ACCELERATING SDG 7 ACHIEVEMENT

POLICY BRIEF 8

ACHIEVING SDG 7 IN AFRICA

POLICY BRIEF #8

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Developed by

The UN Economic Commission for Africa (ECA)

In collaboration with

The African Development Bank, African Union Commission, ENERGIA, the International Renewable Energy Agency (IRENA), and the International Energy Agency (IEA)

Key Messages

Since 2015, Africa has made significant progress with electrification, increasing the overall rate from 38 per cent in 2015 to 44 per cent in 2017. However, much more needs to be done by policy makers to create the enabling investment environment needed to close the continuing energy deficit.

Mega projects, mainly in power generation and distribution, are being implemented with support from development partners and multilateral organisations, including under the Programme for Infrastructure Development in Africa (PIDA), Power Africa, and African Development Bank's 'New Deal on Energy' initiatives. When complete, these projects are expected to improve electricity access in many African countries. For example, Power Africa aims to increase capacity by 30,000 MW and create 60 million new connections by 2030.

However, not all countries can achieve the SDG 7 targets with their current policies, levels of ambition, and pace and scale of investment. Thirteen countries had electrification rates of less than 30 per cent in 2017. To be on course to achieve SDG 7, further regulatory reforms and private sector investments in energy infrastructure are needed.

The low level of access to clean cooking fuels and technologies is evidence of a lack of robust policies and actions to deploy them, particularly in rural areas. Only 17 per cent of sub-Saharan Africa had access to clean cooking in 2017, compared to 12 per cent in 2010 and 13 per cent in 2015. The majority of rural households continue to rely mostly on traditional biomass for cooking.

Deployment of modern renewable energy technologies, especially solar and wind, is increasing, and providing access to millions of households. According to IRENA (2016), modern renewable energy technology options across sectors and countries will contribute to 22 per cent of Africa's total final energy consumption by 2030—up from 5 per cent in 2013.

Significantly, there is an increase in private sector participation and investments in the form of independent power producers (IPPs). As of 2017, 59 IPP projects were ongoing in 18 countries in the region (excluding South Africa), totalling US$11.1 billion in investments and 6.8 GW of installed generation capacity.

Priorities in the short term to medium term

Improving the enabling policy environment for private sector participation should be a top priority, particularly in the Least Developed Countries (LDCs). Diversification of investments sources remains crucial, and many countries still need to be assisted in creating conditions that facilitate private sector participation in the sector.

Rural electrification remains low at 22 per cent, down from 24 per cent in 2016 (but up from 17 per cent in 2015). Often, rural electrification is the preserve of the public sector, and clean cooking technologies are mainly championed by development partners. Rural energisation for heating and lighting, as well as productive activities, should be a high priority.

Energy efficiency is not receiving the attention it deserves. Its potential for improving electricity systems and cooking solutions, both on the demand and supply sides, remains largely untapped. Country efforts on household and industrial energy efficiency measures need to be supported and expanded.

Complementing the establishment of the African Continental Free Trade Area (AfCFTA), Africa energy markets need to be developed and integrated regionally, with anticipated benefits of lowering energy costs and increasing supply to expand access. Implementation of the ongoing regional power interconnection projects will need to be accelerated.

Africa and the Sustainable Development Goals

This chapter will identify the importance of improved energy access for achieving SDG 7; present an overview of the current status; assess the rate of change needed; and reveal what is needed to fill the gap. The chapter recognises the important strides that Africa has made, given the current limitations, to improve energy access, particularly electricity. Further challenges, however, still remain. These include, amongst others, the reliability of the electricity systems, rural energy poverty, and static access to clean cooking fuels and technologies, among others.

Progress over the first 4 years of the 2030 Agenda (2015-2019): current status

While Africa's overall access rate remains lowest of the world's regions at 44 per cent, there is notable progress in improving access to electricity across Africa, even in some of the LDCs. At country levels, there is added impetus, caused mainly by policies and strategies that promote electricity investments in the energy sector. For instance, Ethiopia aims to increase electricity from current 44 per cent to 70 per cent in 2025. The country's electricity access rate was 29 per cent in 2015. Kenya's electricity access is now close to 70 per cent, compared to 36 per cent in 2015.

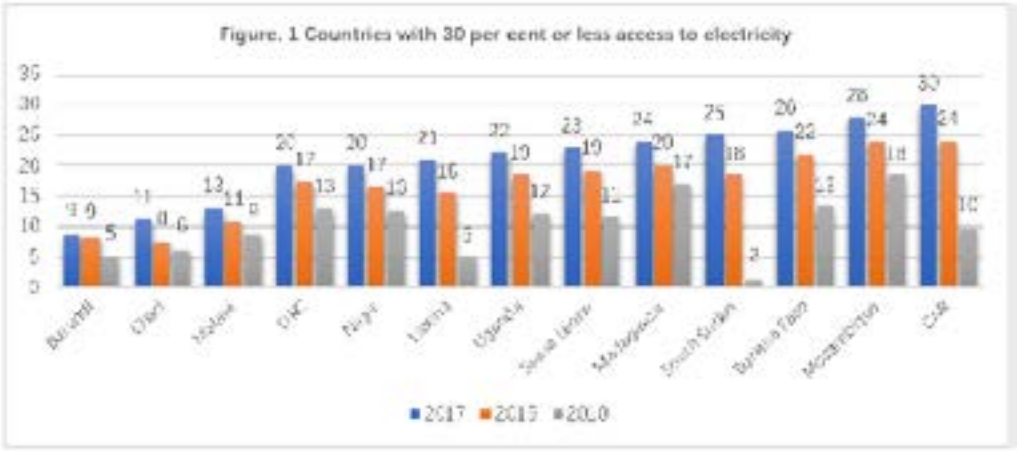
Improved progress is amplified by the increasing investment in the energy sector at country and regional levels, particularly private sector participation in the electricity supply. By 2016, 126 independent power producers (IPPs) accounted for 13 per cent of Africa's electricity output. By 2017, 59 IPP projects were under development in 18 countries in sub-Saharan Africa, excluding South Africa, totalling approximately 6.8 GW of installed generation capacity (Eberhard et al, 2017).

The African Union Development Agency's (AUDA) Programme for Infrastructure Development in Africa (PIDA) has major ongoing projects mainly on hydroelectric and the interconnection of regional power pools. The PIDA vision aims to save Africa $30 billion on electricity production costs and improve access to power to 70 percent by 2040. There are other ongoing regional initiatives, such as USAID's Power Africa, which since 2014 has added more than 9,500 MW (with 2,300 MW alone in 2018) of new electricity connections, benefitting more than 57 million people, or 12.5 million homes and businesses. There are other ongoing initiatives under the "New Deal on Energy in Africa," where the African Development Bank pledged US$ 12 billion of its own resources in the energy sector up to 2020. Additionally, there is the Africa Renewable Energy Initiative, which is an Africa-led initiative to accelerate and scale up the harnessing of the continent's huge renewable energy potential, with the target of installing at least 10 GW of new and additional renewable energy generation capacity by 2020, and mobilize the African potential to generate at least 300 GW by 2030.

Specifically, below are key observations up to 2017-18 in respect of the three key indicators of SDG 7 are as follows:

Electricity access

Access to electricity has outstripped population growth since 2017, but still the number of people without electricity, as a percentage of the overall population, remains high. There was a net 15.5 GW of new installed energy capacity added in Africa in 2017 and this kept up with the population growth across all parts of the continent, except Central Africa, as well as with GDP growth in all regions, except East Africa (Africa Energy Atlas 2018/19). Figures show improved access year on year as concerted efforts made at country and regional level to increase electricity supply through investment in energy infrastructure and policy reform. Still, 29 countries are currently below the 60 per cent access rate.



Source: Data drawn from World Bank 2019

While the progress has been gradual over the last few years about 13 countries—all of which are LDCs—are unlikely to reach the SDG 7 target on universal electricity access by 2030 (Figure 1). These countries are characterized by a combination of challenges, which include low investments in energy infrastructure, macroeconomic instability, and weak or insufficient policies and strategies, power sector governance, inabilities of national power utilities to fulfil mandates, and so forth.

Rural electricity supply is very low in most African countries. Of the nearly 600 million people currently without access to electricity, the majority are in rural areas. Rural electricity access is 22 per cent (World Bank 2019). Expanding grid electricity to rural areas has been sluggish owing more to the high cost of extending grid infrastructure and the corresponding under recovery of the supply. Countries are increasingly considering off-grid technologies, mainly solar and small hydro, as well as mini-grids. However, investments in these technologies are still low as priorities are mainly on on-grid power for urban areas.

Some of the things that needs to be considered in future assessment are issues such as low electricity consumption, low reliability of power (frequent power outages), high per kilowatt costs of electricity, and financial vulnerability of power utilities.

Access to clean cooking fuels

This should be an area of concern for African policy makers. Over the years, there have been insignificant changes. Only countries in North Africa and a few in sub-Saharan Africa have almost universal access to clean cooking fuels. In West Africa, it is Cabo Verde with 70 per cent, and Gabon with 77 per cent. In Southern Africa, it is Mauritius (94 per cent), Seychelles (90 per cent), and South Africa (84 per cent). For the rest of the countries, it appears that this target will not be met by 2030. From analysis of the current data, it appears that there is not a strong correlation between electricity access and clean cooking fuels. In simple terms, access to electricity does not necessarily mean that household transition to exclusively cooking with electricity.

Data analysis shows that there are no changes to about 21 countries where access to clean cooking is less than 50 since last progress tracking in 2017. These countries also exhibit a correlation between low access to clean cooking technologies and overreliance on biomass in both urban and rural areas.

For the rest of the African countries, the change or progress has been minimal—between 1 per cent and 3 per cent. These include Africa's economic power house, Nigeria, which access has improved from being less

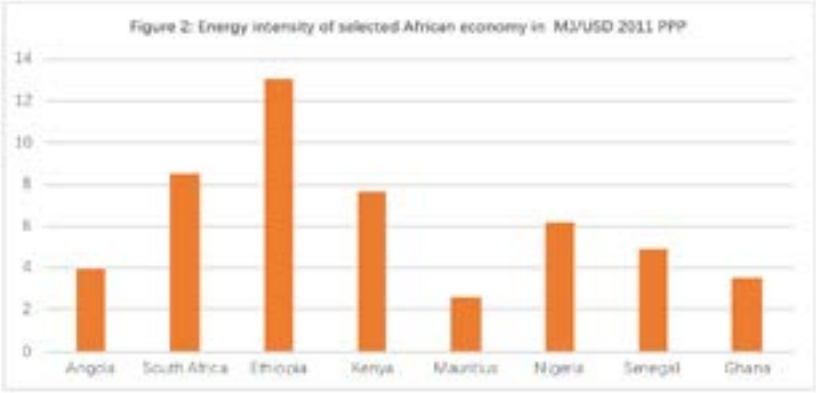
than 5 per cent in 2015 to 6 per cent in 2017.

Energy efficiency

With a possible exception of a few countries (mainly in North Africa), energy efficiency appears to be lower in the agendas of most African countries. Generally, the priority is to increase energy supply to address the growing energy deficits and consequently grow the economies of the continent. Therefore, energy efficiency, defined as the goal of reducing amount of energy required to provide products, is generally difficult to assess in many African economies. As it is observed, using "energy intensity" may not the accurate proxy for energy efficiency, as the former is affected by many factors, such as climate, structure of the economy, nature of economic activities, etc. that are not necessarily linked to pure efficiency. However, the main cause of high energy intensity in Africa is the high share of final consumption of fuelwood for cooking, which is a non-productive energy use.

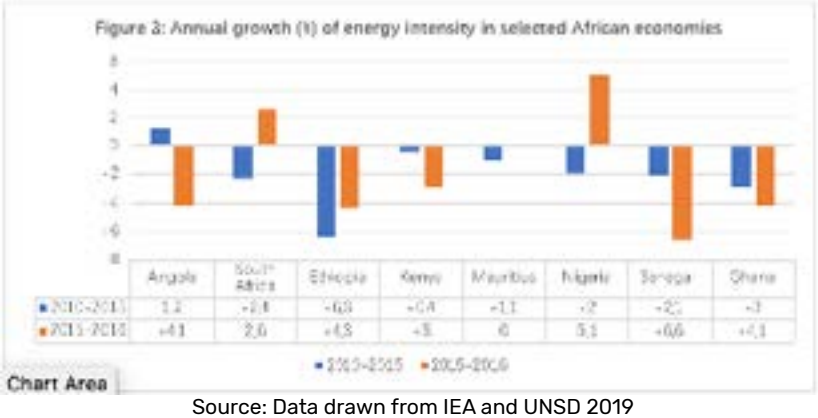
Analysing the latest available information, it appears that the African economy is the most energy intensive in all the world regions. The primary energy intensity level measured at purchasing power parity (PPP) was 7.3 MJ/US$in 2016, compared to the world average of 5.1 MJ/UD$.

It is notable that countries with growing and bigger economies have, over the years, increasing energy intensity (Figure 2). For countries like South Africa, this can be attributed to the structure, which is coal dominated. In emerging countries such as Ethiopia, this could be as a result of not focusing on maximising efficiencies in its economy.



Source: Data drawn from IEA and UNSD 2019

Correspondingly, the annual growth for in energy intensity was at 1 per cent in 2015-2016, up from -2 per cent annual growth in 2010-2015. All other regions of the world are growing in negative figures and showing annual decrease of energy intensity.



Source: Data drawn from IEA and UNSD 2019

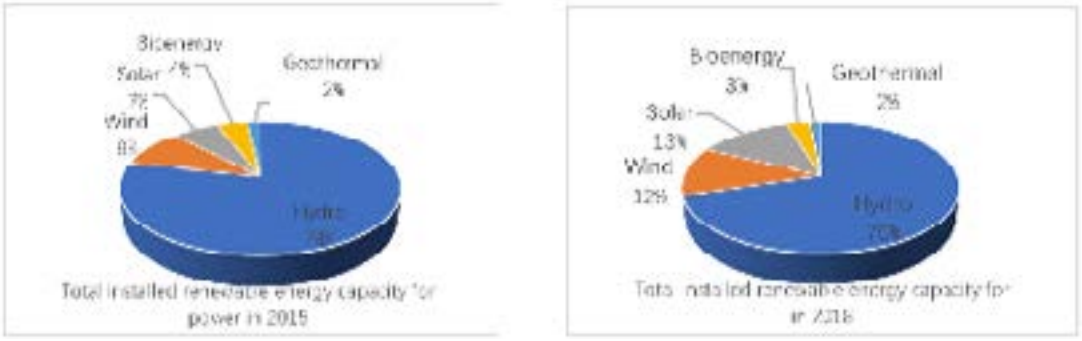
The lack of effective and robust energy efficiency policies, measures, and actions could partially explain the energy intensity of many African countries (which seems to increase annually). This is an area for future focus, particularly if it results in financial cost saving to consumers, reduction of greenhouse gas emissions, and increased energy supply security.

Renewable energy

By definition, most of the total primary energy supply (TPES) is dominated by renewable energy—notably biomass. More than 80 per cent of the population relies on wood, crop, and animal residues for meeting their thermal needs. This is despite increasing electrification in a number of countries. While it is forecasted that African households will continue to use this type of fuel for cooking, this comes at health and environmental costs.

Furthermore, off-grid applications, such as solar home systems, are surging in Africa with about 60 million people, or about 10 per cent of users. Many countries have introduced targets for mini-grids, ranging from total capacity to number of systems, connections or people served. Some targets specify the technology to be used (e.g., solar, micro-hydro, diesel-hybrid) (IRENA, 2018). Despite their relatively small contribution in the overall energy supply, renewables are playing more increasing role in improving access to electricity in the form of utility scale on-grid renewables energy projects, distributed power generation, etc.

Figure 4: Improvements in total installed renewable energy capacity in 2018



Source: Calculations based on IRENA (2019) data

The capacity in various modern renewable energy technologies particularly solar and wind, and to a lesser extent geothermal and modern bioenergy, has improved between 2015. In 2015, the total installed capacity from modern renewables was 29,481 MW, which increased to 32,485 MW in 2018—but remained a small fraction of the world's average (IRENA 2019). The installed solar capacity, mainly PVs, more than doubled in two years from 2,260 MW to 6,093 MW, although this still only accounts for 13 per cent of Africa's total renewable energy generation capacity. Wind capacity is also increasing. However, the technology still represents only 12 per cent of renewable energy installed capacity. Geothermal is growing in niche markets such as in Kenya and Ethiopia where significant investments are made. Despite huge promise at the continental level, modern bioenergy development is still negligible and hardly register any growth in energy supply.

Modern renewable deployment is an area that Africa should be focusing on moving forward. The price of renewable energy technologies continues to fall and, in some world markets, has reached grid parity. In order to accelerate off-grid renewable energy deployment, some of the foundational elements comprise dedicated policies and regulations, enabling institutional frameworks, customised business and financing models, and adapted technology solutions. These should be complimented by adequate cross-sectoral linkages and building adequate capacity across building activities (IRENA, 2017).

The co-benefits of renewable energy path are being experienced in the form of meeting energy needs in a

cost-effective, secure, and environmentally sustainable manner, which means that renewable energy can strengthen socio-economic development.

Are we on track to achieving SDG 7?

On the basis of current trends and patterns, Africa will achieve mixed results come 2030. Electricity access and doubling the use of renewables seem to be low-hanging fruit in many countries. In fact, as mentioned above, this appears to be the major energy priority in Africa. Significant progress has been made in the last 4 years, and predictably more progress will be made especially once the ongoing myriad of projects are complete. On current trends, 20 or so countries will find it difficult to achieve these two main priorities. However, when it comes to other significant targets in clean cooking fuels and energy efficiency, these appear not to feature prominently in country's energy priorities. Sub-Sahara Africa (with a few exceptions mentioned above) is not on track to achieve these targets of SDG 7.

Key challenges

In the short to medium term, there are key challenges that need to be addressed in order to accelerate access to affordable and reliable energy in Africa. It must be mentioned that, at present, there are several initiatives at regional and country levels that attempt to address these. It will be outcomes of these initiatives that will lead to a positive impact on access and sustainability of Africa's energy systems:

a, Limited investments in the energy sector

To keep with increasing power demand of six-fold between 2010 and 2040, the installed power capacity should increase from 125 GW to 700 GW, according to PIDA (the IEA is estimating 563 GW by 2040). The latter estimates that average investment needs for the power sector are US$ 42.2 billion per year (US$ 31.1 billion for generation, US$ 5.4 billion for interconnections, and US$ 3.7 billion in access). If these investments are not made, a roughly equal number of people will not have access to electricity by the end of 2030.

There is a growing diversification of investments in the power sector, particularly in the generation. Over the years, there has been a growth of Chinese investments in many African countries,[1] but governments still remain the main source of financing for power projects. The public sector is also limited in terms of skills (capacity) and resources. Private sector participation and investments are limited. About 50 per cent of countries in the sub-Saharan Africa have not engaged the private sector in the generation, transmission, or distribution of power. Intrinsic and integral access to private sector investments in the power sector will require enabling policy and regulatory environments that will ensure the protection of investments. This include accelerated power sector reforms and review of tariff structures that limit investments, in addition to political stability, currency stability, transparency, etc. For mini-grids, key factors to consider include legal and licensing provisions, tariff regulations, financial support, quality standards, and eventual grid interconnection or arrival of main grid, in addition to various other secondary (such as taxation, land rights, and environment protection) and tertiary support measures (such as capacity building and data availability) (IRENA, 2016).

b, Limited diversification of the power systems

The economies of scale, as well as the smaller supply costs, have made on-grid electricity systems the priority in terms on investment flows in the power sector. To date, even the success of renewables (in wind and solar) is in large part tied to utility scale, grid-connected systems. Investments in decentralized and distributed generation are correspondently low. It has been demonstrated that rural electrification can be achieved through investments in these systems, as they are more amenable to rural energy demand, topography, and population dynamics (i.e., sparsely populated settlements). Therefore, investments are

1 Between 2010 and 2020, China is implementing over 200 projects in Africa with a total generating capacity of 17 GW—or about 10per cent of existing installed generation (Veras, 2018).

needed in stand-alone systems, which include solar home systems as basic energy supply and mini-grids for town-size settlements or rural productive activities. It is notable to observe that a growing number of African countries see off-grid solutions as the best option for a rural economy. For instance, Ethiopia is planning to provide 30 per cent of its rural population with off-grid solutions in the next 10 years. Similarly, Rwanda expects to 48 per cent of the population to be electrified via off-grid, in order to achieve universal access by 2024[2] (IRENA, 2018).

c, Limited energy planning capacity

Poorly planned energy systems are likely to feature sub-optimal energy choices, feature high energy system costs, be vulnerable to climate variability, and be less diversified and more unreliable. Africa's main challenge is to make its energy systems reliable and sustainable; therefore, better planning is very important for a number of reasons. These include, but not limited to:

Scaling up electricity capacity to meet the energy requirements of fast-growing African countries;

- Diversifying energy supply to increase energy security through optimal use of vast renewable energy sources;
- Identifying the most economic but suitable power supply options;
- Introducing off-grid systems as early as possible in regional and national electrification planning processes;
- Providing energy security to accelerate industrial development; and
- Planning for increased private sector investments in the energy supply.

d, Weak energy or power utilities

Vertically integrated (mostly state-owned) power utilities still play a dominant role in the power industry in Africa. Although it can be said that these power utilities often operate dated energy generation, transmission, and distribution infrastructure, most of them are generally insolvent and are often propelled by constant funding from the central government than by their balance sheets. These utilities are still a vehicle for energy supply in most countries, yet their current structure and resource endowments may not allow them to lead and sustain the African energy transition in a suitable manner. Therefore, in the short to medium term, questions have to be asked if, in their current form, these utilities can be able to serve the African power industry up to 2030.

How to fill the gap to achieve SDG 7?

Concerted efforts at deploying renewables in Africa already exist, particularly utility scale solar, wind, geothermal, and modern bioenergy projects. It is also forecasted that the impacts of the ongoing initiatives in progress—when implementation is complete—will positively improve and bridge the gap to achieving SDG 7. However, in the short term, the following actions should be accelerated; and their impacts monitored.

- High level advocacy is needed for the promotion of appropriate clean cooking solutions, mainly rural areas on the continent. These could be based on clean fuels, such as making electricity and gas appliances affordable for cooking and heating.
- There is a need to assist and encourage regulatory and policy reforms to improve governance of the sector, improve efficiencies, and to make power utilities to viable.
- Energy infrastructure investments need to be diversified and the greater participation of the private sector in energy infrastructure development is needed as a panacea for increased the growth of the sector.

2 Mininfra (2015b), "Rwanda Energy Policy," www.mininfra. gov.rw/fileadmin/user_upload/new_tender/Energy_Policy.pdf.

- Increasing and accelerating regional energy interconnections should be considered, because they could save African countries billions of dollars and could also assist with inadequate power generation, as a cost-effective way of increasing their supply.
- Promoting long-term integrated energy resource planning could assist in sustaining energy supply and demand, as well as ensure that energy catalyzes the economic transformation of the continent (and thereby lead to the achievements of other SDGs).
- Special and dedicated high level actions to promote the rapid uptake of renewable energy technologies should be pursued, particularly in viable off-grid environments, such as rural areas.
- As building energy infrastructure is costly and once-off, there is a need to adopt climate resilient strategies and actions, particularly in the planning of these infrastructure assets so that they can withstand the vagaries of extreme climatic conditions.

Policy recommendations

Therefore, and based on the discussion above, the following actions are proposed in order to bridge the energy access gap, in particular for those countries with low access rates. It also recognised that some the recommendations above are being implemented. In those instances, acceleration of those actions is important:

1. Countries should pursue power sector reform to restore the viability of utilities and expand the policy and operational space to crowd-in private sector investment in power infrastructure development.
2. Through a multi-stakeholder process, an implementing mechanism should be developed to accelerate investments in clean cooking technologies, including gas solutions.
3. The African power pools should accelerate regional interconnections and power market development to access least cost options for rapid expansion of power services across regions. In this regard, they need to address the constraints to private sector interest in regional projects.
4. Accelerate the pace of off-grid energy technologies uptake to address the acute gap of rural energy access.
5. With assistance from multilateral agencies, countries should be assisted to develop long-term energy planning capacity, including in the area of climate resilient infrastructure development.

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- **SDG 7.1.2—Access to clean cooking**; custodian agency: **World Health Organisation**; contact person: Heather Adair-Rohani (adairrohanih@who.int).
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7 AFFORDABLE AND CLEAN ENERGY