

**SACRED COWS ON THE ROAD TO DEVELOPMENT:
REFORMING INDIA'S INFRASTRUCTURE SECTORS**

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INTRODUCTION

The Indian economy is at a crossroads. In recent years, it has been one of the fastest growing economies in the world partly for cyclical reasons on the back of abundant monsoons and partly as a result of 15 years of economic reform. The government would like to push growth rates even higher to match the recent performance of China, but to do so will require modern and well-functioning infrastructure. Following years of under-investment and ever increasing demands being placed upon it, India's infrastructure is in woeful condition. Substantial investment in infrastructure will be necessary just to sustain existing growth rates for the economy, but this investment will not by itself create infrastructure of sufficient quality and quantity to facilitate economic growth and to help alleviate poverty. Deeper reforms than have so far been attempted, together with more conscientious implementation, will be necessary.

Since India began to liberalise in 1991, the central government has pursued economic reforms almost regardless of the party in power. Some of these have touched upon the infrastructure sector which is commonly regarded, both within and outside of the government, as an obstacle to a faster development trajectory. Although relatively little has been privatised compared to, for example, Latin America, some publicly-owned infrastructure enterprises have been corporatised and the private sector has been allowed to compete in certain segments. Less reform has occurred at the state level, though progress has varied greatly by state.

These reforms have made a difference, and it is possible to argue that India has turned a corner on the worst failings of its infrastructure. But with more rapid economic growth and a rising population, infrastructure improvements must "run faster just to stand still" as the demands placed on power plants, roads and railroads increase. With the exception of telecommunications, the shortcomings of Indian infrastructure impede the traditional growth path witnessed in other Asian countries of rising agricultural productivity followed ultimately by export-led development. The burdens placed on agriculture from the lack of infrastructure, such as water or electricity, and on industry from the cost and quality of what is provided show little sign of relenting.

One way to give a flavour of the state of disrepair of Indian infrastructure would be to provide anecdotes about untreated sewage, the time spent queuing for water, power blackouts, train accidents or the time it takes to drive from one city to another. Newspaper stories provide abundant examples and the sectoral sections in this paper provide the flavour. Another way is to compare performance in India with that in China, a country India wishes in many ways to emulate. The differences are striking, whether looking at inputs in terms of amounts invested or outputs in terms of services provided. The comparison with China will be made again and again throughout this paper.

The Indian government is well aware of these inadequacies. To overcome them, it hopes to commit \$320 billion of public and private funds to the nation's infrastructure over the next five to seven years – far in excess of what it has been able to muster from either source in the recent past. Given the parlous state of government finances, the private sector will have to take on a much larger role than it has heretofore, particularly foreign investors who have been conspicuous by their relative absence. A recent government report estimates that the Indian

economy could absorb \$150 billion of foreign direct investment (FDI) into infrastructure over this period.

Financing these ambitious plans for expanding and improving infrastructure services is just part of the issue. The root of the problem with Indian infrastructure is as much a question of inadequate reforms as it is of insufficient investment. In spite of gradual reforms, the central and state governments have still not addressed some of the fundamental imperfections in the market for infrastructure which affect most sectors to varying degrees. These imperfections are discussed below. Unless they are tackled directly, the money envisaged to be spent on infrastructure will not achieve the targeted results in terms of infrastructure services or in attracting any significant amounts of foreign capital.

I. CHINA SYNDROME: INFRASTRUCTURE IN CHINA VERSUS INDIA

India's performance in individual infrastructure sectors is compared to that in China throughout the paper, but it is nevertheless useful to fit the relationship between the two countries' experiences in a broader context first. India and China are two of the largest and fastest growing economies in the world. A Chatham House study was one of the first to make the comparison.

[B]oth countries are attempting simultaneously but independently to liberalize dysfunctional systems of central planning, state ownership and government regulation which have been created in four decades of democratic socialism in India and of communism in China. Both have carried through a significant measure of market reforms in industry, the financial sector, trade and foreign investment rules (and, in China, agriculture).¹

Both also began the reform process with insufficient and inefficient infrastructure. With only six telephone lines per 1,000 inhabitants in both countries in 1990, China now has 312 and India 46. Within the past decade, China has created a market for mobile telephones of over 400 million compared to over 100 million in India. In both countries, the market is growing quickly. Per capita electricity consumption since 1990 has grown fivefold in China and threefold in India, with the result that China now produces three times as much electricity per person as India and at a cost almost one third lower than in India. Since 1980, China's rail network has expanded by almost 50 per cent compared to about five per cent in India. China also spends almost ten times as much on its road network.

Overall, China now spends roughly eight times as much on infrastructure or over three times as much as a percentage of GDP. Morgan Stanley estimates that the costs of infrastructure in India, excluding telecommunications, are 50 to 100 per cent higher in India than in China. "The gap in infrastructure stocks is now so large that for India to catch up only to China's present levels of stocks per capita, it would have to invest 12.5 per cent of GDP per year through 2015."² The Indian government has ambitious plans to spend an unprecedented amount of money on infrastructure by 2012 but still less than the amounts invested by China.

¹ Cable (1995), p. 4.

² World Bank (2006a), p. 106.

Concerning private participation in infrastructure in the two countries, the similarities between India and China are greater than the differences. Both countries rank highly among developing and transition economies in terms of the value of public-private partnerships³ (PPPs), as one might expect given the size of their economies. But if one normalises for GDP, China has the lowest value of PPP as a share of GDP of any of the top 15 countries for PPPs listed in Table 1. India has the third lowest share after China and Russia.

Table 1. **PPPs by value**

	<i>\$ billion</i>	<i>% GDP</i>
Brazil	174	32%
Argentina	73	51%
China	72	4%
Mexico	70	10%
India	51	8%
Malaysia	48	41%
Philippines	36	37%
Indonesia	32	13%
Russia	32	7%
Turkey	30	11%
Thailand	29	18%
Poland	28	12%
Czech Republic	22	27%
Hungary	21	23%
Colombia	20	22%

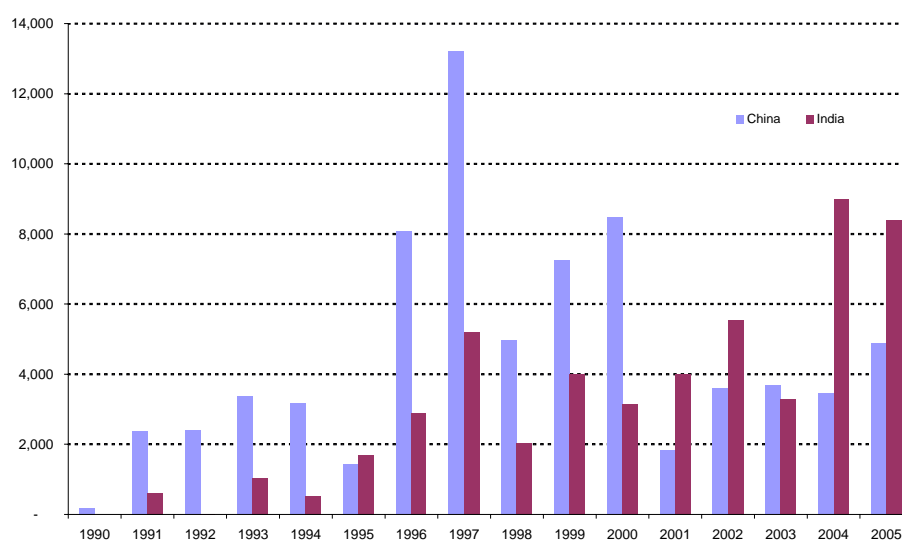
Source: World Bank PPI database

Trends in PPPs in India seem to lag behind those in China. Almost 60 per cent of total PPPs in China occurred between 1996 and 2000, while for India the same is true for the most recent five years (Figure 1). As a result, India has been the second most active country in terms of PPPs over the past five years, just behind Brazil but ahead of China. While private participation in infrastructure worldwide has yet to regain the popularity it enjoyed in both corporate and government circles before the Asian financial crisis, private sector interest in Indian infrastructure continues to reach new heights. The value of projects involving private firms over the past five years has been three times as high as in the 1990s, with the past two years witnessing record levels of investment in Indian PPP projects.

Of course, PPP projects represent only one part of infrastructure spending since the greater part of investment is still by public enterprises with no private participation. We have already seen that the Chinese government devotes far more resources to infrastructure overall than in India. In addition, a simple comparison of outlays says nothing about the efficiency with which the money is spent.

³ There is no standard definition of what constitutes a public-private partnership, the World Bank (2006b) suggests that “they are generally regarded to be contracts for services traditionally provided by the public sector that combine investment with service provision and see significant risks being borne by the private sector”. In terms of the data on PPPs, the total value of the investment cited includes both the public and the private contribution.

Figure 1 **PPPs in India and China 1990-2005** (\$ million)



Source: World Bank PPI

There is an obvious temptation when comparing India and China to go beyond one's remit by discussing broader issues of the political economy of reform. Is China's more centralised and authoritarian political system better at marshalling public and private resources to devote to infrastructure? According to Lal (2006, p. 14), "[p]ro-reform elites in India tend to blame democracy for much of the delay and inconsistency with which the country has gone about implementing its reform agenda".

How democracy affects the speed and durability of reform can only be answered empirically over a very long time period. There are nevertheless a few casual observations which can be made based on the infrastructure sectors described in this study. First, Chinese infrastructure reform has been neither consistent nor complete, in spite of the tremendous advances which have been made in infrastructure services. As in India, there have been setbacks and occasional protests, often related to land clearance. There are also important remaining restrictions such as on foreign ownership in Chinese telecommunications. It seems plausible to suggest that China and India, rather than having different development trajectories, might simply have different starting dates, with Chinese reforms preceding those in India by a number of years.

At the very least, the Chinese experience provides two lessons for India. First, it shows how far India has fallen behind given the slow pace of reform. Second, it shows how quickly infrastructure can be improved in a more suitable regulatory environment.

II. TRENDS IN PRIVATE PARTICIPATION IN INDIAN INFRASTRUCTURE

Public-private partnerships can take several forms: concessions, divestitures, greenfield projects or management and lease contracts. The Indian government has relied almost exclusively on greenfield projects (86 per cent), with divestiture of public-owned enterprises playing only a relatively modest role. Although most countries tend to favour greenfield projects, such ventures still represent less than one half of PPPs in value terms worldwide. Governments, particularly in Latin America and Eastern Europe, have been just as keen to divest themselves of underperforming state assets. This has not yet happened in India to any significant degree.

By sector, the largest share of PPPs in India has been in telecommunications, followed by energy (Table 2). For reasons which will be explored later, India has received twice as much investment in PPPs in telecommunications as China. The transport sector has attracted very few private investors to date and most of that in the past few years. China has received five times more investment in this sector as part of its massive capital outlays on transport infrastructure. It is likely that the Indian figure will rise over the next few years if the spending targets in the National Highways Development Plan can be met which is still an open question.

Table 2. **PPPs in India by sector and sub-sector 1990-2005**

<i>Sector</i>	<i>Sub-sector</i>	<i>Projects (no.)</i>	<i>Investment (\$ m)</i>
Energy		66	17,907
	Electricity	63	17,257
	Natural gas	3	651
Telecom		34	28,195
Transport		70	5,343
	Airports	4	848
	Railroads	2	198
	Seaports	14	1,863
	Toll roads	50	2,434
Water & sewerage		2	2
Total		172	51,447

Source: World Bank PPI database.

Given the importance of the water sector for poverty reduction, public health and agricultural productivity and the gross inadequacies of water distribution and treatment in India, the lack of private investment in water should be a cause of concern. Private participation in water is politically sensitive in most countries, and several large projects have been cancelled in the Philippines and Argentina, for example. But private investors have nevertheless participated in water projects worth \$51 billion worldwide since 1990, of which India represents an infinitesimally small share.

Who are these private investors? Most private participation in infrastructure involves local firms, not foreign investors. In China, six of the top ten private participants are national or Hong Kong investors. In India, local participation is even greater, with eight of the top ten

sponsors being national firms (Table 3). These top ten private investors in PPPs represent 60 per cent of the total value of PPPs in India. Although local investors are the most active sponsors of PPPs in many countries, South Asia as a whole has had the largest share of local investors in total PPPs of any developing region. Whether this reflects the superior competitiveness of Indian firms and their greater capacity to raise financing, preferential treatment by the government or a lack of interest on the part of foreign firms will become clear in the sectoral reviews below. Many of these Indian firms are involved in more than one infrastructure sector, reflecting the high degree of diversification of many large Indian conglomerates.

Table 3. **Top 10 sponsors of PPPs in India**

	Sponsor	Total investment (\$ m.)	share of total value
1	Reliance ADA Group	10,756	15.5%
2	Tata Enterprises	7,969	11.5%
3	Bharti Enterprises	5,703	8.2%
4	Singapore Telecom	5,419	7.8%
5	Essar Group	3,313	4.8%
6	Hutchison Whampoa Ltd	2,479	3.6%
7	Aditya Birla Group	2,422	3.5%
8	GVK Group	1,278	1.8%
9	GMR Group	1,236	1.8%
10	Jaiprakash Associates Limited	845	1.2%

Source: World Bank PPI database

The trends in private participation in Indian infrastructure described above suggest two general observations. First, PPPs in India are on a clear upward trend and are likely to continue to grow in the near future as many recent reforms start to have an impact. Second, with few exceptions, foreign firms have yet to participate substantially in Indian infrastructure and hence still represent a largely untapped and highly elastic supply of capital for India as it struggles to correct the years of under-investment in one infrastructure sector after another.

III. INDIAN INFRASTRUCTURE BY SECTOR

Power sector

State of play

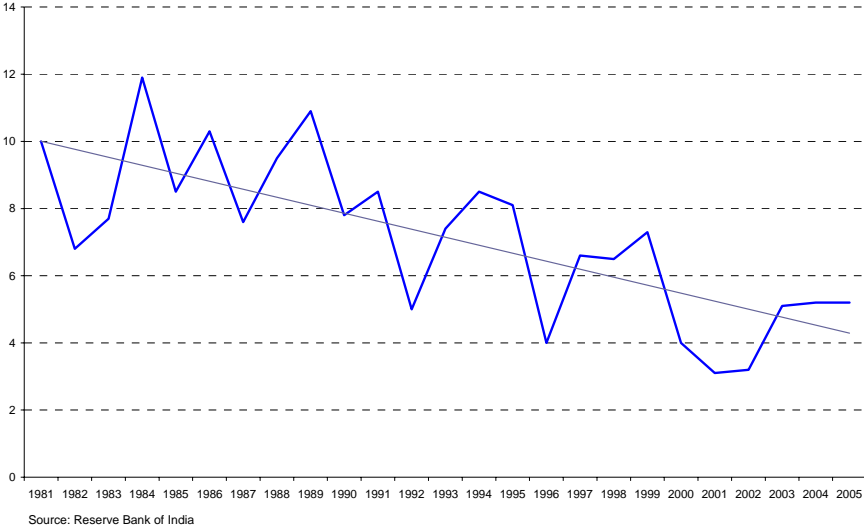
The Indian power sector is one of the most expensive (for industry) and under-performing of any in the world. Even for those lucky enough to be hooked up to the system, peak electricity supply falls 12 per cent short of demand. Only 55 per cent of total electricity generated is

billed and 41 per cent actually paid for.⁴ The rest is lost, stolen in transmission or simply given away.

The market for electricity is heavily distorted by subsidies and cross-subsidies. On average, retail prices for electricity cover only 75 per cent of real average costs. Through higher prices paid by the railways and commercial and industrial firms, generous cross-subsidies are provided to households and the agricultural sector. It is estimated that households pay only 60 per cent of the cost of electricity and farmers only 10 per cent. While such subsidies are often billed as targeting the poor, they tend to favour the richest segment of the agricultural population.⁵

India has 128 gigawatts (GW) of installed capacity, of which over one half is provided by the states, another third by the central electricity board and only 12 per cent by the private sector. Growth in electricity generation has picked up recently, but this might prove to be only a cyclical upturn in what is otherwise a clear downward trend (Figure 2).

Figure 2. **Annual growth in electricity generation** (fiscal years, per cent)



Whether over-charged companies or under-charged farmers, consumers must cope with power cuts, frequency variations and other supply disturbances. For this reason, industry now produces around 19 GW of electricity for its own use which exceeds the total output of privately-operated power plants. In a World Bank survey of Indian firms, 60 per cent had their own generator compared to only 30 per cent in China. Admittedly, this figure is down from 69 per cent four years earlier, but it still represents a loss of nine per cent of the total value of firm output.⁶ The same World Bank report estimated that Indian firms face on average 17 significant power outages per month.

⁴ IEA (2002), p. 21.

⁵ Lal (2006, p. 9) suggests that this mis-targeting is intentional since large-scale farmers tend to be the patriarchs of local clans and hence act as political intermediaries by delivering votes to their favoured political party.

⁶ World Bank (2004c), p. 35.

On top of non-payment, theft, unsustainable subsidies and poor quality, the Indian power sector fails to provide universal access. By the government's own estimates, only 44 per cent of rural households have access to electricity.⁷ A World Bank study puts the figure closer to 25 per cent.⁸

Under the Indian Constitution, electricity is on the "concurrent list" which implies that jurisdiction is shared between the central and state governments. While the states have primary responsibility for setting tariffs, central law prevails in the event of a conflict. State electricity boards (SEBs) owned by the individual states dominate the sector and are the primary source of weakness in Indian power. Lal (2006, p. 3) argues that the SEBs are "inefficient and overstaffed, with corruption⁹ and political interference at all levels". As a result of mismanagement and political capture, the SEBs greatly exacerbate the fiscal crisis in India, with deficits representing an estimated 1.2 per cent of GDP (down from 1.5 per cent). The 19 SEBs are effectively bankrupt.

Government targets for adding capacity are routinely less than 50 per cent achieved, although the Tenth Plan is expected to achieve 90 per cent of its target for additional capacity. The government has set an ambitious target of providing Power for All by 2012 which would require additional capacity of 100 GW. Considering that the previous five year period contributed only 34 GW, this objective seems like an impossible task. Whether it is achieved will depend on two related factors: the extent to which reforms are implemented and the eagerness of private producers to participate in the Indian power sector. These two issues are discussed separately below.

Reforms

Power sector reform has been on the agenda since the beginning of liberalisation in 1991. At a legislative level, reforms have progressed continuously in spite of frequent changes in leadership. The market was opened to independent power producers (IPPs) in 1991, and states were mandated to set up independent State Electricity Regulatory Commissions (SERCs), along with a central government counterpart (CERC). As a result, tariff policies were to be made more transparent and cross-subsidies reduced, and SEBs were to be restructured and corporatised. Central and state transmission utilities have been set up to coordinate and promote interstate transmission of electricity.

Many piecemeal reforms were formalised in the Electricity Act of 2003. The act "consolidates existing laws on generation, transmission and distribution; supersedes conflicting state legislation (a matter of some contention); introduces legislation to govern new concepts like trading and open access; liberalises and delicens generation (except hydro); expands the definition and activities of captive plants; and allows competition in distribution."¹⁰ It will ultimately allow large-scale producers to bypass the SEBs completely in the case of bulk consumers. As such it represents a significant milestone of the road to reform.

⁷ GOI (2006), p. 180.

⁸ Lal (2006).

⁹ A nationwide survey of public perceptions ranked the power sector as the third most corrupt out of all public services and the second most in terms of social impact (Lal 2006, p. 12).

¹⁰ Lal (2006), p. 16.

The problem lies in implementation. By almost any measure, these legislative reforms cannot be considered to have achieved their intended results. And until they do, it is unlikely that the private sector will play any more than a bit part in India's power sector. Most of the recalcitrance has been at the state level.¹¹ There is even the possibility of policy reversals concerning the unbundling of SEBs and tariff setting.

Reform of SEBs, which is central to solving the power deficit, is held up by several aspects of political economy. Firstly, SEBs are a rich source of funds for a ruling politician from which to recoup the high costs involved in gaining an elected office. Secondly, subsidies to farmers are seen as a way of delivering votes, and favoured farmers strongly resist any attempts to initiate cost-recovery pricing in the sector, let alone even metering. Thirdly, "for vast swaths of the Indian lower and middle classes, a government job is primarily a passport to security".¹² As in many countries, they are among the most vociferous opponents of any reform-induced restructuring.

Any reform entails winners and losers, and these obstacles should not necessarily be considered as insurmountable. It is for reformers in the central government to create the right balance of carrot and stick to force change at the state level. Already the fiscal burden of SEBs for the states is a strong inducement.

With the growing integration of the national electricity market and the financial problems at SEBs, central generating companies are now taking an increasing share of the total pie. By 2000, they already represented one quarter of total capacity and are expected to exceed the combined state and private capacity additions in FY2002-2007. These central units allocate power to more than one state at a time thus benefiting from economies of scale and a more efficient response to demand fluctuations. Their plant load factor is much higher than for SEBs, although less than for private plants.

These central generators are organised under the National Thermal Power Corporation Ltd (NTPC), owned 89.5% by the government. Corporatised into a "navratna" company, the NTPC enjoys significant operating independence and can raise commercial financing without explicit government approvals. The Asian Development Bank gives the NTPC high marks: the "NTPC is a technically and financially sound enterprise with strong cash flows, a model corporate governance reform programme and experienced management".¹³

Private participation

Private, including foreign, investment has been permitted in the energy sector since the early reforms in 1991, but by almost any measure the results have been disappointing. Indeed, to the extent that private firms do participate, it is more likely to be through their own autonomous generation of electricity for the needs of their business. Private firms have participated in projects worth almost \$18 billion in this sector, but the public sector still represents 90 per cent of generation and most of transmission and distribution. Foreign investors are, for the most part, an untapped resource.

¹¹ SERCs have been set up in 24 states so far, and 20 states have issued tariff orders. But only two states have privatised distribution.

¹² Lal (2006), p. 13.

¹³ "ADB non-sovereign loan to help bridge India's power deficit", *ADB News and Events*, Asian Development Bank, 27 July.

New private capacity is expected to represent only 14 per cent of total additions to capacity in FY2002-07. The 5 GW of additional capacity that this represents is little more than two thirds of that targeted for the private sector in the Tenth Plan. Private industrial firms produce far more captive capacity¹⁴ for their own production than do IPPs for sale to the state and central electricity boards.

In the early phases of reform, seven fast-track projects were taken up by foreign investors, including Daewoo, China Light, Cogentrix Energy, EDF, National Power and others. “[S]ome backed out, while others faced delays in clearance, renegotiation of contracts, and even opted for unilateral abrogation of the project”.¹⁵ The experience of Enron and others in the Dabhol Power Company is instructive in this regard (see Box 1).

Box 1. Dabhol, Dabhol, Toil and Trouble

Following the government’s decision to allow full foreign ownership in power generation, the US company Enron approached the government in June 1992 to build a 2 GW power plant on a Build-Own-Operate basis in the state of Maharashtra at a cost of almost \$3 billion. It was billed as the largest foreign investment in India and would have provided two per cent of Indian generating capacity. The plant was to be fuelled by naphtha, an efficient but high cost alternative to coal. The private consortium signed a power purchase agreement (PPA) with the local SEB, backed by a guarantee from the central government.

Following state elections in 1995, the new government unilaterally cancelled the project, citing excessive costs and potential corruption. The project was ultimately renegotiated, and construction restarted after costly delays. Once production began, the SEB regularly defaulted on its payments and eventually annulled the contract. The dispute took four years to resolve¹⁶ and led to the creation of a new public company (with both state and central government involvement) to restart production and to complete the second phase of the project.

The problems with Dabhol represent a significant setback for attempts to attract private, particularly foreign, investment in power projects. In common with many IPP projects, the idea was proposed by the private investor with no competitive bidding. This led to charges of potential corruption owing to the lack of transparency in the process. It also meant that neither the state nor the central government considered lower-cost solutions to providing power. The private sector can also be criticised for a lack of due diligence, particularly in its choice of relatively expensive natural gas as an energy source given India’s abundant supplies of coal and the lack of financial solvency of most SEBs. The financial viability of the project would also have been enhanced had more states been involved in the PPA.

Source: IEA (2002), Sader (2000), GOI (2006).

As a result of these early setbacks, foreign investors largely withdrew from the market, and whatever private investment which has occurred has tended to come from Indian companies. Eight of the top ten private investors in this sector are Indian companies, representing over

¹⁴ Captive capacity is mostly used by industry for standby purposes or as a substitute for electricity provided through the grid.

¹⁵ Sarkar & Sharma (2001), p. 3.

¹⁶ A comprehensive settlement was reached only in 2005, over a decade after the initial agreement had been signed.

one half of the value of projects involving private firms. When private investment does occur, it tends to be in generation (93 per cent) rather than transmission or distribution, reflecting the slow pace of reforms. Recent, though rare, examples of privatisation of distribution show mixed results.

In Delhi, the power sector was unbundled and bids were requested on the basis of the greatest reduction of technical and commercial losses. According to the government; the benefits have been considerable: lower capital outlays by the government; full payment for the power provided to the distribution company; better quality and faster repairs; and higher levels of investment. At the same time, the regulator has permitted tariff increases of only 11 per cent compared to the agreed increase of 40 per cent in the first few years. And in a survey of consumers, over half felt they had not benefited from privatisation and protested against alleged faulty metering and billing.¹⁷

In another privatisation in Orissa, the foreign investor AES withdrew from the project, citing the need for tariff hikes and the inaction of the government in combating pilferage and meter tampering. Private investors are likely to hesitate before submitting bids if they find a “lack of political support in collecting dues, in retrenching inefficient staff, in disconnecting illegal connections, in installing meters and feeders, and finally, in combating theft”.¹⁸ Without this political support, the private operator has not been able to meet the required reductions in transmission and distribution losses.

A recent strategy to attract private interest is the creation of shell companies, in a kind of reverse turnkey project where the government hands a prepared (though not built) project to the private investor, with all clearances and off-take agreements already in place. The government hopes to develop five “Ultra-Mega Power” plants, each with capacity of 4 GW and costing over \$3 billion. The initial groundwork such as land acquisition, coal-linkage/allotment of coal blocks, water linkage, environment impact assessments and the preparation of feasibility reports is to be performed by the shell companies prior to inviting bids. There would even be a preliminary credit rating from an Indian agency, although there will be no government guarantees. The power generated will be supplied to several states.

Private investors have been put off by the financial insolvency of the SEBs, their potential customer, and by the lack of reform in the sector. As in many other developing and developed countries, early enthusiasm on the part of foreign investors was quashed by drawn-out contract negotiations and renegotiations or annulments and by unrealistic demand projections. Out of the total 100 GW of generating capacity the government would like to add by 2012, 23 GW are expected to come from private sources, representing an almost fivefold increase over the previous five years. Given the poor implementation of reforms and the mixed experience with privatisation of distribution, this seems an unrealistic goal. With one of the world’s largest and fastest growing markets, together with a certain Hindimania in the western business press, India has the potential to attract far more foreign investment in this sector, but investors will probably only come when the reforms have started to show that they can produce results.

¹⁷ Lal (2006), p. 7, fn 13.

¹⁸ Sarkar & Sharma (2001), p. 10.

Telecommunications

In the typical feast or famine of Indian development, the telecoms sector represents almost the polar opposite of much of the rest of Indian infrastructure. India is one of the largest, fastest-growing and most inexpensive telecoms markets in the world.¹⁹ With only 7 million subscribers in the early 1990s, India now has almost 20 times that many – mostly mobile telephone users – with another 7 million added each month. In mid-2006, India eclipsed China for the first time in terms of new subscribers with 5.9 million compared to 5.1 million. In spite of this growth, coverage was still only 11 per cent at the end of 2005, with telephone use in rural areas at less than two per cent. The government has targeted 250 million telephone subscribers by the end of 2007.

This radical transformation of the sector was not pre-ordained: it is the result of a combination of government reforms and serendipitous technological change. A decade ago, it was still possible to talk of the many obstacles to reform, including “the 470,000 bureaucrats and heavily unionised workers in India’s Department of Telecommunications”, as well as the “desperate need for institutional reforms”.²⁰ Since then, the government has either privatised or corporatised the public telephone companies and established the Telecom Regulatory Authority of India (TRAI). In contrast in China, all telecom companies are state-owned. Internet services were liberalised in 1998 and the monopoly of international long distance (ILD) was ended in 2002. The Tata Group has since bought a 45 per cent share of the ILD operator (VSNL), while the government retains 26 per cent.²¹

Why has reform been possible in telecoms but less so in other sectors? Firstly, mobile telephony lowers entry costs for private firms, heightens competition and minimises the need for private operators to distribute their services through the existing infrastructure in cooperation with the public operator. Secondly, the existing infrastructure was so inadequate prior to reforms that there was no heavily subsidised consumer group resisting reforms. Instead, there was massive pent-up demand, even among the poorest segments of the population. Even if there had been a subsidy, prices have fallen to such an extent – long distance national calls are now less than one-tenth of the cost of five years earlier – that the subsidy would now be irrelevant. Thirdly, telecommunications is not on the concurrent list and hence the central government has sole responsibility for the sector.

The private sector has responded quickly to these reforms. As in other infrastructure sectors, local firms predominate with the top three Indian investors representing three fourths of all investment in PPPs. Foreign investors have nevertheless been keen to participate, and their share is likely to rise quickly now that the limit on foreign ownership has been raised from 49 to 74 per cent. Already before the ceiling was raised, approved foreign investments in Indian telecoms represented almost \$10 billion, including by Hutchinson Whampoa, Singtel, AT&T and Distacom. Since the reform, Vodafone (UK) has invested \$1.5 billion to acquire a ten per cent stake in Bharti Televentures and Maxis Communications (Malaysia) has paid \$1 billion for an ownership share of another operator.

¹⁹ Prices for calls in India are low even with relatively heavy taxation of telephone services. The telecom sector contributes almost one third of India’s service tax.

²⁰ Murphy, Kevin, “India moves to ring in a modern age of telecoms services”, *International Herald Tribune*, 11 February 1994.

²¹ International operators did not bid for VSNL since, with foreigners already holding 38 per cent of the equity through global depository receipts (GDRs) and portfolio holdings, a potential investor would only have been allowed a share of 11 per cent under the 49 per cent foreign limit at the time. (Venkataraman 2002).

The telecoms sector has not been immune to some of the problems seen in other sectors, such as changes in the rules in mid-course.²² There are also potential bottlenecks in terms of spectrum, and service quality sometimes lags behind that in other countries.²³ But by and large the results of reform have been stupendous and are a critical factor in the rising importance of India in business process outsourcing. The economics of telecommunications are sufficiently different from other sectors that care should be taken in drawing broader lessons. At the very least, the experience in this sector indicates that India is capable of rapid reform if entrenched interests can be overcome.

Transport

Roads

India has the world's second largest road network, almost twice as long as in China. By any other comparison, however, India lags far behind China in the quality of its roads and the resources devoted to the sector. The Chinese government increased spending on roads from \$1 billion in 1991 to \$38 billion in 2002 or 3.5 per cent of GDP. It is estimated that this investment raised China's GDP by two per cent annually.²⁴ In contrast in India, road expenditures averaged only \$1 billion annually in the 1990s and \$4 billion at present.

Poor quality roads not only perpetuate rural poverty, they also militate against the target of the Indian government to achieve sustainable growth rates of ten per cent as in China. India's roads carry two thirds of freight and most of passenger traffic in India. Although national highways account for only two per cent of total road length, they carry about 40 per cent of this traffic. Most of these highways consist of only one or two lanes, and only 40 per cent of rural villages have access to all-weather roads.

The government has called for investments of \$38 billion in road infrastructure by 2012 through the National Highways Development Project (NHDP). The NHDP includes several phases, the first two of which are currently being implemented including a highway system linking four major urban centres. So far, raising the money has been less difficult than ensuring that it is well spent. Delays and cost overruns are endemic in this sector worldwide, but even more so in India. A government audit of spending on roads found that only 29 per cent of the first phase of the programme had been completed by the target date. Completed segments suffered delays of up to 28 months and cost overruns of 22 per cent on average.²⁵

These delays arise for a variety of reasons: lawsuits from farmers unwilling to give up their land²⁶ and a general lack of readiness of construction sites, inefficient contract management and procurement processes, a lack of institutional capacity in government agencies, law and order problems and the poor performance of some contractors. Local politicians are often

²² In the late 1990s, for example, the government moved to allow fixed-line operators to offer limited mobile telephone services using a cheaper technology than that of existing mobile operators who protested vehemently at the decision. (Rao, 2003).

²³ The World Bank (2004a) estimates that even in 2004 it could still take 30 days to get a fixed line in India, compared with only 9 days in China.

²⁴ Harral et al. (2006), p. 2.

²⁵ World Bank (2006a), p. 86.

²⁶ One project, involving 170 km of road and costing \$525 million has been held up for seven years as a result of over 300 lawsuits arising from land acquisition.

keen to see projects begin in their jurisdiction but are not held responsible for any subsequent delays.

Another criticism of the NHDP is that building new roads is only part of the answer to India's transport problems. Maintenance spending on roads in India is estimated to be only one third of the \$1.6 billion that should be spent each year just to maintain the existing stock, in spite of the fact that "all the studies, in India and elsewhere, indicate that maintenance, effectively implemented, gives the highest economic return".²⁷ A related problem is the poor quality of new construction or what has been called the Build-Neglect-Rebuild model of infrastructure development. Quality problems were also experienced in China in the 1990s.

Road transport could also benefit from reforms in more general areas. A recent survey of India in *The Economist* described the trials and tribulations involved in transporting freight by road from Kolkata to Mumbai as related by an Indian freight firm. The vignette demonstrates effectively that transport costs involve much more than the availability and quality of roads and the tolling system in place. The 2,150 km trip took eight days at an average speed of 11 km per hour (which, if one excludes night time, is not far off the estimated average of 30-40 kph for road travel India). The driver spent 32 hours at tollbooths and checkpoints, particularly at border crossings between states.²⁸

While these examples are a useful reminder that improving road transport is not just a question of increased investment, few argue that such investment is not necessary. India is still a long way from levels of spending seen in China, even with its ambitious NHDP plans. The relevant question for our purposes is whether the private sector can fund this expenditure gap. Total projects involving private sector firms amounted to only \$5 billion by the end of 2005 in India or four per cent of total investment, compared with \$25 billion (ten per cent) in China. As in other infrastructure sectors, most of these private investors have been Indian firms. Harral et al. (2006, p. 4) estimate that "the better established capital markets and associated legal infrastructure in India offer superior prospects for private participation in highway finance" than what was seen in China.

For the first two phases of the NHDP, the main source of finance has been the fuel cess, with complementary financing by the World Bank and the Asian Development Bank. Private sector participation has been relatively modest. The government has decided that the subsequent two phases should be implemented on the basis of Build-Operate-Transfer (BOT) contracts. While this will provide badly needed funds for infrastructure, even the most optimistic assessments call for substantial public funds to leverage this private capital. The government will provide viability gap funding up to 40 per cent of the project cost.

Railways

India's rail network is the second largest in the world and the largest employer, with 1.5 million employees. In common with the power sector, it suffers from an entrenched and politicised bureaucracy opposed to restructuring and a tariff structure which offers passenger fares at only a fraction of cost-recovery levels through cross-subsidies which penalise freight customers. Unlike with power, however, Indian Railways (IR) is overseen by the central government and hence is less dependent on reforms undertaken at the state level.

²⁷ World Bank (2004b), p. iii.

²⁸ Simon Long, "A Survey of Business in India", *The Economist*, 3 June 2006

Once again, a comparison with its Chinese counterpart is illuminating. Total output of China Railways (CR) is twice that of IR and its performance surpasses the latter by almost any measure: productivity, progress in restructuring, maintenance and profitability. In the ten years leading up to 2002, CR cut its staff by 650,000 while IR has cut its staff by only 145,000 in the past five years through attrition and hiring freezes. Staff costs at IR are still almost twice those in China as a share of working expenses. In addition, between 1992 and 2002, CR invested \$85 billion, or five times as much as IR at only \$17 billion. Harral et al. (2006) suggest that if IR applied normal commercial accounting rules, it would have been well on the way to bankruptcy by 2002. In contrast, CR pays taxes to the government on its profits.

Fortunately for India, this unflattering comparison is only part of the story. China was in a similar position as India in this sector in the early 1990s, and most performance improvements result from policy changes since 1999. Furthermore, IR has also made major improvements in its freight business faced with competition from both roads and air. The freight segment provides two thirds of total revenues. Freight rates have not risen for the past four years, and IR has undertaken several measures to improve productivity such as through speeding up turn-round times and rationalisation of the freight structure. As a result, performance improvements in this segment have exceeded government targets and earnings have been boosted by \$1.6 billion.

Much less progress has been made for passenger traffic. As in the energy and water sectors, the government is reluctant to modify heavily subsidised pricing structures which consumers have come to accept as an *acquis*. As long as these subsidies persist, IR will have trouble generating sufficient revenues to finance both expansion and maintenance and repairs.²⁹ As in other infrastructure sectors, time overruns are a problem, usually relating to land acquisition, litigation, rehabilitation, contractor/labour and financial problems.

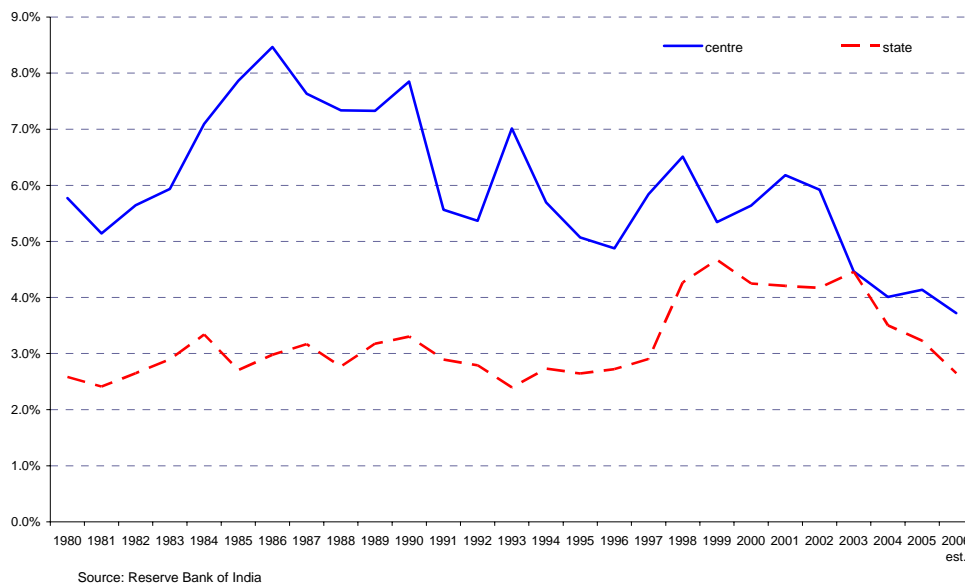
To expedite and finance new projects, foreign investors are welcome in certain segments. Container freight was effectively privatised recently when the government decided in 2004-05 to end the monopoly of the state-run Concor. Fourteen domestic and foreign companies were awarded licences in early 2006. The licences are for 20 years with the possibility of a 10-year extension.

IV. FINANCING INFRASTRUCTURE DEVELOPMENT IN INDIA

Public spending on infrastructure in India is constrained by large fiscal deficits, currently running at 6.5 per cent of GDP. While this represents a substantial improvement from ten per cent only five years ago, it is too early to tell whether this is one of the many cyclical improvements India has experienced. A clearer picture can be obtained by looking at central and state government deficits separately (Figure 3). Central government finances have been improving steadily for two decades, while state governments have yet to see much turnaround when seen from a long term perspective.

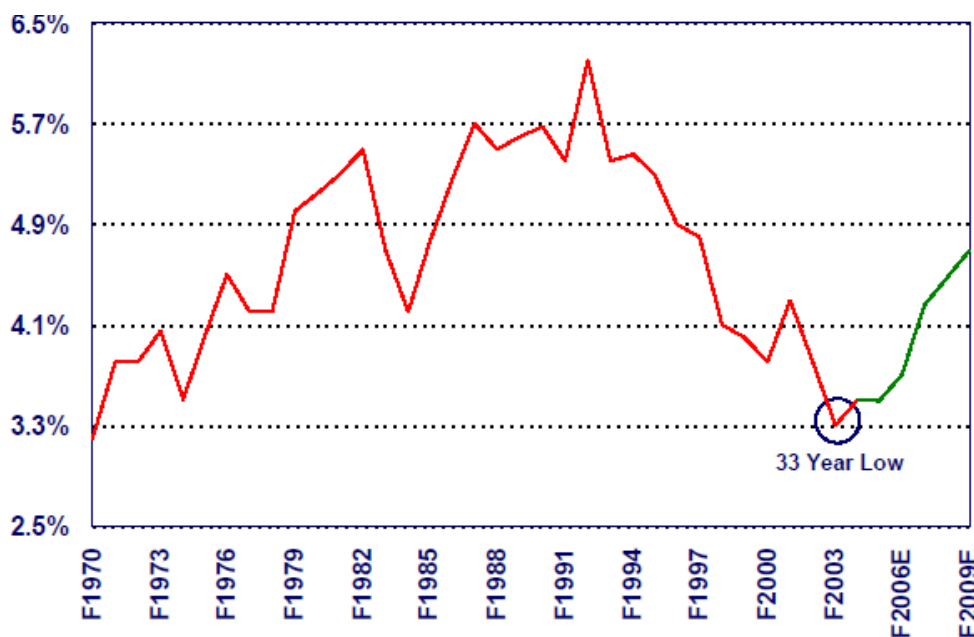
²⁹ Although the safety record of IR is notorious, it has improved markedly in each of the past three years.

Figure 3. **Fiscal deficits of the central and state governments, 1980-2006**
(fiscal years; percentage of GDP)



High fiscal deficits have coincided with declining expenditure on infrastructure by state and central governments. Figure 4 shows infrastructure investment as a share of GDP based on estimates by Morgan Stanley. Infrastructure spending includes gross capital formation in energy, airports, ports, roads and telecommunications. Infrastructure spending in India as a share of GDP has been falling in India since the beginning of reforms in the early 1990s, reaching a 33 year low in 2003. The shares for FY2006 and FY2009 are Morgan Stanley estimates.

Figure 4. **Infrastructure spending as a share of GDP**



Source: Chatterjee (2006) based on estimates from Morgan Stanley.

The Indian government has announced a target of \$320 billion to be spent on infrastructure by 2012, or roughly double the levels of the early part of this decade. Given the state of public finances, can private investment fill the funding gap left by the public sector? On average in developing countries, private investors have provided only 20 per cent of the necessary funding for infrastructure. Is there any reason to believe that this ratio could be higher in India? Possibly yes. India might have greater capacity to raise capital from private sources than other developing countries, including China, even as its weak fiscal position hamstrings public spending. Its equity market is over a century old and currently one of the world's fastest growing.

Compared to equity markets, debt markets are less developed, particularly for the long-term debt required for infrastructure financing. Planned deregulation of the insurance sector, including higher foreign ownership ceilings, should help, as should the opening of the banking sector which is already in much better shape than its Chinese counterpart. In China, “the disinterest of institutional lenders (such as insurance companies and pension funds) in providing long-term debt to support road development [...] in the absence of a government guarantee is a major constraint. In the absence of a well structured legal and regulatory framework, most mainland companies do not have access to sources of long-term domestic funds from institutional investors”.³⁰

To encourage private investors and to help fund the viability gap between the costs of delivering infrastructure and the tariffs that can be charged, the government established the India Infrastructure Finance Company in early 2006 to provide long-term lending, particularly to PPPs (Box 2).

Box 2. India Infrastructure Finance Company

Underdeveloped pension and long-term debt markets in India restrict the ability of local capital markets to finance infrastructure projects which typically involve long gestation periods. As a result, projects often involve the up-front loading of tariffs in order to ensure repayment of debt. Given user resistance to such tariffs, the financial and political viability of such projects is often jeopardised as a result.

The India Infrastructure Finance Company was established to bridge this gap. The IIFC provides financial assistance in the form of long-term debt, either through refinancing for banks and financial institutions or by direct lending to the project up to 20 per cent of the capital cost. Projects can involve roads, ports, airports, energy and telecom projects, and a built-in preference is given to PPPs. The IIFC raises funds from both domestic and international sources on the strength of government guarantees. The government stipulated a \$2.2 billion guarantee limit in the first year of operation. The IIFC went public in an initial offering in 2005, and its share price doubled on the first day of trading

Source: Secretariat for the Committee on Infrastructure, Government of India

The Indian government is hoping that a large share of the private contribution will come from foreign firms. In discussing short-term capital requirements in the infrastructure sector, the

³⁰ Harral et al. (2006).

government's Economic Survey 2005-2006 suggests that "[a] substantial share of this investment is expected to come from the private sector. It has been estimated that India has the potential to absorb \$150 billion of FDI in the next five years in infrastructure alone". This expectation is in spite

These hoped-for inflows of FDI of \$30 billion into infrastructure are five times higher than what India has managed to receive in terms of total FDI inflows into all sectors. With the exception of the telecommunications sector, foreign investors in Indian infrastructure have been relatively insignificant. Could India nevertheless receive substantially more FDI across the board in the near future?

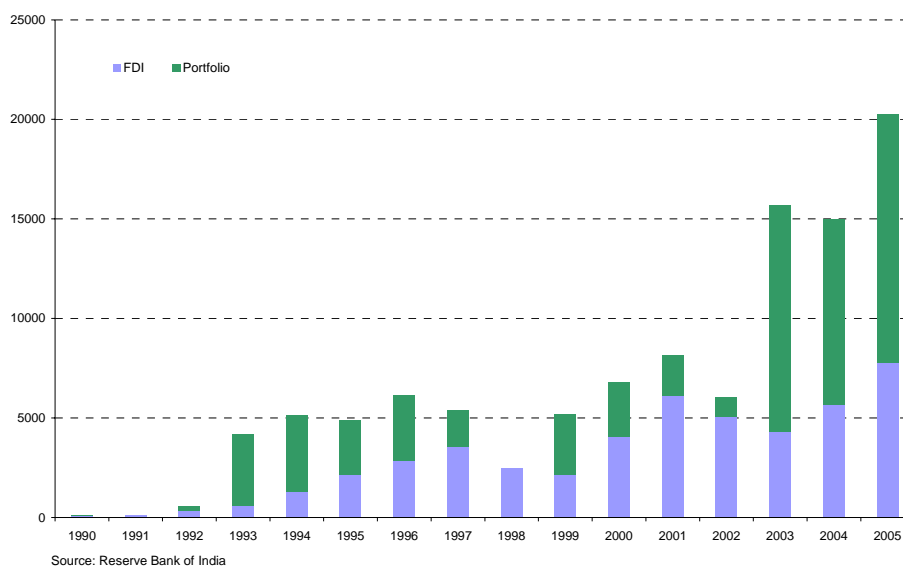
Much of the discussion which follows looks at total foreign investment in India, not just in infrastructure. Although there are specific considerations when investing in infrastructure, many of the obstacles to investing in India for foreign firms arise in all sectors: corruption, frequent changes in the rules and regulations, foreign ownership ceilings, preferential treatment for local firms, including state-owned enterprises, et cetera.

Once again, China serves as a useful reference. During the takeoff period of investment in China in the early 1990s, FDI inflows grew tenfold over a five-year period. India in 2006 is not necessarily the same as China in 1991, but there are several indicators which point to a similar interest on the part of multinational investors. In an annual survey of investor intentions over the next four years, over half of investors surveyed listed India as one of their top three destinations, second only to China.³¹ Furthermore, foreign investment registered in approved projects in India, some of which will never be implemented but which nevertheless give an idea of potential investor interest, are up to five times higher than actual recorded FDI.

Another clue concerns foreign institutional investment (FII). Faced with restrictions on foreign ownership, international capital has sometimes entered the Indian market through portfolio investment. In the year ending March 2006, India received \$12 billion of FII. Between portfolio and direct investment, India received a respectable \$20 billion of foreign investment in FY2005 (Figure 5). Total foreign inflows are growing quickly.

³¹ UNCTAD (2006).

Figure 5. **Portfolio and foreign direct investment in India, 1990-2005**
(fiscal years, millions of dollars)



These figures all suggest that the interest in investing in India on the part of foreign firms exists. But to look only at potential interest is to ignore why more investors have not come already. The crucial question is not whether public and private sources can marshal the resources to upgrade Indian infrastructure – it is a common axiom in infrastructure circles that good projects will always find funds – but whether the money will be well spent. The next section considers the institutional and broader structural reforms which are necessary not only to improve the efficiency of the public sector but also to demonstrate to potential investors that the government will honour its commitments.

V. REFORM AS A PRECONDITION FOR FOREIGN INVESTMENT

The public sector will remain the principal provider of infrastructure in India as elsewhere in the developing world, and much of the funding will come from public sources. Even if foreign investors pour in, money alone will not solve India's infrastructure problems. Indeed, there is even a risk that the focus on new and highly visible projects distracts the government from the less glamorous work of maintenance and repairs of the existing stock which often offers a higher economic return or from the structural reforms necessary to reduce the losses and wastage incurred in distribution of water or electricity, for example. Partial reforms in the railway sector have shown how much can be done with very little private capital or new infrastructure.

Public-private partnerships are not a panacea, as demonstrated by two decades of experience worldwide. They do not relieve the fiscal burden for the government in the short term; they require substantial institutional capacity on the part of governments to negotiate and monitor, and, as their name implies, they require the active participation of the government as a partner in the project. Project failures can be very costly for both the private firm and the government.

Getting the most out of private participation in infrastructure will require two sets of reforms, one at the institutional level and the other political. The central government and, more particularly, the state governments need to develop the institutional capacity to initiate, negotiate, implement and monitor infrastructure projects involving private firms. But at a broader level, the success or failure of PPPs depends on the government's political commitment in ensuring that they succeed. The desire to attract foreign investors into infrastructure seems to be based more on an opportunistic bid for capital rather than on an economic rationale based on the potential efficiency gains from private participation.

Regulating private infrastructure

“Effective regulation is the most critical condition for reform to protect the interests of both private investors and consumers. And, indeed, effective regulation is the only way to be able, at the same time, to attract private funds towards infrastructure, and to get social support for these reforms”.³² A recent study of FDI in infrastructure in lower and middle income developing countries between 1990 and 2002 finds that the level of FDI in a country is significantly and positively related to the existence of an effective regulatory framework.³³

The experience to date in India suggests that much of the necessary groundwork for regulating private participants in infrastructure sectors is lacking. In some sectors and particularly at the central government level, things are moving in the right direction, but without significant investment in developing further institutional capacity, the lessons of Dabhol will be lost and foreign investors will remain shy about returning. “When systems are failing, it is not enough to fix the pipes, one needs to fix the institutions that fix the pipes.”³⁴

While firms in other sectors might be happy to operate with little government interference, the public good nature of infrastructure means that governments and private firms must operate in partnership if the project is to succeed. Governments and private contractors tend to be fair weather friends. As soon as there is a macro shock or public protest, many private investors find themselves left to their own devices with no political support from the government.

A World Bank study of PPPs in India noted the following gaps in PPP frameworks and approaches: an emphasis on PPPs as a short term remedy for financing difficulties; little systematic analysis and dissemination of the number and types of PPPs in India and their effectiveness; and little in the way of *ex post* or *ex ante* assessment of whether the private sector achieves better results than their public counterparts.³⁵ Without this kind of groundwork, many government agencies have difficulty identifying those projects which are most likely to be successful both in terms of appealing to investors and bringing about the desired improvements in infrastructure. As a result, at least 15 projects initiated by state agencies ultimately received no bids, or none that were considered acceptable.

There is no “one size fits all” approach to building PPP capacity, and various initiatives have been taken at the central and state levels. In the road sector, the NHAI has developed standard concession agreements, as well as different approaches to extend government

³² François Bourguignon, Chief Economist at the World Bank, at a Press Conference on Reforming Infrastructure – Privatisation, Regulation and Competition, Washington, DC, 14 June 2004.

³³ Kirkpatrick et al. (2006).

³⁴ World Bank (2006a), p. 27.

³⁵ World Bank (2006b), p. 7.

financial support to projects. In the rail sector, “a special purpose vehicle...has been floated to develop, mobilise resources and implement PPPs”³⁶. At the state level, less capacity building has been undertaken, although three states have enacted framework laws and established cross-sectoral PPP units to serve as a platform to transfer skills across departments and to provide some institutional economies of scale.

Politics and infrastructure spending

Developing a better institutional structure will help to ensure a more efficient allocation of public resources, both financial and administrative. But the crisis in infrastructure in India is more than just fiscal, it is also in part a reflection of a broader political dysfunction, particularly at the state level. “[H]igh levels of clientelism in politics as well as high levels of electoral volatility (the proportion of seats that turn over in each state election) combine to cause highly inefficient patterns of state spending on infrastructure”.³⁷ As a result, “much of the money that *is* being spent seems to be going to waste, with spending spread among too many small projects, no return on state investment in infrastructure and very poor quality of construction and poor maintenance”.³⁸

Pork-barrel politics were not invented in India, and “even before independence large scale infrastructure decisions and spending were politically motivated and targeted”³⁹. But as the number of opposition parties has multiplied and the need for fundraising has grown, this recourse to clientelism has proliferated.⁴⁰ In a study of the power sector, Lal (2006, p. 12) claims a broad consensus behind the belief that “the country’s election-funding mechanisms are the root cause of its widespread institutional corruption and unscrupulous politics”. Wilkinson (2006) finds a significant statistical relationship between the rise in electoral volatility and spending on road infrastructure. While electoral volatility is often the sign of a healthy democracy, it has some unintended consequences: “[i]ntense political competition and volatility has a clear effect on *promises* to deliver infrastructure and also on *initial construction* of infrastructure. But because these projects are often vehicles for raising money for political parties, and because the state does not make individuals pay a high political price for non-completion and maintenance, there are serious questions as to the long-term achievements of these program[me]s”.⁴¹

Politics not only influences where infrastructure is built and who obtains employment in state-owned enterprises in the sector but also how much each consumer group pays for the services it receives. Pricing policies are at the root of many of the problems in Indian infrastructure. Often billed as pro-poor subsidies, they tend to target those who can bring in the votes. Even higher tariffs on infrastructure use by Indian business cannot offset the fiscal drain from low tariffs for other consumers which are often only a fraction of the cost of providing the service.

³⁶ World Bank (2006b), p. 25.

³⁷ Wilkinson (2006), p. 2.

³⁸ Ibid. p. 2.

³⁹ Wilkinson (2006), p. 9.

⁴⁰ Wilkinson (2006, p. 5) suggests that the legal means for opposition parties to raise money have been closed off by the incumbent party in India, citing the example of the government of Indira Gandhi in the 1960s which severely limited campaign contributions from businesses whose support had more often gone to the rival Swatantra party. The incumbent party could use its control of the state to raise funds.

⁴¹ Wilkinson (2006), p. 15.

The impact of these tariff policies are felt throughout the economy: bankrupt state-electricity boards have no money to pay for maintenance or new infrastructure; subsidised consumers have no incentive to minimise their consumption of energy or other services, thus exacerbating shortages; businesses must rely on their own sources of supply such as electricity, without sufficient economies of scale; high costs of infrastructure partially offset any cost advantage Indian firms might otherwise enjoy in world markets; and private investors are reluctant to enter sectors where cost-recovery pricing is unpopular and hence where investors are dependent on political support.

This last consideration is perhaps the most important one as India embarks on a strategy to attract foreign investment into infrastructure. Concerning the energy sector, an IEA report argues that “[c]ompetition and private investment alone cannot be expected to resolve management issues, market distortions and the interference of vested political interest in the system. The existing public electricity-supply industry needs to be put in order first to allow the private sector to operate”.⁴²

CONCLUSION

The Indian government is keenly aware of its infrastructure shortcomings and government officials spend much time in conferences discussing India’s infrastructure needs and investment opportunities. Much has been done already and it is possible to suggest that India might have turned a corner. In spite of frequent changes of government, the reform process has never been reversed. National regulatory agencies have been set up for roads and telecommunications and many states have set up state regulatory bodies for the power sector. Fiscal deficits are declining as a share of GDP, a few electricity distribution companies have been privatised, along with some airports. The telecommunications sector is one of the most competitive in the world. For infrastructure as a whole, cost overruns have declined from 62 to 18 per cent and project execution rates have risen from 18 to 46 per cent between 1991 and 2004.⁴³ The share of projects facing delays has fallen from two thirds to one third since 1995. Spending on infrastructure is up.

And yet some of the most fundamental but politically sensitive issues have not been adequately addressed. In a country known for its sacred cows, public ownership of infrastructure might be yet another one. Public monoliths like Indian Railways and the State Electricity Boards still dominate their sectors. Cost recovery pricing is anathema in power (for farmers and households), in passenger rail transport and for water. To make up the difference, cross-subsidies which place the burden on industrial users make electricity costs among the highest in the world, not to mention the punitive prices for freight transport by rail. More fundamentally, the political system has created a culture of clientelism where projects and jobs are offered as patronage rather than where they are most needed. Until these problems are tackled in a meaningful manner, Indian government officials will continue their conference tours to discuss India’s infrastructure shortfall.

⁴² IEA (2002), p.13

⁴³ Adil Zainulbhai, “A glut of foreign opportunities”, *Financial Times*, 8 August 2006

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