Reserve Bank of India Occasional Papers
Vol. 29, No. 1, Summer 2008

Public-Private Partnership in Indian Infrastructure Development: Issues and Options

L. Lakshmanan*

Infrastructure bottleneck has been a serious concern in India in its way of robust pace of economic progression. While many advanced economies and fiscal constrained developing countries have developed their physical infrastructure successfully either through private participation or through public-private partnership (PPP) model, in India, private participation in the process of infrastructure development has received lacklustre response. While private telecom services is a success story in India, the PPP constitutes a miniscule share in overall infrastructure building despite initiation of various policy adjustments and sector-specific reform programmes. The main focus of this paper is to provide an analytical abstract of sector-wise infrastructure developments in the country and the status of private participation and the PPP in building such public infrastructure. This paper raises some specific concerns in the power, transportation, telecom, petroleum, and urban infrastructure sectors and puts forth suggestive measures to enhance the private participation. It also identifies some generic issues such as inadequate transparency of procedures, inappropriate risk allocation, improper project appraisal, cost and time overruns, overlapping of regulatory independence, dearth of good governance, *etc.,* which need attention to attract private investors to participate in the public infrastructure building.

JEL Classification : H400, H420, H540, L900, L980.
Keywords : Infrastructures, Public Provided Private Goods

Introduction

Physical infrastructure is an integral part of development of an economy and provides basic services that people need in their every day life. The contribution of infrastructure to economic growth and development is well recognised both in academic and policy debates. Well developed physical infrastructure provides key economic services efficiently, improves the competitiveness, extends vital support to productive sectors, generates high productivity and supports strong economic growth. Physical infrastructure covering transportation, power

* The author is Assistant Adviser in the Department of Economic Analysis and Policy of the Reserve Bank of India. He is indebted to Dr. Rakesh Mohan, Deputy Governor for his invaluable suggestions while this paper was submitted to him as an internal note form. He is also grateful to Shri K.U.B. Rao, Adviser for his encouragement and guidance. The responsibility of the views expressed in the paper rests with the author only and the usual disclaimer applies.

and telecommunication through its forward and backward linkages facilitates growth; social infrastructure including water supply, sanitation, sewage disposal, education and health, which are in the nature of primary services, has a direct impact on the quality of life.

Over the years, the basic infrastructure in India has been developed to an extent, which is not sufficient enough while considering India's geographical and economic size, its population and the pace of overall economic development. Infrastructure bottleneck has been a serious concern in India and basic infrastructure like roads, railways, ports, airports, communication and power supply are not comparable to the standards prevalent in its competitor countries.

To develop the Indian infrastructure to a world class and to remove the infrastructure deficiency in the country, the investment requirements are mammoth, which could not be met by the public sector alone due to fiscal constraints and mounting liabilities of the Government. This would call for participation of private sector in coordination with the public sector to develop the public infrastructure facilities. In this direction, the economic reforms initiated in the country provide forth the policy environment towards public-private partnership (PPP) in the infrastructure development. Sector-specific policies have also been initiated from time to time to enhance the PPP in infrastructure building. While the PPP is spreading to develop basic infrastructure world wide, in India, the participation of private sector in the infrastructure building has not been much encouraging, despite several rounds of policy reforms.

Against this setting, the rest of the paper is organised as follows. Section I attempts to review the structure of PPP through literature survey. Section II assesses the global practices towards PPP in the infrastructure development. Section III evaluates the status of private sector participation in infrastructure development at the global level and Section IV captures the Indian experiences in this regard. Section V reviews the investment requirements to bridge the infrastructure gap in the country. Section VI focuses on the sector-wise developments of infrastructure projects with the status of PPP and overall private sector participation along with sector-specific concerns. Generic issues while implementing the infrastructure

projects in the country with private participation and options thereon are analysed in Section VII. Finally, concluding observations are drawn in Section VIII.

Section I
Structure of PPP – Literature Survey

What is Public-Private Partnership?

The expression public-private partnership is a widely used concept world over but is often not clearly defined. There is no single accepted international definition of what a PPP is (World Bank, 2006). The PPP is defined as "the transfer to the private sector of investment projects that traditionally have been executed or financed by the public sector" (IMF, 2004). Any arrangement made between a state authority and a private partner to perform functions within the mandate of the state authority, and involving different combinations of design, construction, operations and finance is termed as Ireland's PPP model. In UK's Private Finance Initiative (PFI), where the public sector purchases services from the private sector under long-term contracts is called as PPP program. However, there are other forms of PPP used in the UK, including where the private sector is introduced as a strategic partner into a state-owned business that provides a public service.

The PPP is sometimes referred to as a joint venture in which a government service or private business venture is funded and operated through a partnership of government and one or more private sector companies. Typically, a private sector consortium forms a special company called a special purpose vehicle (SPV) to build and maintain the asset. The consortium is usually set up with a contractor, a maintenance company and a lender. It is the SPV that signs the contract with the government and with subcontractors to build the facility and then maintain it.

Thus, the PPP combines the development of private sector capital and sometimes, public sector capital to improve public services or the management of public sector assets (Michael, 2001). The PPP may encompass the whole spectrum of approaches from private participation through the contracting out of services and revenue sharing partnership

arrangement to pure non-recourse project finance, while sometime it may include only a narrow range of project type. The PPP has two important characteristics. First, there is an emphasis on service provision as well as investment by the private sector. Second, significant risk is transferred from the Government to the private sector. The PPP model is very flexible and discernible in variety of forms. The various models/ schemes and modalities to implement the PPP are set out in Table 1.

Table 1: Schemes and Modalities of PPP

Schemes	Modalities
Build-own-operate (BOO) Build-develop-operate (BDO) Design-construct-manage-finance (DCMF)	The private sector designs, builds, owns, develops, operates and manages an asset with no obligation to transfer ownership to the government. These are variants of design-build-finance-operate (DBFO) schemes.
Buy-build-operate (BBO) Lease-develop-operate (LDO) Wrap-around addition (WAA)	The private sector buys or leases an existing asset from the Government, renovates, modernises, and/ or expands it, and then operates the asset, again with no obligation to transfer ownership back to the Government.
Build-operate-transfer (BOT) Build-own-operate-transfer (BOOT) Build-rent-own-transfer (BROT) Build-lease-operate-transfer (BLOT) Build-transfer-operate (BTO)	The private sector designs and builds an asset, operates it, and then transfers it to the Government when the operating contract ends, or at some other pre-specified time. The private partner may subsequently rent or lease the asset from the Government.

Source: *Public Private Partnership, Fiscal Affairs Department of the IMF.*

Privatisation and Public-Private Partnership

Typically, the PPP is not a privatisation. At the same time, it cannot be described as partial privatisation also. Privatisation has generally been defined as a process of shifting the ownership or management of a service or activity, in whole or part, from the government to the private sector. The privatisation may be of many forms, which include outsourcing, management contracts, franchise, service shedding, corporatisation, disinvestment, asset sales, long-term lease, *etc.* The key difference between the PPP and privatisation is that the responsibility for delivery and funding a particular service rests with the private sector in privatisation. The PPP, on the other hand, involves full retention of responsibility by the government for providing the services. In case of ownership, while ownership rights under privatisation are sold to the

private sector along with associated benefits and costs, the PPP may continue to retain the legal ownership of assets by the public sector. The nature and scope of the services under privatisation is determined by the private provider, while it is contractually determined between the parties in PPP. Under privatisation, all the risks inherent in the business rest with the private sector while, under the PPP, risks and rewards are shared between the government and the private sector.

Thus, the PPP operates at the boundary of the public and private sectors, being neither nationalised nor privatised. Thus, politically, the PPP represents a third way in which governments deliver some public services in conjunction with private sector. Moreover, in a practical sense, the PPP represents a form of collaboration under a contract by which public and private sectors, acting together, can achieve what each acting alone cannot (Michael 2001).

The Indian Case

In the Indian context, the term PPP is used very loosely while at the international arena, the PPP is adopted for developing public assets in various forms as explained in Table 1. According to Ministry of Finance Government of India the PPP project means a project based on a contract or concession agreement, between Government or statutory entity on the one side and a private sector company on the other side, for delivering infrastructure service on payment of user charges. This is a narrower definition as compared to world best practices where the private sector participation in any form of concession agreement, divestiture of the public sector, greenfield projects and management and lease contract are considered as PPP. The Planning Commission of India has defined the PPP in a generic term as "the PPP is a mode of implementing government programmes/schemes in partnership with the private sector. It provides an opportunity for private sector participation in financing, designing, construction, operation and maintenance of public sector programme and projects". In addition, greenfield investment[1] in the infrastructure development has also been given more encouragement in India.

[1] Greenfield investment is defined as an investment in a start-up project, usually for a major capital investment and the investment starts with a bare site in a greenfield.

Section II
Global Practices towards PPP in Infrastructure Development

While discussing the infrastructure development, a generic question arises, 'Why is PPP needed?' In the face of fiscal and other constraints, governments of most emerging economies have been turning towards the private sector as a means of financing infrastructure development. Many countries have, however, found that it is not always easy to attract the private sector, as the conditions for their participation are, in most cases, different from the traditional method of funding. A closer alliance between various parties involved in the infrastructure development will, however, provide the opportunity to share their views on the risk perspectives, legislative and regulatory environments, which support private investment, project funding packages, project formulation and the means of reducing project preparation and gestation period. It has been empirically proved that "both the public and private sectors have significant effect on each other, the magnitudes of the long-run influence of private production on infrastructure expansion are relatively greater than the reverse for most countries" (Eric C Wang 2002). Review of cross-country experiences while adopting the PPP model in the infrastructure development would provide due solution to the critical question raised at the beginning of this Section.

A number of OECD countries have well established PPP programmes. Other countries with significant PPP programmes include Australia and Ireland while the US has considerable experience with leasing. Many continental EU countries, including Finland, Germany, Greece, Italy, the Netherlands, Portugal and Spain have PPP projects, although their share in public investment remains modest. Reflecting a need for infrastructure investment on a large scale, and weak fiscal positions, a number of countries in Central and Eastern Europe, including the Czech Republic, Hungary and Poland, have embarked on PPP. There are also PPP programmes in Canada and Japan. The PPP in most of these countries are dominated by road projects. Similarly, the EU Growth Initiative envisages the use of PPP type arrangements primarily to develop trans-European road network.

While focusing on country specific practices, the PFI of the UK is perhaps the best developed government's PPP programme, which also comprises privatisation and other forms of cooperation between the public and private sectors, including the provision of guarantees. The PFI projects are viewed primarily as being about the provision of services, and not about the acquisition of assets. In this endeavour, the private sector makes a long-term commitment to maintain assets and provide services, and the government makes a long-term commitment to procure those services; significant risk is transferred to the private sector; public sector investment projects are considered for PFI where they are likely to represent value for money, and where it meets the UK government's criteria for efficiency, equity and accountability (IMF, 2004).

In the case of Ireland, the pick up in enthusiasm for PPP can be summarised that there was quick buy-in on the part of all PPP stakeholders, where the government made it clear that its social partners would be consulted on the approach taken to select PPP projects. Second, the government paid more attention to the efficiency benefits of PPP than to just their fiscal advantages. Third, conclusion was reached that the PPP would be a success despite some institutional challenges that had to be overcome. To facilitate the PPP process, the National Development Finance Agency of Ireland was set up to mobilise resources to finance PPP projects and to provide financial advice to government agencies seeking to form PPPs.

Chile's experience with PPP has been successful and a significant portion of the sizeable infrastructure gap was fulfilled through this model. Chile's success with PPP has been underpinned by a solid institutional framework, well developed procedures to identify, evaluate the projects, efforts to ensure adequate sharing of risks between the stake holders, and reforms to ensure the availability of financing for projects. In the case of Mexico, most progress has been made with respect to telecommunications, ports and airports, but this mainly takes the form of privatisation. Empirical evidence suggest that public infrastructure in Mexico has negligible effects on private sector costs.

The PPP has been operating in China for over 20 years. Since the introduction of open economic policy in early 1980s, some state-owned

enterprises started their reform by becoming a limited liability company. Since the 1990s, some local governments have initiated to resort to the private sector on the provision of public facilities and services. Since 2000, the PPP has become one principal strategy used by the Chinese Government in the provision of public facilities and services. The main objective of PPP is to make use of market competition in order to ensure the effective use of resources in the provision of public facilities and services. However, some local governments place too much emphasis on attracting private investments by offering even more favorable terms than the normal national status.

Lessons Drawn for India

Many developing countries like China, have developed toll roads and a number of private sector greenfield power projects, while Argentina has developed its power sector mostly through divestiture and greenfield investments. The main aim of the Chinese is to attract investors through PPP. Brazil has not only attracted more greenfield projects in power sector but also known for its telecommunication sector development under PPP model. The UK provides guarantees for PFI projects to attract more investment. Chile, on the other hand, has succeeded in the PPP model with institutional development, standardised contract procedures and appropriate risk sharing mechanism. Cross country analysis reveals that the PPP model differs widely across countries and sectors. Overall, many developing countries have developed their power projects, roads, telecom, ports and airports through PPP model, which they considered as the apposite way of developing the public infrastructure through private participation, while these countries have faced fiscal constraints. Judging from the country experiences, the selection of right PPP model is based on the concessions that the PPP is getting, level of development, risk sharing mechanism, government guarantees, stability of the policy environment and commercial consideration of the projects. Therefore, it is rightly accepted that right type of private participation in the infrastructure development with right risk sharing is the only way out to build public infrastructure and thereby bridge the infrastructure gap.

Section III
Status of Private Participation in Infrastructure Development – Global Scenario

Till the early 1990s, provision of infrastructure services were the monopoly of the government world over and the private sector participation was very limited. Disenchantment with past approaches to providing infrastructure services, coupled with tightening budget constraints, governments have explored how best to harness the benefits of private participation. Accordingly, the private participation in the infrastructure development has started picking up in various forms. Moreover, the globalisation and opening up of the markets by Emerging Market Economies (EMEs) have provided investment opportunities for the private investors to develop the public infrastructure projects with or without collaboration with the public sector. Multilateral Institutions have also focused their attention towards the progress in the infrastructure development with private participation, as the basic infrastructure would accelerate the pace of overall economic development of a country. The World Bank has stared capturing such details and also a leading data source for private participation in infrastructure development through its Private Participation in Infrastructure (PPI) Project Database[2]. This database has information on over 3,800 projects in energy, telecommunications, transport, and water and sewerage sectors spread across 150 low and middle-income countries. This database covers the private sector investment/commitment to the development of infrastructure projects and does not include public investment.

According to PPI database, between 1990 and 2006, about 3841 infrastructure projects have reached financial closure, of which major share pertaining to Latin America and the Caribbean (31.4 per cent) followed by East Asia and the Pacific (28.6 per cent) and the Europe and Central Asia (19.4 per cent) (Table 2). Middle East and North African region attracted a meager share of private investment at 2.9 per cent. Though the Latin American and Caribbean countries have attracted more private projects during the mid-1990s, the pattern has changed during the recent period towards East Asia and South Asia due to growing investment opportunities in these countries in tandem with their macroeconomic developments.

[2] This database records contractual arrangements with and without investments in which private parties assume operating risks in low- and middle-income countries. Projects included in the database do not have to be entirely privately owned, financed or operated. Some have public participation as well.

Table 2: Number of Projects by Region and year of Financial Closure

Financial closure year	East Asia and Pacific	Europe and Central Asia	Latin America and the Caribbean	Middle East and North Africa	South Asia	Sub-Saharan Africa	Total
1	2	3	4	5	6	7	8
1990	12	2	39	1	4	2	60
1991	9	7	12	0	2	3	33
1992	20	15	42	1	4	4	86
1993	51	164	45	2	6	10	278
1994	81	62	85	4	11	8	251
1995	60	71	86	2	34	16	269
1996	99	70	106	2	30	18	325
1997	113	47	152	7	18	28	365
1998	48	47	153	9	20	28	305
1999	46	32	83	6	25	31	223
2000	48	40	94	11	15	31	239
2001	69	34	58	14	19	29	223
2002	85	24	61	5	16	9	200
2003	98	29	50	5	26	26	234
2004	78	27	49	13	25	18	210
2005	93	36	35	17	25	40	246
2006	89	39	55	12	68	31	294
Total	**1099**	**746**	**1205**	**111**	**348**	**332**	**3841**

Source: *Compiled from Private Participation in Infrastructure (PPI) Database of the World Bank.*

When we look at the details on country-wise infrastructure projects with private sector participation, China tops in the list of attracting more projects in the developing region followed by Brazil, Russian Federation, India and Argentina. Development of energy infrastructure in China was the leading sector, both in number of projects and investments, followed by construction of toll roads. In case of Brazil, large private investment has flown into the telecom sector. Argentina has attracted more private investment towards the development of their energy sector.

In terms of investment, region-wise analysis reveals that projects in Latin America and the Caribbean region have attracted a maximum share at 39.9 per cent between 1990 and 2006 followed by East Asia and the Pacific with 23.1 per cent and the Europe and Central Asia with 18.9 per cent in the development of infrastructure with private sector participation (Table 3). Brazil attracted more investment among the developing countries followed by China, Argentina, Mexico and India. Major share of private investment attracted towards telecom sector in the developing region with a share of 48.9 per cent followed by energy sector (29.3 per cent), transport sector (16.9 per cent) and water and sewerage sector (4.9 per cent).

Table 3: Investment in Projects by Region and year of Investment (US$ million)

Year of investment	East Asia and Pacific	Europe and Central Asia	Latin America and the Caribbean	Middle East and North Africa	South Asia	Sub-Saharan Africa	Total Investment
1	2	3	4	5	6	7	8
1990	1949	68	10598	10	132	40	12798
1991	3090	277	9789	0	640	0	13795
1992	7205	402	12876	10	40	20	20553
1993	13256	1231	15321	2932	1113	32	33882
1994	14773	3655	16296	298	2801	647	38469
1995	17771	8180	17064	120	3845	817	47796
1996	27219	10722	25573	123	5813	1437	70888
1997	36574	14628	48302	5067	6192	2978	113740
1998	10076	11891	68905	3436	2330	2201	98838
1999	12210	9772	38012	2887	4601	2914	70395
2000	18027	25652	38515	4115	3451	2166	91924
2001	12557	14239	33284	4373	4880	4012	73344
2002	11410	17299	19309	1590	6154	3313	59074
2003	17784	12126	15416	1894	3995	5568	56781
2004	13560	17181	17551	7384	11543	3933	71153
2005	17955	35491	20653	7069	14255	8737	104161
2006	17583	23512	28739	10954	24104	11761	116651
Total	**252998**	**206323**	**436201**	**52264**	**95888**	**50575**	**1094241**

Source: *Compiled from Private Participation in Infrastructure (PPI) Database of the World Bank.*

Section IV
Indian Experience in Private Participation in Infrastructure Development

Before the launching of economic reforms in the country, the infrastructure projects were mainly developed by the Government. Since the initiation of the economic reforms, the development of infrastructure has been given thrust through varied means. Along with the initiation of structural reforms in the country, the Government of India has announced new industrial policy in 1991 to develop the industrial and infrastructure sectors, which gave more emphasis on private participation. Policy announcements relating to sector-specific infrastructure developments with the PPP have also been announced in the subsequent annual Budgets of the Union Government. The coverage of the term infrastructure was expanded from time-to-time to enable the sector to avail of fiscal incentives such as tax holidays and concessional duties during the course of their development.

Since the initiation of the reform process, measures were introduced to strengthen the existing infrastructure and to develop new projects with private participation. The private sector participation in the infrastructure building have broadly been taken place through corporatisation of existing PSUs (e.g. GAIL, ONGC, IOC, *etc*), greenfield investment for development of new projects, PPP in the form of BOT or BOOT model in the road sector and concession agreements with the private sector such as rehabilitate, operate, and transfer; or rehabilitate, lease or rent and transfer; or build, rehabilitate, operate, and transfer basis. Recently established joint venture structure of institutions to develop and modernise the Delhi and Mumbai airports is an apt form of PPP.

According to the PPI database of the World Bank, about 249 infrastructure projects in India have attracted private sector participation and reached financial closure between 1990 and 2006, which constituted a share of 6.1 per cent of the total project among 150 low and middle income countries in the world. Of which, transport sector has a major share at 54.2 per cent followed by energy sector at 30.5 per cent during the period (Table 4). The telecom sector accounted for a share of 13.7

Table 4: Number of PPI Projects in India, 1990-2006

Financial closure year	Energy	Telecom	Transport	Water and Sewerage	Total
1	2	3	4	5	6
1990	0	0	1	0	1
1991	1	0	0	0	1
1992	2	0	0	0	2
1993	3	0	0	0	3
1994	1	4	1	0	6
1995	6	10	0	0	16
1996	6	6	4	0	16
1997	2	4	6	0	12
1998	7	2	8	0	17
1999	8	0	13	0	21
2000	9	0	1	1	11
2001	1	8	4	1	14
2002	4	0	8	0	12
2003	6	0	17	0	23
2004	9	0	6	1	16
2005	3	0	14	1	18
2006	8	0	52	0	60
Total	**76**	**34**	**135**	**4**	**249**

Source: *Compiled from Private Participation in Infrastructure (PPI) Database of the World Bank.*

per cent in private participation during the period. Many number of infrastructure projects under private participation have attained financial closure during 2006 particularly in the transportation sector due to mass development of National Highways Development Projects (NHDP) like Golden Quadrilateral and North South-East West Corridor (NS-EW) projects.

Investment requirements of the infrastructure projects are huge and the private sector contribution to the development of public infrastructure has increased many folds during the recent period due to various policy initiatives by the Government towards more encouragement for private participation. However, when compared to other EMEs, private participation in the infrastructure development in India has gained momentum only recently and its share is not much encouraging. India has attracted only about 6.5 per cent of the total investment among 150 low and middle income nations. The investment has flown mainly into the telecom sector which constituted a share of 49.6 per cent of total investment in India, followed by energy sector at 28.9 per cent and transport sector at 21.3 per cent between 1990 and 2006 (Table 5). Among the developing countries, India stood at fourth position, after China, Brazil and Russian Federation, in terms of

Table 5: Investment in PPI Projects in India, 1990-2006 (US $ Million)

Financial investment	Energy	Telecom	Transport	Water and Sewerage	Total Investment
1	2	3	4	5	6
1990	0	0	2	0	2
1991	614	0	0	0	614
1992	13	0	0	0	13
1993	1,051	0	0	0	1,051
1994	311	97	125	0	533
1995	1,008	683	0	0	1,691
1996	1,553	1,229	182	0	2,964
1997	970	3,827	405	0	5,201
1998	1,066	673	296	0	2,035
1999	2,500	1,045	467	0	4,012
2000	2,357	682	30	0	3,068
2001	345	3,445	343	2	4,136
2002	386	4,615	715	0	5,717
2003	835	1,968	550	0	3,352
2004	4,144	3,731	1,117	111	9,103
2005	755	6,201	1,526	0	8,482
2006	2,750	7,271	9,473	0	19,494
Total	**20,658**	**35,466**	**15,230**	**113**	**71,467**

Source: *Compiled from Private Participation in Infrastructure (PPI) Database of the World Bank.*

attracting the projects and fifth position in terms of volume of investment under private participation. Major share of investments have flown mainly to the sectors where the return on the investments and commercial considerations are high. However, while considering the investment requirements of the country to develop the basic infrastructure, it is considered to be a miniscule share.

Section V
Investment Requirements to bridge the Infrastructure Gap

After analysing the realistic stature of private participation in the infrastructure development in India, it would be more appropriate to look into the quantum of investment requirements to bridge the infrastructure gap and to transform the Indian infrastructure into a world-class. The impact of infrastructure investments on growth depends on the timing of investments, their scale in relation to the existing imbalance between demand and supply of infrastructure, and the location of the projects themselves. Taking into account the infrastructure gap in the country, there is no concrete estimation of requirements for infrastructure development to fill the gap in the country as the requirement will vary from time to time, place to place and project to project.

After the initiation of economic reforms, the first estimation of investment requirements for infrastructure development was attempted by the Expert Group on Infrastructure (The India Infrastructure Report, 1996). The Group estimated that the investment in infrastructure was to be stepped up from 5.5 per cent of GDP in 1995-96 to 8.5 per cent of GDP in 2005-06. But at the same time, the average annual investment was at 4.9 per cent during the 10th Plan period. Then the Committee on Infrastructure, headed by the Prime Minister, has estimated in 2006 the investment requirements for the 11th Plan period at Rs.14,50,000 crore or US $320 billion. The 11th Plan document has identified sector-wise infrastructure gap and accordingly fixed physical target to be completed during the 11th Plan to achieve overall GDP growth of 9 per cent (Table 6).

The 11th Plan document has revised the earlier estimation by the Committee on Infrastructure and placed the investment requirement for

Table 6: Infrastructure Deficit and 11th Plan Physical Target

Sector	Deficit	11th Plan Target
Roads / Highways	65,569 Km of NH comprise only 2% of network carry 40% of traffic; 12% 4-laned; 50% 2-laned; and 38% single-laned	6-lane 6,500 km in GQ; 4-lane 6,736 km NS-EW; 4-lane 12,109 km; 2-lane 20,000 km; 1,000 km Expressway
Ports	Inadequate berths and rail/road connectivity	New capacity: 485 mn. MT in Major Ports; 345 mn. MT in Minor Ports
Airports	Inadequate runways, aircraft handling capacity, parking space and terminal buildings	Modernise 4 metro and 35 non-metro airports; 3 greenfield in NE; 7 other greenfield airports
Railways	Old technology; saturated routes: slow speeds (freight: 22 kmph; passengers: 50 kmph); low Payload to Tare Ratio (2.5)	10,300 km new rail; 10,000 km gauge conversion; modernise 21 stations; Dedicated Freight Corridors
Power	11% peaking deficit; 7% energy shortage; 40% transmission and distribution losses; absence of competition	Add 78,000 MW; access to all rural households
Irrigation	1123 BCM utilisable water resources; yet near crisis in per capita availability and storage; only 43% of net sown area irrigated	Develop 16 mha major and minor works; 10.25 mha CAD; 2.18 mha flood control
Telecom/ IT	Only 18% of market accessed; obsolete hardware; acute human resources' shortages	Reach 600 million subscribers; 200 million in rural areas; 20 million broadband; 40 million internet

Source: *Eleventh Five Year Plan Document, Volume I, Planning Commission, Government of India.*

developing the physical infrastructure at about Rs.2,060,193 crore or US $515 billion, which is higher by 136.4 per cent of the anticipated investment in 10th Plan (Table 7). The document estimated that the private investment would be about 30 per cent and suggested a strategy that the private participation is to be encouraged directly as well as through various forms of PPP wherever desirable and feasible.

Table 7: Projected Investment in Infrastructure Development During 11th Plan

Sectors	Investment (Rs. Crore)		Share in Total (%)	
	10th Plan	11th Plan	10th Plan	11th Plan
1	2	3	4	5
Electricity	2,91,850	6,66,525	33.5	32.4
Roads and Bridges	1,44,892	3,14,152	16.6	15.2
Telecommunication	1,03,365	2,58,439	11.9	12.5
Railways	1,19,658	2,61,808	13.7	12.7
Irrigation	1,11,503	2,57,344	12.8	12.5
Water Supply and Sanitation	64,803	1,43,730	7.4	7.0
Ports	14,071	87,995	1.6	4.3
Airports	6,771	30,968	0.8	1.5
Storage	4,819	22,378	0.6	1.1
Gas	9,713	16,855	1.1	0.8
Total	**8,71,445**	**20,60,193**	**100.0**	**100.0**

Source: *Eleventh Plan Document, Planning Commission, GoI.*

In this connection, some basic issues need to be discussed. First, how to step up the investments in infrastructure? Over the past three years, the infrastructure investment was at around 5 per cent of GDP, which is targeted to be increased to 9 per cent at the end of the 11th Plan period as suggested by the Plan document. Here the question arises, where such a huge investment has to come from? To increase the investment to 9 per cent at the end of the 11th Plan, each year, additional investments has to increase by at least one per cent of GDP during the Plan period. To fund such additional investments, there are broadly two sources – domestic savings and external savings. Under the domestic sources, household savings forms part of major source, which are to be stepped up from the level of 23.7 per cent of GDP on an average during the 10th Plan. Then the government savings, which has mainly represent the public sector savings that have started being positive since 2003-04 only. Next comes the private corporate savings that estimated at 6 per cent of GDP on an average during the 10th Plan is to be increased significantly to cope up with the additional infrastructure requirements during the current Plan. To fill the gap between the investment requirements and the domestic savings, foreign capital inflows is to be channelised from the level of 1.1 per cent of GDP in 2006-07. Then the question arises, how to mobilise such huge investments from different sources? At the Government side, both Centre and States have to borrow about 27 per cent of estimated total investments in addition to budgetary allocations and internal generation.

At the financing side, three major initiatives have been taken to augment the funding for infrastructure projects, *viz.,* (a) setting up of India Infrastructure Finance Company Ltd (IIFCL), a SPV, to meet the long term financing requirements of potential investors; (b) provision of viability gap funding; (c) using of a limited portion of foreign exchange reserves for the development of infrastructure projects through the subsidiaries of IIFCL. But these developments will not serve the purpose fully. Private investments have to flow freely to achieve the desired goal.

The ability to tap private resources - from within the country as well as internationally - for financing infrastructure will strengthen the development. In this regard, the banking system would play a crucial

role while transforming the financial savings into investments. But the problem is that, in the post reform era, there has been decline in activities and importance of term lending institutions. In fact, some term lending institutions have converted into banks. Given the huge requirement of funds for investment in infrastructure and increasing role of private players, it is natural to expect them to approach banks to raise funds for investment. As the basic sources of funds for banks are public deposits, mostly of short or medium term in nature, it would create mismatch in the asset-liability management of the banking system while lending to infrastructure on a long term basis, which is to be addressed.

Another major issue is, how to transform corporate and other savings into infrastructure investment? The 11th Plan document has estimated that the private share in infrastructure development would reach 30 per cent during the 11th Plan from 20 per cent during the 10th Plan. Further more, about 48 per cent of the infrastructure financing requirements has to come from debt financing. But the development of corporate debt market is at a nascent stage. A prudent policy to develop the corporate debt market in India will only help to mobilise such huge investment requirements, which would facilitate to achieve the desired development levels in the infrastructure.

Next the foreign investment flows, which requires innovative instruments and mechanisms that are to be devised much attractive to capture such inflows. The international financing of infrastructure could be in the form of greenfield FDI, ADRs, GDRs, asset securitisation, finance through SPV, *etc.,* for which, suitable policy framework are to be devised to utilise economically the increasing capital flows without affecting the domestic monetary and exchange rate stability.

On the whole, the return on infrastructure is not always lucrative as projects yield returns with considerable lags. Also, the implementation of infrastructure project is spread over a long period of time. This creates uncertainty about both the feasibility and profitability of the projects. The massive investments for infrastructure development, therefore, require innovative methods of financing and unbundling of risks. The investment in the infrastructure sector, both from the public and the private, is to be stepped up significantly to remove the infrastructure bottlenecks and thereby sustain the economic growth.

Section VI
Sector-wise Private Participation – Status and Issues

India has been growing at a level of 9.3 per cent, on an average, during the last three years and the supply of infrastructure has also improved to an extent to cope up with the increasing demand. But gaps are widening. The developments in the infrastructure projects since the introduction of economic reforms could be captured on the basis of two major data bases in addition to respective Ministry sources – one by the Planning Commission on PPP projects and the other by the World Bank on PPI database. As we have already discussed about the PPI database, let us have a brief overview on the status of sector-wise infrastructure projects based on Government of India databases and throw some light on the sector specific issues.

A. Infrastructure Projects under PPP Model

Since most of the infrastructure services are rendered by the Government, commercial approach towards cost recovery has not been adopted, and with the limited resources at Government's disposal, PPP has been encouraged to fill the infrastructure gap. To support the PPP model projects, a Public Private Partnership Appraisal Committee (PPPAC) was constituted in January 2006. The PPPAC has been adding value by shortening the approval process within the Government, reducing the transaction costs and acting as a central focal point for identifying and disseminating best practices in rolling out PPP across sectors and Ministries of the Government. Since its constitution, it has granted approval to 65 projects, with an estimated project cost of Rs.53,136 crore.

When we look at the overall developments of infrastructure under PPP model, only 147 projects in the roads, ports, civil aviation and urban infrastructure have been materialised under the Government of India scheme. Investment in these projects is expected to be around Rs.59,793 crore. However, only about 33 projects have been completed and the remaining projects are in progress (Table 8). Majority of the PPP projects are pertaining to the road sector under BOT or BOOT basis. Government has entered into concession agreement with the private partners for a period of 10 to 30 years in these road sector projects for construction, maintenance and revenue sharing arrangements.

Table 8: Sector-wise PPP Projects - Government of India*

Sector/Union Territory	No. of Projects	Estimated Cost (Rs. Crore)
1	2	3
Road Transport & Highways	84	22752
Ports, Births, Terminals, *etc*	30	9770
Civil Aviation	4	21144
Cluster Development	26	1764
Urban Infrastructure	3	4363
Total	**147**	**59793**

* As on October 5, 2006

Source: *The Committee on Infrastructure website, Planning Commission, GoI.*

PPP in the States

Many of the State Governments have also ventured into PPP model to develop their State infrastructure on the lines of central schemes. Accordingly, about 244 projects are in progress under the PPP model with an estimated investment of Rs.69,893 crore and another 76 projects with an estimated cost of Rs.34,724 crore are in the pipeline. Among the ongoing projects, Rajasthan has more number of PPP projects (42 projects), followed by Madhya Pradesh (28), Gujarat (27), Karnataka (26), Sikkim (24) and Andhra Pradesh (21). However, investment-wise, Gujarat attracted higher share at 26.1 per cent of the total investments, particularly for the development of 13 ports at a cost of Rs.11,730 crore and two urban development projects at Rs.5100 crore. Other states like Sikkim and Maharashtra also have more shares in the PPP projects (Table 9).

In the State scheme, road sector attracted about 46.7 per cent of the total PPP projects in the country followed by urban infrastructure and power sector. Along with the national highways development, States have also taken various initiatives to strengthen and modernise their road sector to smoothen the transport movement. However, in term of investments, port sector attracted major share at 34.5 per cent as it involves huge capital requirement for its development. Other sectors like power and roads have also attracted a share of 23.5 per cent and 20.4 per cent, respectively (Table 10). Overall, the potential benefits that normally expected from the PPP projects include cost effectiveness, higher productivity, accelerated delivery of projects, clear customer focus, enhanced social service and recovery of user charges. Due to various

Table 9: State-wise Ongoing PPP Projects in Infrastructure Sector

Name of the State	Total No. of Projects	Total Estimated Cost (Rs.Crore)
1	2	3
Gujarat	27	18251
Sikkim	24	15627
Maharashtra	9	12498
Orissa	4	3668
Kerala	5	3488
Karnataka	26	2930
Madhya Pradesh	28	2615
Puducherry	4	2233
Andhra Pradesh	21	1999
Rajasthan	42	1818
Tamil Nadu	7	1237
West Bengal	13	1216
Punjab	14	750
Jharkhand	8	732
Goa	3	618
Delhi	6	96
Andaman & Nichobar Islands	1	85
Uttaranchal	1	17
Chandigarh Administration	1	15
Total	**244**	**69,893**

Source: *The Committee on Infrastructure web site, Planning Commission, GoI.*

facilities offered by the Government for infrastructure development through PPP, there is further potential for PPPs to contribute more and help bridge the infrastructure gap in India.

B. Sector-wise Infrastructure Developments - Major Concerns

When we assess the overall physical infrastructure development in the country, India has the fifth largest electricity generation capacity and

Table 10: Sector-wise PPP Projects in the States

Sector	Ongoing Projects		Projects in Pipeline	
	No. of Projects	Estimated Cost (Rs.Crore)	No. of Projects	Estimated Cost (Rs.Crore)
1	2	3	4	5
Roads	114	14265	48	14668
Ports	24	24091	10	16676
Airports	4	2358	2	250
Railways	3	812	..	..
Power	35	16409	6	795
Unban Infrastructure	64	11958	10	2335
Total	**244**	**69893**	**76**	**34724**

Source: *The Committee on Infrastructure web site, Planning Commission, GoI.*

has generated about 704 billion units of power in 2007-08. Its road network is the second largest in the world aggregating 3.34 million kilometers (Kms). Indian Railways is the second largest rail network under a single management in the world. India is the third largest telecom services market in the world with 326 million strong telephone networks at the end of June 2008, including mobile phones of around 287 million. Indian ports, both major and minor, have estimated to handle 650 million tonnes traffic during 2006-07. To develop such a huge physical infrastructure, in addition to PPP model, private sector has also been directly involved in the development of public infrastructure, particularly in telecom, power, ports, airports and urban development. Despite various concession agreements, tax holidays and other benefits to develop the public infrastructure with private participation, the infrastructure development so far have said to be not much encouraging due to sector specific policies and other constraints as discussed below.

Power Sector

India has a huge installed power generation capacity of 1,43,061 MW (end-March 2008), of which the private sector projects constituted at 14.0 per cent only (Table 11). Government of India has, earlier, envisaged a mammoth capacity addition plan of 100,000 MW through 2012 to meet its mission of power for all. The 11th Plan has targeted additional power generation capacity at 78,577 MW, which is more than the total capacity added in the previous three Plans. Even among the proposed capacity additions, the private sector would have a share of only 13.7 per cent, which is very low when compared to power requirements. This huge capacity addition may not be feasible viewing from the pace of development of ongoing and proposed new projects.

Table 11: Status of Private Power Capacity (As on March 31, 2008)

(MW)

Item	Thermal	Hydro	Nuclear	RES	Total
1	2	3	4	5	6
Total Installed Capacity	91907	35909	4120	11125	143061
Of which Private Sector	9772	1230	0	9009	20011
Share in Total Capacity (%)	10.6	3.4	0.0	81.0	14.0

RES: Renewable Energy Sources.
Source: *Central Electricity Authority, Ministry of Power, GOI.*

Given the fiscal constraints, private participation in the power sector development has been considered essential for meeting this capacity addition and to meet the growing demand for power. However, there is no PPP model power project in the central sector and in the states also, it is very limited as the power projects have either been developed by the public sector or by the private sector as Independent Power Producers (IPP), Captive Power Plants (CPP) and Merchant Power Plants (MPP).

Though the power sector reform has encouraged private power project, the response in this regard is not much encouraging. According to Power Ministry sources, about 7366 MW capacity (5 per cent of total installed capacity) consisting of 37 projects has been fully commissioned so far in the IPP segment. Five private power projects have been completed with a capacity of 718 MW and about 5776 MW capacity is under execution. There are about 52 thermal power projects and nine hydro power projects with an installed capacity of 30,825 MW have been cleared/appraised by the Central Electricity Authority (CEA), but there is no sign of their early execution. India has an estimated unutilised hydro power potential of more than 1,50,000 MW. However, only 17.5 per cent of the electricity supply comes from the hydro power sector in 2007-08. A study by the CEA has identified 399 potential hydel projects with an aggregate capacity of 1,07,000 MW. Preparation of pre-feasibility Reports of 162 schemes with aggregate installed capacity of 47,930 MW has already been completed by the CEA. In addition, about 60,000 circuit Kms of transmission network is expected by 2012. Of which, how many projects will be executed through private participation is a big question. Ultra Mega Power Projects with each having a capacity of minimum 4,000 MW through private sector funding have also been considered by the Government to augment the capacity addition to meet the power requirement in the country. However, there are certain issues that come in the way of private sector participation need attention to augment the private investment.

The initial response of the domestic and foreign investors to the private participation in the power sector was extremely encouraging. However, many projects have encountered unforeseen delays. There have been delays relating to finalisation of power purchase agreements,

guarantees and counter-guarantees, environmental clearances, matching transmission networks and legally enforceable contracts for fuel supplies. Continuous losses by State Electricity Boards (SEBs) arising both from inadequate tariff and from Aggregated Technical and Commercial losses of as high as 40 per cent discouraged the private investors in power generation as they faced insecurity of payment and hence expansion of private investment in this sector was constrained. In this regard, policy issues such as inability of SEBs and State Governments to provide acceptable payment security to the private power suppliers, delay in finalisation of power purchase agreement (PPA), fuel supply agreement, fuel transportation agreement and problems in sourcing coal supply to thermal power stations need a relook to encourage private participation.

Second, focusing of small projects under private participation may be viable, bankable, and easily executable and above all, the gestation period will also be minimal. On the other hand, big projects like Dabhol, which encountered with many problems, has also been a discouraging factor for the private participation in mega projects. Reducing the risk is a better option than allocating it. Therefore, minor power projects in the private sector or on PPP basis should be encouraged. An important factor which discourages private participation is the reluctance of lenders to finance large IPPs.

Third, using domestically available fuel may reduce the input cost, which is to be explored first before going in for import of fuels by the developers. Captive mining - not only in India but also abroad - by the power producers would ease the fuel constraints. The cost could be reduced by minimising the complexities in the projects instead of shifting the risks to other parties. Better management and appropriate choice of technology for the Indian condition would reduce the capital cost significantly.

Fourth, the disappointing aspect of the reform process could be the slow tangible progress on competition and open access to grid in the sector. The Electricity Act 2003 provides for an enabling framework to stimulate private investments for capacity augmentation and also for private licensees in transmission and distribution through an independent network. However, private participation in transmission and distribution

system has not been an easy task. It is widely debated that the captive unit have found it difficult to transmit excess power through the national grid, while putting private grid is a costly affair and unviable option at the initial stage.

Fifth, renewable energy should play a major role in the supply of power. However, using of renewable energy sources in India is very limited at around 25 per cent of hydro power and another 7.7 per cent of other renewable energy out of total installed capacity, which is to be encouraged in the wake of their availability, cost and environmental friendly features. Gross wind power potential in the country has been estimated at over 45,000 MW, based on the areas having wind power density of 200 Watt per square meter or more, which is to be explored fully to optimise the power generation at a lower cost. When renewable energy sources are used, the demand for fossil fuels will be reduced. Unlike fossil fuels, most renewable sources do not directly emit greenhouse gases. In view of aforesaid issues, power sector reform has to go a long way, although the legislative and institutional pre-requisites are now in place. If implemented properly, it would create a user competition in wholesale as well as retail power supply.

Telecommunication Sector

Usually, the Government owned operators play a major role in the development of telecom sector worldwide. In India, private investment and association of the private sector was needed in a big way to bridge the resource gap. Therefore, the telecom sector was opened up for private participation after the announcement of industrial policy in 1991 to bridge the gap. As a result, the private telecom companies have started operations in the Indian soil due to vast availability of market potentials. Slowly, they picked up their market share and currently they outperform the government owned services due to increasing commercial gains.

Adoption of unified access service, accepting the intra-circle mergers and acquisitions, licensing regulations and announcement of broadband policy, the private sector has continued to play a significant role in the growth of the telecom sector and their participation has increased significantly during the recent period. The total telephone connections

have increased substantially from 45 million at the end of March 2003 to over 300 million at the end of March 2008 (Table 12). The Government continues to provide incentives to the telecom sector and reduced the

Table 12: Private Sector Performance in Telecommunication Sector

Description	Sector	Position as at the End of			
		Mar-02	Mar-06	Mar-07	Mar-08
1	2	3	4	5	6
Wireline Phones (In Lakh)	Public	379.44	419.79	374.61	352.28
	Private	5.93	309.15	33.13	41.85
	Total	385.37	728.94	407.74	394.13
Wireless Phones (GSM+CDMA*) (In Lakh)	Public	2.18	191.05	339.3	443.21
	Private	62.13	500.93	1321.24	2167.58
	Total	64.31	691.98	1660.54	2610.79
Total Telephones (Fixed + Cellular)		449.68	1420.92	2068.28	3004.92
Tele-density (%)		4.29	12.74	18.31	26.22
Switching Capacity (In Lakh)	Public	474.25	792.14	888.17	959.76
VPTs [PSUs+Private]	Total	468862	547111	564610	532281
OFC Route Kms (Inclusive of MTNL)		326271	490437	519155	564166
TAX Lines (In Lakh)		34.27	69.53	82.2	86.85
Rural Phones (in Lakh)		-	147.68	233.07	765.0

* CDMA : WLL (Wireless+Mobile)

Source: *Department of Telecommunications, GoI.*

license fees significantly. Due to acute competition in this sector, the tariffs for various services have experienced a downward movement apart from harmonisation. As at end March 2008, 134 private licensees have been providing mobile telephony services with a total investment of Rs.95,000 crore. Besides, 120 new private licensees are yet to commence their service (GoI).

New mobile phone connections have been increasing substantially during the recent period and as a result, India has 326 million strong telephone networks with 88 per cent share relates to mobile segment at the end of June 2008, which is one of the largest in the world. Due to continuous encouragement for private operators in this sector, their share in the total telephones has increased to about 73.5 per cent as at end-March 2008. India has joined 100 million mobile club of the world during 2006 as the fifth country after China, the US, Japan and Russia. The private sector projects are reported to be working successfully in the cellular segment due to increase in commercial gains and also vast investment opportunities available in this sector.

Though it appears to be a major success story in private sector participation in the telecom sector, some of the issues deserve attention.

Issues such as spectrum allocation, tariff rationalisation, *etc.,* need to be addressed to encourage further healthy competition in this sector. Since April 2008, one of the major issues concerning the private operators, *viz.,* the access deficit charges have been removed, which may lead to a downward tariff revision. Though the overall tele-density has improved to 28.3 per cent at the end of June 2008, the slow progress in rural tele-density is to be addressed to improve the communication facilities across the country.

Petroleum Sector

The Government has formulated New Exploration Licensing Policy (NELP) to accelerate and expand exploration of oil and gas in the country. The latest NELP-VII is offering 57 blocks under transparent international competitive bidding system (29 onshore, 9 shallow water and 19 deepwater blocks beyond 400m bathymetry). Simultaneous 10 blocks of Coal Bed Methane is under offer for exploration in the third round. Some of the PSUs in this sector have formed joint venture companies for exploration and production. However, the response of the private sector has not been much encouraging. About 14 per cent of the crude oil production is under joint venture and private sector projects. In the refinery sector, India has a refinery capacity of over 156 million tonnes. During the recent period, creation of additional refinery capacity has been limited in the country in the public as well as in the private sector when compared to the demand. Currently, two private sector refineries control 28 per cent of refinery capacity in the country. In the case of natural gas production, the share of private/joint venture sector has been picking up with 23 per cent during 2005-06 (Table 13). Steps to augment

Table 13: Oil and Gas: Public Private Share in 2005-06

(Per cent)

Sector	Public	Private
1	2	3
Retail Network	94.3	5.7
Refinery Capacity	75.0	25.0
Crude Production*	86.0	14.0
Natural Gas Production*	77.2	22.8

* Private sector include JVCs

Source: *Indian Infrastructure, Eight Anniversary Issue, August 2006.*

the crude oil production as well as refinery capacity of the country would ease strain on domestic petroleum prices and supply.

Roads and Highways

The PPP model may be considered as a successful one not only in the world over but also in India in the development of road sector as majority of the on-going highways development projects have been taken up under this model. With a view to attract private investment in road development, maintenance and operation, National Highways Act (NH Act) 1956 was amended in June 1995 to facilitate private participation in road infrastructure projects. While there are a number of forms of PPP, the common forms that have been used for development of National Highways are Build Operate and Transfer (BOT) on Toll basis, BOT on Annuity basis and SPV basis. At present, the Government has embarked upon a massive programme to develop highways through the National Highways Development Project (NHDP), Phase-I to Phase-VII. Under these projects, 13,146 Kms of National highways have been proposed at an estimated cost of Rs.54,000 crore. So far 82 projects valued about Rs.23,104 crore have been taken up on BOT (Toll) basis. Of this, 34 projects have been completed and remaining 48 projects are under progress. Under annuity basis, 25 projects covering a length of 1376 Kms have been taken up, of which eight projects have been completed and the remaining projects are under progress (Table 14). Another 12

Table 14: Projects Undertaken through PPP in Road Sector
(As at end-March 2008)

Item	BOT (Toll)	BOT (Annuity)
1	2	3
Number of Projects	82	25
Value of the projects (Rs.Cr)	23104	7695
Projects Completed	34	8
Projects Under Progress	48	17

Source: *Annual Report 2007-08, Department of Road Transport and Highways, GoI.*

projects have been taken up under SPV funding, of which five projects have been completed. Given the unmatched investment opportunity, contractors and supervision consultants consisting of 46 firms from 27 countries have been implementing about 80 projects with a cost of about Rs.22,000 crore in India.

The Committee on Infrastructure has proposed a massive infrastructure developmental programme, of which the road sector projects include (i) Completion of GQ and NS-EW corridors, (ii) Four-laning of 10,000 kms under NHDP Phase-III, (iii) Two-laning with paved shoulders of 20,000 Kms of national highways under Phase-IV, (iv) Augmenting highways in North East under Special Accelerated Programme, (v) Six-laning of selected stretches of National Highways under Phase-V, (vi) Development of 1000 Kms expressways under Phase-VI, and (vii) Construction of ring roads, flyovers and bypasses on selected stretches under Phase-VII. NHDP Phase I and II were mostly funded through Government where the share of BOT highways was only 10 per cent. Under the second phase, financing was through cess and market borrowings in addition to external funding of Rs.7,609 crore by World Bank and Asian Development Bank. Further, a policy decision has been taken that all the projects in NHDP Phase-III to Phase-VII would be taken up on the basis of PPP on BOT model. The development of 1,000 Kms access-controlled Expressways under PPP will be on new alignment and built on Design, Build, Finance and Operate (DBFO) model. The Committee on Infrastructure had mandated the formulation of a Model Concession Agreement (MCA) for PPP projects in national highways to specify the policy and regulatory framework on a fair and transparent basis. Accordingly, a MCA has been released by the Government as a guideline. The MCA unbundles the risks and costs, and allocates them to the partners best suited to manage them. Establishment of Dedicated Road Fund may ease the financial constraints of the Government in view of the large number of projects, which are under various stages of implementation.

Another issue in the road sector is that many of the projects have been delayed due to problems in land acquisition, hurdles in material movements, law and order problem. A clear mandate to acquire land for public use is to be conceived and to be operationalised to speed up the public projects. In case of toll roads, levying of user charges at a higher rate at the initial stage may dampen the road users, which could be rationalised through gradual increase in the later stage. Risk and revenue sharing arrangements should be clearly dealt with for smooth passage of project implementation. Excessive commercialisation may affect the

common man, who may be protected with some element of subsidy at the initial stage. Above all, the confidence of the local people is to be gained for smooth implementation of the project.

Airports

There are 449 airports/airstrips in the country. Among them, the Airport Authority of India (AAI) owns and manages 92 airports and 28 civil enclaves at defence airfields, which provides air traffic services over the entire Indian airspace and adjoining oceanic areas. The legislative framework for privatisation of airports already exists in India. Some airports have already been owned by State Governments, private companies and even individuals. However, the financing of airport infrastructure has some inherent problems. These projects have a large element of cost, very long gestation period and highly uncertain returns on investment based on several assumptions of traffic growth that may not materialise. It has been estimated by the Task Force on Financing Plan for Airport constituted by the Planning Commission that private sector investment for the modernisation and development of various airports under PPP model would be Rs.31,100 crore (Table 15).

Table 15: Projected Investments from PPP in Airports

(Rs. Crore)

Airport	Private Investment
1	2
Delhi & Mumbai	11,400
Bangalore & Hyderabad	4,000
Chennai & Kolkata	5,700
Five Greenfield Airports	8,500
City side Development	1,500
Total	**31,100**

Source: *Report of the Task Force on Financing Plan for Airports, Planning Commission, GoI.*

Modernisation and restructuring of Mumbai and Delhi airports at an estimated investment of US $3 billion over next 20 years under PPP model has already been in operation. Construction of new greenfield international airports at Bangalore and Hyderabad on BOOT basis, though delayed, have been completed by April 2008. Modernisation of other major airports like Chennai, Kolkata, *etc.,* is pending due to procedural hassles and land acquisition problems, which are to be addressed urgently to ease the air traffic. Due to the introduction of open sky policy, the air

traffic has increased significantly in major airports and the runways in these airports are not in a position to handle the increasing traffic, which resulted in flight delays. This call for expansion and modernisation of existing airports on a priority basis and also new airports of international standard, at least in the metros, are to be developed to accommodate the growing air traffic. Further more, the Committee on Infrastructure has approved the development of 35 non-metro airports. While the AAI will undertake all the development works on the air side, city side developments at most of the viable airports will be undertaken with private sector participation through JVC/private consortium.

In view of worldwide thrust towards corporatisation and privatisation of airports, comprehensive strategy needs to be prepared to capture the best investment opportunities. In case of greenfield projects, the promoter may be required to prepare pre-feasibility study for the smooth functioning of the project. Transparency in the operations and in the revenue and risk sharing would ease the hurdles in the implementation of the projects under PPP model. There will also be need for commercialisation of marginal or loss-making airports by transferring them to private companies, State Governments, urban local bodies *etc.,* for operation and management under negotiated terms and conditions.

Ports and Shipping

There are 12 major ports and about 60 non-major and private ports in the country. With the awarding of infrastructure status for inland waterways and inland ports, the construction of ports under private sector has picked up. At present, 36 private/captive port projects involving capacity addition of about 137 MTPA[3] and an investment of about Rs.9,756 crore are at various stages of evaluation and implementation. Out of these, 13 projects with capacity addition of about 47.40 MTPA involving an investment of about Rs.2662 crore have been operationalised and four projects are under implementation through private participation. Development of other ports is under slow progress, which needs attention of all concerned for early execution. The main areas which have been thrown open for private investment under BOT basis include construction of cargo handling berths, container terminals, warehousing facilities, installation of cargo handling equipments, construction of dry-docks and

[3] Million tonnes per annum.

ship repair facilities. There is a plan to develop 54 new berths through PPP model in the next five years, which are to be hastened to relieve the port congestion problem.

India's weak export infrastructure in the ports such as congestion problems, insufficient bulk terminals and age old Coastal Regulatory Zone Act, need to be addressed. More encouragement for PPP model and captive ports for development of minor/intermediate ports will improve the port infrastructure in the country. In addition, efficiency in cargo handling is to be improved to reduce the dwelling time of ships, which is higher when compared to international standards.

Railways

The demand for railway containers has grown rapidly due to increasing containerisation of cargo during the recent period. Since the beginning of the year 2006, container movement has been thrown open to competition and private sector entities would be eligible for owning and operating container trains. The rapid rise in international trade and domestic cargo has placed a great strain on the Delhi-Mumbai and Delhi-Kolkata rail track. Government has, therefore, decided to build a dedicated freight corridor on these high density routes. This corridor would be constructed, operated and maintained by a corporate entity on commercial principles. Part of eastern, western and dedicated fright corridors would be undertaken through PPP model. The approach to be adopted for the dedicated freight corridor would herald the ownership and operation of a large number of freight trains by competing private entities. It is expected that the proposed separation of rail from wheels would initiate a paradigm shift in the functioning of Indian railways.

Urban Development

Over the next 25 years, modernising and expanding the water, electricity, and transportation systems of the cities of the world will require approximately $40 trillion. But the cost of not meeting the challenge could be even greater than $40 trillion (Viren Doshi et al, 2007). In the Indian scenario, there are about 400 cities with more than 100,000 population, which are facing immense problems in terms of financial management, in the provision of public services, and overall city

management. Government or local bodies alone could not develop the cities and solve the problems. Development of urban infrastructure should be an integral part of development strategy, which includes mass rapid transport system, drinking water, sewage system, solid waste management, urban roads and lightings, *etc.* However, investment in these areas has been inadequate. Development of this sector with the PPP may have a changing pace in the overall economic development, which requires an investor friendly environment with commercial viability of the projects. Overall, the solution to overcome the urban infrastructure bottlenecks is to organise the infrastructure more effectively, balance the public-private interest, reinvigorate electricity, water and transportation system by integrating finance, governance, technology and proper designing of the projects.

Section VII
Generic Issues and Options

Despite improvements in physical infrastructure development in the country during the recent years, significant gap exists between demand and supply of critical infrastructure facilities, which has become a binding constraint on the rapid pace of economic progress. As mentioned earlier, infrastructure gap exists in almost all the sectors (Table 6). In the case of power sector, the power shortage stood at around 9.8 per cent and the power shortage during the peak demand period has been much higher at about 16.6 per cent (in 2007-08), which severely affected the industrial production and economic development. The per capita consumption of electricity has increased to 704 kwh in 2007-08, which constantly put pressure on the generation front. In the road sector, among the proposed development of about 5846 Kms of Golden Quadrilateral (GQ), 96.7 per cent of the projects have been completed and the remaining works are pending due to various litigations. In North South-East West corridor of 7142 Kms, only about 1962 Kms have been completed till February 2008 even though the completion target has been fixed by end-December 2009. Employee productivity of railways in India is very low when compared to China, Korea, Brazil and Indonesia. Wagon shortage hinder the movement of industrial raw materials, coal, minerals, *etc.,* which affects the industrial production. Port container and air freight traffic is

also very low in India as compared to other Asian economies. India's weak export infrastructure in the ports, congestion problem and insufficient bulk terminals are major constraints in this sector. Space is a major constraint in big cities to expand the basic infrastructure. In the absence of well defined law to acquire land for public infrastructure development has also lead to slowdown in the urban infrastructure. Poor basic amenities in the rural areas are also a major concern, despite 72 per cent of the population lives in villages.

When we look at the progress of infrastructure development so far, private participation and PPP arrangements in the development of public infrastructure have still faced several implementation challenges. These challenges typically involve tariff setting and adjustment, regulatory independence or dispute over contractual provision and risk sharing. It may be observed from the discussion so far, the PPP in the infrastructure development is picking up during the recent years, particularly in the road sector and to some extent in the airports and ports sectors. Telecom sector is considered to be a successful sector in attracting private participation on a large scale. This may be due to sector-specific policies and other factors such as Government commitment, increased private interest in these sectors, move towards better competitive process, greater availability of information, size of the projects, acceptable price and encouraging developer return, fiscal concessions, *etc.* However, considering the size and magnitude of the proposed and ongoing projects in the infrastructure sector as a whole, the lacklustre response by the private participation and slow progress in some of the projects need to be reversed through investor friendly policies, transparent procedures and other conducive measures. The PPP model will not be feasible in all types of infrastructure but they are possible in many areas, which are to be exploited fully. The key to making PPP model acceptable is to create an environment where PPPs are seen to be a way of attracting private money into public projects, not putting public resources into private projects. Towards this direction, the following generic issues, therefore, need the attention to make the PPP model as a success storey in the infrastructure development as in the case of some of the developed and developing economies.

Transparency: There is a widespread consensus among economists that transparency is crucial in the case of PPP projects. At present, the process of executing the projects in India involves various stages and each stage is to pass through complicated policies and programmes. Though, the process of bidding and awarding the contract is stated to be much transparent, still there is scope for improvements. The PPPs can sometimes run into controversy if the private partner is seen to have received unduly favourable treatment. This can be overcome by ensuring that the terms of concession agreements are transparent and protective of public interest. Though this approach has been adopted by the Centre through model concession agreement, the State governments should also adopt transparent approach similarly to ensure that the PPP will be a success story.

Risk Allocation: As the projects in the infrastructure sector requires huge investments and involve much time frame for their execution, various risks, *viz.,* construction risk, financial risk, market risk, performance risk, demand risk and residual value risk are to be allocated appropriately among the constituents. The risks should not be passed on to others as and when arise, which would affect the cost and progress of the project and create unnecessary litigations. Too many risks assumed by Government will likely put unjustified pressures on taxpayers. On the other hand, too few will prevent potential private investors from participating in the venture.

Project Appraisal: Execution of infrastructure projects should have a clear choice about its implementation whether by the Government or private or both under PPP. Also, the technicality of the project should be clear regarding its soundness, viability and return. When we look at the PPP programme, while there are a number of successful projects, there have also been a number of poorly conceptualised PPPs brought to the market that stood little chance of reaching financial closure. Clear appraisal of the project before its execution would avoid many litigations. At the same time, it is important to avoid a possible bias in favour of the private sector.

Cost and Time Overruns: Many of the projects under the PPP are delayed due to litigations, which lead to cost and time overruns in their

implementation. For instance, as per the Ministry of Statistics and Programme Implementation, out of 491 central sector projects of more than Rs.100 crore at the end of March 2008, about 231 projects have witnessed delays in their execution due to varied reasons. The cost overrun of these projects has, though, come down from 51.8 per cent of the original cost in March 2004 to 13.9 per cent in March 2008, still it constitutes a significant share, which is to be reduced through implementation of the projects on schedule.

Government Guarantee: Generally, investors look for Government guarantee for their investments and their return before entering into a venture. Constant changes in the procedures for offering Government guarantees discourage the investment opportunities. Though, Government guarantee for private investment is not a preferred option in the fiscal angle, transparent policies and guidelines towards Government guarantee will provide clear perception and encouragement towards the PPP even in the risky areas of investment. But at the same time, the guarantee should not put the Government into pecuniary losses due to lack of clarity as in the case of Dabhol power.

Centre-State Disagreement: Execution of some of the projects like airport development, road, *etc.,* are delayed due to disagreement between the Centre and the State Governments in various aspects, particularly locational choice, cost sharing structure, political disagreement, *etc.,* which are to be avoided with appropriate policies, political will, cooperation, coordination, dedication and determination.

Regulatory Independence: In the infrastructure sector, regulatory bodies like Telecom Regulatory Authority of India, Central Electricity Regulatory Commission, State Electricity Regulatory Commissions, Tariff Authority of Major Ports, National Highway Authority of India and Airport Authority of India have established as autonomous agencies to regulate the activities coming under their jurisdiction. Though regulatory independence is vital for speedy implementation of policies, there are instances of disagreements between the regulatory authorities. To reduce the risk of arbitrary and ad-hoc policy interventions due to disagreement between the authorities, principles on key issues need to be specified upfront in sufficient detail.

Corporate Governance: Good corporate governance will succeed in attracting a better deal of public interest because of its apparent importance for the economic health of corporates and society in general. The corporate governance framework should ensure that timely and accurate disclosure is made on all material matters. The corporate governance practices of the parties involving in the PPP have to match with the benchmarking corporate governance practices with the best in the rest of the world.

In addition, appropriate institutional framework is a prerequisite for the success of the PPP in the infrastructure development due to its size, investment requirements, structure and dimension. Foreign investment will freely flow into a country when there is sound, stable and predictable investment policy. Frequent changes in the policies will be an irritant to the investors, which is to be restricted in an emerging economy like India. Overall, in addition to sector-specific issues, the generic issues also need the attention of all concerned to make not only the PPP model a successful but also to attract more private participation to upgrade the Indian infrastructure into a world-class.

Section VIII
Concluding Observations

In India, infrastructure gaps exist in all most all the sectors, posing a serious threat to sustenance of the growth momentum. To augment the infrastructure facilities with private participation, the initiated policy measures have not met with significant success. Except for the telecom sector, which has witnessed a revolution and has been able to attract massive private investments, other sectors have faced with lacklustre response. Even in the telecom sector, though the overall tele-density has improved during the recent period, rural tele-density remains low, which needs to be dealt with appropriate policy measures.

The status of the PPP in the infrastructure development in India, both in the Central Government schemes as well as State sponsored schemes, is not encouraging. Stable macroeconomic framework, sound regulatory structure, investor friendly policies, sustainable project

revenues, transparency and consistency of policies, effective regulation and liberalisation of labour laws, and good corporate governance are the basic requirements, which define the success of the PPP model. The PPP model in the road sector has experienced with enthusiastic response with the introduction of massive NHDP with structured MCA. However, many of the road projects are faced with cost and time overruns on account of prolonging disputes in land acquisition, hurdles in the material movements, law and order problems, etc.

Power shortage is a serious concern and the quality of the power supply is generally poor, especially in rural and semi-urban areas, which has affected the micro and small enterprises severely. Though the Planning Commission has put in place an ambitious plan to provide power for all by 2011-12 by adding more than 78,000 MW of generation capacity and also facilitate capacity additions in transmission and distribution networks during the 11th Plan period, slow progress in capacity addition needs to be speaded up with a policy thrust. Further, private sector participation in power generation is not forthcoming due to specific issues such as delays in finalising power purchase agreements, high aggregated technical and commercial losses, age-old transmission networks, shortage of fuel supply and policy and procedural barriers while exploring renewable energy sources.

The progress in the development of many of the port projects under private participation is at a sluggish pace, which requires conducive policy environment. Efficiency in cargo handling needs to be enhanced through modernisation of port facilities to facilitate the trade. The PPP model projects in the airport sector are in slow progress and also restricted to major airports. Modernisation of airports like Chennai and Kolkata is yet to take-off due to procedural hassles and land acquisition problems. This brings to the fore a need for constructive and stable policy environment towards land acquisition for public utilities. The urban infrastructure bottlenecks need to be addressed through a development strategy, which encompasses efficient planning and organisation of the project, balancing the public-private interest, reinvigoration of electricity, water supply and transportation system and integration of finance and technology.

International experience suggests that the success of PPP projects requires a single objective of better services for the public at a reasonable

cost. This is achievable through realistic and reasonable risk transfer while addressing the public concerns. The Indian PPP model should adhere to such objectives and best practices to march forward on the success path. In this pursuit, easy availability of long-term private capital is an essential requirement. Fostering the greenfield investments in the public infrastructure with appropriate user charges, transparent revenue and risk sharing agreements would transform the international capital inflows into productive ventures. Above all, selection of right PPP model for a right project at a right time through realistic planning would go a long way in providing meaningful and hassle free infrastructure development, which ultimately would increase the infrastructure standards and thereby sustain the overall macroeconomic developments of the country.

Select References

Efraim Sadka, Public-Private Partnerships: A Public Economics Perspective, International Monetary Fund, WP/06/77, Washington, DC.

Eric C. Wang (2002), Public infrastructure and economic growth: A new approach applied to East Asian economies, Department of Economics, National Chung Cheng University, Ming-Hsiung, Chia-Yi 621, Taiwan, ROC, June 2002.

Gajendra Haldea, Public Private Partnership in Infrastructure: A Paradigm Shift, Planning Commission, GoI, New Delhi.

Geethanjali Nataraj (2007), Infrastructure Challenges in South Asia: The Role of Public-Private Partnerships, ADB Institute Discussion Paper No. 80, September 2007.

Government of India, Ministry of Petroleum & Natural Gas, *Annual Reports*, New Delhi.

— (2005), Ministry of Finance, Scheme for support to PPP in Infrastructure, New Delhi, July 2005.

— Ministry of Finance, *Union Budget 2006-07*, New Delhi.

— Ministry of Finance, *Economic Survey 2007-08*, New Delhi.

— Department of Road Transport and Highways, *Annual Report various issues*, New Delhi.

— Department of Shipping, Ministry of Shipping, Road Transport and Highways, *various issues*, New Delhi.

— Department of Telecommunications, *Annual Report, various issues*, New Delhi.

— Ministry of Civil Aviation, *Annual Report, various issues*, New Delhi.

— Ministry of Power, *Annual Report, various issues*, New Delhi.

—Ministry of Statistics and Programme Implementation, Review of Infrastructure Sector Performance, 2007-08, New Delhi.

—Ministry of Statistics and Programme Implementation, Flash Report in Central Sector Projects, March 2008, New Delhi.

— Tenth Five Year Plan Document, Planning Commission, New Delhi, December 2002.

— Towards Faster and More Inclusive Growth: An Approach to the 11th Five Year Plan, Planning Commission, New Delhi, November 2006.

— Eleventh Five Year Plan, Volume I, II and III, Planning Commission, New Delhi, December 2007.

— Report of the Task Force on Financing Plan for Airports, Planning Commission, New Delhi, July 2006.

— Press Information Bureau, various press releases, New Delhi.

Ho Paul, Development of public private partnerships in China, *Surveyors Times*.

International Monetary Fund, Fiscal Affairs Department, Public-private partnership, March 2004, Washington DC.

India Infrastructure Report, Various Issues, *3iNetwork*, Infrastructure Development Finance Corporation, IIT, Ahmadabad and Kanpur, Oxford University Press, New Delhi.

Indian Infrastructure, *Eighth Anniversary Issue, Vol. 9*, No.1, August 2006, New Delhi.

Kalpana Kochhar (2008), IMF Asia and Pacific Department, Business Standard, May 4, 2008.

Michael B. Gerrard (2001), Public-Private Partnerships, *Finance and Development*, IMF, Vol. 38, No.3, September 2001, Washington.

Mohan Rakesh (2006), Economic reforms in India – where are we and where do we go? Public Seminar by the Institute of South Asia Studies, Singapore, November 2006.

Mona Hammami, Jean-Francois Ruhashyankiko, and Etienne B. Yehoue (1999), Determinants of Public-Private Partnerships in Infrastructure, WP/06/99, International Monetary Fund, Washington.

National Council of Applied Economic Research, *Connextions, Vol 2*, No.3, May 2006, New Delhi.

— The India Infrastructure Report (1996), Expert Group on the Commercialisation of Infrastructure Projects, New Delhi.

Russell D Murphy, Jr. and Andrew Feltenstein, Private Costs and Public Infrastructure: The Mexican Case, WP/01/164, International Monetary Fund, October 2001, Washington.

Stephen Harris (2004), Public Private Partnership: Delivering Better Infrastructure Services, Working Paper, Inter-American Development Bank, Washington, DC.

Viren Doshi, Gary Schulman, and Daniel Gabaldon (2007), Lights! Water! Motion!, Strategy+business.

World Bank, India-Country Framework Report for Private Participation in Infrastructure, March 2000, Washington DC.

— India: Building Capacities for Public Private Partnerships, Energy and Infrastructure Unit and Finance and Private Sector Development Unit South Asia Region, June 2006.

— Private Participation in Infrastructure (PPI) Database, Washington DC.

— World Development Report 1994, Infrastructure for Development, Washington DC.

Public-private partnerships and the global infrastructure challenge. Wherever you go in the world, infrastructure is the bedrock of economic and social well-being. It supports the efficient transport of people and goods.Â EY has infrastructure capability on all continents. This puts us in a position to assess the latest trends and reforms in global PPP markets and to help inform the next stage of policy development. Drawing on lessons from two sources, we aim to assist governments to continue to innovate using project finance and PPPs. First, lessons come from regions with well-established PPP programs that have long been points of reference for other jurisdictions â€" countries such as the UK, Canada and Australia. The term â€œpublicâ€“private partnershipâ€ describes a range of possible relationships among public and private entities in the context of infrastructure and other services. Other terms used for this type of activity include private sector participation (PSP) and privatization. While the three terms have often been used interchangeably, there are differences: â€¢ PPPs present a framework thatâ€"while engaging the private sectorâ€"Âacknowledge and structure the role for government in ensuring that social obligations are met and suc-cessful sector reforms and public investments achieved. A strong PPP alloc... India. Building Capacities for Public Private Partnerships. June 2006 Energy and Infrastructure Unit and Finance and Private Sector Development Unit.Â India has seen real progress over the last 10 years in attracting private investment into the infrastructure sectors, first in telecommunications, and now in ports and roads, and in individual projects in other sectors. There is the potential for PPPs to contribute more and help meet the infrastructure gap in India.Â having guidance provide a range of options where appropriate and also by being guided by a public-private group containing representatives from state as well as central agencies. Information dissemination and guidance should be led from the center, given the public good nature of these activities. Public and Private Partnership. www.ijbmi.org 21 | Page. Their version of 'Balanced Growth' calls for simultaneous investments in large number of activities to.Â consensus obviated the need for any debate on this issue and it was taken for granted that infrastructure sector. needed both large scale action and outlay. During the early years of Planning as much as 78% of Total Plan.Â Private Partnership in infrastructure development in general and analyses the relationshipbetween infrastructure. development and economicgrowth in particular. VI. Keywords: Public-Private Partnerships, Infrastructures, Capital Budgeting, Investment Policy. Author(s) E-Mail Address: mona.hammami@st-cross.oxford.ac.uk; jruhashyankiko@imf.org; and eyehoue@imf.org. 1 Mona Hammami is a Ph.D. candidate at Oxford University.Â To our knowledge, this paper constitutes the first empirical attempt to analyze the determinants of PPPs in infrastructure projects using the World Bankâ€™s Private Participation in Infrastructure (PPI) database on projects for developing countries during 1990â€“2003. We divide the determinants of PPPs into seven channels, taking into account different incentives and constraints in both the public and private sectors.