AFRICA REGIONAL SUMMARY

Northern Africa - Winter weather descended on Northern Africa on January 26 and 27, 2005, leaving parts of Algeria and Morroco white with snow. In this image, light clouds blend with the snow-covered ground, making it difficult to tell how much snow is present.

OVERVIEW

All 19 of the African nations assessed for *Climatescope* 2014 are sub-Saharan and are relatively well distributed between the continent's eastern, western and southern regions. But there the similarities end as the list includes both regional powerhouses, like South Africa and Kenya, and those facing very distinct development challenges, such as Sierra Leone and Liberia. These nations range in size from two million residents in Botswana to 174 million Nigerians.

The power sector has until recent years been neglected in many African countries, leaving them with decades-old hydro and fossil fuel plants and insubstantial grid provision. Lack of reliable power has restrained the continent from enjoying the socio-economic benefits that electricity has provided elsewhere around the world. Clean energy has therefore come to the fore in discussions both around Africa's sustainable growth and poverty reduction at the distributed scale.

More than half the power capacity installed across all the *Climatescope* Africa countries is in South Africa. In fact, South Africa's coal plants alone (37.7GW) add up to more capacity than all the other 18 African countries put together. The next largest power system is in Nigeria, at 10.2GW.

South Africa is also the region's clear leader in terms of clean energy development and was the top scorer (with 1.92 overall) on three of four *Climatescope* parameters. This is no surprise: the country recorded $10bn of clean energy investment in 2012 and 2013, since launching its Renewable Energy Independent Power Producer Programme (REIPP).

Kenya (2nd) and Uganda (3rd) owe their high positions to both the conducive policy frameworks they have established to incentivize renewable energy development and to the relatively extensive networks of service providers present in both countries. Kenya scored 1.73, recording the earliest investments in sub-Saharan Africa as an early mover on clean energy policy. Uganda's score of 1.52 was the bigger surprise, with its policy efforts only starting to bear fruit in the form of significant investment.

Ethiopia (4th), while also scoring for the diversity of companies that befit a country of its size, has followed a different model to achieve its score of 1.25. Its relative surge in investment – $1.5bn since 2006 – to meet large renewable energy expansion targets has mostly been through state procurement (and Chinese financing) rather than private investment. This may soon change, however; at the end of 2013, Ethiopia agreed the outlines of what would be the country's first contract to be signed with an independent power producer.

Tanzania, which takes 5th place in Africa with a score of 1.24, is merited in particular for its frameworks to support distributed energy and small power producers. Like its East African neighbors, it also boasts value chains conducive to supporting the development of clean energy projects.

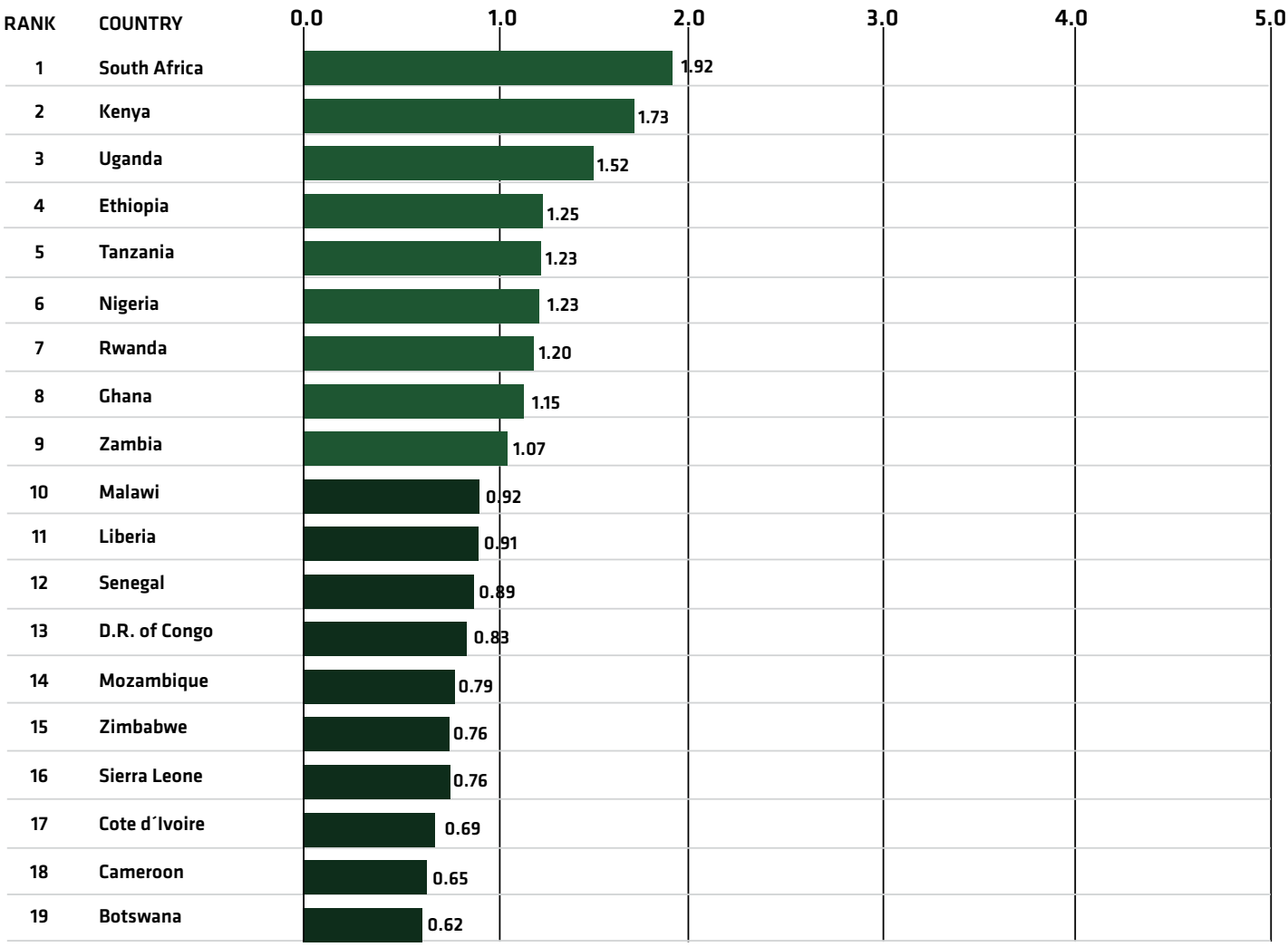
Nigeria and Ghana were the highest ranking West African countries, scoring 1.23 and 1.15, respectively. Both have introduced power sector reforms and feed-in tariffs – but have yet to record an influx of investment. Both are likely to see an uptick in the near term, with significant project pipelines emerging. Also in the top 10, Rwanda scored 1.20 and is punching above its weight for a small country with a high proportion of its population living in rural areas: it has put in place policies to attract projects at sizes its power system can handle, and a high proportion of its small existing capacity consists of clean small hydro.

Further down the Africa index, several countries (such as Sierra Leone and Côte d'Ivoire) have been disrupted by internal strife that is still fresh memory. However, Climatescope recognizes conditions for market potential beyond such instability. Liberia, for instance, finished mid-table for Africa, with a score of 0.91, because of its very high power and fossil fuel prices and its very low electrification rates. These mark it out as a country with significant potential for transformation through improved clean energy access. Other countries that may have similar opportunities include Senegal and Cameroon but they have yet to get into gear, according to the survey.

No African country apart from South Africa scored highly on the carbon market activity and policy indicators. In general, African countries have seen far less Clean Development Mechanism activity compared with those in Asia due to the current program rules and a dearth of financing, while there are few emissions reduction policies or corporate strategies in place.

It should be noted that 18 of the African nations (all but South Africa) were assessed using Climatescope's "off-grid focus" methodology. For them, the survey's focus shifted more toward questions of energy access and the role that clean energy can play in facilitating it.

2014 Global Climatescope scores
Africa ranking



Colors show range for overall score

0.0 - 1.00 | 1.01 - 2.00 | 2.01 - 3.00 | 3.01 - 4.00 | 4.01 - 5.00

ENABLING FRAMEWORK PARAMETER I

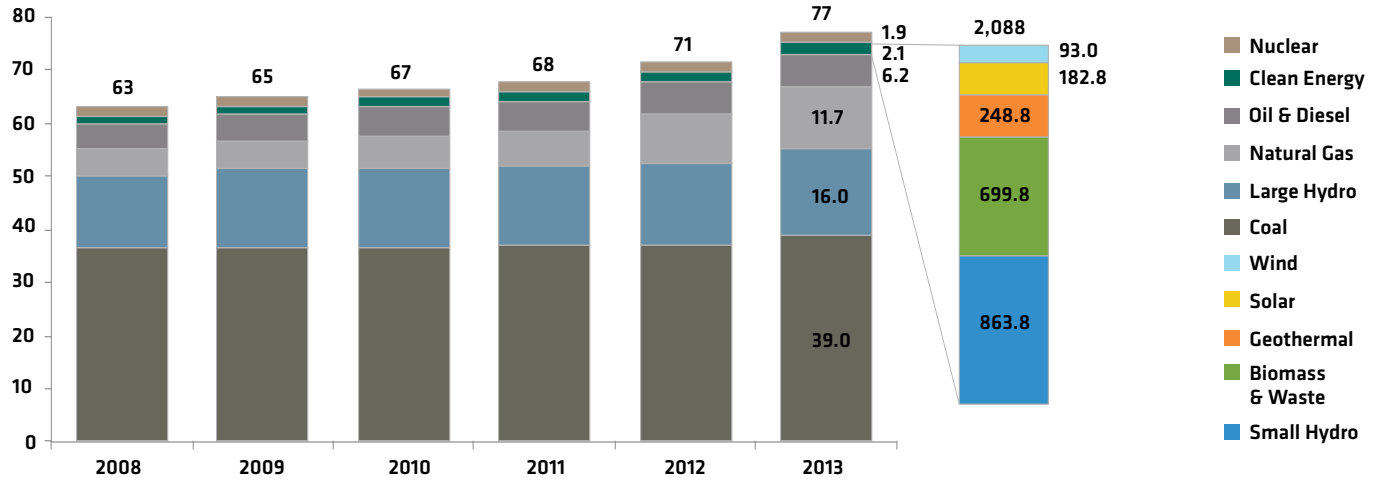
On each of the parameters except Enabling Framework Parameter I, the African nations ranked in a fairly similar hierarchy. But on Parameter I, Rwanda scored highest, followed by Kenya and Liberia, with Uganda, Tanzania and Ethiopia not far behind. South Africa landed mid-table on this parameter.

It should be noted that Parameter I does more than measure policies in place. It accounts for other country characteristics such as the local power sector structure, levels of clean energy penetration, price attractiveness and other market conditions. Because of this, Rwanda scored best partly because clean energy already comprises a high proportion of its overall capacity, while power and fossil fuels are priced relatively high locally.

Most African countries are at a very early stage of getting clean energy capacity actually installed. What is there generally falls into two categories: sources that have often been in place for decades such as small hydro installations and, to a lesser extent, captive generation biomass projects that burn agricultural residues; or new projects, mostly involving onshore wind or solar technology.

Rwanda is in the former camp, benefitting from a high makeup of small hydro plants in its small power system, which helped it take top marks on *Climatescope's* clean energy installed capacity indicator. The same was true of Malawi. In each case, the scores were achieved in part because they were levelized against the country's overall capacity.

AFRICA INSTALLED POWER CAPACITY BY SECTOR (GW) AND CLEAN ENERGY CAPACITY BY SECTOR (MW)



Source: Bloomberg New Energy Finance

Among the countries with the highest absolute levels of clean energy capacity, Kenya (403MW) and Ethiopia (326MW) still scored significantly but South Africa did not – its 511MW paled in comparison to its 43GW of other power plants. (It is worth noting again here that Climatescope does not count large hydro power projects in its clean energy figures.)

On the other hand, South Africa scooped the overwhelming majority of new investment that has gone into clean energy in sub-Saharan Africa and that is reflected in its finishing top in Africa on the growth rate of installed capacity indicator.

South Africa also ranked top on the energy policy indicator, largely due to the REIPPP, its reverse auction program, which has kick-started a 3.6GW scale up of clean energy capacity and transformed the market into global relevance since 2012. But the country also has a range of other financial and tax incentives, and significant targets. Kenya ranked 2nd for its policy framework, which includes a feed-in tariff (FiT) and ambitious targets, followed by Ghana, another FiT country.

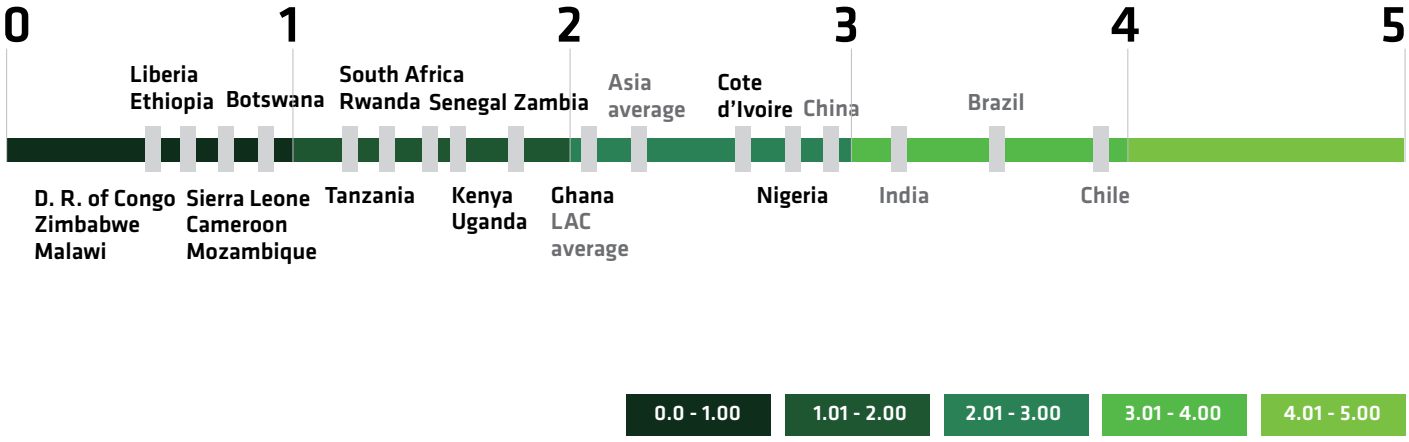
On the other hand, there are several countries with very weak or virtually no policies in place, most notably Sierra Leone and

CLEAN ENERGY POLICIES IN AFRICA

	Botswana	Cameroon	Cote d'Ivoire	D. R. of Congo	Ethiopia	Ghana	Kenya	Liberia	Malawi	Mozambique	Nigeria	Rwanda	Senegal	Sierra Leone	South Africa	Tanzania	Uganda	Zambia	Zimbabwe
Energy target			●		●	●	●	●		●	●	●	●		●	●	●		
Feed-in tariff						●	●				●	●					●		
Auctions			●									●	●		●		●		
Net metering							●						●						
Biofuels blending mandate					●				●	●	●								●
Debt/equity incentives					●				●	●	●	●			●	●	●	●	●
Tax incentives	●	●		●	●	●	●	●	●	●	●	●	●		●	●	●	●	●
Utility regulation		●				●	●								●	●			

Source: Bloomberg New Energy Finance

AFRICA POWER SECTOR SCORE BAROMETER



Source: Bloomberg New Energy Finance

Botswana, which finished at the bottom of the Parameter I table. New policy is often in some stage of development across these nations, but often it can take years to draft. Once legislated, implementation can often get delayed or go unfinished. (For complete descriptions of all of policies on the books supporting clean energy in the Climatescope nations, see www.global-climatescope.org.)

Sub-Saharan African power systems in general are still largely based on the old statist model of a vertically integrated government-owned monopoly utility. That said, some countries have embarked on power sector reforms, generally within the last decade.

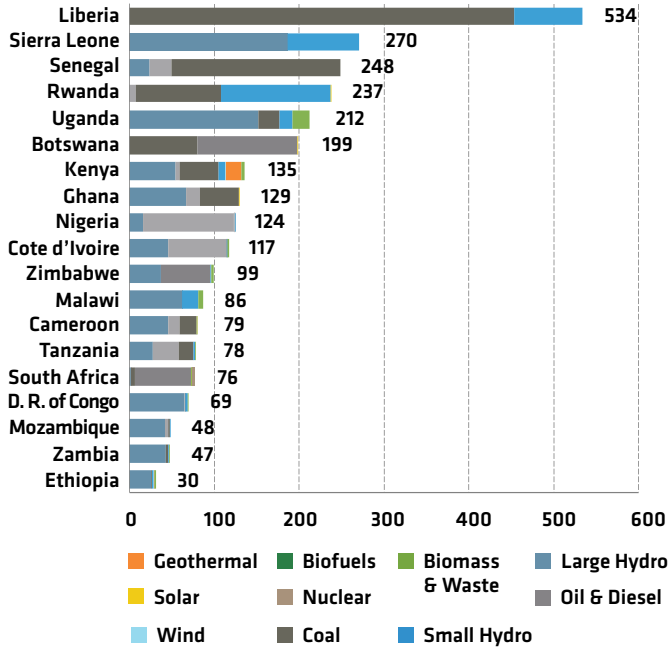
Intriguingly, those African countries with more liberalized power sectors were not necessarily the ones that performed best on Climatescope. The highest scoring countries for the power sector structure indicator were Nigeria and Cote d'Ivoire, followed by Ghana, Zambia and Uganda.

Nigeria is the first to undergo wholesale liberalization, whereby its generation and distribution companies are now privately owned, and a bulk buyer operates between them. In most other countries, liberalization is at an earlier stage: some have introduced privatization without fully unbundling generation, transmission and distribution (Cote d'Ivoire) while others partly unbundled but maintained state ownership of many assets (Ghana, Uganda and to a lesser extent Zambia).

The performance of some countries in attracting clean energy investment without having liberalized their power markets, beyond allowing private involvement in generation, begs the question of whether fully market-oriented systems are a necessary or desired condition for scaling up clean energy in Africa. South Africa and Ethiopia are the obvious examples, the latter being a country that is unlikely to loosen state control of the sector further than it already has.

Power prices vary massively across the continent, with extremes at both edges – from countries whose small power systems remain an expensive luxury, dependent on imported fossil fuel, to those that rely on low marginal cost large hydro plants and/or subsidize consumer prices to levels that prohibit cost recovery. Liberia has among the highest power prices in the world and scores maximum points on this indicator, which explains its surprisingly strong showing on Parameter I given the nascent state of its power sector and policy. The lowest cost power tends to come from countries with a lot of large hydro, followed by those with more mixed systems (including the new gas countries), with those most dependent on coal paying most.

AVERAGE RETAIL ELECTRICITY PRICES ($/MWh) BY POWER MIX, 2013



Source: Bloomberg New Energy Finance

Power demand growth can be a misleading data point in Africa – there is suppressed demand everywhere, alongside inadequate supply and weak grid systems – but Ethiopia scored highest on this indicator, reflecting partly its ambitious electrification program.

Off-grid focus enabling framework

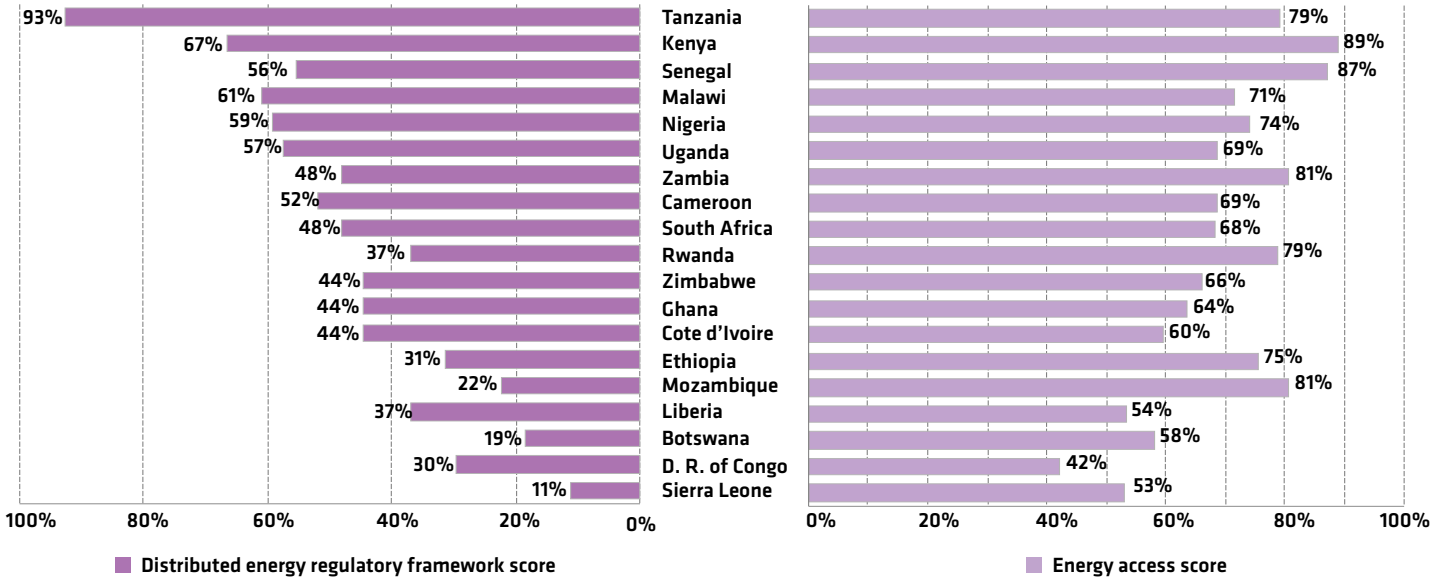
Distributed clean energy – whether through very small scale off-grid installations or the development of mini-grids and other small power projects – is a hot topic for many regions, none more so than sub-Saharan Africa. *Climatescope* sought to assess some of the key policy and regulatory questions around involving private investors, project developers and other companies in these emerging sectors.

The stand out performer for its policy-related off-grid focus indicators was Tanzania. The country has implemented a program targeted at incentivizing power projects smaller than 10MW and has a pipeline of projects that have responded to the scheme. Kenya, which follows, also offers standardized power purchase agreements for projects up to the same size as part of its feed-in tariff. Senegal scored next highest for its regulatory framework in this area, with Nigeria, Malawi and Uganda following further behind. However, Uganda and Kenya topped the African rankings for the off-grid focus indicator scores overall, with their more extensive value chains proving important in the distributed energy sectors too.

The field was more level in terms of country scores on the energy access policies indicator. Every African country has a rural electrification program in place, and specific energy access targets. The level of activity under these programs and funding vary more widely, partly as they have become a focus for international donors. Kenya and Senegal lead the pack on this indicator; notably, both specify clean energy as part of their energy access targets. In almost all the African countries, mobile money is widely used and can be leveraged for distributed energy business models, while clean energy products have penetrated consumer retail markets in all of them.

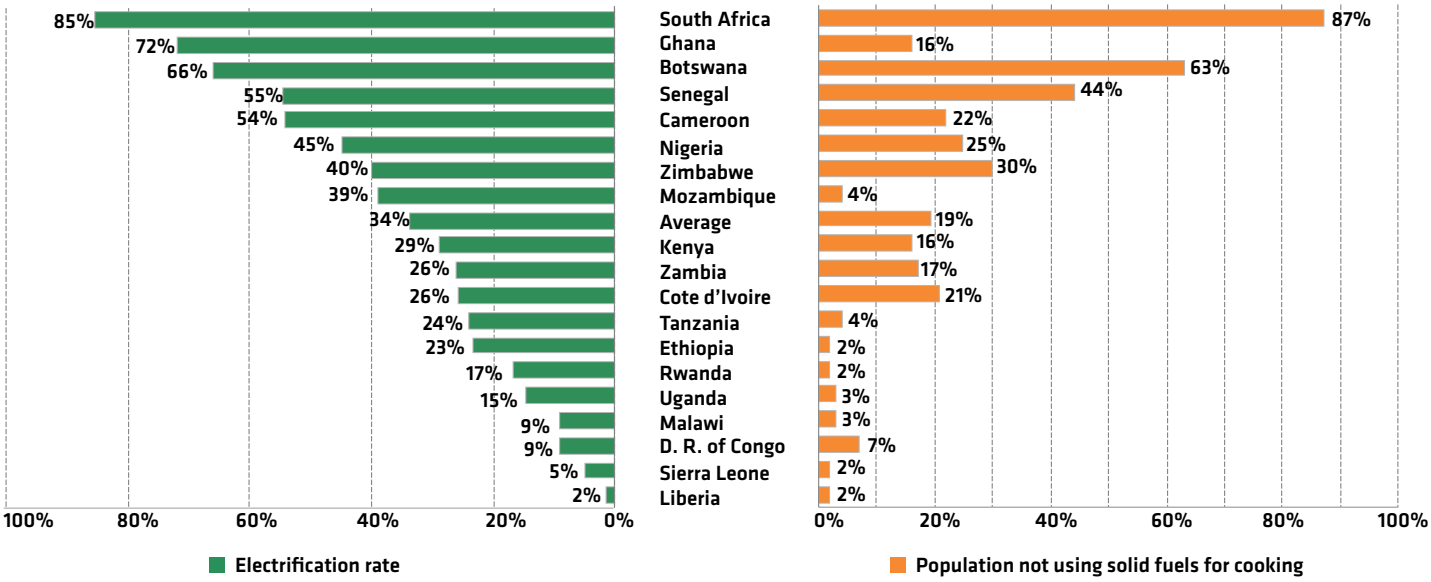
The price attractiveness and market conditions indicators under the off-grid focused methodology illuminated substantial variation between the nations. However, a clear set of countries have both the lowest electrification rates and the highest proportion of their populations using solid fuels for cooking. This suggests significant quotients of their populations are still to be engaged in modern energy services – and that distributed energy has transformative market potential. Exceptions include Mozambique and Ethiopia, which stood out for having very high biomass cooking rates but relatively higher electrification rates.
Diesel and kerosene prices tended to be highest in the same locations, with the Democratic Republic of Congo, Malawi, Rwanda and Senegal facing particularly high prices for both. This led them to score higher on those indicators as clean energy options are comparatively more price attractive.

DISTRIBUTED ENERGY AND ENERGY ACCESS SCORES



Source: Bloomberg New Energy Finance

ELECTRIFICATION RATES AND POPULATION NOT RELIANT ON SOLID FUELS FOR COOKING (%)



Source: Bloomberg New Energy Finance

CLEAN ENERGY INVESTMENT & CLIMATE FINANCING PARAMETER II

Clean Energy Investment & Climate Financing Parameter II looks at 14 indicators and accounts for the amount of clean energy investment a country attracts, the availability of local funds, the local cost of debt and green microfinance activity.

South Africa was far and away the leading African country on Parameter II, with Kenya a relatively distant second. Ethiopia, the Democratic Republic of Congo (DRC) and Sierra Leone followed at the front of the rest of the pack.

South Africa's REIPPP helped it attract over $10bn in 2012-13 and launched the country as a top ten global destination for clean energy investment. Its impressive record will continue in 2014, as further deals are closed under the Round 3 bidding window. This total was not the only reason South Africa led for Africa on Parameter II, however, as it scored particularly well for the growth rate of investment registered and for the more than $2bn in funds it secured from local financing sources. These included Standard Bank, Investec, Nedbank, Absa Capital and Rand Merchant Bank, though the World Bank also accounted for more than $500m of South Africa's total among other development finance institutions (DFIs).

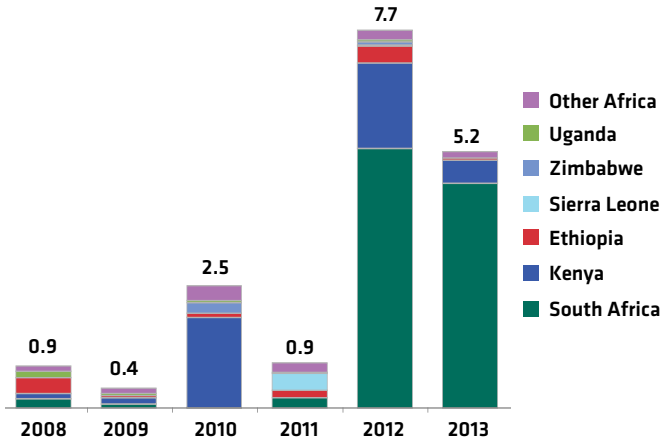
Kenya has been a consistent market for clean energy investment, mainly in geothermal and wind, attracting over $4bn since it introduced its FiT in 2008. That trend is likely to continue upwards: in 2014, the landmark $860m Lake Turkana wind deal reached financial close. Kenya has seen the largest inflow of DFI funding in sub-Saharan Africa since 2006, with the European Investment Bank (EIB) providing over $470m and Agence Francaise de Developpement (AFD) $315m. DFIs have played a fundamental role in the continent's clean energy projects to date: they have been involved in all the major ones monitored by Bloomberg New Energy Finance, often helping to bring on board commercial lenders. The World Bank has led the way, followed by the EIB, African Development Bank and AFD, all providing over $750m in more than 10 deals each.

The Export-Import Bank of China follows with just under $700m and that institution has been active in Ethiopia, which recorded nearly $1.5bn of investment in clean energy from 2006-13, spanning onshore wind, geothermal, biofuels and biomass. While the Export-Import Bank of China financed the Adama wind farm – and several large hydro projects – alongside the government, the DFIs of France, Germany and Japan have also been involved in the country, as has the African Development Bank.

Both the DRC and Sierra Leone perform well on Parameter II as outliers. Sierra Leone's score is skewed somewhat by the significance of a single financing – $349m for the Addax biofuel and biomass power plant. That investment levelized against the country's very modest $5bn GDP produced a high score on the clean energy investment indicator. Meanwhile, the DRC is credited for its growth rate of investment – some $200m in small hydro since 2010 – and the low interest rates reported by its green microfinance providers in a survey conducted for Climatescope.

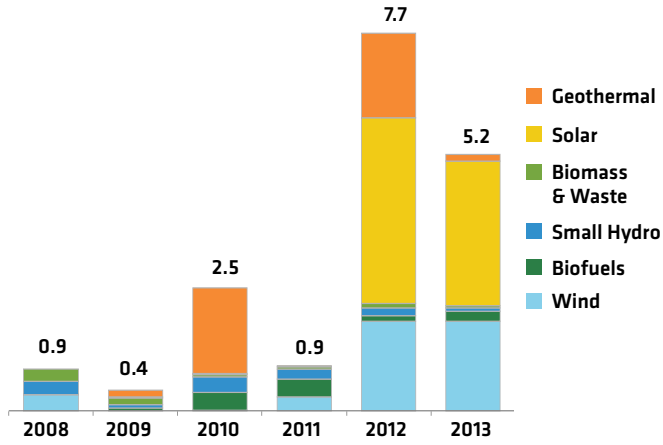
Overall, green microfinance is a nascent sector in Africa, with fewer than 30 microfinance organizations responding to the Climatescope survey that they offer loans for clean energy and low-carbon products or activities. However, three quarters of

TOTAL INVESTMENT IN CLEAN ENERGY BY COUNTRY, 2008-2013 ($bn)



Source: Bloomberg New Energy Finance

TOTAL INVESTMENT IN CLEAN ENERGY BY SECTOR, 2008-2013 ($bn)



Source: Bloomberg New Energy Finance

these said they intended to offer them within two years. It is worth noting that direct microfinance is hardly the only game in town for scaling up financing for micro-scale distributed energy, with several solar enterprises using pay-as-you-go business models combined with mobile technology to offer their own financing arrangements.

LOW-CARBON BUSINESS AND CLEAN ENERGY VALUE CHAIN PARAMETER III

Low-Carbon Business and Clean Energy Value Chain Parameter III measures through three indicators the availability of local manufacturing and other capacity to spur clean energy deployment. These take into account the presence of local manufacturers, service providers, financiers and (apart from South Africa) include those companies serving the off-grid and distributed energy sectors.

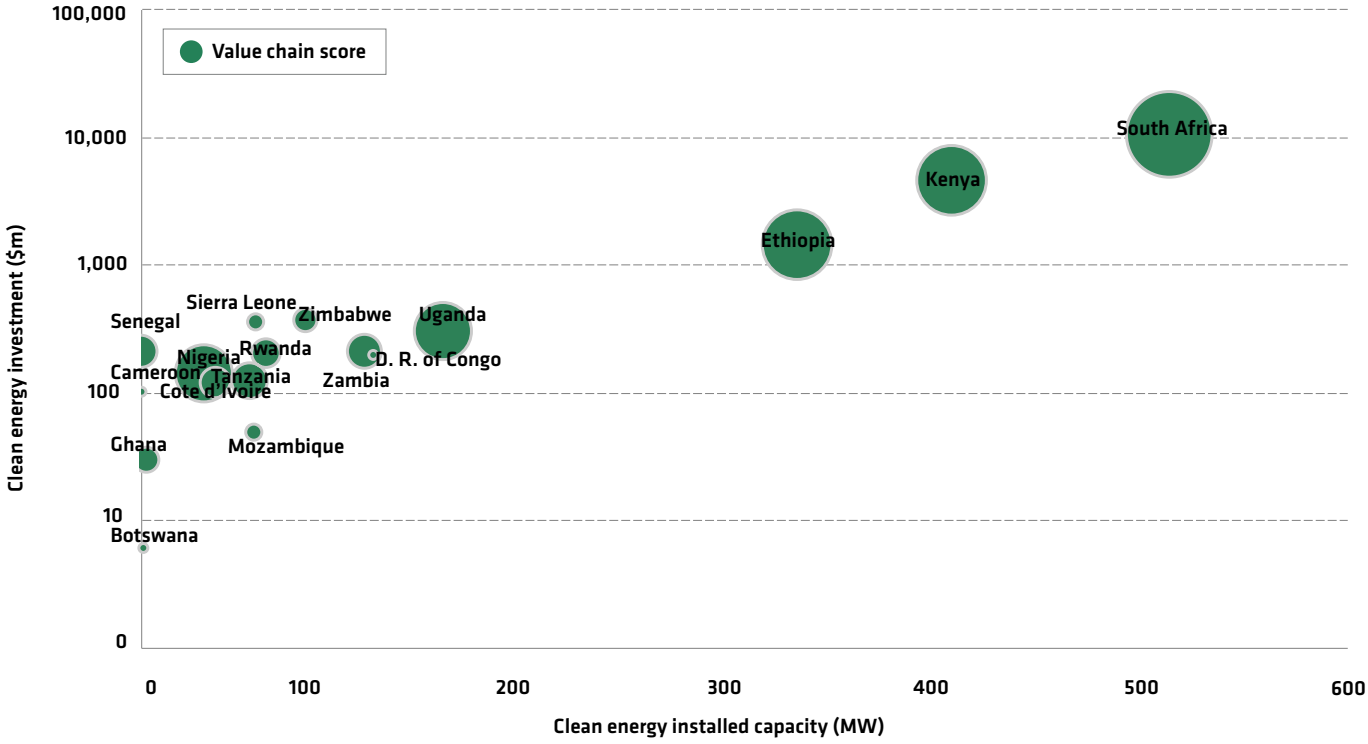
The African *Climatescope* countries offer a diverse picture of the value chains and related businesses in clean energy in the region. South Africa predictably takes 1st place, followed by the other overall top three countries, Uganda and Kenya – all have seen significant project development in recent years. The next highest rankings are taken by relatively large African economies: Nigeria, Tanzania, Ethiopia and Ghana, in that order. All are primed for clean energy investment and this suggests that local players could benefit.

South Africa led for Africa again on Parameter III, which was unsurprising, not just due to the size of its economy and regional relevance, but also because the country has specific "local content" rules. Bidders under the REIPPP auctions are favored if they use components manufactured in-country. Companies engaged in solar and wind manufacturing have seen a surge in recent years, while those in the biofuels, biomass and small hydro sectors have existed for longer. The country boasts every kind of service provider. Meanwhile, South Africa's world class financial sector has also been mobilized by the REIPPP, providing over a fifth of the required clean energy financing.

Uganda landed in 2nd place, with a complete off-grid value chain and all but two types of service provider. Its financial sector also saw one of the first renewable corporate bonds issued in the region, a $30m raise from Kakira Sugar to fund expansion of its cogeneration plant. Kenya, meanwhile, has all but one of the service providers and companies active at some stage of the value chain in all the clean energy sectors. It is one of few countries in the region to manufacture solar modules.

The value chains and service providers assessed under the off-grid focus methodology included locally-based companies involved in distributed solar, mini-hydro, mini-wind and clean cooking, as well as related services including industry associations, training and retailers. On these indicators specifically, Tanzania came out on top, with all of the value chain companies, including at least one mini-wind turbine manufacturer. All of the East African countries scored well for distributed energy service providers, along with Ghana and Zambia. There were importers and retailers of solar equipment in every country.

VALUE CHAIN SCORE VS CLEAN ENERGY INVESTMENT, 2008-13 ($M) VS CLEAN ENERGY INSTALLED CAPACITY, 2013 (MW)



Source: Bloomberg New Energy Finance

GREENHOUSE GAS MANAGEMENT ACTIVITIES PARAMETER IV

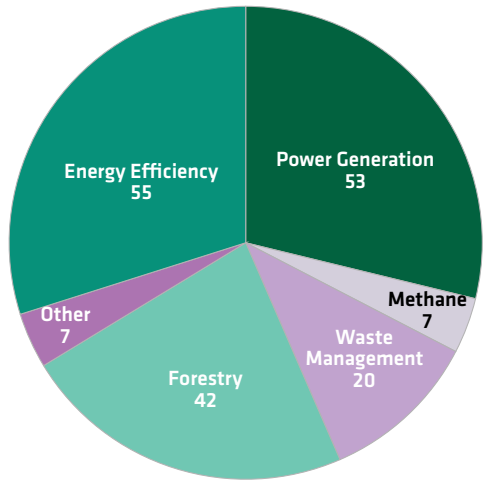
Greenhouse Gas Management Activities Parameter IV takes into account carbon offset project activity, level of policy support for carbon emissions reduction, and local corporate awareness of carbon issues through a total of 13 indicators.

In general, African countries have not registered comparatively high levels of offset projects under the CDM. This partly relates to the lack of demand for credits from forestry projects, greater potential for industrial efficiency projects in Asia, and rules around additionality that are harder to fulfil with low emission baselines. The higher perceived investment risk of many African countries has also slowed financing. Nor has carbon reduction policy been a priority for many countries, given many of their low emission profiles and other development priorities.

South Africa ranked 1st on Parameter IV, followed by Ghana, Kenya, Uganda and Zambia. The leader has 54 registered CDM projects, which account for 42% of all those among the Climatescope Africa countries and mostly relate to power generation.

AFRICAN GHG OFFSET PROJECTS BY SECTOR

184 GHG projects



Source: UNEP Risoe, Bloomberg New Energy Finance

However, South Africa received only an average score on the historical offsets indicator, as they are less significant when levelized against its total emissions. Rather, Kenya and Zambia score the most points for this indicator: the former has the highest number of Voluntary Carbon Standard projects and second most overall, while Zambia is credited for the scale and sectoral coverage of its handful of offset projects. Uganda has the third highest number of offset projects, predominantly under the CDM and mostly in forestry.

Ghana was among the countries that scored well on CDM project risk. However, this indicator was in several cases skewed by countries that had very few offset projects, which were deemed relatively lower risk because they neither failed nor took too long to register. Ghana also hosts think tanks and business training in the sector – one of few African countries, alongside Ethiopia, Malawi, South Africa and Uganda, to have both.

South Africa was the only African country to score even moderately for its carbon policy, as it has a GHG emissions reduction target – pledged under the UNFCCC – and is engaged in the Partnership for Market Readiness (PMR) and Nationally Appropriate Mitigation Action (NAMA) programs. It also plans a carbon tax, though given the dire financial conditions of the national utility, its implementation is far from certain. Virtually none of the other African Climatescope nations have made similar levels of commitment.