BRIDGES NETWORK

BRIDGES AFRICA

Trade and Sustainable Development News and Analysis on Africa

VOLUME 7, ISSUE 3 – APRIL 2018

Harnessing Renewable Energy for Sustainable Development

RENEWABLE ENERGY

What should LDCs keep in mind while developing renewables?

FINANCING

Making the most of available funding options for renewable energy projects

EMPLOYMENT

The stakes of Africa's energy transition from an employment perspective

ICTSD

International Centre for Trade and Sustainable Development

BRIDGES AFRICA

VOLUME 7, ISSUE 3 – APRIL 2018

BRIDGES AFRICA
Trade and Sustainable Development News and Analysis on Africa

PUBLISHED BY
ICTSD
International Centre for Trade and Sustainable Development
Geneva, Switzerland
www.ictsd.org

PUBLISHER
Ricardo Meléndez-Ortiz

EDITOR-IN-CHIEF
Andrew Crosby

MANAGING EDITOR
Tristan Irschlinger

ADDITIONAL SUPPORT
Fabrice Lehmann and Jocelyn Hu

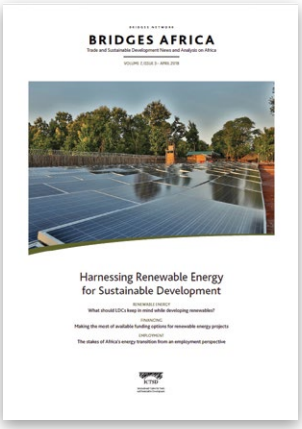
DESIGN
Flarvet

LAYOUT
Oleg Smerdov

To join the Bridges Africa Editorial Advisory Board write to us at bridgesafrica@ictsd.ch

BRIDGES AFRICA welcomes all feedback and is happy to consider submissions for publication. Guidelines are available upon request. Please write to bridgesafrica@ictsd.ch

Harnessing Renewable Energy for Sustainable Development



Energy is the lifeblood of modern economies and societies. As such, the management and development of energy resources constitute an absolute priority from a sustainable development perspective. This is reflected both in Sustainable Development Goal (SDG) 7, which commits UN member states to ensuring "access to affordable, reliable, sustainable and modern energy for all," and in the broader recognition that energy will be key in achieving almost all of the SDGs. In particular, improving energy access will be critical to progress towards agreed global targets in the areas of poverty reduction, industrialisation, economic growth, health, and education, among others. Importantly, efforts to increase energy access must also factor in climate change as encompassed in SDG 13 on climate action as well as the 2015 Paris climate agreement. Carbon-intensive economic development is no longer an option, meaning that clean and renewable sources must be put at the centre of energy policy.

In sub-Saharan Africa, the energy challenge is particularly acute. According to the International Energy Agency, today around 78 percent of the region's inhabitants rely on solid biomass for cooking – which often comes with significant health risks – while 57 percent do not have access to electricity. Most of these people are concentrated in rural areas that conventional grids often fail to reach. Although encouraging progress in electrification has been achieved in recent years on the continent, there is still a long way to go. To tackle energy poverty and build modern, sustainable, and inclusive energy systems with a view to transforming African economies and improving livelihoods, determined and ambitious policy efforts will be required.

Fortunately, Africa is endowed with considerable energy potential. Along with significant fossil fuel reserves, it has abundant biomass, geothermal, hydropower, solar, and wind resources, which can power homes, businesses, schools, and dispensaries across the continent. Against this background, what are the key considerations and priorities that African countries, in particular least developed countries (LDCs), should keep in mind as they develop renewables? How can they best take advantage of available funding options to finance renewable energy projects? What are some of the broader considerations related to the energy transition? This issue aims at shedding light on these questions.

In the lead article, Giovanni Valensisi focuses on LDCs and offers insights to help inform strategies for the deployment of renewable energy. David Chama Kaluba, for his part, reflects on how African countries can better access available funding options for renewables. The third piece, written by Moustapha Kamal Gueye, examines the employment implications of Africa's energy transition. This issue further features an article focusing on the rationale and opportunities for fossil fuel subsidy reform on the continent. The final two articles look at the experience of Solar Sister – a not-for-profit social enterprise – in supporting small-scale women entrepreneurs in the renewable energy sector, and the role of mini-grids in responding to the continent's energy needs.

As usual, we welcome your substantive feedback and contributions. Write to us at bridgesafrica@ictsd.ch.

LEAST DEVELOPPED COUNTRIES

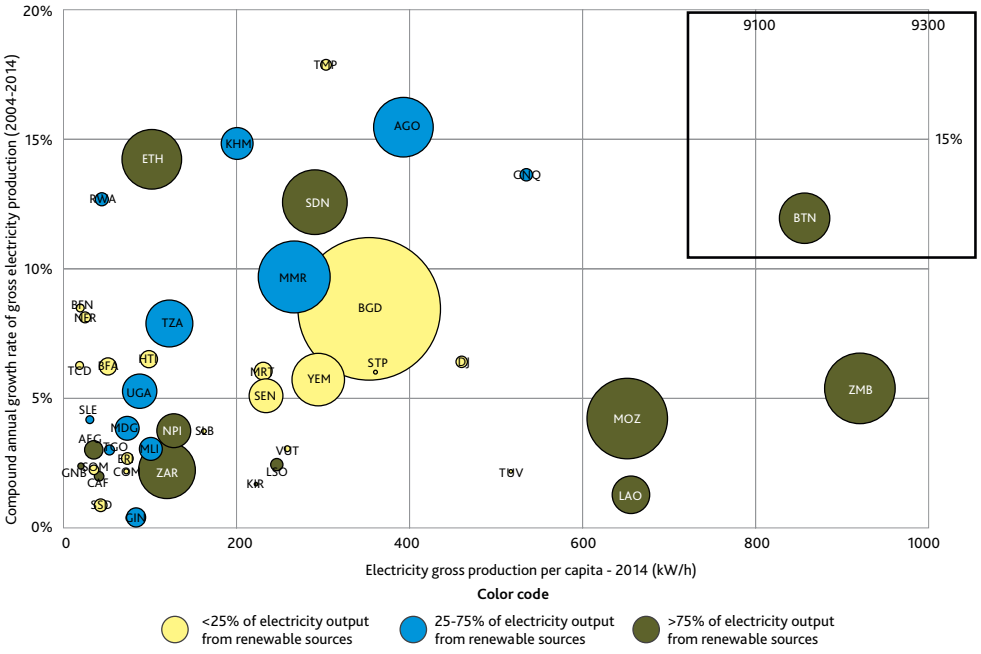
Renewables in Least Developed Countries: More Arrows in the Quiver?

Giovanni Valensisi

Ensuring universal access to energy will constitute a major challenge for least developed countries. What are the key considerations that these countries should keep in mind as they deploy efforts towards meeting this objective?

As "sustainable and modern energy" continues to feature prominently in the development discourse and the global shift towards low-carbon energy system gains momentum, the specific situation of the least developed countries (LDCs) warrants deeper consideration. Representing 13 percent of the world's population, these countries account for the majority of people lacking access to electricity (54 percent in 2014), and will thus largely determine whether the objective of universal energy access enshrined in Sustainable Development Goal (SDG) 7 will be achieved or missed. Although the levels of installed capacity and electricity production have been on the rise for the last 15-20 years in LDCs, they have so far failed to catch up with mounting demand. The "electricity divide" between LDCs and the rest of the world has actually widened, to the extent that in 2014, electricity production per capita was less than a third of the world average (3,290 kilowatt hour) in all LDCs but Bhutan (Figure 1).[1]

Figure 1: Gross electricity production in the LDCs (production per capita, growth rate, and share of renewables)



Notes: the size of the bubble is proportional to the country's total gross electricity production in 2014. Bhutan (BTN) is represented separately because it is an obvious outlier in terms of gross electricity production per capita.
Source: Author's calculation based on data from UNCTAD 2017

Against this background, considerations related to the virtues of renewable energy for climate change mitigation are unlikely to play a decisive role for LDCs, given that they account for a negligible share of historical CO_2 emissions, display extremely low levels of energy consumption per capita, and in many cases already have a low-carbon power sector thanks to hydroelectric dams. A more fundamental issue, from an LDC

perspective, is rather the extent to which technological innovations and the improving cost-competitiveness of (mainly non-hydro) renewables can be harnessed to boost their power sectors.

In this context, national and international investors are increasingly eyeing viable business opportunities to scale up renewable energy generation in developing countries, Africa being often touted as a lucrative frontier market. Many developing countries themselves have bet on the potential of renewable energy. In the context of the COP 22 of the UN Framework Convention on Climate Change, for example, the members of the Climate Vulnerable Forum (a coalition encompassing 24 LDCs) have pledged to achieve 100 percent domestic renewable energy production by 2050. Whilst these developments are promising, exploiting the transformational opportunities offered by renewables will require a sound and proactive policy framework capable of shaping the evolution of the power sector in a predictable way, as well as concerted policy efforts at the local, national, and international levels.

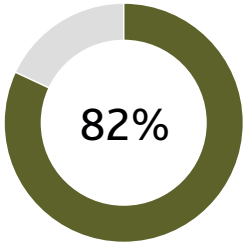
The remainder of this article is structured as follows. The next section presents key strategic considerations with respect to the opportunities that renewable energy sources may bring about in the context of LDCs' development efforts. The following one highlights the main challenges related to technology transfer, which will be required for scaling up the deployment of renewable generation technologies. The final section outlines some broad policy recommendations.

The strategic dimension of renewables for LDCs

Worldwide, the deployment of renewables has accelerated significantly over the last few years, and this trend is set to continue. The International Energy Agency estimates that in 2016, renewable energy sources accounted for almost two-thirds of new net capacity additions, with solar photovoltaic (PV) and wind claiming the lion's share of this increase.[2] In LDCs, unlike in other developing countries (notably China and India), the penetration of non-hydro renewables is still an incipient phenomenon, mainly confined to smaller-scale plants. Nevertheless, the process is rapidly getting traction. In the last few years, utility-scale solar and wind farms have come online in a number of LDCs, with countries like Ethiopia, Laos, and Senegal leading the way. As this trend gains momentum and learning effects push further down the cost of renewable energy technologies, a few strategic considerations are warranted.

As technological progress broadens the array of commercially viable energy technologies, more options become available to realise least developped countries' theoretical resource potential, and boost electricity production and access.

From an LDC perspective, the economic rationale underpinning the growing appeal of renewables rests on four main elements. Firstly, most LDCs are characterised by vast and largely untapped energy resource potential, not only for hydro-electricity, but also for solar, wind, bioenergy, and – in some cases – geothermal generation. As technological progress broadens the array of commercially viable technologies, more options become available to realise their theoretical resource potential, and boost electricity production and access. In this respect, LDCs could also benefit from a "latecomer advantage": they can leverage their renewable energy potential without incurring large costs for retrofitting existing infrastructures, but rather by gradually integrating renewables into their system. Secondly, renewable energy technologies (such as solar PV, mini-hydro, or even biomass generators using agricultural wastes) lend themselves well to the kind of decentralised generation which could spur rural electrification where the costs of grid extension remain prohibitive. Considering that 82 percent of the people lacking access to electricity in LDCs



Least developed countries (LDCs) account for the majority of people lacking access to electricity on a global scale, and 82 percent of the people lacking access to electricity in LDCs live in rural areas.

live in rural areas, the deployment of renewable-based or hybrid mini-grids and other off-grid technologies thus promises to have a transformational effect, facilitating the emergence of higher productivity rural non-farming activities. Thirdly, a strong renewable energy sector might open the scope for fostering the establishment of stronger and more viable energy value chains through backward and forward linkages, including not only the manufacturing and assembling of renewable energy technologies, but also installation, maintenance, and repair services. Fourthly, except in the case of countries endowed with fossil fuel reserves, on the medium-term a gradual transition towards low-carbon energy sources might help reducing the import bill for fuels, thus alleviating balance of payment difficulties.[3]

Beyond the purely economic sphere, a greater penetration of renewable-based technologies might be helpful also from an energy security point of view. Most LDCs have historically relied on variable combinations of fossil fuel and hydroelectric plants for their power generation, with a number of them being entirely dependent on one of these sources only.[4] In this context, technological advances in (mainly non-hydro) renewable energy technologies could pave the way for greater diversification of the power generation mix, enhancing system resilience. The relevance of these considerations is set to increase as the impact of climate change becomes more visible, as highlighted by the recent experience of which turned to solar as its hydro-based electricity production plummeted due to severe drought.

The challenges of technology transfer

While the above factors will plausibly play a key role in the long term, leading to a gradual and more varied penetration of renewable energy technologies in the LDCs, one cannot take for granted a smooth process of technological diffusion. Nor is the pace of such a transition likely to be in line with international targets if left to the spontaneous workings of the market. Meeting SDG 7 will undoubtedly require daunting financial efforts, regardless of the suite of technologies considered. Estimates of the cost of attaining universal electricity access range, in the case of LDCs, from US$12 to US$40 billion annually. With development assistance to energy-related sectors in LDCs falling short of US$3 billion in 2016, and in view of the looming concerns about LDCs' debt sustainability, the quest for development finance is set to remain the top priority.

This situation is exacerbated by the fact that renewable energy technologies are typically characterised by large upfront capital expenditures. Therefore, LDCs' tight financing conditions (and higher perceived risk) end up weighing down their competitiveness vis-à-vis alternative options. Moreover, while international costs of renewable-based electricity are declining (especially for solar PV), varying local conditions imply large heterogeneity across countries, meaning that technologies which are commercially viable in some contexts may not yet be competitive in many LDCs.[5]

Equally important, for an industry characterised by scale economies and large variations between peak and off-peak load, the viability of investments is constrained by the size (and time-profile) of demand. The limited purchasing power of consumers in LDCs, coupled with the low levels of energy demand for productive purposes, thus translate into challenging market conditions, whereby prospective investors have to balance scale economies considerations with the risk of low capacity utilisation. In this context, the need to reconcile affordability and financial sustainability cannot but affect the way in which utilities and policymakers engage private investors and independent power producers. If the involvement of the latter has proved beneficial to accelerate renewables' deployment, on the other hand, the sustainability of the underlying business models has also been questioned. The political economy dimension of private sector participation, including with reference to the terms of power purchase agreements, deserves particular scrutiny in view of the potential for market power or natural monopoly situations.[6]

Moreover, as renewables' performance is often contingent on local conditions (solar irradiation, wind-speed, etc.), their deployment cannot but rely on systematic mapping of LDCs' resource potential, careful planning and designing, and sound operation and

management. This is compounded, in the case of variable renewables (i.e. solar or wind), with the need to devote additional resources to cope with their intrinsic variability, by enhancing and effectively managing system flexibility through storage, better transmission networks, demand management, etc. In this context, if becoming "early adopters" of advanced renewable energy technologies may indeed offer LDCs some scope for leap-frogging – decentralised generation and smart-grids being a case in point –, the multifaceted complexity of energy systems makes the acquisition of know-how and technological adaptation all the more critical. Moreover, technology diffusion is affected by absorptive capacities both at local level (for instance by decentralised power producers or mini-grids operators) and within specialised institutions (like planning authorities, system operators, and energy research centres).

To date, of the four main channels for technology transfer and acquisition – namely trade, foreign direct investment, licensing, and labour mobility – international trade has been by far the most relevant for LDCs in relation to energy technologies. The more than doubling of net installed capacity taking place in LDCs over the last 10-15 years has been accompanied by a fourfold increase in the imports of power generating machinery and equipment.[7] Around half of these flows (and 70 percent of imports of electrical end-use machinery and appliances) originated in other developing countries, highlighting the growing relevance of South-South trade as a vehicle for energy-related technology transfer, with China being the main (but not only) driver of this trend.

While burgeoning trade flows confirm the dynamism of investment in energy sectors, renewables will not unleash their full development potential unless LDCs are able to move beyond pure technology acquisition and into adaptation and related innovation. From this perspective, notwithstanding some encouraging signs, the track record remains rather inadequate, due to the weakness of local absorptive capacities in relation to a rapidly evolving and increasingly technology-intensive sector, as well as to the lack of effective international support measures.

More needs to be done if least developed countries are to achieve universal access to sustainable and modern energy (SDG 7) and reap broader developmental benefits from a gradual shift towards low-carbon energy systems.

The way ahead

The incipient penetration of non-hydro renewables in LDCs is consistent with past energy transitions, whereby the penetration of new technologies required a relatively long initial period of adaptation and cost discovery before larger-scale deployment. Nonetheless, more needs to be done if LDCs are to achieve universal access to sustainable and modern energy (SDG 7) and reap broader developmental benefits from a gradual shift towards low-carbon energy systems.

With this objective in mind, LDCs may consider the following priorities for their energy policy framework:

- Developing a sound and predictable system-wide planning for the power sector, to shape its long-term evolution in a coherent manner (including through harmonised standards to ensure interoperability), while fully exploiting synergies and complementarities across different technologies;

- Leveraging the modularity of renewable energy technologies (especially in the context of decentralised generation), and more generally adopting forward-looking approaches

to future energy needs, in order to minimise the risks of technological lock-in and enhance system flexibility;

- Fully integrating modern energy access into development strategies, with a view to foster productive energy uses and give rise to a virtuous circle between energy supply and demand;

- Adopting a strategic approach to trade and investment issues, including by harnessing regional integration (notably power pools) and South-South cooperation with a view to strengthening system resilience, as well as absorptive capacities and local innovation systems.

Needless to say, the international community also has an essential role to play in supporting the achievement of SDG 7, and the global transition to low-carbon energy systems. In particular, three areas of intervention stand out in relation to LDCs. First, there is a need for greater provision of aid and technical assistance to the energy-related sectors in LDCs, in line with long-standing international targets. Second, more effective forms of international support are warranted to facilitate the transfer of clean energy technologies to the benefit of LDCs (including through the recently established Technology Bank for LDCs). Finally, it is also crucial to increase the availability of de-risking instruments to facilitate the crowding-in of private financial resources while keeping in check LDCs' levels of indebtedness.

This article is based on chapter 3 of UNCTAD's Least Developed Countries Report 2017: Transformational Energy Access: http://unctad.org/en/PublicationChapters/ldcr2017_ch3_en.pdf

---

1. UNCTAD. *The Least Developed Countries Report 2017: Transformational Energy Access*. New York and Geneva: United Nations, 2017.

2. International Energy Agency (IEA). *Medium-Term Renewable Energy Market Report 2017.* Paris: OECD/IEA, 2017.

3. This consideration is particularly relevant for small island LDCs, most of which are entirely reliant on imported oil products for their electricity generation. See UNCTAD, *op cit.*

4. *Ibid*.

5. Offshore wind and concentrated solar power provide instructive examples in this respect.

6. Anton A. Eberhard et al. *Independent Power Projects in Sub-Saharan Africa: Lessons from Five Key Countries*. Directions in Development Energy and Mining. Washington, DC: World Bank Group, 2016.

7. UNCTAD, *op.cit.*

Giovanni Valensisi
Economic Affairs Officer, United Nations Conference on Trade and Development

AFRICA

Financing Renewable Energy in Africa in the SDG Era

David Chama Kaluba

At a time when developing renewable energy has become a priority for sustainable development, how can Africa best take advantage of the myriad international financing options that are available to develop sustainable energy systems that support the continent's economic transformation?

Renewable energy, in its many forms and with a multitude of financing options, is here to stay, as it will play a pivotal role in efforts to implement both the Sustainable Development Goals (SDGs) and the 2015 Paris Agreement on climate change. As a clean and much-needed alternative source of energy, it can be instrumental in supporting enhanced energy access in Africa and driving the continent's sustainable development agenda. For these grand objectives to materialise, however, there is a need for African countries to design the right strategies in order to secure the necessary funding for the deployment of renewable energy solutions.

Renewable energy and the Sustainable Development Goals

A real life story from a community in Zambia is a good way to set the stage for our discussion. Mutemwa Community in Zambia's Sesheke District received financial support to implement a water reticulation project from the World Bank's Pilot Programme for Climate Resilience in 2014. The proposal submitted was a response to the impact of climate change. The main idea was to bring water closer to the community, which is located in a drought-prone area where changing climate patterns have led to more severe drought episodes. Three solar-powered boreholes were to be installed at the school and in two other communities at a total cost of US$50,000, benefiting 1,442 people, half of them women.

When it had been successfully implemented, the project meant that the community's women and young girls no longer had to walk long distances to the crocodile-infested Zambezi River where they used to fetch water every day. In the process, it also reduced the risk of deaths and loss of livestock from crocodile attacks. With a solar-powered borehole, members of the community now have clean water close to their yards. Neighbouring households extended pipes to common locations nearby to reduce the distance from the main tap at their own cost. In order to ensure sustainability, the community instituted a mechanism for the collection of fees towards repairs, maintenance, and the security of the solar installations.

A number of lessons emerge from this project. Renewable energy enabled the community to secure their important assets such as cattle, goats, and chickens in the advent of climate change. Clean water has meant fewer cases of diarrhoea and other waterborne diseases that all-too-often plagued the community as a result of drinking contaminated water from shallow wells and rivers. The school can now boast of access to water for its school feeding programme supported by the government of Zambia and donors such as the World Food Programme and UNICEF. The water and sanitation situation at the school is better because toilets can now be cleaned more consistently.

The Mutemwa water reticulation project illustrates, in clear and simple terms, the strong synergies between renewable energy, the SDGs, finance, and international cooperation, which are all essential ingredients for Africa's sustainable development. The story of the solar-powered boreholes in rural Africa is not unique. Other systems such biogas, geothermal, and wind solutions are equally important inputs in the transformation agenda. All these options have tremendous potential and can provide the sources of energy needed to support communities, households, small businesses, and literacy classes

600 million

Estimates by the International Energy Agency suggest that close to 600 million people in Africa, which represents a little less than 60 percent of the continent's total population, do not have access to electricity.

in rural areas across the continent. They can also, for example, improve the delivery of health services in villages which conventional electric power lines do not reach. This is in addition to reducing the environmental damage caused by the unsustainable cutting down of trees for firewood and charcoal.

On a large scale, some examples in East and North Africa can be considered. Solar farms such as Africa's largest 2.2 billion euro Noor Ouarzazate IV power station in Morocco, spanning 137 square kilometres and generating 582 megawatts of renewable energy for over 1 million people, can deliver greater benefits at scale. In Kenya, a 630 megawatts geothermal plant has come on line, providing electricity for 500,000 households and 300,000 small and medium-sized enterprises. Kenya alone has the potential to generate 10,000 megawatts from its geothermal resources. The Japan International Cooperation Agency is currently providing a loan of approximately US$400 million for the construction a new 140-megawatt geothermal plant in the country. As clearly illustrated by these examples, renewable energy can be a powerful engine for sustainable development at various levels of society in Africa.

Renewables have tremendous potential and can provide the sources of energy needed to support communities, households, small businesses, and literacy classes in rural areas across the African continent.

Why is investment in renewable energy important for Africa?

Estimates by the International Energy Agency suggest that close to 600 million people in Africa, which represents a little less than 60 percent of the continent's total population, do not have access to electricity, while around 780 million rely on traditional solid biomass for cooking (mainly fuelwood and agricultural waste). Nearly 80 percent of those lacking access to electricity across sub-Saharan Africa are living in rural areas. Looking at the targets contained in the nationally determined contributions (NDCs) submitted by countries that are party to the Paris Agreement, the International Renewable Energy Agency (IRENA) found that Africa's renewable power installed capacity could increase by 290 percent between 2015 and 2030, compared to 161 percent for Asia and 43 percent for Latin America. IRENA also estimates that the cost-effective potential for renewables on the continent is around 310 gigawatts by 2030.

In terms of financing needs, the World Bank has estimated a required investment of US$43 billion per year in infrastructure in the power sector, while the African Development Bank and the United Nations Environment Programme (UNEP) estimate a need for a package of US$41 billion per year to finance the development of the energy sector in Africa. According to the Africa Progress Panel, an additional investment of US$55 billion per year will be needed until 2030 to achieve universal access to electricity on the continent. Looking at renewable energy specifically, IRENA has estimated that to fully exploit Africa's significant potential in renewables, US$32 billion will be needed on average every year from 2015 to 2030. Most of these estimates are based on the cheapest source of energy and must thus be seen as a lower floor for the investment needed in renewable energy. In this context, how does Africa secure these funds?

Financial instruments

Coming back to some of the specific projects mentioned above, we note that in the case of the Moroccan solar project, the funding avenues included resources from the German KfW development bank, the European Union, the European Investment Bank, and the Saudi Arabian ACWA Power group. In the Mutemwa project, the role of partnerships between the government of Zambia, the Climate Investment Fund, and the World Bank is also part of the story. In each case, it is worth noting that the grant mechanism served as a means

to de-risk these important investments. For example, the World Bank provided a US$4.5 million grant towards the first phase of the main Pilot Programme for Climate Resilience project to support the efforts by the government of Zambia to conduct feasibility and baseline studies, draft operation manuals, establish institutions with appropriate staff and systems, engage stakeholders, and raise awareness among members of the benefiting communities on their role in the project. Being a community-based intervention for adaptation with co-benefits in climate change mitigation, the Mutemwa project received grant funding for this innovative initiative.

Overall, international cooperation through bilateral and multilateral relationships has played a crucial role in delivering the much-needed technical, technological transfer, and financial support towards renewable energy projects in Africa, both large and small in scale. African countries have the opportunity to utilise the global social and environmental goodwill to access cheap technical, technological, and financial resources to make leaps in the continent's sustainable development agenda. The Mutemwa and Morocco consolidations of various financing instruments are good examples of how African countries can mobilise various resources to achieve scale and secure the necessary project financing.

The current financing landscape hosts large players such as the World Bank, which had a US$61 billion portfolio in 2016, funding large and small infrastructure projects all over the world, including Africa. Alongside a large loan portfolio, the World Bank also provides concessional financing to countries whose GDP per capita does not exceed US$1,215 per annum. In total, an estimated US$12.6 billion was allocated towards projects in sub-Saharan Africa by the World Bank in 2016. The African Development Bank, based within the continent, has approved a total of US$103 billion in loans and grants across Africa since its creation in 1974. In 2016, the Bank disbursed US$6.3 billion towards projects and programmes on the African continent. Another important source of funding, the Global Environment Facility (GEF), was established in 1992 on the eve of the Rio Earth Summit by UNEP, the United Nations Development Programme, and the World Bank, with the objective of tackling the world's pressing environmental problems, and is a reliable response to some of the SDGs. To date, it has provided over US$17 billion in grants for various projects worldwide. Most recently, the world saw the emergence of the Green Climate Fund (GCF) in 2011, and its first financial envelope reached US$10.6 billion in 2015. Like the World Bank, the African Development Bank, and the GEF, the GCF offers avenues for supporting private sector initiatives towards development objectives.

African countries have the opportunity to utilise the global social and environmental goodwill to access cheap technical, technological, and financial resources to make leaps in the continent's sustainable development agenda.

Taken together, these funding channels offer a variety of funding options, making available both grants and loans (concessional and non-concessional) to countries depending on the nature of the specific projects they seek to finance. Other players such as the European Investment Bank, the European Union, the Japanese Development Agency, the United States Agency for International Development, the Swedish International Development Cooperation Agency, the Danish International Development Agency, the UK's Department for International Development, the Canadian International Development Agency, and other bilateral institutions also provide grants and loan schemes to African countries. In this sense, opportunities for financing the SDGs, and renewable energy projects in particular, are wide-ranging.

What should African countries do to access funds?
The choices available are myriad, but there are a few guiding principles that African should follow to optimise access to these funds and maximise their potential.

First, countries need to define their needs accurately and in a manner that optimises their chances of achieving their sustainable development objectives. This is key to access funds, enhance their impact, and support country ownership. Most African countries have produced long-term visions and national development plans to guide medium-term strategies, but technocrats need to be focused and deliberate about accessing resources for renewable energy investments.

Second, African technocrats must produce bankable projects in advance, before financing entities come knocking at their doors. Coordinating institutions of government should drive the renewable energy agenda, as opposed to being driven from the supply side. This approach can spur countries into a proactive engagement with financiers by creating a demand for resources. And to win in the race in this context, a country need to present more bankable projects than others.

Third, putting in place an enabling environment is crucial for attracting investment. Policies on taxation and feed-in-tariffs must be structured with an eye to making a winning case. Locally managed power companies should also play their role in reducing inefficiencies in electricity generation and thus help make the most of financial resources that are already available.

Fourth, embracing the private sector will also be key. The private sector can play an important role in rolling out renewable energy investments quickly and at no cost to governments. These investments are a vital source of technology transfer and deployment of young talent at scale.

Fifth, almost all funding entities look for recipient institutions that meet internationally accepted fiduciary standards and have appropriate environmental and social safeguards in place. This entails professionalism, employing modern tools and systems of management, and efficient execution of projects. Government officials must engage with the experts from multilateral and bilateral funding institutions as equal partners for better deals. Africa has plenty of these experts but they must be gathered at the negotiating table across from these partners to represent their country.

David Chama Kaluba
Chief Executive Officer, Welada
Bio-energy Solutions

EMPLOYMENT

Africa's Energy Transition: Opportunities and Challenges for Decent Work

Moustapha Kamal Gueye

Africa's energy landscape is changing, but not in a uniform direction. New discoveries of oil and gas are accompanying the expansion of renewable energy generation. What does the continent's energy transition hold for jobs and sustainable development?

Because of its vulnerability to climate change, Africa as a whole is facing the double challenge of tackling climate change and coping with its consequences on production, growth, and employment in all economic sectors. While adaptation efforts are already, and will continue to be needed, preventing the worst possible impacts of climate change from materialising is also critical. Otherwise, the achievement of the 2030 Agenda for Sustainable Development may be compromised. Indeed, over the past decade, climate change and extreme weather events have caused unprecedented damage in African countries, ruining infrastructure, threatening economic activity, and destroying jobs. The most visible manifestations are the droughts in southern Africa, floods in West Africa, and desertification of entire areas in the Maghreb region.

To be sure, African countries focus most of their attention on adaptation to climate change. At the same time, however, an increasing number of governments across Africa consider a sustainable energy transition as a central aspect of their climate strategies. In this regard, several questions remain to be answered. How to achieve a sustainable energy transition that delivers inclusive growth and jobs? How to reduce the gap in skills in order to unleash the potential for vibrant enterprises and green jobs? And finally, how to develop public policy frameworks that are conducive to a just transition for workers, enterprises, and communities? This article touches upon these issues.

Context and issues in Africa's energy transition

Compared to the majority of fossil fuel-dependent industrial countries, the energy transition in Africa presents a distinct feature. With the exception of a few countries such as South Africa, most African countries are not in a situation of pressure where they need to phase out of coal to meet their energy needs through alternative energy sources. Africa's energy transition rather faces two important challenges: modernisation and expansion.

Modernisation is about exploiting the continent's vast endowment of renewable energy resources, including biomass, wind, solar, and hydro-power potential. It also implies moving away from the use of inefficient and hazardous forms of energy by over 700 million people and towards the deployment of modern fuels and sources of energy for cooking, heating, and lighting. In the fossil fuel sector (especially oil and gas), both resource and labour productivity need to be improved. Expansion is about bringing to scale adapted technologies to meet the energy needs of a growing population of 1.2 billion people, of which only 30 percent have access to reliable electricity.

Globally, we are witnessing a shift in the energy landscape, away from fossil fuels and towards less-polluting sources of energy. In Africa, however, a closer look reveals a different picture. On the one hand, there is an expansion in energy generation from renewables. For example, the recently launched Taiba Ndiaye Wind Project in Senegal will generate 158-megawatt of additional capacity. In Ghana, the planned Nzema Solar Power Station will be the largest installation of its kind in Africa, and it is expected to increase Ghana's electricity generating capacity by 6 percent and allow nearly 100,000 homes to benefit from clean energy. Morocco, a pioneer in this area, seeks to deploy about 1.5 gigawatts of solar and wind capacity across the country to meet its goal of increasing the

share of renewables in its energy mix to 42 percent by 2020. In April 2018, South Africa signed contracts with 27 independent renewable energy power producers, worth US$4.6 billion, to produce 2,300 megawatts of electricity over the next five years.

One the other hand, since 2004, there has been a wave of oil and gas discoveries in countries such as Chad, Ghana, Guinea, Guinea-Bissau, Kenya, Liberia, Mali, Mauritania, Mozambique, Sao Tome Principe, Senegal, Sierra Leone, Tanzania, Togo, and Uganda. According to the Africa Energy Outlook 2014, 30 percent of global oil and gas discoveries made between 2010 and 2014 have been in sub-Saharan Africa. A number of countries that were previously net energy importers will become energy exporters in the next five years due to increasing oil exports. And based on certain estimates, sub-Sahara Africa is expected to outpace Russia as a global gas supplier by 2040.

Therefore, while the African energy landscape is changing, it is not in a single direction. The energy transition is complex and has important ramifications for the structure of economies and future development prospects. Climate change is an essential aspect to it, but so are many other key aspects of the sustainable development goals, such as reducing the health impact on women and children of the use of inefficient cooking fuels; powering productive industries in rural areas and modernising agriculture; and the overall improvement of living conditions.

Many young African women and men see the potential associated with the development of micro and small enterprises in the renewable energy sector.

What are prospects for new job creation?

Studies by the International Labour Office and other institutions have pointed to four types of possible impacts of climate change and greening policies on labour markets.[1] Firstly, the expansion of greener products, services, and infrastructure will translate into higher labour demand across many sectors of the economy, thereby leading to the creation of new jobs. Examples include jobs in renewable energy, energy efficiency, manufacturing, transportation, and building and construction. In addition to direct jobs, indirect employment is created along the supply chains, including in the building of necessary infrastructure.[2] And as new income is generated and spent across the economy, further employment is created.

Secondly, some of the existing jobs will be substituted as a result of transformations in the economy from less to more efficient, from high-carbon to low-carbon, and from more to less polluting technologies, processes, and products. Examples include the shift from the manufacturing of internal combustion engines to the production electric vehicles, as well as the energy transition itself, as clean energy replaces fossil fuels.

Thirdly, certain jobs may be eliminated, either phased out completely or massively reduced in numbers, without direct replacement. This may happen where polluting and energy- and materials-intensive economic activities are reduced or phased out entirely, such as in the closing of inefficient coal mines.

Finally, many, and perhaps most, existing jobs (such as plumbers, electricians, metal workers, and construction workers) will simply be transformed and redefined as day-to-day workplace practices, skill sets, work methods, and job profiles are greened. For instance, plumbers and electricians can be reoriented to carry out similar work with solar water heating or solar photovoltaic systems.

On the energy transition more specifically, two common questions are whether clean energies generate more employment than fossil fuels, and whether this applies in the context of Africa. Several studies indicate that renewable energy technologies create more

62,000

The International Renewable Energy Agency (IRENA) estimated that the renewable energy sector employed nearly 10 million people worldwide in 2016, with 62,000 jobs in Africa.

jobs than fossil fuel technologies. One study concludes that per dollar of expenditure, spending on renewable energy can produce nearly 70 percent more jobs than spending on fossil fuels. The International Renewable Energy Agency (IRENA) estimated that the renewable energy sector employed nearly 10 million people worldwide in 2016, with 62,000 jobs in Africa. Nearly half of these jobs are in South Africa and a quarter in North Africa.[3]

In relation to the notion of modernisation mentioned above, replacing the millions of kerosene lamps, candles, and flashlights used in many African countries with modern solar lighting can provide a cheaper alternative and stimulate green jobs. A study found that replacing these lighting systems with modern solar lighting technologies for people living outside the grid could create 500,000 new jobs related to lighting in countries of the ECOWAS region.

Bridging skills and capacity gaps to reap the employment dividend

More than 10 million young African men and women are expected to enter the labour market each year over the coming years. Most analysts tend to agree that the traditional public sector will not be able to absorb this new workforce. Entrepreneurship and self-employment are indispensable to create quality jobs in large numbers, and the energy transition can play a central role in this regard. For that to happen, skills development and upgrading, entrepreneurship promotion, and enabling policy and governance frameworks are required.

A global review of skills for green jobs including four countries in Africa (Egypt, Mali, South Africa, and Uganda) revealed the existence of a gap between the goals and targets set in environmental policies and the human resources available for their implementation.[4] The same applies in the energy sector. Some skills gaps already exist for technical and engineering positions and could grow as the renewable energy sector continues to expand. Skills gaps could lead to project delays or even cancellations, cost overruns, and faulty installations. Efforts are needed in education and training systems to develop renewable energy curricula, integrate modules into vocational training courses, support apprenticeships, and establish common quality standards.[5] Nonetheless, there are promising experiences. For example, Cape Verde launched a Renewable Energy and Industrial Maintenance Center (Cermi), whose main activity is the training of professionals in the areas of design, assembly, and maintenance of photovoltaic installations.

Various intervention models and programs to promote job creation in clean energies have shown a clear advantage of combining technical and vocational training with entrepreneurship training. Particularly for African countries, entrepreneurship and self-employment are becoming priorities in youth employment strategies and policies. In view of Africa's specific business environment, micro-enterprises have an important role here. In general, micro-enterprises are defined as businesses with up to 10 employees, small businesses as those with 10 to 100 employees, and medium-sized enterprises as those with 100 to 250 employees. In Africa, the majority of job creation is coming from the smallest businesses (less than 19 employees). In the East Asia and Pacific region, job growth is mostly concentrated in enterprises with 20–99 employees, while in Latin America and Eastern Europe/Central Asia, more than 40 percent of job creation is by businesses with more than 100 employees.

Typically, young entrepreneurs in the energy space face challenges related to (1) access to finance, (2) lack of technical knowledge, and (3) lack of experience in business management. It should also be noted that because of the prevalence of unemployment and underemployment, there are some entrepreneurs by vocation, but also a large number of entrepreneurs by necessity. As a result, in the absence of strategies and tools to support entrepreneurship, a large proportion of young entrepreneurs remain in the informal economy.

Nevertheless, many young African women and men see the potential associated with the development of micro and small enterprises in the renewable energy sector. Remarkable

initiatives are underway throughout Africa, with dynamic companies such as M-Kopa Solar, which operates in East Africa in the distribution and installation of solar kits. Many such small and micro enterprises active in the distribution of energy systems, maintenance and operation, and sometimes in assembly would benefit from policies to support their integration in value chains and the development of local supply chains. Government policies favouring local content and after-sales services can be helpful. Through the use of such policies, for example, the Tunisia Solar Plan enabled the development of joint ventures and local manufacturing of solar water heaters.

Conclusion

Africa's energy transition is well underway, structured by national and regional contexts and priorities, as well as global policy frameworks and commitments that countries have made. Critical to its success is the fine combination of new fossil fuel discoveries and the expansion of renewables across the continent. A critical dimension of the energy transition for Africa also has to do with cost of technologies. As Collier and Venables have put it, Africa cannot afford cost-increasing mitigation: any measures that it takes to green its energy usage must also be cost-reducing.

Although most studies indicate net job gains in the energy transition, in Africa as in other parts of the world, issues of temporal and geographical disconnect exist. These refer to the fact that new jobs are not necessarily created in the same locations and regions, and at the same pace as other jobs may be displaced or eliminated in the energy transition.

The notion of a just transition for all implies that policies are in place to manage social and employment impacts carefully, in order to avoid social and economic disruptions.❻ The fear of job losses can act as a powerful social and political force to maintain the *status quo* and slow progress. Effective social dialogue, planning for a just transition, and social protection policies are all elements of a just transition framework that can help African countries manage their energy transition well.

The views and opinions in this article are those of the author and do not represent views or opinions of the International Labour Office.

---

❶ International Labour Organization (ILO). *A just transition to climate-resilient economies and societies: Issues and perspectives for the world of work.* Geneva: ILO, 2016.

❷ International Labour Organization (ILO). "Rural Renewable Energy Investments and their Impact on Employment." STRENGTHEN Publication Series, Working Paper No. 1, 2017.

❸ International Renewable Energy Agency (IRENA). *Renewable Energy & Jobs – Annual Review 2017.* Abu Dhabi: IRENA, 2017.

❹ ILO. *Skills for Green Jobs: A Global View.* Geneva: ILO, 2011.

❺ High-Level Political Forum on Sustainable Development. "Interlinkages between energy and jobs." Policy Brief No. 13, forthcoming.

❻ ILO. *Guidelines for a just transition towards environmentally sustainable economies and societies for all.* Geneva: ILO, 2015.

Moustapha Kamal Gueye
Coordinator, Green Jobs Programme, International Labour Office

FOSSIL FUEL SUBSIDIES

Reforming Africa's Fossil Fuel Subsidies

Leah Worrall, Shelagh Whitley, and Andrew Scott

Despite growing international momentum towards climate change mitigation and the promotion of renewable energy, various African countries continue to subsidise fossil fuels. Why is reforming these policy instruments so important and how should Africa go about it?

On the African continent, the low level of electricity access remains a major development constraint and under a business as usual scenario, it is estimated that 89 percent of the world's energy poor will reside in sub-Saharan Africa in 2030. Although the proportion of energy consumption from fossil fuels remained relatively stable over the past two decades (at nearly 40 percent) in the region, new oil and gas discoveries may spur an increase in the use of fossil fuels for energy production. Rapid population and economic growth will also continue to drive increases in per capita energy demand for both power and transport, the latter being heavily dominated by fossil fuels.[1] As African policymakers strive to meet this growing demand, energy choices made in the coming few years have the potential to lock African countries into high emission trajectories for the next few decades.[2]

Internationally, parties to the Paris Agreement agreed to limit the increase in global average temperature to well below 2°C and pursue efforts towards a more ambitious target of 1.5°C. To meet this commitment, at least three-quarters of existing proven reserves of oil, gas, and coal will need to be left in the ground, according to the Intergovernmental Panel on Climate Change (IPCC). In this context, phasing out subsidies to fossil fuels is vital to achieve the aims of the Paris Agreement. And whilst cost effectiveness is central to influencing energy decision-making in Africa, metrics on the cost of energy unfortunately rarely account for taxes and subsidies. This article takes a look at fossil fuel subsidies in sub-Saharan Africa and considers the opportunities and challenges of reforming such subsidies in the region.

Defining fossil fuel subsidies

There is no internationally agreed definition for fossil fuel subsidies, nor consensus on how they should be estimated. Here, we rely on the WTO's Agreement on Subsidies and Countervailing Measures, which defines a subsidy as "any financial contribution by a government, or agent of a government, that is recipient-specific and confers a benefit on its recipients in comparison to other market participants." This includes the direct transfer of funds (e.g. grants, loans and equity infusion), and potential direct transfers of funds or liabilities (e.g. loan guarantees); government revenue that is otherwise due, foregone, or not collected (e.g. fiscal incentives such as tax credits); government provision of goods or services other than general infrastructure, or purchase of goods, below market-value; and, income or price support.

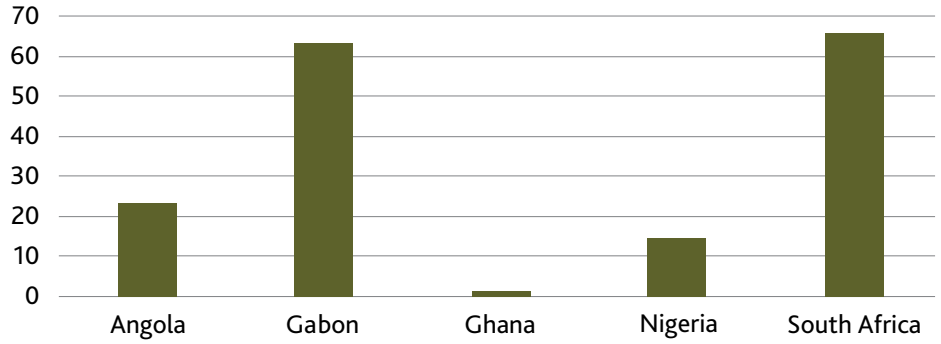
Estimating Africa's fossil fuel subsidies

In 2015, the amount of fossil fuel subsidies distributed by sub-Saharan African countries was estimated at US$26 billion, a reduction from US$32 billion in 2013 due to reform efforts and the falling price of fossil fuels, and somewhat compensated by rising energy demand (inclusive of pre-tax and post-tax subsidies).[3] The countries that provided fossil fuel subsidies in excess of US$1 billion in 2015 were Angola, Côte d'Ivoire, Mozambique, Nigeria, South Africa, Tanzania, Zambia, and Zimbabwe. When externalities – such as local pollution, impacts on climate change, road accidents, and congestion – are included, the estimated costs associated with fossil fuel subsidies rise to US$75 billion in 2015 for the whole region. The majority of these costs is related to the consumption and production of petroleum, coal, and electricity.

There is high variation in the provision of fossil fuel subsidies between countries, and reliable country-level data is rather scarce. Databases that do provide country-level data for sub-Saharan African countries include the OECD's bottom-up inventory of production and consumption subsidies, and the International Energy Agency (IEA)'s estimates of consumption subsidies (adopting a price-gap approach).

The OECD finds that in South Africa, subsidies reached US$3.5 billion in 2016, from US$2.9 billion in 2014. This dataset, however, does not cover other African countries. The IEA estimates South Africa's fossil fuel consumption subsidies alone at US$3.6 billion in 2016. In comparison, Gabon provided an estimated US$118.7 million in consumption subsidies to fossil fuels in 2016, compared with US$30.9 million in Ghana and US$2.5 billion in the larger economy of Nigeria. In North Africa, consumption subsidies in Libya and Egypt reached US$2.5 billion and US$11.1 billion, respectively. Gabon, for its part, is a significant provider of subsidies per capita, despite a relatively modest amount of subsidies in absolute terms (Figure 1).

Figure 1: Normalised fossil fuel subsidies for select sub-Saharan African countries (2016, USD per capita)



Source: IEA fossil fuel database; and World Development Indicators.

Fossil fuel production in Africa is currently being financed by both governments and public finance institutions. For example, fossil fuel investments made by multilateral development banks in Africa between 2008 and 2014 reached US$13 billion.[4] Or, in South Africa, support by OECD export credit agencies for coal mining and coal-fired power generation reached US$ 4.5 billion.

International commitments

At the international level, African countries have recognised the importance of fossil fuel subsidy reform by undertaking commitments in various fora. The Paris Agreement aims at strengthening the global response to climate change, including by "making finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development." Under the agreement, several countries have committed to fossil fuel subsidy reform in their respective nationally determined contributions (NDCs), including Egypt, Ethiopia, Ghana, Morocco, Rwanda, and Togo. In late 2015, UN members adopted the UN Sustainable Development Goals (SDGs), and committed under SDG 12 to "ensure sustainable production and consumption patterns," including by "rationalising" fossil fuel subsidies. As part of the G20, South Africa has reiterated its commitment to phase out inefficient fossil fuel subsidies every year since 2009. Finally, at the WTO, the "Friends of Fossil Fuel Subsidy Reform" have issued a communique calling for accelerated action in the phase out of fossil fuel subsidies also, which has been endorsed by Ethiopia, Gambia, Ghana, Morocco, Mozambique, and Uganda.

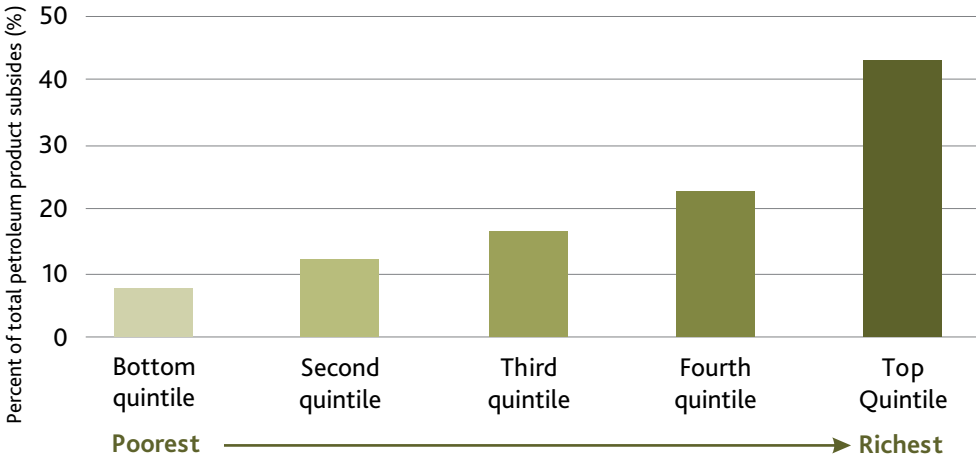
Why reform?

As international pledges need to be backed by concrete action, African countries that provide fossil fuel subsidies – and which have all, at least, committed to the SDG 12 – should pursue domestic reform opportunities in a determined manner. There is mounting evidence that the costs of fossil fuel subsidies far outweigh the benefits. From an environmental perspective, fossil fuel subsidies encourage wasteful consumption, depress

investment in energy efficiency, and create an uneven playing field for renewables. The IEA has estimated that phasing out such subsidies would generate 12 percent of the required emissions reductions by 2020 under a 2°C pathway, with 15 percent of these savings are made by Africa.

Fossil fuel subsidies are socially regressive. They help to support the perpetuation of inequality by benefitting the rich and failing to meet the needs of the poorest (see Figure 2). Despite this, their removal would disproportionately affect the poorest, which should also be taken into account. Fossil fuels also damage public health. The IMF has estimated, for example, that phasing out fossil fuel subsidies globally would lead to a 63 percent decrease in worldwide deaths from outdoor fossil fuel air pollution.[5]

Figure 2: Benefits accrued from fossil fuel subsidies in developing countries



Source: Arze del Granado, Coady and Gillingham (2010), in Whitley and van der Burgh (2015)

Fossil fuel subsidies are also economically inefficient, as they impose a significant burden on government budgets and decrease the competitiveness of key industries, such as low carbon businesses and the renewables sector. They can also increase the risk of stranded assets by encouraging capital or operational investments in fossil fuels, and act to undermine the effectiveness of carbon price signals in markets.

Despite this, fossil fuel subsidies are still used by various sub-Saharan African countries. This is in part due to the presence of market failures. For example, subsidies to fossil-fuel power are provided to compensate for electricity tariffs which cover only 70 percent of the cost of power production. The persistence of such subsidies is due to a lack of information about both consumer and producer subsidies, a reliance on fossil fuels in energy or national development plans, weak institutions, and political capture.

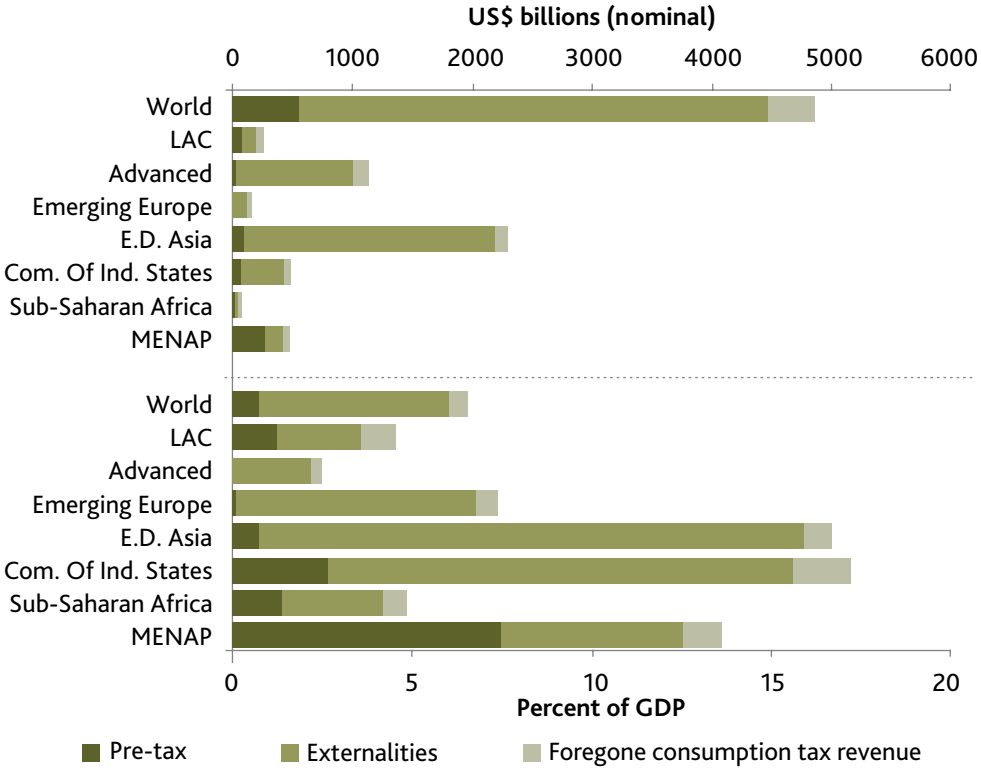
What are the key factors for success?

Whilst sub-Saharan African countries are relatively low providers of fossil fuel subsidies compared with other regions, future population growth coupled with economic growth puts these countries at increasing risk of fossil fuel-related fiscal burdens. Countries should hence seek reform opportunities in the near-term to reduce such risk. Based on the lessons drawn from various reform efforts across sub-Saharan Africa, a number of key principles for effective reform can be identified.[6]

First, energy decisions impact on wider social, economic, and environmental objectives, and as such, they require a whole-of-government, cross-ministerial approach.

Second, research and analysis is needed to better understand the scope and nature of fossil fuel subsidies, their policy objectives, and the potential domestic impacts of reform. For example, some analysis conducted under Nigeria's 2011 Subsidy Reinvestment and Empowerment (SURE) programme was issued as public statements on the benefits of fuel and electricity reforms, highlighting the total cost of subsidies in the budget, and

Figure 3: Fossil fuel subsidies by region (2013, as a percent of GDP, and in USD billions)



Note: The figure includes externalities, which are not a burden on government budgets.
Key: LAC = Latin America and Caribbean; ED Asia = Emerging and Developing Asia; MENAP = Middle East and North Africa
Source: Coady, Parry, Sears, Shang (2015)[7]

communicating government plans to re-direct public finance including towards social safety net assistance.

Third, another key element for success lies in communication and consultation with stakeholders. This can include the building of alliances for change (between government officials, industry associations, companies, trade unions, consumers, political activists and civil society organisations), including by engaging with players that can help offset fossil fuel lobbies. For example, the Namibian Government introduced in 1997 a consultative approach for fuel reform, following protests against reform efforts, which have since been maintained. Under Nigeria's fuel reform programme, the government's plan to re-allocated public funds to social sectors was met with distrust by many, making reform even more challenging.

Fourth, mobilising upfront resources (pre- and post-reform) is essential. Subsidy reform can provide significant fiscal space, but only following reform, hence governments need to mobilise up-front financing (whether domestic or international) to support the elements needed in a robust reform process.

Fifth, there is a need for strengthening institutions. This can include setting up independent regulatory bodies supporting reform processes (in part to depoliticise the process), improving state enterprise efficiency, and promoting investment in energy production (for quality and access purposes). For example, in Tanzania, a specialised regulatory agency was set up to monitor reform efforts and keep the public informed on energy prices.

Sixth, reform processes should be accompanied by complementary measures (e.g. new, more efficient subsidies). The impact of reform can be significant for some economic sectors or population groups. Complementary measures can help counteract these, from employment insurance for job loss, to social safety nets (e.g. cash transfers) and budget transfers (to e.g. regions or municipalities). For example, successful fuel subsidy reform

in Ghana in 2005-2014 allowed the elimination of school fees in state-run schools and increased funding for public transport and health services in poor areas.

Finally, African countries should be particularly careful about the timing and phasing-in of reforms, while also linking fossil fuel reforms to wider energy sector reforms. Fossil fuel subsidy reforms should set ambitious goals, with credible and specific timelines – and time these with economically advantageous periods in business or sectoral cycles. This can increase the likelihood of reforms being maintained. It is also beneficial to target goods primarily consumed by wealthier sectors or households initially, before goods consumed primarily by lower-income households. For example, in 2014, Angola's government began reforms with a focus on petrol, which is consumed by wealthier households, before reforming subsidies for kerosene, which is primarily consumed by poorer households.

Conclusion

International commitments can help African governments to develop collective momentum and initiate reforms in fossil fuel subsidies. International cooperation is already having a demonstrable positive effect on domestic action, including through technical and financial support by international organisations. As an example, in 2015-2017, the Global Subsidies Initiative supported Egypt and Morocco in their reform efforts.

African governments should use windows of opportunity for fossil fuel subsidy reform, such as dips in international oil prices, and enact reforms in partnership with international actors, from bilateral donors to multilateral development banks. This would increase the financial and technical resources available for reform initiatives, including analysis of impacts and public communications to mitigate political risks. Access to international financing would also make resources available upfront for "complementary measures" aimed at supporting adversely affected households and sectors, such as support for health and educational services, social protection, and economic diversification.

Cooperation with international partners should incorporate earmarking newly available fiscal resources to climate action, alongside fossil fuel subsidy reform. This can include shifting national and international development finance towards climate projects, and technical support to advance renewable energy in national energy and climate plans (e.g. NDCs).

Finally, governments should ensure that development and export financing ceases to support fossil fuel exploration, production, and consumption. This for example includes the need to rule out climate financing to fossil fuel projects such as coal-fired power plants with carbon capture and storage, or construction of super-critical coal-fired power plants.

Leah Worrall
Senior Research Officer, Climate and Energy Programme, Overseas Development Institute

Shelagh Whitley
Head, Climate and Energy Programme, Overseas Development Institute

Andrew Scott
Senior Research Fellow, Climate and Energy Programme, Overseas Development Institute

1. Whitley, Shelagh, and Laurie van der Burg. *Fossil Fuel Subsidy Reform in Sub-Saharan Africa: From Rhetoric to Reality.* New Climate Economy, 2015.
2. For example, fossil fuel-fired power plants often last 25 years.
3. This assumes that in the case of falling international oil prices, governments only partially pass through reductions to retail prices.
4. Oil Change International. Shift the Subsidies Database.
5. Parry, Ian, et al. *Getting Energy Prices Right: From Principle to Practice.* International Monetary Fund, 2014.
6. See Whitley and van der Burgh, Op. cit., on which this section is based.
7. Coady, David, et al. *How Large Are Global Energy Subsidies?* Working paper, International Monetary Fund, 2015.

GENDER

Why Renewable Energy Enterprise Must Include Women

Fid Thompson

Many Africans living in rural areas still lack access to electricity. To help tackle this challenge, Solar Sister supports African women entrepreneurs in establishing renewable energy businesses that bring solar technology to "last-mile" communities.

The small community of Odeh sits on the banks of the Niger River in southeast Nigeria. One village leader has a tiny generator that lights one flickering bulb. Other than that, there is no power here. The closest place to charge a mobile phone is a 15-minute boat ride up the river and the nearest electrical grid is an hour away.

Across the African continent, in northern Tanzania, Ranch community encompasses a wide expanse of flat land, dotted with thorny acacia trees and home to pastoralist Maasai families. Though not far from the national grid, several miles down the main road in Longido town, this community has no access to electricity of any kind.

These are just two examples of the "last-mile" communities – low-income, often remote, and unlikely to see grid power any time soon – where Solar Sister works. In thousands of similar communities, Solar Sister's model of women-driven clean energy entrepreneurship brings solar technology to power family homes, local businesses, churches, schools, and clinics.

Powering Africa

The challenge of electricity access is huge, but it also presents a great opportunity to create transformational change on the African continent. In Nigeria alone, there are over 20 million households without access to any kind of power. However, renewable energy is increasingly a positive disrupting force in Africa's energy sector and, globally, solar is leading the charge. As solar technology for portable lighting, mobile connectivity and larger systems, has improved in price and quality, there is a rush to cover a market in great need of power. Many solar companies across a spectrum of for-profit companies (d.light, Greenlight Planet, Mobisol, Off-Grid Electric, M-KOPA, Fenix International, PEGAfrica) as well as hybrid social enterprises and charities (Barefoot, Energy4Impact, ENVenture, Practical Action, SolarAid, Solar Sister) have risen to this challenge, using a variety of business model, payment, financing, and distribution innovations to spread solar energy solutions to underserved African communities.

Solar Sister's model

Solar Sister's approach aims to leave no one behind in the race to provide renewable energy in Africa and also recognises that investing in local women's skills and leadership is essential. The organisation's model offers women the opportunity, training, and resources necessary to set up a clean energy business. These entrepreneurs spread clean power in communities that many others do not reach because they do not present lucrative profits due to remoteness, sparse populations, purchasing power challenges, and gaps in trained local workforce. This "first light, last mile" access is absolutely fundamental because without effectively reaching these markets, universal energy access, one of the 17 Sustainable Development Goals to reach by 2030, will remain a pipe dream.

Solar Sister sources high quality clean energy products on wholesale and delivers them to entrepreneurs in last-mile communities. Through their local networks and markets, entrepreneurs market and sell solar lamps and clean stoves to communities in need, while earning a retail mark up.

Solar Sister entrepreneurs are local women who are trusted and known in their communities. They are women like Nanbet Magdalene, a farmer, a single mum of five, and a clean energy entrepreneur selling solar lights and clean cookstoves in Jos, Nigeria. They are women like Valentina Tlemu, a grandmother, a community health worker, and an entrepreneur from Haydom, Tanzania. To date over 3,000 Solar Sister entrepreneurs have brought improved clean energy access to over 1 million people in Nigeria, Tanzania, and Uganda.

Valentina, like many of Solar Sister's entrepreneurs, is making sure that her solar business lives on in future generations: "I've taught all my children about selling solar [...]. They know how to use solar lights and they are entrepreneurs [...]. After school is done, they need to think about business."

Why Women?

Energy poverty is gendered. Of the 728 million people who use harmful fuels such as charcoal and wood for cooking, it is largely women who bear the burden. It is women who are responsible for energy management in the household, who invest in their children's education and who take care of the sick and elderly. It is thus women who are in need of clean and renewable energy solutions. There is ample evidence showing that if you invest in women, the social return is likely to be significant. For starters, as noted by the World Bank, "women usually reinvest a much higher portion in their families and communities than men, spreading wealth beyond themselves." And energy access makes all the difference. Improved energy access correlates with higher income and decision-making for women: in Brazil, rural self-employed women with energy access have over twice the income of women without energy access; in Tanzania, women with solar lanterns have more decision-making power, more respect, and greater control over financial decisions.

It is women who are responsible for energy management in the household [...]. It is thus women who are in need of clean and renewable energy solutions.

As Isabella Mgaya, a Solar Sister entrepreneur from Maduma village in Tanzania notes, "the woman is the home." Valentina Tlemu also reminds us that "The community looks to us first because of the way we look after them. Because we show them love. We show them care."

Impact

As a result of Solar Sister's efforts to support African women entrepreneurs in bringing clean energy to the last-mile communities, important social and economic impact have been recorded, both for the entrepreneurs themselves and in the communities where they sell.

The Miller Center for Social Entrepreneurship at Santa Clara University, which conducted a study based on Solar Sister's activities in 2017, found that the organisation's women-driven clean energy model has significant developmental impacts, be it from an economic, social, or environmental point of view. Their report highlighted that "solar lanterns create a positive cycle of economic growth that can revolutionise a family's financial well-being," and that "solar-powered lighting protects the health of each person in the household and spurs intrinsic changes in women's self-image and perceived agency."

A 2018 study by the Massachusetts Institute of Technology's Comprehensive Initiative on Technology Evaluation (CITE) also underlined that "Solar Sister women entrepreneurs are penetrating into last-mile markets and communities that have few alternatives for reliable and affordable clean lighting products."

Key challenges

Solar Sister's experience in reaching last-mile communities highlights key areas where businesses need extra support to grow and reach more people. In Africa, small-scale clean energy entrepreneurs work in often difficult environments, particularly for business. Remote communities and markets are connected by poor roads and infrequent transport, seasonal incomes limit purchasing power and cheap, and poor-quality solar products flood local markets. There is also a shortage of trained local experts to increase awareness about new technology, sell high quality solutions, provide customer service, and meet a community's energy needs. This ongoing local expertise is essential in order for customers to trust the technology and see the benefits first hand.

"One person laughed at me when I tried to sell him a solar lamp. He went to buy a cheaper one at the market. It broke in a month and he came back and bought from me," says Victoria Ikem, a Solar Sister entrepreneur from Odeh village.

A final difficulty is government taxation on imported clean energy products such as clean cookstoves and solar products, which ultimately trims the margin for Solar Sister entrepreneurs as they sell these products in communities where people do not have a lot of disposable income.

Recommendations

In conclusion, a set of key recommendations – adapted in part from the Global Distributors Collective's call to action – can be formulated, with a view to solving the last-mile distribution challenge with a gender-inclusive approach:

- **Adopt a women-driven approach**: From a sustainable perspective, it is essential to acknowledge women's critical role in the supply side of sustainable energy value chain, push for gender inclusion at all levels, and address cultural barriers for women entrepreneurs.

- **Improve access to finance**: Distributors struggle to access finance. In light of this, subsidised capital is essential to mitigate risk and navigate challenges inherent in bottom of the pyramid markets – and does not prevent enterprises from ultimately reaching financial sustainability.

- **Galvanise support for demand-side challenges**: Governments, donors, and manufacturers can play a key role in helping to address the demand-side and awareness challenges in last-mile markets, as well as stimulate greater adoption and use.

- **Influence decision-makers and policy**: Distributors need a greater voice in the decision-making process, so that governments and aid agencies can design policies and programs that support the sector.

Fid Thompson
Communications Lead, Solar Sister

RENEWABLE ENERGY

Access to Energy in Africa: The Mini-Grids Agenda

Edward Mungai

Improving energy access across Africa is a necessary step towards inclusive economic transformation and sustainable development. How can the potential of mini-grids be harnessed to meet this challenge?

Accelerated economic development resulting in higher disposable incomes is a prerequisite for eradicating poverty in Africa. For this to be achieved, there must be more equitable allocation of resources to unlock the productive capacity of citizens. This will require support resources to be available, like access to energy, better health services and basic education. In particular, improving African populations' access to energy is critical if the continent is to achieve the ambitious 2030 Agenda for Sustainable Development adopted by the UN in late 2015. While Sustainable Development Goal (SDG) 7 explicitly focuses on the need to "ensure access to affordable, reliable, sustainable and modern energy for all," it is widely recognised that energy access will also play a pivotal role in the achievement of other SDGs, including those related to poverty reduction, inclusive and sustainable economic growth, resilient infrastructure and sustainable industrialisation, access to healthcare, and access to food. Energy access is one of the key enablers of economic development, contributing to the mechanisation needed to reduce inefficiency, which is one of the factors holding back growth and structural transformation across the African continent.

The level of energy access in Africa is significantly below the world average, with less than 10 percent of the population being able to access electricity in countries such as Burundi, Chad, and Malawi, among others. Based on data from 36 African countries, an Afrobarometer study found that in 2014-2015, four Africans out of ten were not connected to an electric grid, while also underlining that reliability was often very poor for those who were connected. The International Energy Agency (IEA), for its part, reported in 2017 that 590 million people on the African continent remain without access to electricity, amounting to around 57 percent of the population. Sub-Saharan Africa is rich in energy resources, in particular solar and wind, but the level of energy supply is very low. Although Africa has what it takes to produce enough energy for its population to have universal access, these resources have not been tapped. The leading factor behind this lack of supply, and thus access, is the cost of infrastructure, which is very high and is either not a government priority or governments do not have the required resources.

Developing mini-grids by fostering more private sector participation

Such a situation begs the question of what the solutions are to the low access to energy in Africa. An important part of the answer to the challenge lies in the business model for the delivery of energy. The continent is still stuck with the utility model, where government-owned utilities rule the continent. The lack of a proper business model, as well as the need for regulatory regimes that allow more private sector participation in the energy space, are the main barriers that must be addressed to increase the level of access to energy in Africa. If the right reforms are implemented, the resulting level of economic development will be unprecedented, as has been shown in other regions where access to energy has become an enabler for economic development and trade.

Most African governments have attempted to increase the level of access to energy by focusing on grid expansion, a strategy that can prove especially expensive in the context of Africa's demographics, with insufficient attention given to mini-grids – which can be defined as the interconnection of small, modular generation sources to low voltage alternative current distribution systems. Mini grids present, however, a promising option for increasing access to electricity across the continent while also tapping Africa's huge potential for renewable energy. The IEA has stated that for Africa to achieve SDG 7 on

sustainable energy for all, 40 percent of the new connections that will be needed will have to be through mini-grids. However, for mini-grids to thrive, there is a need for the public sector to allow for more private sector involvement, mainly through the provision of an enabling environment. This should be in the form of regulations as well as financing mechanisms.

On the regulation front, many African countries do not have an environment that is conducive to the development of mini-grids. For instance, most of the countries are still on uniform tariff regimes, which means the government controls the price of electricity, as opposed to leaving this to the free hand of the market, where the interaction of demand and supply will determine the price. This has the effect that the payback period of projects is lengthened, which can significantly reduce their attractiveness to the private sector. Moreover, licensing of mini-grids is not well defined in many jurisdictions in the continent, with the utilities having countrywide licenses, thus locking out mini-grids unless they are run by the government.

As business models are developed for mini-grids, there is a need to consider how the electricity will be used, and how the communities to be connected can benefit. In the past, governments have focused on providing electricity for lighting, which has resulted in huge investment in last-mile connectivity, a good example being Kenya. The challenge is that the productivity of the citizen is not bolstered in this way, or at least not nearly as much as it could be with a comprehensively thought-out approach. It is therefore imperative that as governments consider the mini-grids route, they pay particular attention to the productive use of electrical power. Access to energy needs to have a transformative impact and result in economic empowerment, productivity gains, and increased trade; this is how more disposable income will be delivered. For the private developers of mini-grids, this is also critical to ensuring that customers have the resources required to pay for the power supplied.

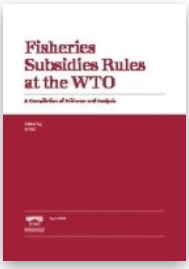
Along development partners

Despite the understanding that mini-grids will be one of the fundamental solutions to achieving universal access to electricity in Africa, there is a need to intensify efforts towards their deployment across the continent. So far, very little has been done in that regard. As the private sector has shied away, however, development partners have ventured into this sector. They have provided grants to governments to give support for the development of business models, technical training, and the provision of technical expertise in an effort to boost the levels of energy access in Africa. The entry of development partners in the energy sector in Africa has opened up the continent for trade in regard to energy. Many of them are providing blended financing, which serves as a catalyst for the sector, hence preparing for commercial financing. For instance, one of the clients of the Kenya Climate Innovation Centre (KCIC) has received funding from the Sustainable Energy Fund for Africa – a multi-donor trust fund administered by the African Development Bank – of close to US$1 million to support the preparation of a 7.8 megawatts hydropower project in Kenya. This is one example of how development partners are supporting the expansion of private sector involvement in mini grids. PowerGen is another KCIC alumni client that received grants from KCIC at inception to prove its concept, and various development partners and private investors are looking to invest in the company. The combined action of development partners and private investors can be instrumental in providing clean energy mini-grid projects with the necessary sustainability, thus helping African countries to achieve their nationally determined contributions under the Paris climate agreement, as well as the SDGs.

Universal access to energy in Africa can only be achieved through partnership between the government, private sector and development partners. This will involve the development of business models to accelerate the growth of the sector, the creation of an enabling environment through the development of appropriate policy and regulation, and finally access to innovative financing from both the development community and private investors.

Edward Mungai
CEO, Kenya Climate
Innovation Centre

Publications and Resources



Fisheries Subsidies Rules at the WTO: A Compilation of Evidence and Analysis – ICTSD – April 2018

At the WTO's Eleventh Ministerial Conference in December 2017, ministers adopted a Decision on Fisheries Subsidies directing negotiators to continue talks with a view to adopting an agreement by 2019, the year of the next ministerial conference. The ministerial decision also specifically re-commits WTO members to implementing their existing notification obligations in order to strengthen transparency of the subsidies provided to fishing. The papers in this compilation aim to respond to some of the technical and legal questions the negotiations have brought up. https://bit.ly/2K3C8Yv

Our Shared Prosperous Future – All-Party Parliamentary Group For Trade Out of Poverty and ODI – April 2018

This document is the final report of the Inquiry into the potential of the Commonwealth for lifting people out of poverty through enhanced trade and investment, which was commissioned by the UK All Party Parliamentary Group for Trade Out of Poverty. It introduces the inquiry, presents the case for a new Commonwealth agenda on trade for development, identify priority areas for future action, and offers recommendations on the way forward. https://bit.ly/2uKeFba

Distributed Ledger Technology: Opportunities for Africa's Trade – Tralac – April 2018

This Trade Brief introduces the reader to the concept of distributed ledger technology, particularly its application in the blockchain, and provides an overview of how this technology works, a brief history of its adoption, and reflections on prospects for future use and its relevance in the trading economy of Africa. The paper then highlights the challenges, potential applications and opportunities for adopting this technology in the African economy as well as its potential in simplifying the value and supply chain in trade. https://bit.ly/2K0fkZO

Promoting Capability Enhancing Development – ICTSD – March 2018

The WTO's Eleventh Ministerial Conference did not deliver on special and differential treatment (S&DT). Partly, this is because the debate on S&DT and policy space rests on different views on the optimal nature and scope of trade policies, and on the role of governments in promoting structural transformation. The discussions presented in this policy brief bring to light the need to acknowledge the rising call from a number of lower income developing countries to consider ways in which multilateral trade rules can best support the design of trade and trade-related policies enabling of economic transformation. http://bit.ly/2FQEniR

The Least Developed Countries Report 2017: Transformational Energy Access – UNCTAD – November 2017

Ensuring universal access to modern energy is one of the Sustainable Development Goal (SDGs) and is also a condition for achieving several other SDGs. However, the discourse has so far focused mainly on households' access to modern energy and related environmental implications, neglecting the economic dimension of modern energy access. This report highlights the potential for a mutually supportive relationship between access to modern energy and structural transformation, and identifies key challenges in accelerating the deployment of modern energy technologies in the LDCs. https://bit.ly/2jkgy9c

EXPLORE THE TRADE AND SUSTAINABLE DEVELOPMENT WORLD FURTHER WITH ICTSD'S BRIDGES NETWORK

PASSERELLES
Analysis and news on trade and sustainable development
Francophone Africa focus - French language
www.ictsd.org/news/passerelles

BRIDGES
Trade news from a sustainable development perspective
International focus - English language
www.ictsd.org/news/bridges

BRIDGES AFRICA
Analysis and news on trade and sustainable development
Africa focus - English language
www.ictsd.org/news/bridges-africa

PUENTES
Analysis and news on trade and sustainable development
Latin America and Caribbean focus - Spanish language
www.ictsd.org/news/puentes

МОСТЫ
Analysis and news on trade and sustainable development
CIS focus - Russian language
www.ictsd.org/news/bridgesrussian

PONTES
Analysis and news on trade and sustainable development
International focus - Portuguese language
www.ictsd.org/news/pontes

桥
Analysis and news on trade and sustainable development
International focus - Chinese language
www.ictsd.org/news/qiao

ICTSD

International Centre for Trade and Sustainable Development
Chemin de Balexert 7-9
1219 Geneva, Switzerland
+41-22-917-8492
www.ictsd.org

BRIDGES AFRICA is made possible through generous contributions of donors and partners including

DFID - UK Department for International Development

SIDA - Swedish International Development Agency

DGIS - Ministry of Foreign Affairs Netherlands

Ministry of Foreign Affairs, Denmark

BRIDGES AFRICA also benefits from in-kind contributions from its contributing partners and Editorial Advisory Board members.

BRIDGES AFRICA accepts paid advertising and sponsorships to help offset expenses and extend access to readers globally. Acceptance is at the discretion of editors.

The opinions expressed in the signed contributions to BRIDGES AFRICA are those of the authors and do not necessarily reflect the views of ICTSD.

ISSN 2519-8866