

RESTRUCTURING THE POWER SECTOR IN INDIA

by

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ABSTRACT

The paper argues for a renewed emphasis on hydro generation, with a concerted effort to tackle the environmental issues. It also argues for dropping the concept of State Level planning for power sector so that the generators can be located near the mines' mouth or hydel locations and electricity wheeled to distant load centres through high voltage transmissions.

Introduction

Recently we are witnessing a scenerio where we have an incremental demand of about 38,000 MW in the VIII five year plan to be met — and this is a conservative estimate in the context of liberalisation and the expected increase in industrial growth rate — and the country is woefully short of resources to finance this electricity expansion. We have an added imperative to contain the budget deficit to 4.7% . Since electricity sector is capital intensive, and traditionally accounts for about 19% (7th Plan) of the Plan outlay, it is necessary to carefully design the investment strategy in the Power sector to optimise the hydro-thermal mix and simultaneously plan for the maximum productivity of these investments, so as to achieve the short term objective of containment of the budget deficit (by minimum cost expansion) and the long term objective of growth and development (by ensuring availability of power).

Present Scenerio

The Mix: It is common knowledge that the cost of a unit of power increases according to the source, along the continuum, hydro, coal thermal, gas, diesel and nuclear. Still, in practice, the investment priorities emphasise gas, nuclear options, and some States even think of diesel options. Hydro is given the least priority for a variety of reasons, even though only about 11% of the hydro potential is exploited so far (ABE 85). Of late, the hydro share in the hydro-thermal mix has in fact come down.

Hydro: As mentioned earlier, we have not exploited hydro adequately even though it is the least cost and renewable energy source. Our exploration is not in top gear. Site posting is

considered as punishment posting. Exploration activity seems to lack adequate incentives to attract the best talent. Even the central sector organisation set up exclusively for hydro generation lags its thermal counterpart in terms of dynamism and image. Then there is the argument against hydro that it has *long gestation period*. Here one has to assess how delays from schedule can be minimised ; why project monitoring techniques are not effectively adopted; why detailed project reports are not sufficiently detailed so as to minimise the occurrences of surprises which cause delay during execution; and how schedules themselves can be shortened. A third bottleneck for hydro development is its getting bogged down in *inter-state river disputes*. A fourth reason attributed for inattention is that most of the potential is in *inaccessible areas*. With the advent of the EHT transmission, it is possible for us to develop not only the hither-to inaccessible sites in the North-East, but also invest in hydro development in Nepal, Bangladesh and Bhutan and buy power from them with long run contracts. There are two other reasons attributed for lack of emphasis on hydro: that it is more *capital intensive* than thermal and at the State level one needs a *balanced mix* as an insurance against years of draught. These two arguments are rejected, the first one on the basis that the relevant *criterion* should be overall cost minimisation and not just capital cost minimisation, and the second one loses its force when one considers regional and national grid with import and export possibilities. The constraint imposed on hydro exploitation by the *environment* is considered separately.

Gas: Gas based electricity has the advantage of low capital cost and low gestation period (6 to 9 months) and has a role in meeting peak demand. But today gas price is an administered price and does not consider the opportunity cost of its value in fertiliser production. It is to be noted that the World Bank has objected over the use of gas for electricity for the power project in Maharashtra, arguing that this was not the least cost option (ET 8.12.93). This is the same position taken by the Planning Commission several years ago in not allowing Gujarat for going in for gas based electricity. Another option that is talked about is to have combined cycle plant which will initially operate with gas as long as gas is freely available and then switch over to coal or oil once gas finds its higher value added uses. The GAIL is talking of gas grid for south India for power generation, which appears ill conceived since even if electricity were to be produced from gas, foregoing its higher value in fertiliser, it would be cheaper to produce it near its source and transport the electricity than have a gas grid. Interestingly the reason advanced for the gas grid is that it will enable various States to have electricity generation in their own States.

Mini/Micro Hydro: Recently DNES and other agencies are giving thrust to development of mini/micro hydro. It has to be analysed, under what circumstances, i.e., what load factors, distances from the grid, etc., the mini/micro hydro scheme is viable.

Location: We already have a national grid, albeit a weak one at present, and network and inter-temporal linear programming studies have established that transport of electricity is cheaper than transport of coal. Yet the electricity planning process is still focusing on self sufficiency based on demand and supply at the state level, even though at the operational level of meeting the demand the gap between demand and supply is bridged by imports or exports. If one were to minimise total costs of production of electricity, one has to remove the State boundaries and locate the generating stations at the pitheads — much more than what is done at present — and carry electricity through extra high voltage lines, upping the transmission voltage further, if necessary, so as to minimise coal transport costs. Similarly the large hydro potential in the North-East can be tapped with EHT lines carrying the power to far off corners of load centres in India.

Locating generating stations near their respective sources, and wheeling them through EHT lines is a much more cost effective proposition, than constructing generating stations near the load centres, and accordingly in power planning regional and national planning should replace state level planning. In a sense, fortuitously this is already happening with SEBs more and more relying on imports and central sector power, due to paucity of funds for the power deficit boards and due to profit motive for the power surplus boards. Economically the proposition is already established. Only the political and administrative feasibility of operationalising this concept and the implications for the incremental investment in strengthening the transmission network to achieve this end, need to be studied.

Environment: At present, a large number of hydro schemes are in limbo due to opposition from environmental groups; eg. Silent Valley, Sardar Sarover, Tehri to name a few. This is largely due to the absence of effort to understand the trade off between economic benefits due to hydro electricity and the environmental costs that it entails at various levels of analysis, such as at various heights of the dam. There is an urgent need for developing acceptable environmental guidelines which will facilitate optimal hydro development with minimum environmental costs.

At present economic and environmental analyses are carried out separately and the value judgements of the decision maker are left vague, so that different groups arrive at different conclusions from the same project. This area of vagueness needs to be tackled, and a framework developed. Also the benefits and costs of storage hydro projects vary with the height of the dam and there is an optimal height which minimises the environmental costs like submersion and people displacement, without reducing the direct benefits too much. There is also need to review the existing environmental standards for hydro and thermal power stations, and attempt to remove areas of fuzziness which may cause delay due to nonclarity of communication between the power project formulator and environmental regulator.

Organisation Structure

Presently, there is, by and large, State monopoly in the form of SEBs, based on the feature of economies of scale and the natural monopoly argument. But in the developed world the monopoly phase has ended and competition has emerged due to (i) fall in demand growth and the resultant increase in long run marginal cost which has wiped off the economies of scale and (ii) failure of regulation to either restrain prices or provide other consumer benefits. We have neither exhausted the economies of scale nor our regulations have even started to be oriented towards restraining prices or be consumer friendly. Our regulations so far have been aimed only at control of the supply in a legal sense (E.T. 8.12.93). So, we have to be careful in adopting an Orissa type privatisation in hiving off generation, transmission and distribution to different parties; a point to note is that even in the U.K. distribution to consumers less than 10 kw is in the monopoly segment, due to inherent economies of scale (Oliveira and MacKerron 1992). Thus in going for privatisation, for bridging resource gap— as opposed to seeking competition and efficiency — one may have to be aware that such a privatisation need not bring in the benefits of competition and if anything the costs may actually rise (Ranganathan.V., 1993).

A second aspect of organisation structure is that the central sector generation, particularly through NTPC has provided critical relief, but for which we would have been in deep trouble. In general, all the central sector generators' performance has been much better than the state sector generators, except perhaps in the case of nuclear, both in terms of timely construction, cost control and operating performance in terms of availability factor. The time is ripe now, in view of the cash crunch of the State governments, to think of extending the concept of further expanding the supply in the central sector supplemented by private sector if necessary, and reducing the SEBs to Distribution Boards. Further thinking is required to operationalise this concept.

If we are clear that we are privatising for meeting the resource gap and competition will be brought in wherever industry structure permits, i.e., wherever it is in line with overall cost minimisation, then the steps towards restructuring the power industry will become clearer. We may examine whether there is scope for privatising the generation segment, especially the coal thermal stations. By privatisation here, we mean the State progressively selling the shares from the existing stations, so that with the additional resource mobilised from the private sector, the State can invest in distribution. The terminal organisation structure will be: Centre to own hydel generation sets and transmission; private sector (both domestic and foreign) to own thermal sets and to supply to industry and concentrated loads and SEBs to own distribution assets and to distribute to household and rural sector. The future thermal stations are visualised to be fully integrated with captive coal mines, wherever possible. This way the high cost thermal source will be

with the private and foreign sector where private initiative will minimise costs in this area; the hydro, which is a national resource, and which needs high investment and has long gestation lags, will properly be with the Central Government; this will be supplemented by hydro power from neighbouring countries wherein the Central Government must invest; the distribution, which has the maximum characteristic of monopoly will be retained in the public domain with the SEBs. This will also minimise the pangs of the SEBs in terms of staff-shedding, since they can keep the staff in the distribution area which is a labour intensive activity.

During the transition period there is a strong need for a regulating body along the lines of Office of the Electricity Regulator (OFFER) guide price making, till effective competition takes up that role.

Financing

Lack of funds for power development is presently leading us to several blind alleys. Import of power equipment is favoured when domestic power equipment manufacturing industry is starved of orders. We are unable to exploit the glut in the international power equipment industry and get the equipment at heavily discounted prices. In spite of opening up the coal deposits, offering very attractive rates of return, and covering even normal business risks by way of assured plant load factor, there is not much response from foreign companies, to invest in power sector in India, since they are to supply to SEBs, many of which are suffering from deep financial losses, acute cash flow problems and consequently are well known debtors. Here, the short term problem is to find resources for investment to meet the demand, and the long term problem is to progressively align the price structure to reflect the marginal costs.

One has to study four aspects of financing in the power sector. These are:

1. Raising financial resources from *domestic* (market and government)
2. Raising financial resources from *foreign markets*
3. Fuller utilisation of domestic manufacturing capacity to make power equipment
4. Raising resources ultimately from the user, i.e., viable *tariff policy*

Raising Domestic Resources: Based on the above organisational structure, where the private companies will be able to find a direct buyer instead of the SEB to buy its electricity, raising finances from private sector will be feasible, since private sector will be progressively owning old and new thermal stations, and more importantly they can sell the power to industry clients and concentrated loads at prices which are nearly competitive.

Raising Foreign Funds: Once a proper tie up is established between the generator-seller and a buyer who can pay for the electricity (i.e., avoiding the present scheme of selling to the SEBs), attracting foreign investment in power generation is not a problem, just as many of the Indian scrips are oversubscribed in the international capital market. However, the present terms of 16% assured rate of return, with various kinds of protection needs to be professionally studied to make sure that incentives are not amounting to a sell out.

The policy of going in for a foreign loan with a tied equipment purchase again needs a careful study to ensure that this is not the standard African recipe for disaster. There is a glut in the international power equipment industry now but the ability to shop around is only for those with cash. The situation is likely to remain so, even in the long run, since the developed countries have the excess capacity in power production, while about 45% of the incremental demand is expected to come from developing countries.

Fuller Utilisation of Domestic Real Resources: Lack of monetary resources should not lead to idling of real resources. While opening up the power equipment market for foreigners, one aspect of ensuring level playing field will mean how local equipment manufacturers like BHEL should be protected from losing orders merely because they cannot provide the credit. One has to make a cost benefit analysis of buying from domestic manufacturers vs foreign manufacturers, atleast upto the point the domestic manufacturers reach a reasonable capacity utilisation.

A second aspect of this is to check how many of the loss making public sector units like Heavy Engineering Corporation, or Coal India and even some of the power intensive users like NALCO can go into power production industry with some adjustments. Already ordnance factories are making pressure cookers.

Tariff Policy: Ultimately, viability of the power sector depends on whether it can recover the costs it incurred. Here, we have to explore the extent to which tariffs can be aligned to marginal costs, and to what extent this can be implemented in the agriculture sector.

Conservation and Demand Management

Traditional technology induced conservation has limited scope, especially for the existing industries with energy inefficient equipment, since the capital costs on the past investments are sunk costs for them, and conservation does not appeal much to them. However, there is much to be gained from examining the energy intensity of products, and deciding on a policy of importing energy intensive products in future. This means, we have to reexamine the role of such industries as aluminium, steel, caustic soda etc., which are electricity guzzlers in our future production mix.

In our opinion, alignment of tariffs to reflect marginal costs — especially for the HT industry — by itself would take care of electricity conservation and wean away the future product mix from the electricity intensive route. However marginal cost based tariff may spell a death knell for the existing electricity intensive industries. Besides they may also have entered into long term contracts with the SEBs for supply of power at fixed rates. Thus implications for adopting marginal cost pricing for existing industries needs to be carefully assessed.

Conclusion

The future growth of our country critically depends on the power sector development along healthy lines. This is the right time to take stock of the situation and initiate bold measures for a rapid growth of the power sector. Since gestation periods are long in the power sector, we must have a broad strategic plan for the long term and the short term actions must be in conformity with this long term plan. It is time we give importance for hydro development in large scale, go the whole hog for pit head based generations with very high voltage transmission and a capacity planning based on integrated national grid. The future scenerio will have private and foreign companies playing active roles along with the state sector, but when we let in the foreign companies or go in for foreign loans it must be on our terms and not on their terms.

References

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