

Infrastructure Development

Introduction

Growth of an economy can be constrained by the non-availability/inadequacy of infrastructure. Though the availability of infrastructure may be viewed as a necessary condition for growth, it need not be treated as a sufficient one. Traditionally, infrastructure services have been produced and provided through vertically integrated production units by the 'public sector'. This has been due to huge investment requirements, high upfront costs, uncertainty about returns and long payback periods. These characteristics of infrastructure service provision also lead to emergence of natural monopolies. Combined with these features is the generation of large positive and negative externalities, which make it difficult to translate the costs and benefits into the user levies for these services. Recent advancements in technology and management practices have made it possible to split the vertically integrated plants into various segments, *i.e.*, by resorting to unbundling of these utilities into production, transmission or/and distribution units. The investment requirements and the risks associated with an unbundled sub-sector are fractions of those required for the vertically integrated plants. Thus, unbundling makes it possible to replace monopolies by more competitive market structures, wherein private sector can also participate.

Provision of infrastructure by the public sector in India has been due to two reasons. Huge investment requirement, as explained above, is the first reason. The second reason is that on the eve of planning process, India accepted a 'mixed economy' path or a 'socialistic pattern of society' and associated with such a system were the economic and social responsibilities of the State. Even as of today, rural electrification is deemed to be a basic minimum service to be provided by the State under the Prime Minister's Gramodaya Yojana (PMGY).

Attempts to run the infrastructure utilities on non-commercial principles have resulted in subsidisation, cross-subsidisation and distorted pricing. Naturally, the end result is financial non-

viable operations of utilities providing infrastructure. The strain on fiscal sector and the fear of collapse of infrastructure utilities has compelled a paradigm shift in provision of infrastructure in India, *i.e.*, a shift in favour of private sector participation. Many of these new experiments seem to be in the direction of replication of the successful examples witnessed in other countries.

In this chapter, we include the five basic physical infrastructure services, *viz.*, power, roads, ports and water transport, telecom and water supply to urban population. The scope of this chapter is confined to the description of the present status (availability and problems), reforms initiated and possible solutions for problems in efficient provisioning of the above-mentioned infrastructure. The contents of this chapter are organised as follows. First, we provide the context and discuss the general issues pertaining to growth of infrastructure. This is followed by the full-length discussions on each of the above-mentioned categories of infrastructure. Finally, the policy prescriptions and strategies for development of infrastructure sector as a whole constitute the concluding part of the chapter.

Backdrop: Context, Issues and Approaches

Kick-starting infrastructure projects at the national, state and sub-state levels is the priority of the policy makers. For this, co-ordination of policy decisions of centre, states and local bodies is essential. With the government funding becoming increasingly scarce and inadequate investment in crucial infrastructures, attempts are being made to 'commercialise' this hitherto heavily subsidised government dominated sector. The onset of rapid reforms since 1991 has led to considerable activity in terms of projects, policies, regulation and foreign collaborations. However, the state of physical infrastructure in the country is far from adequate both in terms of availability and quality.

The state of infrastructure in India and its massive fund requirements have been clearly stated

in Government of India (1996, GoI). This report had estimated annual requirements of funds for infrastructure at US\$ 26 billion during 1996-2001 and higher at US\$ 43 billion during 2002-2006. The report had further added that about 15 per cent of the investment could be financed externally and 85 per cent should be domestically raised. An important reason given in favour of raising domestic finance was due to the fact that these projects will generate revenues in local currency and hence, in the long run it would be difficult to finance them out of foreign savings. Having briefly underlined the context, we now turn to the issues debated with respect to provision of infrastructure.

The *first* issue is whether the infrastructure should come first rather than later (Morris, 2001). This pertains to the lead and lag relationship between infrastructure provision and production. There are two views regarding whether infrastructure should be planned and created before the demand for it arises (infrastructure first) or whether demand for infrastructure should lead the production and provision of infrastructure (infrastructure later). If the infrastructure is created and the demand for it does not take off due to some reason, there is a danger of infrastructure being underutilised, leading to a heavy cost of infrastructure and financial losses.

The *second* issue is whether the infrastructure should be 'provided' by the public sector (with or without Private Sector Participation, (PSP) or by the private sector. Over the years, inefficiency in operations of public utilities has led to escalation of the cost of infrastructure services. The perceptions about the role of public sector in economic activity are changing in response to the performance of the public sector. Provision of infrastructure includes generation, transmission or/and distribution activities. As these services can be unbundled, it is possible to get hybrid systems, wherein, some services can be provided by public sector and others by private sector. As mentioned earlier, unbundling results in division of investment requirements and risks of provision of infrastructure. The various alternatives which involve PSP are: Build-and-transfer (BT), Build-lease-and-transfer (BLT), Build-operate-and-transfer (BOT), Build-own-and-operate (BOO), Build-own-operate-and-transfer (BOOT),

Build-transfer-and-operate (BTO), Contract-add-and-operate (CAO), Develop-operate-and-transfer (DOT), Rehabilitate-operate-and-transfer (ROT), *etc.* In most of these cases, the ultimate ownership of infrastructure projects is supposed to rest in the hands of the government.

The *third* issue is that of pricing of infrastructure services. The distinction between 'ownership' and 'commercial principle' is at the core of the pricing issue. The dilemma faced here is whether infrastructure services should be priced on the basis of commercial principles or according to social objectives. Linked to this issue is the dilemma as to whether commercial principles should be adhered to by the State or not. If the State also adheres to commercial principles in pricing, then the justification for State monopolies in these services is nearly lost. Again various hybrids can be experimented in this sphere as well. This is due to the fact that all infrastructure services need not be viewed as equally relevant from the point of view of social welfare, *e.g.*, the case of water supply to poor cannot be equated with that of the provision of telecom services. The State cannot altogether absolve itself from the responsibility of provision of all kinds of infrastructure. A proper allocation of resources through budgets may have to be resorted to if the State allows private sector to provide these utilities. In this case, it will have to provide direct subsidies to the targeted consumers, if the State positions itself as a guarantor of social welfare of its people. Yet another alternative is to leave provision of these services to the private sector and provide an enabling policy environment to the private sector in the form of State guarantees, cheaper loans (*via* directives to financial institutions for infrastructure financing), tax incentives for infrastructure bonds, *etc.*

The *fourth* issue is that of fairness to consumers. In order to combine commercial principles and efficiency, independent regulatory commissions both at central and state levels have been established/are mooted so as to protect consumers' interest and ensure that the services are provided to consumers at 'fair' prices. The regulatory commissions are also expected to ensure that the rules and regulations applicable to various service providers are not discriminatory and unfair.

Power Sector

The Constitution of India has placed power in the concurrent list, implying thereby, that the responsibility of taking and implementing decisions has to be shared both by the central and state governments. However, the primary responsibility at consumer end is that of the states. Thus, development of power sector in a state has to be within the framework of the national policy. In view of this, we first present a background of power sector in India covering its objectives, problems and reforms. This is followed by the discussion of power sector in Maharashtra and a comparison with the other major states.

Problems and Objectives of Power Sector Reforms

Power is a crucial input in the growth process. Per capita electricity consumption in India (355 kwh in 2000) is not only extremely low in comparison with developed countries, but also with those in comparable developing countries. In the year 2000, the global average per capita consumption of electricity was 2176 kwh. The respective figures for some of the countries from the developing countries, viz., Brazil, Mexico and China were 1878, 827 and 1655 kwh, respectively. As against this, the consumption levels in developed countries, viz., France, Germany, Japan, UK and USA were 6539, 5563, 7628, 5601 and 12332 kwh, respectively (World Bank, 2003). As stated in Electricity Bill 2003, only 55 per cent households in India have access to electricity. Access is yet to be provided to about 80,000 villages (GoI, 2001). Most of those who have access do not get uninterrupted reliable supply.

Cross-subsidisation in power sector is coupled with lack of assurance about the quality of supply. The timely and uninterrupted supply of power is necessary for industry to maintain growth momentum, as also to compete in the global markets. The crucial reasons why the growth of hardware segment of the IT sector has not complemented the growth of software industry in India are interruption and voltage fluctuations in power supply, besides the power shortages. In the absence of improved availability of power in the

years to come, it will be difficult to sustain the growth of software segment of the IT sector and also to have it regionally dispersed.

The main *problems* facing the power sector in India are as follows.

- Huge investment requirement to meet the demand for power.
- Low coverage of population receiving power.
- Inadequate quantity (as reflected in energy and peak deficits) and poor quality of power.
- Large unmetered supply and high transmission and distribution (T&D) losses.
- Cross-subsidisation leading to financially unviable public utilities.

The basic *objectives* of the power sector reforms as laid down in the (GoI, 2001a) are as follows: (i) provide power on demand by 2012; (ii) make the power sector commercially viable and self-sustaining; (iii) provide reliable and quality power at an economic price; and, (iv) achieve environmentally sustainable power development. The policy makers have set the goal of electrifying all villages by 2007 and all households by 2012. This has also been advertised as reliable, affordable, quality 'Power to All: 2012'. The 16th Electric Power Survey (2000) has set the target of additional capacity installation to the tune of 107000 MW (by 2012), so as to fulfill the objective of 'Power to All by 2012'. This means doubling the existing capacity in the next 10 years or replicating the achievements of more than 5 decades in the coming decade. The central, states and private sectors are expected to contribute about 61.0, 17.6 and 21.4 per cent of this additional capacity installation. Realism of this target has to be viewed against the additional capacity installation to the tune of about 36843 MW (52 per cent of the targeted additional capacity installation) during the VIII and IX Five Year Plans.

In conformity with the traditional view that infrastructure ought to be provided by the State, the public sector has been predominant in India's power sector. It is only recently that the continuing and unsustainable losses of the power utilities have made it mandatory to introduce reforms in the power sector.

Box 6.1: Major Documents on India's Power Sector

- The documents, which have shaped/outlined, the power sector reforms in India are as follows:
- Settlement of SEB Dues, Report of the Expert Group (M.S. Ahluwalia, Chairman), Ministry of Power, (GoI, 2001a)
- Restructuring of SEBs, Report of the Expert Group (M.S. Ahluwalia, Chairman), Ministry of Power, (GoI, 2001b).
- Blueprint for Power Sector Development in India, Ministry of Power, (GoI, 2001)
- Distribution Policy Committee Report (Ashok Basu, Chairman), Ministry of Power (GoI, 2002)
- Accelerated Power Development and Reform Programme (APDRP), (GoI, 2002b)
- Structure of APDRP, Reform Framework and Principles of Financial Restructuring of SEBs, Report of the Expert Committee on State-Specific Reforms (Deepak Parekh, Chairman), Ministry of Power (GoI, 2002c)
- IT Task Force Report for Power Sector, submitted by IT Task Force (Nandan Nilekani, Chairman), Ministry of Power (GoI, 2002e)
- Report on Rating of State Power Sector, Submitted by ICRA/CRISIL, Ministry of Power (GoI, 2003c)
- Report on Distributed Generation, (A.V. Gokak, Chairman), Ministry of Power (GoI, 2003d)
- Electricity Act, 2003 (GoI, 2003e)
- National Electricity Policy (GoI, 2005)

Power Sector Reforms in India

Power sector reforms in India were initiated in the early nineties, as a part of stabilisation and structural reform package, power sector was opened to foreign investment. We also observe that since the year 2001, a number of committees and expert Groups have been appointed by the Ministry of Power, Government of India (GoI) to identify the problems of power sector and to find solutions for the same. The major documents, which have been prepared by these committees and expert groups (along with the major policy documents/announcements and legislative measures) have been listed in Box 6.1. These documents have shaped the course of the power sector reforms in India.

The power sector reforms can be classified into three categories, *viz.*, legislative reforms, policy reforms and administrative reforms.

Legislative reforms

The legal/institutional frame adhered to for the growth of power sector has been defined by the Indian Electricity Act (1910), the Electricity Supply Act (1948). The Electricity Regulatory Commission Act was passed in 1998, and it provides for setting up of a Commission at the Central level and also for regulatory commissions at state levels. The Central Electricity Regulatory Commission (CERC) was constituted in July 1998 and is in operation. In 22 states, the State Electricity Regulatory Commissions (SERCs) have been set (as on 16th Feb, 2005). As mentioned earlier, these regulatory commissions are

meant to protect consumer interests in an environment of increasing privatisation. Lok Sabha has passed the Electricity Bill 2003 on 9th April, 2003 and by Rajya Sabha on 5th May, 2003. The Electricity Act, 2003 was notified on 2nd June 2003 and became operational w.e.f. 10th June, 2003. The Act aims at creating a liberal framework for development of the power sector by distancing Government from regulation. It has replaced the earlier three existing legislations, *viz.*, Indian Electricity Act, 1910, the Electricity (Supply) Act, 1948 and the Electricity Regulatory Commissions Act, 1998. The salient features of the Electricity Bill 2003, are provided in Box 6.2. Besides this, emphasis is being laid on conservation of energy. Energy Conservation Act was passed in 2001 and it came into effect on 1st March 2002. A Bureau of Energy Efficiency (BEE) has been set up to reinforce the objectives of the Act. Central and State Governments have been empowered to facilitate and enforce efficient use of energy and its conservation. Standards and Labeling (S&L) have been identified for improvement in energy efficiency. Standards and Codes (S&C) are to be applied for commonly used equipment in industries, such as, pumps, fans, blowers, compressors, boilers, *etc.*, and efficiency gains of the order of 10 per cent are expected in use of these equipment. In the existing legislative framework, there is also provision for imposing penalties in the case of wastage of energy.

Box 6.2: The Highlights of the Electricity Bill 2003

- **Formulation of Policy/ Legislations:**
 - Preparation of a National Policy Draft in consultation with State Governments
 - More stringent anti- theft legislation
 - Constitution of an Appellate Tribunal to hear appeals against the decision of the CERC and SERCs
 - The State Electricity Regulatory Commission to be mandatory
 - Authorisation to Regulatory Commissions to fix ceilings on trading margins, if necessary.
- **Thrust on generation and management of rural electrification**
 - Licence free generation and distribution in the rural areas
 - Local management (by Panchayats, Cooperative Societies, non-Government organisations, franchisees) of rural distribution
- **Structural reforms to increase competition and efficiency**
 - Delicensed and captive generation of thermal power (though hydro projects would require clearance from the Central Electricity Authority)
 - Reorganisation or continuance of SEBs
 - Mandatory metering of all electricity supply
 - Open access in distribution to be introduced in phases
 - Gradually phasing out of cross subsidies
 - Private licensees to be allowed in transmission, open access in transmission from the outset, entry in distribution through an independent network
 - Freedom to distribution licensees to undertake generation and generating companies to be permitted distribution
 - Recognition of trading as a distinct activity
- **Continued Role of the State**
 - A government company to act as transmission utility at the Central and State levels so as to plan and coordinate the transmission network.
 - Provision for payment of subsidy through budget.

Source: GoI documents released on 9th May, 2003

Policy and Administrative Reforms

The resources required for additional capacity installation of about 1,07,000 MW during the X and XI Five Year Plans are estimated to be Rs. 8,00,000 crores (GoI, 2001). Of this amount, nearly one fourth is required for the transmission system. In view of this huge sum required for installation of additional capacity, efforts have been made to facilitate private investment, including foreign capital as well. There is no ceiling on foreign equity participation in the power sector. Foreign direct investment (FDI) in transmission is being encouraged through two routes, *viz.*, Joint Venture (JV) and Independent Private Transmission Companies (IPTC). In view of the industry requirements and the time lag it may take to match the industry needs through additional capacity installation, development of captive power plants is being encouraged, especially in special economic zones.

A crucial component of the policy reforms pertain to the settlement of SEBs dues to central undertakings. Most of the SEBs are on the verge of financial collapse. As a result, these have not been able to pay for the power supplied to them by the central utilities. The total outstanding dues of SEBs to the central power utilities have risen to more than Rs. 4,10,000 crores and their losses have reached an alarming proportion of about 1.5 per cent of GDP (GoI, 2002). The recommendations of the Ahluwalia Group (GoI, 2001b, 2001) have been operationalised. The outstanding dues of SEBs towards CPSUs are being scrutinised by respective states with the clear understanding that the SEBs will pay their current dues.

Accelerated Power Development and Reform Programme has been one of the crucial policy measures. APDRP was introduced in February 2001 (as Accelerated Power Development Programme and later rechristened as APDRP in February 2002).

The objectives of the reforms as regards the distribution of power are to achieve 100 per cent metering, energy audit, better HT/LT (High Tension to Low Tension) ratio, replacement of distribution transformers, use of IT solutions relating to power flow at critical points so as to ensure accountability at all levels, *etc.* These are expected to result in improvement in quality of power supply to the consumers, besides improving revenue realisation for the utilities. Sixty-three circles have been selected and are being developed as 'Centre of Excellence' for distribution reforms. The plan is to cover all the circles in the country in a phased manner. The funds to state governments are to be provided through the APDRP for: i) Renovation and Modernisation (R & M), Life extension, Upgrading of old thermal and hydel plants; and ii) Upgradation & strengthening of sub-transmission and distribution network (below 33kV or 66kV). This is to enable energy accounting and metering in the distribution circles. The Upgradation, strengthening of transmission and distribution network is considered to be the crucial. This can reduce the high aggregate technical and commercial losses (40-45 per cent of total losses arise at the distribution stage) and improve quality of power supply (low voltage)/availability/reliability. The funds are provided through a combination of grant and loan to the state governments as Advance Central Plan Assistance. The funding details are as follows:

- 100 per cent project cost finance is provided to Special Category States (all North Eastern States, Sikkim, Uttaranchal and J&K) in the ratio of 90 per cent grant and 10 per cent soft loan.
- In respect of other states (Non-Special Category), 50 per cent of the project cost is provided by the center and the ratio of grants and loans is 50:50. The balance 50 per cent funds of the project requirement have to be raised by the state.
- The access of the states to the funds is based on agreed reform programmes, e.g. on the narrowing and ultimate elimination of the gap between unit cost of supply and revenue realisation within a specified time frame. Priority is accorded to projects from those states, which have committed themselves to a time bound programme of

reforms. The financial aspects of these reforms have been discussed later whilst comparing the power sector in Maharashtra with the rest of Indian states.

The financial support available to states under APDRP is under two streams, *viz.*, investment and incentive streams. The former is aimed at developing 'demonstration projects' and the latter at reducing the gap between unit cost of supply and revenue realisation. In other words, the latter depends on the actual performance. The general financial losses of public utilities can be classified into two major types. These are: (i) deficits accumulated from the past, *viz.*, dues to suppliers of power and fuel such as NTPC and Coal India (or its subsidiaries); and, (ii) unfunded liabilities arising from future promises of payment, largely related to labour, such as, pensions, provident fund and gratuity.

Power Sector in Maharashtra vis-à-vis Other States: Present Status

Until early June 2003, three power utilities, *viz.*, Tata Electric Companies (TEC), Bombay Suburban Electric Supply (BSES) and Bombay Electric Supply & Transport (BEST) served the Mumbai area. BSES Ltd was fully inducted into the Reliance conglomerate in early June 2003 and was renamed as Reliance Energy Ltd (REL). TECs and REL are private companies, whereas, BEST is municipality-owned. The remaining area of the state is served by the Maharashtra State Electricity Board (MSEB) which is a public utility created under the Electric Supply Act (1948).

Maharashtra was ranked as one of the best states in terms of infrastructure availability. About 80 per cent of the population in the state has access to electricity. Though almost all households in cities and towns have access to electricity, this is not true for all the rural households. In Table 6.1, we provide a brief profile of Maharashtra's share (MSEB and private sector) in installed capacity in India.

Maharashtra accounts for about 11 to 12 per cent of India's total installed capacity in power sector. The contribution of MSEB in 1997 was more than 4 times that of the private sector. The

Table 6.1: Mode and Ownership-wise Installed Capacity in Power Sector: Maharashtra and India

Mode and Ownership-wise Installed Capacity								
Sector/Utility/Region	1997				2002			
	As a % of Grand Total for India				As a % of Grand Total for India			
	Hydel	Thermal	Wind	Total	Hydel	Thermal	Wind	Total
MSEB	1.58	7.48	0.01	9.07	2.29	6.99	0.01	9.29
Maharashtra (Private Sector)	0.50	1.55	0.00	2.05	0.43	2.45	0.30	3.17
Maharashtra (Total)	2.08	9.03	0.01	11.12	2.71	9.44	0.31	12.46
India	25.24	73.70	1.05	100.00	25.03	73.53	1.44	100.00
Grand Total for India (MW)				85795				104918
Mode and Ownership-wise Installed Capacity								
Sector/Utility/Region	1997				2002			
	As a % of Total for Maharashtra				As a % of Total for Maharashtra			
	Hydel	Thermal	Wind	Total (MW)	Hydel	Thermal	Wind	Total (MW)
MSEB	17.47	82.46	0.07	7782	24.63	75.30	0.07	9744
Maharashtra (Private Sector)	24.26	75.74	0.00	1756	13.42	77.16	9.42	3331
Maharashtra (Total)	18.72	81.23	0.06	9538	21.78	75.77	2.45	13074
India	25.24	73.70	1.05	85795	25.03	73.53	1.44	104918

provisional estimates for 2002 put the relative contribution of MSEB to about 3 times that of the private sector, thus indicating a greater role played by the private sector in the recent years as regards capacity installation in Maharashtra's power sector.

In 1997, the composition of installed capacity in Maharashtra was slightly more skewed in favour of thermal power as compared to that for India. Almost one-fourth of installed capacity at the all-India level was comprised of hydel power, whereas, for Maharashtra this figure was even less than one-fifth. Provisional estimates of composition of installed capacity for 2002 indicate a marginal shift in favour of both hydel and wind power and the mode-wise composition of installed capacity in Maharashtra has become similar to that for the country as a whole.

Though Maharashtra has ample power for the base load, it does face shortages of both energy and peaking capacity. The quality of supply is poor due to voltage drops, frequency fluctuations and load shedding. In Table 6.2, we provide data regarding the energy deficit and peak-deficit in Maharashtra (MSEB) and for India as a whole. Both energy and peak deficits for Maharashtra were lower than that for all India in 1991-92 and 1996-97. By 2001-02, Maharashtra recorded energy deficit that was higher than the corresponding figure for all India and the

peak deficit became almost equal to the corresponding figure for all India. Though the state suffers from energy and peak deficits, these deficits need to be interpreted with caution, as these are in relation to the requirements. A state that is stagnant (with recessionary conditions or economically backward) may not show deficits. Moreover, if peak deficits are to be avoided, then excess capacity installation becomes necessary. In fact, the Electricity Bill 2003, does aim at creation of excess capacity in view of the need for uninterrupted availability of power. It may, however, be noted that underutilised capacity at non-peak hours implies higher costs of power and a choice has to be made between 'high cost of power with absence of deficit in peak hours' and 'a lower cost of power with peak deficits'. It may also be noted that the energy and peak deficits in Maharashtra have increased to 10.2 and 18.2 per cent, respectively, in 2003-04.

Table 6.2: Power Sector Deficit in Maharashtra and India

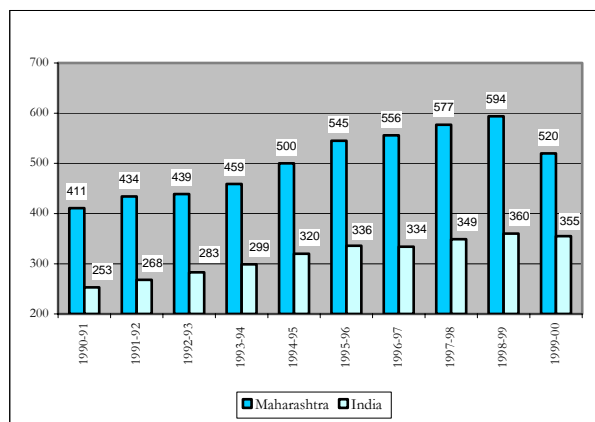
Year	Energy Deficit (%)		Peak Deficit (%)	
	Maharashtra	India	Maharashtra	India
1991-92	4.5	7.8	8.7	10.8
1996-97	5.6	11.5	8.7	18.0
2001-02	8.8	7.5	12.5	12.6

Source: Annual Report 2001-02 on The Working of State Electricity Boards & Electricity Departments

Despite the fact that Maharashtra is one of the most industrialised states of the country, the state has very low consumption of electricity per person in relation to the global standards. The per capita consumption of electricity in Maharashtra (411 kwh) was about 1.63 times that of all India figure (253 kwh) in 1990-91. By the end of the decade, this multiple had decreased to about 1.47. In Figure 6.1, we provide a comparison of per capita consumption of electricity in Maharashtra with that for the country as a whole.

We can also see that in 1999-2000 the per capita consumption of electricity registered marginal decline for both Maharashtra and for India. However, the fall in the former was more pronounced than for the latter. In 1994-95, Maharashtra served the highest number of consumers in the country (13 percent of countrywide consumers). By 2000-01 (revised estimates), it served only 11.6 percent of India consumers and also no longer remained a state serving the highest number of consumers. Tamil Nadu at present commands this enviable position.

Figure 6.1: Per Capita Consumption of Electricity (Kwh)



Source: GoI, 2002c

Given the predominance of MSEB in provision of electricity in the state, its financial viability is one of the major concerns. The arrears of MSEB (as provided by the MSEB) have been rising in the recent years. These are as follows: Rs. 5907 crores (2001), Rs. 7114 crores (2002) and Rs. 8765 crores (2003). Some of the major reasons for financial losses of MSEB are distorted pricing, technical and physical factors and hasty reforms.

Electricity Boards and Electricity Departments supply electricity to different categories of consumers at different rates. Hence, the financial

sustainability of these utilities also depends on the composition of consumer categories, tariff structure across various consumer categories and the cost of supplying power. In Table 6.3 and Figure 6.2, we provide a synoptic view of the composition of the consumer categories in Maharashtra and compare the same with the national level figures.

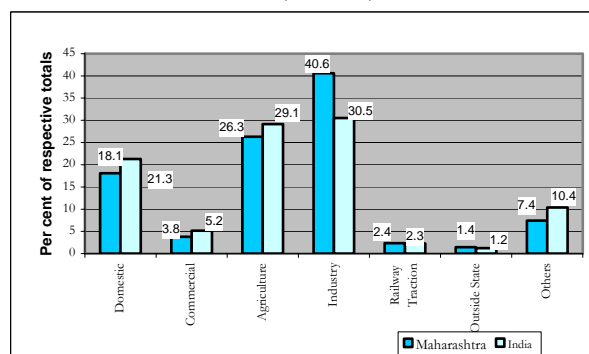
Way back in 1960-61, about 10 per cent of electricity was supplied to the domestic and agricultural sector. In 2000-01, about 44 per cent of electricity by MSEB was supplied to the domestic sector (18 per cent) and agricultural sector (26 per cent). At the national level, these two categories account for about 50 per cent of electricity consumption. Electricity to these sectors is heavily subsidised and therefore it affects the financial viability of SEBs.

Table 6.3: Electricity Consumption by Different User Groups in Maharashtra

Year	(% of Total)				Total (Mn kwh)
	Domestic	Commercial	Industry	Agriculture	
1960-61	9.6	7.3	68.1	0.6	2722
1970-71	9.6	7.2	69.4	4.7	7650
1980-81	12.7	6.8	57.9	12.3	14034
1990-91	16.9	6.9	49.1	22.0	29971
2000-01	18.1	15.0	40.6	26.3	41598
2001-02	25.7	9.5	37.6	18.8	46338
2002-03	24.6	9.3	36.4	21.3	49945

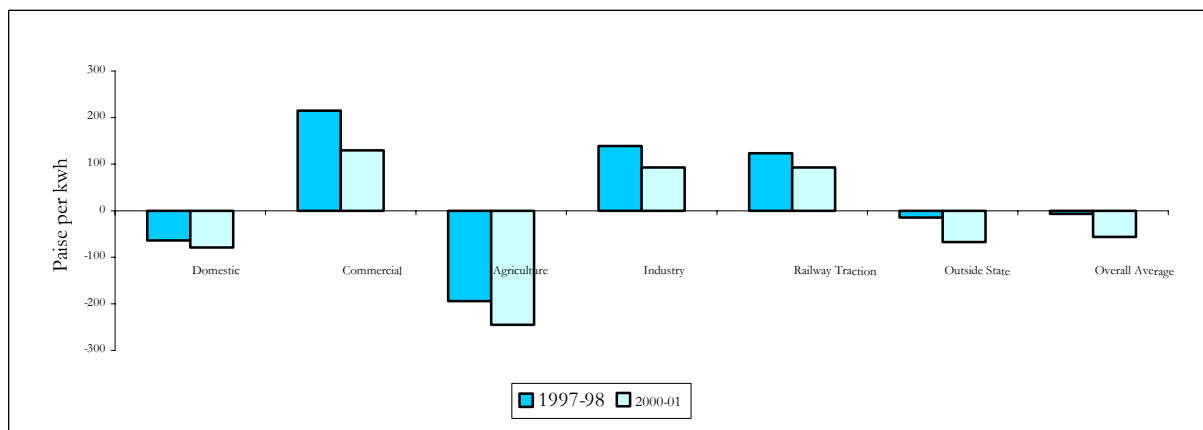
Source: GoI (2002c), MEDC (2000), GoM (2004); and author's calculations

Figure 6.2: Consumer Categories: A Comparison of Maharashtra with India (2000-01)



Source: Based on the data in Annual Report 2001-02 on the Working of State Electricity Boards & Electricity Departments

In Figure 6.3, we have plotted the margin of tariff over the cost of power supply for different categories of consumers. This difference provides us information about cross-subsidisation. From all these figures, we can conclude that, be it Maharashtra or the entire country, the domestic and agricultural sectors that account for more than 40

Figure 6.3: Cross-Subsidisation to Various Consumer Groups

Source: Calculated from the Annual Report 2001-02 on The Working of State Electricity Boards & Electricity Departments.

per cent of power supply have a recovery ratio (ratio of tariff to the cost of power supply) of less than unity. The opposite is true for industry, commercial and railway traction sectors. In other words, there is cross-subsidisation from these sectors to agricultural and domestic sector. It can be also seen from Table 6.3 that the proportion of electricity consumption by sectors other than household and agricultural sector has been on a decline over the years and cross-subsidisation is one of the reasons of financial problems of the MSEB.

Cost of supply of power in Maharashtra has been lower as compared with the all India average (revised estimate for India in 2000-1 was 327.1 paise per kwh). The cost of supplying electricity in Maharashtra in 1997-98 was 215.6 paise per kwh. The respective figure for 2000-01 (revised estimate) was 318.7. MSEB is not only one of biggest SEBs in the country but has been historically known for its technical efficiency. It performed substantially better than the other electricity boards both in physical terms (plant availability and plant load factor) as also in financial terms. MSEB has been recipient of many awards for its technical efficiency. In the last two years, the losses of MSEB have been consistently falling and in fact, Maharashtra has also been able to get the incentive component of the ARPD funding. Nevertheless, about 18 per cent of thermal generation plants in the state are more than 25 year old and about 48 per cent are about 15 to 25 year old (GoM, 2002a). This results in high technical losses in the transmission process. Financing investment requirement for replacing these plants

would be a daunting task and Maharashtra will have to face this challenge in the coming years.

The physical and financial performance of MSEB vis-à-vis the average of all electricity boards is provided in Table 6.4 and Table 6.5 respectively.

From Table 6.4, we see that both plant availability and plant load factors for MSEB have been higher than that for all Electricity Boards combined. The ceiling set by the Central Electricity Authority for T&D losses is 16 per cent. As regards, T&D losses, MSEB had substantially lower T&D losses as a percentage of its plant availability during 1996-97 to 1998-99.

Table 6.4: Physical Performance

Year	Maharashtra			India		
	PA (%)	PLF (%)	T&D (%)	PA (%)	PLF (%)	T&D (%)
1996-97	85.9	68.7	17.7	79.00	64.40	24.53
1997-98	85.0	68.3	17.1	79.40	64.70	24.79
1998-99	82.9	68.4	15.5	78.70	64.60	26.45
1999-2000 (Provisional)	85.1	71.7	30.5 (31.8)	80.30	67.30	30.80
2000-01 (Revised)	86.4	72.6	30.0	80.50	69.00	29.90
2001-02 (Plan Estimate)	NA	74.5	28.0 (39.4)	NA	69.90	27.80

Note: (i) PA, PLF and T&D indicate Plant Availability, Plant Load Factor of Thermal stations and T&D Losses. (ii) Figures in parenthesis indicate T&D losses reported in Tariff filing with the MERC (see World Bank, 2002).

Source: GoI, 2002c

Thereafter, MSEB can hardly claim to be one of the better states with low T&D losses. High T&D losses of MSEB can also be partly attributed to a high ratio (approximately 2) of Low Tension to High Tension transmission. Both high T&D losses

and high cost of power from Dabhol Power Corporation (DPC) have led to deterioration of financial position of the MSEB in the recent years.

This is reflected in a yawning negative rate of return on capital of MSEB especially in the recent years, though it is below that of the average for all SEBs (see Table 6.5). In view of this, several measures were undertaken to introduce the reform in power sector in Maharashtra. As mentioned above, some of these hastily implemented reforms themselves are responsible for financial deterioration of MSEB. We now proceed to outline the power sector reforms in Maharashtra and whilst doing so, we will also discuss the issue of hasty reforms with Enron saga as an example.

Table 6.5: Rate of Return on Capital without Subsidy

(Per cent)

Year	Rate of Return on Capital without Subsidy (%)	
	Maharashtra	Average of All SEBs
1992-93	3.10	-12.7
1993-94	3.10	-12.3
1994-95	4.10	-13.1
1995-96	-5.30	-16.4
1996-97	-1.20	-19.6
1997-98	-0.14	-22.9
1998-99	1.92	-34.2
1999-2000	-16.52	-43.1
2000-01 (RE)	-13.85	-39.1
2001-02 (Annual Plan)	-31.72	-44.1

Source: GoI, 2002c

Power Sector Reforms in Maharashtra

Maharashtra pioneered, in a temporal sense, as regards initiation of power sector reforms. This can be seen from the fact that though much of action on the part of Central Government has been seen since the year 2000, The Government of Maharashtra had taken several initiatives in the nineties itself. Moreover, the Government of Maharashtra has also undertaken reform initiatives so as to avail of benefits provided by the Central Government, which hinge on the reform milestones undertaken by the state governments. This is not to deny the fact that the implementation of reforms has been far from ideal. In Box 6.3, we present the initiatives taken by the GoM.

Maharashtra was one of the early states to rush in for foreign investment. Despite the fact that the entry of Dabhol Power Corporation (with its three US based shareholders, *viz.*, Enron, Corporation, Bechtel Enterprises *Inc.*, and General Electric Company) was debated and criticised for several

reasons and there were many a hiccups in clearing of the project, finally the approval was given on the Build-operate-and-own (BOO) basis. DPC perhaps provides the best example of a hasty reform in the power sector. In view of the relevance of this case for devising reforms, in Box 6.4, we highlight the problems with DPC. Phase I of DPC was started with guarantees and counter guarantees regarding the rate of return in foreign currency terms and commitment of MSEB to buy power from DPC.

As mentioned earlier, a high cost of obtaining power from DPC, *inter alia*, resulted in financial derailment of MSEB. The authorities themselves have admitted this. To quote the official position, "The optimistic expectations from the IPPs have not been fulfilled and in retrospect it appears that the approach of inviting investments on the basis of government guarantees was perhaps not the best way" (GoI, 2003). The DPC saga, financial derailment of MSEB and introduction of power reforms by the Centre have made it necessary for Maharashtra to also go in for consolidation of the financial position of MSEB.

Basak (2003) claims that Maharashtra will become a power-surplus-state in the next five years. He opined that MSEB can successfully compete with the private sector and that the Electricity Bill 2003 (which has subsequently been enacted) is an opportunity rather than a threat to MSEB. This is due to the fact that MSEB's cost-efficiency and asset base. MSEB's cost of power production per unit ranges between 40 paise to Rs. 2.24, transmission cost per unit is 24 paise, distribution cost per unit is 65 paise, and asset value on replacement cost basis is Rs. 62, 000 crore. Thus, MSEB's cost structure at present is much lower than the cost at which it bought power from DPC. However, there still remains a question as to whether MSEB will be able to meet the power needs of the state at this relatively lower cost even when the old plants will have to be replaced, given the fact that about half of the thermal generation plants in the state are about 15 to 25 year old.

Status of Power Sector Reforms in Maharashtra vis-à-vis Other States

One of the modes of assessing the progress of power sector reforms in Maharashtra vis-à-vis other states would be to examine the progress on the various reform milestones under APDRP.

Box 6.3: Power Sector Reforms in Maharashtra

In order to initiate power sector reforms, the Government of Maharashtra appointed several committees and also brought out the White Paper. However, only a few of the suggested reforms have actually been implemented. In this box, we first summarise the suggested reforms by the various committees and later enumerate the reforms implemented/not implemented so far.

- Rajadhyaksha Committee was appointed in 1996. It suggested various measures so as to "put MSEB on a viable footing". One of its main recommendations was creation of a regulatory body. It also recommended the conversion of MSEB into a generation and transmission company with private sector owning shares of such a company. The other recommendations were 'privatisation of the distribution' of electricity supply. Of these recommendations, except for the creation and operationalisation of Maharashtra Electricity Regulatory Commission (MERC), which was mandated by the power sector reforms undertaken by the Central Government, the other major recommendations have not been implemented.
- Upasani Committee was appointed in 2000 with the objective of formulating legislation so as to enhance powers of MERC's, and bringing its power on par with the other regulatory commissions in India. Maharashtra Electricity Reform Bill was drafted so as to widen the scope of powers of MERC and commence the unbundling process. The draft of the Bill has acquired the status of legislation now.
- Reforms Undertaken as a Part of Accelerated Power Development Reform Programme (APDRP): Under the APDRP, initiated by the Central Government, Maharashtra has signed the MoUs with the Ministry of Power, Government of India. Some of the reform milestones included in the APDRP are: setting up of regulatory commission; unbundling of SEBs; removal of cross-subsidies and tariff anomalies (issuing of tariff orders); providing budgetary support through subsidies to SEBs; introduction of privatization; etc. In March 2001, GoM and GoI signed the MoU for undertaking measures for operating MSEB on commercial principles. The broad objective was to reduce systemic losses and eliminate all losses in distribution by 2003. GoM agreed to fully implement tariff orders of MERC. Two tariff orders have been issued, the last tariff order was issued in 2002. Under APDRP, the SEBs are required to sign a MoA with the Ministry of Power so as to carry out distribution reforms. The prime objectives of the MoA is to enforce accountability and commercial accounting, introduce online management information systems, reduce T&D losses, introduce benchmark for the prime indicators that reflect consumer satisfaction and stability of the system. MSEB signed the MoA with the Ministry of Power in June 2002. Another component of the APDRP is signing of a Tripartite Agreement (TPA) by the state governments with the Central Government and the Reserve Bank of India, as a part of one-time settlement of dues of the state utilities to central utilities. In March 2003, the Government of Maharashtra has signed the TPA. In order to reduce the technical and T&D losses, 85 per cent metering of 11 kv feeders and 86 per cent consumer metering has been completed. Though the anti-theft legislation has been passed, Maharashtra Electricity Reform Bill is yet to be passed.
- Energy Review Committee was appointed in February 2001. Dr. Madhav Godbole chaired the Committee. The main objectives of the Committee were to critically examine the contract with the Dabhol Power Corporation (DPC) and recommend a new framework for negotiation with the DPC and suggest measures to improve the financial performance of MSEB. The Committee recommended the following measures: (i) Restructuring of MSEB into various of generation and distribution utilities, though transmission was to remain a monopoly; (ii) Financial restructuring of the resulting generation and distribution utilities before their privatization; (iii) privatisation of the urban distribution and implementation of credible solutions (such as, cooperatives-based solutions or privatisation based on the support of a subsidy programme which is transparent) for the rural areas; and, (iv) implementation of a multi year tariff system so as to create incentives for private distributors to reduce losses. Except for opening up the private sector (both domestic and foreign) for generation of power and a more liberal policy for captive power plants, the other measures have not been implemented.
- In August 2002, Industries, Energy and Labour Department of Government of Maharashtra published a White Paper on Maharashtra Power Sector Reform. The reforms mooted in this paper are: internal reform, independent regulatory framework and structural reforms. The internal reforms consist of development of human resources, reduction of T&D losses, instituting anti-theft measures, energy auditing and metering, demand side management and instituting consumer grievance redressal system. The target for T&D loss reduction has been set at 1 per cent per year for technical losses and 3 per cent per year for commercial losses in urban areas. The respective figures for rural area are 0.5 per cent and 1 per cent per year. The regulatory commission is to address the issues of tariff rationalization, phasing out of cross-subsidies in 5 years whilst protecting interests of poor consumers. Under structural reforms, unbundling and corporatising MSEB into separate generation, transmission and distribution companies is mooted.
- As regards implementation of the Electricity Act 2003, there is no move to privatize MSEB by the GoM. However, restructuring of MSEB into separate state-owned companies for generation, transmission and distribution is under consideration. In order to ensure competition, a greater scope for private sector in generation and distribution is being envisaged by the state.

Source: World Bank (2002), GoI (2003), GoM (2001 and 2002) and MEDC (2003)

As on 31st July 2003, SERCs have been constituted in 19 states, including that in Maharashtra. Maharashtra is also one of the 17 states in which SERCs are operational. Tariff orders have been issued by 15 states and Maharashtra has done it twice, the latest being in 2002. MoUs and MoAs have been signed by 27 states, including that in Maharashtra. Maharashtra is also one of the 25 states that have signed TPAs. As regards its progress towards metering, Maharashtra has made substantial

efforts, though it has been outperformed by West Bengal. The core of power sector reforms lies in Enactment of Reform Bills at the state levels, unbundling/corporatising the electricity boards and privatisation of distribution. On all these fronts, the reform process has been rather slow, especially in Maharashtra. Only 9 states have enacted both the reform bills and have unbundled/corporatised their electricity boards. West Bengal has done the latter but not the former. Maharashtra has done neither of

Box 6.4: Dabhol Saga: An Example of Hasty Reforms

With the initiation of power sector reforms, in 1991, the Government of India decided to open up power sector for private sector through independent power projects (IPPs). The Dabhol Power Company (DPC)—mainly a foreign entity domiciled in India agreed to establish a 2,184 MW power plant in two phases (740 MW first phase and 1444 MW in second phase) in Maharashtra. Along with MSEB, it had three US-based companies as its shareholders, viz., Enron Corporation, Bechtel Enterprises *Inc.* and General Electric Company.

In May 1992, the MoU was signed. In September 1992, a World Bank team assessed the project and recommended against the project on two grounds. First, it was not the least costly option as the plant was liquid fuel-based, wherein, liquid fuel was to be imported from Oman. Coal or hydro plant would have enabled cheaper power generation vis-à-vis imported liquid fuel plant. Second, there was apprehension about the ability of MSEB to generate sufficient revenues meets its payment obligations under the Power Purchase Agreement (PPA). Despite this, a draft PPA was initiated in November 1993, and concluded in December 1993. The financial closure was reached for Phase I in March 1995. DPC entered into a PPA with MSEB for sale of power on Build-Own-and-Operate (BOO) basis for a period of 20 years. DPC agreed to a levelised tariff of Rs. 1.89 per unit at the exchange rate of 32 Rs per US, at a fuel price of \$13 per barrel and a plant load factor of 90 per cent. In anticipation of a high growth rate of the economy, the demand for electricity was also expected to increase rapidly. PPA implied that DPC sells power to the MSEB for which it is paid a sum that covers both fixed and variable costs. The payment of fixed cost was not tied to the level of generation, while the variable cost was linked to the amount of power being sold. This sum, divided by the amount of power sold, gave the per unit rate. MSEB and Government of Maharashtra gave guarantees about the payment to DPC. The GoI provided the counter guarantee.

In August 1995, MSEB was instructed by GoM to repudiate the transaction and to request DPC to stop construction as the doubts began to be expressed about the project. After lengthy negotiations involving GoI, GoM and MSEB, a revised PPA was reached and in December 1996, financial closure for the second phase was attained and the construction of plant was resumed. Phase I of the plant became operational in May 1999. During May 1999 to December 2000, DPC supplied 6048 million units of electricity to MSEB at the rate of Rs. 4.67 per unit. This was much higher than the tariff of Rs. 1.89 negotiated with unrealistic assumptions. Due to the industrial deceleration, it was difficult for industry to absorb this escalated cost of electricity and this got reflected in the reduced the growth rate of demand for electricity. The revisions in the estimates of demand for electricity made in The 16th Electric Power Survey of India (GoI, 2000) bear a testimony to this fact. Moreover, the cost of buying power from DPC was more than double the average purchases price from other suppliers. MSEB's finances deteriorated sharply due to the costly power purchase from DPC. It was able to pay for the power until December 1999. In May 2001, MSEB repealed the contract and halted the construction of Phase II.

The amounts at stake are considerable. The present exposure of the lenders is of the order of US\$1.5 billion (Phases I and II), most of which has been arranged or guaranteed by the Indian Financial Institutions. Five major foreign banks, viz., Citibank, Bank of America, ANZ Bank, Credit Suisse First Boston and ABN-Amro, have communicated to the Finance Ministry that they be paid their \$339 million exposure to the power project. However, the counter-guarantees cover only \$100 million in the first phase of which \$10 million have already been repaid. The bankruptcy of Enron in November 2001 has also complicated the matter.

After the bankruptcy of Enron, the domestic financial institutions, led by the Industrial Development Bank of India (IDBI), have been making frantic attempts to sell the foreign equity stake in the Dabhol Power Company and get the company restarted. The interest of domestic lenders in restarting DPC can be understood as they expect to recover a part of their exposure to DPC through the sale of power to the Maharashtra State Electricity Board (MSEB). However, the foreign lenders are opposed to any such move as the guaranteed amounts are still pending. A few firms, such as, Reliance, BSES, Tata Power, Gail India, British Gas, Gaz de France and Shell had shown interest in having stakes in DPC and restarting it. Given the fact that foreign lenders have veto powers in this matter, the fate of DPC still is unpredictable.

The fiasco of DPC can be explained due to the following reasons. *First*, the mode of awarding the contract was through negotiations rather than through competitive bidding, despite the fact that the rationale for reforms is explained in terms of competition and efficiency. *Second*, the technical and economic aspects of the projects were not given adequate attention. Though the need was to augment the intermediate and peak capacity, the first phase of the project was to primarily create the base-load. Coal/hydro/gas-based plants would have enabled energy generation at a lower cost. Despite this, contract was awarded to the liquid fuel-based plant, which would import liquid fuel. Perhaps, optimistic perceptions about the growth scenario and foreign exchange reserves in future were behind the award of this contract, despite scarcity of foreign exchange at the scarcity at the time of the award of the contract. Sensitivity analysis regarding the cost of power to exchange rate, plant load factor, price of imported liquid fuel, *etc.*, ought to have been conducted if the policy-makers were serious about the reforms. *Third*, the structural aspects of reform process aim at introducing efficiency through market forces and how guarantees and counter-guarantees fit into the reform process is something which has to be convinced to people by the policy makers at both the state and the national levels. Naturally, the questions of governance are bound to arise. *Finally*, another faulty aspect of the structural aspect of this contract was opening up generation for private investment (with a single buyer model in which the entire risk is passed on to the Government by private investor) without liberalising power distribution.

Source: World Bank (2002), GoM (2001), Business Standard (January 07, 2003 and April 04, 2003)

these. Only Orissa and Delhi have taken initiatives in privatisation in distribution.

The states can avail finances from the central government under APDRP only if accompanied by their own initiatives. It can be seen from Table 6.7 that merely 8.9 per cent of the APDRP project costs

have been utilised in India so far. Tamil Nadu and Delhi have utilised about 18 to 20 per cent of the APDRP costs. States like Karnataka, Andhra Pradesh and Rajasthan have utilised about slightly more than 10 to 15 per cent of the APRDP project costs. Maharashtra and Gujarat, despite being the

most industrialised states have not been able to exploit this lucrative opportunity provided by the APDRP. As indicated earlier, the release of the financial assistance to states under the APRDP scheme is based on the performance of the states in terms of bridging the gap between the cost of supply of power and the tariff charged by them. This explains the low utilisation of APDRP funds in various states including that in Maharashtra.

Table 6.6: Power Sector Reforms in Maharashtra vis-à-vis other States (As on 31st July, 2003)

Reform Milestone	Maharashtra	Total States & UTs
Constitution of SERC	Yes	19
Operationalisation of SERC	Yes	17
Number of Tariff orders	2	15
Signing of MOU	Yes	27
Signing of MOA	Yes	27
Signing of TPA	Yes	25
Reform Bill Enactment	No	10
Unbundling/Corporatisation	No	9
Privatisation of Distribution	No	2
11 kV for 100% Metering	85%	11
100% Consumer Metering	86%	5
Anti-theft Law	Yes	7

Source: GoI, 2003

An expert committee (GoI, 2002d) recommended restructuring models that include possibilities of competition and especially those that involve private sector participation in distribution segment. It also warned against using a single buyer model and opined that state governments should not engage in purchase and sale of electricity through any entity that is controlled or owned by it – either directly or through guarantees. In an unbundled electricity industry, it recommended that transmission utility should not trade in power in order to avoid potential misuse of its monopoly power. In this context, it is pertinent to note that in states, such as, Orissa, Andhra Pradesh, Haryana, Rajasthan and Uttar Pradesh have implemented power sector reforms and have gone in for a Single Buyer Model. Effectively, the role of Electricity Regulatory Commissions (ERCs) has been confined to promotion of investment and growth of power sector. The presumption that regulatory bodies will protect interest of consumers' appears to be far-fetched in the case of power sector. Promotion of

infrastructure and consumers' interest need not always coincide, is reinforced by the Dabhol experience in Maharashtra. Dabhol saga was caused by provision of guarantees and counter guarantees coupled with a single buyer model. These features of the contract went against the very principle of the market discipline.

Road Development in Maharashtra

Growth of a region depends, *inter alia*, on how well is it connected internally as well as with the rest of the world. Roads not only enable the masses to use the public road transport at economical prices but also help in smoothening inter-regional disparities in availability of goods (and hence, reduce dispersion of prices across regions).

Development of network of national highways is crucial to the development of a state. National highways provide connectivity to the states with other trading centers and ports of the country and constitute the first tier of road development plan (in a multimodal transport system).

Road development in India depends on efforts of both the central and the state governments. We first examine road development in Maharashtra through schemes initiated by the Central Government and later discuss the state initiatives. In December 1998, the Prime Minister's Taskforce approved the National Highways Development Project (NHDP). The Golden Quadrilateral (GQ), one of the components of NHDP, aims at connecting Mumbai, Delhi, Kolkata and Chennai. It involves construction of road length of about 5846 kms. In February 2002, except for Allahabad Bypass, civil contracts were awarded for various parts of the GQ. Earlier a substantial part of the project was to be completed by the end of year 2004, which has now been advanced to the end of 2003. Along with this, the North-South (NS) corridor, connecting Srinagar to Kanyakumari and East-West (EW) Corridor, connecting Silchar to Porbandar, are also part of the NHDP. Four major sources of financing that have been identified for GQ and corridor projects are: (i) imposition of cess on petrol; (ii) external assistance; (iii) market borrowings; and, (iv) contribution of private sector. The total estimated cost of the project is about Rs. 58,000 crores. The contribution of the above four financing sources is expected to be approximately

Table 6.7: Progress of APDRP (as on 31-03 2003)

State	APDRP Cost (Rupees Crore)	APDRP Release (Rupees Crore)			Utilisation/ APDRP cost (%)
		Investment	Incentive	Total	
Andhra Pradesh	755.70	163.82		163.82	9.53
Bihar	368.99	66.11		66.11	1.69
Delhi	473.23	105.51		105.51	19.95
Gujarat	517.90	105.42	236.37	341.79	6.45
Haryana	226.71	56.33	5.01	61.34	11.04
Karnataka	580.60	145.15		145.15	10.73
Kerala	175.18	30.43		30.43	7.41
Madhya Pradesh	339.54	74.87		74.87	3.67
Maharashtra	673.93	138.48	137.89	276.37	5.65
Orissa	296.11	54.35		54.35	0.00
Punjab	353.19	53.98		53.98	6.89
Rajasthan	627.53	125.64		125.64	14.45
Tamil Nadu	484.09	111.57		111.57	17.80
Uttar Pradesh	406.43	80.12		80.12	0.00
West Bengal	102.13	19.02		19.02	4.57
Assam	408.54	96.97		96.97	0.01
India	8737.60	1755.51	379.27	2134.78	8.90

Note: It may be noted that the project costs are double of the APDRP costs.

Source: GoI, 2003

34, 34, 21 and 10 per cent, respectively, of the total estimated project cost.

National highways passing through Maharashtra state account for just about 6.2 per cent of the total length of national highways in the country. A large 'interior' triangular area in Maharashtra, bound by Dhule, Nagpur and Osmanabad, still remains uncovered by the national highway network. Maharashtra and Gujarat account for around 8.3 to 8.4 percent of proposed laning under GQ. This is lower in comparison to the share of Andhra Pradesh, Karnataka, Tamil Nadu, Rajasthan and Uttar Pradesh. Share of these states range between 10.7 and 17.4 per cent. Maharashtra accounts for just 6.0 per cent of the proposed laning of NS corridor. The main beneficiaries of NS corridor will be Andhra Pradesh, Jammu & Kashmir, Madhya Pradesh and Tamil Nadu. The EW corridor does not pass through Maharashtra and the direct benefits of this corridor will accrue mainly to Assam, Bihar, Gujarat, Rajasthan, Uttar Pradesh and West Bengal. The total share of Maharashtra in laning of both the corridors is just about 3.2 per cent, which is much lower than for many other major states of India. In order to exploit the full connectivity potential of this minor share in four/six laning of national highways, Maharashtra will have to complement this by construction of

roads through its own initiatives, which would connect the GQ and the NS corridor. NHDP will also help the state in providing connectivity to about 44 of its ports (NHDA, 2003)

In view of the fact that there were about 1.60 lakh unconnected habitations (about 40 per cent of total habitations) in the country at the turn of the century, Pradhan Mantri Gram Sadak Yojana (PMGSY) was launched in December 2000. This scheme is dedicated solely to the construction of rural roads and aims at closing the gap between 'Urban India' and 'Rural Bharat'. The targets of PMGSY are to connect every unconnected habitation with a population of over 1000 persons through good, all-weather roads by the year 2003. Habitations with a population of more than 500 persons are to be connected by the end of the 10th Plan, *i.e.*, by the year 2007. All habitations in the Hill states, Desert and Tribal areas (with a population of more than 250) are also to be provided connectivity through PMGSY. The nodal agency for implementing the project in Maharashtra is the Ministry of Rural Development (Pradhan Mantri Gram Sadak Yojana, 2003).

In Table 6.8, we indicate the share of Maharashtra in the PMGSY. Maharashtra accounts for about 6.3 per cent of the total habitations of the country. The state accounts for about 9.1 per cent

Table 6.8: Maharashtra's share in PMGSY

Maharashtra's Share in PMGSY	Population				
	1000+	500-999	250-499	Below 250	Total
Habitations	7.8	6.1	5.0	6.1	6.3
Connected Habitations	10.7	9.9	7.1	8.0	9.1
Unconnected Habitations	0.9	1.0	2.6	4.4	2.5
Habitations covered under PMGSY Phase I (2000-2001)	4.5	1.8	2.5	0.3	2.3
Habitations covered under PMGSY Phase II (2001-2002)	4.8	9.9	1.1	0.1	5.4
Habitations to be covered under PMGSY Phase III (2003-2004)	2.3	1.5	0.7	2.5	2.1

Source: Author's Calculations based on GoI (2003f)

of connected and 2.5 per cent of unconnected habitations of the country. In other words, rural road network in Maharashtra seems to be better as compared to other states. Though Maharashtra is not going to be a major beneficiary both in terms of financial allocations and the coverage of habitations, yet there is a reasonable scope for improving the rural road conditions in the state and also meeting the other socio-economic objectives, if the scheme is implemented in an integrated manner with the other employment and income-generating poverty alleviation schemes. One of the major departures of this scheme from other developmental schemes is that the execution of the scheme is time-bound, without a possibility of cost escalations. Penalty clauses have been included in the cases of time overruns. However, the scheme assumes the ready availability of land, which opens up the crucial issue of governance, displacement and compensation.

Maharashtra is one of the major industrialised states of India. The city of Mumbai has acted as a magnet in attracting migrants from all over the country and has emerged as a hub of industrial, commercial, entertainment and financial activity. There has been a phenomenal increase in the number of mechanical vehicles in the state over the years. Inadequacy of roads due to disproportionate growth between the number of vehicles and the growth of road length also has resulted in poor quality of roads in the state. The road length at the eve of the formation of the state was just 39,242 kms. At the end of March 2003, the road length in the state increased to 2.25 lakh kms. Out of the above road length, 1.65 per cent (3,710 kms) was National Highway, 14.98 per cent (33,705 kms)

State Highway, 21.4 per cent (48,192 kms) Major District Roads, 19.64 per cent (44,183 kms) Other District Roads, and the rest 42.30 per cent (9,150 kms) village roads. At the end of March 2003, the road length per 100 sq. kms of geographical area in the state was 87.40 kms (provisional). As per the 1991 Census, the road availability per lakh of population was 277 kms.

At the end of March 2003, out of 40412 inhabited villages in Maharashtra, 93 per cent of villages were connected by all-weather roads and 4.77 per cent by fair weather roads. Any type of roads did not connect remaining 2.23 villages. Of these unconnected villages 31 per cent were villages in tribal area and 69 per cent in non-tribal area.

Road Development Initiatives of Government of Maharashtra

To meet the ever-increasing demand for better and wider road network in the state, two 20 year Road Development plans, *viz.*, 1961-81 (Public Works Department, GoM, 2003b) Road Development Plan (Bombay Plan) and 1981-2001 Road Development Plan, have been implemented. The details of targets and achievements during the Road Development Plans 1961-81 and 1981-2001 are given in Table 6.9. It can be seen from Table 6.9 that the original target of national highway was much higher in the Bombay Plan as compared to the revised target. These plans were preceded by the Nagpur plan, the targets of which were almost met when the state of Maharashtra was formed in 1960. By the end of the seventies, the problem of deceleration in industrial growth had caught the attention of policy makers

Table 6.9: Targets and Achievements During the Road Development Plans in Maharashtra

Category of Roads	1961-81 Plan						
	Length as on 1.4.61 (kms)	Target (kms)	Revised target (kms)	Length as on 1.4.81 (kms)	Achievement as a % of revised target		
NH	2312	5007	2956	2945	-0.4		
SH	9804	13468	20374	18949	-7.0		
MDR	11058	27426	29024	25233	-13.1		
ODR	6954	32681	35714	25404	-28.9		
VR	9114	35100	44230	28105	-36.5		
Total	39242	113682	132298	100636	-23.9		
Un- classified	-	-	-	40495			
Total	39242	113682	132298	141131	6.7*		
1981-2001 Plan							
Category of Roads	Targeted length (kms)	Revised target (kms)	Total achievement (kms)	As a % of total achievement			Shortfall as a % of revised target
				BT or CC	W B M	Un-surfaced	
NH	3924	3112	2972	98	-	2	-4.5
SH	28282	35831	32380	95	4	1	-9.6
MDR	44047	48615	41166	57	280	6	-15.3
ODR	50794	51396	41701	26	58	16	-18.9
VR	76602	131304	72834	10	63	27	-44.5
Total	207348	270010	191053	39	45	15	-29.2

Note: (1) Abbreviations used in the above Table are as follow. NH: National Highways, SH: State Highways, MDR: Major District Road, ODR: Other District Roads, VR: Village Roads, BT:Black Topped, CC: Cement Concrete, and WBM: Water Bound Mecedam

(2) Over achievement of target (*) is due to the fact that there was no target fixed for the un-classified roads in 1961-81 plan.

Source: Public Works Department, GoM, 2003a and author's calculations

and the availability of infrastructure was considered to be one of the reasons for the same. In view of this, the efforts were made at the national level to prepare the Road Development Plan for the country as a whole for the period 1981-2001. Maharashtra finalised its own road development plan within the overall national road development plan framework. The basic objective of the state road development plan was to connect all the villages having population in excess of 500 in rural areas with at least one all weather road. This plan also highlighted the problems of energy shortages, environmental degradation and road safety. The main components of the Maharashtra's Road Development Plan 1981-2001 were: (i) expansion of National Highway (NH) network; (ii) construction of expressways on major traffic corridors; (iii) extension of State Highways (SH) to connect district headquarters, industrial centers and tourist centers; (iv) construction of Major District Roads (MDRs) to connect villages with population of 1000-1500; and, (v) construction of pedestrian footbridges (Sakavs) in hilly areas to serve the villagers living in remote areas by giving them access to their farms/other social amenities

lying across rivers/creeks. Given the uphill task of raising resources for implementation of the plan, the finances were raised from different sources, viz., assistance from the World Bank, National Bank for Agricultural and Rural Development (NABARD), private sector (on BOT basis) and plan and non-plan allocations from annual state budgets.

In Maharashtra, construction of roads has been financed, to a large extent, by the non-plan expenditures. One of the major initiatives taken by the GoM towards development of road and road transport can be said to be the creation of MSRDC. MSRDC was established in July 1996 and is fully owned by the GoM. MSRDC was created mainly to deal with the properties and assets comprising of movables and immovables including land, road projects, flyover projects, toll collection rights and works under construction which were vested with the State Government and were under the control of the Public Works Department. These functions have been subsequently transferred to MSRDC. Some of the projects undertaken by the MSRDC have been listed in Box 6.5. Mumbai-Pune expressway is cited as one of the successful

Box 6.5: Progress of Projects Undertaken by MSRDC

Completed Projects	<ul style="list-style-type: none"> • Airoli Bridge Project
On Going Projects	<ul style="list-style-type: none"> • 50 Flyovers (Mumbai Traffic Improvement Mega Project) • Amravati City Integrated Road Development Project • Aurangabad City Integrated Road Development Project • Bandra Worli Sea Link Project • Four laning of Satara - Kolhapur - Kagal section of NH4 • Improvements to Satara - Chalkewadi - Patan Road • Mumbai - Aurangabad - Nagpur Highway Development to NH standards • Mumbai Pune Expressway & Panvel - Bypass Project • Nagpur City Integrated Road Development Program • Pune Integrated Road Development Project • Railway Over - Bridges Project • Solapur City Integrated Road Development Project • Construction of Railway Over Bridges under Vidarbha Scheme • Widening of Thane Ghodbunder Road SH – 42
Projects in the Project Development Phase	<ul style="list-style-type: none"> • Light Rail Transit (LRT) for Pune and Nagpur • Multi - Modal International Hub Airport at Nagpur • Mumbai Trans Harbour Link (Nhava - Sewri sea link Project) • Mass Rapid Transit System for Thane City • Nanded City Integrated Road Development Project (Waghela MC) • Nandurbar Integrated Road Development Project • Development of New Mahabaleshwar as a Hill Station • Western Freeway Sea Link Project • Kolhapur City Integrated Road Development Project • Passenger Water Transport (PWT) Project of Mumbai
Projects Under Mumbai Urban Transport Project	<ul style="list-style-type: none"> • Widening of Existing Jogeshwari Vikroli Link Road • Construction of Santacruz Chembur Link Road

Source: MSRDC, 2003b

examples of the state initiative. The Government of Maharashtra entrusted the task of this expressway to MSRDC in March 1997 on Build-operate-and-transfer (BOT) basis with the permission to collect toll for 30 years. The expressway opened for its full length from 1st March, 2002, though part of the route was opened a couple of years earlier than this. The project was completed in a record time and it is the first 6-lane expressway in the country.

Financial Requirements

Roads are maintained by the various agencies, *viz.* Public Works Department (PWD), Zilla Parishads (ZPs), Municipal corporations/Councils, *etc.* About 88 per cent of the total road length was maintained by the PWD and ZPs at the end of March, 2002. The classification of this road length according to the category of road is presented in the Table 6.10. As on end of March 2002, the financial requirements for maintaining the existing roads were estimated at Rs. 11,600 crores, whereas, to

complete the remaining construction work under the Road Development Plan 1981-2001, the estimated cost was Rs. 15,800 crores. Besides this, Rs. 600 crores were required for acquisition of land for expressway. In other words, Rs. 28,000 crores of financial requirements was estimated to meet the set targets. Given the financial position of the state and a limited share of Maharashtra in the both NHDP and PMGSY, exploring other sources of funding seems to be inevitable.

Table 6.10: Road length Maintained by the PWD and ZPs as on 31st March, 2002

Category of Roads	Road length (in km.)	Percentage of total
National Highway	3,710	1.7
State Highway	33,405	15.0
Major District road	47,927	21.5
Other District Road	43,906	19.7
Village road	93,618	42.1
Total	2,22,600	100.0

Source: Economic Survey of Maharashtra, 2002-03

Ports and Inland Water Transport

Maharashtra has a coastline of about 720 kms, which is about 10 per cent of the total coastline of the country. Out of 12 major ports in India, 2 belong to Maharashtra, *viz.*, Mumbai Port Trust and Nhawa-Shewa port. The state also has 48 minor ports. The minor ports of Maharashtra fall into 5 groups, *viz.*, Bandra group (9 ports), Mora group (11 ports), Rajpuri Group (9 ports), Ratnagiri group (11 ports) and Vengurla group (8 ports). In order to provide the multi-user port facilities, the state government has decided to develop 7 of these minor ports, *viz.*, Rewas-Aware, Dighi, Jaigad, Anjanwel (Dabhol), Alewadi, Ganeshgule, Vijaydurga, and Redi. Of these, development of the first three ports is in progress, whereas, the remaining ones are yet to be developed.

Development of major ports comes under the jurisdiction of Central Government, whereas, minor ports fall into the state list. As per the Port Policy of GoM (Nalinakshan, 2002), development of the minor ports is to take place through PSP on the BOOST basis. These ports are to be developed for multiple uses, such as, for handling all types of cargo like, bulk and break bulk, containers, petroleum and chemicals, *etc.* All the property of the GoM in the port (to be taken up for development) is to be transferred on lease to the developer company. The developer is to be exempted from payment of registration fee and stamp duty. The concession period is 50 years, including 5 years as the construction period. The state government can have equity participation of the order of about 11 per cent. In order to operationalise these projects, Maharashtra Maritime Board (MMB) was established in 1996 to act as a nodal agency. The Government will levy tariff of only Rs. 3.00 per ton for the cargo handled by the port. This tariff can be increased up to 5 years, but at the end of 5 years it should not exceed twice the amount of the existing tariff. The developer is to be accorded full freedom to decide tariff rates for the various services provided at the port. The developer is also expected to develop facilities required for passenger water transport. However, the fixation of passenger tariffs is to be the prerogative of the GoM.

A co-ordination committee comprising of officers from the concerned Government

Departments (under the Chairmanship of the Chief Executive Officer of MMB) is to provide a single window clearance to the investors. The investor will have to raise the required finance, develop the port, provide all services and manage the port as per the agreement entered with the GoM. The investor will be responsible for the construction of roads within the port boundary. However, the cost of construction of the approach roads and their maintenance are to be shared equally by the government and the investor. The investor will also be responsible for conservation of the port. Table 6.11 summarises the cargo handled at various groups of minor ports in Maharashtra. Bandra group basically handles coal and machinery. Mora group, which accounts for almost 70 per cent of cargo of minor ports of Maharashtra, primarily handles minerals and iron in various forms. Rajapuri ports handle iron in various forms. Ratnagiri port handles a diverse basket of commodities, whereas, Vengurla primarily caters to molasses cargo. With the development of Sindhudurg district as a tourism area, it is quite likely that minor ports could also be used for transporting consumption goods.

In Table 6.12, we provide the relative position of Maharashtra's minor ports. Gujarat accounts for almost 80 per cent of the cargo of minor ports of India. Maharashtra's share has been at best about 15 per cent in 1996-97 and in 2001-02 the provisional figure stood at about 5 per cent. Comparatively, Gujarat has an advantage over Maharashtra as regards geographic location. The former is closer to the north, central and even east bound cargo, while the latter's proximity is only to the south, which already has many ports. Besides, Gujarat being one of the most industrialised states also has the advantage of contributing to cargo handled at its own ports.

Table 6.11: Cargo handled at minor ports in Maharashtra (2001-02)

Group of Minor Port	Cargo handled in (MT)	(% of Total)
Bandra group	350058	7.6
Mora group	3235068	69.9
Rajpuri Group	787604	17.0
Ratnagiri group	584067	12.6
Vengurla group	20132	0.4
Total	4627015	100.0

Source: Data provided by The Maharashtra Maritime Board and author's calculations

The GoM has also formulated a policy for captive jetties, which can facilitate both port development and the inland water transport. To encourage the development of captive jetties the GoM has announced that the land and site for a jetty will be leased out for a period of 30 years. The entire construction of the captive jetties and construction on the back up site will be on BOT basis. The construction, repair, maintenance and management of the jetties will also be the sole responsibility of the holder of these captive jetties.

Table 6.12: Relative Position of Cargo Handled by Minor Ports of Select States

Year	Maharashtra	Gujarat	Goa	India Thousand Tonnes
	As a percentage of India			
1991-92	4.0	77.7	0.1	13258
1992-93	2.0	77.2	1.4	15403
1993-94	3.3	80.9	1.1	19470
1994-95	11.0	76.0	1.0	22282
1995-96	13.5	71.9	0.4	25710
1996-97	15.2	71.3	1.4	27832
1997-98	12.1	71.8	2.6	38607
1998-99	14.3	63.1	6.0	36306
1999-00	9.5	73.7	3.9	63383
2000-01 (P)	6.8	81.7	3.7	87249
2001-02 (P)	5.2	83.8	3.0	95126

Source: Data provided by The Maharashtra Maritime Board and author's calculations

As per the port policy of the GoM, it will not recover any berthing dues from the vessels calling at the jetty. However, wharfage charges will have to be paid to the MMB as per the prescribed rate notified by the GoM through an official gazette. At the end of 30 years, the jetty and the super structure on the jetty will get transferred to the MMB.

Of late, the GoM has initiated development of inland water transport as the railway and road transport system in Mumbai has been extremely pressurised. Again, PSP is supposed to enable this. The inland water transport routes are to cover three routes, *viz.*, (i) Nariman Point to Borivali (western sea route) passing through Bandra, Juhu and Versova); (ii) The Eastern sea route (from South Mumbai/Gateway of India to Thane/Navi Mumbai; and (iii) the cross harbour route (from Gateway of India/ferry wharf/South Mumbai to Mandwa, Rewas, JNPT, Elephanta, *etc.*). The exact location at each of these sites has been finalised and the requirement of land has been worked out. A few

remaining issues, such as, promulgation of the navigational channel and details of infrastructure required, are being addressed. The commuter ferry system has already been made operational on the Eastern Sea route and Cross harbour route. However, better landing sites and infrastructure facilities are being planned so as to make the ferry system more attractive, convenient and safe.

Telecom Sector

Over the last decade, significant developments have taken place in the telecom sector. These changes have been in the arena of institutional reforms as well as technological advances. As regards institutional reforms are concerned, these have been in the nature of increased scope for private sector participation and globalisation leading to greater competition and efficiency. Technological progress has been in the form of reliance on radio waves rather than on fixed wired lines, which enables customers to use these services at a lower cost with greater mobility. The boom in information technology which has enabled the growth of telecom sector has, at least to some extent, relieved the constraints on growth imposed by inadequate and expensive transport facilities.

Telecom sector in India comes under the jurisdiction of the central government and hence, the progress of telecom sector of a state can only be viewed within the policy framework provided by the central government. However, the state governments can provide the enabling environment for the growth of this sector. In Table 6.14, we provide a synoptic view of the reforms pertaining to the telecom sector in India. It can be seen from Table 6.13 that the reforms in telecom sector in India allowed it to be opened to private operators, instituted regulatory authority and also were quick to move forward with the technological advances in this field.

At present, India has a telephone network of 44.6 million lines and commands the 6th rank in the world and the 2nd among emerging economies of Asia (next only to China). Though in absolute terms, the telecom network of India is large, teledensity in India is one of the lowest in the world. Barely about 2.6 per cent of the population owns telephones. Table 6.14 provides the relative teledensity in various countries.

Table 6.13: Major Telecom Sector Reforms in India

Year	Nature of Reform
1984	Manufacturing of the subscriber premises equipment opened up to the private sector
1985	Department of Telecommunications established
1986	Telecom services in Delhi & Mumbai corporatised under Mahanagar Telephone Nigam Ltd. (MTNL) and international telecom services were corporatised under Videsh Sanchar Nigam Ltd. (VSNL).
1989	Telecom Commission established
1991	Telecom equipment manufacturing opened to private/foreign sector
1992	Value added services opened up for private sector
1994	Announcement of New Telecom Policy and broad guidelines for entry of private sector into provision of basic services, issuance of licenses for cellular mobiles for four metros, tenders floated for bids in cellular mobile services in 19 circles (barring the four metros)
1997	Telecom Regulatory Authority of India (TRAI, formed by an Ordinance in 1996) starts functioning
1998	Policy announcement for Internet Service Providers (ISPs)
1999	Announcement of Telecom Policy
2000	Telecom Regulatory Authority of India (TRAI) Amendment Bill 2000 passed by the Indian Parliament, National Long Distance (NLD) services opened to private operators, Internet Service Providers (ISPs) permitted to set up International Internet Gateways for both Satellite and Landing Stations for submarine fibre-optic cables, Free right of way to lay fibre-optic cable networks along highways and roads. Ceiling on foreign equity in telecom services increased from 49 per cent to 74 per cent, the restriction on the number of players in cellular services removed, FDI up to 100 per cent permitted for ISPs that do not have satellite or submarine landing stations, reduction in customs duties on various telecom equipments, Corporatisation of Department of Telecom Services (DTS) and formation of Bharat Sanchar Nigam Limited (BSNL).
2001	Announcement of policy for voice mail/audiotex incorporating a new service, <i>i.e.</i> , unified messaging service, Infrastructure Providers of two categories (IP-1 and IP-2) allowed to provide end-to-end bandwidth and dark fibre, right of way, towers, duct space, etc., Wireless in Local Loop (WLL) introduced
2002	Private operators allowed in International Long Distance services, 3 licences issued.

Source: Adapted from Mani (2003)

Table 6.14: Relative Teledensity in Various Countries (US =100)

Country	1991	2002
China	1.1	6.9
France	90.9	87.7
Germany	80.8	83.7
India	1.1	2.4
Indonesia	1.1	3.3
Japan	80.9	76.1
Korea (Rep.)	56.8	67.0
Malaysia	16.4	27.7
Thailand	4.5	10.9
United Kingdom	80.8	81.3
United States	100.0	100.0

Source: Author's calculations based on data sourced from International Telecommunications Union (2003)

In 1991, India, China and Indonesia had teledensity (telephones per 100 people) of about 1.1 per cent of that of the United States. China has improved its position significantly as compared to

that of India. In fact, India has progressed slower than even Indonesia in this regard. However, one of the redeeming features of the growth of telecom industry in India is that it is growing at a phenomenal rate. Table 6.15 provides a synoptic view of the growth of telecom industry in India. Almost all growth rates are in double digits, except for the internet subscribers. In fact the growth of private Direct Exchange Lines (DELs) and cellular mobiles is closer to three digits than to two digits. Growth of private DELs was as high as 85 per cent in 2001-02. However, as the private DELs were barely one per cent of the public DELs, it will take almost a decade for the number of private DELs to surpass that of the public DELs (assuming constant growth rates witnessed by these segments in 2001-02). Another highest growing segment in India's telecom industry is the cellular mobile segment, which recorded a growth rate of 79 per cent in 2001-02. Even if the growth rates witnessed by DELs and cellular mobile phones in 2001-02 are

assumed to remain constant in the coming years, the number of cellular phones will exceed the number of DELs within a matter of six years. The pricing policy, apart from the convenience of mobile cellular phones, is also a key factor in propelling the growth of this segment of the telecom sector in India. In the recent past, there have been upward revisions in the tariff rates of fixed line phones, whereas, cellular mobile rates have been on a decline, *i.e.*, the relative tariff rates of land lines have increased. Opening up of the cellular services to private sector have brought even the public sector companies into the ambit of competitive play.

Another feature of the India's telecom sector is the inequitable distribution of telecom services between rural and urban areas. The urban teledensity is around 13.71, whereas, the rural teledensity is just about 1.41. A silver lining is that in the recent years the growth of DELs in rural areas has been almost twice that of urban areas. Also new technologies, such as, Wireless in Local Loop (WLL) are expected to promote rural telephony within a short span of time.

Table 6.15: Status of Telecom Sector in India

Description	As on		Growth Rate in 2001-02 (%)
	31-03-2001	31-03-2002	
Switching Capacity (BSNL & MTNL)	39.9	47.4*	18.8
No. of DELs	32.7*	38.5*	17.5
(i) Public	32.4*	38.0*	17.0
ii) Private	0.3*	0.5*	85.2
Cellular mobile phones	3.6*	6.4*	78.8
VPTs (Public & Private)	4.1#	4.7#	14.7
Rural DELs	6.7*	9.0*	34.8
PCOs	8.4#	10.7#	27.1
Internet Subscribers	3.0*	3.2*	7.7

Note: '*' and '#' denote measurement in millions and lakhs, respectively. VPTs are Village Public Telephones and PCOs are Public Call Offices.

Source: GoI (2003c), and author's calculation

The advancements in technology and opening up of the telecom services to both domestic and foreign players have revolutionised the telecom industry in India by making it competitive, mobile

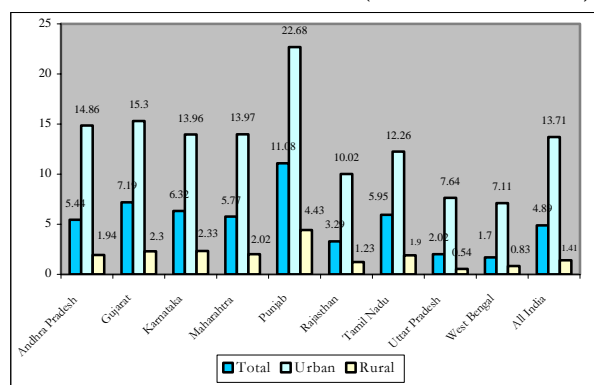
and global. In fact, perhaps this is the only sector where advances in technology and knowledge have percolated in the form of lower prices to consumers and have made this infrastructure somewhat more affordable to the masses.

Telecom Sector in Maharashtra

As per the data provided by Government of India (2003a), Maharashtra accounted for about 15.8 per cent of India's telephone subscribers, 9.5 per cent of total telephone connections, 9.1 per cent of connections in urban areas and 1.1 per cent in rural areas of the country (as on 31st Dec., 2002). About 8 per cent of cellular phones of the country are registered in Maharashtra. The Telecom Policy 1999, has set the targets of achieving an overall national teledensity of 7 by the year 2005 and 15 by the year 2010. It also targets the rural teledensity of 4 by the year 2010.

The overall, urban and rural teledensity recorded for Maharashtra (as on 31st Dec., 2002) were 5.77, 13.97 and 2.02, respectively. These figures are marginally above the national figure. The relative teledensity in India *vis-à-vis* other developing and developed countries (Table 6.15) indicates the distance that both India and Maharashtra have to travel in order to catch up with these countries. It is also noteworthy (Figure 6.4) that the overall teledensity in Punjab, Gujarat and Karnataka are higher than that for Maharashtra. Punjab leads the other states as regards the teledensity. It has teledensity almost twice as that of Maharashtra. It has already surpassed the overall national teledensity targets set for India for 2005 and rural teledensity target set for 2010. This is not true of Maharashtra. It is also pertinent to note that within Maharashtra, the teledensity is quite skewly distributed. Mumbai has teledensity (23.52), almost as high as urban teledensity in Punjab. The difference between teledensity in Maharashtra and Punjab may be a pointer to the fact that telecommunication industry growth is higher and more evenly dispersed if the urban-rural disparities in income are lower. In view of this, Maharashtra needs to pay attention to income and employment generation strategies so that its rural population is able to take the maximum advantage of the telecom revolution taking place currently.

Figure 6.4: Teledensity in Selected States of India
(as on 31st Dec., 2002)



Source: GoI, 2003b

Urbanisation and Water Supply

Year 2003 has been declared as the 'International Year of Freshwater'. The World Water Development Report (United Nations, 2003) has pointed out that water scarcity is one of the biggest challenges and the most vital developmental issues in the years to come. It has also reiterated the need for judicious use of water. Ensuring of basic needs such as right to health and food security (pre-conditions to poverty alleviation), protection of ecosystem, meeting competing needs due to urbanisation, supply of energy, *etc.*, are crucially linked to availability of water. Some of the facts and figures provided by United Nations (2003) are as follows: (i) the Asian continent is the most stressed continent as regards the availability of water. It supports about 60 per cent of world population and accounts for just 36 per cent of the global water resources; (ii) about half of the population in developing countries is exposed to polluted water; (iii) climatic changes are supposed aggravate the problem of water scarcity; (iv) the bacteria levels from human wastes in Asian rivers are three times that of the global average. The lead content in these rivers are 20 times more of that of the industrialised countries; (v) India is among the third worst countries as regards provision of quality water, it ranks 120th among 122 countries rated for the water quality indicators; and, (vi) the extent of urbanisation of global population is about 48 per cent at present and is expected to increase to 60 per cent by 2030 and urbanisation not only increases the need for more water but also generates more waste water. One litre of wastewater pollutes about eight litres of freshwater.

Urbanisation and Water Supply in Maharashtra

Urbanisation in Maharashtra is higher than the All-India average. There is a wide disparity in the levels of urbanisation (as regards the numbers of cities and towns and populations contained therein) within the state of Maharashtra. For example, in Konkan division (comprising Mumbai, Mumbai Suburban, Thane, Raigad, Ratnagiri and Sindhudurg), about 72 per cent of the population resides in urban areas and almost all of it is in Mumbai, Mumbai Suburban and Thane. As against it, in Aurangabad division the corresponding figure is as low as only about 20 per cent. High levels of urbanisation and the regional variations in urbanisation lead to a high and lop-sided pattern of demand for urban infrastructure. Naturally, the planning for provision of basic infrastructure to the urban population of the state is needed. Urban infrastructure includes urban transport, water supply, health care and other social services, and real estate and conservation of heritage structures. With increasing urbanisation in Maharashtra, the demand for all these above categories of urban infrastructure has been rising. However, in the years to come, water scarcity is anticipated to assume a proportion, which would be even more serious than that for oil. We have, therefore, addressed only this problem.

The 74th Constitution Amendment Act (1992) provided for constitution of State Finance Commissions (SFCs). SFCs recommend the basis for transfer of resources from state to local bodies and also specify the division of functional responsibilities between state and local bodies. Of course, this was made conditional to proper electoral procedures to be followed by the states.

The institutional and financial arrangements for supply of water in urban areas of Maharashtra are as follows. The entire range of activities related to water supply, *viz.*, augmenting water resources, treating the water, conveying the treated water, distributing it across consumers, operations and maintenance of billing and collection of user fees, *etc.*, are currently being provided in the state either by the Urban Local Bodies (ULBs) or by the Maharashtra Jeevan Pradhikaran (MJP). Collection of the wastewater, conveying it to the pumping station and then to the treatment plant is also the responsibility of the ULBs. Thus, the entire chain

involving water supply is vertically integrated. Similar to that in the case of power supply, there is scope for unbundling and privatisation in water supply service. The ULBs are responsible for providing safe drinking water supply and they find it difficult to fulfil this obligation due to huge financial requirements associated with this task. In order to circumvent this problem, the state government provides grants-in-aid (GIA) to ULBs. Besides this, the ULBs also receive soft loans from the institutions such as Life Insurance Corporation (LIC), Housing and Urban Development Corporation (HUDCO) and other multilateral agencies. It can be seen from Table 6.16 that larger is the size of ULB, lower is the GIA component in the financing pattern. Moreover, in the new financing pattern, the public contribution to the extent of 10 per cent has also been included. The restructuring of Capital Grants programme in July 2000, is aimed to provide incentives for improved performance of ULBs. Under this programme, 30 per cent of the state's grants are reserved for incentives. These incentives can be availed by plugging in leakages and reducing water thefts.

Major Problems in Supply of Water in Urban Maharashtra

The problems in water supply are very similar to those in power supply.

Poor Service Coverage

About 171 towns in the state get water supply below the norms. The average percentage of water supply available in summer is below 60 per cent of the norms. Only 72 towns get water supply as per the norms (Pethe, 2003). In Maharashtra, only 37 ULBs satisfy quantitative norms for water supply, whereas, 207 do not. The shortfalls are as high as 55 per cent.

Besides, even though the quantitative norms may be fulfilled by some of the ULBs, there is problem of supply of water only for a few hours during the day. More often than not, these hours are also not convenient to the public. Water availability in Western Europe is even lower than in India, but the supply is continuous unlike that in most of the urban areas of Maharashtra and also in the country. Unreliability of water supplied is also in terms of contamination of water.

Low tariffs

Almost all Municipal Corporations and Councils have uniformly low water tariff levels as compared to the cost of provision of water. As per the calculations of Sukthankar Committee Report (2000), the ULBs in Maharashtra have to hike the water tariffs at least 2 to 2.5 times, if they have to meet the cost of supplying water. Due to low tariffs and financial strain on ULBs, the paucity of funds for operation and maintenance functions can hardly be fulfilled satisfactorily. This also results in deterioration in the quality of assets of ULBs. Moreover, low tariffs act as disincentive for judicious use and recycling of water. With the increased power tariffs, upward revision of water tariffs has become all the more necessary, as increased electricity costs also lead to escalation in cost of supplying water. Needless to mention that, the rationalisation of water tariffs requires considerable political will. Maharashtra Industrial Development Corporation (MIDC) provides water to industrial estates at subsidised rates, if they are within the confines of the city. Industries can be asked to pay water charges based on commercial principles. Unlike many other infrastructure services, water is essential for survival and hence, poorest of the poor should not be denied of this source of life, even if state has to pay for it.

Table 6.16: Financing pattern of ULBs in Maharashtra

Category of ULB	Old Financing Pattern (%)		New Financing Pattern (Since July 2000) (%)		
	GIA	Loans	Public Contribution	GIA	Loans
Municipal Corporations	23.3	76.7	10	23.3	66.7
A-Class Municipal Councils	25	75	10	25	65
B-Class Municipal Councils	40	60	10	40	50
C-Class Municipal Councils	50	50	10	50	40
C1-Class Municipal Councils	100	-	10	90	

Source: GoM, 2000a

Box 6.6: Direct and Indirect Initiatives to Improve Water Supply

- 73rd and 74th Constitution Amendment Acts (1992)
- Enactment of Groundwater Act (1993)
- Establishment of Maharashtra Jeevan Pradhikaran (1994)
- Publication of White Paper on Water and Sanitation (Brihat Arakhada) by Government of Maharashtra (1995)
- Establishment of Water supply and Sanitation Department (WSSD) by Government of Maharashtra (1996)
- Established WSSD a core group in to prepare a roadmap for private sector participation in water and sanitation sectors in Maharashtra with support from Indo-US Financial Institutions Reform and Expansion (FIRE) Project (1999)
- Appointed of a Committee to prepare a road map for improved provision of water and sewerage services under the chairmanship of D.M., Sukthankar (2000)
- Restructuring of Capital Grants Programme to create incentives for water sector reform (2000)
Submission of the report by D.M., Sukthankar Committee (2001)

Regressive Nature of Water Charges

Due to uneven distribution of water supply (for various economic and non-economic reasons), the poor are worst hit. For example, the residents of distant suburbs of Mumbai (primarily from lower income groups), have to depend on the water provided by tanker vendors who charge substantially higher prices as compared to the water tariffs paid by economically better-off residents to whose houses the piped water is supplied. This is also true of Delhi where the poor pay US\$ 4.89 per cubic meter to vendors, whereas, households with piped connections pay just US\$ 0.01 (United Nations, 2003). In view of this, it is necessary that water-pricing scheme should include mechanisms to protect the poor. A reasonable water tariff with assured supply to poor will serve them better as compared to pricing water extremely low and supplying it primarily the better-off sections of society.

Contaminated Water Supply

As per the bacteriological analysis conducted by the State Public Health Laboratory, Pune (2000) for the samples (collected during Jan 1999 and Dec. 1999) of water supplied by the various Municipal Corporations/Municipal Councils in Maharashtra, about 10 were found to be contaminated by bacteria (Sukthankar Committee, 2000). A higher proportion of samples from Mumbai (14 per cent), Nagpur (12 per cent) and Kolhapur (11 per cent) were also found to be contaminated. Besides, the proportion contaminated samples; the extent of contamination also matters. Right to health is impaired by supply

of such contaminated water and the adverse impacts on the poor are much severe. Though bacterial tests of water are conducted, but their official reporting to public is not a common practice. It may be also noted that there are hardly any tests of water for its physical and chemical contamination. The problem of contamination of water also arises from the fact that the supply systems are meant for continuous supply of water, whereas, water is actually supplied intermittently resulting in physical damages of the supply equipment and ultimately leading to water contamination.

Irrational funding Policies

Funding for the new water projects by Central government, financial institutions and international agencies has been much easier than for operations and maintenance of old projects. Due to this, many new projects have been initiated without budgeting for their proper operations and maintenance. This aggravates the financial stress on local bodies rather than solving the problem of water supply. One of the reasons for the poor asset quality has also been the irrational funding policies for water projects.

Deficient Institutional Arrangements

MJP is responsible for construction and commissioning of water system in most of the urban areas of Maharashtra. The responsibility of operations and management (O&M) is often transferred to ULBs, after commissioning of the projects. Due to the inadequacy of financial resources to finance O&M, ULBs refuse to accept their responsibility. About 43 ULBs have declined to take over the commissioned projects from MJP (Indo-US, FIRE (D), 2002a).

Lack of Accounting Norms

There is no accounting norm set up for ULBs and MJP. In the power sector, public utilities are expected to earn a minimum rate (3 per cent) rate of return on capital. Similar norms need to be prescribed in the case of water supply providers.

Illegal Connections and Thefts

The difference between the quantity of water supplied by the ULBs and the metered quantity of water supplied is the Unaccounted-for Water (UFW). There can be two reasons for UFW: (a) physical losses due to leakage from pipes; and, (b) administrative losses due to illegal connections or thefts and unmetered water supply. In Maharashtra, the UFW ranges from 40 to 55 per cent of the total quantity of water supplied by the local bodies.

Augmenting Financial Resources of ULBs

Despite the fact that ULBs are responsible for providing and maintaining the urban water supply, in reality a significant proportion of population in almost every city has to depend on other sources, including the private sources, to meet its water requirements. In order to overcome the paucity of financial resources, three main approaches have been suggested in the literature. These are: (i) Private Sector Participation (PSP) in financing and execution of the projects; (ii) Floating of financial instruments by the ULBs in association with financial institutions; and (iii) Internal generation of resources by the ULBs, such as, by rationalisation of tariffs.

We have already discussed PSP in the context of power and roads. The institutional change will require involvement of the financial institutions. Providing incentives to commercial banks for lending for water sector schemes could be one of the possible ways to boost investment in this sector. In order to access funds from the financial sectors, the ULBs will have to fulfill the obligations to maintain proper financial accounts and report them in a transparent and consistent manner. This will aid the process of rating the ULBs bonds. Commercial Banks can also help in developing a vibrant secondary market for ULBs bonds.

The various ways of generating resources internally by the ULBs include, rational management

practices, appropriate priorities for allocation of resources, cost cutting exercises, selection of appropriate low cost technologies, proper maintenance and timely replacement of outdated equipment, identification of socially essential subsidies and eliminating the inessential ones, *etc.*

It is also pertinent to take note of the recommendations of Sukthankar Committee, such as, revision and improved collection of water tariff, allocation of funds for O&M, training of manpower of ULBs, involvement of community (and in particular, of women) in water supply schemes in order to meet the spirit of the 73rd and 74th Amendments of the Indian Constitution, redefining the role of MJP, *etc.*

Strategies and Policies for Development of Infrastructure

As mentioned earlier, kick starting of infrastructure projects has been a major concern of both central and state governments. This is reflected in the fact that in the Budget 2003-04, the Finance Minister has listed 'infrastructure development' as one of the five priorities (labeled as '*Panch Priorities*') of the Government. He also stated that in order to exploit the full potential of technological progress and competition, it has become mandatory to provide quality infrastructure, such as, roads, ports, reliable power supply, safe drinking water, *etc.* Moreover, all these have to be provided at reasonable prices to the users. To achieve this, substantial improvement in efficiency in infrastructure sector generation and distribution cannot be postponed any further.

As regards the initiative at the state level, GoM has brought out a draft of the MIDAS Act (Maharashtra Infrastructure Development and Support Act). This is a comprehensive bill dealing with an entire gamut of issues, ranging from regulation to institutional aspects. It also deals with decision frame and policy implementation aspect, as well as, grievance redressal mechanism. Whilst this is an important state level initiative, the so-called Act completely bypasses the ULBs and hence, is open to possible criticism.

The strategies that are being tried to improve provision of infrastructure services include, introduction of competition (in order to improve efficiency) through private sector participation,

unbundling so as to overcome the problem of bulky investment in vertically integrated plants, financial accountability and sustainability of infrastructure providers (through rational tariff setting and running the enterprises on commercial principles), checking thefts and leakages, setting up regulatory bodies to protect consumer interests, augmenting financial resources of ULBs through debt, *etc.* In line with the global trends, Indian infrastructure scenario too, is witnessing a changing role of government from its traditional role as a 'provider' of services to a 'facilitator' of services by ensuring that infrastructure services are actually delivered at reasonable prices. Establishment of various regulatory commissions is a testimony to this fact. In order to promote efficient provision of adequate and quality infrastructure, we suggest the following strategies:

First, as the provision of most of the infrastructure services involves Central Government, State Governments and local bodies, a proper integration of roles, responsibilities and obligations of these layers of governments is required. Accelerated Power Development Reform Programme (APDRP) can be treated as a model, which provides efficiency-based incentives to states. Similar incentive schemes can be devised for other infrastructure services as well and states' efforts in promoting efficiency can be rewarded. It may also be important to note that the strategy for development of infrastructure will have to be a multi-pronged one. Mere announcement of incentives may not be adequate for the states to take advantage of these. This is confirmed by the fact that utilisation ratio of funds under the APDRP has been just about 9 per cent.

Second, there seems to be hardly any option as regards more privatisation and unbundling, given the huge financial requirements for both creation of new capacity and also for the financial viability of existing public utilities. Tremendous possibilities exist to enlist private sector support in infrastructure. Private sector participation can take various hybrid forms including various parameters such as, responsibility of construction, transient ownership, operation, leasing and ultimate ownership. In the wave of privatisation and

deregulation that has been sweeping across the globe, it is being increasingly recognised that ownership and operation of infrastructure facilities are separable. Sophisticated models exist to meet the desired characteristics for individual projects. The private operators can finance and build a project, operate and generate project income and eventually transfer ownership to government at the end of the concession period. Depending on the characteristics, an infrastructure project can be more or less suitable for a particular form of the private sector participation. As suggested by Pethe (2003), the projects that capture significant social benefits such as urban transport or water supply systems are more suited for traditional government ownership. This is because of the fact that non-exclusion characteristic comes into play, making pricing difficult. Indeed, in the first case even joint consumption comes into play making it close to the pure public good category. Of course, this may not be true if tolls are applicable (as in the case of flyovers or express ways) and if metered connections (which is generally not the case) exist, the above is not true for water. On the other hand, projects which offer commercial returns, such as, telecom, provide a greater scope for private participation. While private sector participation may accelerate development in infrastructure, the government would still remain a crucial player. Privatisation can also act as a substitute for the lack of political will to implement tariff rationalisation by the state utilities. Privatisation in distribution of power and water can help in reducing leakages and thefts and improve financial position of SEBs and ULBs.

Third, realisation of 8 per cent growth target specified in the Tenth Five Year Plan hinges on the speed with which we develop quality infrastructure. Financial institutions will have to play a vital role in financing these projects. The ratio of bank credit to infrastructure financing to the total bank credit was a meager 2 per cent in 1998 and at present it is about 6.5 per cent. Financial institutions should rely more on credit appraisal of the infrastructure projects undertaken by public utilities and consistent monitoring of the projects financed by them rather than provide guarantees and counter-guarantees (MEDC Summit, 2002).

Fourth, rational tariff setting is one of the most challenging tasks associated with provision of infrastructure services. As it has already been argued, a 'single uniform principle' of price setting for all types of infrastructure services may be inappropriate. This is because there are differences between the types of infrastructure. Some of them, such as water, may be required for human existence and invoking market principles for supply of water to poor would be an inappropriate developmental strategy. Some cross-subsidisation or direct subsidy will be needed for supply of water to poor. At present, we find that pricing of water is distortionary and that water charges are regressive rather than proportional or progressive in nature. Similarly, rural electrification programme may not be feasible without direct funding from the government. Nevertheless, it is possible to benchmark the minimum rate of return to be earned by public utilities in order to ensure their sustainability.

Fifth, removal of anomalies in tariff policies both across various infrastructures (inter-services) services and also within the same service (intra-service) needs to be carefully looked into. One of the examples of the former is that in power sector industrial sector subsidises domestic and agricultural sector. In the case of water, industrial sector is given subsidy by MIDC. This makes the subsidy structure irrational, complex and non-transparent. As regards intra-service anomalies, one can find them in the water sector in the form of regressive pricing. Those households from lower income groups who neither steal nor resort to obtaining water from unmetered connections, end up paying more for worse quality of water supplied by the tankers as compared to the water tariffs paid by the better off sections of urban population. Yet another example of such anomalies can be found in the form of tariff structure in power sector, wherein, cross-subsidisation is coupled with opening up this sector for captive power generation and for private sector. This has led to erosion of consumer base from commercial and industrial sectors, thereby, creating financial problems for electricity boards.

Sixth, proper sequencing and implementation of reforms in infrastructure sector are badly needed. Needless to mention that, the issue of governance cannot be ignored in this process. Dabhol case

reconfirms that a supportive policies by the state does not mean that it should absorb all losses associated with ill-designed policies. In Maharashtra, there is no shortage of base generation capacity but there is the problem of peak deficit. Dabhol was to add to the base generation capacity rather than solve the problem of peak deficit. This is an indication that prioritisation of problems is needed before implementation of reforms. In order to address the problem of peak deficit, serious exploration of demand management approach by resorting to time zoning needs to be done. Guarantees and counter-guarantees based on unrealistic assumptions seem more to be a problem of governance rather than opening it up for the private sector.

Seventh, the problem of high costs of infrastructure needs to be attended to. Regulatory bodies in various spheres, such as, Electricity Regulatory Commissions, Telecom Regulatory Authority of India, *etc.*, have been established to protect consumers' interest. The concept of fair-price seems to be based on a reasonable mark-up for the infrastructure providers rather than based on efficient production and lowering of distribution costs. State initiative in promotion of appropriate and advanced technology and disseminating the same can also be experimented. In fact, in many countries, various state departments facilitate technology transfers to the private sector. A related issue, which needs to be addressed, is that the regulatory bodies should be able to function independently and objectively. Regulatory bodies cannot be watchdogs of public interest if their decision-making is either influenced by the government or by business lobbies from the private sector.

Eighth, some of the infrastructure schemes, such as construction of roads can be integrated with the employment and income generation programmes. This will also help in alleviation of poverty.

Ninth, some awareness campaigns by the mass media may be required. Indian consumers have always been a victim of exaggerated claims of advertising campaigns for products. A multiplicity of private sector players in provision of infrastructure is something new, which is being witnessed by the Indian users of infrastructure. Only

a few can grasp the implications of the deal, which they make with the service provider. This has been demonstrated in the telecom sector. Regulatory authorities can insist that users of infrastructure be provided complete and comparative details about the services offered to them.

Last but not the least, one of the most contentious issues in development of infrastructure

pertains to the land acquisition and displacement of Project-Affected People (PAP). Philosophically, there is no ground for displacing people from their lands for welfare of others. Skirting this problem, if displacement does take place, the state should at least ensure proper compensation packages to the PAP to ensure development of infrastructure with a less inhuman face.