

5

Infrastructure
Development



Infrastructure development is a key driver for progress across the African continent and a critical enabler for productivity and sustainable economic growth. It contributes significantly to human development, poverty reduction, and the attainment of the Millennium Development Goals (MDGs). Investment in infrastructure accounts for over half of the recent improvement in economic growth in Africa and has the potential to achieve even more.

5.1 DEVELOPING INFRASTRUCTURE FOR GROWTH

Strong infrastructure is a crucial factor for productivity and growth. For Africa, the need for adequate infrastructure—secure energy, efficient transport, reliable communication systems, resilient sanitation, and affordable housing—is particularly apparent. While the continent has seen tremendous economic growth over the past years, serious infrastructural shortcomings that have been hampering business growth, service delivery, trade, and investment, as well as Africa's progress in inclusive and sustainable development, continue to impact negatively on the region's competitiveness and constrain the full achievement of the continent's development. Inadequate water and sanitation infrastructure is costing Africa the equivalent of 5 percent of GDP, high transport costs add 75 percent to the price of African goods, and about 30 countries have chronic power outages. Together, underdeveloped infrastructure has been estimated to shave off at least 2 percent of Africa's annual growth.

But Africa also has a unique opportunity to develop its infrastructure in a sustainable manner. Compared to more developed regions, Africa could leapfrog to new, sound technologies, drawing on the best innovations from around the world. Developing adequate and efficient infrastructure will also assist African economies to increase productivity, especially in manufacturing and service delivery. This in turn will create more jobs, increase attractive investment opportunities, and encourage the efficient use of natural resources. Improved infrastructure will also contribute to social development in the areas of health and education and reduce societal inequalities through a more equitable distribution of national wealth.

A development agenda for Africa should, therefore, focus on the challenges and opportunities presented in various infrastructure areas.

	All African Countries	Africa's Poorest Countries	Developing Countries	World
Electricity Coverage, % of population	43%	31%	77%	82%
Access to an all-season road, % of rural population	43%	35%	67%	69%
Mobile Penetration Rate, % of population	80%	-	89%	96%
Improved Water, % of population	68%	59%	87%	89%
Improved Sanitation, % of population	40%	28%	57%	64%
People living in slum conditions, % of urban population	50%	-	33%	-

Source: African Development Bank, World Bank Group, International Energy Agency, International Telecommunication Union, TA Telecom, World Health Organization, United Nations Children's Fund, and United Nations Department of Economic and Social Affairs

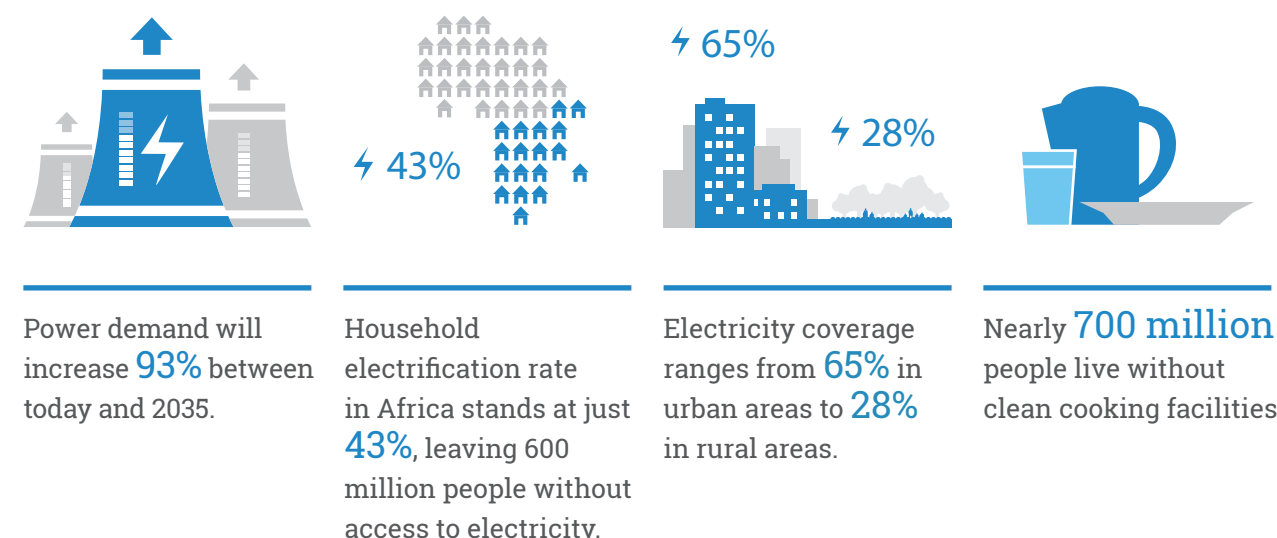
For Africa, the need for adequate infrastructure—secure energy, efficient transport, reliable communication systems, resilient sanitation, and affordable housing—is particularly apparent.

- Africa's vast infrastructure deficit is a constraint on its growth, but also an opportunity to leapfrog to new, more efficient technologies
- As Africa becomes more urbanized, public goods will become easier and cheaper to deliver to a more geographically concentrated population.
- Key challenges will be to supply the burgeoning population with reliable electricity, affordable housing, and transport infrastructure, though these industries will also create new jobs.

5.2 ENERGY

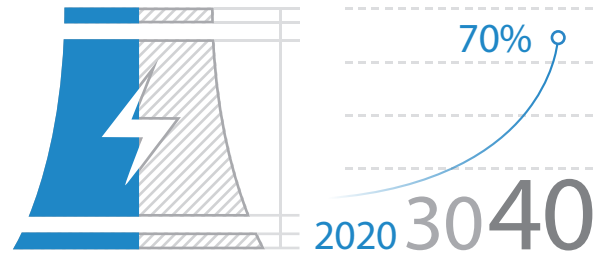
Power demand will increase 93 percent between today and 2035, yet a lack of affordable and reliable energy may pose as a challenge. While improving, the household electrification rate in Africa stands at just 43 percent, leaving 600 million people and 10 million small- and medium-sized businesses without access to power. There is also a marked urban/rural divide, with electrification rate recorded at 65 percent and 28 percent respectively. In Africa, nearly 700 million people live without clean cooking facilities. Around two-thirds of the population continue to burn biomass for fuel, which poses both health and environmental hazards and requires time-consuming foraging by women and children. The average cost for electricity in African countries is also three times as high as in United States and Europe. Households and businesses that do have access to power often face intermittent power outages as well.

Yet Africa has huge energy reserves. If Africa reinvested just 5 percent of its oil and coal export revenue, it could achieve modern energy for all by 2030. Africa also has enormous potential for clean and affordable energy. There is vast hydropower potential in Central and East Africa, barely 10 percent of which is currently tapped. East Africa has large geothermal energy potential, while North Africa, South Africa, and the Horn of Africa offer favorable conditions for wind and solar energy. With far less invested in conventional energy generation than other continents, Africa has the potential to leapfrog over old technologies and become a global leader in renewable energy. Projections for electrification rates indicate a steady rising trend in the upcoming three decades, to around 70 percent in 2040, providing access to 800 million more people.



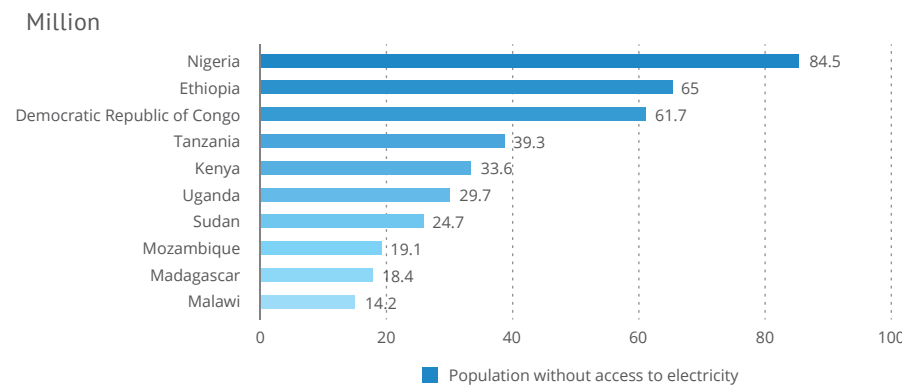


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African countries with the largest population without access to electricity



Together, these countries account for **65%** of the people who lack access to electricity in Africa.

Source: African Development Bank and International Energy Agency

5.3 TRANSPORTATION

Reliable transport infrastructure, in all four subsectors—roads, railways, air transport, and ports—is an essential component of all countries' competitiveness. It is particularly crucial for landlocked countries, for which it is a prerequisite to opening up production zones. Reliable transport must be in place for companies to import and export goods, to fill orders, and to obtain supplies.

ROADS

Although roads are the predominant mode of transport in Africa—carrying at least 80 percent of goods and 90 percent of passengers—major deficits exist in its infrastructure throughout the continent.

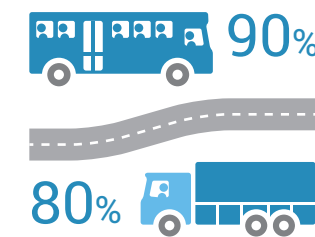
A significant percentage of Africa's road network is unpaved, isolating people from basic education, health services, transport corridors, trade hubs, and economic opportunities. Moreover, access to the road network is uneven, with rural areas largely underserved. This unequal access makes the flow of goods and services to and from rural areas difficult and expensive. Maintenance of the road network is also inadequate, and when done often inefficient. Further complicating the issue, the road network in various countries continues to suffer from vehicle overloading, causing road surfaces to prematurely degrade and resulting in reduced construction life span and high maintenance costs.

Despite having fewer vehicles on its road than any other region, the underdevelopment of the road network has resulted in

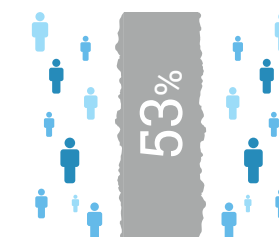
severe traffic congestion. Road safety is also an issue, with road fatalities resulting in 225,000 deaths every year—about one-fifth of total fatalities from road crashes worldwide. As the size of the middle-class population increases, more automobiles will be purchased and improvements in road safety need to be stepped up. Safety measures include the introduction (where not already in existence) of speed limits, drink-driving laws, compulsory seatbelt use and child constraints, and the wearing of helmets for motor cyclists. There should also be annual safety checks for vehicles over a certain age (e.g. 3-5 years) to ensure their road-worthiness. Such measures will require greater investments and regulation, especially in the set-up phases.

Investment rates in transport infrastructure have been increasing, thanks to major continental initiatives such as the Programme for Infrastructure Development in Africa (PIDA).

Some countries are making good progress. Ethiopia, for example, has reduced the average distance to an all-weather road from 21 kilometers in 1997 to 12.4 kilometers in 2012, and access to an all-weather road is said to have decreased poverty by 6.9 percent and increased food consumption by nearly 17 percent. Senegal, too, has embarked on an ambitious program of infrastructure development, which involves the construction of a 32-kilometer toll highway that will link Dakar to Diamniadio in the western part of the country. Cross-border corridors are also being used to link markets—particularly important for landlocked countries—and enhance intra-African trade. The Trans-Africa Highway (Cairo–Dakar) is the most ambitious road network on the continent: it comprises nine interlinked highways with a total length of 56,683 kilometers. Other planned or ongoing regional projects include the Abidjan–Ouagadougou–Bamako Transport corridor, connecting Côte d'Ivoire, Burkina Faso, and Mali.



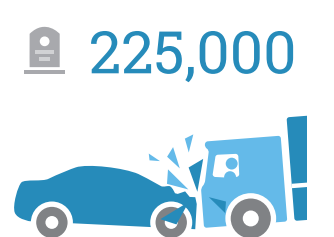
Roads are the main mode of transport, carrying at least **80%** of goods and **90%** of passengers.



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Less than **half** of Africa's rural population has access to an all-season road.



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Paved roads in selected African cities

Meters per 1,000 population

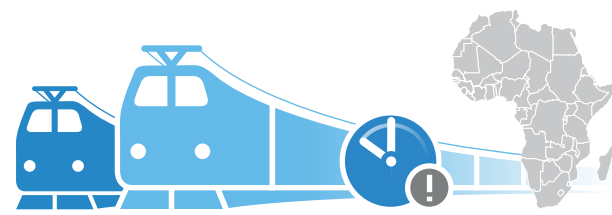
City	Paved Roads
Abidjan.....	346
Conakry.....	174
Dakar.....	467
Dares Salaam.....	150
Kampala.....	225
Kinshasa.....	63
Lagos.....	400
Average Sample in African low-income countries.....	318
Average Developing World.....	1,000

Source: African Development Bank and Commonwealth Business Council

RAIL

Of all the transportation modes, rail networks are the least developed in Africa, with very few additions since colonial times. Outdated infrastructure and limited maintenance have undermined the effectiveness of railways across Africa, resulting in a significant reduction in usable track.

In total, Africa counted 84,000 kilometers of rail track, for a surface of about 30 million square kilometers, most of it in Southern and Northern Africa. Thirteen sub-Saharan African countries have no operational rail networks, while the spatial density of operational rail ranges from 1 to 6 route-kilometers per thousand square kilometers. The network density for most African countries ranges from 30 to 50 kilometers per million people, with a few countries (Gabon, Botswana, and South Africa) having network densities of more than 400 kilometers per million people. These network densities are very low compared to Europe's range of 200 to 1,000 kilometers per million people.



Outdated infrastructure and limited maintenance have undermined the effectiveness of railways across Africa.

Source: African Development Bank and Commonwealth Business Council

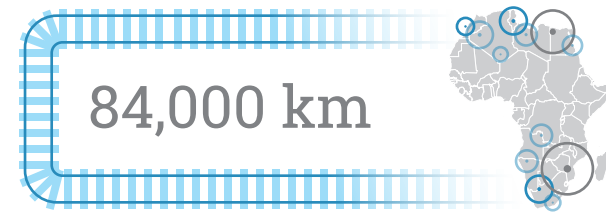
AIRPORTS

By providing a quick link to export markets, air transport enables the trade of time-sensitive, perishable exports such as cut flowers, vegetables, fruits, meat, and fish, which are becoming increasingly important foreign-exchange earners for African countries.

Yet air transport in Africa remains expensive by international standards. This is mainly because of lower passenger traffic, limited liberalization of air space, high passenger and airport taxes, safety issues, and limited infrastructure (airports, runways, and safety systems). Africa still records the lowest safety standards in air transport of any region in the world. African airlines have also lagged behind in terms of technological

Nonetheless, the African rail system has the potential for expansion and to act as a catalyst for regional integration, trade, and economic development. Inefficiencies and inadequacy in the railroad network are increasingly being addressed by countries in recent years. For instance, Zambia has been working on improving the operational efficiency of the Zambia Railways and the TAZARA Railway. There are also plans on extending the Zambia Railways network to the Botswana Railways network via the planned Kazungula Bridge.

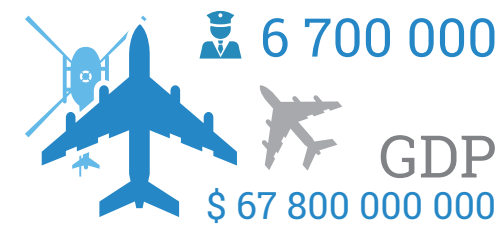
It is also notable that African exports are largely bulky primary commodities, which could be transported more efficiently and at lower cost by rail than by road. Rail development therefore holds some opportunities for investors. Investments in associated activities like locomotive building, logistics, and communications also exist.



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upgrades, notably surveillance equipment and fleet modernization. Progress is further hampered by poor airport infrastructure and inadequate air connections.

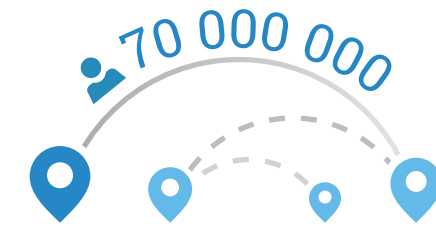
The importance of air transport, especially for landlocked countries, cannot be overemphasized. It is imperative that African countries enhance this sector's development to improve connectivity and safety and to reduce costs in order to promote intra-African and global trade. Air transport has to be enhanced not only by the amount and quality of physical infrastructure but also, even more importantly, by the way it is operated with regard to air-traffic control and ground-air communications, which are inadequate in much of the region and need to be boosted.



Air transport supports **6.7 million** jobs and **\$67.8 billion** in GDP in Africa.



The most pressing problem for African aviation is safety.



In 2012, airlines based in Africa carried **70 million** passengers.



Runway accidents accounted for about a **quarter** of the accidents during 2006-2010.



In 2012, African airlines had one accident (with a Western-built jet aircraft) for every **270,000** flights. Globally, the industry average was 1 accident for every **5 million** flights.

Source: African Development Bank and International Air Transport Association

PORTS

Seaports too are badly in need of investment and regulatory reforms to remove the bottlenecks and chronic congestion problems. Whereas Africa operates 64 ports, many of them are poorly equipped and uneconomically operated. Huge problems exist with respect to inadequate capacity, particularly in terminal storage and maintenance. Delays are often caused by long processing times and poor shipment handling rates, with over-the-quay container-handling performance running below 20 moves per hour in the African region, compared to 25 to 30 in modern terminals worldwide. In addition, handling costs average 50 percent more in Africa than in other parts of the world. Further challenge stems from a lack of efficient linkages between roads and rail lines, and their poor connectivity to ports.

Private investment in ports is low; yet there is a great need for transshipment facilities and maritime structures. Four regional hubs exist and these include Durban in Southern Africa, Mombasa, and Dar-es-Salaam in East Africa, with Djibouti also emerging as a new hub. In West Africa, Abidjan used to play this role but as a consequence of the civil war, its role has been supplanted by the port of Malaga in Spain. With

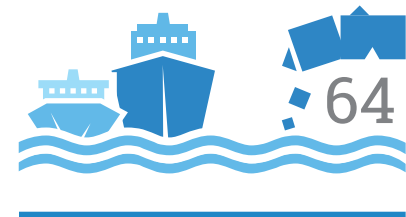
about half of the coastal countries that operate port facilities introducing sectoral legislation and regulatory reforms, new investment opportunities will present themselves.

Enhancing port infrastructures can substantially reduce the cost of production for companies and contribute to economic growth. For instance, as a result of the recent Dakar Port Container Development Project, Senegal has been able to expand its exposure to international markets, increase the volume of port traffic by 13 percent, and reduce average waiting time for ships from 15 hours to 2 hours and for trucks from several hours to less than 30 minutes. The port enhancement project will increase berth capacity by 50 percent and vessel productivity from 20 moves per hour to 61 moves per hour. Moreover, the port will operate the terminal continuously, on a 24-hour-a-day basis. Costs have also been reduced by the implementation of an electronic customs clearance system and the liberalization of the container shipping market.

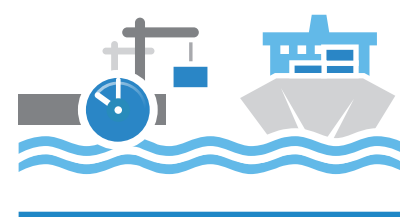
Africa's prolonged underinvestment in transportation has resulted in a dilapidated transport infrastructure. Indeed, compared with other developing countries—

excluding the provision for maintenance—African countries invested, on average, 15 to 25 percent of GDP in transport infrastructure over the period 2005-2012, while India and China invested about 32 percent and 42 percent of GDP, respectively, over the same period. With many national economies relying on the transport of bulky primary produce, increased attention is being given to developing roads, rail networks, airports, and inland

waterways. As Africa looks at scaling up infrastructure investments in the transportation sector, the trade impact of such investments will spur growth and development. This, in turn, will have spillover effects in all other sectors, opening further opportunities for private sector investments. Within the transportation subsector, there are considerable opportunities to develop systems that will improve intermodal efficiency.



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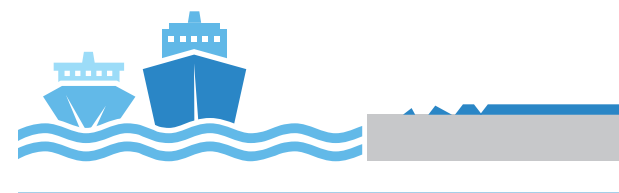
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Further challenge stems from a lack of efficient linkages between roads and rail lines, and their poor connectivity to ports.

Source: African Development Bank and Commonwealth Business Council

“The transport sector needs to be better oriented towards enhancing human and social capital.”

5.4 INFORMATION AND COMMUNICATION TECHNOLOGY

While Africa's information and communication technology (ICT) market is still relatively immature, robust economic growth, population boom, rapid urbanization, an emerging middle class, strong competition among providers, and the increasing affordability of mobile devices have propelled it to grow dramatically in recent years. Substantial development assistance has been channeled to the ICT sector in Africa while private investment amounted to USD 50 billion over the last decade.

Africa is now the fastest growing and second largest mobile phone market in the world. More than eight in ten Africans have a mobile phone, amounting to 760 million mobile subscriptions, up from only 15 million in 2000—across the continent. Progress will continue over the next 5 years, with the number of subscriptions projected to cross the 1 billion mark by 2016. The average penetration rate has also risen from 37 percent in 2010 to 80 percent in 2013 and is still growing at 4.2 percent annually.

Internet use continues to increase. Africa's data network has been boosted through the rapid spread of submarine data transmission cables, bringing significant international bandwidth within reach of many Africans. The number of internet users has increased from 4 million people in 2000 to over 197.6 million people in 2012. Broadband coverage has increased from a meagre 0.1 percent of the population in 2005 to 16 percent in 2012. A sharp upward trend is projected by 2060—to reach 99 percent of the population. In addition, the Internet is increasingly accessed through mobile phones. Africa's mobile data usage amounts to 15 percent of the total internet traffic. In some countries like Kenya, nearly 99 percent of internet subscriptions are on mobile phones.

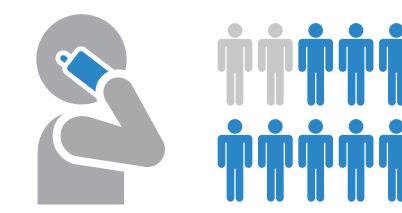
in e-business, e-payments, e-learning, e-health, and e-government, and propelled private consumption. Despite the progress of the ICT sector in recent years, the biggest impact has yet to come. While Africa's internet contribution to overall GDP is low today, at 1.1 percent—about half of that in other developing regions, this number is expected to grow to at least 5 or 6 percent by 2025—the same level as the world's leading economies. With digital technology, governments could improve transparency and public service delivery, teachers and students could gain access to education content and training via tablets and e-books, remote diagnosis and treatment could be provided to those with lack of access to a health clinic, farmers could access up-to-date weather and market information, and more people could gain access to finance via mobile and online banking. As the continent becomes more connected, social and economic growth will accelerate, transforming lives in the process.

Telecommunications is crucial to economic growth: it underpins business growth by providing connectivity access to global markets and supporting trade communications; it has also brought on innovations

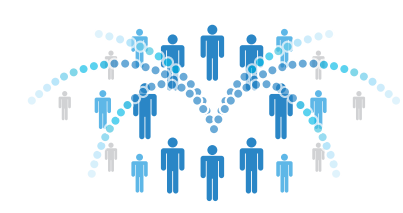
Africa's mobile phone market



Africa is now the **fastest growing** and second largest mobile phone market in the world.



More than **8 in 10** Africans have a mobile phone.



Average penetration rate has also risen from 37% in 2010 to **80% in 2013** and is still growing at **4.2%** annually.



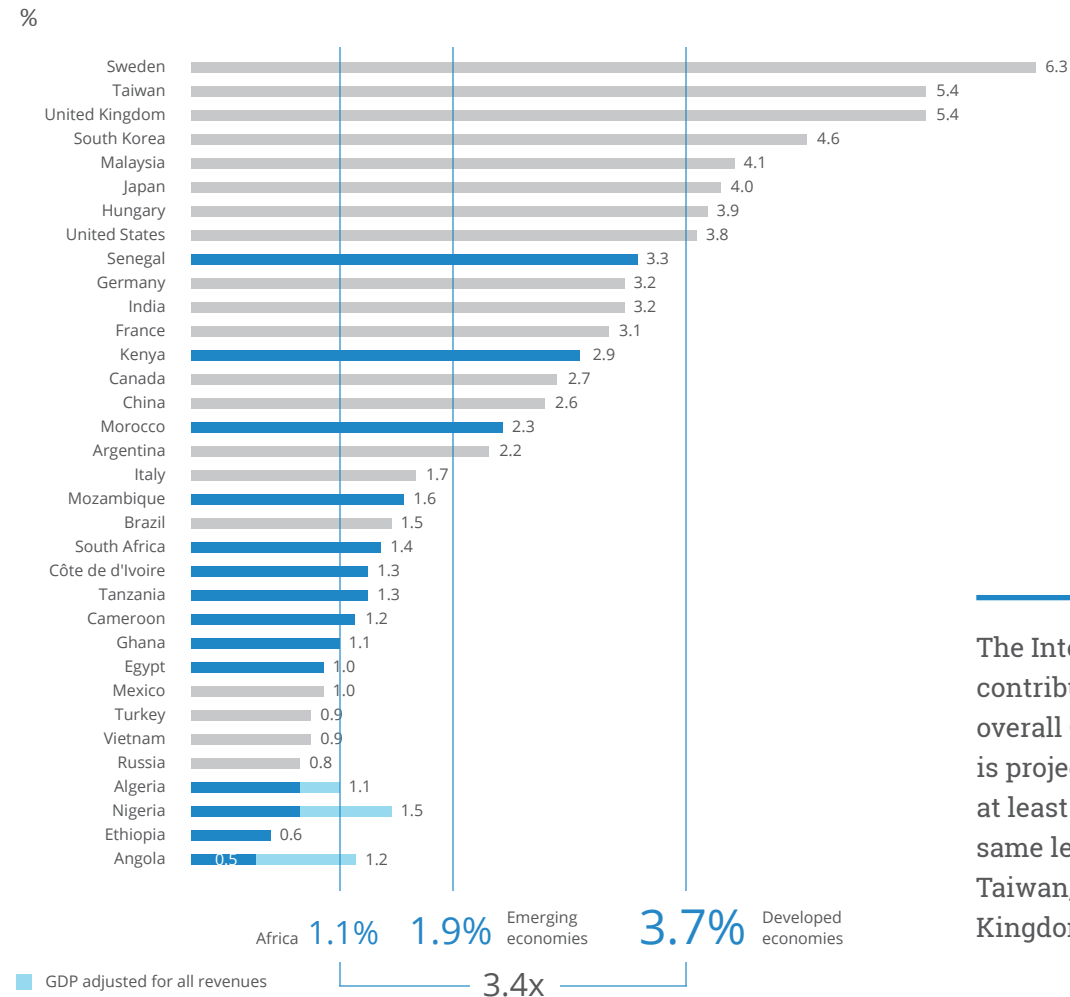
There are now **760 million** mobile subscribers in Africa. This number is projected to cross the **1 billion** mark by **2016**.

Source: International Telecommunication Union and TA Telecom



Africa's mobile data usage amounts to **15%** of the total internet traffic.

Internet's contribution to GDP 2012



The Internet's contribution to Africa's overall GDP is low, but is projected to grow to at least **5 to 6%**, the same level as Sweden, Taiwan, and the United Kingdom, **by 2025**.

Source: McKinsey & Company

Top 10 Internet Countries in Africa

Country	Number of Internet Users (Million)
Nigeria	55.5
Egypt	35.6
South Africa	21.5
Morocco	17.9
Kenya	13.9
Sudan	7.8
Algeria	5.9
Uganda	5.3
Tunisia	4.5
Ghana	4.3

Source: International Telecommunication Union

In 2012, over **197.6 million** people in Africa are using the internet, which corresponds to **18.6%** of the population.

Broadband coverage is at **16%** and will likely reach **99% by 2060**.

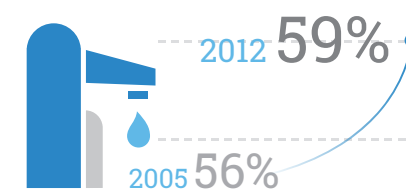
5.5 WATER AND SANITATION

Increasing access to clean water and sanitation has been among the most challenging of the Millennium Development Goals (MDGs) to implement in Africa. The share of the population in Africa's poorest countries with access to an improved water source has increased from 56 percent in 2005 to 59 percent in 2012, compared to an average access rate of 87 percent across the developing world. Sanitation lags even further behind. Only 28 percent of these countries have access to improved sanitation facilities, and the rate of investment is only just ahead of population growth. While access has been improving in rural settings, progress in urban areas has stagnated, with growing disparities between wealthier and poorer neighborhoods.

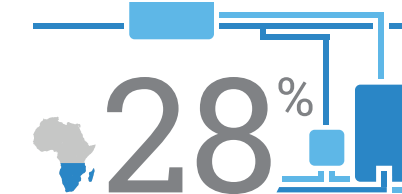
In many cases, the lack of access to improved water source has slowed the progress on sanitation and contributed to outbreaks of diseases like cholera and diarrhoea. Factors hindering progress in access to safe drinking water include political instability, the increasing number of refugees, and

growing populations putting pressure on the available resources. Additionally, African countries generally lack the technologies needed to improve water and sanitation. Where these technologies exist, they do not trickle down to the many rural areas that would benefit from them. Women and girls are the most affected, because they bear the primary responsibility of fetching water, taking up a lot of time that could be used more productively.

Water is one of the most essential natural resources, for livelihoods, food security, and economic growth. Africa urgently needs to invest in the sustainable development of its vast water resources, to protect against the impact of climate change in the coming years. This includes improving cooperation on the shared management of Africa's eighty or more international water basins. There are a number of successful models to follow, such as the Senegal River Basin Development Authority and the Nile Basin Initiative.



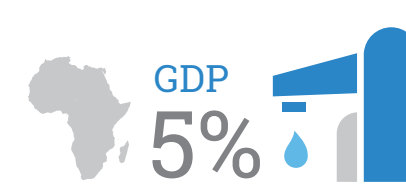
The share of population in Africa's poorest countries with access to an improved water source has increased from 56% in 2005 to **59% in 2012**.



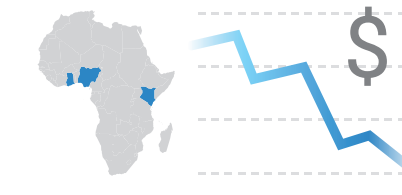
Only **28%** of Africa's poorest countries have access to improved sanitation facilities.



Almost **half** of the people with no access to improved sanitation live on less than two dollars a day.



On average, inadequate water and sanitation costs Africa **5%** of its GDP.



Poor sanitation costs Nigeria, Kenya, and Ghana \$3 billion, \$324 million, and \$290 million each year respectively.



In most countries, current investments in sanitation are less than **0.1%** of GDP.

Source: African Development Bank, World Health Organization, UNICEF, and World Bank

5.6 HOUSING

African cities are growing exponentially, adding an estimated 15 to 18 million people a year—averaging to 40,000 to 50,000 people every day. In the coming decades, Africa’s urban population is projected to grow 45 percent faster than the population as a whole. By 2040 half of Africa’s population will live in a city.

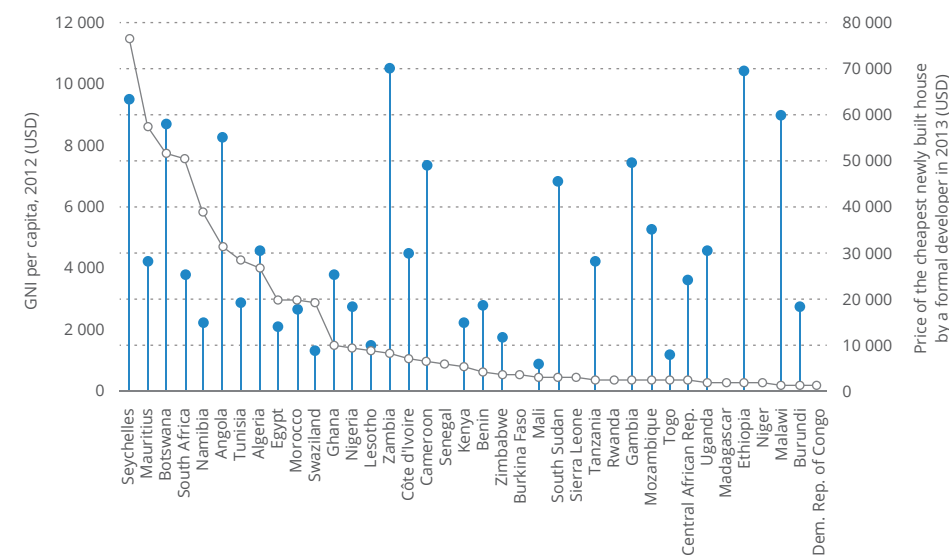
The growth of cities comes with an increasing demand of land for housing, services, jobs, and other aspects of urban development. Yet, housing is rarely affordable—with prices ranging from USD 5,800 in Mali to USD 70,000 in Ethiopia and Zambia. This leaves half of the urban population—the majority of which are between the ages of 15 and 24—with no alternatives but to live in slums and informal settlements under poor, overcrowded conditions instead. Today, over 226 million people in Africa live in slum conditions—up from 123 million in 1990. Those living with insecure property rights often find themselves living beyond the reach of the law and vulnerable to exploitation.

Scarce urban land for housing development, increasingly high construction materials and infrastructure costs, as well as a lack of land and housing policies and legislation, all lead to rising housing costs and tenure insecurity. Housing finance in Africa is generally limited, with 85 percent of urban dwellers unable to secure housing due to high down-payment requirements, short loan periods, and high interest rates.

While there are great challenges, they are not insurmountable. Several countries have already demonstrated progress toward affordable housing provision by successfully implementing housing policies and programs catered to low-income households. As a result, some 24 million African urban dwellers have had significant improvements in their living conditions. The number of slum populations in countries like Egypt, Morocco, and Tunisia has also substantially reduced over the past decade as well.

Urban legislation should continue to be a priority area for sustainable urban development. Governments should legislate to ensure that all categories of citizens have equal access to adequate and affordable housing, basic infrastructure and services, and equal job opportunities. Mass affordable housing would require careful policy coordination—removing inappropriate building regulations; clarifying land titling and legal enforcement; encouraging innovation in housing finance; promoting the construction, maintenance, and upgrades of existing housing properties and informal settlements; and supplying integrated infrastructures and services that target the marginalized groups, including the poor, youth, women, and elderly people. It also demands a carefully crafted and comprehensive response from city planners to ensure orderly urban development and prevent urban sprawl. Better communication and allocation of resources from central to municipal authorities are also crucial.

Relationship of income to housing cost



Housing, where available, is simply not affordable for the vast majority of Africans.

Source: Centre for Affordable Housing Finance in Africa