



# Sustainable Energy in Urban Africa – the role of local government

Africities Summit 2015: Background paper

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## ABSTRACT

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Energy is the life blood of urban economic activity. It is central to people's welfare and a functioning urban system. The promotion of adequate and sustainable energy requires specific attention as an indispensable component of shaping a prosperous future for Africa. The local level of government has an increasingly important role to play in shaping the energy supply and demand situation in urban areas. This is the case in Africa as well. The fast rate of urbanization and the lack of capacity in local governments across Sub-Saharan Africa is likely to contribute to a situation of increasingly inadequate energy provision, inefficient energy use and escalating transport congestion and emissions, with associated economic and social problems. However, the challenges are now better understood, and in some areas successful approaches are being deployed at the local government level. It is necessary to share lessons and move forward in a coordinated manner in recognising and building local government's important role in delivering locally appropriate sustainable energy solutions if Agenda 2063's hopes for a prosperous future are to be realised.

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## SUSTAINABLE ENERGY IS AN ESSENTIAL COMPONENT OF A PROSPEROUS FUTURE FOR SUB-SAHARAN AFRICAN COUNTRIES

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Energy is just one facet of sustainable urbanization, but a completely essential and cross-cutting one, closely linked with welfare, economic health and environmental sustainability. Without energy, a city grinds to a halt. No machine operates, no vehicle moves, no light shines, no computer works, no mobile network functions, and nothing is cooked. An adequate and affordable energy supply is considered a precondition to a vibrant economy and domestic welfare. However, in spite of being resource-rich, access to modern energy in Sub-Saharan Africa remains low – even in many urban areas – and the use of unsafe and unhealthy fuels is widespread, energy infrastructure is poorly developed, and electricity supply is often unreliable. The region lags behind in terms of energy for economic growth as well as access to modern energy to improve welfare (IEA 2014).

There is global alignment around the urgency of supporting a transition to sustainable energy. The recently adopted international Sustainable Development Goals (SDGs) include a specific focus on energy access (SDG 7):

*“Ensure access to affordable, reliable, sustainable and modern energy for all.”*

In addition, the global Sustainable Energy for All programme (SE4All) aims to:

1. Ensure universal access to modern energy services,
2. Double the global rate of improvement in energy efficiency, and
3. Double the share of renewable energy in the global energy mix.

The UN general Assembly has declared 2014 to 2024 the decade of sustainable energy for all. In addition, the devastating impacts of climate change are being experienced in Africa, and this issue is accelerating the global focus on sustainable energy. Energy, broadly, is also an important focus of the African Union’s Vision 2063. While Sub-Saharan Africa is faced with a significant challenge regarding the transition to sustainable energy and a prosperous future, there is growing support for this transition which the region needs to tap into strategically. The region should not just draw on such support as a passive beneficiary, but must ensure that resulting initiatives support a truly developmental agenda.

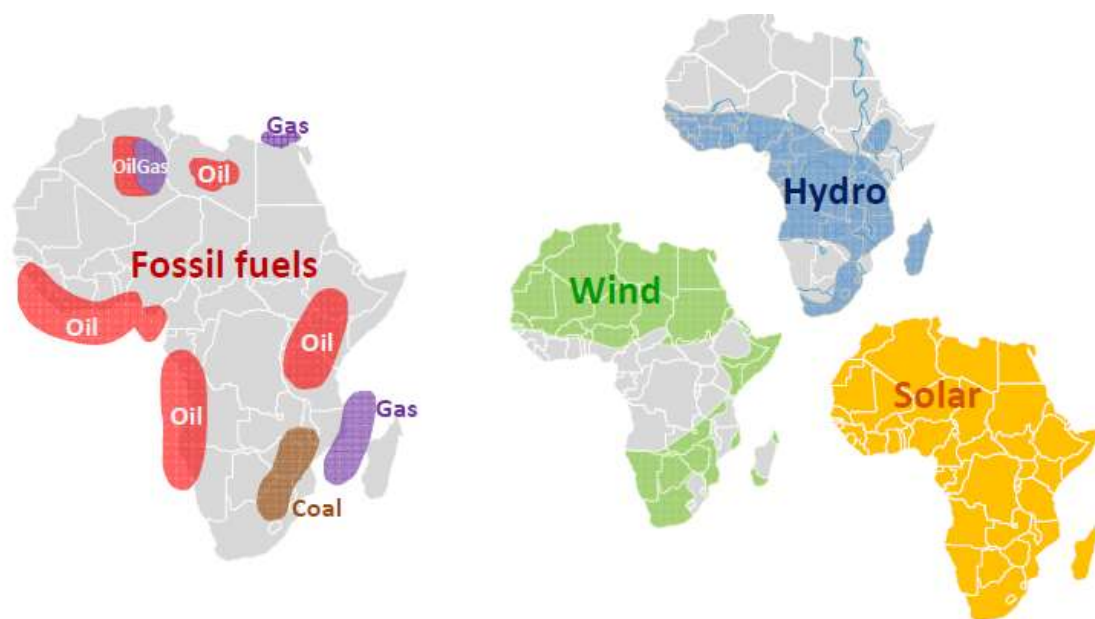


Figure 1: Africa is rich in energy resources, including vast untapped renewable energy potential (Source: IEA Africa Energy Outlook 2014)

## GIVEN URBANIZATION RATES, SUB-SAHARAN AFRICA'S ENERGY FUTURE IS SUBSTANTIALLY URBAN

Africa's population is expected to nearly double from 2010 to 2040, by which time the population will be more than 50% urbanized (AfDB 2011). While large cities in Sub-Saharan Africa will grow significantly, it is noteworthy that much of this growth will be in the smaller cities, where capacity to service even existing populations is severely constrained. Although data on urban energy consumption is limited (even in substantial publications such as the IEA's Africa Energy Outlook), urban areas are generally more energy intensive than rural areas due to the concentration of households, transport and industry (SEA 2015). As Sub-Saharan Africa becomes increasingly urban, therefore, the bulk of energy will be used in our towns and cities - around 76% by 2040 (Figure 2) - and the sustainable energy transition imperative will need to focus increasingly on urban areas. It should be noted that this is not – and must not be – at the expense of rural areas, but rather that energy programmes in Sub-Saharan Africa need to accommodate the urbanizing trend and strategically position themselves to address both rural and urban energy challenges.



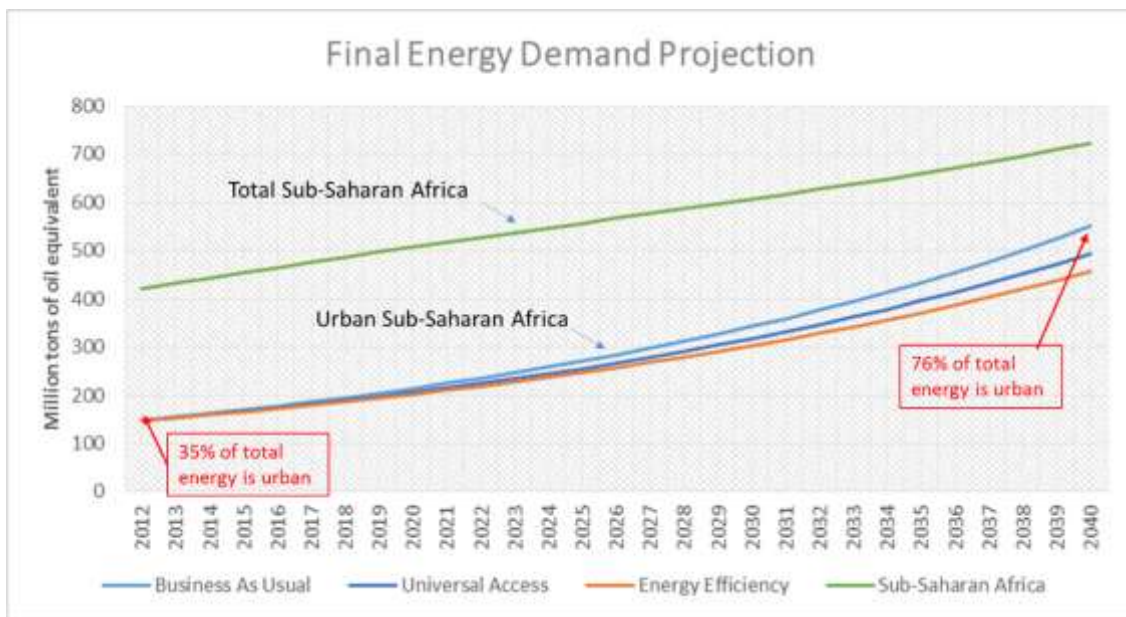


Figure 1: Modeling projections for energy use in urban Sub-Saharan Africa to 2040 (Source: SEA 2015)

## TO CHANGE NATIONAL ENERGY PROFILES WILL INCREASINGLY REQUIRE ATTENTION TO ENERGY IN URBAN AREAS

As urban areas are generally the most energy intensive nodes in a country, if national and regional energy profiles are to be transformed to enable a sustainable and prosperous future for the sub-continent, the attention of energy transition initiatives will need to be increasingly on urban areas. Not only are these the most intensive areas of demand - in industrial, transport and residential sectors - but with increasing global trends towards decentralized energy supply rather than just centralized national utilities (Bloomberg 2014), options such as grid-connected rooftop solar PV have the potential to become a significant, urban-based component of the energy supply mix.

## AFRICA'S FUTURE GLOBAL WARMING EMISSIONS WILL ALSO BE DRIVEN LARGELY BY URBAN AREAS

While the impact of global warming on Sub-Saharan Africa will be devastating, currently the region's contribution to global warming is insignificant at around 1.8% of the global total emissions, with per capita emissions from Europe being 50 to 100 times more, and from USA being 100 to 200 times more. The IEA (2014) expect that this contribution will not rise significantly in the decades to come, in spite of a partial move from biomass to 'modern' energy, because of an anticipated shift toward less energy intensive economic activity, including the service industry. Other estimates indicate that emissions will grow more substantially to be around 4% of the global total (SEA 2015).

Such forecasts currently remain uncertain, and whether the sub-continent becomes a more significant global emitter of greenhouse gasses remains unclear. A future pressure to reduce emissions should not be completely discounted, albeit on the more energy intensive countries such as Gabon and South Africa. With expected urbanization rates, urban areas in particular may need to develop responses, as will the energy supply sector. As noted at a recent international conference (SAIREC 2015), Sub-Saharan Africa has an important opportunity to ‘leapfrog’ to clean and modern technologies in both energy supply and demand. This is essential if the sub-continent is not to be stuck with outdated technology which renders us inefficient and uncompetitive. With the potential for significant international climate mitigation support becoming available for a clean energy transition, Sub-Saharan Africa has little reason to develop an energy sector that is not sustainable, both on the supply and demand sides. Future energy-related planning in urban areas should seize this opportunity.

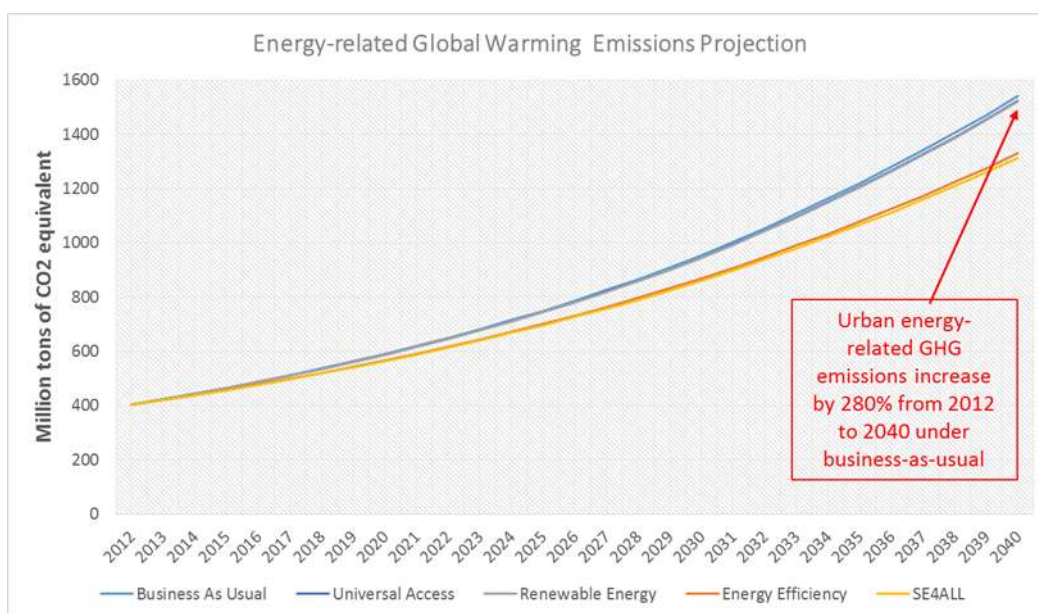


Figure 2: Modeling projections for global warming emissions from energy in urban Sub-Saharan Africa (Source: SEA 2015)

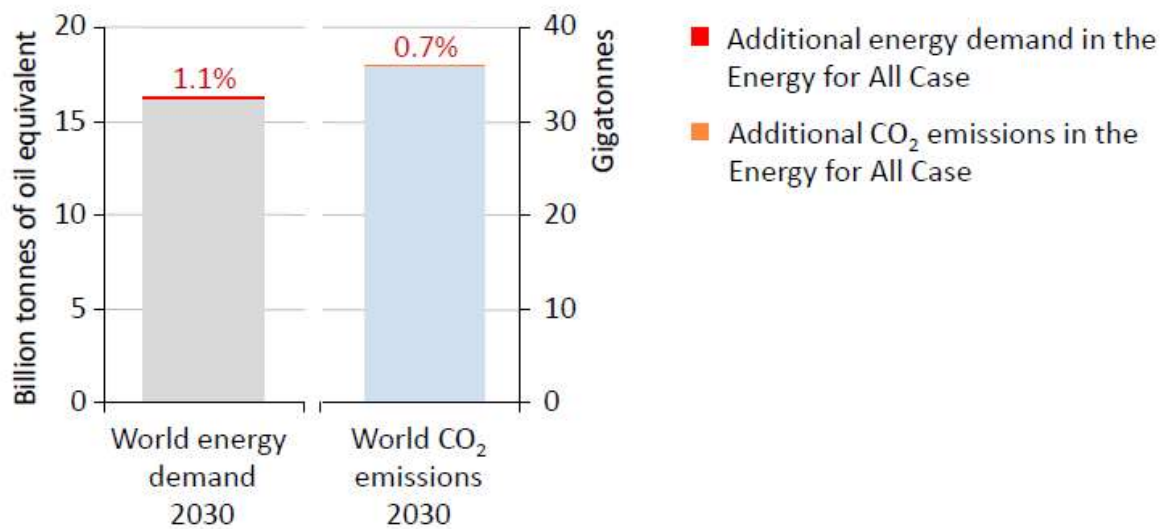


Figure 3: Improving access to modern energy does not have a significant impact on global energy demand or CO<sub>2</sub>e emissions (Source: IEA World Energy Outlook 2013)

## LOCAL GOVERNMENT'S ROLE IN SUCH TRANSITIONS IS SIGNIFICANT, EVEN WITH EXISTING FUNCTIONS AND MANDATES

It is widely recognized that municipalities need to be stronger players in supporting a sustainable future for African cities (Cities Alliance and UCLGA 2013; AfDB 2011a; AfDB 2011b; UN-Habitat 2014). This applies equally to their role in sustainable energy transitions. Their core role around urban planning, transport planning, and building plan approvals, amongst others, are important factors in energy transitions. These are within the functions and mandates of many local governments already (Euston-Brown et al, In Press). They also have an important facilitative role to play in national programmes promoting sustainable energy. For example, energy efficiency appliance rollout programmes, such as those recently spearheaded by national government in Ghana, would benefit by the involvement of local government who have better knowledge and links with the local community, and are well placed to observe the factors of success and failure. They are also likely to have an important facilitative role in renewable energy generation from decentralized options such as rooftop solar PV generation, as these generation technologies become increasingly viable.

In addition, municipalities have direct ownership and control of their own building stock, vehicle fleet, waste collection, and often sewage processing. These provide important opportunities to lead by example and demonstrate energy efficiency interventions such as building lighting and ventilation retrofits, and potentially renewable energy generation from landfill and sewage methane.

## STRENGTHENING THE ROLE OF LOCAL GOVERNMENT IS IMPORTANT TO DIVERSIFY ENERGY GOVERNANCE AND PROMOTE ROBUST, LOCALLY APPROPRIATE SOLUTIONS

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Not only is there an international trend towards decentralized energy supply, as noted above, but also an ongoing move towards the diversification of energy governance and the democratization of the energy sector which should be taken cognizance of (Goldthau 2014; Reddy 2002). There is an important role for players beyond the large centralized national utilities and other large players in a future energy sector. In keeping with this, the diversification of energy governance can support a more robust and flexible energy sector – qualities which become increasingly important in the current fast changing global energy environment. Diversified governance, as noted in the principle of ‘requisite variety’<sup>1</sup>, brings innovative and locally appropriate approaches which centralized planning seldom spawns. Such responsiveness is necessary given the challenges faced not just by Africa, but the world, in moving to a sustainable energy situation.

...as long as cities and local authorities are not put in a position to take initiatives and be at the forefront of actions to make African cities more inclusive, competitive, sustainable, safer and better managed, there is little chance that Africa will overcome the challenges posed by rapid urbanization.

(Cities Alliance and UCLGA 2013, p10)

## LOCAL GOVERNMENT CAPACITY DOES NOT MATCH THE FAST ESCALATING CHALLENGES REGARDING ENERGY AND URBANISATION, AND SUCH CAPACITY SHORTFALLS ARE MOST DIRE IN MEDIUM-SIZED CITIES WHERE MOST URBANIZATION IS TAKING PLACE

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UN-Habitat population estimates indicate that most urbanization will occur in small to medium cities (UN-Habitat 2010). This is significant, because, while the capacity of our large city municipalities is generally insufficient to meet growing service delivery demands, the capacity shortage in the smaller urban centres is much more severe (UN-Habitat 2014). Here municipalities fall far short of the staff and financial resources needed to match even current population needs, let alone forward-plan and respond to the emerging challenges posed by rapid urbanization. Proactively engaging with new challenges associated with sustainable energy will therefore often require specific capacity building and support. Some of these challenges require institutional approach and mindset shifts which will take time, however it is important to note that merely by making small, manageable changes, municipalities can make significant shifts. Examples are supporting sustainable energy via inserting conditions in their municipal procurement conditions which promote energy efficiency, considering public transport facilities more strongly in their local transport plans, and introducing by-laws to ensure new commercial buildings meet certain energy efficiency standards. These and other interventions are well within the capacity of many municipalities.

Most urban development in sub-Saharan Africa is occurring in a completely non-planned and non-transparent manner.

(Africa Research Institute 2013, p4)

Forward planning is critical if urban areas are to avoid continued informal, dispersed growth which is increasingly more difficult to control and service (Africa Research Institute 2013). Such uncontrolled growth ensures future cities where efficient public transport is difficult to promote and congestion is exacerbated. Even today, congestion in the larger Sub-Saharan African

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<sup>1</sup> Requisite variety: this principle notes that, particularly in complex systems, a repertoire of responses is necessary to effectively cope with the inevitable range of problems that will be encountered.



cities is such that commute times are upwards of 4 hours per day, sometimes up to 8 or 10 hours per day<sup>2</sup>. Not only will our urban areas become less energy efficient and more polluting without a decisive focus on planning, but there is a large social and economic cost of such unplanned growth. Spatial planning is a critical area where local governments need to be capacitated to hold a strong course to promote a sustainable energy and prosperous future for Sub-Saharan African urban areas, and indeed countries.

## **LOCAL EXPERIENCE DEMONSTRATES THE POSITIVE IMPACT ON LOCAL GOVERNMENT'S CAPACITY OF APPROPRIATELY DESIGNED, LOCALLY-BASED, LONG-TERM SUPPORT PROGRAMMES**

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Local government's role in sustainable energy transitions has to date mostly been ignored, and often national governments will regard energy as an entirely central-planning concern. There is thus little experience engaging with local governments around sustainable energy in most of Sub-Saharan Africa. In addition, it is not easy for outside support initiatives to understand the complexities of local government (Borchers et al, In Press), and thus support initiatives targeting local government will often have limited impact. However, long-term local government support initiatives exist in Sub-Saharan Africa, and are delivering valuable lessons on how such capacitation may be effectively undertaken. Experience indicates that capacity building and support initiatives around sustainable energy should uphold the following:

1. they should be substantially locally-based rather than rely largely on foreign technical support (though such support is not excluded);
2. they should be long-term, as capacitation of such institutions cannot take root even over a period of 4 or 5 years;
3. they should build the capacity of in-country non-municipal organisations to be an ongoing local resource for municipalities;
4. they should work with municipalities as 'partners on the journey', rather than 'external advisors' to the municipalities;
5. they should build networks of municipalities engaging with sustainable energy challenges to enable inter-municipality sharing of challenges and approaches.

Impacts of an appropriate approach embodying the above appear significant (Bawakyillenuo et al, 2015; Borchers et al, In Press; CDRA 2014).

## **EMPOWERING LOCAL GOVERNMENT TO BETTER MEET THE CHALLENGES REGARDING SUSTAINABLE ENERGY IS AN IMPORTANT COMPONENT OF A SUSTAINABLE AND PROSPEROUS FUTURE FOR AFRICANS**

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Without modern and affordable energy, efficient use of energy, and an increasing shift to renewable energy, it will be difficult to improve the welfare of Sub-Saharan Africa's fast growing urban population. The sub-continent's local governments are important players in the transition to sustainable energy. Not only do they have existing mandates and functions which relate directly to energy issues, they are also well placed to identify locally appropriate solutions and be responsive to local needs. Empowering local government to support the sustainable energy agenda will also diversify energy sector governance which in turn introduces more innovation and robustness in this fast-changing global environment.

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<sup>2</sup> The commute from Awutu Senya (30km out of Accra) to central Accra is often 4 to 5 hours each way, as noted by municipal officials of Awutu Senya. Some people choose to sleep in their offices on occasions rather than do this commute every day.

This is not to minimize the role of centralized or national-level approaches, which remain important. However, the complexity of challenges (including energy and sustainability challenges) emerging on a fast-changing sub-continent requires a multi-pronged approach, and one of the important players in this endeavor is local government. With specific support and capacity building, local government can start an important shift towards sustainable energy, as noted earlier. But the first step is for global, regional and national governments to recognize local government as an important player in pursuing the sustainable energy agenda, resource them more appropriately, and bring them into national policy and strategy frameworks.

While the capacitation and support for local government remains a challenge, local municipal support programmes exist and are starting to institutionalise sustainable energy approaches into local government functions, as well as highlighting key lessons on effective developmental approaches to capacitate local governments in this regard. Such support programmes are initially reliant on donor support, and with the global imperatives around sustainable energy and promised resource flows to support this agenda, directing international funds to well-designed support programmes for local government in Sub-Saharan Africa appears appropriate.

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## ANNEX 1: ELECTRICITY ACCESS IN AFRICA – 2012 (Source: IEA, Africa Energy Outlook 2014)

Region	Population without electricity millions	National electrification rate %	Urban electrification rate %	Rural electrification rate %
<b>Africa</b>	<b>622</b>	<b>43%</b>	<b>68%</b>	<b>26%</b>
<b>Sub-Saharan Africa</b>	<b>621</b>	<b>32%</b>	<b>59%</b>	<b>16%</b>
<i>Angola</i>	15	30%	46%	6%
<i>Benin</i>	7	28%	55%	6%
<i>Botswana</i>	1	66%	75%	51%
<i>Burkina Faso</i>	14	16%	54%	2%
<i>Burundi</i>	9	10%	34%	7%
<i>Cameroon</i>	10	54%	88%	17%
<i>Cabo Verde</i>	0	94%	100%	84%
<i>Central African Republic</i>	4	3%	5%	1%
<i>Chad</i>	12	4%	16%	0%
<i>Comoros</i>	0	45%	72%	35%
<i>Congo</i>	3	35%	52%	5%
<i>Côte d'Ivoire</i>	15	26%	42%	8%
<i>Democratic Republic of Congo</i>	60	9%	24%	1%
<i>Djibouti</i>	0	50%	61%	14%
<i>Equatorial Guinea</i>	0	66%	93%	48%
<i>Eritrea</i>	4	32%	86%	17%

Region	Population without electricity millions	National electrification rate %	Urban electrification rate %	Rural electrification rate %
<i>Ethiopia</i>	70	23%	85%	10%
<i>Gabon</i>	1	60%	64%	34%
<i>Gambia</i>	1	35%	60%	2%
<i>Ghana</i>	7	72%	90%	52%
<i>Guinea</i>	10	12%	28%	3%
<i>Guinea-Bissau</i>	1	20%	37%	6%
<i>Kenya</i>	35	20%	60%	7%
<i>Lesotho</i>	2	28%	55%	17%
<i>Liberia</i>	4	2%	3%	0%
<i>Madagascar</i>	19	15%	37%	4%
<i>Malawi</i>	15	9%	33%	5%
<i>Mali</i>	11	27%	55%	12%
<i>Mauritania</i>	3	21%	47%	2%
<i>Mauritius</i>	0	100%	100%	100%
<i>Mozambique</i>	15	39%	66%	27%
<i>Namibia</i>	2	30%	50%	17%
<i>Niger</i>	15	14%	62%	4%
<i>Nigeria</i>	93	45%	55%	35%
<i>Réunion</i>	0	99%	100%	87%
<i>Rwanda</i>	10	17%	67%	5%



Region	Population without electricity millions	National electrification rate %	Urban electrification rate %	Rural electrification rate %
<i>Sao Tome and Principe</i>	0	59%	70%	40%
<i>Senegal</i>	6	55%	90%	28%
<i>Seychelles</i>	0	97%	97%	97%
<i>Sierra Leone</i>	6	5%	11%	1%
<i>Somalia</i>	9	15%	33%	4%
<i>South Africa</i>	8	85%	88%	82%
<i>South Sudan</i>	11	1%	4%	0%
<i>Sudan</i>	24	35%	63%	21%
<i>Swaziland</i>	1	27%	40%	24%
<i>Tanzania</i>	36	24%	71%	7%
<i>Togo</i>	5	27%	35%	21%
<i>Uganda</i>	31	15%	55%	7%
<i>Zambia</i>	10	26%	45%	14%
<i>Zimbabwe</i>	8	40%	80%	14%
<b>North Africa</b>	<b>1</b>	<b>99%</b>	<b>100%</b>	<b>99%</b>
<i>Algeria</i>	0	99%	100%	96%
<i>Egypt</i>	0	100%	100%	99%
<i>Libya</i>	0	100%	100%	99%
<i>Morocco</i>	0	99%	100%	97%
<i>Tunisia</i>	0	100%	100%	100%

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