

Private Sector Participation in Infrastructure in Africa¹

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Abstract

The last two decades have witnessed a profound global reassessment of public policy towards infrastructure, with a clear shift in orientation towards private management and ownership. *This study appraises the record of private sector participation in infrastructure in Africa.*

The results of almost two decades of regulatory reforms, implementation of the privatisation, and liberalisation agenda, combined with the influx of private investment in infrastructure, have decidedly been mixed. There has been a “policy mistake” founded on the dogma that infrastructure would be financed by the private sector. For various reasons, mainly involving investment climates and rates of return, private investment has been limited in terms of volume, sectors, and countries. The current global economic and financial crisis poses a new threat. Its effects are already being felt in greater delays in financial closures, more cancellations, and higher financing costs for PPI projects.

The lessons of experience, however, show that most countries will be better off working out a partnership with the private sector. To begin to solve Africa’s infrastructure investment problems, broad institutional reform along with greater financial commitments by governments and the private sector will be required. Private participation in infrastructure requires fiscal reform and improvements in public sector management. It also requires careful attention to the basics of project design, including identifying and allocating risk, and ensuring sound procurement practices.

Keywords: Infrastructure, reform, privatisation, and Africa

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1. Revised and updated version of the draft presented at the Third African Economic Conference held in Tunis, Tunisia, in November 2008. The comments of participants at the conference, especially those of the lead discussant as well as an anonymous reviewer, are gratefully acknowledged. The usual caveat applies.
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1. Introduction

Traditionally, infrastructure industries are monopolies, owned and operated by the public sector. For much of the 20th Century, infrastructure services in most countries were provided by state-owned utilities that were vertically integrated. Although this model initially produced some desirable results, it later led to serious problems, especially in developing countries. These problems included under-investment, caused to a large extent by under-pricing, low productivity, poor service delivery, long queues, lack of access to basic services, lack of transparency, and damaging political interference in the operations of the infrastructure entities.

Since the late 1980s, there has been a profound reassessment of public policy towards the infrastructure sector because of two main reasons: (i) The generally poor performance of state-owned monopolies, and (ii) the rapid globalisation of world economies, which has brought into sharp focus the economic costs of inadequate infrastructure, prompting several developing countries to seek new initiatives in promoting competition. The resulting shift has generally favoured private ownership and management of infrastructure utilities.

The debt and fiscal crises that emerged in the early 1980s in many developing and transition economies led to the recognition that infrastructure was a critical tool in sustainable economic growth and international competitiveness. In the face of extraordinarily weak performance in the provision of infrastructure, many African countries began to consider alternative means of its development. The endorsement and promotion of infrastructure privatisation by international development agencies encouraged many countries in Africa to begin to implement far-reaching infrastructure reforms, including restructuring, privatisation, and establishing new approaches. This has been happening over the past decade.

The reforms are being implemented to promote private investment. They are also aimed at providing strong incentives for boosting efficiency, and to restore the financial viability of virtually bankrupt state-owned network utilities. In this regard, the reforms have especially been directed towards the promotion of more rational pricing policies that would improve service quality and eliminate service backlogs, the introduction of greater transparency in the operations of infrastructure utilities, and their insulation from damaging political interference.

This study appraises the record of and modalities for enhancing private sector participation in infrastructure in sub-Saharan Africa (SSA). It is of the view that private sector participation in the continent is yet to produce the anticipated massive investments and dramatically improved technical performance. Notwithstanding some notable successes, overall outcomes have fallen short of expectations. The results have been disappointing, particularly in the provision of water and electricity. Limited private financing has been mobilised. A number of concessions have run into problems. In many countries,

Table 1. Africa's Infrastructure Deficit

Normalised units	Sub-Saharan Africa Low Income Countries	Other low-income countries
Paved road density	31	134
Total road density	137	211
Mainline density	10	78
Mobile density	55	78
Internet density	2	3
Generation capacity	37	326
Electricity coverage	16	41
Improved water	60	72
Improved sanitation	34	51

Note: Road density is in kilometres per square kilometre; telephone density in lines per thousand people; generation capacity in megawatts per million people; and electricity, water, and sanitation coverage in percentage of the population.

Source: Yepes *et al.* (2008).

the cost of infrastructure services has not declined, and the expected increases in quality and access rates have failed to materialise.

The infrastructure backlog is huge. By most measures, sub-Saharan Africa trails behind other regions of the world in terms of infrastructure service quality and delivery. By any conceivable measure of infrastructure coverage, African countries lag behind its peers in other parts of the developing world. Results presented in the African Infrastructure Diagnostics Study indicate that the differences are particularly large in the case of paved roads, telephone mainlines, and power generation capacity as shown in Table 1. The gap is widening over time.

Africa's largest infrastructure deficit is more pronounced in the power sector, whether measured in terms of generation capacity, electricity consumption, or security of supply. Statistics from Energy Information Administration indicates that total electricity generation for the whole of Africa was only 579.2 billion kilowatt-hours in 2007, less than 620.7 for Canada and only slightly more than 438.7 for Brazil alone. Electricity consumption maintained the same trend at 515.4 billion kilowatt-hours in 2007 for Africa, 536.05 billion kilowatt-hours for Canada, and 404.27 billion kilowatt-hours for Brazil. Moreover, only 12 percent of rural households have access to electricity (Africa Infrastructure Country Diagnostic 2009).

Against the backdrop of the global financial and economic crisis, the region's track record of investment suggests that the private sector by itself is unlikely to provide the kind of near-term funding needed to address these shortcomings. With Africa's low levels of infrastructure investment in the face of rapidly growing needs, the private sector appears capable of supplying only a fraction of the estimated US\$ 38 billion annual investment needs in Africa's infrastructure over the next 10 years. This is equivalent to 5.3 per cent of GDP, according to estimates provided by the Africa Infrastructure Country Diagnostic (Infrastructure Consortium for Africa 2008).

The global economic and financial crisis that became apparent in 2008, considered by many observers to be the worst since the Great Depression of the 1930s, introduced a new threat. Its effects have included greater delays in financial closures, more cancellations, and higher financing costs for private (sector) participation in infrastructure (PPI) projects.

Although Africa was relatively insulated from the financial contagion owing to its limited integration into the global financial system, the continent is now being affected through second round effects of the crisis. These include a fall in demand for exports, a potential decline in official development assistance (ODA), reduced private investment due to tightening of liquidity in global financial markets, as well as a decline in Diaspora remittances and tourism receipts. Owing to their limited economic diversification and heavy dependence on external finance for development, several African countries have been hard hit by the crisis.

However, the solution is not to return to a strategy of improving state firms under public management. Any effort to reapply that strategy would have to overcome the many serious problems encountered the first time around.

This paper is structured in five sections. Section 2 appraises the relationship between infrastructure and development. Section 3 presents trends in private sector in infrastructure. Section 4 is a sectoral evaluation, and Section 5 concludes the discussions.

2. Infrastructure and Development

Curiously, analytic discussions about infrastructure were practically absent from economic discourses for two centuries (Prud'homme 2004). It was until the 1990s that the subject gained prominence through a vast body of literature on its contribution to economic growth. The subject is again back on the development agenda, with renewed emphasis on its role in growth and poverty reduction (Estache 2006).

There is no ironclad definition of infrastructure. It is most commonly discussed in terms of its characteristics, namely, longevity, scale, inflexibility, and higher investment costs. But that is seldom seen as satisfactory. Increasingly, its meaning has been shifting from one focusing on physical fixed assets such as roads, airports, sea ports, telecommunications systems, water distribution systems and sanitation (what might be called public utilities). It now often embodies notions of softer types of infrastructure, such as information systems and knowledge bases (Button 2002).

While economic infrastructure (essentially transport, energy, ICT, water, sanitation, and irrigation) is specifically identified in the millennium development goals (MDGs) only in respect of water and sanitation, telephones, personal computers and internet users, in many ways, infrastructure investments underpin virtually all the MDGs, including halving poverty in the world by 2015. It is widely acknowledged that the contribution of infrastruc-

ture to halving income poverty or MDG 1 is more significant than the other goals (Willoughby 2004).

Infrastructure also affects non-income aspects of poverty, contributing to improvements in health, nutrition, education, and social cohesion. Indeed, infrastructure makes valuable contributions to all the MDGs (Willoughby 2004). The many benefits of infrastructure have also been confirmed by the United Nations Millennium Project (2005), which advocates for major increase in basic infrastructure investments to assist countries (especially in Africa) to escape the poverty trap, and by the Commission for Africa (2005).

Recent research confirms the importance of infrastructure in the promotion of sustainable development, though the body of evidence on private sector in infrastructure is only just evolving. There are several shortcomings in the literature, especially in methodology and scope. Most studies have tended to concentrate on case studies. Despite this deficiency, the relevance of infrastructure to growth and poverty alleviation is quite analytically robust. Whatever the approximation used for infrastructure, the econometric evidence shows that it positively influences either growth or growth convergence. The strongest impact comes from the telecommunications sector, followed by roads and electricity. The evidence on the link of access to water or sanitation is more complex.

A recent comprehensive analysis by Andres *et al.* (2008) addresses some of the shortcomings in the literature. It applies new methodologies and systemic cross-country approach to examine the impact of private sector participation in the electricity, telecommunications, and water sectors in Latin America. Despite its subtlety, it makes two important methodological contributions, both targeted at avoiding previous overstatement of the benefits of private sector participation – the distinction between transition period effects and longer-term changes in performance – and a comparison of pre and post-private sector participation trends rather than levels.

The main results of this analysis, accounting for the counterfactual, are that the changes associated with private sector participation had a significant positive effect on labour productivity, efficiency, and quality. There were significant reductions in the workforce. The robust results of this analysis show that the benefits of private sector participation are quite large, particularly in terms of productivity gains, quality of service, and coverage. It highlights the fact that the benefits can be even larger with better design and implementation, and with an appropriate institutional capacity and legal and regulatory framework.

3. Trends in Private Participation in Infrastructure in Africa

Governments around the world have adopted a wide variety of approaches in engaging the private sector in the delivery of infrastructure services.

Table 2. Options for Private Sector Participation in Infrastructure

Approach	Asset Ownership	Operation & Maintenance	Capital Investment	Commercial Risk	Contract Duration
Service Contract	Public	Public/private	Public	Public	1-2 years
Management Contract	Public	Private	Public	Public	3-5 years
Lease	Public	Private	Public	Shared	8-15 years
Concession	Public	Private	Private	Private	25-30 years
Build-Operate-Transfer (BOT)	Public and Private	Private	Private	Private	2-30 years
Divestiture	Private or public and private	Private	Private	Private	Indefinite or limited by license

Source: Adapted from World Bank's Private Participation in Infrastructure (PPI) database.

Options range from service contracts, in which relatively few responsibilities and risks are passed to the private sector, to concession contracts and divestitures, in which the private sector takes full responsibility for operating and investing in infrastructure services and therefore takes on significant commercial risks. The main distinction among the key PPI approaches is how responsibility is allocated for asset ownership, operations and maintenance, capital investments, and commercial risk, as shown in Table 2.

Drawing from the World Bank's Private Participation in Infrastructure database, we evaluate the extent of private sector participation in infrastructure in Africa³.

According to this database, 150 low and middle-income countries transferred to the private sector the operating risk for 4,078 infrastructure projects between 1990 and 2007, attracting investment commitments of \$1.243 billion as indicated in Table 3, though actual investment may have been somewhat lower due to some cancelled projects.

Sub-Saharan Africa attracted \$68.7 billion in investment commitments between 1990 and 2007 as indicated in Table 2⁴. This represents about 5.5 percent of the cumulative investment in developing countries.

In spite of this dismal performance, South Africa (with 32 projects accounting for \$25.3 billion) and Nigeria (with 32 projects at \$17.1 billion) accounted for over 62 percent of these flows, which works to about \$19 billion from 1990–2004. Nigeria has claimed a rapidly growing share (about 2.6 percent) over the 15-year period, with much of that investment coming in since 2001. Excluding South Africa and Nigeria, which have emerged as the top 10 countries globally by investment flows since 2001 as

3. Due to the way data from the PPIAF data is structured, much of the discussion in this section is limited to sub-Saharan Africa

4. This may have been underestimated, since the data on private activity exclude small-scale private service providers, which play an important role in Africa.

Table 3. Private Sector in Infrastructure Projects by Region (1990-2007)

Region	Total Number of projects	Percentage of Total	Total Investment Commitments US \$ Million	Percentage of Total
Latin America and the Caribbean	1,243	30.53	474,525	38.17
East Asia and Pacific	1,224	30.01	275,552	22.17
Europe and Central Asia	714	17.51	230,393	18.53
South Asia	414	10.15	127,577	10.26
Sub-Saharan Africa	357	8.75	68,716	5.53
Middle East and North Africa	124	3.04	66,295	5.33
Total	4,078	100	1,243,058	100

Source: Adapted from World Bank's Private Participation in Infrastructure (PPI) database

Table 4. Top 10 Countries by Investment Commitment 2001-2007

Country	Share of total Investment
Brazil	12.3
India	11.5
Russia Federation	7.5
China	7.0
Mexico	6.1
Turkey	3.2
Poland	2.9
Malaysia	2.8
Nigeria	2.6
South Africa	2.6
Total	58.6

Source: World Bank's Private Participation in Infrastructure (PPI) Database

shown in Table 4, the region's share of the total for low and middle-income countries is less than two percent.

By 2007, 46 of the 48 sub-Saharan countries had awarded 357 infrastructure projects with private participation over the 17-year period. This is likely to have been underestimated. However, only four countries had projects in all the four infrastructure sectors, namely energy, telecommunication, transport, and water and sewerage. The projects' average size was only about a quarter of what obtains in the rest of the developing world. Indeed, Africa has had relatively widespread private activity, but fewer and smaller projects per country than in more affluent regions.

After a slow start in the early 1990s, private activity in infrastructure in sub-Saharan Africa grew significantly since the mid 1990s. Annual investment in infrastructure projects increased from \$1.4 billion in 1986 to \$4.6 billion in 1999, then declined to \$3.5 billion in 2000, fluctuating in subsequent years before peaking at \$11.8 billion in 2006 (Table 5). It decli-

Table 5. Number of Private Sector in Infrastructure Projects by Primary Sector in Sub-Saharan Africa (1990-2007)

Financial Closure Year	Energy	Telecom	Transport	Water and Sewerage	Total
1990	1	0	1	0	2
1991	1	0	1	1	3
1992	0	3	0	1	4
1993	3	3	3	1	10
1994	4	3	1	0	8
1995	3	10	2	1	16
1996	5	9	4	1	19
1997	6	17	5	0	28
1998	5	15	7	1	28
1999	7	13	6	5	31
2000	5	19	6	1	31
2001	7	16	2	4	29
2002	3	3	1	2	9
2003	7	9	9	1	26
2004	4	10	5	0	19
2005	12	6	21	1	40
2006	11	10	8	2	31
2007	6	14	2	2	24
Grand Total	89	160	84	24	357

Source: World Bank's Private Participation in Infrastructure (PPI) database

ned marginally to \$10.9 billion in 2007, the latest year for which data is available.

Sub-Saharan Africa's share of private sector investment in infrastructure has been heavily tilted toward telecommunications. As indicated in both Tables 5 and 6, telecommunications is the leading sector with private sector participation in sub-Saharan Africa, both in terms of capital invested (\$49.4 billion or 72 percent) and the number of projects (160 or 44.8 percent). This is a far larger share than the 47 percent of capital invested in the rest of the developing world. Transport ranked a distant second in investment (\$10.2 billion or 14.8 percent) though third in the number of projects (84 or 23.5 percent).

Nearly 60 percent of this went to toll roads, mostly for long-term concessions. Perhaps, the largest recent project is the \$450 million Bakwena Platinum Toll Highway, linking Pretoria to South Africa's border with Botswana.

Energy had the next largest share of activity, with \$8.8 billion on 89 projects. Among recent energy projects, the largest is the 865-kilometer pipeline to transport natural gas from fields in Mozambique to South Africa, a \$1.2 billion project.

Investment in water and sewerage projects lagged far behind other sectors at \$266 million (less than one percent of the total) for 24 projects between 1990 and 2007. However, many African governments bundle energy and water into one large utility that they then turn over to private operators. Africa had 12 such projects between 1990 and 2007, which was more than

**Table 6. Private Sector Investment in Infrastructure Projects
by Primary Sector in Sub-Saharan Africa
(Total Investment Commitments in US\$ million)**

Investment Year	Energy	Telecom	Transport	Water and Sewerage	Total Investment
1990	40	0	0	0	40
1991	0	0	0	0	0
1992	0	20	0	0	20
1993	0	1	31	0	31
1994	76	553	18	0	647
1995	77	677	63	0	817
1996	428	961	28	20	1,437
1997	754	1,755	469	0	2,978
1998	715	1,467	336	0	2,517
1999	585	2,846	1,087	82	4,601
2000	451	2,787	204	31	3,473
2001	713	4,050	484	3	5,251
2002	484	3,635	78	0	4,196
2003	1,297	4,715	280	9	6,301
2004	56	4,512	223	0	4,792
2005	1,359	4,918	2,460	0	8,737
2006	616	7,028	4,251	0	11,895
2007	1,192	9,484	187	121	10,984
Grand Total	8,841	49,410	10,199	266	68,716

Source: World Bank's Private Participation in Infrastructure (PPI) database

any other developing region. These projects accounted for about five percent of total investment, though anecdotal evidence suggests that most investments went into electricity rather than water. Regional investors, mainly from South Africa, have played a key role in all infrastructure sectors, accounting for more investment (about 38 percent) in Africa than any other category of investor in period between 1998 and 2005 (Schur, von Klauudy, and Dellacha 2006). The breakdowns by sub-sector are presented in Table 7.

About 31 projects or 8.7 percent of the total infrastructure projects with private participation implemented in sub-Saharan Africa between 1990 and 2007 have been cancelled⁵ or classified as "distressed". This represents \$1.9 billion or 2.8 percent of investment commitments in that period (see Table 8). Except for Middle East and North Africa (1.5 percent) and Europe and Central Asia (1.6 percent), sub-Saharan Africa, at 2.8 percent, had similar slightly lower project failure rates, but lost a much larger share of projects (8.7 percent). Ten of the cancelled or distressed projects in Africa were small Greenfield mobile operations that failed to build a sizable customer base.

5. Cancelled projects are those in which private sponsors sell or transfer their economic interest back to the government; remove all management and personnel; or cease operation, service provision, or construction. Distressed projects are those under international arbitration or for which cancellation has been formally requested.

Table 7. Total Projects by Primary Sector and Subsector (US\$ million)

Primary Sector	Sub-sector	Project Count	Total Investment
Energy	Electricity	83	6,908
	Natural Gas	7	2,249
Total Energy		90	9,157
Telecom	Telecom	160	49,410
Total Telecom		160	49,410
Transport	Airports	11	495
	Railroads	20	4,769
	Roads	10	1,856
	Seaports	44	3,096
Total Transport		85	10,217
Water and sewerage	Treatment plant	3	133
	Utility	21	134
Total Water and sewerage		24	266
Grand Total	..	359	69,050

Source: World Bank's Private Participation in Infrastructure (PPI) database

Table 8. Canceled or distressed infrastructure projects with private participation by region, 1990-2007

Region	Investment Total (2007 US Billion)	Share of Total (per cent)	Project Count	Share of Total
East Asia and Pacific	26.8	9.7	65	5.3
Europe and Central Asia	3.8	1.6	21	2.9
Latin America and the Caribbean	49.8	10.3	117	9.4
Middle East and North Africa	1.0	1.5	6	4.7
South Asia	3.9	3.1	7	1.7
Sub-Saharan Africa	1.9	2.8	31	8.7
Total	86.3	6.9	247	6.1

Source: World Bank's Private Participation in Infrastructure (PPI) database

Management and lease contracts are lower risk, and are popular in the region, but these characteristics do not guarantee their sustainability.

An emerging trend is the increasing importance of China, India, and a few Middle Eastern Gulf nations in African infrastructure. A recent study indicates that investment commitments in Africa by these emerging financiers jumped from less than \$1 billion per year before 2004, to \$8 billion in 2006 and \$5 billion in 2007. By far, the largest contributor was China, whose contribution started from a low base (less than \$1 billion per year before 2004) but rose to over \$7 billion in 2006, before dipping to \$4.5 billion in 2007 (Foster *et Al.* 2008). Noteworthy, however, is that nearly 70 percent of Chinese investments are concentrated in resource rich Angola, Nigeria, Ethiopia, and Sudan, a feature demonstrating the huge appetite of China for Africa's oil.

Table 9. Number of Projects by Type

Financial Closure Year	Concession	Divestiture	Greenfield	Management and lease contract	Total
1990	1	0	0	1	2
1991	1	0	0	2	3
1992	0	1	2	1	4
1993	1	0	3	6	10
1994	0	0	6	2	8
1995	3	3	8	2	16
1996	1	1	11	5	18
1997	2	5	18	3	28
1998	3	2	22	1	28
1999	5	2	19	5	31
2000	4	4	21	2	31
2001	1	7	16	5	29
2002	1	0	4	4	9
2003	11	0	10	5	26
2004	5	1	11	2	19
2005	23	1	14	2	40
2006	6	4	17	4	31
2007	3	5	15	1	24
Grand Total	71	36	197	53	357

Note: Most infrastructure projects with private participation fit in one of these four categories. But the boundaries between these categories are not always clear, and some projects have features of more than one category. In these cases projects have been classified in the category that better reflects the risk borne by the private sector.

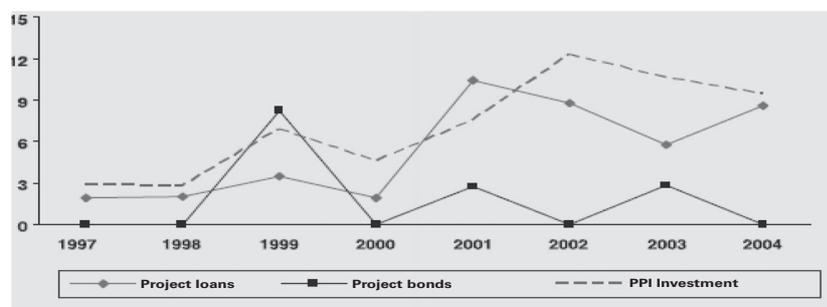
As indicated in Table 9, sub-Saharan African countries have tended to rely mainly on Greenfield projects to increase capacity. This type of project, used mainly for mobile telecommunications, topped private activity in investment and number of projects (197 projects or 55 percent). Concessions were next, accounting for 71 projects, closely followed by management and lease contracts with 53 projects. Divestiture accounted for only 36 projects.

These transactions generally involved the sale of controlling stakes through international tenders, to strategic investors committed to managing the companies and complying with a predefined investment programme. Most divestitures took place in telecommunications. They involved incumbent national operators.

Infrastructure projects with private participation are often financed with a mix of equity and non-recourse debt (debt contracted by the project company without recourse to the sponsors, also called project finance). Limited access to such debt can severely damage an economy's ability to attract private investment in infrastructure. Project sponsors will rarely finance infrastructure projects with equity only, or take the project debt fully on their balance sheets.

Africa has attracted less non-recourse bank debt relative to private investment in infrastructure than other developing regions as shown in Figure 1. It has been even less successful in raising project finance in capital markets

Figure 1. Sub-Saharan Africa's Share of Project Finance and Private Infrastructure Investment Flows to Developing Countries, 1997-2004 (Percent)



Source: Sheppard, von Klaudy, and Kumar (2006)

through project bonds. And most of this bond financing was raised for South African projects through local currency issues in that country's capital markets.

Sheppard *et al.* (2006) identify three related sets of factors that limit Africa's ability to tap both foreign and local currency markets to raise private finance for infrastructure, especially long-term debt finance. First, most African countries have low or nonexistent sovereign credit ratings. Only 16 of 48 countries have foreign currency debt ratings, and only four of these have ratings of BB – or higher, which provide relatively broad access to financial markets. The countries that have obtained (or have an estimated) foreign currency debt rating of at least BB – represent only 43 percent of regional gross national income (GNI). This share is dominated by South Africa. In all other developing regions, the share is more than two-thirds of regional GNI, and in East Asia and Pacific, close to 100 percent.

For most African countries, foreign commercial lending is therefore difficult to access and typically limited to short-term transactions. The ability of infrastructure projects to tap long-term foreign currency lending has depended on a mix of factors that mitigate risk. These include the ability to generate foreign currency revenues and strong support by official (bilateral or multilateral) agencies.

Secondly, most local financial markets have limited capacity to finance infrastructure projects. Only South Africa has domestic banks and a local capital market capable of consistently providing local currency financing for infrastructure projects on suitable terms and in significant amounts.

In virtually all other African countries, local long-term financing has been limited, and infrastructure projects have needed substantial credit enhancement (for example, through guarantees), provided mostly by official agencies to attract local currency debt.

Third, features typical of infrastructure projects raise the risk of investments. Compared with projects in many other sectors, those in infrastructure tend to have longer payback and build-out periods. They are also more

susceptible to political and regulatory interference, which increases the regulatory risk such investments may face.

Together, these factors have helped shape the characteristics of infrastructure projects with private participation in Africa. The projects have typically been small, relative to those in other regions. Many have been financed entirely with equity. Projects with economics permitting faster payback and shorter-term debt (such as telecommunications) have often been favoured over those with long payback periods and requiring long-term financing to offer services at an affordable price (such as toll roads).

4. Sectoral Evaluation of Infrastructure reform efforts

Until recently, there have been fewer assessments of PPI in SSA. The few evaluation studies have used less sophisticated methodologies relative to those applied in other regions. Subsequently, there is no sufficient empirical evidence to generate a definitive conclusion regarding PPI's effects.

In this section, we appraise the main developments in each sector.

4.1. Water and Sanitation

About 1.1 billion people in the developing world currently lack access to clean water. Nearly 2.6 billion lack adequate sanitation. An estimated 12.2 million people die every year from diseases directly related to drinking contaminated water (United Nations 2006).

In water and sanitation, sub-Saharan Africa is falling further behind. Africa has the lowest water supply and sanitation coverage compared to other regions of the world. In 2004, the ratio of the population with access to improved water source and sanitation were 56 percent and 37 percent respectively.

By 2015, sub-Saharan Africa will account for more than half of the global clean water deficit and just under half of the sanitation deficit. South Asia will account for the bulk of the remainder. If the current trend persists, sub-Saharan Africa will reach the water target in 2040 and the sanitation target in 2076 (United Nations 2006). To get on track, connection rates for water will have to rise from 10 million a year in the past decade to 23 million a year in the next decade.

During the 1990s private participation was broadly hailed as the solution to problems of developing countries in the water sector. Private investors were expected to provide not only much-needed expertise, but also the sizable funding required to rehabilitate infrastructure and expand coverage.

However, the private sector investment boom of the late 1990s has been succeeded by declining investment flows and the cancellation or distress of several high-profile projects.

The reason lies in the fact that contracts often reflected excessive optimism by both private investors and governments. The socio-political difficulties of raising tariffs to levels covering costs were often underestimated. Financial markets were hesitant to provide non-recourse financing for water projects (unlike projects in other infrastructure sectors), often requiring that financing be backed by the sponsors' balance sheets. Some of the largest water projects were in East Asia and Argentina, and when the financial crisis broke out, the contracts proved insufficiently robust to weather the storm. Several international water operators lost much of their appetite for further investment in developing countries.

Nonetheless, recent data paint a more nuanced picture. Activity in 2005 suggests that private participation in the water sector is entering a new phase. New private activity is focusing on smaller projects, a few countries, and bulk facilities. Contractual arrangements involving utilities are combining private operation with public financing, and new players are entering the market. Indeed, 2005 was a record year. Forty-one projects reached financial closure, the most since 1990.

Indeed, private investors committed \$56.5 billion to 584 water projects in developing countries in 1990–2007. In the 17-year period, 60 developing countries brought private participation to their water sector. By 2005, 54 of those countries still had operational water projects. In the past three years, countries as diverse as Albania, Algeria, Ghana, Peru, and Russia have opened their water utilities to private participation. Sub-Saharan Africa was able to attract only 24 projects and 12 other projects combining water and electricity services. Even then, South Africa accounted for seven of these projects.

Due to the high country risk in sub-Saharan Africa, private operators had been reluctant to invest even during the "concession boom," leading to a predominance of management and lease contracts. Since these schemes have proved to be more sustainable, countries such as Côte d'Ivoire and Senegal have become international success stories for private participation. In 2005, Vittens of the Netherlands won the management contract for Ghana's national water utility in a consortium with Rand Water of South Africa.

Nowhere has privatisation met more intense resistance in Africa than in water supply. There have been a number of effective campaigns against the privatisation of water services in sub-Saharan Africa, notably in Ghana⁶, Kenya, and South Africa.

4.2. Energy

Energy is critical to economic and social well-being. The provision of electricity is perhaps the most capital-intensive of all infrastructure activities,

6. The most successful, perhaps, has been in Ghana, where the Integrated Social Development Centre (ISODEC), a Ghanaian NGO, led the coalition against water privatization. It was reinforced by research from Christian Aid and widespread support by academics and NGOs worldwide.

requiring massive investments in power generation, transmission, and distribution systems and other related facilities.

Thirty-five countries in Africa are currently experiencing a debilitating power crisis. The supply is regularly interrupted. Only one in four Africans has access to electricity. In rural areas, the figure is below one in ten (MDG Africa Steering Group 2008). In some countries, such as Burkina Faso, Malawi, and Mozambique, access rates are as low as seven percent (International Energy Agency 2006). Electricity consumption is a fraction of that in other regions. Not only are access rates low, but the electricity supply is costly and unreliable.

On attaining political independence, energy infrastructure was seen as an essential lever for economic take-off and social advancement of the citizenry. Governments took up the responsibility to manage the operation, the planning, and the financing of this sector. The organisation of the sector was thus based on state-owned monopolistic operators and managed as government departments or a separate public company. Over the years, the public monopoly approach facilitated the expansion of power suppliers and captured technical economies of scale. However, it failed to ensure high quality service, wide access to the service, and reliable supply. This led to poor investment decisions and precarious financial viability.

Since the 1990s, new ways of organising the industry have been explored. In an effort to improve the technical, commercial, and financial performance of utilities, many countries have adopted plans to reform the structure, operation, and financing of their state-owned electricity utilities. A number of African countries have adopted policies and plans to privatise their power sectors and to introduce competition. These reforms have been aimed at boosting sector cash flow, mobilising resources for capital investment on a commercial basis, and extending access to electricity to poor and rural communities.

While the depth and pace of reforms in Africa have not been as extensive or as rapid as in many industrialised countries, a sizeable group of countries have taken several steps in the reform process, with considerable private sector involvement, both in IPPs and in divested assets.

Private participation has mainly been through management contracts, concessions, and new investments in independent power producers. Most countries are also establishing independent electricity regulators, and many power sector reform initiatives have also involved the establishment of electrification funds and agencies. It is noteworthy that most African governments moved to reform their power sectors under pressure from the Internal Finance Institutions, which unanimously bundled institutional reforms with lending for investment to expand and renew power facilities.

Conventionally, power sector reforms begin with commercialisation and “corporatisation” of state-owned utilities, followed by Unbundling and the introduction of competition. Although many African countries have begun this reform process, none has completed the transition to a fully unbundled,

competitive, and private electricity sector. In fact, so far, only Uganda has successfully unbundled its utility. Some have introduced limited competition for the market by allowing bids by independent power producers. Ghana, South Africa, Tanzania, and Nigeria are examples. Others, such as Mali and Uganda, have arrived at concession agreements. However, none has succeeded in developing competition in the market through a competitive power market or at the distribution level.

While past and ongoing reforms in the power sector in Africa have registered some encouraging results, especially improved generation capacity as well as financial performance in certain utilities, there are a number of important challenges that are yet to be addressed. First, there is the need for sustained improvement in technical and financial performance in the electricity industry. In a number of African countries, the advent of PPIs has certainly improved the availability of power by boosting national installed capacity. In addition, in some countries, changes ushered in by new management teams usually under some form of contract management arrangement has resulted in change of attitudes, especially in respect of debt collection levels. The long-standing problem of poor performance at the transmission and distribution end, however, remains intractable.

Other challenges include expansion of supply of electricity to the poor. The power sector in Africa has largely failed to provide adequate electricity services in support of economic growth and improved social welfare. With the exception of South Africa, Ghana and to a lesser extent, Zimbabwe, the majority of sub-Saharan African countries continue to register woefully low levels of national electrification. In most countries, rural electrification levels are in single digit levels and urban electrification levels still well below 50 percent. For lower income groups, access to electricity is still a dream. The emphasis on profitability appears to have relegated expanded electrification for the poor to the bottom of the priority list.

4.3. Telecommunications

Reliable, affordable, and cost effective telecommunication infrastructure is not only a prerequisite for an information society, but also a key issue in the improvement of basic services and the achievement of the millennium development goals. Worldwide, ICT has accelerated dramatically over the past decade, spurred by an increasingly global economy, technological advances, increased competition, and the loosening of trade restrictions.

Investment in ICTs has grown substantially in both developed and developing countries. Despite some remarkable changes with recent reforms in the telecom sector across Africa, overall teledensities remain extremely low. The rollout of fixed lines by incumbent operators is barely inching forward in most countries, as the uptake of mobile telephony moves rapidly past.

With about 12 percent of the world's population, Africa has less than three percent of the world's telephone lines. Fixed-line and Internet penetra-

tion is a little more than three percent and mobile penetration is at around 15 percent.

However, telecommunication sector reforms have triggered significant private investment in networking. In the past few years, a domino effect has occurred in Africa's telecommunications sector, resulting in a flurry of reform activities. This puts the continent at par with developments in other regions.

The record of private participation in infrastructure in sub-Saharan Africa has been largely in telecommunications. Many countries are undergoing sectoral reform and foreign investment is now actively encouraged across the continent as privatisation and liberalisation are progressively being introduced. More than one-third of all state telecommunications companies have already been privatised and several more are set to undergo privatisation in the near future.

Africa is currently the world's fastest growing market for mobile phones over the last three years, with 65 million new subscribers in 2007 alone, according to International Telecommunication Union (ITU). There were more than 250 million mobile subscribers on the continent at the start of 2008. Mobile subscribers are also now more evenly distributed. In 2000, South Africa accounted for over half of all Africa's mobile subscribers, but by 2007, almost 85 percent were in other countries.

Fuelled by competition and the introduction of prepaid services, the growth of mobile phones and other wireless technologies in the past few years has been exponential. About 95 percent of African mobile subscribers use "pay as you go" model, which is particularly suited to Africa, bypassing the problematic issues of billing and revenue collection.

There are currently more than 120 mobile networks in operation in Africa, compared with 33 in 1995. Regional and international players continue to jostle for positions in Africa's lucrative mobile market and consolidation is beginning to take hold. Particularly remarkable is the influx of Middle Eastern firms.

The most competitive markets are Algeria, Democratic Republic of Congo, Nigeria, and South Africa, with three or more operators. South Africa is Africa's most developed market, with a market penetration rate of 67 percent in 2006, followed by Tunisia. Despite falling tariffs, competition is still needed in some markets, particularly where monopolies have been retained, such as Ethiopia and Rwanda. These countries have the lowest penetration rates.

Table 10 presents Africa's top 15 Mobile phone companies. Considering Africa's top 500 companies, South African phone companies maintain their position of supremacy in the new economy in Africa. MTN, Telkom, and Vodacom, as the fifth, seventh and ninth largest firms on the continent respectively, have the home market stitched up and are continuing to expand abroad.

Celtel's one network project in East Africa is the world's first borderless or unified phone network. It offers subscribers in Kenya, Uganda, and Tanza-

Table 10. Africa's Top 15 Telecommunications Firms in 2008

Rank in 500	Company	Country	Turnover (USD Billion)
5	MTN Group	South Africa	\$10.3
7	TELKON	South Africa	\$8.33
9	Vodacom	South Africa	\$7.13
15	Vodacom South Africa	South Africa	\$6.39
20	ORASCOM	Egypt	\$4.91
25	MTN South Africa	South Africa	\$4.18
31	MAROC Telecom	Morocco	\$3.60
41	MTN Nigeria	Nigeria	\$3.00
64	Telcom Egypt	Egypt	\$1.82
65	ORASCOM Tel. Algeria	Algeria	\$1.76
87	Algerie Telecom	Algeria	\$1.31
101	Zain Nigeria	Nigeria	\$1.17
104	Soc Nat. De Telecom	Senegal	\$1.13
111	Vodafone Egypt	Egypt	\$1.05
129	Tunisie Telecom	Tunisia	\$0.88

Adapted from Africa's Top 500 Companies, The Africa Report, February to March 2009

nia with free roaming facilities across borders with airtime charged to their local currencies.

There have also been some noteworthy efforts to expand telecommunications to rural areas through the institution of universal service obligations (USO) and funds for rural communications development. In addition, providers of mobile telephone services have been licensed in almost all countries in Africa.

The use of Internet has grown rapidly in most urban areas in Africa, in much the same pattern as the adoption of the mobile phone. As an indication, five years ago, only a handful of countries had local internet access. Now it is available in every capital city. Each computer with an Internet or email connection usually supports a range of three to five users.

In 2006, Africa had an estimated 44 million Internet Users or 3.8 percent of the world's 1.1 billion Internet users. The Internet remains out of reach to the vast majority of Africans and is still mostly confined to the larger cities and towns. By early 2004, overall Internet penetration in Africa was below 1.2 percent.

The lack of telecommunication infrastructure is the most important economic issue currently holding back Africa's development. Despite the availability of low-cost and efficient solutions, there remains a huge unmet demand for telephone connections. There is also a wide disparity between the various regions of the continent. For example, the five Maghreb countries and South Africa have more telecommunication infrastructure than all the 46 countries in sub-Saharan Africa.

At least five satellite operators are extending their coverage of Africa, and the WASC/SAT3/SAFE submarine cable link to Europe and Asia started in May 2002, providing transmission capacity of 80Gb/s and an ultimate design

capacity of 120Gb/s. The lack of competing providers to route international traffic, combined with the over-dependence on satellite technologies and a regional market fragmented into low-volume national markets, has resulted in prohibitive prices for international traffic. This impedes the development of Internet use.

4.4. Transport

Transport infrastructure (roads, railways, sea, river, and airports) enhances production and trade potential of local, national, and regional economies. It also facilitates access to economic and social services essential for achieving the MDGs. Transport impacts on women in Africa, which explains why gender has begun to feature internationally as a recognised issue in transport policy and planning. Women carry the burden of transport in rural Africa. Providing effective and efficient transport infrastructure underpins all attempts to reduce poverty.

Since the 1990s, the transport sector has undergone a major transformation. Transport policies have been modified to permit market-determined decisions, enterprise autonomy, and private participation in the ownership and management of transport business. Most bus and trucking companies have been privatised, and governments are making concessions on the railways, ports, and airports, especially since 2000. Various forms of public-private partnerships have been tried in airports, seaports, and railways, but more rarely for roads. Investors' perception of high risk renders full privatisation impractical, so most private participation in transport infrastructure has taken the form of leases or concessions.

Private contractors are rapidly replacing force account in the rehabilitation and maintenance of roads and transport infrastructure. In addition, public enterprises have been given considerable autonomy, and arbitrary regulation has been replaced by regulation through consensual performance contracts. In the highway sector, setting up of more sustainable institutions (autonomous road agencies and dedicated road funds) has become the norm, and has started to show positive results in some countries.

Nonetheless, Africa is still considerably disadvantaged in all respects in the transport sector. Less than one-fifth of the roads network in sub-Saharan Africa is paved, compared to more than a quarter in Latin America and over two-fifths in South Asia. Even paved roads are severely affected by systematic axle overloading of trucks and poor drainage.

High transport costs handicap Africa's capacities to compete within a global market. Inland transport costs are twice as high in sub-Saharan Africa compared to Asia. International maritime costs are three times higher. These higher costs are due to a combination of factors, such as lower road quality, outdated port facilities, time-consuming administrative procedures, and in some countries, insufficient competition between service providers.

Despite the importance of airports and seaports for long distance freight, only a few airports (in Egypt, Cape Verde, Ethiopia, Morocco, Ghana, and South Africa) have attained FAA Category I status required for international flights. Only 4.5 percent of global air traffic is in Africa, yet its share of accidents reached 25 percent in 2004. Only one African seaport is owned by one of the five largest global port operators known worldwide for their efficiency. Most container terminals are reaching or have reached capacity limits, and are under-equipped. Even Durban has had a congestion surcharge imposed by shipping lines for two years (Goldstein and Kauffmann 2006).

5. Conclusion

There has been a “policy mistake” in the belief of the 1980s/90s that the private sector would finance infrastructure. For various reasons, mainly involving investment climates and rates of return, private investment has been limited in terms of volume, sectors, and countries.

The two-decade experience reveals a limited private sector interest in some areas of infrastructure, limited sustainability of some arrangements for private participation, high fiscal cost sometimes associated with private participation, and a backlash of public opinion in some parts of the world. Moreover, from the private sector perspective, participation in infrastructure projects has not always been as profitable as originally envisaged.

Clearly, the optimism of the early 1990s, which saw private finance of infrastructure entirely replacing public finance, was unfounded. Roughly only one-third of the developing countries can count on private sector operators for the delivery of electricity, water, or railways services. The largest presence is in the fixed-line telecommunication business, where about 60 percent of the countries rely on private operators. Overall, the private sector has roughly contributed to 20-25 percent of the investment realised in developing countries on average over the last 15 years or so. In Africa, it has probably contributed less than 10 percent. This is not to deny the presence of the private sector. In fact, where the state and the large private sector have failed to deliver the services, the small scale, generally local, private sector, has filled the gap.

So far, the region’s track record of investment suggests that the private sector by itself is unlikely to provide the kind of near-term funding needed to address these shortcomings. With Africa’s low levels of infrastructure investment in the face of rapidly growing needs, the private sector appears capable of supplying only a fraction of the additional infrastructure finance that Africa needs to meet the Millennium Development Goals.

The financial resources required for this task must come from governments, other official sources, and, increasingly, from private capital markets. The two approaches on which reform hopes have been based have both proven deficient, though in different ways. The revised tactics require further

revision. The search for mechanisms that combine private capital and expertise with socially acceptable management and delivery must be renewed.

Public sector funding will remain central in many countries and for many types of infrastructure needs. Nevertheless, private investment is likely to remain an important component of infrastructure development in the years ahead, particularly as the available fiscal space in many countries remains limited. The important thing will be to channel private initiative where it has the greatest likelihood of being successful and to have realistic expectations as to what it can achieve.

Some of the problems experienced with private participation reflect basic errors in the design and implementation of such contracts. Private participation should be focused on those aspects of infrastructure that present the most appropriate risk-reward characteristics, accepting that public finance will remain necessary in other areas.

Guarantees for infrastructure projects can be more carefully designed to avoid some of the large payouts experienced in the past. Greater thought needs to be given to the distributional impacts of private participation to ensure that benefits are fairly distributed across different stakeholder groups (including the government, customers, employees, and investors).

Private participation in infrastructure is not only about financing, it is also more importantly about capacity building, transferring better technologies, innovations and removing capacity constraints to implementation. It requires fiscal reform and improvements in public sector management. It also requires careful attention to the basics of project design, including identifying and allocating risk and ensuring sound procurement practices. Developing successful projects requires some things in short supply in the developing world. They are time, money, and sophisticated skills. Moreover, private participation does not always work well in every infrastructure sector or every developing country.

Some of the problems experienced in the last decade may be avoided through greater reliance on the local private sector. In the early days, PPI was synonymous with large multinational corporations. In many countries, however, the local private sector may have significant resources to invest and may be better equipped to deal with currency devaluation and political interference.

Improving the capacity of the local financial markets to mobilise resources will be an important part of a sustainable financing strategy. As in other regions, project sponsors in Africa have in recent years sought to increase local financial markets' contributions to the debt funding of infrastructure projects that generate mostly local currency revenues. These efforts have led to some local currency loans and bonds, mainly for telecommunications projects. But a larger share of local currency financing would be desirable. Progress in financial sector reform could make this feasible, as local banks build capacity for project finance and capital markets become more liquid.

Regional approaches to infrastructure development are probably more important than previously recognised. Africa is highly fragmented with a large number of small economies, many of which are landlocked. Regional infrastructure offers the opportunity for cost reductions through economies of scale, making infrastructure more affordable. However, regional infrastructure projects are proving difficult to realise, in part due to the size of financing requirements and the complexity of multi-country transactions. In many cases, an active catalyst will be required to move a regional project forward. Careful co-ordination with regional and continental authorities (such as the NEPAD) rationalises state action on cross-border projects, while offering the country benefits from larger markets.

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