CHAPTER 4

CEMAC's Infrastructure Gap: Issues and Policy Options

RUPA RANGANATHAN, VIVIEN FOSTER, AND CECILIA BRICEÑO-GARMENDIA

The member countries of the Central African Economic and Monetary Community (CEMAC) are extremely heterogeneous, with varying income levels, natural resource endowments, geography, and topography. The CEMAC comprises three low-income countries (Cameroon, Chad, and the Central African Republic), one lower-middle-income country (the Democratic Republic of Congo), one upper-middle-income country (Gabon), and a high-income country (Equatorial Guinea) that is not a member of the Organization for Economic Cooperation and Development (OECD). Geographically, CEMAC is composed of coastal nations (Cameroon, the Republic of Congo, and continental Equatorial Guinea and Gabon), islands (part of Equatorial Guinea), and isolated landlocked countries (Chad and the Central African Republic). The topography in the CEMAC region varies dramatically within and across countries, ranging from arid deserts to forests and lush vegetation, lowlands, volcanic mountains, and islands.

Rapidly rising oil incomes since the early 2000s have made the CEMAC countries more prosperous. All CEMAC nations except the Central African Republic are richly endowed with natural resources and oil and have benefited from increased oil exports and, consequently, fiscal revenue. Exploiting the recent discovery of mineral deposits and some oil in the Central African Republic might enable it to join this league in the near future. In general, however, despite abundant oil revenue, the standard of living for a large portion of the CEMAC population has not improved. Much of the population lacks access to basic power, safe drinking water, and improved sanitation.

Higher oil income presents CEMAC countries with both economic opportunities and challenges. Increased oil income can be expected to have positive repercussions in the economy as a whole, but evidence across the world provides a mixed story. Most cases of increased oil wealth and dependence on natural resources have led to increased wealth disparities often resulting in political instability (Nigeria, Angola, and Bolivia provide clear examples) and a real economy overdependent in one sector at the detriment of other sectors. The term used for the phenomenon is *Dutch disease* (Adam and Bevan, 2006, and references therein).

Higher oil revenue permits resource-rich countries, including CEMAC member states, to undertake spending for infrastructure and social needs to bolster

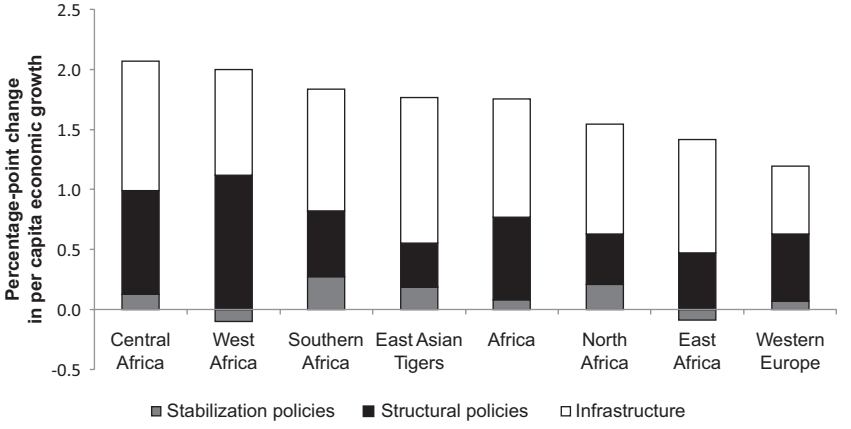

Figure 4.1 Changes in Growth per Capita Caused by Changes in Growth Fundamentals, 1990–2005
Source: Calderon, 2009

growth and attain the Millennium Development Goals (MDGs). The complex political and economic landscape in the region requires that the oil revenue be carefully managed and invested. The governance difficulties in resource-rich environments have hindered the necessary investments that could transform natural resources wealth into productive infrastructure. Oil-endowed countries have experienced significant challenges in budget preparation, timing of budgets, and project preparation, and have been impeded by cumbersome procurement processes. These issues have hindered capital budget execution. Capitalizing on oil revenue, particularly during boom periods, and making investments in non-oil sectors such as essential infrastructure should be an urgent priority.

Adequate infrastructure is crucial for economic growth and competitiveness in Africa. Inadequate infrastructure prevents faster growth. This view, highlighted by the Commission for Africa (2005), is supported by a considerable volume of economic research. A key question for policymakers is the extent to which infrastructure development, compared with other policy parameters, contributes to growth. One study found that across Africa, expanding and improving infrastructure contributed almost 1 percentage point to per capita economic growth per year from 1990 to 2005, compared with 0.8 percentage point for macroeconomic stabilization and structural policies (Calderón, 2009) (Figure 4.1).

Infrastructure improvements in Central Africa[1] during 1995–2005, similar to what was found on the continent as a whole, boosted per capita growth rates by 1 percentage point, largely driven by the growth of mobile telephony in the region. Inadequate power infrastructure deterred growth. These trends are similar to what has been observed in Africa as a whole.

[1]Central Africa comprises Burundi, Cameroon, the Central African Republic, Chad, the Democratic Republic of Congo, Equatorial Guinea, Gabon, Rwanda, and São Tomé and Príncipe.

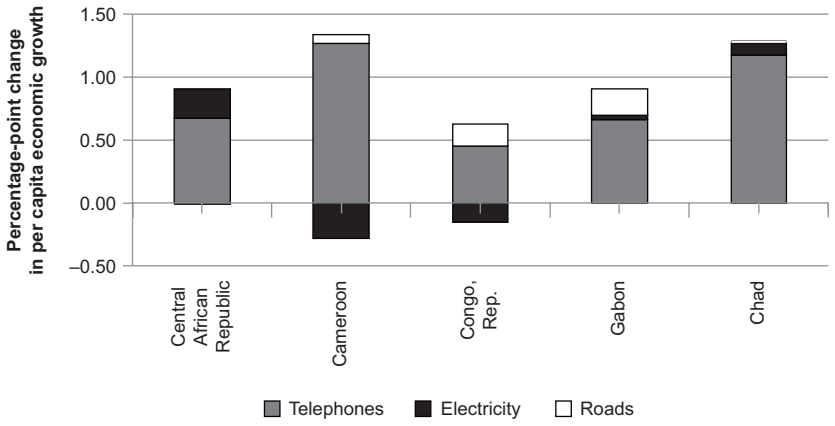

Figure 4.2 Changes in Growth per Capita in CEMAC Countries Caused by Infrastructure Improvements, 1999–2005
Source: Calderon, 2009

Considerable differences exist at the country level (Figure 4.2). The historic impact of infrastructure on per capita growth varied from 0.6 percentage points in the Republic of Congo to 1.2 percentage points in Cameroon. Across the board, information and communications technology (ICT) improvements have made the largest contribution to economic growth. Power infrastructure has been a positive influence in some cases (notably the Central African Republic), but negative in others (Cameroon and the Democratic Republic of Congo).

Infrastructure could contribute much more to growth than it has in the past. Simulations suggest that if Central Africa's infrastructure could be upgraded to the level of Mauritius, the leading country in infrastructure provision in Africa, the impact on per capita economic growth would be on the order of 5 percent, with the power sector driving the largest change followed by roads and telecom (Figure 4.3).

More-detailed microeconomic work on the relationship between infrastructure and the performance of firms consistently shows a strong relationship between infrastructure stock and the output, productivity, and investment behavior of firms. An exhaustive study analyzed the entire set of investment climate surveys in Africa (Escribano, Guasch, and Peña, 2008). The central finding was that in most African countries, particularly the low-income countries, infrastructure is a major constraint to doing business and depresses firm productivity by about 40 percent. Firms report that infrastructure contributed almost 50 percent to total factor productivity with 40 percent of the contribution coming from customs clearance and about 20 percent coming from power and water infrastructure.

Inadequate infrastructure constrains firms' business activities. Recent enterprise surveys indicate that between 60 and 75 percent of firms in Cameroon, Chad, the Republic of Congo, and Gabon identified power as a major impediment to doing business. Almost half the firms in Chad, the Republic of Congo, and Gabon cited inadequate transport as a hindrance to the effective undertaking of business activities.

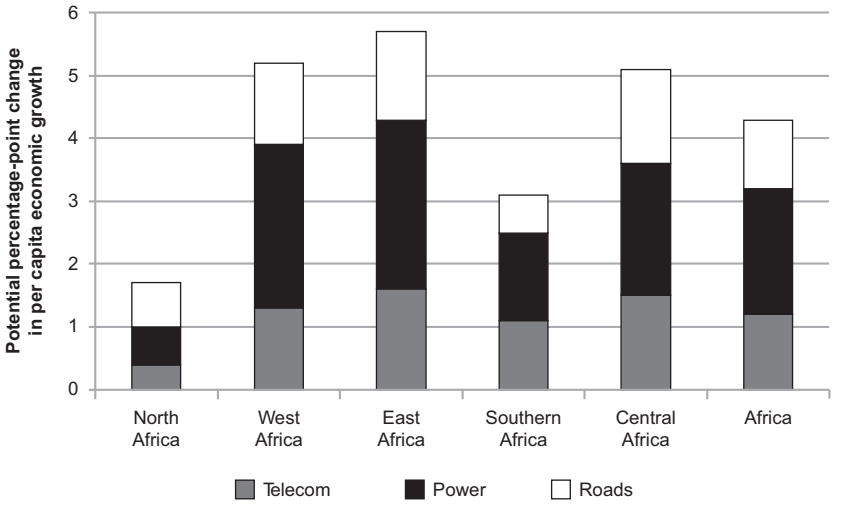

Figure 4.3 Potential Growth per Capita Attributable to Improvements in Infrastructure
Source: Calderon, 2009.

Infrastructure is also a key input for human development. Safe and convenient water supply arrests the spread of life-threatening diseases and prevents child mortality and malnutrition. Electricity powers health and education, and boosts business productivity. Transportation networks link local, regional, and global markets. ICT services democratize access to information, facilitate ease of communication, and reduce transport costs by enabling transactions to be conducted remotely.

BENCHMARKING THE CEMAC'S INFRASTRUCTURE

Despite strong growth and a surge in oil wealth in the early 2000s, CEMAC's infrastructure performance has been lagging behind its peers. Overall, CEMAC countries display infrastructure indicators on par with other low-income countries in Africa but significantly behind benchmarks set by other resource-rich states. Installed electricity generation capacity and access to power are lower than all benchmarks. Mobile and mainline telephone subscriptions and access to sanitation, though marginally better than in low-income countries, are lower than resource-rich peers in other parts of Africa (Table 4.1).[2]

[2]Low income, nonfragile: Benin, Burkina Faso, Ethiopia, Ghana, Kenya, Madagascar, Malawi, Mali, Mozambique, Niger, Rwanda, Senegal, Tanzania, Uganda, and Zambia. Low income, fragile: Burundi, Central Africa Republic, Comoros, Democratic Republic of Congo, Côte d'Ivoire, Eritrea, The Gambia, Guinea, Guinea-Bissau, Liberia, São Tomé and Príncipe, Sierra Leone, Togo, and Zimbabwe. Middle income: Botswana, Cape Verde, Lesotho, Mauritius, Namibia, Seychelles, South Africa, and Swaziland. Resource rich: Angola, Cameroon, Chad, Republic of Congo, Equatorial Guinea, Gabon, Nigeria, and Sudan.

TABLE 4.1

Infrastructure Access in the CEMAC Region

Indicator	Units	CEMAC	SSA Benchmarks		
			Low-income countries	Resource-rich countries	Middle-income countries
Classified road network density	Km per 1,000 people	2.4	1.3	2.3	7.1
Classified road network in good condition	percent	32	35	29	48
Installed generation capacity	MW per million people	16	20	43	799
Access to electricity	percent of population	30	33	46	50
Internet subscribers	per 100 people	2.8	5.69	11.8	8.94
Mobile telephone subscribers	per 100 people	28.9	25.58	37.35	57.33
Main telephone lines	per 100 people	0.7	0.8	0.83	4.78
Access to piped water	percent population	12	10.5	12	52.1
Access to flush toilet or septic tank	percent population	6	4.9	11.2	40.8

Sources: Africa Infrastructure Country Diagnostic; US Department of Energy, 2005–8; World Bank Information and Communications for Development, 2009.
Note: Roads and ICT data for 2008; energy and water data for 2004–05; electricity access for 2001. Benchmarks are for latest year available in the period 2000–05. CEMAC = Central African Economic and Monetary Community; ICT = information and communications technology; MW = megawatts; SSA = sub-Saharan Africa.

Consumers in CEMAC countries pay much higher prices for their infrastructure relative to African and global standards. Power prices and road freight tariffs are three times higher in CEMAC countries on average than in other developing regions. Internet dial-up access costs six times as much (Table 4.2).

These high prices are driven by myriad factors that vary depending on the type of infrastructure. For example, in the power sector, costs of power generation are genuinely higher in many African countries because of the small scale of power systems and the reliance on expensive diesel-based generation technology, with costs that can run nearly three times as high as those of larger hydro-based power systems in other parts of Africa. The high cost of road transport in the CEMAC region is due to the presence of cartelization and restrictive regulation of the trucking industry leading to exceptionally high profit margins. The expensive

TABLE 4.2

Infrastructure Costs in the CEMAC Region

Service Costs	CEMAC	Sub-Saharan Africa	Other Developing Countries
Power tariffs (US$ per kilowatt-hour)	0.10–0.30	0.03–0.43	0.05–0.10
Port container handling charges (US$ per TEU)	160–260	100–320	80–150*
Road freight tariffs (US$ per ton-kilometer)	0.13	0.04–0.13	0.01–0.04
Mobile telephony (US$ per basket per month)	15.1	2.6–21	9.9
Internet dial-up service (US$ per month)	68	6.7–148	11

Sources: Banerjee and others, 2008; Eberhard and others, 2009; Minges and others, 2009; and Teravaninthorn and Raballand, 2009.
Note: TEU = Twenty-foot equivalent unit. Ranges reflect prices in different countries and for various consumption levels. Prices for telephony and Internet represent worldwide developing regions, including Africa.

ICT services in the CEMAC region can be explained by the small number of countries that are connected to the submarine cable and the absence of competition in international gateways even where countries are connected.

A SECTORAL PERSPECTIVE ON THE CEMAC'S INFRASTRUCTURE

The suboptimal performance of infrastructure throughout the CEMAC region is consistent across sectors, although the challenges are different. This section takes a deeper look at some of the highlights of each sector.

Transport Infrastructure

The common themes in road transport across all CEMAC countries are the low road density and low traffic volumes. All other facets of road transport vary widely across countries (Table 4.3). Classified road network[3] density is significantly lower than in low-income countries in Africa and comparable to that in African resource-rich peers. A sizable share of the road network is in good or fair condition except in the Republic of Congo, where the roads are in extremely poor condition, and in Cameroon, that with the largest road network density, had a relatively small proportion of roads in good condition. The unpaved network is quite poor, suggesting that accessibility along rural roads can be a challenge in the CEMAC region, given its low road densities. A small proportion of the rural population lives in close proximity to an all-season road. Traffic volumes overall are between a third and a half of what is typically observed in Africa's resource-rich or low-income countries, and barely a fraction of the levels in middle-income countries. Cameroon, however, stands out in this regard because it has high volumes (see Figure 4.4). Inadequate transport networks impede business. Almost half of the firms in Chad, the Republic of Congo, and Gabon indicate that transport is a major constraint compared with one-quarter of firms in low-income or resource-rich countries.

Many African countries have introduced fuel levies as a mechanism for collecting road user charges to fund road maintenance. These levies are collected in road funds, which are important mechanisms that allow countries with weak institutions to protect resources for road maintenance to capture them in a way that bears some relationship to road usage. Even in countries in which institutions and public expenditure management systems are relatively mature, incentives exist to postpone maintenance as a way to offset short-run fiscal imbalances. While the effects of poor or non-maintenance are not perceivable immediately, this leads to a false economy creating significant medium-term liabilities for road rehabilitation and reconstruction.

[3]"Classified road network" generally refers to the roads that fall under the responsibility of the state to build and operate, and includes the sum of the primary, secondary, and tertiary networks.

TABLE 4.3

Benchmarking Road Infrastructure

Indicator	Units	Cameroon	Central African Republic	Chad	Congo	Gabon	Low-Income Countries (Nonfragile)	Middle-Income Countries	Resource-Rich Countries
Classified road network density	km/1,000 sq km	51	28	22	37	35	88	278	38
Rural accessibility Index	percent of rural population within 2 km from all-season road	27	58	24	34	25	23	32	26
Road network in good or fair condition	percent of classified network	68	80	78	27	60	81	88	64
Classified unpaved road network in good or fair condition	percent of classified unpaved network	36	20	34	n.a.	n.a.	56	58	61
Daily traffic, paved primary road network	annual average vehicles per day	1,614	200	562	655	977	1,341	3,798	1255
Daily traffic, unpaved road network	annual average vehicles per day	60	14	26	17	6	39	75	25
Transport quality	% of firms that indicate transport as a constraint to doing business	27		46	48	49	24	5	27

Sources: Gwillliam and others, 2009; and AICD road database, 2010.
Note: n.a. = Not available.

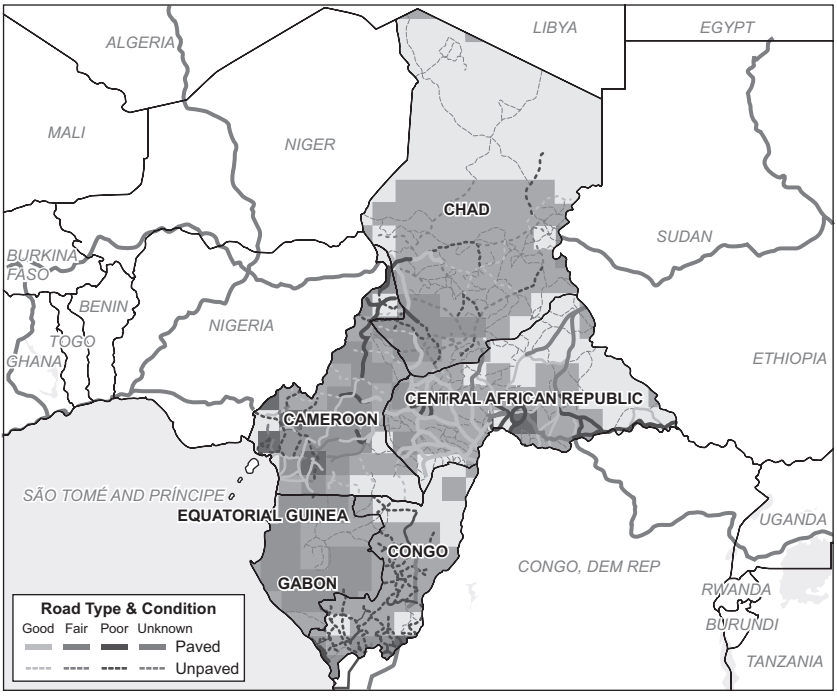

Figure 4.4 National Road Network Quality in CEMAC Countries
Source: Foster and Briceño-Garmendia, 2009.

On average, countries with both road funds and road agencies[4] have been able to maintain their roads better than those that lack either or both of these institutions.

Four CEMAC countries—Cameroon, the Central African Republic, Chad, and the Republic of Congo—have taken the important policy measure of adopting fuel levies. Fuel levies in the region have been set between US$0.05 and US$0.10 per liter (Figure 4.5).

Only in Cameroon is the fuel levy high enough to make a significant contribution to road maintenance funding. However, even adequate funding does not necessarily guarantee that roads will be satisfactorily maintained. For example, poor planning and implementation, or high local construction costs, can lead to insufficient maintenance.

In Chad and the Republic of Congo, the fuel levy is barely one-third of the level needed to provide sustainable road maintenance funding. Chad, with its low

[4]"Most African countries have been moving toward an institutional model for the road sector that is based on the principle of road user charges. Under this approach, road users pay pseudo charges in the form of fuel levies and other surcharges that are transferred into a dedicated and ring-fenced road maintenance fund. Road works are implemented by an autonomous road agency. A series of institutional indicators are collected to capture the extent to which this modern institutional model has been applied in each country" (Foster and Briceño-Garmendia, 2009).

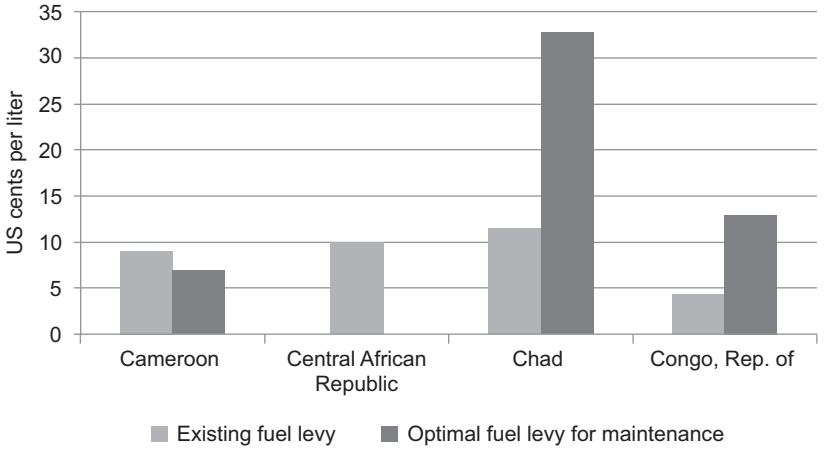

Figure 4.5 Fuel Levy in Select CEMAC Countries
Source: Gwilliam and others, 2008.
Note: CEMAC = Central African Economic and Monetary Community.

traffic volumes spread across an extensive geographic area, highlights the difficulty of applying road user charging principles in the Central African context. The optimal fuel levy would be in excess of US$0.30 per liter, which is more than twice the highest fuel levy applied anywhere in Africa to date, and would likely prove prohibitive for road users.

The deficiencies of the CEMAC's national road networks are clearly reflected in its regional transit corridors, characterized by deficient infrastructure quality and very low traffic volumes. Freight travels at an effective velocity of only 6 kilometers per hour—no faster than a horse and buggy. Less than half the transport corridors in the CEMAC are in good or fair condition, significantly worse than the next poorest performer, West Africa,[5] where three-quarters of the roads are in good condition. The mobility barrier imposed by poor road quality is compounded by the extremely high freight tariffs prevalent in the region. Road freight prices at $0.13 per ton-kilometer are among the highest in the world, more than double the prices in Southern Africa,[6] which at $0.05 per ton-kilometer are the lowest in sub-Saharan Africa.

Three major corridors traverse the CEMAC region, and a substantial share of the roadways in these corridors are unpaved and in poor condition (Table 4.4). In most cases, only about two-thirds of the length of the regional corridors is paved. Indeed, traffic volumes along two of the three corridors fall short of the typical economic threshold that justifies road paving. Some internal road links connecting CEMAC member states are missing. For example, no road connects the Republic of Congo with the Central African Republic.

[5]West Africa comprises Benin, Burkina Faso, Cape Verde, Côte d'Ivoire, The Gambia, and Ghana.
[6]Southern Arica comprises Angola, Botswana, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, South Africa, Swaziland, Zambia, and Zimbabwe.

TABLE 4.4

Road Quality and Traffic for Key CEMAC Corridors

	Condition (percent)				Type (percent)			Traffic Volumes (annual average daily traffic) (percent)			
Corridors	**Good**	**Fair**	**Poor**	**Unknown**	**Paved**	**Unpaved**	**Unknown**	**>300**	**300–1,000**	**>1,000**	**Unknown**
Douala to Bangui	53.9	23.4	22.7	0.0	68.6	31.4	0.0	64.6	20.4	15.0	0.0
Cameroon	29.6	35.7	34.7	0.0	52.1	47.9	0.0	53.1	24.0	22.9	0.0
Central African Republic	100.0	0.0	0.0	0.0	100.0	0.0	0.0	86.5	13.5	0.0	0.0
Douala to N'Djamena	18.9	24.5	56.6	0.0	67.3	32.7	0.0	25.9	49.4	24.7	0.0
Cameroon	18.9	24.5	56.6	0.0	67.3	32.7	0.0	25.9	49.4	24.7	0.0
Pointe Noire to Brazzaville to Bangui	29.1	18.9	45.2	7.0	68.8	25.2	6.0	26.6	11.3	0.0	62.1
Cameroon	55.6	38.8	0.0	6.0	0.0	100.0	0.0	70.2	24.1	0.0	5.6
Central African Republic	99.2	0.0	0.0	1.0	99.2	0.8	0.0	79.5	19.3	0.0	1.2
Republic of Congo	0.0	21.3	69.4	9.0	27.9	62.8	9.2	0.0	6.1	0.0	93.9

Source: AICD, http://www.infrastructureafrica.org/.
Note: CEMAC = Central African Economic and Monetary Community.

For landlocked countries like the Central African Republic, the regional corridors are critical for integrating the country with the rest of the region and for access to ports. The Central African Republic has lightly paved just about the entire length of its corridors to the sea and keeps them in good condition. However, the connecting routes in Cameroon and the Republic of Congo are mostly inadequate. These countries seem to be neglecting strategic hinterland routes that are critical to Chad and the Central African Republic. In each of these cases, the problem seems to be the neglect of road quality by a coastal gateway country. The incentives for the coastal country to maintain hinterland road corridors do not appear to be strong—the coastal countries' own economies are typically concentrated along the coast, thus rendering these upcountry segments regional public goods.

Traversing the CEMAC's regional corridors is costly and slow, hindering growth and productivity. It can take between 26 and 70 days, sometimes longer, to move freight from ports to landlocked capitals. Some 50 to 80 percent of this time is taken up by the inefficient operations of the ports serving Central Africa: Douala, Cameroon, and Pointe Noire, Republic of Congo (Figure 4.6a). Time-consuming regulatory processes related to customs clearance and technical controls consume further time. Moving a metric ton of freight costs between $230 and $650 along intraregional corridors in the CEMAC region compared with between $120 and $270 in the Southern African Development Community region where distances are significantly longer. Expensive charges for road freight transport and port services account for the bulk of these costs (Figure 4.6b).

Freight tariffs are high in the CEMAC region because regulation restricts market entry and because of a lack of competition among trucking companies. The combination of self-regulation and national protection is particularly damaging. Both advance the interests of the incumbent national operator at the expense of the customer. The CEMAC region is notorious for strong trucking industry cartels. Powerful freight bureaus and transport associations influence the market, preventing truck operators from contracting directly with customers. As a result, trucking industry profit margins are rather high. Profit margins in West and

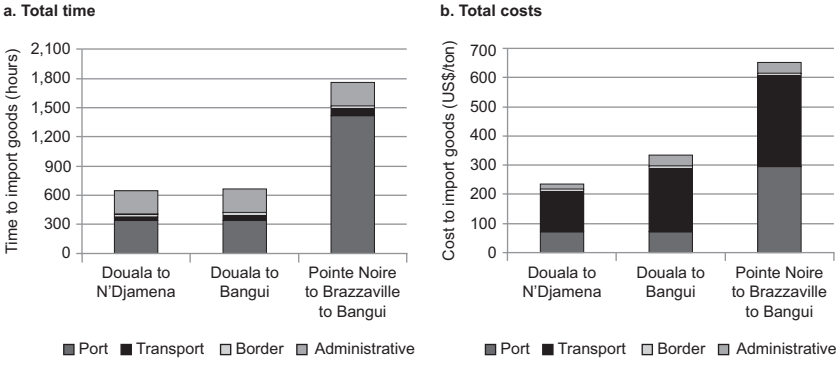

Figure 4.6 Importing Freight by Road through Alternative Gateways
Sources: Data collected from World Bank, 2008; AICD ports database; Teravaninthorn and Raballand, 2009.
Note: Ports data are based on indicators from 2006–07.

Central Africa were found to be on the order of 80 percent, compared with 20–60 percent in Southern Africa. Along the route between Ngaundere, Cameroon, and Mondou, Chad, the profit margin is 163 percent compared with 18 percent between Lusaka, Zambia, and Durban, South Africa, in Southern Africa (Teravininthorn and Raballand, 2009).

A coalition of interest groups that oppose change make breaking the regulatory status quo in the region a difficult proposition. Truckers exercise strong leverage over authorities because they have enough monopolistic power to block trade. Governance issues occur because some high-level authorities either supervise or control trucking companies and benefit from the status quo. Deregulating the trucking industry in the CEMAC region is more a political and social change than a technical one. The main concern for the economy is the potential reduction in number of trucks to match demand in road transport. A reduction could lead to a drop in trucking employment and profits, and some companies would disappear or shrink and the resulting social effects would need to be mitigated. It is possible that the cartels resisting the change might concede to reform if compensation schemes pay part of the social costs.

As is evident from Figure 4.6, inefficient ports add significant hurdles to trade logistics. Douala and Pointe Noire are the most significant ports in the CEMAC, with the former handling the bulk of the transit traffic from landlocked Chad and the Central African Republic. Pointe Noire is one of the best natural deep sea ports in Africa and used to play an important role in the subregion before the civil conflict in the Republic of Congo. However, since that time, the quality of the country's road and rail surface transport links has deteriorated markedly, preventing transit cargo from being channeled through Pointe Noire. In the meantime, neighboring Gabon developed its own integrated rail and port infrastructure, diverting traffic that would previously have gone to Pointe Noire.

Performance of Central African ports does not compare favorably with the rest of Africa, let alone with global best practices. The services provided by Central African ports generally cost twice as much as those in other global ports. The ports score poorly on productivity measures—for example, crane productivity in Central African ports, as measured by either containers or weight, is less than half the international benchmark. The international standard dwell time is seven days or less, but in Central Africa, most containers spend more than two weeks in the terminal.

Ineffective and inefficient performance of the rail network also constrains movement of goods in the CEMAC region. The railway network in Central Africa is by far the smallest in Africa, operating only 6,000 route-kilometers and carrying only 4,000 net ton-kilometers of freight annually. The railways in Cameroon and Gabon post relatively good productivity indicators for wagon, carriage, and labor productivity. Concessions in Cameroon and Gabon have boosted operational performance, efficiency, and traffic, so that labor and rolling stock productivity measures compare favorably with other rail concessions in the region and show substantially better performance than for CFCO, the region's major publicly owned railway. Camrail carries about 60 percent of the nonmineral traffic from

Douala toward the borders with Cameroon and Chad, and it also compares favorably with competing bus services on the route from Yaoundé to Ngaoundere, for which travel by unpaved road becomes difficult in the rainy season.

Despite improved performance, the railways in Central Africa are very lightly used by global standards, carrying little more than moderately busy branch lines elsewhere. The resulting challenge is that such low traffic volumes do not generate the revenue needed to finance track rehabilitation and upgrading, leaving the future of the railways heavily dependent on public funding.

River transport is cost-effective in parts of Central Africa and could be used to carry high-volume forestry products. However, upgrades are urgently needed to improve service. River transport by barge was widely used during the colonial period and remains a highly competitive transport option at US$0.05 per ton-kilometer. River transport is used for timber exports originating in the neighboring Democratic Republic of Congo and in the Central African Republic that travel along the main river and do not rely on the tributaries. Logs from the north are normally floated down the Oubangui and Congo Rivers to Kinshasa, where they are loaded onto trains for transport to the coast and exported.

The lack of dredging on the Sangha and Oubangui tributaries of the Congo River, which service the Congolese forestry concessions, rules out this transport option for domestic forestry products. In addition, important stretches of the Congo River are not navigable during the dry season because of an absence of dredging. Lack of adequate investment in signaling and river port infrastructure also impedes navigability (Briceño-Garmendia and Foster, 2010).

Power Infrastructure

CEMAC's power infrastructure is still in an embryonic state (Figure 4.7). There are few large-scale power plants, and not one of the countries in the region has developed a national power grid, much less a regional grid. Insufficient power supply means that some 10 percent of effective power demand in the Central African Power Pool (CAPP)—CEMAC's regional power trading arrangement—fails to be met. Installed capacity per million people varies across member countries but can be classified into three groups (Table 4.5). Capacity in Cameroon and the Republic of Congo is broadly comparable to the group of resource-rich countries. Gabon's installed capacity—the greatest in the region at 300 megawatts (MW) per million people—is a fraction of that installed by its comparator group of middle-income countries. Finally, the Central African Republic's and Chad's dismal power indicators are well behind the low-income peer group and among the worst in Africa.

Limited installed capacity has translated to low access overall and chronic power problems in the CEMAC region, more so than in other parts of Africa. A staggering 50–75 percent of firms allude to power as a large impediment to business activity, resulting in significant losses in productivity and sales.

Consumers in CEMAC countries pay very high prices for the limited supply of power that is available. Average prices range from US$0.11 per kilowatt-hour (kwh) in Cameroon to US$0.30/kwh in Chad (Table 4.6). The prices in Chad

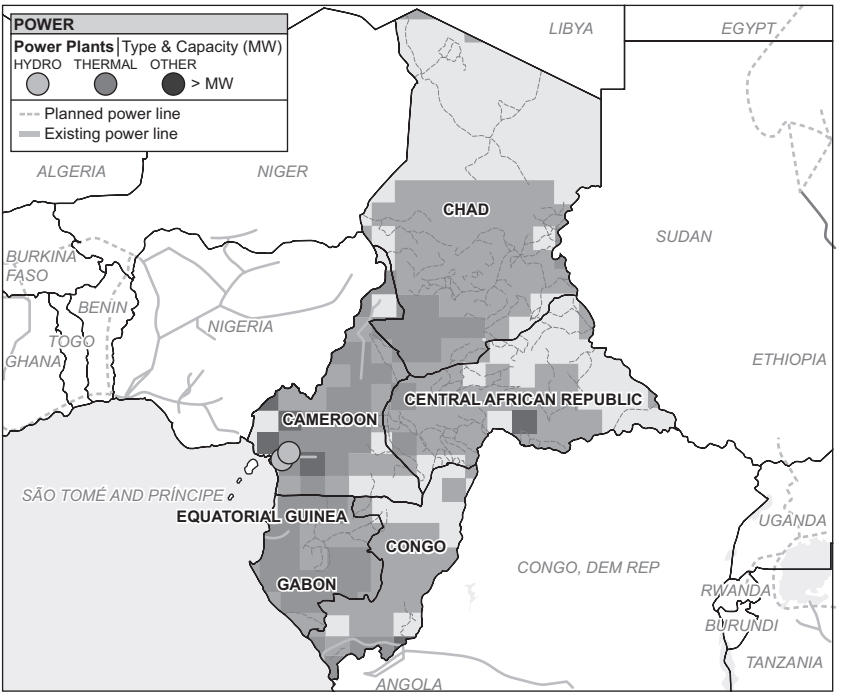

Figure 4.7 CEMAC's Power Infrastructure
Source: Foster and Briceño-Garmendia, 2009.

are about twice the average power tariff in sub-Saharan Africa of about US$0.14/kwh, and about six times higher than typical power tariffs of about US$0.07/kwh elsewhere in the developing world (Figure 4.8). The Republic of Congo has lower prices but this is due to substantial underpricing.

Despite high end-user prices, power generation costs are seldom recovered. The high costs are driven by the small scale of power production facilities. Each of the power systems in the Central African Republic, Chad, the Republic of Congo, and Equatorial Guinea range between 20 and 120 megawatts of installed capacity, which is well below the minimum efficient scale of about 200 megawatts for a single thermal generation plant. Many of these countries also rely heavily on expensive oil-based generation. The situation in Chad is extreme. Since the destruction of its import facilities for heavy fuel oil, Chad has relied on importing diesel fuel for power generation, resulting in power generation costs of US$0.33/kwh due to the compound effect of more inefficient power generation technologies and more expensive fuels. The long-run marginal costs of power for the region would be significantly lower, at US$0.10/kwh, if more cost-effective hydro generation capacity could be developed.

Tariffs for power (as well as for water) are all too often set below cost-recovery levels. This practice results in a hidden transfer from producers to consumers and is a very inefficient way of providing generalized subsidies at the expense of the financial health of the utilities. These hidden transfers clearly create distortions in consumption

TABLE 4.5

Benchmarking CEMAC's Power Infrastructure

Indicator	Units	Cameroon	Central African Republic	Chad	Congo, Rep. of	Gabon	Low-Income Countries/ Fragile	Low-Income Countries/ Nonfragile	Middle-Income Countries	Resource-Rich Countries
Access (national)	percent of population	46	3	4	35	75	15	33	50	46
Access (urban)	percent of population	47	101	10	51	61	58	86	50	53
Installed generation capacity	MW per million population	51	10	3	29	296	46	20	799	43
Firms that find power a constraint for business	percent of firms	59		75	71	58	67	52	31	56
Outages	days/year	26	40	40	39	40	11	10	6	15
Collection rate	percent of billing	94	66	83	91	n.a.	34	92	91	70
Cost recovery ratio	percent, historical	60	68	91	80	n.a.	100	89	85	97
System losses	percent of generation	31	48	33	47	n.a.	40	24	10	26
Total hidden costs	percent of revenue	95	167	22	86	n.a.	443	69	0	169

Sources: Eberhard and others, 2009; Rosnes and Vennemo, 2009; World Bank Enterprise Surveys, various years. Financial indicators were derived from financial accounts for utilities based on Briceño-Garmendia, Smits, and Foster, 2009.

Note: n.a. = Not available.

[1]Data for urban access in the Central African Republic are for the capital city.

TABLE 4.6

Power Costs and Tariffs *(U.S. cents per kilowatt-hour)*

Country	Average Total Costs	Average Capital Costs	Average Historic Operating Costs	Average Revenue	Average Effective Tariff	Long-Run Marginal Cost
Cameroon	17.1	4.4	12.7	10.9	10.9	6.0
Central African Republic	19.0	6.7	13.0	15.0	15.0	11.0
Chad	33.2	4.2	29.0	30.0	30.0	11.0
Congo, Rep. of	20.1	6.7	13.4	12.8	16.0	7.0
Equatorial Guinea	n.a.	7.4	n.a.	n.a.	n.a.	10.0
Gabon	n.a.	5.7	n.a.	n.a.	11.7	7.0

Sources: Derived from Eberhard and others, 2009.
Note: n.a. = Not available.

and also benefit most those who are least in need of such support. At least half of all power consumers in the CEMAC countries, with the exception of Gabon, belong to the top quintile of the expenditure distribution. In some cases, power subsidies also benefit large industrial customers. For example, in Cameroon, tariffs mask generous cross-subsidies that are directed to the aluminum smelter, Alucam. The low and medium voltage consumer paid between $0.11 and $0.14 cents in 2009, whereas Alucam benefited from a tariff cap of 7 Coopération Financière en Afrique Centrale (CFA) francs/kwh (less than $0.02) until 2009, when tariff revisions took effect (Husband, McMahon, and van der Veen, 2009) (Box 4.1).

Power utilities in the CEMAC region suffer large financial losses as the result of various inefficiencies or hidden costs. First, power tariffs only recover 60–80 percent of costs in CEMAC countries. Second, transmission and distribution losses range from 30–50 percent, compared with a best practice benchmark of 12 percent. And third, revenue collection ratios range from 65–90 percent, compared with a best practice benchmark of 100 percent. In addition, the utilities are further burdened by overstaffing that can siphon away up to 20 percent of revenue. All together, these

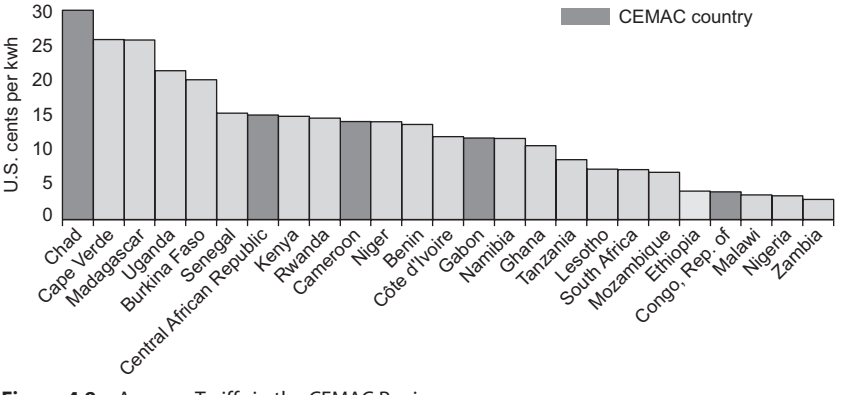

Figure 4.8 Average Tariffs in the CEMAC Region
Sources: Adapted from Briceno-Garmendia and Shkaratam, 2011.
Note: CEMAC = Central African Economic and Monetary Community.

BOX 4.1

Electricity Subsidies for Aluminum in Cameroon

Alucam is Cameroon's largest electricity consumer, accounting for 35–40 percent of the power produced. Under a historic 30-year agreement that ended in 2009, Alucam benefited from extraordinarily low prices for electricity and a guaranteed supply of power. Alucam was guaranteed 145 milowatts (MW) of power during the dry season and 165 MW during the rainy season. A tariff cap of 7 Coopération Financière en Afrique Centrale (CFA) francs per kWh (about $0.017/kWh) applied until the end of 2009, compared with tariffs of $0.114/kWh and $0.136/kWh for medium- and low-voltage customers, respectively. Alucam's prices were exceedingly low in the context of the chronic power problems throughout the country. Alucam has been seen as receiving an implicit power subsidy for decades. The overall subsidies are estimated to have been worth about $120 million per year, equivalent to 32 percent of AES Sonel's (the power producer's) revenue. Since the expiration of the agreement, Alucam's power prices have been increased by 73 percent to 12.94 CFA francs per kWh, or $0.031/kWh. This price is above the global electricity tariff for aluminum companies, which averages about $0.0256/kWh. Even with the price increase, the rates paid by Alucam still fall well below operating costs of $0.13/kWh and total costs of $0.17/kWh, adding to AES Sonel's cost-recovery woes.

Sources: Husband, McMahon, and van der Veen, 2009; and World Bank, 2011.

inefficiencies create a drain equivalent to 20–120 percent of utility revenue (Figure 4.9). The levels of inefficiency in the CEMAC region are greater than low-income countries overall and far exceed Africa's best performer, South Africa.

During the decade beginning in 2010, these challenges could be exacerbated because power demand is expected to double. To double electrification in the region from 35 percent to 53 percent of households, the CAPP needs to support

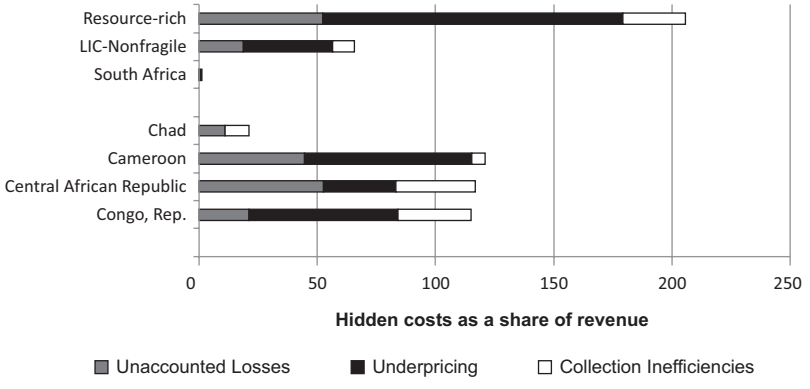

Figure 4.9 Inefficiencies in the Central African Economic and Monetary Community's Power Utilities

Source: Briceño-Garmendia, Smits, and Foster, 2009.

Note: LIC = low-income country.

TABLE 4.7

Long-run Marginal Costs of Power

Pool or Country	Trade Expansion Scenario (US cents/kwh)	Trade Stagnation Scenario (US cents/kwh)	Absolute Differential	Percentage Differential
CAPP	7	9	−2	−22
EAPP	12	12	0	0
SAPP	6	7	−1	−14
WAPP	18	19	−1	−5
Cameroon	7	6	1	17
Central African Republic	11	11	0	0
Chad	7	11	−4	−36
Congo, Rep. of	6	8	−2	−25
Equatorial Guinea	8	10	−2	−20
Gabon	7	7	0	0

Source: Adapted from Rosnes and Vennemo, 2009

Note: EAPP = East Africa/Nile Basin Power Pool; SAPP = Southern African Power Pool; WAPP = West Africa Power Pool; CAPP = (Central African Power Pool). Each power pool represents the regional power trading arrangements for East, Southern, West, and Central Africa, respectively.

the development of 4,400 MW, or 2.5 times existing generation capacity, and refurbish half the existing power capacity, some 900 MW.

Regional power trading could be a way to develop additional power generation and slash power costs. Power trading would consist of expanding cross-border trade to leverage lower-cost energy resources in the region as a whole and adding cross-border transmission capacity to facilitate the flow of power from production to consumption locations. A counterfactual scenario—trade stagnation—assumes that no cross-border interconnectors will be built and countries will meet incremental power demands by expanding their domestic power sectors (Table 4.7).

Using power trade to address the power needs of CEMAC countries would require harnessing Cameroon's rich hydropower potential and reducing reliance on oil-based systems in other countries. Cameroon would need to develop 1,400 MW of additional hydropower capacity, largely dedicated to supplying power to neighboring countries. All countries in the CAPP (except the Central African Republic) would need to invest in developing a total of 1,662 MW of new cross-border interconnectors to allow power to flow more readily around the region. The heaviest transmission investment would need to be made in Cameroon and the Republic of Congo, comprising 80 percent of the required cross-border investment. Figure 4.7 illustrates the existing regional power infrastructure and highlights the notable absence of transmission capacity for wheeling power across the region. Figure 4.10 illustrates the patterns that could emerge if CEMAC countries trade power.

The Central African Republic is the only country in the CEMAC region that would apparently not benefit significantly from regional power trade. In all other countries, power trade has the potential to bring substantial benefits in three areas.

First, power trade can save the CAPP as much as $160 million annually in energy costs. To harness trade, CEMAC countries would have to make an additional US$100 million investment annually in capital-intensive hydropower generation and development of cross-border transmission capacity, but these

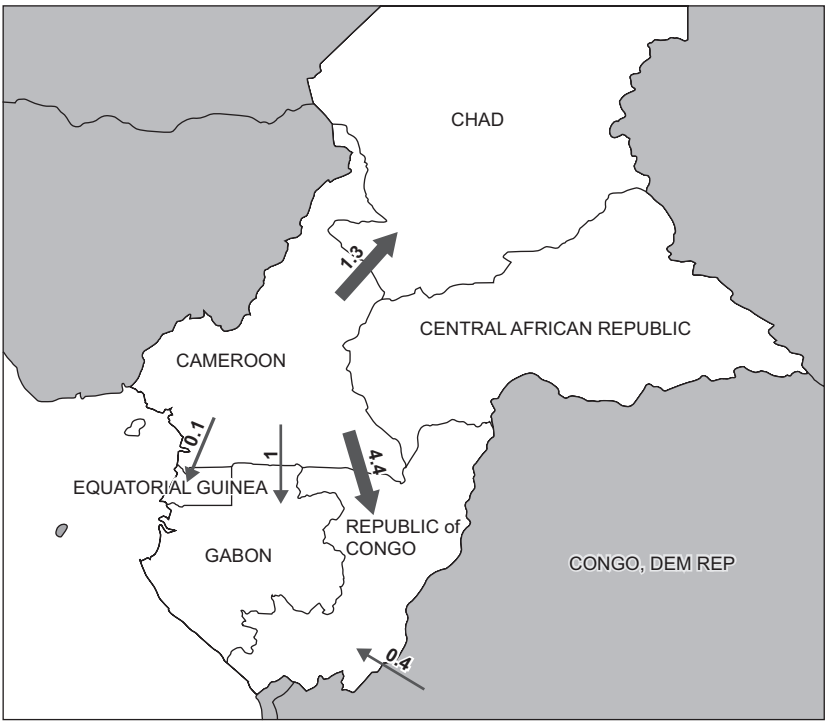

Figure 4.10 Potential Power Trading Patterns
Source: Derived from Rosnes and Vennemo, 2009.

investments would be more than offset by reductions in the fuel bill as reliance on thermal generation is reduced.

Chad and the Republic of Congo would achieve the largest savings in national energy costs through power trade (Figure 4.11). Cameroon, which would become the region's major power exporter, would need to spend more on power under trade, but these investments would yield returns in the form of revenue from power trade.

Second, trade expansion would reduce the long-run costs of power in the CAPP by as much as $0.02/kWh (a 22 percent savings overall). Because power is a key input in any economy, power cost savings will positively affect productivity and competitiveness. The savings accrue because of the shift from very small-scale, oil-based generation schemes to cheap hydropower from Cameroon. In particular, Chad, Equatorial Guinea, and the Republic of Congo could save between $0.02/kWh and $0.04/kWh, a percentage reduction in power costs of between 20 and 36 percent (Table 4.7). Only in Cameroon would the long-run marginal cost of power increase under trade, reflecting the need for it to develop additional energy resources for export.

Third, trade expansion significantly increases the weight of hydropower in the regional generation portfolio from 83 percent to 97 percent, thereby reducing

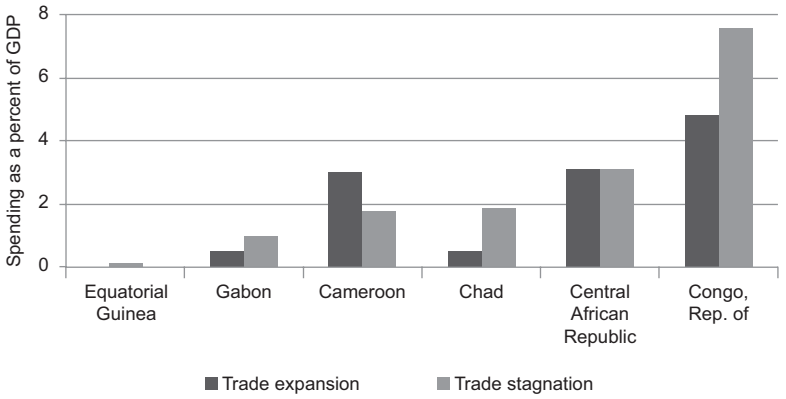

Figure 4.11 The Central African Economic and Monetary Community's Spending Needs for Power at the Regional Level
Source: Derived from Rosnes and Vennemo, 2009.

carbon dioxide emissions by 4 million tons per year and making energy production more environmentally sound.

Water Supply and Sanitation

Access to safe water supply and sanitation is a key ingredient for human development. Accordingly, one of the U.N. MDGs calls for halving the percentage of the population without access to improved water and sanitation by 2015. Gabon and Cameroon are both on track to meet the water-related MDG. Chad and the Central African Republic have made steady progress, but it is not sufficient to meet the targets by 2015. Meanwhile, the Republic of Congo and Equatorial Guinea are not likely to meet the MDGs. With regard to sanitation, the situation is less bright—the entire CEMAC region is seriously off course for meeting the sanitation MDG.

Access to water varies widely across the CEMAC region, as shown by the percentage of the population with access to utility water, whether from private taps or public stand posts (Figure 4.12a). Gabon stands out as the regional leader, with piped water access greater than 70 percent and a further 10 percent having access to standposts. About half the populations of Cameroon and the Republic of Congo receive utility water, which is significantly better than the average for Africa's low-income countries. The Central African Republic, Chad, and Equatorial Guinea lag far behind with only 10–20 percent of their populations benefiting from utility water. Large and arid regions and low population densities in the Central African Republic and Chad explain the limited reliance on water from utilities, with some two-thirds of the population in these countries relying on wells and boreholes. Equatorial Guinea is particularly worrisome, with more than half the population continuing to rely on unsafe surface water.

A similar dichotomy can be seen in sanitation (Figure 4.12b). Chad and Equatorial Guinea present the most desperate situation, with 50–70 percent of their populations continuing to rely on open defecation, a highly insanitary practice. Elsewhere in the region, the practice of open defecation has been brought to less than

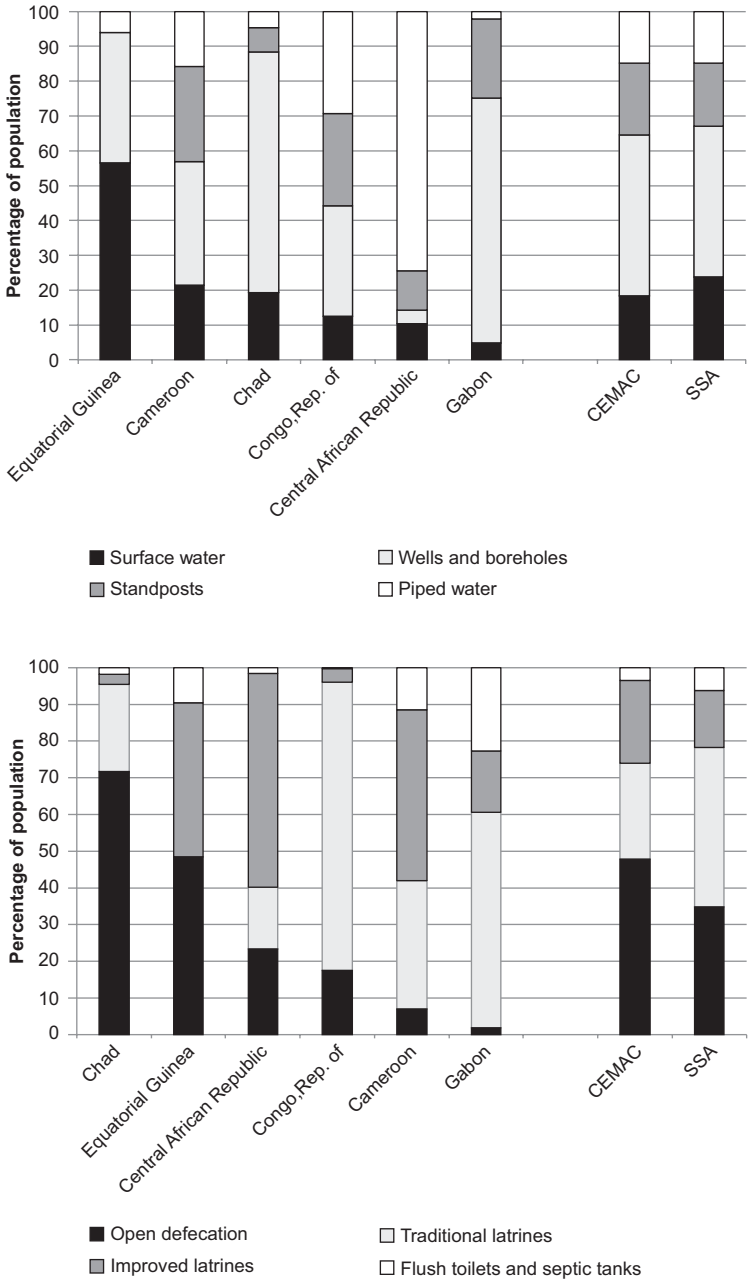

Figure 4.12 Access to Water and Sanitation by Modality

Sources: AICD calculations based on WHO/UNICEF Joint Monitoring Programme country reports 2010 (http://www.wssinfo.org/documents-links/documents/?tx_displaycontroller[type]=country_files).

Note: CEMAC = Central African Economic and Monetary Community; SSA = sub-Saharan Africa.

TABLE 4.8

Benchmarking Performance of CEMAC's Water Utilities

Indicator	SNEC, Cameroon	SODECA, Central African Republic	SDNE, Republic of Congo	SEEG, Gabon	Low-Income Countries	Low-Income Countries/ Fragile	Resource-Rich Countries	Middle-Income Countries
Collection ratio (% of billed)	n.a.	86	91	n.a.	90	97	72	100
Connections per employee	n.a.	62	136	181	151	181	116	369
Nonrevenue water (%)	37	51	28	18	37	32	41	27
Operating cost recovery ratio (%)	79	64	82	101	97	81	100	82

Source: Derived from Briceño-Garmendia, Smits, and Foster, 2009.
Note: n.a. = Not available.

20 percent. In the Republic of Congo and Gabon, the majority of the population is using traditional latrines that provide limited sanitary protection. Only in Cameroon and the Central African Republic do improved latrines reach a substantial share of the population. Across the region, flush toilets, and even septic tanks, are a rarity.

With respect to operators, the limited evidence points to important differences in water utilities' performance within the CEMAC region (Table 4.8). While utilities in Cameroon and the Republic of Congo suffer from relatively high distributional losses (nonrevenue water), Central African Republic's losses are equivalent to half the water produced. Nonrevenue water in Gabon, however, is comparable to global standards. The operating costs for water production are higher than the revenue generated via tariffs in Cameroon, the Central African Republic, and the Republic of Congo.

Cost recovery for both water and power is a challenge in African utilities. Although subsidies are often justified politically for making services affordable to the poor, the reality is that the poor are rarely connected to these services. Tariffs set at cost-recovery levels are typically affordable for the relatively well-off households that enjoy access. However, subsidies can be helpful in relation to system expansion. Targeted and transparent subsidies to connections, capital investment (in-lending to utilities with a grace period), and well-designed tariff schemes in which cross subsidies are determined based on an affordability analysis are important policy options. The inefficiency issues arise when subsidies are hidden and nontransparent, which not only distorts consumption but also severely hampers the financial health of providers, deters private investors from entering the industry, and stifles network expansion and maintenance.

Aggressive increases in access to utility water passes through sector reforms targeting improvements in efficiency to fulfill basic water and sanitation needs in the region.

Information and Communications Technology

Although mobile telephony has made major strides in the CEMAC region, the basic fiber optic backbone infrastructure necessary for providing adequate international and Internet connectivity is conspicuous by its absence (Figure 4.13). Access

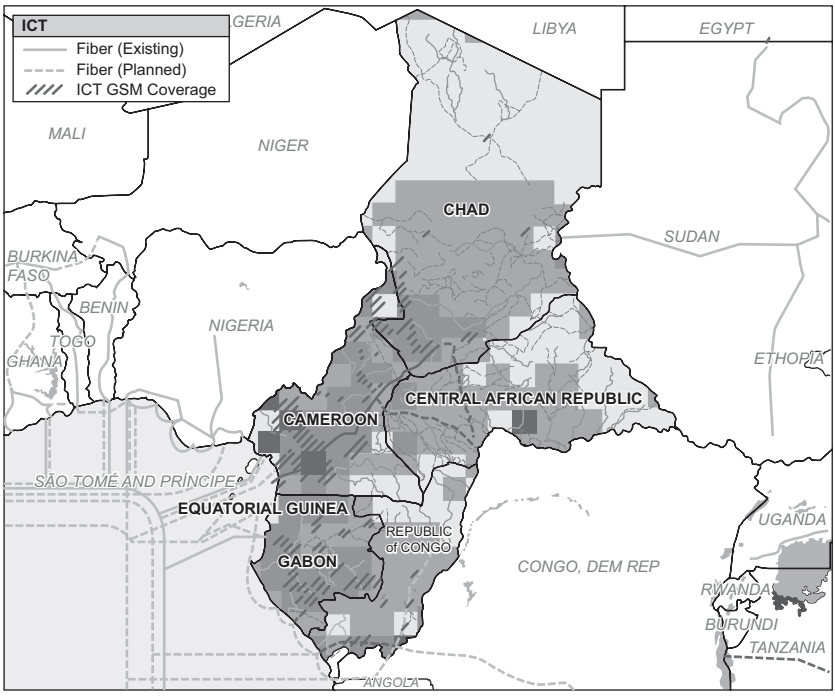

Figure 4.13 ICT Backbone Infrastructure in the CEMAC Region
Source: Foster and Briceño-Garmendia, 2009.

to ICT services among CEMAC member states can be broadly categorized into two groups. Cameroon and Gabon, the first group, are leaders in access to ICT services across Internet, telephone, and mobile subscriptions. The Republic of Congo is not far behind with regard to mobile footprint, Internet users, and mainline and mobile telephone access; and Equatorial Guinea also demonstrates high access rates for mainline telephones and mobile telephones. At the other extreme, the Central African Republic and Chad have very low rates of access and are consistently behind the others in all aspects of ICT infrastructure. Mobile coverage and subscriptions in the Central African Republic are a fraction of those in the low-income peer group (Table 4.9). Despite relatively high internet bandwidth in Equatorial Guinea, usage of the service lags far behind similar income peers. The modest levels of access in the region are associated with the high costs for ICT services. Prices for mobile baskets of service, Internet access, and telephones are consistently and significantly higher than trends in resource-rich, low-income, and middle-income countries.

Two major issues constrain ICT usage in the region: lack of regional roaming arrangements for mobile telephony and limited access to submarine cables.

In other regions of Africa, high international fixed line calling rates are being circumvented through the widespread diffusion of preferential roaming arrangements for mobile telephony—the preferred mode of communication in any case. These roaming arrangements are helpful because subscribers who belong to one of these networks can use their mobile handsets in the other countries without

TABLE 4.9

Benchmarking ICT Infrastructure in the CEMAC

Indicator	Unit	Cameroon	Central African Republic	Chad	Congo, Rep. of	Equatorial Guinea	Gabon	Resource-Rich Countries	Low-Income Countries	Middle-Income Countries
Access										
Mobile coverage	percent of population	80	20	50	80	30	80	59	42	95
Internet users	per 100 people	3.8	0.44	1.19	4.29	1.82	6.21	11.80	5.69	8.94
Mobile subscriptions	per 100 people	32.28	3.55	16.58	49.98	52.49	89.77	37.4	25.58	57.33
Telephone lines	per 100 people	1.04	0.28	0.12	0.61	1.52	1.83	0.83	0.80	4.78
Internet bandwidth	Mbps per capita	10.94	0.44	0.64	0.29	35.12	150.30	2.04	3.01	25.44
Prices										
Prepaid mobile monthly price basket	US$	14.40	13.70	16.00	18.80	18.60	13.70	8.19	11.03	10.10
Price of a three-minute call to the United States	US$	1.80	1.83	4.56	2.40	5.61	2.30	3.48	3.50	2.78
Price of the 20-hour Internet basket	US$	48	130	105	85	97	110	41	56	42
Price of the fixed telephone basket	US$	14.30	12.90	12.70	n.a.	n.a.	n.a.	9.24	13.15	7.58

Source: Minges, and others, 2009.
Note: CEMAC = Central African Economic and Monetary Community; ICT = information and communications technology; n.a. = Not available.

TABLE 4.10

Gaps in Intraregional Connectivity and Total Investment Required to Attain Minimum Levels of Regional Connectivity

Country	Gaps (km)	Necessary investment (US$ million)
Rep. of Congo	425	12
Central Africa Rep.	325	9
Gabon	1,418	38
Equatorial Guinea	89	2
Total	**2,257**	**61**

Source: AICD calculations.

paying for incoming calls and paying only local rates for outgoing calls. Such arrangements have become widespread in West and East Africa, facilitated by a favorable regulatory environment as well as by the presence of panregional operators. In the CEMAC region, only the Republic of Congo and Gabon have made progress in promoting preferential interoperator roaming arrangements that are commonly available in other regions in Africa.

Despite the presence of the SAT2/WASC undersea fiber optic cable skirting the entire CEMAC coastline on its way from Asia to Europe, only two coastal countries—Cameroon and Gabon—have made connections to this infrastructure (Figure 4.13). By contrast, the remaining coastal and landlocked countries are completely bypassed at present and lack even terrestrial fiber optic connections with neighboring countries connected to the cable, which might at least provide some form of indirect access. With a number of new submarine cables now being laid, there are plans for some CEMAC countries, such as the Republic of Congo, to connect.

In addition, the Central Africa Backbone project will ensure fiber optic connectivity into landlocked Central African Republic and Chad. To develop the complete ICT regional backbone infrastructure, including connectivity to the submarine cables, CEMAC member countries will have to install almost 2,300 kilometers of new fiber optic links. However, the investments required are quite modest (Table 4.10).

These developments will significantly increase bandwidth, lowering prices of Internet access in the region by as much as 75 percent. However, access to the submarine cable is a necessary but not a sufficient condition to lower prices of critical ICT services. Without competition for access to submarine infrastructure through multiple international gateways, the substantial cost reductions will be captured as monopoly rents rather than being passed on to consumers in the form of lower prices.

FINANCING THE CEMAC'S INFRASTRUCTURE

Meeting the CEMAC region's pressing infrastructure needs and catching up with developing regions in other parts of the world require rapid expansion of infrastructure assets in key areas. For the purposes of this analysis, an illustrative package of infrastructure targets is used (Table 4.11). These are not intended to be normative, but are simply reasonable objectives that would help to bring the CEMAC's

TABLE 4.11

Illustrative Investment Targets for Infrastructure in CEMAC

Sector	Economic Target	Social Target
ICT	Install fiber optic links to neighboring capitals and submarine cable	Provide universal access to GSM signal and public broadband facilities
Power	Develop interconnectors to facilitate regional trade	Raise electrification to 84 percent urban and 19 percent rural (average 53 percent) based on national targets
Transport	Achieve regional (national) connectivity with good quality two-lane (one-lane) paved road.	Provide rural road access to over half the highest-value agricultural land, and urban road access within 500 meters
Water Supply and Sanitation	n.a.	Achieve Millennium Development Goals, clear sector rehabilitation backlog

Sources: Mayer and others, 2009; Rosnes and Vennemo, 2009; Carruthers, Krishnamani, and Murray, 2009; and You and others, 2009.
Note: CEMAC = Central African Economic and Monetary Community; GSM = Global System for Mobile Communications; ICT = information and communications technology; n.a. = Not available.

infrastructure performance in line with other developing countries. An examination of the feasibility of funding a standardized infrastructure package makes possible meaningful cross-country comparisons of the feasibility of these objectives.

Based on available information for Cameroon, Chad, the Central African Republic, the Republic of Congo, and Gabon, meeting these illustrative infrastructure targets in the CEMAC region would cost US$4.6 billion per year over a decade (Table 4.12). Capital expenditure would account for 70 percent of this requirement. About 60 percent of the overall spending needs are associated with the power and transport sectors.

These spending needs would absorb about 10 percent of the CEMAC region's aggregate GDP. However, at the country level, the burden represented by infrastructure spending needs varies widely. For Cameroon, Equatorial Guinea, and Gabon, infrastructure spending needs are well below 10 percent of GDP and should be affordable. For Chad, the Central African Republic, and the Republic of Congo, spending needs amount to 15–20 percent of GDP, comparable to what China has been investing annually to develop its infrastructure. However, this amount is well above historic spending trends in these countries (Figure 4.14).

TABLE 4.12

Large Infrastructure Spending Needs for the CEMAC Region, 2006–15

	Capital Expenditures	Operating Expenses	Total	Capital Expenditures	Operating Expenses	Total
Sector	(US$ million per year)	(US$ million per year)	(US$ million per year)	(percent of GDP)	(percent of GDP)	(percent of GDP)
ICT	254	244	498	0.54	0.52	1.06
Power	1,129	415	1,544	2.42	0.89	3.3
Transport (basic)	805	454	1,259	1.72	0.97	2.69
Water supply and sanitation	680	254	935	1.46	0.54	2
Total	3,190	1,371	4,562	6.82	2.93	9.76

Sources: Mayer and other 2009; Rosnes and Vennemo 2009; Carruthers, Krishnamani, and Murray, 2009; and You and others 2009.
Note: Derived from models that are available online at http://www.infrastructureafrica.org/aicd/tools/models.

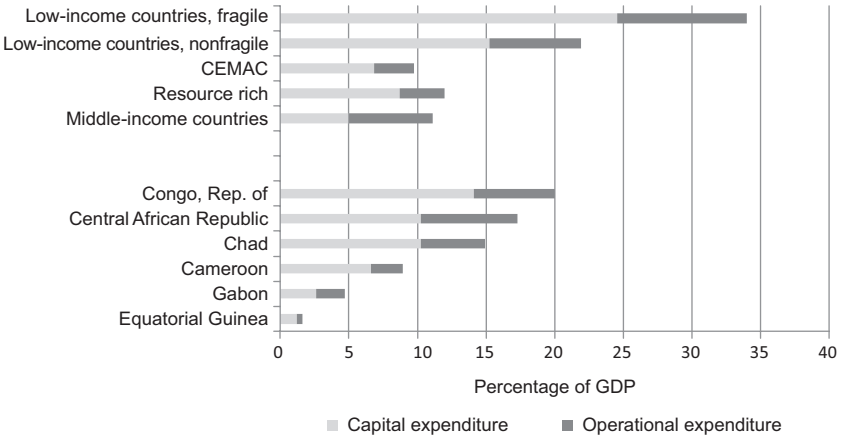

Figure 4.14 Infrastructure Spending Needs as a Share of GDP
Source: Foster and Briceño-Garmenidia, 2009.
Note: CEMAC = Central African Economic and Monetary Community.

During the period 2004–08, CEMAC countries spent an annual average of US$2.5 billion on infrastructure, equivalent to approximately 5 percent of GDP, split more or less equally between capital and operating expenditures (Table 4.13). Spending was strongly concentrated in the transport sector. Infrastructure spending in the CEMAC is generally consistent with what resource-rich countries elsewhere in Africa have been spending. Spending effort ranged from a low of about 3 percent of GDP in Chad to a high of almost 8 percent of GDP in the Republic of Congo (Figure 4.15) Thus, existing spending levels are approximately half the spending needs identified for the CEMAC region. The oil-rich countries should find it feasible to substantially step up infrastructure spending if petroleum royalties could be captured in government budgets. However, for the

TABLE 4.13

Public Sector Infrastructure Spending in CEMAC Countries, 2004–08
(*US$ million per year*)

	Operations and Maintenance	Capital expenditure					
Sector	Public sector	Public sector	ODA	Non-OECD financiers	PPI	Total capital expenditures	Total spending
ICT	173	163	7	11	135	315	488
Power (nontrade)	434	85	31	34	60	210	644
Transport	443	334	134	51	39	558	1,001
Water supply and sanitation[1]	122	102	64	3	29	199	321
Total	1,178	685	235	100	263	1,283	2,461

Sources: Mayer and others, 2009; Rosnes and Vennemo, 2009; Carruthers, Krishnamani, and Murray, 2009; and You and others, 2009.
Note: CEMAC = Central African Economic and Monetary Community; ICT = information and communications technology; ODA = Official development assistance; OECD = Organization for Economic Cooperation and Development; PPI = Private participation in infrastructure.
[1]Includes irrigation.

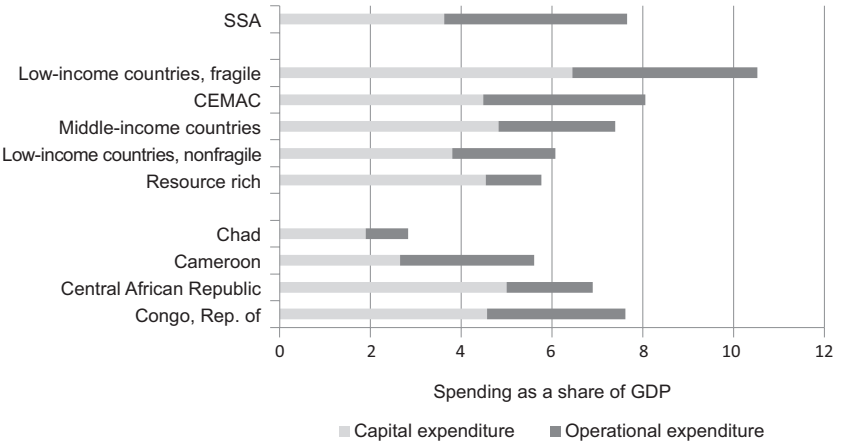

Figure 4.15 Infrastructure Spending as a Share of GDP
Source: Derived from Foster and Briceño-Garmendia, 2009.
Note: CEMAC = Central African Economic and Monetary Community; SSA = sub-Saharan Africa.

Central African Republic, with its relatively large infrastructure needs and lack of resource revenue, closing the funding gap will be a far greater challenge.

More than 75 percent of all recent infrastructure spending, including half of all capital expenditures, in CEMAC countries has been funded by the public sector (Figure 4.16). Even in the ICT sector, for which private funds are generally available, the public sector has financed about 50 percent of capital spending. Official development assistance has also made a significant, though secondary, contribution to funding transport and water and sanitation investments. The external private sector has been a major financier of ICT infrastructure and has made a modest contribution to

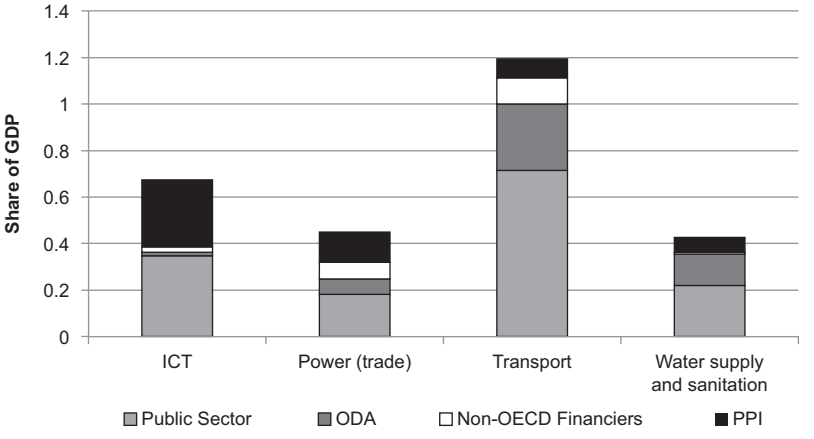

Figure 4.16 Sources of Investment Funding in the CEMAC Region
Sources: Derived from Briceño-Garmendia , Smits, and Foster, 2009.
Note: CEMAC = Central African Economic and Monetary Community; ICT = information and communications techonology; ODA = Official development assistance; OECD = Organization for Economic Cooperation and Development; PPI = private participation in infrastracture.

TABLE 4.14

Potential Gains from Tackling Infrastructure Inefficiencies *(US$ million per year)*

Sector	Operational Inefficiencies					Capital Execution	Tariff Recovery
	Labor inefficiencies	Losses	Under-collection	Under-maintenance	Total		
ICT	66	n.a.	n.a.	n.a.	66	0	n.a.
Power (non-trade)	86	264	28	0	378	38	374
Transport	n.a.	n.a.	68	0	68	86	32
Water supply and sanitation	19	14	7	0	40	8	137
Total	172	278	102	0	551	132	544

Sources: Derived from Foster and Briceño-Garmendia, 2009.
Note: n.a. = Not available.

other areas of infrastructure. In contrast to other African countries, CEMAC members have not benefited greatly from non-OECD financing for infrastructure, although there has been some investment in both transport and power. China is becoming an active financier of infrastructure projects in the CEMAC region, supporting hydropower projects in Cameroon and Gabon, and modernizing water plants in Cameroon. China has also been involved in financing new rail construction projects linking Belinga iron ore mines to the port of Santa Clara in Gabon.

Regardless of the secured financing sources, a major policy issue is that much more can be done within the existing resource envelope to meet infrastructure needs in the CEMAC region. This starts by tackling the inefficiencies across infrastructure sectors. Approximately US$1.2 billion per year can be recovered by addressing inefficiencies (Table 4.14). The largest drain by far occurs in the power sector, with inefficiencies valued at US$790 million annually, deriving equally from underpricing and operational deficiencies. The transport and water sectors *each* hemorrhage some US$185 million of resources annually. Underpricing is the key source of inefficiency in water. For transport, low capital budget execution is the major issue.

Bringing the CEMAC's infrastructure up to par comes with a substantial price tag of US$4.6 billion a year over a decade. The region already spends US$2.4 billion a year on infrastructure—but inefficiencies account for a staggering US$1.2 billion of that sum. If the region could correct these inefficiencies, the funding gap would drop to a manageable US$874 million a year (Table 4.15). This would amount to

TABLE 4.15

Tackling Inefficiencies to Reduce the Funding Gap *(US$ million per year)*

	ICT	Irrigation	Power	Transport	Water Supply and Sanitation	Total
Needs	−498	−326	−1,544	−1,259	−935	−4,562
Spending traced to needs	427	4	625	1,001	321	2,378
Within sector reallocation	61	3	19	0	0	83
Potential efficiency gains	66	0	790	185	185	1,227
Gap or surplus	57	−318	−110	−73	−429	−874

Source: Derived from Foster and Briceño-Garmendia, 2009.

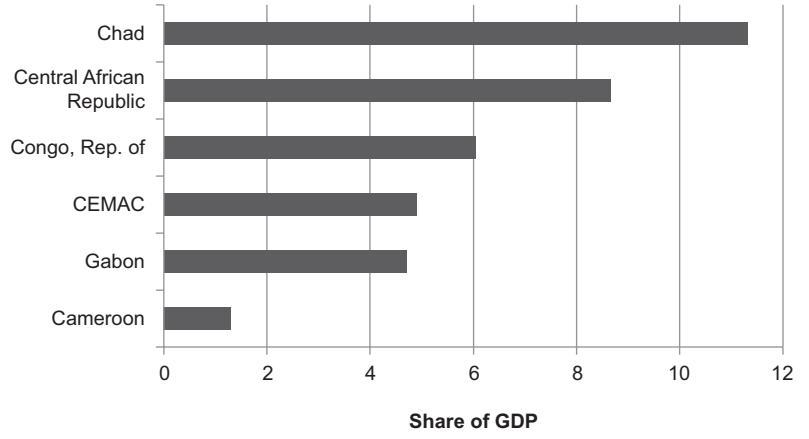

Figure 4.17 Funding Gap as a Percentage of GDP
Source: Foster and Briceño-Garmendia, 2009.
Note: CEMAC = Central African Economic and Monetary Community.

about 5 percent of the region's GDP (Figure 4.17). The largest funding gaps are in the water and sanitation (including irrigation) sectors. Despite the very high power spending needs, much of the requirement in this sector can be met from capturing internal inefficiencies; the resulting funding gap is relatively small.

A number of policy choices relating to selection of technologies and regional approaches to infrastructure development could also contribute to reducing the funding gap by lowering the costs of meeting infrastructure targets. Adopting lower-cost technologies, such as standposts, boreholes, and latrines for meeting the MDGs in the water supply and sanitation sector, could save US$200 million annually. Adopting more appropriate standards for paved roads could shave almost US$400 million from the cost of achieving good road connectivity. Regional power trade, based on hydropower exports from Cameroon, could reduce the costs of energy supply by almost US$160 million. Measures such as these could potentially eliminate the infrastructure funding gap for power and transport, and almost halve it for water and sanitation. If all such measures were applied, the overall funding gap would fall to US$0.5 billion annually.

WHAT ELSE CAN BE DONE?

There are at least two other ways to close the remaining infrastructure gap: raise additional finance and set less ambitious timeframes for infrastructure development.

The region's oil boom could generate the necessary resources to finance infrastructure. The extent to which resource royalties are channeled toward infrastructure is largely a political choice, and different examples exist across Africa. In Nigeria, for example, infrastructure spending actually declined during the oil boom of the early 2000s because the country chose to use the windfall to pay off accumulated debts. Angola and Sudan, however, seem to have channeled a substantial share of their oil wealth into infrastructure, leading to massive public investment programs in roads and power. Nevertheless, on average, resource-rich

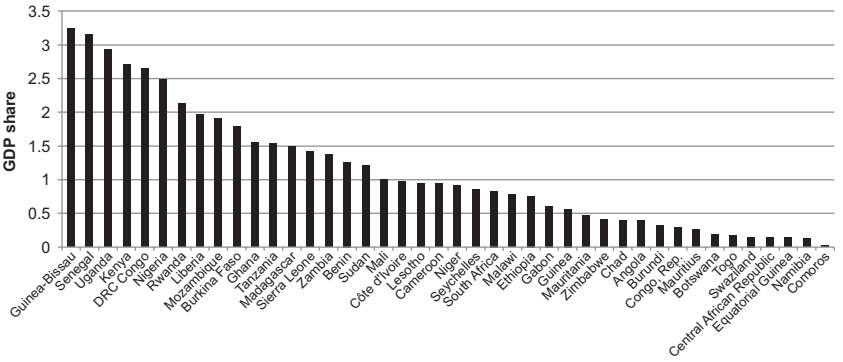

Figure 4.18 Private Investment for Infrastructure
Source: AICD calculations.

countries have spent less on infrastructure as a percentage of GDP than have low- and middle-income or even fragile states in Africa. The natural resource–endowed CEMAC countries could allocate more resources to financing infrastructure provision, as long as commensurate improvements in public expenditure management systems are made to ensure that those resources are efficiently used.

Attracting private investment for infrastructure is another possible source of financing. During the early 2000s, Cameroon, for example, captured private investment commitments worth about 0.9 percent of its GDP, even as the sub-Saharan African countries capturing the highest level of private investment reached about 1.5 percent of GDP in private investment (Figure 4.18). In other CEMAC countries, the volume of private finance is much lower (Gabon and the Republic of Congo) or almost nonexistent (the Central African Republic, Chad, and Equatorial Guinea).

However, the challenges of the political economy and an uncompetitive investment climate need to be addressed to encourage large inflows of private financing for infrastructure in CEMAC member countries. Establishing a proper legal and institutional framework is a critical priority area for attracting private infrastructure financing as well as for managing fiscal risks from such engagements.

Assuming that CEMAC member states do not raise any additional funding and do not implement the cost-saving policies described above, the only way to meet the infrastructure targets identified would be to take a longer time than the decade that was contemplated at the outset of this exercise. If the CEMAC region were able to correct the various inefficiencies identified above, and preserve overall spending at current levels, the targets would take 18 years to reach. Without tackling inefficiencies, attaining suitable levels of infrastructure seems an impossible proposition.

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