ACCELERATING SDG 7 ACHIEVEMENT

POLICY BRIEF 18

ACHIEVING SDG 7 IN AFRICA

7 AFFORDABLE AND CLEAN ENERGY

ACCELERATING SDG 7 ACHIEVEMENT

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POLICY BRIEF #18

ACHIEVING SDG 7 IN AFRICA

Developed by

United Nations Economic Commission for Africa (UNECA)

In collaboration with

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KEY MESSAGES

Status and progress towards achieving SDG 7 in Africa

- While countries in North Africa have attained nearly universal access to electricity and clean cooking, and a few countries in the rest of Africa are making good progress towards achieving universal access by 2030, most of the continent is unlikely to achieve SDG 7 with existing policies and commitments. Due to future projected population growth (from 1.3 billion people in 2017 to 1.7 billion in 2030), roughly the same number of people are likely to be without access to electricity in 2030 as in 2016 (590 million). For those who have access to electricity in sub-Saharan Africa today, the average per capita consumption remains the lowest in the world. The number of people without access to clean cooking has continued to increase, reaching 846 million in 2015. Biomass continues to play an important role in the energy transformation agenda in Africa. Based on current policies and commitments, the number of people without access to clean cooking will reach 900 million by 2030.
- Renewable electricity capacity exceeded 38 GW in 2016 (about 23 per cent of the total), driven mainly by developments in wind, s**o**lar PV, geothermal and large hydropower.
- Energy intensity remains high (6.0 MJ/USD in 2014), largely as a result of overreliance on inefficient biomass and weak energy efficiency policies and programmes.
- To ensure the attainment of SDG 7 in Africa by 2030, investments of approximately US$ 34.2 billion per year are needed (US$ 32.5 billion per year for electricity access and US$ 1.7 billion a year for clean cooking).

Priority Actions

- Put in place coherent policies and an enabling environment to leverage limited public resources in order to mobilize necessary investments from the private sector (including from domestic resources), capitalizing on falling technology costs for renewable energy.
- Address data gaps and reliability (especially on biomass) to inform investment planning, develop greater capacity to collect and analyse energy data, harmonize data-collection methodologies and strengthen existing data-collection systems.
- Develop in-country human and institutional capacities for energy planning and management and greater engagement with the private sector.
- Ensure that climate resilience is fully integrated into the planning and implementation of energy infrastructure and investments, especially for hydropower systems, which are at risk from climate change and variability.
- Promote sharing of good practices and experiences with both on-grid and off-grid systems, including business models and instruments to attract private sector investments. Promote coordination of the various regional and sub-regional programmes on energy access to synergize and share experiences.
- Systematically prioritize energy efficiency across all sectors and capitalize on quick wins in energy efficiency in cities, industries, buildings and transportation, recognizing that energy efficiency gains enhance access.
- Promote investments in strengthening the grid for greater efficiency and increased penetration of variable renewable power and promote cross-border interconnections to accelerate access to electricity.
- Promote local content enhancement across the full renewable energy value chain as a catalyst for longer term enhanced deployment of renewables with wider socio-economic benefits.
- Accelerate efforts to encourage innovation in energy services and promote collaborative research and development at the regional level.

ACHIEVING SDG 7 IN AFRICA

Current status

Of the 54 African countries, 33 are currently defined as Least Developed Countries (out of 47 countries globally). These countries have very large rural populations, oft existing policies and commitments, which affects attainment of the other SDGs. This is despite the numerous programmes at the regional, subregional and national levels aimed at increasing access to modern energy.

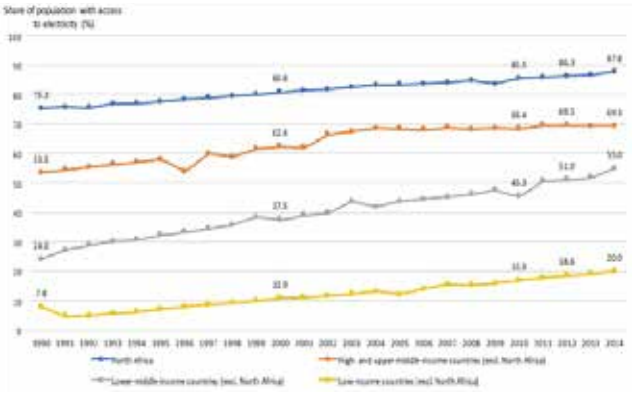
Energy access (SDG 7.1)

The electrification rate increased by 12.9 percentage points (to 43 per cent) in the 20 years from 1990 to 2010—increasing from 186 million people to 444 million, with the addition of 12.8 million people per year. However, the total population during the same period increased annually by 20.65 million, outpacing electrification efforts. Between 2010 and 2012, the rate increased to 45.1 per cent, and the number of people gaining electricity each year doubled to 25 million, while the total population grew by 27.5 million per year. In 2012-2014, the rate continued to grow, reaching 46.9 per cent, while the global average was 85.6 per cent (ECA, 2017).

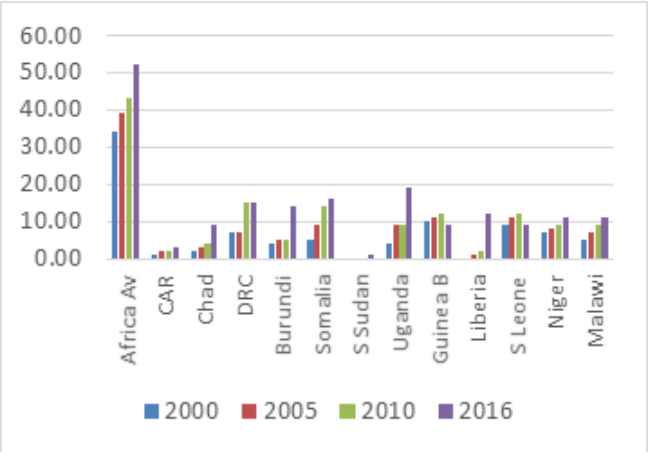
According to the 2017 IEA Energy Access Outlook, the electrification rate increased from 34 per cent in 2000 to 52 per cent in 2016, compared to 64 to 86 per cent on average for developing countries, and 87 to 97 per cent for the Central and South America region, over the same period. While the number of people gaining access to electricity in Africa has been increasing over the years, due to population growth rates, the region is lagging behind.

Figure 18.1

Share of population with access to electricity by subregion, 1990-2014. Source: (a) IEA and World Bank (2017); (b) extracted from IEA (2017).



(a)



(b)

Since 2013, however, the rate of access to electricity has surpassed the rate of population growth in Africa: the number of people lacking access to electricity decreased from 640 million in 2013 to 590 million in 2016, with average urban and rural electrification rates of 77 per cent and 32 per cent, respectively. North African countries have close to 100 per cent electrification. In sub-Saharan Africa, urban electrification rates range from as low as 4 per cent (South Sudan and Central African Republic) to 100 per cent (Cabo Verde and Mauritius), while rural electrification rates range from 1 per cent (Central African Republic, Chad, Democratic Republic of Congo, Djibouti, South Sudan, Burkina Faso, Guinea, Guinea-Bissau and Niger) to 71 per cent (Ghana and Swaziland), 89 per cent (Cabo Verde), 99 per cent (Seychelles) and 100 per cent (Mauritius). The average per capita consumption of 200 kWh per year in sub-Saharan Africa remains the lowest in the world. This compares unfavourably to 1,600 kWh in the European Union; 1,075 kWh in India and 4,066 kWh in China.

Although the resource potential and demand are high, the current total electricity installed capacity in Africa is only around 170 GW. The electricity supply mix is dominated by coal at about 35 per cent, reflecting the dominance of South Africa (where 90 per cent of electricity comes from coal); however, over 50 per cent of the coal power plant units are more than 40 years old. Despite its huge potential, hydropower only contributes about 23 per cent of electricity supply.

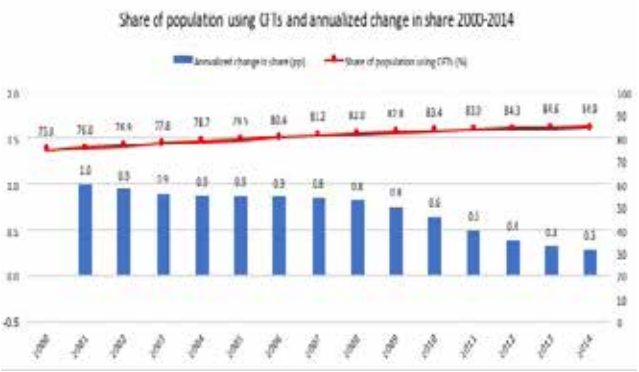
Africa is also the worst performing region in terms of access to clean fuels and technologies (CFTs). According to the Sustainable Energy for All Global Tracking Framework 2017, between 2000 and 2010, the share of the population using clean-cooking solutions barely increased (from 24.4 to 25.6 per cent), representing a yearly increase of just 6.9 million new users. The population increased annually by 23 million during the same period. Between 2010 and 2012, the share remained almost flat at 25.7 per cent, as there

were only 7.5 million new users of CFTs per year, while the total population increased by 27.5 million people per year. The pace of adoption of CFTs remained almost stagnant, at 0.1 per cent during the period 2012-2014. The share reached 25.8 per cent with 8 million new users yearly, against an additional 29 million people per year. To reach universal access by 2030, the rate of adoption of clean-cooking solutions needs to increase dramatically.

The IEA Energy Access Outlook 2017 shows that the share of the population without access to clean-cooking solutions in North Africa was less than 1 per cent in 2015, compared to 84 per cent in sub-Saharan Africa, where no-access levels ranged from 95 per cent in some countries (such as Central African Republic, Democratic Republic of Congo, Burundi, Djibouti, Rwanda, Nigeria, Malawi and United Republic of Tanzania) to 2 per cent in Mauritius and Seychelles. Although the share of the population without access to clean-cooking solutions has been decreasing, the total number of people without access actually increased from 610 million to 846 million between 2000 and 2015, with 783 million people depending entirely on solid biomass for cooking in 2015. As a result of the low level of access to clean-cooking solutions on the continent, about 500,000 premature deaths per year in the region are attributable to poor indoor air pollution resulting from biomass combustion—more than the annual number of deaths from malaria (IEA, 2017a).

Figure 18.2

Share of population using clean cooking fuel technologies (CFTs), 2000-2014. Source: IEA and World Bank (2017)



Renewable energy (SDG 7.2)

The share of renewable energy in total energy consumption in Africa was the highest in the world in 2014, at 57 per cent, mostly traditional biomass consumption. The region also recorded the highest share of total energy consumption in the world, at 48.9 per cent, in 2014. The share of renewable energy in the total energy consumption in Africa decreased slightly between 1990 and 2012, from 60.2 per cent in 1990 to 57.5 per cent in 2010, and 56.5 per cent in 2012; it peaked at 62.4 per cent in 1994.

Most renewable energy in Africa is derived from biomass. According to the IEA about 780 million people in sub-Saharan Africa rely on solid biomass for cooking, and this number has grown by 44 per cent since 2000 (IEA, 2017b). The penetration of modern renewables is lower than the world average and modest, except for large hydropower plants.

Figure 13.3

Total renewable energy and modern renewable energy share in Africa, 1990-2014.

Source: IEA Energy Balances (2016) and UN Statistics

In terms of renewable electricity, the total installed capacity exceeded 38 GW in 2016 (about 23 per cent of total electricity capacity), driven mainly by developments in wind, solar PV, geothermal and large hydropower in South Africa, Morocco, Ethiopia and Kenya, among others.

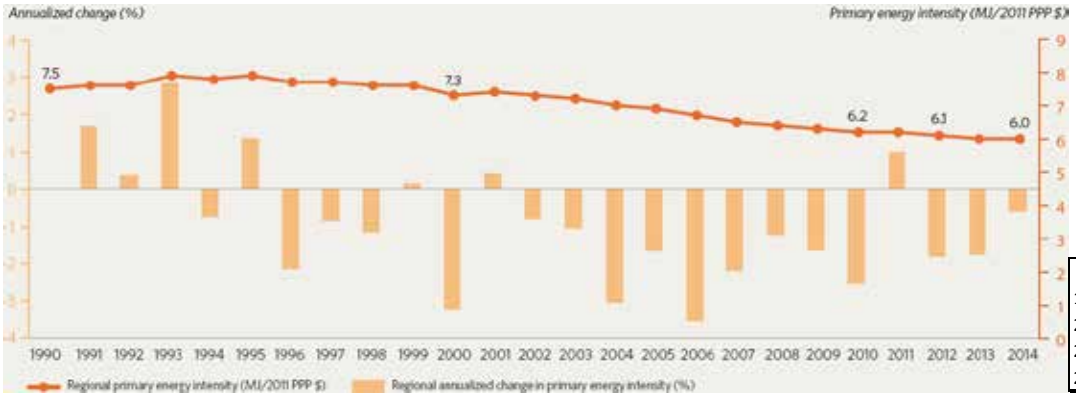
Under the Paris Agreement on climate change, all African countries have included renewable energy actions (covering all technologies and end-use applications) as commitments to tackle climate change and spur economic growth. The Africa Renewable Energy Initiative (AREI)—launched at COP21—is an ambitious continental initiative that aims to add 300 GW of new renewable electricity capacity on the continent by 2030. IRENA's report—Africa 2030: Roadmap for a Renewable Energy Future—shows that this will require US$ 70 billion per year for generation, transmission and distribution (IRENA, 2015). Mobilizing such volumes of investment would require substantial political will, and innovative and ambitious policies, including an enabling environment for mobilizing private sector finance, both from foreign direct investment and domestic resources.

Energy efficiency (SDG 7.3)

Africa reported comparatively high rates of energy intensity in 2014 at 6.0 MJ/US$ (i.e. megajoules per 2011 purchasing power

Figure 18.4

Energy intensity and annual change in intensity in the African region, 1990-2014. Source: IEA and World Bank (2017)



CAGR of energy intensity	
1990-2000	-1%
2000-2010	-2%
2010-2012	0%
2012-2014	-4%

parity dollar), compared to the global average of 5.5 MJ/US$. In the period 1990-2010, energy intensity in the region decreased from 7.9 MJ/US$ in 1993 to 6.2 MJ/US$ (Figure 3), with a compound average growth rate (CAGR) of -2 per cent between 1990 and 2000. The improvement in energy intensity was -1.7 per cent in the period 2000-2010, driven by GDP growth that coincided with a global surge in commodity prices, particularly for oil. Energy intensity declined in the period 2010-2012 by -0.4 percentage point, mainly due to a dip in oil prices in 2009, but accelerated again to -1.2 per cent in the period 2012-2014, as GDP returned to higher levels when the oil prices recovered briefly until 2015 (IEA and World Bank, 2017; ECA, 2017a).

Energy intensity changes have varied by economic sector. Energy intensity in the industrial sector returned to a negative CAGR in the periods 2010-2012 and 2012-2014, after trending higher during the period 2000-2010. The lowest energy intensity was in the agricultural sector, at 0.5 MJ/US$, in 2014, however, it never exceeded 0.76MJ/US$ from 1990 to 2014. Following two decades of declining trends, energy intensity in the services sector shot up in the periods 2010-2012 and 2012-2014, which can be attributed to improved infrastructure for information and communications technology. The residential sector had slight changes in energy intensity, which may be a combination of poor capture of energy consumption and GDP data, and a general shift to more efficient CFTs (IEA and World Bank, 2017; ECA, 2017a).

Are we on track to achieving SDG 7 in Africa?

Africa is far from being on track to achieving SDG 7 targets. While a few countries, including Ethiopia and Kenya, are presently on a trajectory towards universal access to electricity, progress is uneven and 600 million people are still projected to be without electricity by 2030 on the basis of existing policies. Access to clean-cooking solutions is even less promising, with the number of people without access to clean-cooking solutions expected to increase to 900 million, 820 million of whom will rely primarily on biomass for cooking in 2030 (IEA, 2017a).

Renewable energy is essential for delivering sustainable and clean electricity access, air pollution reduction and climate goals. Strong growth in renewable electricity capacity is anticipated to increase its share in power generation to 36 per cent in 2030 with current and planned policies, driven mainly by hydro, solar PV and wind, up from 18 per cent in 2016. However, limited policies targeting renewable heat and transport means that the overall share of modern renewables in total final energy consumption would remain relatively low at 11 per cent in 2030, up from 7 per cent in 2015.[1] In order to deliver on sustainable development and climate objectives, the IEA Sustainable Development Scenario shows that the renewable energy share in TFEC needs to grow to 22 per cent in 2030 and 32 per cent in 2040 (IEA, 2017b). Progress in energy efficiency is also expected to be uneven and slower than the world average, with annual improvements anticipated to decline at a rate of 1.8 per cent per year under current policies, less than half the rate required to achieve sustainable development objectives (IEA, 2017b).

With the year 2030 just over 12 years to come, most of the continent will not achieve all the SDG 7 targets, especially universal access and energy efficiency targets, given the low base from which most countries started and the lack of meaningful investments. The greatest challenge is access to clean cooking, and it is clear that this target will not be reached by a majority of African countries, save for North African countries where the share of population without access to clean cooking is less than 3 per cent. In sub-Sahara Africa, only Mauritius and Seychelles have almost universal access to clean cooking, followed by South Africa at over 80 per cent with access (IEA, 2017a).

[1] Including traditional biomass, the share of renewable energy in TFEC is anticipated to decline from 58 per cent in 2015 to 54 per cent in 2030 (IEA, 2017a).

Key challenges

Low power generation capacity

The electricity installed capacity in Africa was 147 GW in 2012, reaching about 168 GW in 2016 (AfDB, 2017), mostly from fossil fuels (coal, oil and gas). Excluding South Africa and North African countries, the rest of Africa has an installed capacity roughly equal to that of South Africa and is just under the 53 GW of solar PV addition in China in 2017 or just over the installed capacity in Thailand. Renewable energy, mainly large-scale hydropower, makes up a quarter of the electricity capacity (IRENA, 2017). In most cases, the generation is very inefficient, with some of the generation assets nearing retirement age.

Cost of rural electrification

Many countries have rural electrification programmes—including rural electrification agencies and sometimes dedicated funds—to accelerate electrification in rural areas where the majority of the population lives and lacks electricity access. For example, all Southern African countries have rural electrification agencies or units, except Seychelles and Mauritius (which are already fully electrified).

Limited grid coverage inhibits further growth in rural electrification; the focus has largely been on grid electricity for urban areas. For the majority of countries between 80 to 95 per cent of the unserved communities are targeted to receive electricity supply through grid extension (World Bank, 2010). There is growing a realization about the cost implications of grid connection as the mechanism for rural electrification. The investment required to extend grid coverage in rural areas is significant, and the investment gap is wide. Off-grid technology options—mini-grids and individual systems—are increasingly being considered as cheaper supply options for small consumers residing far from the grid network.

Also, rural electrification is viewed more as a social service. As such, demand in rural areas is in most cases suppressed. Eventually most rural electrification initiatives end up being rural lighting projects. There is a need to shift towards stimulating productive uses of electricity and energy services as options for stimulating growth economic using decentralized power systems.

Financing gap

There is a huge financing gap. In Africa, excluding North Africa, the IEA estimates that investments of US$ 34.2 billion per year are needed to ensure energy access for all by 2030. This consists of US$ 32.5 billion per year for electricity access and US$ 1.7 billion a year for clean cooking (IEA, 2017a). In the case of renewables, the Frankfurt School-UNEP Centre/BNEF 2017 report on global trends in renewable energy investment shows that of the US$ 242 billion invested in renewables in 2016, only about US$ 3.5 billion was in Africa (Frankfurt School-UNEP Centre/BNEF, 2017)—US$ 894 million in South Africa, US$ 660 million in Morocco, US$ 648 million in Kenya and US$ 745 million in Egypt. Most African countries are not tapping the huge potential of domestic resource mobilization to finance their energy transformation. However, domestic resource mobilization for Ethiopia's US$ 4.7 billion Grand Renaissance dam was targeted to raise 12 billion birr (about US$ 550 million) from the public, through domestic and diaspora bonds. To date over 8 billion birr has been raised. In South Africa, domestic resources constitute well over 70 per cent of the investments in the renewable energy procurement programme. This programme also demonstrates how investment transformation can happen when the political will and right polices are in place. Over US$ 14 billion in investments so far are committed to renewable energy procurement in the country. Already over 6 GW of renewable electricity capacity is contracted, with 3.27 GW dispatched to the grid in 2017.

Interlinkages with other Sustainable Development Goals

The importance of SDG 7 is not confined solely to access to clean and affordable energy, renewable energy and energy efficiency but also is central to the attainment of all of the other SDGs. For example:

Industrialization (SDG 9)

Renewable energy has a critical role to play in powering Africa's industries, as well as in creating industries along the low carbon, climate resilient and inclusive development pathway. With rapidly declining renewable technology prices, especially solar and wind power, the potential for renewables to transform industrialization get higher and higher with the renewables learning curve. In Ethiopia, for example, industrial parks (such as the eco-friendly Hawassa Industrial Park[2]) are being developed and powered with renewable power sources and promoting cleaner production.

Climate change (SDG 13)

Renewable energy and energy efficiency are key for decarbonization of the energy sector. The Economic Commission for Africa has been analyzing and reviewing the nationally determined contributions (NDCs) to climate action of all Africa countries under the framework of the Paris Agreement on climate change. These NDCs all include renewable energy and energy efficiency actions for climate change mitigation and adaptation. For example, as elaborated by IRENA, adding 300 GW of renewable electricity in Africa by 2030 from hydropower, wind and solar would result in a climate benefit of 310 megatonnes (Mt) of CO_2 reduction in emissions by 2030, compared to the baseline business-as-usual scenario (IRENA, 2015).

[2] See, for example, http://www.ena.gov.et/en/index.php/economy/item/3345-hawassa-industrial-park-to-be-fully-operational.

Gender and health (SDG 5 and SDG 3)

There are strong linkages between gender-based constraints and structural transformation (UNCTAD, 2017). Gender-based roles at the household level, especially in rural areas, presuppose that women should do the work of fetching water and firewood, cooking, nurturing children and general upkeep of households. ENERGIA (2012) has elaborated an effective framework for mainstreaming gender into energy sector and practice in a way that ensures gender equity, particularly leading to an inclusive development framework that empowers women and girls and gives them more free time for productive and self-interest activities, thus contributing to accelerated attainment of SDG 5. Concerning SDG 3 on health, access to modern energy forms and services could cut the number of premature deaths from indoor smoke and air quality by up to 500,000 according estimates by the IEA (IEA,2017a).

Policy implications

Creating investment climate, particularly for decentralized energy systems

In many African countries, energy provision is seen as a public good and the public sector provides funds and implements most energy programmes, with little private-sector finance and participation. However, there are some significant shifts. For example, energy projects under the Pogramme for Infrastructure Development in Africa (PIDA) envisage substantial private- sector participation. Through political will and policy reforms that create the enabling environment and investor confidence in most African countries, there have been significant public-private partnerships (PPPs) in the energy sector, particularly in the power sector. Starting with countries such as Morocco, South Africa, Kenya and, more recently, Ethiopia, among others, there have been significant private sector investments in on-grid renewable energy projects. However, there is still a long way to go in mobilizing private sector investments to drive accelerated energy access on the continent, unless concerted and urgent actions are taken by policymakers, in partnership with development partners to boost investor interest and create the enabling environment and framework for return on investment.

Connecting the grid to most rural areas, especially the sparsely populated areas far away from urban centres is generally not financially viable. Urgent actions to support and incentivize accelerate deployment of decentralized technologies are crucial if the energy access target of the SDG 7 is to be achieved in Africa. A number of African countries are deploying solar home systems in their rural electrification programmes and these are mainly supported by development partners. However, in spite of providing alternative power, the impact of these systems on improving livelihoods is limited. Generally, such systems are still costly and only provide minimal power, and are not suited for higher valued added stages of production (UNCTAD, 2017). Recognizing that the private sector is not the panacea for attaining SDG 7 in Africa, it is in rural energy access that innovations in business models, supported by carefully designed public interventions, are needed the most to spur new investments access to modern energy. In the past, investing in renewable energy technologies deployed in rural areas was risky, owing to regulatory and policy uncertainties, as well as an impoverished market. However, recently there has been an emergence of digitalized decentralized energy services business models (such as M-KOPA that has, over the last six years, connected over 600,000 homes with solar power[6]) that are already making transformative impacts towards access to clean and affordable energy on the continent.

A number of countries are creating a good environment for rural-based energy, but these reforms are still nascent and need to be accelerated. The renewable energy space is still dominated by international firms and finance in partnership with public institutions. There is little participation by local project developers or independent power producers (IPPs) because the latter often do not have access to credit like their international counterparts. International firms are crowding out local firms in supplying renewable energy options, as is the case in South Africa, Zambia and a host of other African countries. In a recent Zambian 100-MW bid, only one out of 11 firms that qualified was African—and this company came from South Africa (McDaid, 2016). The formation of special credit facilities at the national level will assist local project developers. An example is the Ugandan Energy Credit Capitalization Company (UECCC), supported by KfW, a German development bank, which is offering advisory services and funding for renewable projects in the country.

Capacitating energy service providers

Skills development, both soft and hard, should be at the centre of interventions to promote and accelerate energy access. This ensures sustainability and localization of technologies and practices. Special funds are needed for strategic programmes aimed at improving the capacity of energy services providers in the both the public and private arena at the national and local levels. This is an area that has been identified as a serious impediment in rolling out energy interventions in Africa. There are regional centres of excellence (some established and others recently created) already embarking on supporting their member States with polices, as well as human and institutional capacity to enhanced energy services provision. These institutions include the African Institute for Economic Development and Planning (IDEP) which is developing a comprehensive capacity development programme for energy supply and demand management and planning, as well as sub-regional institutions—such as West Africa's ECOWAS Centre for

[3] http://solar.m-kopa.com/about/our-impact/.

Renewable Energy and Energy Efficiency (ECREEE), Southern Africa's Centre for Renewable Energy and Energy Efficiency (SACREEE), North Africa Regional Centre for Renewable Energy and Energy Efficiency (RCREEE) and East Africa's Centre for Renewable Energy and Energy Efficiency (EACREEE).

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