Emerging Markets Forum

Building Asia's Infrastructure: Issues and Options

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I. The Context[1]

Asia has always recognized the role of infrastructure in creating wealth. Archeological evidence points to the exchange of goods between Mesopotamia and the Indian and the Chinese territories between 7500 and 4000 BC. The Silk Route created prosperous clusters of towns and trading posts while connecting Asia and Europe through the Middle East. In more recent history, Asian nations were openly trading with each other long before Europeans arrived in the region. And historians have argued that it is the capabilities developed through this long history of intra-Asian trade that allowed Japan and the newly industrialized economies to emerge as economic success stories in the late 20th century. What is also an interesting fact is that most of this was enabled through private initiative and enterprise.

The private sector has continued to be an engine of Asia's phenomenal growth. Today, Asia hosts four of the ten largest world economies- Japan, the People's Republic of China, India and Korea, accounting for almost 30% of total world GDP. Asian Development Bank's (ADB)

[1] The discussion draws on the statistical annex on Asia's Infrastructure attached to this paper. For this paper, the East Asia includes People's Republic of China and Mongolia; Central Asia includes Afghanistan, Armenia, Azerbaijan, Kazakhstan, Kyrgyz Republic, Tajikistan, and Uzbekistan; South Asia includes Bangladesh, Bhutan, India, Pakistan, Nepal and Sri Lanka and Southeast Asia includes Cambodia, Lao PDR, Indonesia, Philippines, Malaysia, Myanmar, Thailand, and Viet Nam.

most recent estimates suggest that developing Asia grew at an average rate of 7.4% last year despite numerous external challenges and shocks, and that the average growth will continue to be in the 7% per year range until 2007. Asia has achieved rapid poverty reduction: there were 300 million fewer people living in poverty in 2003 compared with 1990 (ADB 2005).

Strong export growth and high foreign direct investments have been two important drivers of this growth. First the Asian Tigers, and then Southeast Asia and PRC, have enjoyed a virtuous cycle of regional trade and investment through the medium of production networks. More recently, South Asian countries are also creating their own route to sustained growth and poverty reduction. Over the last 20+ years, Asia's exports to the world have grown at the rate of 11% per annum (or from a level of $162 billion in 1980 to $1.9 trillion in 2004). Asia now accounts for a quarter of world exports.

This strong export growth in recent years has been marked by a rapid increase in the absolute and relative significance of intraregional trade. Asia as a whole has reported an average growth of nearly 17% per annum for regional exports. Southeast Asia and PRC reported an annual average growth of over 20% during 1980–2004 whereas South Asian exports grew on average by 10% a year. Data for imports show similar trends. The degree of integration measured through intraregional trade in East Asia has been rising quickly: from 35% in 1980 to 55% in 2004, if Japan is included, and from 22 to 44% without Japan. This share is higher than the North American Free Trade Agreement (NAFTA) area although it remains somewhat lower compared with the European Union.

Much of this is due to rapid trade liberalization in these economies in the 1990s and beyond. Several economies in the region reduced tariff barriers significantly: for example, overall tariff rates were reduced by 50% in the PRC, Malaysia, Philippines, and Thailand, whereas South Asian countries such as Bangladesh and India reduced average import tariffs by two thirds. In most countries, tariff reductions were also accompanied by removal of nontariff barriers and simplification of customs rules and regulations (Dollar and Kraay 2001).

The expansion in trade in Asia has been accompanied by a rapid rise in foreign direct investment (FDI) during this period: though the United States and the European Union are all important, Japan is the largest developed country investor in ASEAN, with the exception of Singapore. In the case of the PRC, Hong Kong, China is the largest investor. FDI inflows rose more than 28 times in 24 years during 1980–2004. In 2004, the East and Southeast Asian economies accounted for over 59% of all FDI inflows in developing economies (UNCTAD 2005). Today, one of the most important destinations of FDI remains the PRC: from a level of $57

million in 1980, the PRC was able to attract over $60 billion in FDI in 2004. Most FDIs in Asia were in new, greenfield investments concentrated in manufacturing, but there was also a significant increase in cross-border mergers and acquisitions, largely in service sectors.

Net private foreign equity flows to emerging Asia have been growing steadily as well in recent years, indicating a resurgence of confidence: from a level of only 8% of net private equity flows at the end of the crisis in 1998, Asia accounted for 39% of such flows in 2005. Most Asian currencies have also appreciated relative to the dollar (ADB, 2006). The economies are firmly back on the path of sustained growth.

The development of infrastructure has facilitated this growth, by integrating Asia both globally and regionally. Until the 1997 financial crisis, a large part of domestic savings were channeled towards infrastructure development. In fact, the 1994 World Development Report on "*Infrastructure for Development*" comparing performance of East Asia with sub-Saharan region concluded that Asian growth was due to improvements in infrastructure access. More recently, studies have indicated that infrastructure differences account for about one third of the difference in output per worker between Latin America and East Asia (Calderon etc 2004).

After the Asian financial crisis, there was a slow down in infrastructure investments across some of the East Asian countries. In Indonesia for example, infrastructure investments which accounted for 6% of GDP before 1997, have fallen to 2% in recent years, reflecting a sharp decline in public and private spending on infrastructure.

Overall access to infrastructure services remains uneven across Asia: While Singapore, Thailand, and Malaysia have achieved universal access for most infrastructure services, Cambodia and Lao PDR have much lower access. There is a sharp divide between access rates in rural areas and in urban cities. For example, a low electrification rate in Cambodia means that its per capita power consumption is one tenth of that of Thailand. In rural areas, access rates to good road, safe drinking water and sanitation services are very low, not only compared to developed OECD countries, but even compared to urban populations in the same countries. Within individual cities, the poor are particularly vulnerable because they are accommodated largely in informal settlements with much lower access rates for water and sanitation, electricity, telephones and other infrastructure services than the rest of the urban population.

While emerging infrastructure gaps within countries of Asian countries have not as yet affected the overall export performance, there is an increasing concern regarding the upward

rise in overall logistic costs. Inadequate transport and communication infrastructure, uncompetitive transport and logistics sectors, and high fuel costs all contribute to relatively high logistics costs in Asia. In PRC, for example, logistics costs represent nearly 18% of GDP, whereas in North America, the ratio is less than 10%. Moreover, while logistics costs as a percentage of GDP have declined in North America and Europe, they have actually increased in Asian countries such as PRC and India (Rodrigues, etc 2005).

A major reason for this is the fast pace of urbanization in Asia. At the moment, Asia is not as urbanized as some other regions. However, it is expected that Asian cities will need to make space for nearly 500 million new entrants in the next twenty years. Some large cities in the Asian region have begun to reach their capacities and unless large investments in urban transport, roads and efficient linkages to ports are created to connect these cities with the inland areas, Asian exports would face rapidly increasing logistics costs. Major gaps are emerging in the infrastructure services of some of the urban centers in the Asian cities like Manila and Jakarta because the current land use plans did not envisage such large economic expansions. Retrofitting infrastructure in rapidly growing cities is not only expensive, but may cause large environmental and social risks.

Asia's infrastructure demand is expected to grow rapidly in the next few decades. In the past, demands for power and telephones have risen at much faster pace than the rise in per capita incomes across countries whereas the demand for transport has grown at the same rate as income. First, with Asia expecting to grow at 7% per annum, demand for power, water, paved roads or telephones is expected to rise significantly. The second factor driving the high demand is the uneven access rates across countries and even within an individual countries. As economies grow, new capacities will need to be created in areas that lack infrastructure services. Third, the overall quality of infrastructure services needs to improve significantly. Power breakdowns, water shortages and road congestion have ceased to be headlines given the frequency with which these occur across Asia. Finally, with growing stock of infrastructure assets, the needs for maintenance investments are much greater.

There is no single recent study assessing demand for infrastructure for the Asian region. It is estimated that East Asian countries would need to invest about $200 billion a year (ADB, etc 2005). Following the

Asia's Infrastructure Investments

	South Asia	Central Asia	East Asia & Pacific
As % of GDP	7.6%	10%	6.2%
Investments ($ billion)	$ 88	$11.3	$ 200

Source: ADB etc 2005, Chatterton etc 2006, and ADB Staff Estimates for Central Asia Region

same methodology, South Asia's demand for infrastructure is estimated to be $88 billion every year assuming South Asia grows at the rate of 7.5% (Chatterton etc 2006). Thus, Asia's investment needs are estimated to be in the region of $300 billion per year or $3 trillion for the next ten years. If anything, these levels may be conservative given that only large infrastructure projects in network industries are included. Most of these investments are required in electricity and transport sectors and overall requirements are dominated by two countries, PRC and India.

This would translate in a per capita investment of $97 for PRC and $62 for India. Although country level data on investments in infrastructure is fragmented, actual investments are less than half of these requirements in Asia. At present, South Asia invests only about a third of this level indicating a gap of nearly $60 billion every year. These large financing gaps present major challenges to Asian planners and policy makers. In a large number of countries, cost recovery levels have been historically low and major political will is required to raise tariffs. This is proving to be a major risk for private investors. Second, with growing decentralization in most of the Asian countries, infrastructure requires strong planning and coordination across different levels of governments for creating enabling policy environment. Finally, the domestic capital markets need considerable development to meet the infrastructure financing requirements. There is a growing recognition that neither the government nor the private sector alone is likely to have all the resources needed to build essential infrastructure and bear all of the risks. Obviously, Asia has to build lasting partnerships with the private sector if these needs are to be met.

Until the onset of the 1997 financial crisis, private investors were playing an important part in meeting the infrastructure challenge in the Asian countries, particularly in the Southeast Asia, accounting for nearly about one third of global private investments in infrastructure. Indonesia and the Philippines welcomed private investors with a set of reforms in legal and regulatory framework for infrastructure sectors. During 1990-2005, the developing Asia[2] has reported $270 billion in private investments financing over 1150 projects. After the crisis, there was a slowdown in private sector investments in East Asia. Though annual investments are not as high as its peak in 1997, there is now a renewed interest in Asia from private investors.

What is interesting is that this interest is coming from the Asian private sector, both domestic entrepreneurs and multinationals based in Asia rather than global players. This is an interesting phenomenon because the risk perceptions of global infrastructure operators and

[2] Includes all of ADB's developing member countries.

those based in the region are different[3] and this can have important impact on infrastructure financing. There is also another reason: the lessons from the 18th century Britain and 19th century USA indicate that it was the need to mobilize large infrastructure financing that provided the much needed impetus for the development of domestic capital markets. The private financing could not only help to build infrastructure, but also domestic capital markets.

Finally, in the 1990s, the largest source of finance had been commercial banks, either directly or through syndicated loans. Following the 1997 crisis, there has been an increase in the cost of lending: from an average of 160 basis points in 1995-97 to 220 basis points in 2002-2003. This increase was largely due to increasing host country risk, rather than global infrastructure industry risk (World Bank 2004). There is some growth in infrastructure financing through bonds, but this is limited to a few countries in Asia.

II. Major Challenges

Mobilizing finances for the infrastructure requires a balanced approach among different stakeholder groups. The governments need to have a strong strategic vision for infrastructure and its role in the economy. Some of the Asian countries, especially the newly industrialized countries, had followed a path of building infrastructure ahead of demand and have been successful in driving strong economic performance. However, the present infrastructure challenge is not the same as it was in the 1980s. With technological innovations having a major impact on the information flows, much more is demanded today. Infrastructure projects have many more stakeholders than before. The role of civil society in any large infrastructure project has changed. The public sector is also under pressure to improve performance and it is not an easy task to simply raise tariffs. A number of reforms would be needed to enhance accountability of all stakeholders and create the right business environment. Infrastructure investments reflect long term commitment on both sides. Governments want the predictability of knowing that private sector will remain reliable partners in infrastructure sectors, and private operators need stable and predictable policy regimes and a functioning judicial system. Given that most infrastructure sectors need reforms and restructuring, the most important aspect of creating this environment is to prioritize a series of reforms and prepare an action plan to deliver credible results.

[3] During the 19th century in the United States, it was found that local participation brought local knowledge, improved information flows and in the end became a sustainable source of infrastructure financing.

As the "C*onnecting East Asia"* study (ADB etc 2005) pointed out, there is enough private interest even today to support infrastructure investments; however, this interest is not being transformed into infrastructure investment flows as yet. One of the biggest challenges is to strengthen accountability structures for infrastructure. If the right policy environment and business climate were created, most of the private sector operators would be keen to invest in Asian infrastructure. Most Asian countries have a large continuing agenda of reforms and restructuring for their infrastructure sectors and it varies depending on the sector. The telecommunications sector has been able to adopt competitive market structures that allows for greater accountability for performance. In other sectors the performance varies. Power sector reforms are at different stages of restructuring depending on the country, size of the markets and the demand growth. A number of countries have been able to appoint regulators for water or power sectors, but these have not as yet translated into better outcomes for the consumers. Some regulators, such as the Indonesian Water Supply Association, has a set of indicators benchmarking its performance and publishing these on the web, whereas, others, still keep licenses and contracts confidential.

A second challenge is human and institutional capacities: public-private partnership (PPP) transactions offer a new way of meeting infrastructure demand. Any expansion in PPP requires considerable political will to achieve a level playing field for both public and private sectors. The role of the public sector in this new mode is still evolving in almost all countries.

In this new environment, despite huge opportunities and large needs, preparing bankable projects has proved to be a major constraint. The crisis has demonstrated that ultimately, projects must be economically and financially viable: risk mitigation alone cannot offset either poor economics or poor government policies. A viable project requires several crucial elements: an enabling framework of public policy where the private sector has a clear role to play in infrastructure provision; a good, economically relevant project; a responsive government; a reliable private sponsor; credible contracts; and a financing structure that is sustainable. The private sector can play an important role in designing viable projects; however, this is expensive given the complexity of infrastructure projects, long lead time and high mortality rates. The transaction costs for private projects are typically large – between 3-12% of total costs. Infrastructure is capital intensive; hence, these costs are significant and can become an important deterrent. There is also a long, time consuming process and for every project that is successful, ten projects are not.

As financial structuring of PPP projects is new even in developed markets, the already pervasive capacity constraints in developing countries imply that the public sector should find more resources to design projects well in the initial stages. Leaving aside the legal or regulatory impediments affecting private sector participation, it is critical that the contracting agencies or line ministries allocate resources to prepare good quality information memoranda and at least pre-feasibility studies. Recognizing the constraints, ADB is helping some countries in the region through the establishment of Project Development Facilities (PDF). In Indonesia, for instance, discussions are underway to set aside dedicated resources for preparing large scale national and smaller scale decentralized projects. By reducing the information gap, a PDF can help both the public and private sectors in achieving greater competition, better quality, and lower costs of providing infrastructure services. In particular, detailed assessments done by a PDF can help increase the bankability of a project by feeding good quality information to determine the appropriate type (and level) of risk-sharing. Support will also be provided for transparent bidding and execution of project transactions.

Finally, with its large working – age population, Asia is also a high saving region. In 2005, almost all Asian countries reported a higher share of GDP going towards savings compared to 1990. The developing member countries of ADB in 2004 reported a total savings of nearly $1.3 trillion. The biggest challenge is to mobilize a part of these savings through capital market reforms for infrastructure projects. There is a large reform agenda to build capital markets, at the country level, and at the regional level so as to meet the financing requirements for infrastructure.

III. Asia's Infrastructure Agenda

Though Asia's infrastructure agenda is complex, there is already a broad consensus on the steps that need to be taken in order for it to be implemented. This is because the Asian countries have always recognized the contribution of infrastructure in overall economic development. Further, the 1997 Asian financial crisis has provided many important lessons and generated the much needed political will to enhance regional cooperation, not only in regional infrastructure projects, but also in much broader areas of financial and monetary cooperation.

There is a large continuing agenda of reforms and modernization for infrastructure sectors in Asia that varies depending on the size and development stage of the individual country. Country-specific solutions require a country-specific strategy and detailed action plans to deal with binding constraints, i.e., creating the necessary fiscal space for infrastructure

investments; improving cost recovery especially in the lagging sectors; and strengthening accountability structures, either through more competition or through improved regulation. The efforts are ongoing to create an investment climate that would once again make Asian infrastructure an attractive destination for the private sector.

With a severe paucity of bankable projects, the national governments and official institutions have an important role to play in supporting development of an infrastructure pipeline that will increase the supply of bankable projects by providing resources and sharing in these preparatory risks.

Although the financing requirements for infrastructure in Asia are huge, there is ample scope for enhancing regional financial cooperation to develop, domestic and regional capital markets, harmonize rules and regulations, and allow innovative solutions to meet the huge financial requirements. Asia's savings ratio is much higher than other regions, and thus Asia is not only exporting manufacturing goods and services, but is also an exporter of capital. Since the 1997 crisis, Asia's savings have been increasingly intermediated for Asia's investments in foreign currencies through global capital markets. Strengthening regional and domestic bond markets will be one of the first steps in creating a viable source of infrastructure financing to tap these Asian savings. The Asian Bond Market Initiative is one such option, and was designed to facilitate access to the market by a wide variety of issuers and to create an environment conducive to developing domestic and regional bond markets. This initiative has significant potential to raise resources for infrastructure. Recent examples include Baht denominated bonds issued for a power plant in Lao PDR and other local currency bonds. Actions will need to be taken on several fronts such as developing municipal finance, supporting utility bonds, the securitization of revenue earning infrastructure assets, and developing appropriate guarantee mechanisms. The domestic markets will not be sustainable unless adequate regulatory reforms are undertaken to ensure appropriate disclosure and capacity-building for investors.

At the global and regional level adequate resources to fund Asia's infrastructure exist. There is a need to integrate Asian capital markets with the global financial system and find innovative solutions. For example, the sheer size of Asian foreign currency reserves opens up a set of opportunities to not only increase the return on these reserves but also meet an important need of the region. Multilateral institutions and regional governments can come together to discuss potential modalities and possible instruments to channel part of these reserves into creation of infrastructure assets, provided adequate safeguards are put in place. Developing regional and domestic capital markets and instruments would be one way, and some have

suggested that there may also be other more direct ways to channel these reserves to infrastructure.

In conclusion, Asia's infrastructure agenda remains large and complex. A set of reforms to improve policy environment and governance are under way across Asia. The action will also have to focus on building human capacities, participative processes, and institutions that will strengthen accountability for better infrastructure outcomes. Ultimately, the Asia's infrastructure agenda must go beyond simply looking for financial resources because these resources exist, in large part, within the region. What is needed now are bankable projects, continued and intensified sector reforms, and the political will to unlock the region's huge domestic savings for adequate long-term infrastructure finance. None of this will come without cost – but to neglect concerted action now will mean we all pay a much higher price later.

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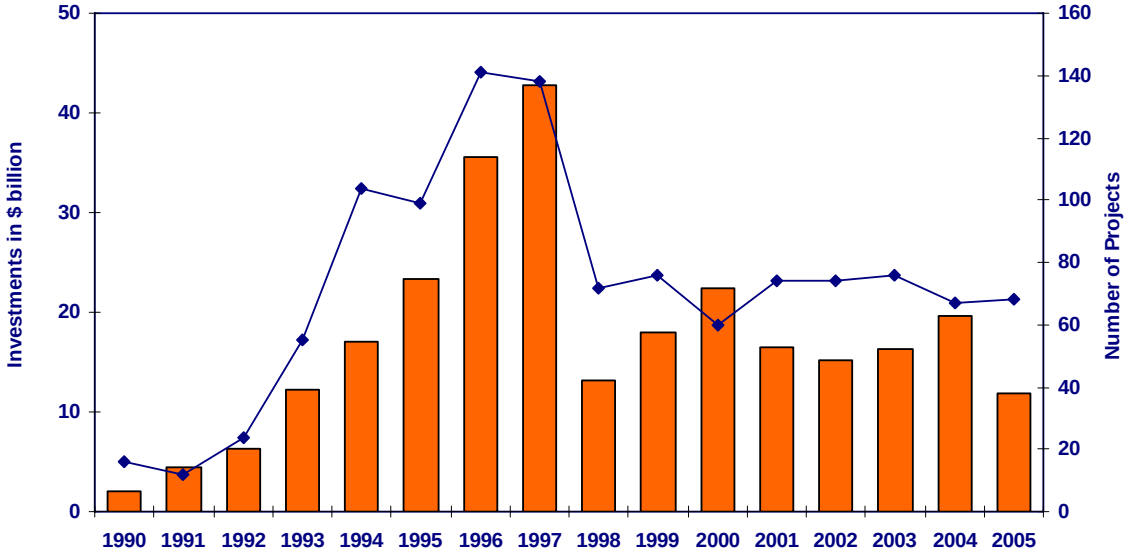
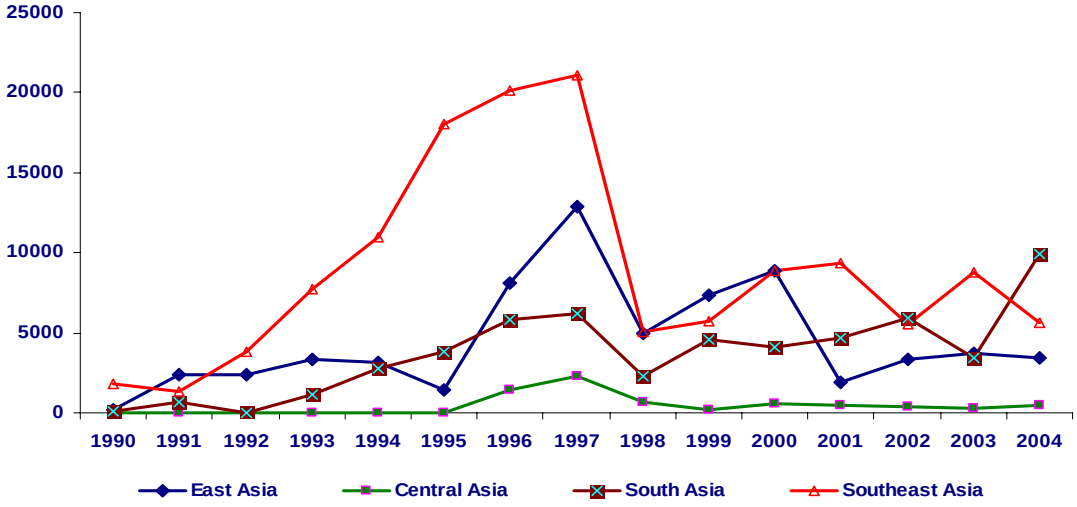
Asia's Infrastructure
Statistical Profile

Figure 1: Trends in Private Infrastructure Investments in Asia



Source: World Bank. 2006. *PPI Database*. Available at: http://ppi.worldbank.org/

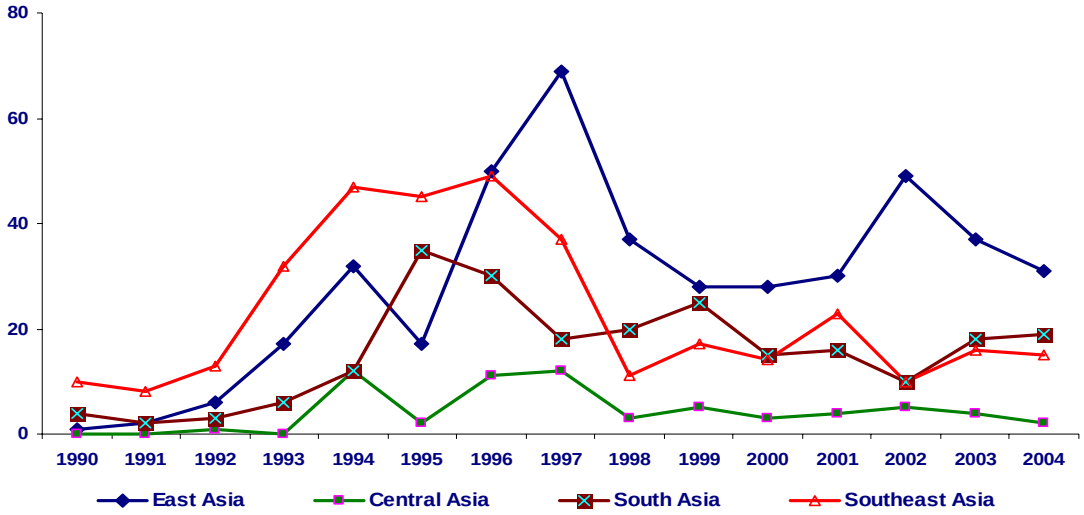
Figure 2: Regional Private Infrastructure Investments*
($ millions)



Source: World Bank. 2006. *PPI Database*. Available at : http://ppi.worldbank.org/

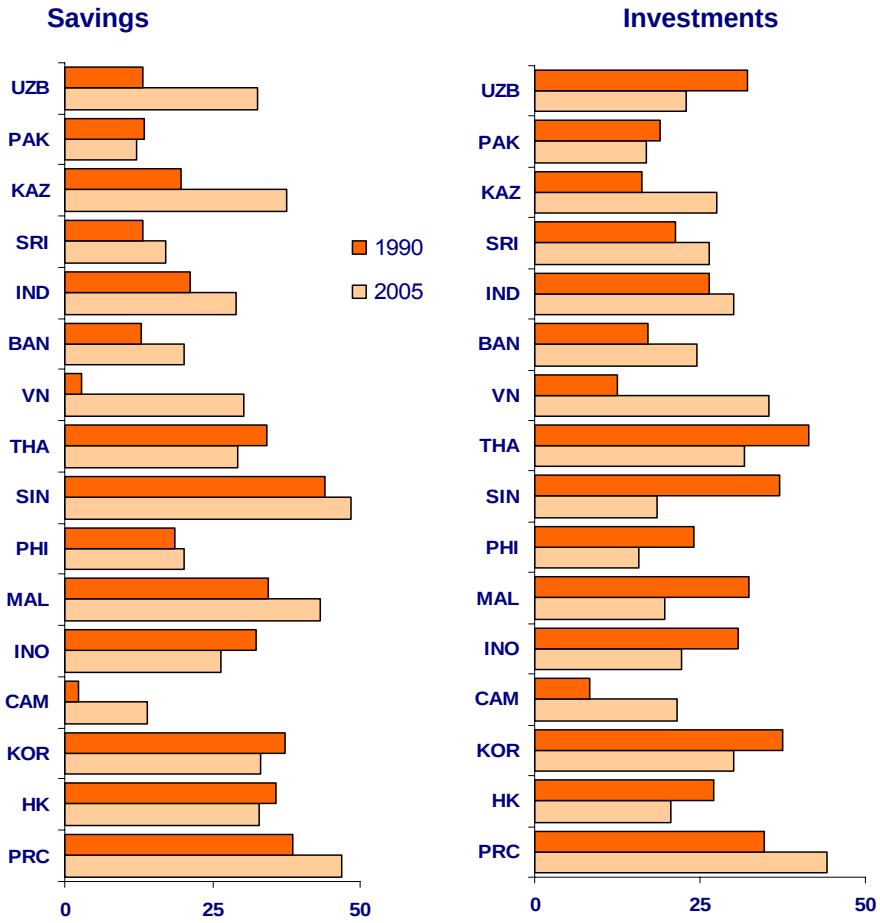
* East Asia includes People's Republic of China and Mongolia,
Central Asia includes Afghanistan, Armenia, Azerbaijan, Kazakhstan, Kyrgyz Republic, Tajikistan and Uzbekistan;
South Asia includes Bangladesh, Bhutan, India, Pakistan, Nepal and Sri Lanka
Southeast Asia includes Cambodia, LaoPDR, Indonesia, Philippines, Malaysia, Myanmar, Thailand, and Viet Nam.

Figure 3: Regional Private Infrastructure Investments*
(Number of Projects)



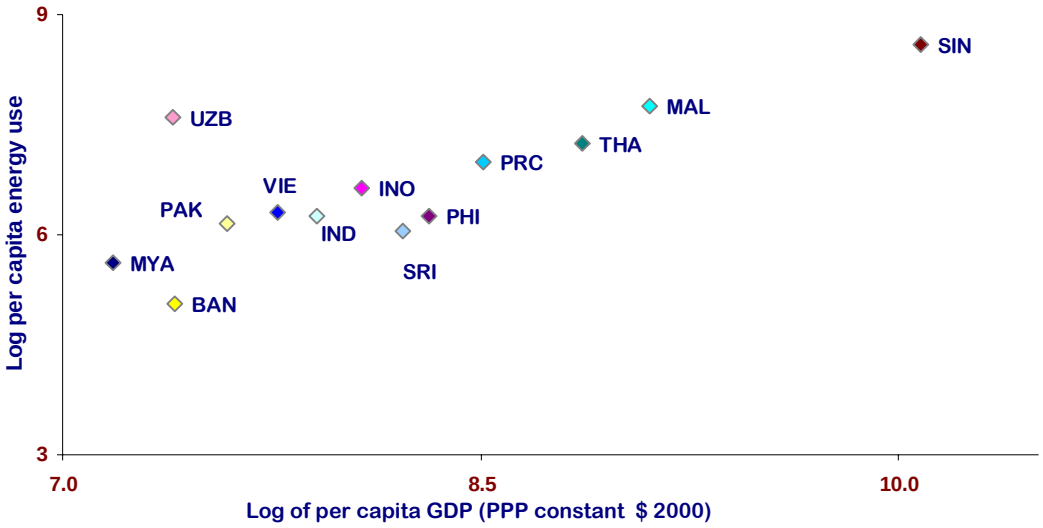
Source: World Bank. 2006. *PPI Database*. Available at: http://ppi.worldbank.org/

Figure 4: Selected Asian Countries Savings and Investments
(as % of GDP)



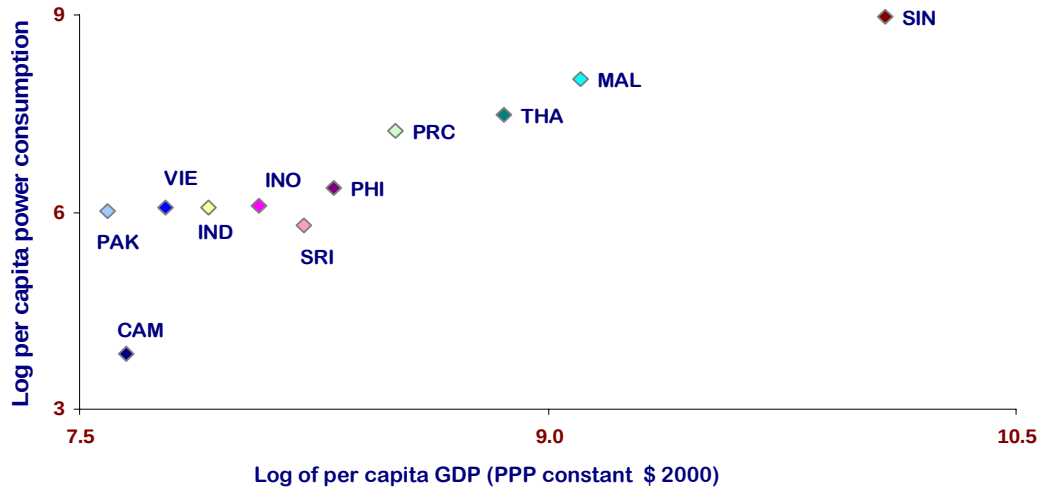
Source: Asian Development Bank 2006. *Key Indicators of Developing Asian and Pacific Countries 2006*. Manila: ADB

Figure 5: Selected Asian Countries: Energy Sector (2004)
(Per Capita Energy Consumption)



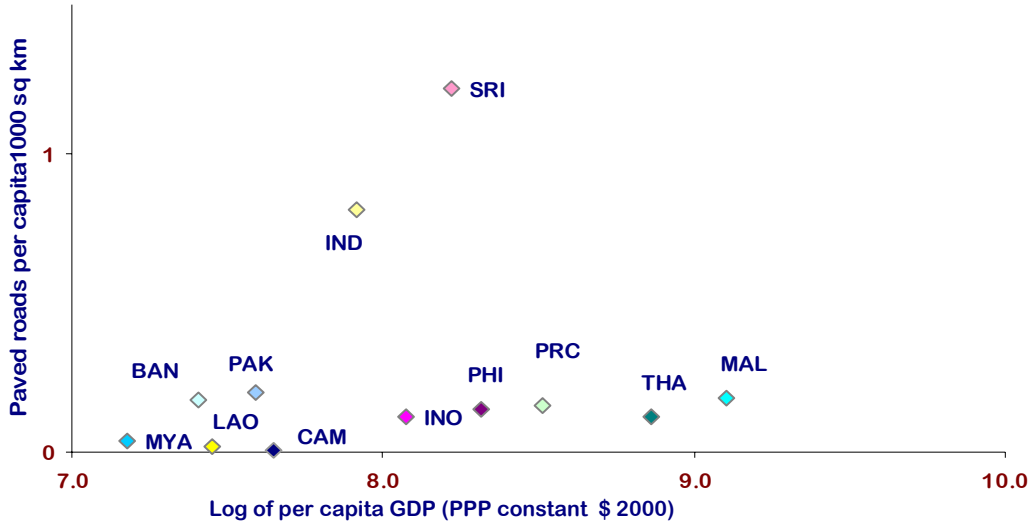
Source: Based on data from the World Development Indicators CD Rom 2006.

Figure 6: Selected Asian Countries: Energy Sector (2003)
(Per Capita Power Consumption)



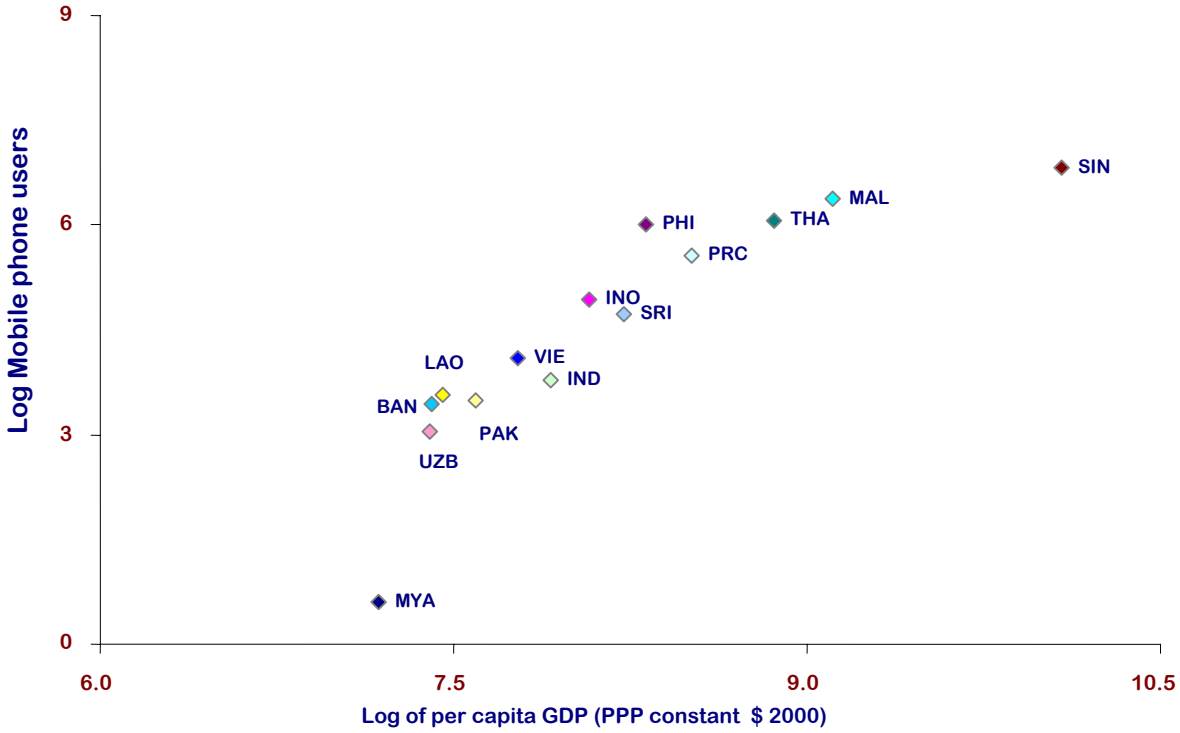
Source: Based on data from the World Development Indicators CD Rom 2006.

Figure 7: Selected Asian Countries—Access to Paved Roads (2002)
(Normalized for size: per capita per 1000 sq km)



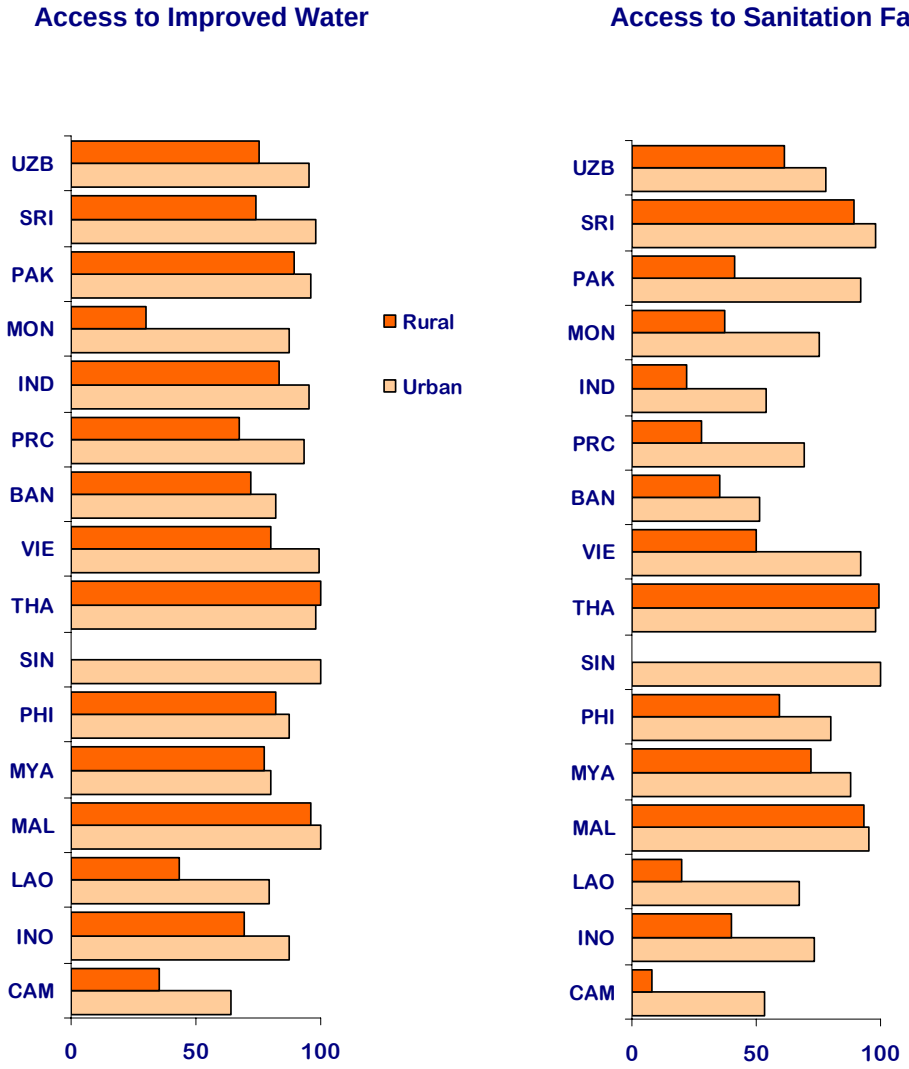
Source: Based on data from the World Development Indicators CD Rom 2006.

Figure 8: Selected Asian Countries (2004)
Mobile Phone Users (per 1000 population)



Source: Based on data from the World Development Indicators CD Rom 2006.

Figure 9: Selected Asian Countries: Population with Access to Water and Sanitation (2004) (%)



Source: Asian Development Bank 2006. *Key Indicators of Developing Asian and Pacific Countries 2006*. Manila: ADB

Table1: Infrastructure Reforms Indicators

	Bangladesh			Cambodia			PRC		
	Regulation	*Ownership*	*Market Structure*	*Regulation*	*Ownership*	*Market Structure*	*Regulation*	*Ownership*	*Market Structure*
Electricity Sector	Independent	Private generation Public distribution	Not vertically integrated	Independent	… Private distribution	…	Not independent	Public generation Public distribution	…
Water Sector	Not independent	Public capital		Not independent	Private capital		...	Private capital	
ICT Reforms	Independent	Public capital		Not independent	Public capital		Not independent	Private capital	
Local Phone Monopoly			No			No			No
Mobile Monopoly			No			No			No
Long Distance Monopoly			No			No			No
Leased Lines Monopoly			Yes			No			No
Internet Service Provider Monopoly			No			No			No

	India			Indonesia			Lao PDR		
	Regulation	*Ownership*	*Market Structure*	*Regulation*	*Ownership*	*Market Structure*	*Regulation*	*Ownership*	*Market Structure*
Electricity Sector	Independent	Private generation Private distribution	Not vertically integrated	Not independent	Private generation Public distribution	…	Not independent	… Public distribution	…
Water Sector	Not independent	Private capital		Not independent	Private capital		Independent	Public capital	
ICT Reforms	Independent	Private capital		Independent	Private capital		Not independent	Private capital	
Local Phone Monopoly			No			No			No
Mobile Monopoly			No			No			No
Long Distance Monopoly			No			No			Yes
Leased Lines Monopoly			...			No			Yes
Internet Service Provider Monopoly			No			No			No

	Malaysia			Mongolia			Pakistan		
	Regulation	*Ownership*	*Market Structure*	*Regulation*	*Ownership*	*Market Structure*	*Regulation*	*Ownership*	*Market Structure*
Electricity Sector	Independent	Private generation Public distribution	Not vertically integrated	Independent	... Public distribution	...	Independent	Public generation Public distribution	Not vertically integrated
Water Sector	Not independent	Private capital		...	Public capital		Not independent	Public capital	
ICT Reforms	Independent	Private capital		Independent	Private capital		Independent	Private capital	
Local Phone Monopoly			No			No			No
Mobile Monopoly			No			No			No
Long Distance Monopoly			No			No			No
Leased Lines Monopoly			No			No			No
Internet Service Provider Monopoly			No			No			No

Table 1: Infrastructure Reforms Indicators (continued)

	Philippines			Singapore			Sri Lanka		
	Regulation	*Ownership*	*Market Structure*	*Regulation*	*Ownership*	*Market Structure*	*Regulation*	*Ownership*	*Market Structure*
Electricity Sector	Independent	…	Vertically integrated	Independent	…	Not vertically integrated	Independent	Private generation	Vertically integrated
		Private distribution			…			Public distribution	
Water Sector	Independent	Private capital		…	Public capital		Not independent	Public capital	
ICT Reforms	Independent	Private capital		Independent	Private capital		Independent	Private capital	
Local Phone Monopoly			No			No			No
Mobile Monopoly			No			No			No
Long Distance Monopoly			No			…			No
Leased Lines Monopoly			No			No			No
Internet Service Provider Monopoly			No			No			No

	Thailand			Uzbekistan			Vietnam		
	Regulation	*Ownership*	*Market Structure*	*Regulation*	*Ownership*	*Market Structure*	*Regulation*	*Ownership*	*Market Structure*
Electricity Sector	Not independent	Private generation Public distribution	…	Not independent	Public generation Public distribution	Vertically integrated	Not independent	Public generation Public distribution	…
Water Sector	…	Private capital		...	...		Not independent	Private capital	
ICT Reforms	Independent	…		Not independent	Public capital		Not independent	Public capital	
Local Phone Monopoly			No			No			No
Mobile Monopoly			No			No			Yes
Long Distance Monopoly			No			No			Yes
Leased Lines Monopoly			No			No			Yes
Internet Service Provider Monopoly			No			...			No

Source: Estache & Goicoechea, 2005

Table 2: Selected Countries: Infrastructure Indicators

2003-2004	PRC	India	Indonesia	Malaysia	Philippines	Viet Nam
Energy Sector (2003)						
Energy production (mt of oil equivalent)	1,381	453	250	84	23	55
Energy imports, net (% of commercial energy use)	2.02	18.11	-54.72	-47.98	46.58	-23.20
Energy use (kg oil equivalent per capita)	1093.9	519.9	752.54	2318.4	525.46	544.31
Energy use per PPP GDP (kg oil eq. per const 2000 PPP $)*	0.23	0.18	0.24	0.24	0.13	0.24
Energy use per GDP (kg oil eq. per const 2000 $)*	0.94	0.99	0.88	0.53	0.5	1.22
GDP per unit of energy use (const 2000 PPP $ per kg oil eq.)	4.53	5.25	4.26	3.88	7.75	4.36
Electricity production (billion kwh)	1,907	633	113	78	46	35
Electricity prod. from oil sources (% of total)	3.01	4.59	24.93	4.34	14.21	6.49
Electricity prod. from nuclear sources (% of total)	2.27	2.8		..	..	
Electric power consumption (kwh per capita)	1378.5	435.31	440.11	3060.5	574.47	433.11
Power transmision and distributionlosses (% of output)	7.11	26.21	16.16	5.55	12.88	13.95
Electricity (% managers deeming major constraint)	29.7	28.9	22.3	14.8	33.40	..
Pump price for super gasoline (US$ per liter)	0.48	0.87	0.27	0.37	0.52	0.48
Transport Sector (2004)						
Air transport, freight (million ton-km)	8188.2	689.43	434.14	2599.2	300.80	216.53
Air transport, passengers carried (mn)	120	24	27	19	7	5
Roads, total network (thousand km) (2002)	1,810	3,315	368	72	200	*216*
Roads, paved (% of total roads) (2002)	79.48	62.6	58	77.9	9.9	n.a.
Rail lines (thousand total route-km)	61	63	6	2		3
Railways, goods hauled (billion ton-km)	1,509	333	4	1		0.002
Railways, gds hauled per GDP (ton-km per thous const 2000 $)	1,097	613	27	11		
Railways, passengers carried (bn passenger-km)	551	541	16	2		0.004
Railways, pass. per GDP (pass.-km per thous const 2000 $)	321	931		18		
Container port traffic (mn TEU)	75	4	6	11	4	2
Container port traffic per GDP (TEU per mn const 2000 $)	43.5	7.3	28.2	105.5		
Average time to clear customs (days)	7.88	6.69	5.78	3.65	9.1	
Information Technology (2004)						
Fixed line & mobile subscribers (per 1,000 people)	499.4	84.5	183.8	765.6	446	131
Telephone mainlines (per 1,000 people)	241.1	40.7	45.9	178.6	42	70
Mobile phones (per 1,000 people)	258	44	138	587	404	60
Average cost of phone call to US (US$ per 3 min.)	2.89	1.19	2.78	0.71	1.2	1.95
Personal computers (per 1,000 people)	40.9	12.1	13.9	196.8	45.1	12.7
Internet users (per 1,000 people)	73	32	67	397	54	71
Water and Sanitation (2004)**						
Improved water urban (% of urban pop. w/ access)	93	95	87	100	87	99
Improved water rural (% of rural pop. w/ access)	67	83	69	96	82	80
Improved sanitation urban (% of urban pop. w/ access)	69	54	73	95	80	92
Improved sanitation, rural (% of rural pop. w/ access)	28	22	40	93	59	50
Economy (2004)						
Population, total (mn)	1,296	1,080	218	25	82	82
GDP (bn current US$)	1,271	510	173	95	85	45
GDP (bn constant 2000 US$)	1,715	581	197	107	89	41
GDP, PPP (bn current international $)	5,829	2,804	673	223	377	226
GDP, PPP (bn constant 2000 intl $)	7,024	3,115	722	235	346	207

Table 2: Selected Countries: Infrastructure Indicators

2003-2004	Thailand	Pakistan	Bangladesh	Uzbekistan	Kazakhstan
Energy Sector (2003)					
Energy production (mt of oil equivalent)	48	55	18	56	106
Energy imports, net (% of commercial energy use)	45.64	19.93	19.14	-6.66	-111.77
Energy use (kg oil equivalent per capita)	1405.70	466.92	158.71	2023.16	3342.21
Energy use per PPP GDP (kg oil eq. per const 2000 PPP $)*	0.2	0.24	0.1	1.2	0.53
Energy use per GDP (kg oil eq. per const 2000 $)*	0.65	0.86	0.41	3.23	2.01
GDP per unit of energy use (const 2000 PPP $ per kg oil eq.)	5.02	4.23	10.36	0.81	1.86
Electricity production (billion kwh)	111	61	17	45	52
Electricity prod. from oil sources (% of total)	2.70	15.73	6.74	11.35	5.96
Electricity prod. from nuclear sources (% of total)	..	2.18	..	..	..
Electric power consumption (kwh per capita)	1,751.76	407.78	127.67	1,740.79	3,510.03
Power transmision and distributionlosses (% of output)	7.31	25.11	11.52	8.82	15.70
Electricity (% managers deeming major constraint)	25.60	..	..	4.80	..
Pump price for super gasoline (US$ per liter)	0.54	0.62	0.59	0.35	0.52
Transport Sector (2004)					
Air transport, freight (million ton-km)	1868.58	402.04	179.62	83.48	12.58
Air transport, passengers carried (mn)	21	5	2	2	0.8
Roads, total network (thousand km) (2002)	*57*	254	239	n.a	258
Roads, paved (% of total roads) (2002)	*98.5*	60	9.5	n.a.	95.86
Rail lines (thousand total route-km)		8		4	14
Railways, goods hauled (billion ton-km)		0.005		0.018	0.163
Railways, gds hauled per GDP (ton-km per thous const 2000 $)					
Railways, passengers carried (bn passenger-km)		0.24		0.002	0.012
Railways, pass. per GDP (pass.-km per thous const 2000 $)					
Container port traffic (mn TEU)	5	1	0.6		
Container port traffic per GDP (TEU per mn const 2000 $)					
Average time to clear customs (days)	4.6			6	
Information Technology (2004)					
Fixed line & mobile subscribers (per 1,000 people)	537	63	37	79	351
Telephone mainlines (per 1,000 people)	107	30	6	55	167
Mobile phones (per 1,000 people)	430	33	31	21	184
Average cost of phone call to US (US$ per 3 min.)	0.67	1.03	1.21		
Personal computers (per 1,000 people)	58.3	4.9	11.9		
Internet users (per 1,000 people)	109	13	2	34	27
Water and Sanitation (2004)**					
Improved water urban (% of urban pop. w/ access)	98	96	82	95	97
Improved water rural (% of rural pop. w/ access)	100	89	72	75	73
Improved sanitation urban (% of urban pop. w/ access)	98	92	51	78	87
Improved sanitation, rural (% of rural pop. w/ access)	99	41	35	61	52
Economy (2004)					
Population, total (mn)	64	152	139	26	15
GDP (bn current US$)	162	96	57	12	41
GDP (bn constant 2000 US$)	150	86	56	17	27
GDP, PPP (bn current international $)	515	338	260	48	112
GDP, PPP (bn constant 2000 intl $)	474	311	239	45	103

Table 2: Selected Countries: Infrastructure Indicators

2003-2004		Kyrgyz Rep	Brazil	Mexico	Turkey
Energy Sector (2003)					
Energy production (mt of oil equivalent)		1	171	243	24
Energy imports, net (% of commercial energy use)		48.67	11.43	-51.63	70.06
Energy use (kg oil equivalent per capita)		528.12	1065.3	1563.5	1116.6
Energy use per PPP GDP (kg oil eq. per const 2000 PPP $)*		0.31	0.15	0.18	0.15
Energy use per GDP (kg oil eq. per const 2000 $)*		1.68	0.31	0.27	0.36
GDP per unit of energy use (const 2000 PPP $ per kg oil eq.)		3.15	6.85	5.61	5.97
Electricity production (billion kwh)		8	365	219	141
Electricity prod. from oil sources (% of total)	..		2.96	32.37	6.54
Electricity prod. from nuclear sources (% of total)	..		3.66	4.8	
Electric power consumption (kwh per capita)		1,646.69	1882.8	1801.5	1656
Power transmision and distributionlosses (% of output)		29.38	17.31	14.56	18.49
Electricity (% managers deeming major constraint)		4.70	20.3		17.3
Pump price for super gasoline (US$ per liter)		0.48	0.84	0.59	1.44
Transport Sector (2004)					
Air transport, freight (million ton-km)		5.00	1499.5	402.59	369.42
Air transport, passengers carried (mn)		0.2	35	21	13
Roads, total network (thousand km) (2002)		19	1,725	349	354
Roads, paved (% of total roads) (2002)		90	5.5	33.5	41.6
Rail lines (thousand total route-km)		0.4	30	27	9
Railways, goods hauled (billion ton-km)		0.0005			7
Railways, gds hauled per GDP (ton-km per thous const 2000 $)					34
Railways, passengers carried (bn passenger-km)		0.00005	1	2	5
Railways, pass. per GDP (pass.-km per thous const 2000 $)					23
Container port traffic (mn TEU)			5	2	3
Container port traffic per GDP (TEU per mn const 2000 $)			7.7	3.1	12.8
Average time to clear customs (days)		3.34	13.76		6.4
Information Technology (2004)					
Fixed line & mobile subscribers (per 1,000 people)		106	587.2	544.6	750.5
Telephone mainlines (per 1,000 people)		79	230.4	174.1	266.6
Mobile phones (per 1,000 people)		59	357	370	484
Average cost of phone call to US (US$ per 3 min.)			0.7		2.08
Personal computers (per 1,000 people)		17	105.2	108	51.6
Internet users (per 1,000 people)		52	120	135	142
Water and Sanitation (2004)**					
Improved water urban (% of urban pop. w/ access)		98	96	97	96
Improved water rural (% of rural pop. w/ access)		66	58	72	87
Improved sanitation urban (% of urban pop. w/ access)		75	83	90	94
Improved sanitation, rural (% of rural pop. w/ access)		51	35	39	62
Economy (2004)					
Population, total (mn)		5	184	104	72
GDP (bn current US$)		2	461	648	184
GDP (bn constant 2000 US$)		2	655	619	229
GDP, PPP (bn current international $)		10	1,357	908	445
GDP, PPP (bn constant 2000 intl $)		9	1,385	935	511

Sources: World Development Indicators (CD Rom)
* Key World Energy Statistics
** ADB Key Indicators 2006
Numbers in italics are for different years, the lastest available.

Table 3: Comparative Infrastructure Indicators

	Africa*	East Asia & Pacific	Eastern Europe & Central Asia	Middle East & North Africa	South Asia	Latin America & Caribbean
Population(million)	674	1,823	474	300	1,378	518
Percentage living on less than $1 -day	46	15	4	2	31	10
Present Urban population (in%)	36	43	65	59	28	77
Urban Population 2030 (in %)	51	62	70	70	42	85
Infrastructure Access Indicators (in % of population)						
Electricity Network	24	88	99	92	43	89
All weather Roads within 2 km	58	78	91	88	84	89
Teledensity (subscribers per 1000 people)	36	49	82	75	35	74
Improved Water	34	95	77	51	65	54
Sanitation facilities	62	357	438	237	61	416

* Refers to the World Bank Regional classification

Source: Jones, Stephen. 2006. Infrastructure Challenges in East and South Asia. *IDS Bulletin* 37 (3): 28-44.,

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