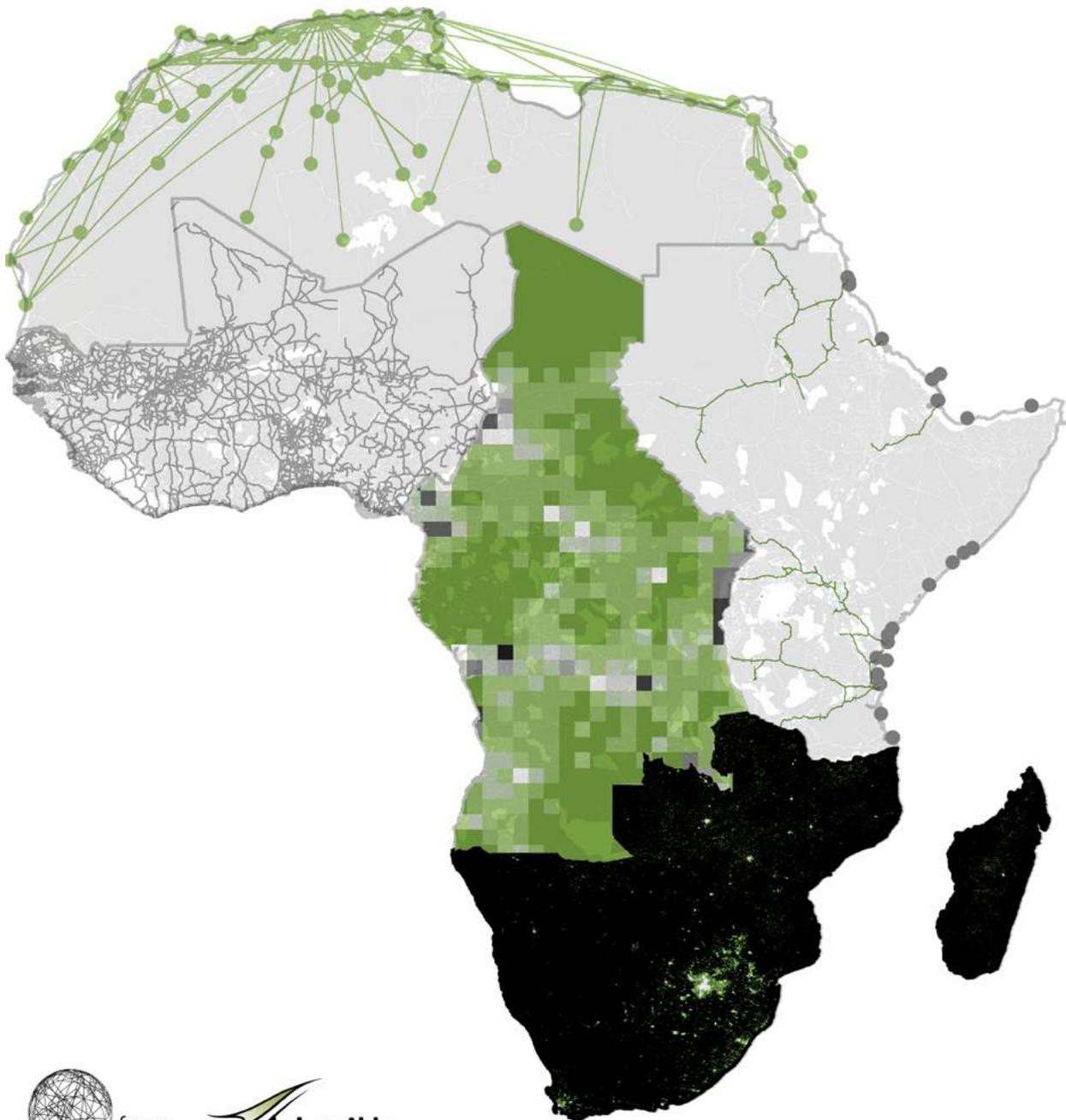

INFRASTRUCTURE AS A DISRUPTOR:

LEVERAGING PRIVATE CAPITAL FOR GROWTH



Foreword by the Chief Executive Officer of Harith General Partners

Ten years ago, Harith began an exciting new experiment – mobilizing African capital in support of transformational infrastructure investments across borders. Since then, we have consistently demonstrated that it is not only possible to generate good financial returns, but make significant contributions to growth, prosperity, and opportunity across the continent.

Over the past decade, Africa has experienced significant transformation, with old patterns disrupted and new development trajectories opened. Private investment in infrastructure has played a major role in this new positive narrative about Africa.

The thesis has been proven that a sustained and effective private investment in infrastructure is possible and starts with leadership. Our experience has shown that when African leadership is committed to building an enabling space for infrastructure investments, it is possible to generate tremendous amounts of patient capital for strategic projects. African leaders in both the public and private sectors can work closely together, through arrangements like public-private partnerships, to make life-changing investments that improve the standard of living for all.

Thanks to the early support of the African Development Bank and our anchor investor, the Government Employees Pension Fund (GEPF), Harith was able to take risks and pursue this vision. Through partnerships with organizations like the African Finance Corporation (AFC), we also have seen the extent of our impact evolve. Our joint power projects with the AFC deliver 1.7 GW of power, providing approximately 30 million people with access to electricity.

We are neither the first nor the last fund to pursue a pan-African approach to strategic infrastructure investments, but we have demonstrated that such an idea is possible. Now, there are other funds chasing a similar dream of investing in multiple sectors, from agriculture to healthcare, and thereby contributing to greater prosperity across the continent as well.

Through this report, we demonstrate the role of private investors in power, telecommunications, and transportation infrastructure, using several of our flagship projects to illustrate the potential gains from further investment. Through our theme of infrastructure as a disruptor, we emphasize the possibilities for strategic investments to change the entire economic trajectory of cities, countries, or even regions.

After ten years of active learning and engagement, Harith remains a committed partner and leader in infrastructure investment throughout Africa. We are proud to continue our pursuit of attractive investment opportunities that can have an enormous positive developmental impact on communities across the continent.

All our investments and future strategic plans dovetail into our commitment to improve connectivity and trade between African cities. We aim to create innovative sector models with the capacity to attract capital to help us bolster our mission to finance and develop world class mega infrastructure projects in Africa.

We believe that a key fundamental driver of our modest successes over the past decade has been our people and our partnership philosophy. We seek and effect real partnerships, at the fund level and project level.

Over the past decade, African democracies have improved, African people secured access to the grid, communication and travel, and Harith has played a strong role in this narrative. We are not about to be complacent because we are mindful of the long-term horizon. Africa still needs to be built and we commit to remain a part of this cause long into the future.



Tshepo Mahloele

Chief Executive Officer, Harith General Partners



Historically, strategic infrastructure investments have altered the trajectory of a country's economic and social development. From America's Hoover Dam to Dubai's international airport, infrastructure can transform peoples' path to prosperity and propel entire nations to the global stage. It can happen in Africa too. Whether it is connecting people to new opportunities through broadband, providing improved electricity access using renewable energy, or reducing geographic divides with world-class airports, similar investments in 21st Century infrastructure have the potential to transform prospects and growth across the continent.



Through projects across the continent, Harith General Partners has been a leader in telecommunications, power, and transportation infrastructure. Harith is the fund manager of both Pan African Infrastructure Development Fund (PAIDF) I & 2, a closed end private equity fund that invests in power, transport, water, ICT, healthcare, and sanitation across the African continent. Harith works with major sponsors and local operators to facilitate infrastructure development with strong investment returns.

Harith General Partners is an Authorised Financial Services Provider with FSB Licence number 43795



Fraym is a geospatial data and analytics company focused exclusively on the African continent. Its proprietary platform delivers hyperlocal insights for cities and nearly any customizable geographic area. The platform is powered by the combination of the latest satellite imagery and geostatistical datasets with over 50 billion data points from hundreds of professionally-enumerated household surveys.

Infrastructure’s disruptive power

In 1935, U.S. President Franklin D. Roosevelt dedicated one of the largest infrastructure projects in history; it was a project that would completely transform the development trajectory of the American southwest. The Hoover Dam took \$49 million (roughly \$840 million today), 5,000 workers, and five years to complete. Today, it provides water for 25 million people and hundreds of thousands of hectares of agricultural land, and provides electricity for roughly 8 million people. Major cities like Los Angeles, Las Vegas, San Diego, and Phoenix would never have grown as prosperous or strategically important without the Hoover Dam. And, California definitely would not have become the 7th largest economy in the world without it.

Historically, strategic infrastructure investments have transformed the trajectory of a country’s economic and social development. Whether it is the Hoover Dam in America, the North Sea Protection Works in the Netherlands, the Panama Canal, or Dubai’s international airport, infrastructure can transform peoples’ path to prosperity and propel entire nations to the global stage. For a country that is partially below sea level and prone to flooding, the North Sea Protection Works represent an engineering marvel that saves lives and enables a secure and resilient economy. The Panama Canal and Dubai’s international airport redefined how local communities engaged with global commerce and disrupted existing patterns of movement and trade.

It can happen in Africa too. Whether it is connecting people to educational and economic opportunities through broadband, providing affordable and reliable electricity access using renewable energy, or reducing geographic divides with world-class airports and port facilities, similar investments in 21st Century infrastructure have the potential to transform prospects and growth across the continent.

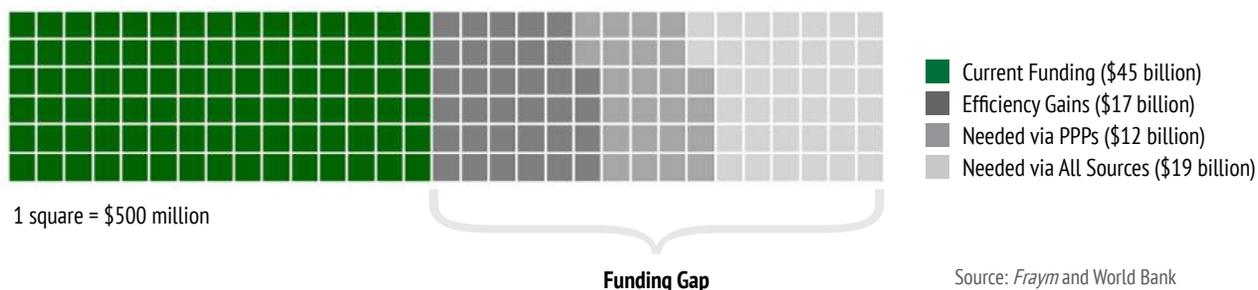
This report highlights the disruptive possibilities of strategic infrastructure investments in Africa, with a specific focus on the role and opportunities for private investors. The first section discusses the scope of the continent’s need for infrastructure development and potential gains. Next, the report provides an overview of three specific sectors that can deliver outsized benefits to African economies and people: telecommunications, power, and transportation. Each sector includes specific examples of how private investments are promoting greater prosperity and opportunities for local communities, national economies, and across borders. This is the first report to provide this type of city and neighbourhood level data focused specifically on African infrastructure sectors.¹

Strategic infrastructure investments create opportunities to deliver transformational benefits

For the more than one billion people living across the African continent, strategic infrastructure investments represent a massive disruption that could change the trajectory of economic and social possibilities. The sheer scale of the opportunity—and the related challenges—will require that private investors play a central role in meeting the demands of both today and tomorrow.

African governments, private investors, and development partners will need to invest nearly \$100 billion annually over the next decade to fully reap the benefits available in the power, transportation, telecommunications, water and sanitation, and irrigation sectors (see exhibit 1).

Exhibit 1: Funding African Infrastructure



Infrastructure and the private sector

Across the continent, investments in infrastructure can help to realize huge benefits from improved regional linkages and more reliable and affordable electricity. Such targeted investments could increase trade, facilitate communication, and power households and communities that form the building blocks of strong economic growth. Achieving this vision clearly requires policy, regulatory, and institutional reforms, as well as the standardization of new business models and partnerships.

Central government investments continue to ground much of the continent's infrastructure development. They contribute to the roughly \$30 billion needed each year for the maintenance of existing infrastructure. On average, countries in Sub-Saharan Africa spend about two percent of GDP to build, maintain, and improve existing infrastructure, with roads accounting for two-thirds of those funds. However, public spending levels overall remain far too low to meet the region's rapidly growing infrastructure needs.²

Given this, the private sector will continue to serve as a major player in filling the funding gap and reaching spending targets. Currently, less than half of the required funding is being provided, with investments in infrastructure totalling roughly \$45 billion per year. With optimal efficiency gains, the resulting funding gap is about \$31 billion annually. The World Bank estimates that about 40 percent of this gap could be provided through public-private partnerships (PPPs) amounting to \$12 billion per year.³

Private investment in infrastructure is increasing, though the number of PPPs remains small and primarily concentrated in South Africa, Nigeria, Ghana, Kenya, and Uganda. The power sector, particularly renewable solutions, attracts a growing share of PPPs in the region. To boost investment levels, there is a need for robust institutional and regulatory frameworks that consider innovative structures to manage risk and encourage responsible monitoring.⁴

Unlocking a new growth potential

While the need for investment is large, the potential return is also very attractive on a risk-adjusted basis. Infrastructure has played a central role in Africa's improved growth performance in recent years.⁵ Compared to other developing regions, the growth potential in Sub-Saharan Africa is even greater. Approximately 40 percent of the region's population lives in landlocked countries, and many economies are largely isolated from global market centres.⁶ Investments that help these less connected economies overcome geographic disadvantages, lower transportation costs, and engage in trade, will open up new opportunities for millions of people living across the continent.

Bridging the quantity and quality gaps in infrastructure could increase GDP per capita growth by 1.7 percentage points each year, excluding South Africa.⁷ For lower-income countries in the region, the power sector offers the largest potential gains, while lower-middle-income countries could see particularly large gains from transportation sector investments. By strategically investing in infrastructure development, the private sector plays a critical role in promoting growth, equity, and poverty reduction.

Harith General Partners:

How private investors can define new possibilities

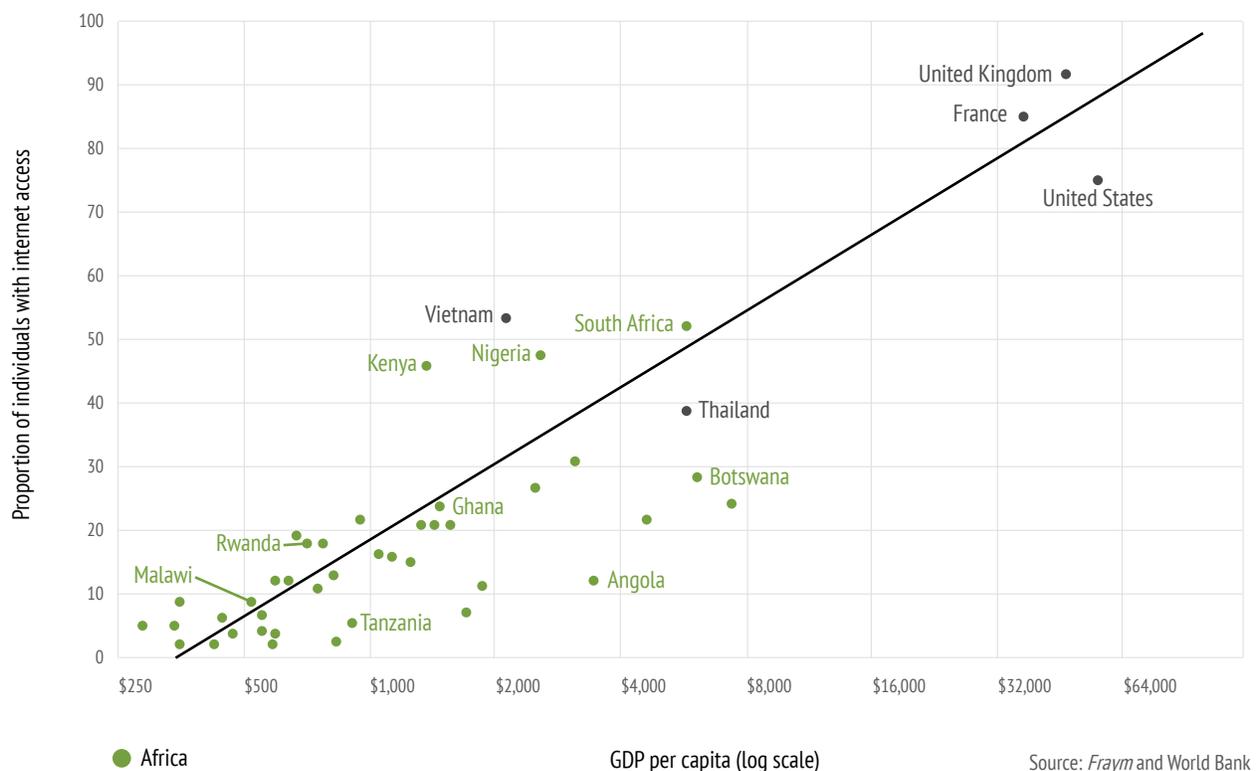
Through projects across the continent, Harith General Partners has been a leader in telecommunications, power, and transportation infrastructure. Harith is the fund manager of both Pan African Infrastructure Development Fund (PAIDF) I & 2, a closed end private equity fund that invests in power, transport, water, ICT, healthcare, and sanitation across the African continent. PAIDF 1 was initiated in 2006 and closed at \$630 million. In 2014, Harith announced the close of the \$435 million PAIDF 2 originating from African national pension funds, investment banks, and financial institutions, among other sources. Harith has developed over 11 major projects throughout the African continent. One such major partnership, Aldwych Holdings, has invested over \$70 million towards the development of renewable energy projects, including the Lake Turkana Wind Power Project. Another collaboration, the Harith-Africa Finance Corporation joint venture, provides power to more than 30 million people across the continent. Harith works with major sponsors and local operators to facilitate infrastructure development with strong investment returns. These areas have the potential to revolutionize sectors from business and entertainment to health and education.

Sector Focus One: Telecommunications

Telecommunications infrastructure has played an outsized role in transforming societies and economic opportunities across the continent.⁸ Telecommunications technology touches all Africans, every day, in profound ways. It creates and supports social linkages and networks; facilitates education and knowledge dissemination; enables trade and commerce; and has contributed to growing entrepreneurship across the continent.

Globally, there is a strong correlation between wealth and internet connectivity (see exhibit 2). There are several African countries with relatively high internet access rates given their income levels, such as Kenya, Nigeria, and Rwanda. At the same time, there also is a sizeable cluster of under-performing countries that have much lower internet connectivity levels than peer countries at a similar economic level, such as Angola, Botswana, and Tanzania.

Exhibit 2: Internet access rates and GDP per capita globally



Mobile access expansion

While connectivity differs across the African continent, telecommunications infrastructure has improved in the region as a whole. The mobile phone clearly has become increasingly ubiquitous. The number of mobile subscriptions has jumped from 15 million to 760 million since 2000, and now more than eight in ten Africans have a mobile phone.⁹ In addition, the number of internet users increased 13-fold over the last decade, increasing from 1.3 per 100 people in 2005 to 16.7 in 2015.¹⁰

The growth of tech hubs

The availability of internet connectivity has further supported the creation of technology hubs in nearly every African country. In 2012, there were roughly 70 tech hubs on the continent. Today, there are around 300.¹¹ Nigeria, South Africa, Egypt, Kenya, Morocco, and Ghana are home to the greatest number of hubs, which offer a growing mix of funding, training, and professional connections. For instance, the Co-Creation Hub in Lagos provides emerging African technology leaders with additional support through Google for Entrepreneurs. Accra's Meltwater

Entrepreneurial School for Technology has an incubator fund, helping entrepreneurs finance and test their ideas. Nairobi's iHub, part of Kenya's Silicon Savannah tech ecosystem, has launched more than 150 start-ups to date.¹² The emergence of these nascent, but rapidly growing ecosystems of entrepreneurs, venture capitalists, and research institutions is helping to produce the next generation of technology solutions, celebrated business leaders, and job creators. Without broadband investments, they also would not exist today.

However, additional investments are needed to build upon these successes. At least \$9 billion per year must be invested to bolster information and communications technology (ICT) infrastructure on the continent.¹³ This is particularly the case for countries that have not fully benefitted from the landing of terrestrial fibre optic cables along the African coastlines.

Example Project:

Main One Cable expands broadband access throughout West Africa

Strategic investments in the telecommunications sector have fuelled the rapid growth of broadband and internet access in the region. Within this context, Main One Cable has had a particularly profound impact on West African countries. The 7,000-kilometer submarine cable has connected Nigeria, Ghana, and other countries to the rest of the world and served as a catalyst for broadband and connectivity.

For years, these West African countries relied on prohibitively expensive satellite-based solutions that provided unreliable, low bandwidth solutions. Main One Cable, the second submarine cable in the region, aimed to offer speeds up to 10 times faster than was previously available in West Africa.¹⁴ After starting to sell bandwidth to internet service providers in 2010, Main One helped to reduce the prices for international connectivity services by 80 percent in Nigeria and Ghana.¹⁵ Main One Cable also strives to increase reliability with 24/7 monitoring and a commitment to restore service quickly.¹⁶

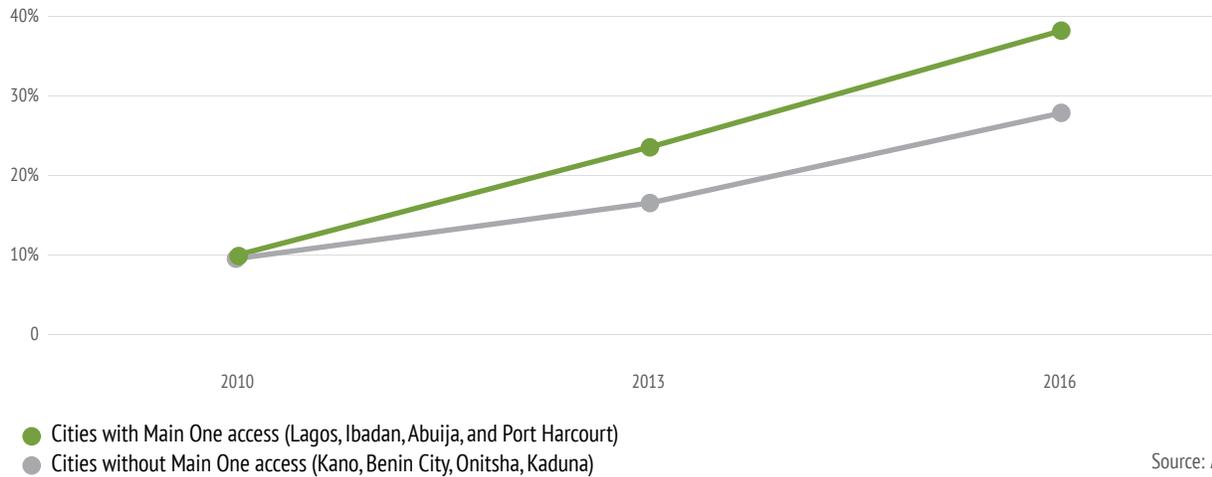
Through an investment in Main One Cable, Harith has helped to spur employment opportunities, both directly and indirectly, advocate for fair and transparent broadband policies that are well enforced, invest in local human capital, and overcome the last mile challenge, endeavouring to reach inland customers. Within the first few years of operation, Main One helped to create at least 20,000 jobs, both directly and indirectly.¹⁷ Aside from its effects on employment, business creation, cost, and reliable access, Main One has increased its social impact by providing free bandwidth to select universities and hubs for social technology ventures, as well as free educational materials to select primary schools. Tech firms are springing up in Lagos and other Nigerian cities,

expanding venture capital activity and creating well-paying, high skilled jobs. Meanwhile, consumers across the board can see improved availability of a wide array of services. New sectors, like e-commerce, are beginning to bloom as a result of cheaper, faster internet connectivity. Moreover, start-ups are starting to revolutionize established sectors, particularly financial services and media.

The Main One Cable, a 7,000-kilometer submarine cable, has connected Nigeria, Ghana, and other countries to the rest of the world and catalyzed broadband connectivity and the creation of new technology communities throughout the region.

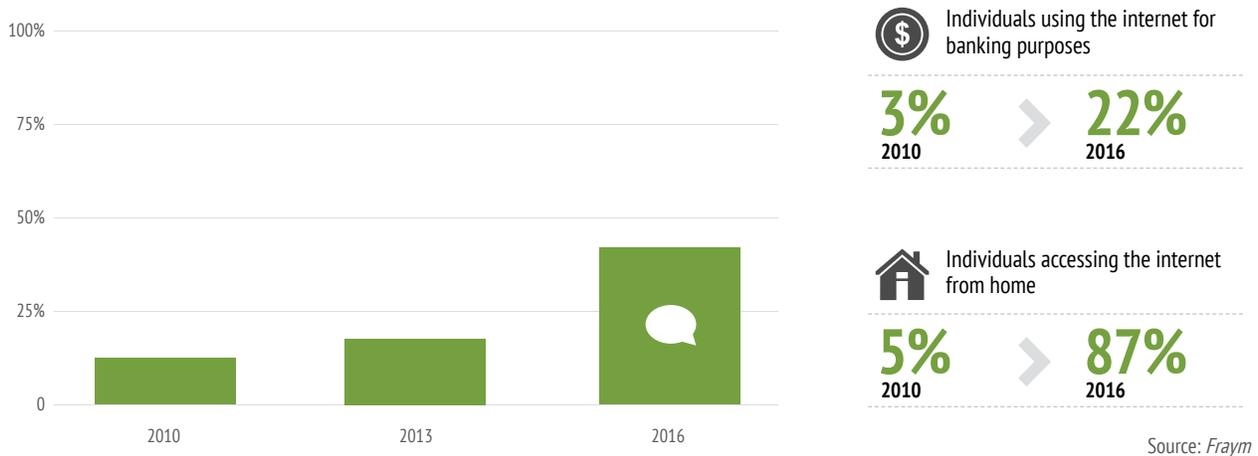
More specifically, internet access in cities with Main One coverage accelerated faster than in cities without it (see exhibit 3). Lagos saw a particularly high jump in internet access between 2010 and 2016.

Exhibit 3: Internet access rates in Nigerian cities



Of internet users in Lagos, almost 90 percent report accessing the internet from their home and more Lagosians are banking online (see exhibit 4).

Exhibit 4: Individuals in Lagos reporting internet access



80%

The price of internet connectivity service dropped by 80% in Ghana and Nigeria after Main One became operational.

Accra and Lagos together witnessed more than 1.3 million additional people using the internet regularly in the years immediately following Main One's arrival. Internet use among youths in both cities increased as well, with regular usage more than doubling after Main One. The number of households with a computer also rose, and likely is related to the increase in people accessing their internet from home (see exhibit 5).

**Exhibit 5:
Measurable changes in the first few years after Main One Cable**

Lagos, Nigeria



Over **1,000,000** additional people use the internet more than once per week



The proportion of youths, **18 to 24**, who regularly use the internet doubled, while the proportion who never use the internet shrank by more than **30%**



686,000 more people live in a household with a computer

Accra, Ghana



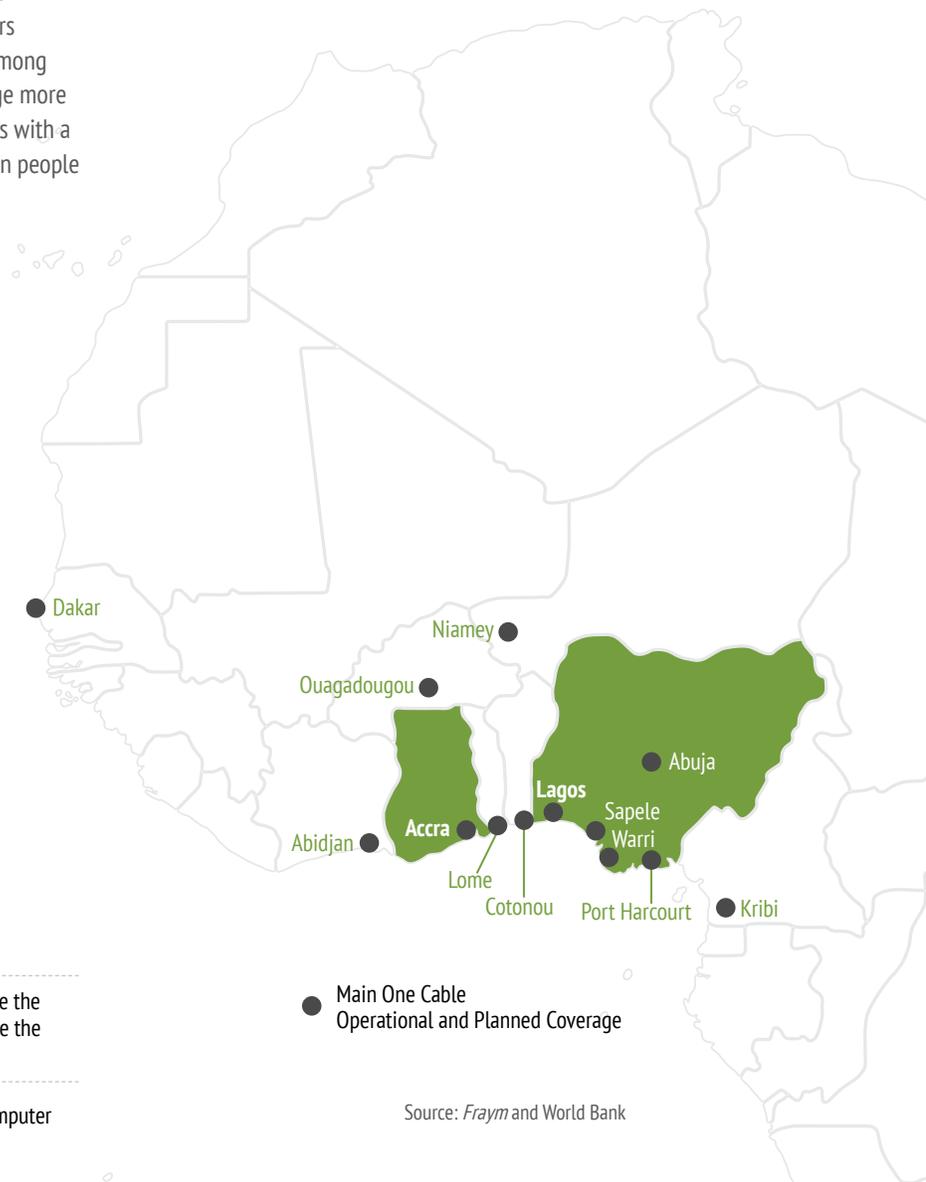
336,000 additional people use the internet more than once per week



The proportion of youths, **18 to 24**, who regularly use the internet doubled, while the proportion who never use the internet shrank by more than **20%**



170,000 more people live in a household with a computer



Source: Fraym and World Bank

Four other submarine cables in West Africa followed Main One's successful launch. This further expanded broadband access, fuelling economic growth, and boosted international connectivity in the region.

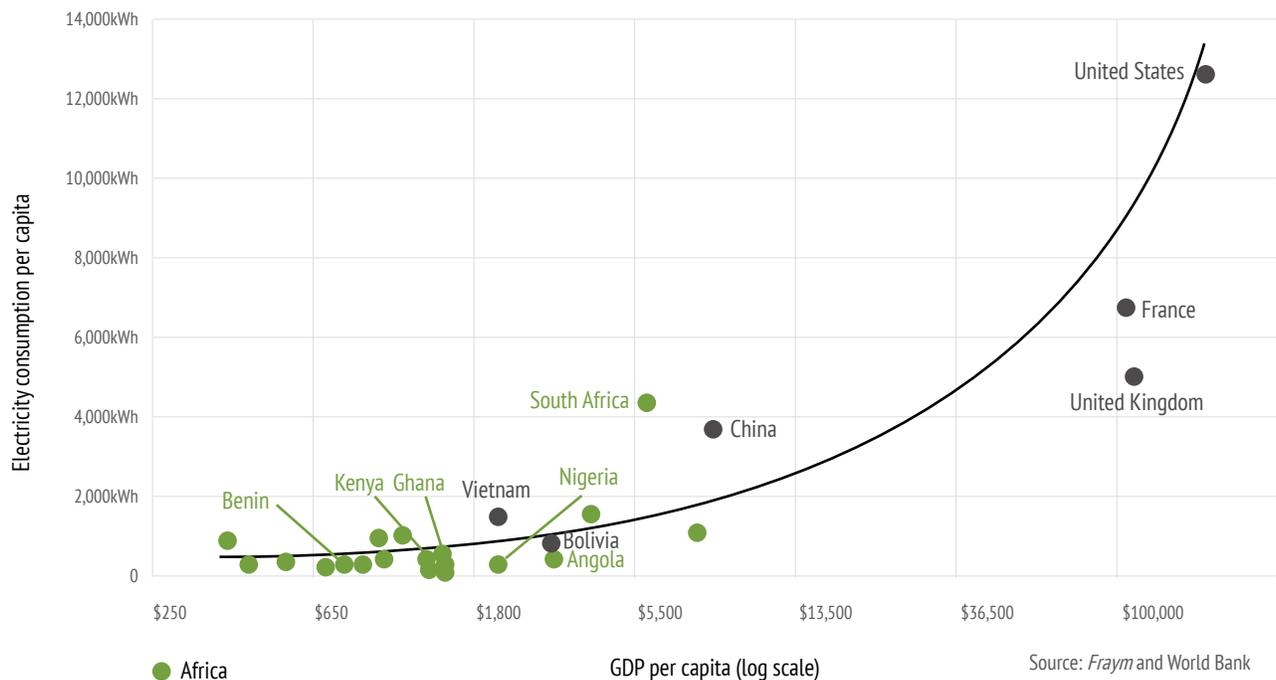
Similar investments in submarine cables and optical fibre networks have contributed to growing internet access for individuals and businesses elsewhere on the continent. In South Africa, home to more than 30 tech hubs, Harith's investment in Dark Fibre Africa added close to 10,000 kilometres of fibre infrastructure and now provides reliable bandwidth and employment opportunities to a highly diverse set of users.

Sector Focus Two: Power and Electricity

Electricity is the lifeblood of modern economies. It is a critical ingredient for every sector in every African country, ranging from manufacturing to agro-processing to professional services. Given this, investments in modern energy infrastructure arguably will be the greatest disruptor and enabler for creating new businesses and job opportunities for the roughly 12 million people joining the workforce every year on the continent.¹⁸

Globally, there is a strong correlation between electricity consumption and per capita income levels (see exhibit 6). Yet, with the notable exception of South Africa, the vast majority of African countries have significantly lower energy consumption levels than their peers with similar levels of wealth. Nigeria is the most poignant example. Despite having roughly equivalent GDP per capita levels, Nigeria consumes 90 percent less electricity than Vietnam. Similarly, Angola consumes almost 60 percent less electricity on average than Bolivia, despite their similar wealth levels.

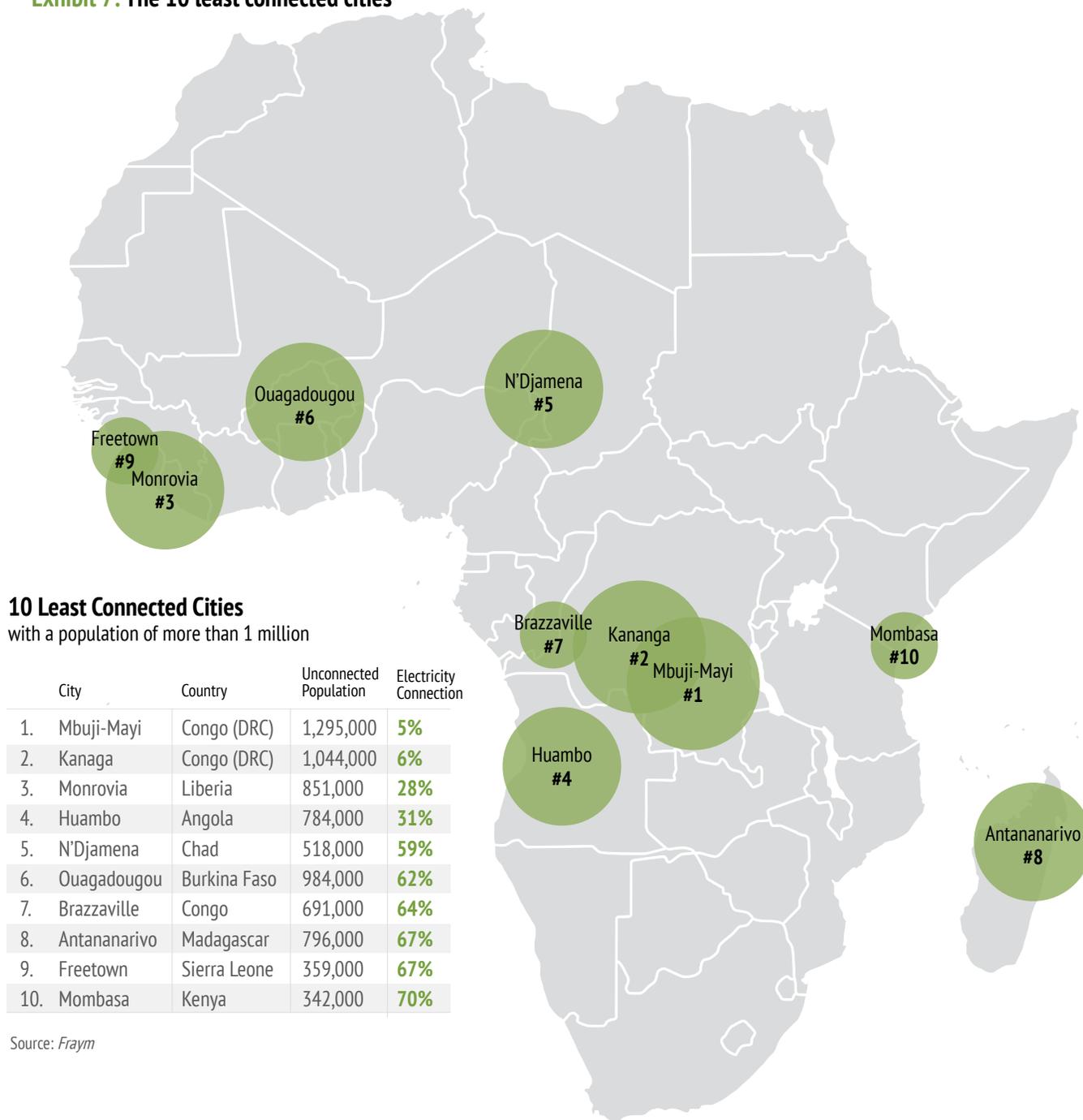
Exhibit 6: Electricity consumption (kWh) and GDP per capita globally



These regional and national trends also often obscure subnational dynamics. For example, rural access rates are only one-third those of urban rates, with roughly 20 percent of rural Africans having an electricity connection. Connectivity patterns also vary widely across cities. Even in the 10 least connected major cities (population greater than 1 million), access rates and the size

of the unconnected population vary widely (see exhibit 7). For example, fewer than 10 percent of people in the Congolese cities of Kananga and Mbuji-Mayi have electricity access, while more than two-thirds of the populations in Antananarivo, Freetown, and Mombasa have access.

Exhibit 7: The 10 least connected cities

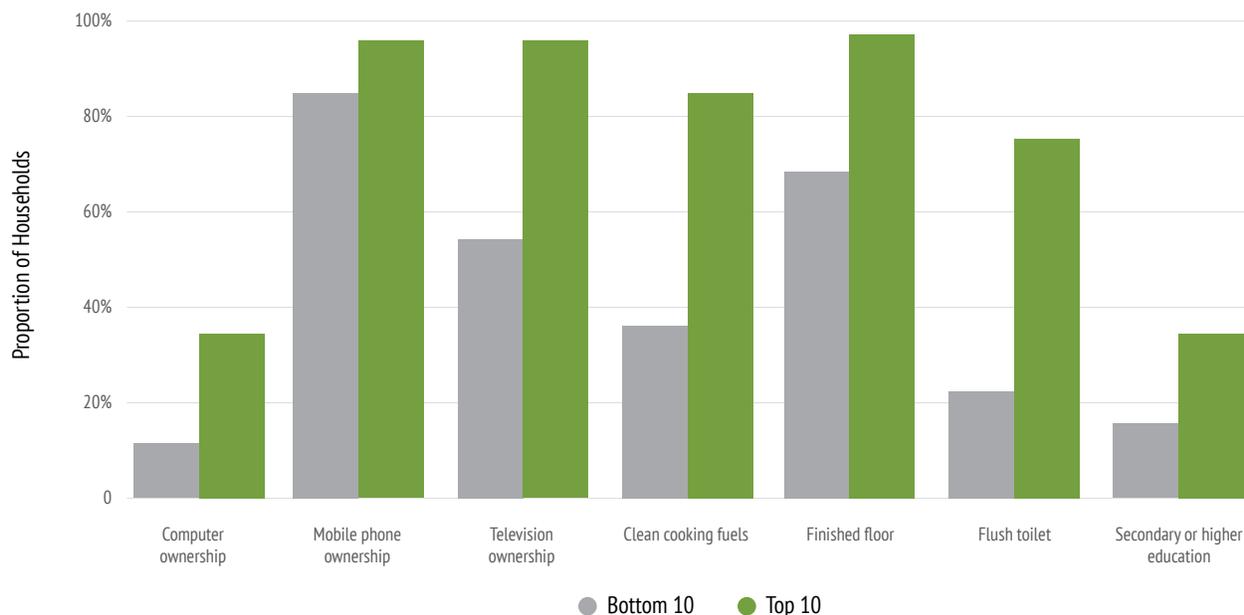


Source: *Fraym*

As electricity production and grid connectivity expand, people experience quality of life changes that go well beyond economic growth. Of Africa's urban areas with over one million people, cities with lower grid connectivity levels lag far behind their more connected peers in terms of education, asset ownership, and housing quality. When power is accessible and affordable,

households purchase energy-intensive appliances, like televisions and computers (see exhibit 8). The availability of power is also correlated with other signals of higher standards of living, such as finished floors and access to sanitation and education.

Exhibit 8: Comparison of most and least connected cities in Africa



10 most connected cities with a total population above 1 million:
 Alexandria (Egypt), Ibadan (Nigeria), Tunis (Tunisia), Benin City (Nigeria), Onitsha (Nigeria), Cairo (Egypt), Addis Ababa (Ethiopia), Yaoundé (Cameroon), Algiers (Algeria), Cape Town (South Africa)

10 least connected cities with a total population above 1 million:
 Mbuji-Mayi (Congo DRC), Kananga (Congo DRC), Monrovia (Liberia), Huambo (Angola), N'Djamena (Chad), Ouagadougou (Burkina Faso), Brazzaville (Congo), Antananarivo (Madagascar), Freetown (Sierra Leone), Mombasa (Kenya)

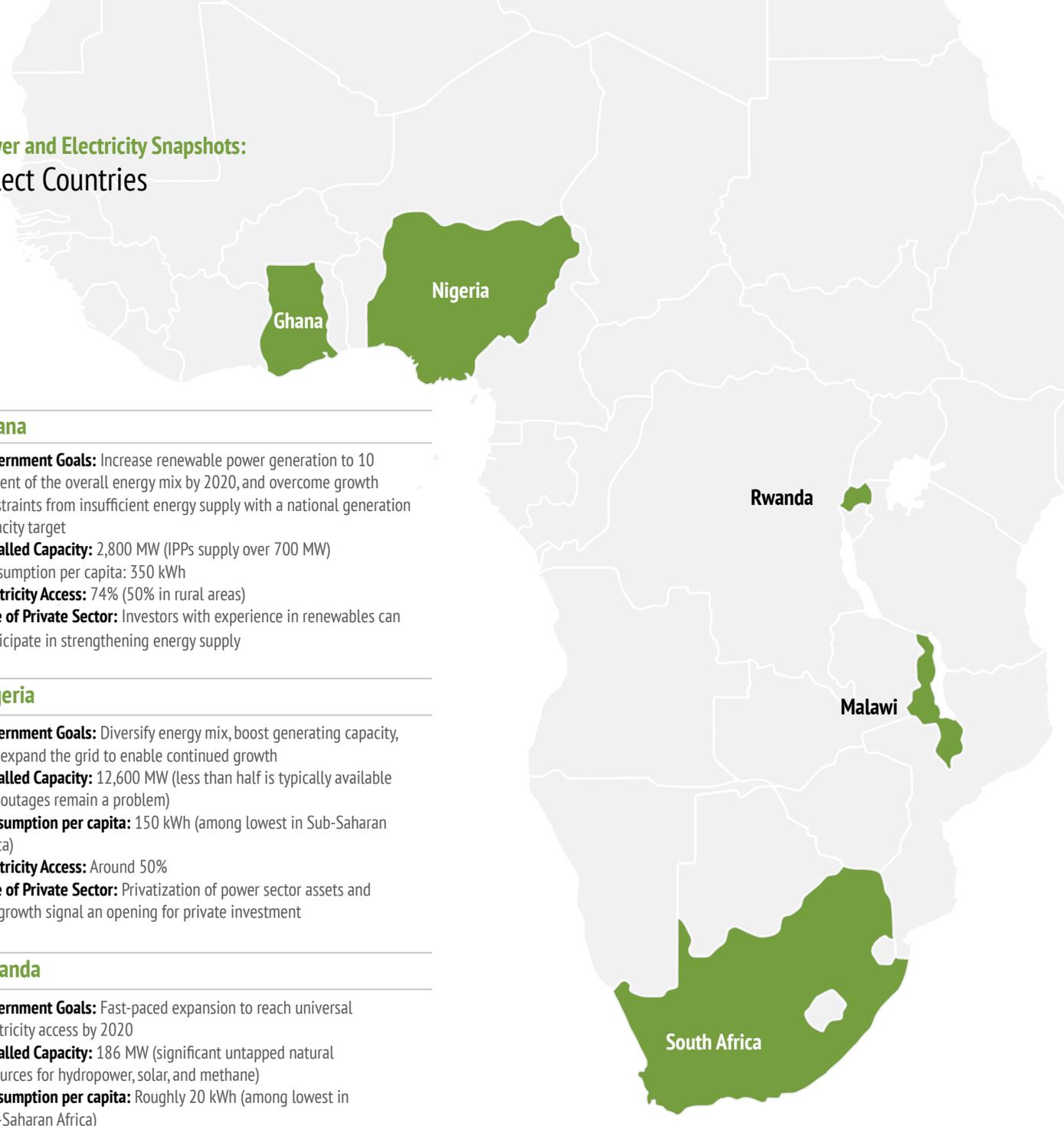
Source: Fraym

Power represents the greatest infrastructure challenge for the continent overall, particularly as demand has far outstripped generation capacity. Despite improvements in household electricity access rates, more than 600 million people and 10 million businesses still do not have access to power.¹⁹ At the same time, electricity-generating capacity on per capita terms has been relatively stagnant, hovering around 0.04 MW per 1,000 people. As a result, at least 30 African countries regularly face power shortages and are forced to use emergency power, such as generators at a high cost.²⁰

In recent years, African governments and their partners have launched multiple signature initiatives to harness this strategic opportunity. For instance, the US government's Power Africa Initiative, which was launched by President Obama in 2013, has mobilized more than \$50 billion in commitments from public and private sector partners, including Harith, to provide life-changing power to millions of people across the continent.²³ In fact, more than 10 million households and businesses are expected to become connected as a result of these related projects and investments.

Estimates show that more than \$40 billion annually is needed to meet these growing power infrastructure needs on the continent.²¹ For many African countries, investment requirements are too costly for the public sector to meet on its own, leaving a major role for private investors. The potential return for those who invest is significant. For instance, geothermal potential in East Africa represents a \$40 billion investment opportunity.²²

Power and Electricity Snapshots: Select Countries



Ghana

Government Goals: Increase renewable power generation to 10 percent of the overall energy mix by 2020, and overcome growth constraints from insufficient energy supply with a national generation capacity target

Installed Capacity: 2,800 MW (IPPs supply over 700 MW)

Consumption per capita: 350 kWh

Electricity Access: 74% (50% in rural areas)

Role of Private Sector: Investors with experience in renewables can participate in strengthening energy supply

Nigeria

Government Goals: Diversify energy mix, boost generating capacity, and expand the grid to enable continued growth

Installed Capacity: 12,600 MW (less than half is typically available and outages remain a problem)

Consumption per capita: 150 kWh (among lowest in Sub-Saharan Africa)

Electricity Access: Around 50%

Role of Private Sector: Privatization of power sector assets and IPP growth signal an opening for private investment

Rwanda

Government Goals: Fast-paced expansion to reach universal electricity access by 2020

Installed Capacity: 186 MW (significant untapped natural resources for hydropower, solar, and methane)

Consumption per capita: Roughly 20 kWh (among lowest in Sub-Saharan Africa)

Electricity Access: Approximately 30%

Role of Private Sector: Needed to surmount numerous generation and access constraints

Malawi

Government Goals: Diversify generation mix, attract private investment, and expand access to 30% by 2020

Installed Capacity: 351 MW (mostly hydropower)

Consumption per capita: Approximately 100 kWh

Electricity Access: 10% (closer to 50% in urban areas)

Role of Private Sector: Reforms to strengthen the legal framework for private sector participation have enabled international companies to compete to develop solar capacity

South Africa

Government Goals: Diversify energy mix and achieve universal electricity access by 2025

Installed Capacity: 45,000 MW (highest in Sub-Saharan Africa)

Consumption per capita: Above 4,000 kWh (highest in Sub-Saharan Africa)

Electricity Access: 90%

Role of Private Sector: Government initiated a competitive procurement process to attract more independent power producers (IPPs)

Sources: USAID, Power Africa, CIA Factbook, and *Fraym*

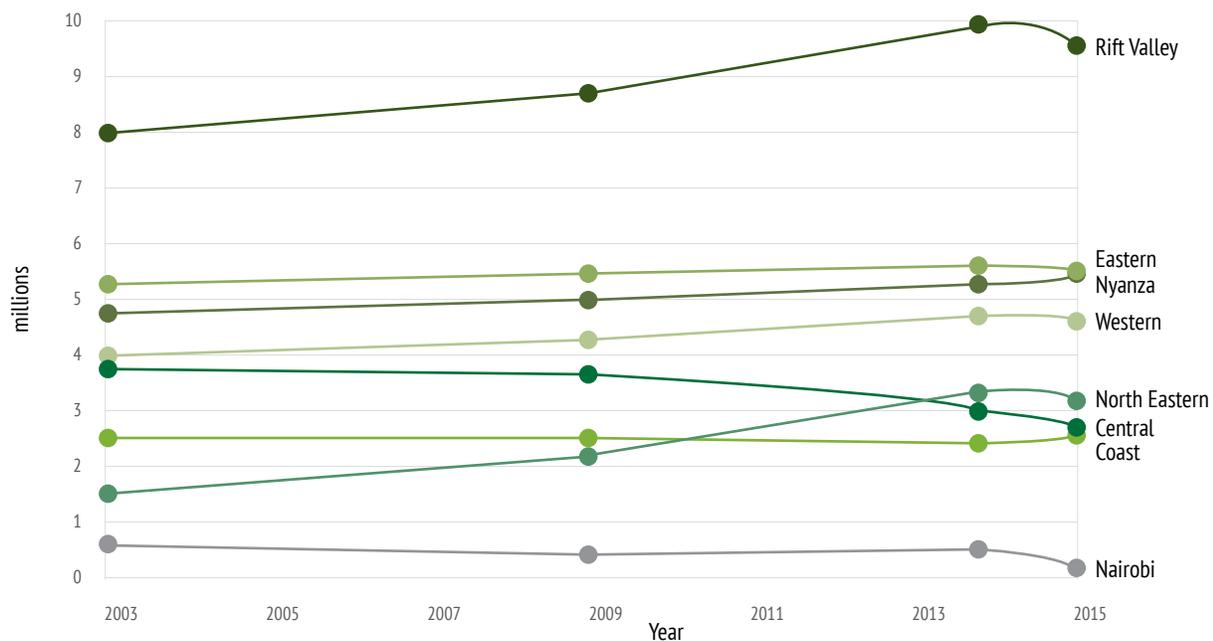
Project Example:

Lake Turkana Wind Power Project supports Kenya’s electrification goals

Kenya is one of the region’s bright spots in terms of increasing electricity access rates due to a combination of an enabling policy and regulatory environment, improved utility performance and predictability, significant investments in distribution and transmission networks, and major independent power project (IPP) investments. Since 2010, household electricity access rates have more than doubled, rising from 25 percent to over 60 percent in 2017.²⁴ Rural access rates also jumped from 4 percent in 2007 to more than 30 percent in 2015, largely due to a major push from the Kenyan government.²⁵

Nonetheless, access levels differ widely within the country (see exhibit 9). Nairobi has seen a significant decrease in the population without electricity access, in part due to efforts to bring electricity to some of the city’s poorest neighbourhoods in recent years.²⁶ At the same time, the Rift Valley and North Eastern regions have not benefitted on a commensurate level, with access struggling to outpace population growth during the same period.

Exhibit 9: Population without electricity over time in Kenyan regions



Source: Fraym

The Kenyan government has established a goal of achieving universal electricity access by 2020. To fulfil this vision, while also maintaining grid stability, the country needs approximately \$14 - \$18 billion in power infrastructure investments to deliver roughly 2,700 MW in additional installed capacity. Independent power producers are playing an important role in addressing

these generation requirements. Approximately 80 percent of Kenya’s new capacity is now coming from these players. Moreover, projections suggest that roughly 60 percent of Kenya’s total power generation will come from IPPs by 2020.

The Lake Turkana Wind Power Project—the largest private investment in Kenya to date and Sub-Saharan Africa’s biggest wind farm—will tap into the country’s unique wind resources and contribute to further advances in national electricity access. The project, a Harith investment, is expected to be one of the lowest-cost power generation options for Kenya. It will add 310 MW to the country’s installed capacity, or roughly 15 percent of the total current installed capacity.

When fully operational, the Lake Turkana project will be the most efficient wind power farm on the planet.²⁷ Winds at the project site are highly predictable, with a constant direction and consistent speed, thereby allowing highly efficient and continuous operations, and yielding lower costs for the utility off-taker and end-users. As a result, Lake Turkana has a load capacity factor above 60 percent, compared to factors between 25 percent and 35 percent for typical windfarms.²⁸ This installation will save Kenya more than \$140 million on fuel imports and will generate enough electricity to power roughly one million Kenyan homes.²⁹

At the time of project construction, the roughly 32 million Kenyans without electricity were spread throughout the country, many either in or around cities with grid access (see exhibit 10). An additional 2.5 million Kenyans reported that electricity services were unreliable.³⁰ This highlights both the significant demand for reliable and affordable power, and the opportunity to deliver higher quality services for Kenyan consumers. Beyond direct changes in access and reliability for households, the project also has the potential to positively disrupt the Kenyan economy by expanding non-agricultural opportunities in energy-intensive sectors, such as light manufacturing and ICT.

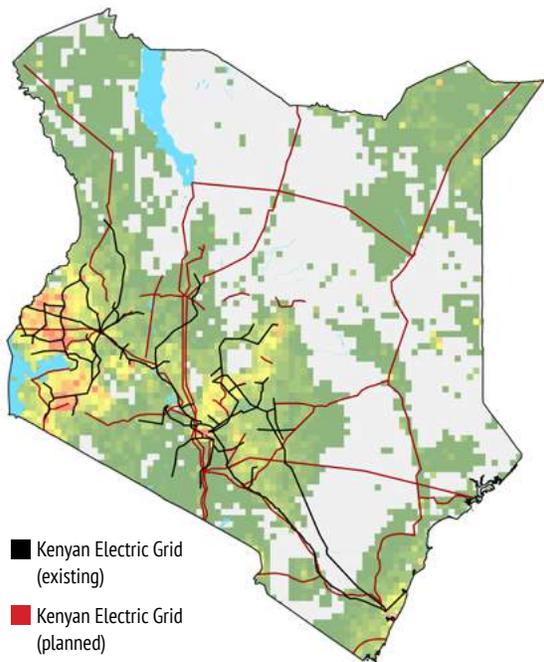
Exhibit 10: Transformative possibilities of the Lake Turkana Wind Power Project



Project Details:

With 365 wind turbines and a high voltage substation, the Lake Turkana Wind Power project will feed Kenya’s national grid with 310MW of reliable, low-cost energy, representing roughly 15 percent of installed generation capacity.

The project is the largest private investment in Kenya and the largest wind farm project in Africa to date.



■ Kenyan Electric Grid (existing)
■ Kenyan Electric Grid (planned)

Number of households without electricity access



Baseline conditions when construction began in 2014:

31,900,000
Kenyans lacked electricity

2,500,000
grid-connected Kenyans said access is unreliable

25% +
of Kenyans were employed in agriculture

National Transformation Possibility

The project will add 310MW to Kenya’s generation capacity, which was approx. 2,300 MW in 2015

This represents enough capacity to power one million homes

With a load capacity factor above 65%, the project will be the most efficient wind power farm on the planet, feeding the grid with reliable, low-cost energy

Source: Fraym

In addition to contributing to national transformation, large infrastructure investments like the Lake Turkana Wind Power Project have the potential to bring benefits to local communities (see exhibit 11).³¹

Exhibit 11: The potential local impact from a large infrastructure investment

Baseline conditions in Lake Turkana project area when construction began in 2014



 **85%** of people around Lake Turkana lacked electricity

 **70%** of people in the project county reported no formal education, compared to 17% nationally

 **62%** Project county employment rate was 62%, compared to the national average of 90%

Locally, the project will increase job opportunities, support health and education programs, and improve road infrastructure in the project area.

Source: Fraym

Sector Focus Three: Transportation

While electricity is the powering force for African economies, transportation infrastructure is what binds them together and connects them to the rest of the global marketplace. It facilitates the flow of communication, trade, and people, both within and across borders. As with electricity and internet connectivity, research has shown that paved roads and rail networks are positively correlated with income per capita levels.³² Currently, Sub-Saharan Africa overall has the lowest road and rail densities in the world, and it is the only region that actually witnessed declines in road density levels during the 1990s and 2000s.³³ Approximately three-quarters of Sub-Saharan Africa's roads are unpaved,³⁴ and many paved roads are more than three decades old and in poor condition.³⁵ Similarly, many of the continent's railways remain unconnected and fragmented, which are the legacy of colonial-era networks.³⁶ This presents the potential for significant cost and efficiency gains, as exhibited by the new Mombasa-Nairobi and Djibouti-Addis Ababa rail lines.

On a smaller scale, rural transportation networks connect rural residents with economic opportunities and greater access to health and education services. At the same time, investments in regional transportation boost trade, increase information flows, and improve efficiency and reliability of existing cross-border linkages. On every level, robust transportation infrastructure is essential for inclusive growth, ensuring access to social services, and enabling national and regional integration.³⁷

Specifically in Sub-Saharan Africa, trade logistics costs remain high and limit the competitiveness of local firms. The value of exports traded between African countries grew from \$12 billion to \$38 billion in 2015, but the share of total exports that are traded within the region remains comparatively low. While the share of intraregional exports for the European Union or East Asia is close to or above 50 percent, the share for Sub-Saharan Africa is just 13 percent.³⁸ This suggests that there is significant untapped potential for greater trade within the region, which will further support export diversification, job opportunities, poverty reduction, food security, and regional value chains that feed into global exports.³⁹

On every level, robust transportation infrastructure is essential for inclusive growth, ensuring access to social services, and enabling national and regional integration.

Roughly 70 percent of African countries have initiated reforms in recent years to facilitate increased trade flows. While good policies and procedures are essential, they must be accompanied by investments to improve physical infrastructure. More than \$18 billion is needed annually to address Africa's transportation infrastructure needs.⁴⁰ From building new bridges, railways, ports, roads, and airports to improving the quality of existing linkages, there are diverse opportunities for the private sector to be an active partner in delivering state-of-the-art transportation infrastructure across the continent.

In concert, national reforms and investments can enable African firms to compete in regional and global markets. While the gains from improved regional transportation infrastructure are many, local infrastructure projects can have a similarly profound effect.

Example Project:

The Henri Konan Bédié (HKB) Bridge’s impact on Abidjan is visible from outer space

The Henri Konan Bédié (HKB) Bridge in Abidjan disrupted the established patterns of congestion and development, and is transforming connectivity within and beyond the city. Before the bridge opened in December 2014, Abidjan residents faced aging infrastructure and highly congested traffic corridors. In 2013, more than 75 percent of Abidjan’s inhabitants faced difficulty in obtaining housing related services – such as water and electricity – while 13 percent of residents identified road and transportation infrastructure as one of the top three issues for the government to address.⁴¹

The public-private partnership project included the 1.5 kilometre bridge, as well as 6.7 kilometres of road linking the north and south of Abidjan’s lagoon. For residents commuting between a populous residential community in the north and the airport and industrial and commercial centre on the island to the south, the bridge reduced commute times on average by 30 minutes and reduced the driving distances by 10 kilometres.⁴² Moreover, the number of vehicles crossing the bridge each day is expected to

grow to 100,000.⁴³ Additionally, roughly 50,000 fewer vehicles crossed the older Charles de Gaulle Bridge once the new bridge opened, lowering the volume of traffic and speeding travel times by 30 percent.⁴⁴ With alleviation of congestion, the bridge is also expected to reduce pollution, saving thousands of metric tonnes of CO2 emissions in the city as vehicles wasted less fuel while idling in traffic.⁴⁵

In addition to reducing congestion and pollution, the project aimed to increase access to basic social services and infrastructure for people on both sides of the bridge. By linking two parts of the city that were not directly connected previously, the project spurred urban development in new geographic areas. Using advanced classification algorithms and satellite imagery to analyse changes, urbanised land use has increased by more than 20 percent since the bridge was constructed in 2014. The total new urban land area is the equivalent of roughly 130 football pitches (see exhibit 12). HKB Bridge illustrates the potential for transportation infrastructure to rewire the trajectory of a city.

Exhibit 12: Urbanisation around HKB Bridge



Urbanisation around the bridge increased by more than 20% between 2013 and 2017. This increase in urban land area is equivalent to roughly 130 football pitches.

Strategic infrastructure investment is needed to unlock Africa's new growth trajectories

History demonstrates that major infrastructure investments have the potential to disrupt entire economies and produce step-change improvements in economic and social opportunities. This is no less true for the African continent. Given the massive and growing infrastructure demands, and highly constrained public resources, private investors must play a critical role in this regard.

This report analyses three specific infrastructure sectors, with accompanying deep dives on several transformative projects. In doing so, it illustrates how private sector-led investments, supported through enabling policy and regulatory environments, can radically transform communities, cities, countries, and entire regions. This ranges from Main One Cable contributing to the creation of new tech ecosystems in Lagos, Accra, and other West African cities, to the Lake Turkana Wind Power project fuelling the Kenyan economy and helping to connect millions of people to life-changing electricity services, to the Henri Konan Bédié Bridge rewiring where Abidjan residents work and live.

Some people refer to the 21st century as Africa's century. This is due to the continent's burgeoning population and growing prosperity. However, Africa's potential can only be realized if a critical mass of strategic infrastructure investments continues to disrupt and transform the region's footprint, economic opportunities, and linkages with the rest of the world.

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