ELECTRICITY REFORM IN DEVELOPING COUNTRIES

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The electricity supply industry worldwide has gone through a period of major reform and restructuring during the last decade. Some of these changes were a necessary adaptation to technological advancement and a response to the more aggressive business climate ushered in by what is loosely called the Regan-Thatcher era. Other changes were plain knee jerk reactions to the ideological imperatives of the same period. There has been considerable pressure, both external and internal, in Asian countries, especially China, Thailand, Singapore and to a degree India, to implement power markets on the lines of the England and Wales system or the California deregulation model. The pressure is being felt in Sri Lanka in the form of proposals to privatize the CEB. The collapse of the California power market occurs therefore at an opportune time at which to take stock. Perhaps my 15 years of research involvement in this field may be helpful in exploring the main issues. Actually, the literature on the topic is now quite enormous.

The debacle in California has rekindled interest in best course to take in reforming the electricity supply industry in developing countries. This article looks at Thailand, China and Sri Lanka.

Introduction

The market oriented restructuring of the electric supply industry (ESI) in the West has led to a realization of the need for reform and an appreciation of the potential benefits of competition in developing countries as well. However, there are basic differences in the maturity of the ESI structure, economic priorities and the role of the state in development. There is unfortunately a tendency in developing countries to adopt the structures implemented in the pioneering Western countries without a critical appraisal of their suitability in the local context. These prescriptions are: (i) dismantling key state-owned assets, (ii) decreasing national control over sectors of the national economy, and (iii) preparing the ground for penetration by foreign capital. The latter is quite often, not on the basis of when and where the national economy may benefit, but rather on terms that are attractive to the investor. Lessons also need to be learnt from difficulties encountered elsewhere, for example the collapse of the California market.

Recently, a considerable amount has been written on ESI reform in developing countries [1-6]. The BOT/BOO (Build Operate and Transfer and Build Own and Operate) investment strategies have been employed in Asia including Sri Lanka where the capital required for power projects is too large to be met by the governments or by contributions from multilateral financial institutions. The BOT/BOO strategy has however contributed little to transmission, which is growing rapidly in Asia as national grids, connecting different provinces or regions. In big countries such as China, India, and some APEC countries, there is also an interest in developing and connecting regional power markets. Transmission systems, due to their economic, technical and geographical natural monopoly features, play a key role in determining the overall technical and business configuration of the ESI. It will be argued below that unified non private sector decision making framework, combining conventional system control and long term grid-investment is a *sine qua non* for fast growing systems. Hence while "additionality" of private capital may be beneficial in generation expansion, transmission development should remain state controlled.

Thailand's Egat

Privatization in the energy sector had been planned and implemented gradually for several years in Thailand but the 1997 economic crisis led the government to accelerate privatization and encourage competition in the hope of reducing the government's debt burden by enhancing private investment flows. The proposals included reform of the electricity supply industry and the establishment of a power market.

In September 1998, after a lengthy examination of economic, political and ideological issues, the government of Thailand approved a Privatization Master Plan (PMP) for all parts of national infrastructure including communication, transportation, water supply and energy supply [6].

The restructuring of the power industry in the PMP is divided into three stages. The first stage began in 1999 and the last stage will reach completion in the year 2003 at which stage, a wholesale spot market would have been established with generation entities and retail suppliers. The PMP envisages that all EGAT's (Electricity Generating Authority of Thailand) generation facilities will be privatized and broken into different business units which would compete against each other and against new private entrants into the generation market. The last stage also envisages that the transmission system, EGAT-T , a separate transmission company, will be established as a subsidiary of a new EGAT holding company. This holding company will be a "publicly owned corporation" [4] in which the government will still hold enough shares to retain control. It was clearly understood that it is unwise to transform ownership from a state enterprise to a completely private company in Thailand or other similar developing countries for political and strategic reasons. A possible means to attract market capital into transmission is transmission-BOT, but the concept is still unproven.

The government of Thailand has retained a consortium of international consultants to advise on the design and implementation of a competitive electricity market. At the time of this writing, the final

report has been submitted and is being reviewed. The consultants recommended that EGAT should retain a significant stake in the hydro generation and transmission businesses but that all non-hydro generation facilities should be privatized. In reality, however, EGAT may not be able to divest its generation utilities since there is political and social opposition to privatizing generation facilities whose investment burden has been borne by the state out of public funds.

This was the case when the privatization of Rachamburi power plant, the largest installation in the country, was opposed by EGAT's labor unions in 1999. This critical situation led to a reversal of privatization plans and created uncertainty in the efforts to initiate competition and setup a power market. Moreover, risk and financial uncertainty are also of concern in privatization because the stock market in Thailand has still not recovered from 1997. The weak market will have difficulty absorbing large sales of generation assets. Hence, it is possible, if sales prices are low (lower than book value), the government will back off, and consequently the entire plan to create a power market may falter.

It would be much wiser, therefore, for the government of Thailand to reconsider the arrangements for EGAT-T (transmission assets), separate grid ownership from EGAT (Generation), and turn entities like Rachamburi into public corporations that are required to compete in a power market. The private sector will, in this scenario, enter the market through new plant investments, instead of attempting to gain control of existing state assets.

Developments in China

China's electricity supply industry is divided into 15 regional power grids, some covering a single province or region, while others combine two-to-four provincial power companies. The largest is the East China grid serving Shanghai and the surrounding region, with an installed capacity of about 48,000 MW. The other large ones are the North China, Northeast China and Central China Power Networks, and the Guangdong, Northwest and the Shandong Provincial Grids. Other networks are much smaller particularly in the less developed regions.

Reform Plan

By far the greatest change in China's power industry in recent years has been the creation of the State Power Corporation (SPC), as a replacement for the Ministry of Electric Power. The SPC is a government entity, but the Chinese Government's decision to establish it points the way towards a greater use of market mechanisms. Hierarchically below the SPC are increasingly independent regional-, provincial- and district- level entities running generation, transmission and distribution activities. Though government owned in the formal legal sense, these entities (which also operate privately financed plants) are of great importance. Devolution of greater autonomy and authority to this level will be a crucial requisite in invigorating ESI development in China. The first stage, implemented in 1997-8, was the SPC taking over of the role of the Ministry. The second, now current, stage aims to turn provincial power bureaus into public electric power companies, establish a core group of independent power producers and restructure financial mechanisms. Further stages, beyond 2001 assume that a national power market linked through a national grid system will be available so that a competitive inter-provincial power trade can begin to take shape.

The SPC's role is very important in achieving long term national goals as a matter of priority. The reforms could, however, restrict foreign businesses entering the market as government subsidies allow Chinese power generators to produce electricity at cheaper prices. For example, National Power, UK, may have to delay its $1.8 billion investment in Zhejiang province. Nevertheless, it is essential that the reforms be developed systematically, taking China s own long term needs as fundamental, while the pace of power-market innovation has to be seen not as an end in itself but only as a tool for this purpose.

Progress of Reforms

The claim sometimes made in some provinces of competition between China's publicly owned power plants are premature. Operators in Shanghai have indicated that the ground rules are not at all clear and officials in Shandong have echoed the same. Advice from international experts and the World Bank in respect of market reforms is completely inappropriate (simply parroting Western experience) but fortunately the SPC does not appear to have been misled. The debacle in California has finally rescued other countries from repeating the same mistakes.

The ownership of the generation and transmission is like to be unbundled at the provincial level and this will pave the way for more power market operations in the long run and motivate some changes in power pricing. It is essential that the reform process be controlled and regulated. It is unlikely, however, that even in the more advanced eastern seaboard this process will be completed for another decade.

Public and private generators will bid for access to the system and a provincial authority will purchase from the lowest bidders for sale to consumers. The provincial organs are likely to sign five-year contracts with the power generators and undertake to purchase 80 percent of out put. New provincial state owned transmission companies would have to obtain part of the funding needed for China's huge future transmission and distribution expansion from surpluses or taxes in power-market operations.

Future Growth

Development of the transmission and distribution systems is a major challenge for the future and is often lost sight of since discussions focus on the more profitable generation sector. It is anticipated that $15.2 billion will be required for T&D investment in the country, one-third in urban and two-thirds in rural areas.

The Three Gorges project, which will be completed by 2009, is centered on the north-south and east-west portions of an emerging national grid. The grid developments will include several major HVDC lines, thousands of kilometers of 500 kV AC lines and incorporate many high-tech features.

A proposal for a Xinjiang-to-Shanghai natural gas pipeline with massive generation facilities en-route, additional hydropower projects and expansion in pumped storage are all being planned by the Chinese government.

The regional power markets being experimented with at this time must, therefore be compatible with the needs and opportunities of the future. Great care has to be taken not to set in stone, at this time, impediments to long range national priorities. This prioritization is not difficult to achieve since the central and provincial governments are the big spenders, key players and driving force behind the grid development as China's installed capacity approaches 300,000 MW, second in size only to the United States. There is an important but subordinate role for private capital to play.

The Case of Sri Lanka

Sri Lanka's monopoly national utility the CEB, owns a relatively small system of less than 1000 MW capacity dominated by several multipurpose (irrigation, power and flood control) hydro schemes. A sparse grid covers the whole island but penetration into rural areas, where a large portion of the population lives, is inadequate. The distribution network in most cities is over-stretched resulting in poor reliability and poor quality of supply. The system, like most in Asia, faces investment capital shortfall.

The Principal Issues

The need for extensive restructuring of the Sri Lanka ESI is palpably obvious but has not been addressed because the design of a proper alternative structure for the system has not been thought through. The overall generation expansion programme is not established and in recent years has proceeded by ad hoc decision making. One problem is that at the national policy level, the role of private investment has not been formulated unambiguously and consensus achieved, nor has the distinction between privatization and private sector participation been appreciated and clarified in government pronouncements.

Privatization of the existing state owned generation assets is neither possible nor desirable, especially in the case of hydro plant where down stream flows need to be regulated to service short term and seasonal agricultural needs. There is also no reason to privatize the remaining relatively much smaller CEB owned thermal plant and encounter employee and political hostility. It is better to require this plant to generate competitively against potential new investor owned plant and the recently added BOT plant. Corporate management is not strong or purposeful, standards in decision making run up against indecisive decision structures, accountability is poor, graft is widespread at all levels and employee productivity is low. Hence a range of managerial objectives, not simply a concern with creating an artificial power market, make a thorough reform of the electricity supply industry imperative.

An Approach to Restructuring

Private investment in new generation, which certainly would involve foreign participation, is required. There is also a need for additional investment in the distribution sector to improve reliability and technical performance and extend supply to new customers. There is potential for commercial success in city distribution business while rural electrification will continue as a subsidized national infrastructure development activity. Hence reform in Sri Lanka must incorporate the following major elements:-

1. Including seasonal and weather and irrigation dependent, state owned, hydro-electricity in competitive power dispatch.
2. Converting state owned thermal-generating plant into competitive, public, commercial corporations.
3. Allowing private investment in new competitive generation plant.
4. Developing a dispatch methodology for that is acceptable to participants in 1 to 3 above.
5. Creating a new national (federal after devolution) transmission entity
6. Unbundling distribution, and vesting some that require large additional investment, in well regulated private companies. (The LECO experience has been positive).
7. Creating a framework to ensure that rural electrification continues to progress.
8. Complete corporate reform of the smaller reconstituted entities to eleminate graft, political meddling and gross managerial inefficiency (This, of course, easier said than done).

The expansion of generation capacity and including in this framework a large thermal, preferably coal fired, component is the major investment need at the moment. However, there is a much uncertainty in respect of both technical and geographical decisions in this respect. This spills over directly as complexity and uncertainty in long term national or federal transmission grid structuring.

Conclusion

The outlook that has pervaded this article is not hostility to the inclusion of local and foreign private investment in the power sector but rather its rational participation. It has been argued that socially necessary decision making giving priority to a long term development strategy as in China and Thailand is necessary in Sri Lanka as well. The basic approach to problems is different from that of the IMF, World Bank and "expert" consultants, who are all driven by a belief that simply opening a power market is all that is needed. Furthermore, this article recognizes that government policy and state interventions are major factors affecting the success or failure of reform in developing countries. The transmission systems, due to its economic, technical and geographic natural monopoly features, has a special role to play in determining the overall technical and business configuration of the electricity supply industry. China, Thailand and a potentially federal Sri Lanka are three different types of technical and managerial challenges.

References

[1] A.K. David and P.N. Fernando, "The BOT Option: Conflicts and Compromises," *Energy Policy*, Vol.23, No.8, pp.669-675, August 1995.

[2] *Electricity Generating Authority of Thailand*, "EGAT's Power Development Plan 1999-2011, Revised" PDP 99-01, Report No. B3200-4201, January 1999.

[3] L. Clark, "The Operation of the Pool in England and Wales," *Proceeding of the IEE Int. Conf. On Advances in Power System ontrol, Operation & Management (APSCOM-95)*, Hong Kong, October 1995, pp.7-22.

[4] N. Leeprechanon, S.S. Moorthy, R.D. Brooks and A.K. David, "A Review of Major Factors in Restructuring Power Market in Developing Countries," *Proceeding of the APSCOM 2000*, Hong Kong, Nov.2000

[5] N. Leeprechanon, S.S. Moorthy, C.S. Gresen and P. Vongthanet "EGAT's Legacy and the Transition towards a Competitive Electricity Market in Thailand," *Proceeding of the POWERCON2000*, Western Australia IEEE Chapter, December 2000.

[6] *National Energy Policy Office*, "Privatization and Liberalization of the Energy Sector in Thailand," March 1999. ■

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