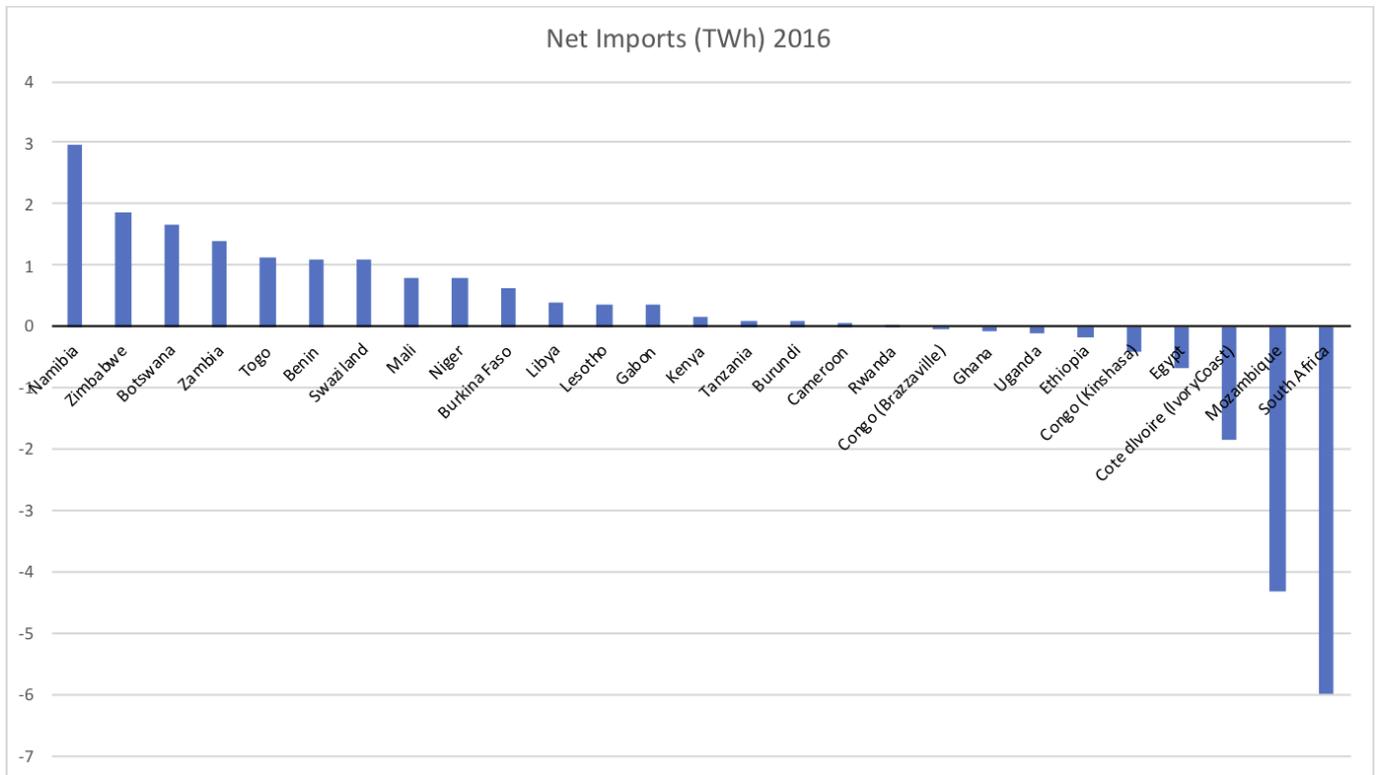


The potential for grid interconnectivity and increased cross-border electricity trading in sub-Saharan Africa is significant. In addition to boosting energy security, it would likely bring down electricity costs and enable greater amounts of renewable energy to be integrated into the power mix, while also providing widespread investment opportunities for companies operating across the power sector. That said, infrastructure bottlenecks, regulatory hurdles and faltering political support remain hurdles to the successful realisation of a pan-African power grid.

### **Electricity trading limited across SSA, but regional interconnectivity becoming more of a policy priority**

Developing power grid infrastructure to boost regional interconnectivity and facilitate electricity trading is a priority for many governments across sub-Saharan Africa (SSA). There are four established power pools in the region: The Southern African Power Pool (SAPP), the Central African Power Pool (CAPP), the West African Power Pool (WAPP) and the Eastern African Power Pool (EAPP). The power pools are largely under-developed and only a small amount of electricity is currently traded across borders.



Net electricity imports by select countries in regional power pools (TWh) in 2016 (source: US Energy Information Administration)

Despite relatively limited electricity trading at present, the aspirations for interconnectivity remain high. A handful of countries have gained membership to more than one power pool, namely Angola (SAPP, CAPP), Tanzania (SAPP, EAPP), Burundi (CAPP, EAPP) and the Democratic Republic of the Congo (DRC) (CAPP, EAPP, SAPP). The successful connection of these countries to multiple power pools would enable electricity trading between the pools and provide the first steps towards establishing a pan-African power grid.

Power interconnectivity high on policy agenda in sub-Saharan Africa, but far from realised

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WAPP	Senegal	Niger	The Gambia	Benin	Guinea-Bissau	Guinea	Sierra Leone	Liberia	Ghana	Togo	Burkina Faso	Nigeria	Mali	Ivory Coast
SAPP	Tanzania	DRC	Botswana	Angola	Zambia	Mozambique	Malawi	South Africa	ESwazini	Lesotho	Namibia	Zimbabwe		
EAPP	Tanzania	DRC	Burundi	Kenya	Djibouti	Egypt	Ethiopia	Libya	Rwanda	Sudan	Uganda			
CAPP	Cameroon	DRC	Burundi	Angola	Congo	Central African Republic	Chad	Equatorial Guinea	São Tomé and Príncipe	Gabon				

*SSA power pools and member states (source: regional power pool websites)*

## Electricity trading has potential to boost energy security, incentivise power infrastructure investment

One major benefit of increasing regional electricity trading is the boost it would provide to energy security in a region where electricity deficits are widespread and well-documented. According to the International Energy Agency's latest "Africa Energy Outlook" report, published in 2014, more than 620m people across SSA do not have access to electricity and those who do are exposed to high costs and supply fluctuations. The pooling of electricity resources can reduce an individual country's exposure to supply risks and, through economies of scale, reduce operating costs and electricity prices.

Furthermore, regional electricity trading has wider implications for the electricity generation mix of the region. Firstly, it enables much greater flexibility in the power system and would therefore help balance the intermittency associated with variable renewable energy sources, such as wind and solar. This would allow for greater amounts of renewable energy to be integrated into the system.

Secondly, it incentivises the development of large-scale power infrastructure investments in countries hoping to capitalise on the substantial external demand that power pool membership can bring. The development of large hydropower projects provides the most pertinent example of this. The Grand Ethiopian Renaissance Dam in Ethiopia and the Grand Inga Dam in the DRC are two flagship projects in the region, whereby a large proportion of the electricity output is destined for export.

The significant potential for electricity trading in SSA has translated into development opportunities for companies operating in the region, particularly across the transmission and distribution network. In line with this, the pipeline for interconnection projects has strengthened notably over the last decade. The power generation segment has also garnered increased attention from investors, given that the formation of power pools creates a larger consumer base in which to capitalise on. The 2.4-GW Batoka Gorge hydro-electric power plant, which is being developed on the Zambezi River, will capture demand from both Zambia and Zimbabwe, with the output shared between the two countries. The \$5bn project has been met with interest from the international community, highlighted by the shortlisting of three contractors in early 2019, including companies from Italy, the US and China.

Furthermore, the ongoing involvement of development finance institutions in interconnection projects is supporting investor interest. The African Development Bank, in particular, is playing an active role in a number of interconnection projects across the region, including the over 1,000-km Kenya-Ethiopia Electricity Highway Project, which will be capable of transferring 2,000 MW of electricity, and the Zambia-Zimbabwe-Botswana-Namibia Interconnector (ZiZaBoNa), which is initially targeting the transfer of 300 MW of electricity.

### Interconnectivity hinges on ability to expand infrastructure and establish regulatory frameworks

While regional interconnectivity and electricity trading in SSA holds great promise, the realisation of a pan-African power grid remains a distant prospect. This is due to a number of factors, centred around infrastructure bottlenecks, faltering political support and regulatory hurdles.

The underdeveloped and inefficient nature of the power infrastructure across the markets of SSA is a key barrier to electricity trading and is largely a symptom of low levels of investment from both private investors and state utilities. As a result, there is a lack of installed baseload capacity in place to feasibly allow for trading to occur. Weaknesses in the grid network and extremely high system losses also significantly reduces the ability for cross-border electricity flows, particularly over long distances.

Furthermore, governments may be reluctant to rely too heavily on imported electricity for their domestic energy security, under the assumption that they will be exposed to the whims of neighbouring governments. Government energy policies that are skewed towards export ambitions as opposed to domestic electrification may also be met with opposition from the population.

The successful realisation of cross-border interconnectivity will depend heavily on mutual cooperation between governments in the region, and the ability of utilities to fund projects, a situation that is uncertain given the lack of financial resources and other capacity constraints that often afflict public sector utilities. In addition, cooperation among governments, system operators and utilities is needed in order to establish conducive regulatory, legal and pricing frameworks to enable widespread trading to take place.

## Power interconnectivity high on policy agenda in sub-Saharan Africa, but far from realised

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