000	22171.4	0.41	56980.6	47980.6
11.66	4849.32	17060.1	0.28	43844.3	38995.0

since individual consumption is not being measured.

Both rationing and measurement of aggregate consumption will require physical separation of the agriculture supply network. In practice it may be more economical to separate the rural network instead of just the agriculture supply network.

In the long run it will be desirable to separate the rural network both physically and organisationally. This may be necessary to enable faster privatisation of the 'concentrated' urban zones. The rural and agricultural segments may also require alternative organisational structures for efficient functioning.

Rafiq Dossani

Price Regulation and Subsidy Design

There are some interesting approaches around the world that might be worth considering for India. As Prof Sidharth Sinha was saying, in the US, the Rural Electrification Administration and rural co-operatives started in 1936, when licencees for the large estates set up absurdly high charges for rural access. This has now led to some interesting situations, and in Sunrise Valley, Northern California, where rural had become semi urban, a few years ago, Pacific Power was charging eight cents a unit on one side of the street and on the other side, Sunrise Valley Rural Electric Corporation, a cooperative was charging five cents a unit. Some of that was due to cheaper power on account of the differential cost of regulation. The cooperative covered a huge command area with a very small population relying almost entirely on voluntary metering, with which they had not encountered problems. This is one model we could consider.

The Chinese too followed the regime of heavy subsidy up till the mid 80s, just like in India, but after that they decided to freeze the old levels of power consumption, start metering power and charge a commer-

cial rate for the excess above the old consumption level. On average, as new consumption overtook old consumption, that approach has worked out and was also a politically sensible way to raise rates.

When we started looking at India the literature revealed several willingness to pay (WTP) studies. WTP tries to measure by how much prices may be raised without affecting welfare (i.e. there should be no income

effects arising from the item being a large percentage of total costs) and product utilisation (i.e. near inelastic demand in the range of the WTP). It is a valid concept for essential public goods in which quantity used is less than potential supply at the current price. However, in the case of power, the first condition will not apply. If you're charged the true price of power and that comes to more than say 20 – 25% of your income, then it makes no sense to try and raise the power price because that'll lead to a huge decline in welfare and you'll have serious political problems. Further, since power is rationed, users will usually include those with WTP at the current price. Hence, it is likely that measured WTP will be close to the current price.

A survey was conducted by Professor Ranganathan and myself among 449 farmers in the Rayalseema, Telengana and coastal districts of Andhra Pradesh. The survey aimed at analysing the income effect, the nature of subsidies, the inefficiencies arising from quality problems and the usefulness of cooperatives, and suggesting approaches to distribution reform. The farmers had a median landholding of 14.27 acres and a median income of Rs 34,375, with an average pumpset ownership of 2.19 and average usage of for 7.22 hours per day (**Exhibit 2**). The survey was conducted in the year 2000 and many things have changed since then in terms of the pricing structure but the issues are still valid.

The conclusions we reached regarding income effect and subsidies were:

- Income effect is significant. The true cost of power was Rs 43,844 to AP Transco which was significantly more than the median income Rs 34,375. What the farmer now pays is Rs 4849. So if you start charging people the full cost the average farmer goes out of business. Moreover, there are political considerations also here.

The average farmer will not accept paying anywhere near the true cost of power. Hence, WTP measures will not work.

- Subsidies are regressive – richer farmers receive higher subsidies.
- Multiple pumpset ownership may be linked to power pricing structure (lower charge for lower hp pumpset).

There were interesting findings about the continuity of supply and the inefficiencies resulting from interrupted supply.

- Average continuity of supply, i.e., percentage of total hours supplied in a single block, is 72.01%, i.e., 2 blocks of 5.2 hours and 2.02 hours. We hypothesised that the more continuously you get your power, the less water you'll use. (The problem of rewatering, for one, would not be there.) Our regression test revealed that if you get continuous power in a single block of 7.22 hours the number of hours used declines to 6.1 hours, yielding the utility a saving of 1.12 hours, or 15.5%.
- Since landholdings were mostly contiguous, multiple pumpsets (typically located at a distance from each other) indicated higher fixed costs than needed and a higher pump set rating than what was actually used in order to ensure adequate water.
- Pumpset users reported rewatering land frequently since, after interruption, this was the only way that water could reach farther parts of the land. Thus, groundwater was overused.
- Inadequate power also leads to higher pumpset size than needed in order to ensure enough water is pumped during the time power is supplied.
- Average annual pumpset repair cost per farmer of Rs 3826.64 may be linked to interruptions and low power quality.

So if you provided good quality power you could probably reduce a lot of these costs and significantly improve the economics of the utility.

Coming to the performance of co-operatives, they do not have a significant presence in Andhra Pradesh, distributing less than 10% of the power. Co-operatives rely on the main utility for supply and many of them reported that they were poorly treated by the main utility, and that power was cut off to the co-op-

erative area first, and the surrounding areas which were not covered by the co-operative were treated better. The study revealed that among those receiving APTransco power, 52.1% favoured privatisation, 32% favoured government supply and 15.9% favoured co-operatives. Among those receiving co-operative supply, 40% preferred co-operative supply, 35% favoured private supply and 25% favoured government supply.

The conclusions we reached regarding co-operatives were:

- Co-operatives are favoured over privatisation and government supply by users with experience of co-operatives, while others favour private supply the most.
- The preference may be linked to the higher probability of paying a bribe for connection and higher burnout problems under state supply. Some co-operatives reported using load balancing equipment at the substation to reduce quality problems.

What does this imply for distribution reform?

- Natural monopoly means that no firms will survive without regulation and, with regulation, only one firm ought to exist. Is electricity a natural monopoly? The answer is mixed. Natural monopoly arises from two sources. From economies of density and economies of geography.
- Economy of density, i.e., lower average costs arising from raising usage per customer or number of customers in the area, is empirically true. However, it does not apply to increasing geography, i.e., covering unserved areas, and there are likely to be diseconomies of geography. It is true of both developed and developing countries, that beyond one million population there are diseconomies of scale and this would be true of India as well. This implies that rural areas, for example, could be served by independent distribution companies.
- Cross-subsidisation is easiest to administer in larger firms. Alternatively, a universal service pool to allow cross-subsidisation from urban to rural areas can be created. The survey has shown that rural users will need subsidy; an additional reason for continuing subsidy is that it reduces migration to urban areas, i.e., urban users may be taxed for this privilege.
- Political forces should be squarely addressed

in any reorganisation. Political forces arise not only from subsidised users (external forces) but also from labour (internal) and shareholders (external) who will come up once private distribution comes in.

- Large firms are empirically shown to be more subject to internal political forces than small firms. The reasons include high fixed costs for exercising political influence, greater stakes and moral hazard. Co-operatives have historically been the best at coverage and have needed the least regulation, compared with municipals and private firms. Co-operatives are most subject to political forces from users and municipals are most subject to internal political forces.
- Regulation of private firms increases the power of both labour and subsidised users.

The outcomes of reform, if left to the action of natural political forces, will be complex and hard to predict. Thus, in states with strong labour unions, large, regulated private firms may be the likely outcome of reform rather than small, regulated private firms or co-operatives. In states with large, unserved rural areas, small co-operatives may result. Given the existence of economies of density and diseconomies of geography, policymakers should lend their own weight in support

of multiple distribution structures.

References and Notes

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