

**TRENDS IN DEVELOPMENT  
ASSISTANCE TO NEW RENEWABLE  
ENERGY IN SUB-SAHARAN AFRICA**

Rasmus Hundsbæk Pedersen  
Ole Winckler Andersen  
Henning Nøhr

## **Acknowledgements**

Working Papers make DIIS researchers' and partners' work in progress available to readers prior to formal publication. They may include documentation which is not necessarily published elsewhere. DIIS Working Papers are published under the responsibility of the author alone. Therese Marie Bostrup provided data assistance. The authors would like to thank Wolfgang Mostert who shared his experiences with development assistance to renewable energy in Africa and Mikkel Funder who provided comments on a draft version of this paper. The study has received financial support from the Danish Ministry of Foreign Affairs.

### **Rasmus Hundsbæk Pedersen**

senior researcher, DIIS  
rhp@diis.dk

### **Ole Winckler Andersen**

senior analyst, DIIS  
owa@diis.dk

### **Henning Nøhr**

chief technical advisor, Danish Ministry of Foreign Affairs  
hennoh@um.dk

## **DIIS WORKING PAPER 2020: 12**

DIIS · Danish Institute for International Studies  
Østbanegade 117, DK-2100 Copenhagen, Denmark  
Tel: +45 32 69 87 87  
E-mail: diis@diis.dk  
www.diis.dk  
ISBN 97887-7236-030-0 (pdf)

DIIS publications can be downloaded free of charge from [www.diis.dk](http://www.diis.dk)  
© Copenhagen 2020, the authors and DIIS

# **TRENDS IN DEVELOPMENT ASSISTANCE TO NEW RENEWABLE ENERGY IN SUB-SAHARAN AFRICA**

**Rasmus Hundsbæk Pedersen  
Ole Winckler Andersen  
Henning Nørh**

## **TABLE OF CONTENTS**

<b>Introduction</b>	<b>2</b>
<b>Main trends in donor financing of renewable energy</b>	<b>6</b>
<b>Purposes and modalities of donor support to renewable energy</b>	<b>12</b>
Support for governance and regulatory reforms	13
Support for market instruments	20
Support for off-grids and mini-grids	27
<b>Perspectives for future donor support</b>	<b>33</b>
Moving new renewable energy to scale requires continued funding, but also acknowledgement of different interests and objectives	33
Ensuring a balance between support for market development and support to government entities	34
Not undermining longer-term capacity-building in the quest for cheap energy	34
Ensuring donor coordination as well as independent advice	35
The need for flexible approaches	35
<b>References</b>	<b>36</b>

## INTRODUCTION

Nearly half of all people in Sub-Saharan Africa, 548 million people, lack access to electricity (Kruger et al. 2018, IEA et al. 2020). Reaching universal access by 2030, as prescribed in SDG 7 on affordable and clean energy, would require significant additional investments. Although energy production is increasing, it has been estimated that a fivefold increase from the current level of investments to more than USD 100 billion per year is needed (IEA 2019: 141). According to current energy policies in sub-Saharan African countries, almost two thirds of investments in power production on the continent are envisaged to be in non-hydro renewable energy like solar, wind and geothermal (ibid). However, many countries have been very slow in realising their goals for new renewable energy, which by 2018 still only accounted for 4% of total generating output (IEA 2019: 56, Kazimierczuk 2019).<sup>1</sup> 'Moving to scale' using new renewable energy technologies like solar and wind is required if African countries are to avoid becoming major contributors to carbon emissions and climate change.

Development assistance continues to play a key role in financing power-sector projects in Sub-Saharan Africa, which increasingly involve new renewable energy sources (ICA 2017). There have been large-scale renewable projects in the past, and hydropower in particular remains a mainstay of African energy sectors, but serious concerns about the sustainability of large-scale hydropower have led western donors to focus their support on wind and solar projects. This also implies that approaches to development assistance have changed in tandem with the fact that these new renewable energy technologies have matured and become more price-competitive over the last couple of decades. Increasingly many of the boutique operations of the past, which often supported immature technologies and were not integrated into national energy systems, have been replaced with utility-scale projects, as well as more cost-effective mini-grids and stand-alone installations (Foley 1992, Michaelowa and Michaelowa 2011, Ockwell et al. 2018, IRENA 2020).

This paper documents and analyses these recent trends in development assistance for new renewable energy projects. Overall, it demonstrates a shift to promoting market-led approaches with the aim of mobilising private capital for power-sector investments on the continent (see also Sachs et al. 2019, Müller et al. 2020). The trend is global, but due to the role of development donors and the limited domestic financial, administrative, managerial and technological resources of most African

---

<sup>1</sup> Many African countries have goals for renewable energy (Kazimierczuk, 2019). Under the strategic aim of promoting 'inclusive, sustainable growth and development', Denmark also prioritizes sustainable energy with an emphasis on access for poor population groups (Danida, 2017; see also <https://p4gpartner-ships.org/#home>). In other words, the expansion of sustainable energy production and services is a major priority among governments and development donors.

countries, the dynamics on the continent differ. As research into this combination of development assistance, market-promotion and new renewable energy is still limited, the paper focuses on collecting experiences with different approaches and discusses their implications for renewable energy at different scales and in different country contexts in Sub-Saharan Africa.

The paper provides a number of findings and arguments. One key finding is that, although more capital has been mobilised for new renewable energy projects, a significant financing gap remains for both facilitating the energy transition and achieving universal access in sub-Saharan Africa. Another is that the promotion of market-led approaches poses not only opportunities, but also a number of challenges to governments as well as donors. First, aligning government and donor priorities is not always easy. As the paper shows, support to new renewable energy projects is intricately linked to broader trends in energy-sector reform, though governments and donors have not always agreed on the scope and speed of reform, and setbacks have been common. Whereas the involvement of private developers as independent power producers (IPPs) is not the only way of promoting new renewable energy, it is generally a dominant feature of the reforms that western donors are prepared to promote.

Second, while renewable energy is a priority for western donors, clean energy and decarbonisation often play less significant roles for key decision-makers in African countries (Meier et al. 2014).<sup>2</sup> After improving access to modern energy services became a joint donor and host-government priority in the 2000s and 2010s, it became easier to bridge differences over reform models and the promotion of new renewable energy technologies in several countries. However, the continued stream of large-scale hydropower and fossil-fuel projects, often involving Chinese finance, also suggests that differences remain that are linked to the different political economies of energy on the continent. Countries with few or no hydrocarbon resources generally seem more open to new forms of renewable energy as a way to diversify energy supplies.

Third, whereas large-scale projects may attract global lead firms and international finance, they also present new risks for the host country (Le et al. 2020). Market-led approaches are often presented as win-win projects, but contracts and financing models are complex, and their risks and implications may be hard to assess for low and lower-middle income countries with less developed capital markets and limited public- and private-sector capacity. Even a country like South Africa

---

<sup>2</sup> See also Dornan and Shah (2016), who suggest that one of the motivations for small island developing states committing to nationally defined contributions to reduced emissions is that it can help mobilise development assistance.

experienced legal and financial advisory services being ‘stretched to the limit’ when the country first embarked on renewable energy auctions (Meier et al. 2014: 167).<sup>3</sup>

Fourth, and relatedly, when projects move from demonstration pilot projects to a larger scale, the importance of planning, procurement and integration of renewable energy in power systems increases, as do the links between the three. Despite improvements in recent years, this remains challenging in terms of governance and capacity in developing countries. There are more recent examples of badly planned processes of the procurement of energy projects that have led to oversupply and pose a threat not only to the viability of state power utilities, but also to fiscal stability (Sarkodie 2019, Dye 2020, The Nation 2020). Competitive procurement has been identified as a promising way to reduce costs, but here too the capacity to manage these processes has proved important (Kruger and Eberhard 2018, Bhamidipati et al. 2019). Moreover, less predictable power flows from solar and wind pose a challenge to existing electricity networks (OEF 2020).

Fifth, the economic shocks from COVID-19 are likely to cut disposable incomes and affect demand, making planning more challenging (IEA 2020a and b). It is premature to assess or draw conclusions about developing countries’ policy responses to the pandemic, but it seems plausible to suggest that the focus will be on the short term, trying to mitigate the immediate adverse effects of the pandemic with implications for sector priorities and allocations, while medium to longer term objectives may be given less attention, including investing in the transition to renewable energy.<sup>4</sup> It has been argued that accelerating the deployment of new renewable energy can help boost economic growth, create jobs and build more resilient and cleaner energy systems (ibid). However, given that the production of new renewable energy technologies is dominated by international lead firms embedded in global value chains, more effort will be needed to increase local content and production, which hitherto has proved a challenge in countries with limited resources (Hansen et al. 2018, Hansen et al. 2020, Larsen and Hansen 2020, Morris et al. 2020).

Sixth, this points to a continued role for development assistance in most energy-sector segments, and a need for the continuous monitoring of experiences and adjustments, as well as flexibility in adapting interventions to different country contexts. One question raised by the paper is whether advice from and capacity-building by current donor actors is sufficiently long-term and independent. Multilateral banks play a prominent role in reform and procurement processes, but as banks they also have a business case that may not always be easy to reconcile with being a main advisor. Similarly, bilateral donors often promote and finance projects and

<sup>3</sup> South Africa is a front-runner when it comes to new renewable energy projects and programmes at scale. However, with more domestic public- and private-sector resources to reduce its reliance on development assistance, the country is also an outlier compared to other countries on the continent. We therefore do not analyse it in much detail in this paper.

<sup>4</sup> See also articles in *The Economist*, May 23<sup>rd</sup>, 2020.

programmes in areas where their own companies have strongholds. Some coordination between the multitude of donor organisations involved in recipient countries can be observed, but complementarity of interventions and projects is not guaranteed.

The paper is based on a review of the relevant literature, including donor documents and evaluations.<sup>5</sup> The volume of publications on different technologies and approaches to new forms of renewable energy is by now significant, but scholarly understanding of and systematic research into the role of development assistance in this changing context is still limited and fragmented, both in general and in relation to different countries.<sup>6</sup> The study therefore focuses on how development assistance has been adjusted to reflect the fact that new forms of renewable energy are emerging in sub-Saharan Africa on a larger scale. More detailed reviews of developments and experiences from Kenya and Ethiopia were conducted to acquire in-depth insights into energy-sector developments in different countries, stressing the importance of historical and political-economy perspectives for understanding such developments.<sup>7</sup>

Following this introduction, the rest of the paper is divided into three sections. Section 2 provides an overview of the main trends in the donor financing of renewable energy in sub-Saharan Africa, including applied finance instruments. Section 3 focuses on experiences with donor support for renewable energy, with a particular focus on: (i) capacity, governance and regulatory reforms; (ii) market instruments; and (iii) off-grid solutions. Section 4 concludes by discussing perspectives for future donor support for renewable energy.

<sup>5</sup> The review is based on searches in WorldCat, a database linked to library collections across the world, and Google Scholar, combining search terms like 'renewable energy', 'Africa' and 'development assistance'. Additional searches were conducted using phrases like 'renewable energy', 'energy transition' and 'power sector reform in Africa', as well as the experiences of Kenya and Ethiopia in different databases in the OECD DAC Evaluation Resource Center Database. Different donor websites were also reviewed for evaluations.

<sup>6</sup> For brief literature reviews of the existing literature on renewable energy and the energy transition in general, see e.g. Baker et al. (2014) and Kruger and Eberhard (2018).

<sup>7</sup> This study is the first of two studies. In the present paper the main focus is on donor support to renewable energy, both directly to renewable energy projects and indirectly in the form of capacity-building and market development in the renewable sector in Sub-Saharan Africa. The second study, which is scheduled to be published in 2021, will focus on the political economy of the energy transition in Africa, including distributional issues (e.g. user charges) and access to energy services for the poor. Thus, the two studies are meant to complement each other, which implies that various political economy aspects and challenges related to access to energy are given less emphasis in the present study.



## MAIN TRENDS IN DONOR FINANCING OF RENEWABLE ENERGY<sup>8</sup>

Donor financing of renewable energy is nothing new, but it has undergone changes in recent decades. In the 1990s and into the 2000s, large hydropower projects were implemented with support from western and Arab donors. Often the emphasis on hydropower was supplemented with investments in oil- or gas-fired power plants to help stabilise the potentially intermittent power from hydro. In the late 1990s and 2000s there were also some investments in plants using bagasse, the pulpy residue left over from sugarcane production, in countries like Mauritius, Angola and Uganda, and in geothermal in Kenya. However, as western support for large-scale hydro declined due to concerns about environmental and social sustainability, China became a significant actor in this area, as well as in coal and gas (see box 1 below).

Support for new renewable energy on a larger scale is of more recent date. Among traditional donors, the European Union was for long the biggest donor for renewables, followed by the World Bank and AfDB (Hafner et al. 2018: 84). However, the latter two have been catching up, and the World Bank is now the biggest individual donor to African power sectors. Of existing energy policies on the continent, wind, geothermal and solar are expected to provide over a quarter of the overall energy supply by 2040, with solar as the main contributor (EIA 2019: 126).

However, as mentioned in the introduction, not only is there a significant need for energy financing in Sub-Saharan Africa, but also a notable financing gap. Figure 1 shows total ODA for energy in Sub-Saharan Africa (policy, generation and distribution) from both official donors and DAC donors.<sup>9</sup> The figure shows a clear growth in ODA to energy in Sub-Saharan Africa from the former. Thus, ODA has more than doubled in the last decade, but with some volatility in disbursements the last four to five years. The figure also shows that ODA from DAC countries increased up to 2015, since when it has declined. Whether the growth in ODA will continue in view of the COVID-19 pandemic is still too early to assess.

<sup>8</sup> See OECD (2018, 20-22) for a brief discussion of data availability.

<sup>9</sup> The figure is based on data from OECD's Creditor Reporting System, assessed at [www.stats.oecd.org](http://www.stats.oecd.org). Official donors include various non-DAC donors, multilaterals and private donors. The figure covers 'All Channels', 'All types of Aid' and is in 'Constant Prices (2018)'. It is notable that China, as a major actor in renewables in Sub-Saharan Africa, has not reported any ODA to the sector 2009-18.

**Figure 1**

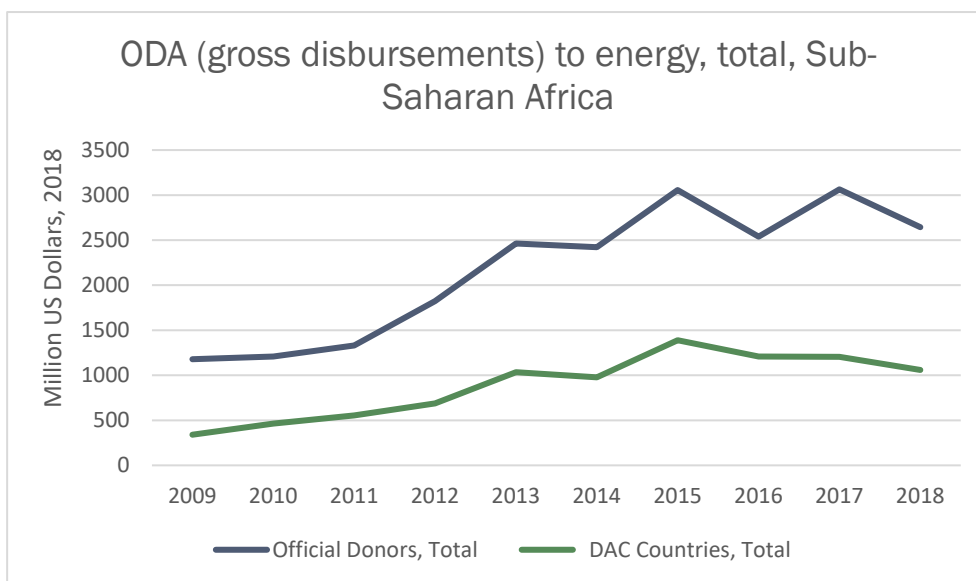
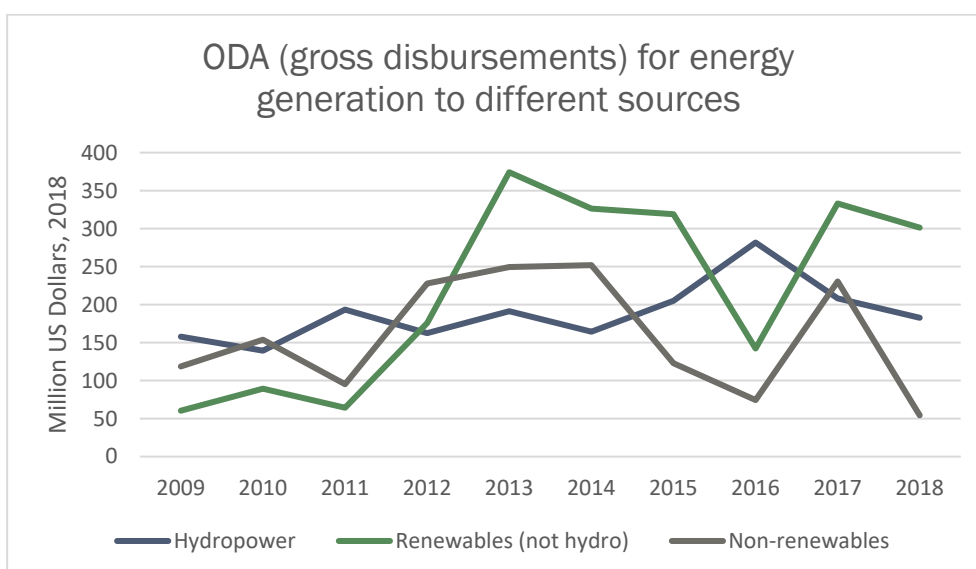


Figure 2 shows ODA to different sources of energy generation in Sub-Saharan Africa from official donors. The overall tendency is that support for renewable energy has been greater than support for both non-renewables and non-hydro renewables since 2012.<sup>10</sup>

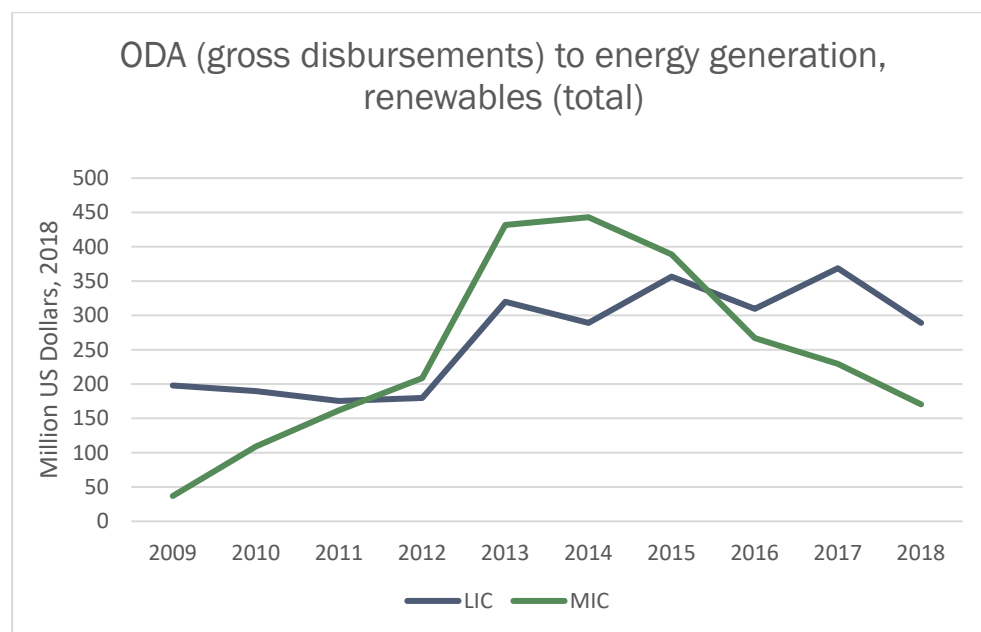
**Figure 2**



<sup>10</sup> A comparison with commitments showed an even larger difference between renewables and non-renewables.

A recurrent theme in discussions has been the distribution of ODA to country groups. Figure 3 shows the distribution of ODA to renewable energy generation, including hydropower, to low-income countries (LICs) and middle-income countries (MICs) in Sub-Saharan Africa. The figure indicates an increase in disbursements to LICs compared to MICs.

**Figure 3**



Data from OECD also show that a significant share of ODA is supporting energy policy and administrative management in Sub-Saharan Africa, to the tune of over USD 500 million in 2018. There is no information available on how this ODA is divided between renewables and non-renewables.

Whereas in the early years aid for renewable energy tended to be project-specific and to be aimed at developing or adapting specific types of technology, it gradually developed into larger programmes that were increasingly integrated into energy-system planning as new renewable energy technologies matured and new funding mechanisms appeared. Over the same period, a shift from technology-based to market-based approaches can be observed (Stewart et al. 2009). This did not necessarily imply that the role of development assistance became less important, but more attention was paid to create an enabling environment for mobilising various kinds of finance and actors. In the early 2000s renewable energy became an important part of rural electrification programmes, while from the late 2000s onwards it became increasingly important in larger scale programmes as well (discussed in more detail in the following sections).

Limited systematic information is available about the financial instruments that were used, but grants, concessional loans, guarantees and equity appear in various combinations with private finance (Barnard and Nakhoda 2014: 6-9, Schwerhoof

and Sy 2017). Grants and concessional finance may be important both to ensure that investments are made in poorer countries and in rural areas, and to finance technical assistance and capacity-building. Various types of guarantee are widely used to mitigate the risks to private investments.<sup>11</sup> Investments in renewable energy are associated with particular risks due to the evolving nature of the technology and the high up-front costs, but for Sub-Saharan Africa specific political and governance-related risks also exist (Schwerhoff and Sy 2017, Müller et al. 2020).

In recent years, finance from China and independent private producers has increased much faster than ODA from OECD countries (Eberhard et al. 2016). The box below provides more information on China's increasing role as an investor in energy in Africa.

---

<sup>11</sup> For introductions and discussions of the use of guarantees, see Mostert (2010) and Andersen, Hansen, Rand (2020).

### **Box. China as investor in the energy sector in Africa**

China has become a major source of finance for Africa countries' energy-sector projects. The drive was part of China's 'Going-out' strategy from 2001 and was further encouraged under the current 'One Belt, One Road' initiative from 2014, both linked to a desire to access new markets for Chinese companies (Siciliano and Urban 2017). By 2009 Chinese investments had overtaken IPP projects in sub-Saharan Africa (minus South Africa), and by 2017 it was estimated that Chinese energy investments on the continent had reached USD24 billion (Eberhard et al. 2016, Cabré et al. 2018). Others put the amount even higher (Shen 2020). Projects typically involve a number of Chinese actors in construction, as well as in finance, where China's policy banks, the China Development Bank and Export-Import Bank of China, have become giants. By far the greatest share, almost –two thirds, is in hydropower, with coal and gas making up most of the remaining projects. New renewable energy projects are miniscule in comparison.

From an African government perspective, a part of the attractiveness of Chinese projects is the pragmatism with which they have been implemented. Compared to OECD development donor finance, few conditions are attached in terms of modalities apart from the selection of Chinese contractors, where Chinese state-owned enterprises are world-leading in hydropower. There are also often shorter time horizons from decision to financial close and implementation (Johnson et al. 2017). Typically, projects are turnkey projects that allow ownership by African government entities, financed through a mixture of commercial loans and concessional loans (bilateral assistance) and at times including trade agreements. Ghana's Bui project provides an example of what such a financing model can look like. The project had a longer history, but remained a chimera until Sinohydro, a construction company, submitted an unsolicited bid for the dam in 2005, and the Ghanaian government requested funding from China (Darko et al. 2019). This was granted at the 2006 China–Africa Cooperation Summit in Beijing. It is partly being financed by Ghana's government (USD60 million), a commercial loan from the Exim Bank (USD292 million) and a Chinese concessional loan (USD270 million) (ibid.; [https://en.wikipedia.org/wiki/Bui\\_Dam](https://en.wikipedia.org/wiki/Bui_Dam)). In addition, it involves a trade agreement in which Ghana's cocoa earnings pay back the loans.

Chinese pragmatism may also explain why new renewable energy has not been promoted in African energy projects more, even though Chinese companies also have significant strongholds in these technologies. This partly reflects a lack of interest among recipient countries, who have a greater say than in OECD-financed projects. In addition, indifference or outright reluctance regarding new forms of renewable energy have been identified among Chinese development bank officials, who question the bankability of such projects (Kong and Gallagher 2020).

The private sector can make an important contribution to the energy transition (see OECD/UNCDF 2019: 31). Analyses have shown that private investments have contributed to about 40 percent of new energy-generating projects in developing countries, while the percentage is as high as 70-80 percent for modern forms of renewable energy (solar, wind and biomass) (Foster and Rana 2020: 7-8). However, the figures for sub-Saharan African countries may differ. The next section will come back to the role of independent power producers in these contexts. The contribution of the private sector is often made in combination with some involvement by the public sector, for instance, in the form of public-private partnerships, blended finance and new financial instruments.

Blended finance has been mentioned as a way to increase finance for development and thus to cover the financing gap, but although there has been some growth, the amount of private finance that has been mobilised is still very low (OECD/UNCDF 2019),<sup>12</sup> especially compared to other forms of finance (ODA and development finance from MDBs and DFIs) (Convergence 2019: 12). The share of blended finance transactions going to Sub-Saharan Africa is declining, though energy and in particular renewable energy are the main sectors with blended finance projects (OECD 2018: 25, 35; OECD/UNCDF 2019: 11; Convergence 2019: 3, 16). The issue of financial and development additionality is therefore also relevant for this region and needs to be carefully considered.<sup>13</sup>

Various international mechanisms have been established to support the sector, including the Clean Development Mechanism (CDM) under the Kyoto Protocol, which came into force in 2005. The CDM allowed rich world actors to reduce their own emissions through projects in developing countries. A number of donors have provided support to set up and develop the capacities of host-country institutions (Satoguina 2006: 25, Gboney 2009a, Gboney 2009b). After 2012, the EU gave preferential treatment to carbon credits from LDCs. By the end of 2014, however, the continent's share of potential CDM projects still only amounted to 2.51%, and for LDCs the share was only 0.63%, with even less being implemented and operational (Kreibich et al. 2017). Of all the projects the most important were hydropower, followed by reforestation and energy efficiency. The low level of Africa's carbon emissions overall may explain some of this, but the major factors are similar to the general difficulties in attracting private-sector investments on the continent, namely the business climate, institutional barriers, and low public- and private-sector capacity (ibid.).

<sup>12</sup> Note that bilateral donors only allocate about 3 percent to blended finance (Convergence, 2019, 27), while most funding comes from MDBs and DFIs.

<sup>13</sup> See Andersen, Hansen and Rand (forthcoming) for a critical review of the various aspects of financial and development additionality in connection with blended finance projects.

Over the same period, the number of funds and financing mechanisms has only increased.

Since the UNFCCC entered into force in 1994, the Global Environment Facility (GEF) has served as a financial mechanism, as well as managing the Special Climate Change Fund and the Least Developed Countries Fund. The World Bank has also set up Climate Investment Funds (Patel et al. 2020). The African Development Bank has established its own fund with Danish and US funding, called the Sustainable Energy Fund for Africa. It also advises governments on how to access other funding and provides lending capital through a public as well as a private vehicle (Schwerhoff and Sy 2017: 397-8). Patel (2020: 17) mentions 23 public-sector funds, of which eleven are mitigation-focused, six adaptation-focused and six cross-cutting. There are also examples of bilateral funds and Hafner et al. list more than sixty 'global financing initiatives completely or partially focused on SSA's electrification', which, however, may not promote new forms of renewable energy only (Hafner et al. 2018).

## **PURPOSES AND MODALITIES OF DONOR SUPPORT TO RENEWABLE ENERGY**

As mentioned in the introduction, a number of factors have changed the conditions for donor support to renewable energy in Sub-Saharan Africa. Not only have new renewable energy technologies become more mature, donor finance has also gone up, new financial instruments have been introduced, and the purposes and modalities of donor support have been adjusted. In particular, three elements are interesting in this respect: support for (i) governance and regulatory reforms, (ii) market instruments and (iii) off-grid. Whereas these partly overlap, their timing to some extent differs, with greater emphasis on governance and regulatory reforms beginning in the 1990s, the promotion of market instruments in the late 2000s, and an increasing emphasis on new renewable and off-grid energy as part of a new agenda to improve energy access in the 2010s.

Details of support to these three areas will be given in this section. While there is some literature on experiences with the implementation of liberalisation reforms from the 1990s and early 2000s, systematic research into more recent experiences is scarce. Some authors have claimed that reform-minded countries using market-led approaches have made greater progress with the transition to cleaner energy, but others have challenged the dichotomy between market- and state-centric countries. The evidence is generally somewhat ambiguous when it comes to the correlation between reforms and new renewable energy (Lee and Usman 2018, Baker and Phillips 2019).

### **Support for governance and regulatory reforms**

Development assistance for new renewable energy is intimately linked to broader reform trends in energy sectors. As donors and Sub-Saharan African governments gradually came to share an interest in improving access to electricity, support for Sub-Saharan Africa's energy sectors has become less dogmatically focused on liberalisation and more adapted to different country contexts. Some donors have been supporting new renewable energy technologies for years, but with the access agenda, support has increasingly been streamlined into broader programmes, first through rural electrification, and from the late 2000s into broader energy-sector interventions. Whereas wholesale liberalisation is not a requirement for the promotion of new renewable energy, some Western donors keep pushing for reform and the unbundling of state utilities by using access to finance as a motivating to

Aid for new renewable energy technologies was long separated from more general aid for power-sector reform. On the one hand, bilateral aid donors and UN agencies increased their support for new renewable energy projects, particularly wind and solar, but with significant variations among donors. On the other hand, new forms of renewable energy did not play a significant role in the World Bank's support to the power sector. As an evaluation of World Bank support for renewable energy puts it, new renewable energy was 'largely orphaned' in the World Bank's broader work on energy-sector reform in the 1990s, and projects were treated more like 'boutique operations' run by dedicated staff often mobilising external funds (IEG 2006: 8). The two agendas began merging in the 2000s, first through a greater emphasis on rural electrification in order to address poverty reduction more systematically, and later increasingly involving the private sector through IPPs using new renewable-energy technologies at scale.

The changes to new renewable energy among donors coincided with the emergence of more pluralist approaches to power-sector reform than the liberal paradigm of the 1990s that had emphasised the restructuring of state utilities, the creation of regulatory bodies, the participation of the private sector through IPPs and the establishment of competitive power markets, if necessary, as a condition for power-sector loans (Foster and Rana 2020: 42). These more pluralist approaches were driven by a number of factors, above all by the realities on the ground in the recipient countries, which had often accepted the reform agenda on paper but delayed or resisted some of the reform agenda-related projects and programmes during implementation. Consequently, most African countries had ended up with hybrid models with a continued significant role for state utilities, despite donor pressure. In 2014, 21 out of 48 Sub-Saharan African countries still had state-owned integrated utilities that were responsible for power production, transmission and distribution, with no private-sector participation, while the rest had chosen models with varying degrees of state control (Eberhard et al. 2016).



In theory the increased pluralism also reflected a greater acknowledgement among western donors of the importance of different countries' political economies of energy, as dominant interests, ideas and priorities did not always coincide with those of the donors. In the early years of reform, breakthroughs in passing reform agendas and introducing IPPs had often been driven by crises in energy supplies, which necessitated new investments that cash-strapped countries could ill afford without significant donor finance. For instance, in Uganda, Kenya and Ghana, recurrent droughts were vital in pushing through the first reform and allowed the first IPPs to emerge in the mid- to late 1990s (Edjekumhene and Dubash 2002, Eberhard and Gratwick 2005, Bhamidipati et al. 2019, Godinho and Eberhard 2019).

However, it was also clear that implementation of reform in many countries then stalled until the next crisis occurred. The World Bank therefore increasingly emphasised the need for more tailored approaches and the complementary roles of the public and private sectors while continuing to promote market solutions that could leverage financial resources (World Bank 2009a, World Bank 2013). The World Bank gradually increased its support to new forms of renewable energy, which it integrated into its strategic and results frameworks from the second half of the 2000s onwards (Ibid, IEG 2020: 24). Similar changes, albeit somewhat delayed, can be observed in AfDB approaches (AfDB 2016).

This pluralism also reflected the continued diversity among donors. Some bilateral donors were involved in supporting various aspects of energy-sector governance, including reforms, but many also kept promoting technologies and projects that at times had as much to do with their own industries' strengths and competences than with the needs of the recipient countries (Michaelowa and Michaelowa 2011). The degree to which aid was tied differed, as among Scandinavian countries, where Sweden did not emphasise the involvement of Swedish industry, while Denmark explicitly linked aid to Danish companies and interests (Ing.dk 2017, Multiconsult 2018). Among western donors this suited the more market-led approaches being promoted, often with an emphasis on multi-stakeholder partnerships, which became fashionable after the World Summit on Sustainable Development in Johannesburg in 2002, with its increasing emphasis on market facilitation and public-private partnerships (see also Stewart et al. 2009, Parthan et al. 2010). One example is USAID's Power Africa, which was established in 2013 'to provide market-driven solutions' involving a number of US and foreign government partners and over 140 private companies as partners (USAID 2017). However, it could also be argued that the continued role of development assistance meant that the facilitating role of recipient country states was to some extent supplanted by that of donor country states and entities (Müller et al. 2020).

The increasing pluralism of development assistance in the late 2000s and 2010s also reflected the fact that recipient-country and donor interests and priorities increasingly converged on the wish to improve access to electricity. This meant that the emphasis in support shifted from the implementation of market reforms to more

holistic approaches to the sector. The big investments in expansion associated with improved access also made it easier for donors to promote renewable energy technologies and projects. In the early reform period, no clear correlation between implementing reforms and promoting renewable energy could be observed, and with few exceptions larger IPP projects were overwhelmingly fuelled by petroleum products (Eberhard et al. 2016: 17ff, see also Lee and Usman 2018: 34). Generally, large-scale renewable energy projects were more likely to be linked to a wish to diversify energy supplies, donor priorities and the availability of new financing mechanisms than to reforms or environmental concerns. This can, for instance, be seen in Kenya, which is otherwise often highlighted as among the best performers in Sub-Saharan Africa (Meier et al. 2014).

## **Box 2. Reforms, donors and renewable energy in Kenya**

Kenya has a reputation for being a good reformer through a combination of strategic choices, inherent strengths and coincidence, which has allowed it to mobilise donor funding and private capital more effectively than most other countries. Like other Sub-Saharan African countries, Kenya came under pressure from donors to liberalise its power sector in the 1990s. In dire need of investments, and despite internal resistance, the country embarked on a reform path with donor support that eventually led to the unbundling of the state utility, the Kenya Power and Lighting Company (KPLC). First a regulator was established and power production was moved to the Kenya Power Company (later Kenya Electricity Generating Company, KenGen). In 2008, the Kenya Electricity Transmission Company Limited (KETRACO) was established (Godinho and Eberhard 2019). Though the government has maintained majority ownership, KenGen and KPLC were later listed on the Nairobi stock exchange.

Renewable energy accounts for 87% of Kenya's electricity mix for the grid, with hydro-power and geothermal as the largest sources of energy, but the link to the reform agenda is ambiguous (Ibid; Gordon 2018). Though donors have pushed for renewable energy, three quarters of Kenya's commissioned IPP projects run on fossil fuels (Godinho and Eberhard 2019). The first major expansion of geothermal was made possible by a World Bank credit, effective in 1998 (McEvan 2001), but it was state-owned KenGen, not IPPs, that over the years managed to mobilise more government and donor support for geothermal projects (Godinho and Eberhard 2019, Hughes and Rogei 2020). The choice of geothermal had the dual goal of ensuring environmental sustainability and developing domestic energy resources. The fact that energy security may be a greater concern than sustainability among Kenyan decision-makers then and later can be seen in the various planning documents that mention renewable energy and geothermal on a par with coal, all considered domestic resources (GOK 2007, GOK 2018a).

Nonetheless, Kenya has managed to attract significant investments in renewable energy in recent years, typically combining donor, public and private finance. Despite unbundling, state entities have remained important actors. For instance, the emphasis on on-grid electrification reinforced the position of KPLC, the distributor, though the politisation of the sector through the introduction of below-cost tariffs at times threatened its viability (World Bank 2018, Sergi et al. 2018). The mobilisation of donor funding also remains key. While bilateral donors have tended to focus on large-scale generation projects, funding for grid development and expansion has been more prominent in World Bank and AfDB funding. China, through its Belt and Road Initiative, is also reported to have provided concessional loans for power infrastructure involving Chinese companies (China Daily 2018, Hale et al. 2020). The implementation of electrification programmes has led to Kenya being highlighted as the best performer in Africa in terms of improving access, going from 25% in 2013 to 75% in 2018, the aim being to achieve full access by 2022 (IEA 2019: 43).

The convergence of donor- and recipient-country agendas on improving access can be observed especially clearly in respect of the rural electrification programmes that emerged in the early 2000s (see section 3.3 below for more details), but in the second half of the 2000s it increasingly affected broader energy-sector planning and projects at scale. This could be observed in Kenya in the late 2000s, related, for instance, to an Electricity Expansion Project supported by the World Bank and other Western donors in 2010, whose total cost amounted to almost USD1.4 billion and which had geothermal generation and transmission and distribution as its main components (IEG 2019). Electrification targets that now aim at full access by 2022, as well as funding for grid expansion from 2010 onwards, have provided a further impetus for investments in the energy sector (Foster and Rana 2020: 303, IEA 2019: 117).

In Ethiopia, a similar change of approach linked to improving access could be observed in a World Bank-supported project for Electricity Network Reinforcement and Expansion from 2012. Until then, Ethiopia had on paper committed itself to the reform agenda, but in practice it dragged out implementation that would have given the private sector a bigger role in power production. The country's first large-scale new renewable projects, in wind, materialised in 2008 and 2009 with the aid of French and Chinese companies and finance, but they were turnkey projects to be handed over to EEPCO, the state utility, after construction (Chen 2018). This had to do with statist inclinations and what has been termed the 'residual dirigisme of the ruling party' (Abegaz 1999: 4). However, one aspect of the new reform agenda in the 2010s was tariff reform and restoration of the financial viability of the power sector, which came to include a bigger role for the private sector and new renewable energy (ESMAP 2019: 32).

### **Box 3. Reforms, donors and renewables in Ethiopia**

Ethiopia embarked on a reform trajectory with a new Energy Policy in 1994 that was part of a wider set of reforms supported by western donors and were initiated in response to political and economic crises. The Policy encouraged the development of the country's indigenous resources, as well as private participation in the energy sector through reform of the state utility and elimination of subsidies (Teka 2006, Howell 2011). Subsequently, the public utility, the Ethiopia Electric Light and Power Authority (EELPA), was turned into an autonomous public enterprise, the Ethiopian Electric Power Corporation (EEPCO), and a new regulatory body, the Ethiopian Electricity Agency (EEA), was established at the same time (Asress et al. 2013). However, the pace of reforms slowed in the late 1990s and early 2000s as part of a more general 'residual dirigisme of the ruling party' that impeded a second generation of reforms (Abegaz 1999: 4). IPPs could apply for licenses, but with a poorly developed regulatory regime the interest of potential investors was limited (Kebede and Mitsufuji 2017, Gordon 2018). Only in 2013 was EEPCO further restructured by splitting it into two entities, Ethiopian Electric Power (EEP), which retained control over electricity generation project development and transmission, and Ethiopian Electric Services (EES), which was to manage distribution and sales.

Until then, major investments and projects had centred around central government priorities, such as grid expansion and state utilities, linked to the government's broader development objectives and programmes, for instance, its plans to become an exporter of power (Asress et al. 2013). Combined with an urban bias, this called for centralised power production and grid expansion that initially provided limited room for private-sector participation and non-hydro renewables on a larger scale (ibid.; Degefu et al. 2015). A small pilot geothermal power plant had been operational since 1998 under EEPCO, but plans for the further expansion of geothermal did not materialise, despite support for the building of technical capabilities by various bilateral and multilateral donors (Howell 2011, Kebede 2013). However, a study of potential wind-farm sites financed by a grant from German GTZ paved the way for two wind-farm projects in 2008 and 2009 respectively, one with Vernet of France financed by the French Development Bank (AFD) and BP Paribas through three loans, of which the Ethiopian Government covered 9% (Chen 2018). The second, delivered by HydroChina and CGCOC, was majority-financed by China's Export Import Bank (ibid.). Both wind projects were turnkey projects to be handed over to EEPCO after construction. By far the biggest project, the Grand Ethiopian Renaissance Dam (GERD) was implemented soon afterwards, financed by the Ethiopian government by selling bonds (Chen and Swain 2014).

These projects came at a time when universal access to electricity had become a larger priority because of the Universal Electricity Access Program of 2006, whose implementation was repeatedly delayed due to EEPCO capacity constraints (World Bank 2014). However, the restructuring of the state utility signalled a change of tack. With a new growth and transformation plan (2016-2020), the focus shifted from infrastructure growth to last-mile connectivity, and ambitious targets for off-grid were included (World Bank 2018). A National Electrification Program (NEP) was launched in 2017 with support from the World Bank, which included on-grid, off-grid and sector capacity and institutional reform, as well as goals for sustainable development of the energy sector and universal electricity access by 2025 (ibid.). A feed-in-tariff to facilitate larger renewable IPP projects had been underway since the early 2010s, but it seems not to have materialised (Gordon 2018). Auctions were introduced in the second half of the 2010s (World Bank 2019).

A significant new element in the more plural or pragmatic approaches of the late 2000s was that attention moved from supporting reform implementation and the facilitation of IPPs to also supporting capacity more generally among existing public entities. The Kenyan project mentioned above had a significant component for institutional development of the sector and operational support that included training in ‘project management, energy policy, power system planning, power system operations, customer service management, public–private partnerships (PPPs), financial management, management and leadership development, utilities regulation, environmental and social safeguards, procurement and logistics’ (IEG 2019). Similarly, the Ethiopian equivalent had as its point of departure the observation that ‘EEPSCO itself needs to build capacity by investing in human resources and training in order to become a modern electric utility capable of handling the current and forthcoming growth in the sector’ (World Bank 2012).

The increased emphasis on host-government capacity was warranted as the complexity of making markets work became increasingly clear. As one of the reforms demanded by donors, and as a condition for support, many countries have established energy-sector regulators, which in theory should protect private investors from political interference and consumers from private monopolies (Foster and Rana 2020: 63). In practice, however, with no or only partial liberalisation, they are often overseeing public utilities, and their degree of autonomy, and thus effectiveness, varies significantly (*ibid.*). The unbundling of energy utilities and the introduction of market competition generally places greater requirements on host-government capacity, with one estimate suggesting that the number of regulatory functions increases from 12 to 28 whenever public monopolies are split into commercial and regulatory bodies (*ibid.*: 25).

The need for capacity increases further with new forms of renewable energy, not only in planning and procurement, but also in integrating it into power systems. Often in African countries, planning and procurement are not clearly linked (Eberhard et al. 2016: 39). The procurement of IPP projects (though not necessarily new renewable ones) in Ghana, Kenya and Rwanda has led to excess power that now threatens the viability of state utilities and state finances (BusinessDay 2019, Sarkodie 2019, Chemouni and Dye 2020, Dye 2020, The Nation 2020). Similarly, competitively procured new renewable projects may reduce prices for IPPs, but the bill for baseload power production in periods where intermittent solar and wind do not produce will still be sent to government utilities. The challenge of capacity has been identified not only among recipient countries, but also to some extent among the donors that advise them (IEG 2020).

## **Support for market instruments**

In spite of hybrid forms of governance being established in many countries, market mechanisms did become more pronounced, pushed by western donors, but also partly linked to changing financing mechanisms with the emergence of new climate finance. In particular, two instruments are increasingly being used in the renewable energy sector in Africa: feed-in tariffs (FiT) and auctions.

### **Feed-in-Tariffs (FiT)**

FiT is an instrument that became fashionable in Sub-Saharan Africa in the late 2000s to support renewable energy technologies (Müller et al. 2020). It was promoted by European bilateral aid programmes, which treated it as a way to meet the higher costs of financing renewable energy (Davies and Allen 2014 in Eberhard et al. 2016: 64). FiT has been described as having three components, namely a fixed price for produced energy that is sufficient to cover the cost of investments, as well as a return, a guaranteed grid connection and a long-term contract that provides stability for investments (NEPAD-OECD 2009: 76, Yuliani 2016: 146). With feed-in-tariffs typically higher than the average production cost of energy, this represents a de facto subsidy to producers. It was introduced in Denmark and Germany in the early 1990s to help promote renewable energy technologies and later spread across the world (Ćetković and Buzogány 2016, Ćetković et al. 2017).

In the early years, FiT was seen as a way for African governments to provide stability for renewable energy investors while at the same time financing it through the CDM. Whereas the FiT approach was successful in developed countries, it has proved a more challenging approach in low-income countries (Ibid, Yuliani, 2016). Thirteen African countries have adopted the scheme, but it ended up delivering little investment (NEPAD-OECD 2009, Kruger et al. 2018: 11, Kazimierczuk 2019). It is not clear why this is the case, but conflicting policy targets between its environmental, reliability and price-competitiveness elements may have been obstacles reducing host countries' desire to implement projects (Meyer-Renschhausen 2012: 57). Affordable power prices and stability of the power grid, which are typically major concerns in low-income countries, do not always fit easily with new renewable energy technologies in developing countries, and therefore projects have often been met with resistance. Furthermore, in developed countries the required subsidies have been justified not only out of environmental concerns, but often also as a tool of industrial policy to develop the productive capacity of renewable energy technology, which has turned out to be less easily achievable in low-income countries.

In Sub-Saharan Africa, the FiT approach was introduced in South Africa and Uganda in 2007. In South Africa, it was mentioned in a Renewable Energy White Paper published in 2003 with support from the Danish foreign-aid agency Danida which also touched on IPP in renewables, as well as the possibility of CDM financing (Department of Minerals and Energy 2003, Baker 2017: 383, Ćetković and Buzogány 2016, Ćetković et al. 2017). There were disagreements within the energy bureaucracy over whether a competitive tender system or the FiT should be the

chosen model, with the latter coming out as the winner after a push by the electricity regulatory body following a study tour to Germany and Denmark (Baker et al. 2014). The Danish Embassy also promoted the FiT approach. In 2011, however, it was declared illegal in South Africa and replaced with a competitive bidding system (ibid.).

In Uganda, a FiT scheme for small renewable energy projects for the grid came out of the 2007 Renewable Energy Policy, which was introduced as a response to a power crisis in the period 2005-7. By then drought had put strains on hydropower energy production, resulting in expensive emergency power arrangements and convincing the government that it needed to diversify its energy production. This was facilitated by the World Bank as part of a Rural Transformation Programme, but it came in various phases and underwent several iterations along the way (GOU 2007, Bhamidipati et al. 2019). The first phases struggled to attract serious bidders. In preparing for the third phase, GET FiT Uganda joined forces with German actors from KfW and Deutsche Bank linked to a GIZ-led study of the potential for small hydropower in Uganda. It focused on addressing the issues of risk and had multiple iterations that involved funding commitments for top-up payments by NORAD, DFiD, the EU-Africa Infrastructure Trust Fund and the German BMZ, as well as a Partial Risk Guarantee through the World Bank and technical assistance to the regulatory body on tariff modelling and project licensing.

The third phase in Uganda was launched in 2013. It included a separate auction component for solar and led to the first six projects being commissioned, among them three hydropower and two solar power projects. More followed, and in total seventeen projects secured financial close (ibid: 129; Get Fit Uganda 2019). GET FiT projects now deliver more than 7% of Uganda's electricity consumption, and with the leveraging of 'over USD 455 million in private investments, including USD 165 million of private commercial financing', it is considered a success (Ibid, Kruger and Eberhard 2018, Godinho and Eberhard 2019). However, it is also clear that donor subsidies have played an important part in this achievement. As noted by Godinho and Eberhard (2019: 17), the World Bank provided a USD 160 million partial risk guarantee, but most of the projects under GET FiT were not covered by it.

The GET FiT approach was later exported to Zambia, largely mirroring the arrangements in Uganda, although the top-up premium for solar PV projects was removed because of the falling costs of the technology (Kruger and Eberhard 2019). Again, the approach involved significant donor involvement and finance, not least a 31 million Euro grant from the German government to cover transaction advisory services, as well as various guarantees and access to an AfDB loan facility. In the process the Zambian Ministry of Energy, using an agency contract, authorised KfW to make binding commitments on behalf of the Zambian government, and the GET FiT secretariat was staffed with KfW-funded consultants and Multiconsult Norway (ibid.: 33). Winning bidders for solar PV were announced in 2019 with low prices.



Whereas Uganda and Zambia therefore managed to get projects moving through a FiT, other countries have achieved far less. Newell and Phillips (2016) claim that sidelining FiT procedures have been common 'throughout the region'. To increase the electricity supply and diversify sources of electricity energy, in 2008 the Government of Kenya introduced a the renewable energy feed-in tariff (REFiT) scheme with donor support and with maximum tariffs for developers that must not be exceeded (Meyer-Renschhausen 2013: 61). It has subsequently been revised several times, e.g. in 2010 to allow for higher tariffs for wind and biogas, as well as permitting biomass, geothermal and solar resources (ibid.). The achievements of the Kenyan REFiT scheme are not impressive. Bids have been received from some of the larger wind, solar and geothermal IPP developers, but for solar and wind Hansen et al. (2018) report that they have been delayed and are struggling to move beyond expressions of interest, secure funding or reach financial close. Eberhard et al. (2016, 64) report that the Kinangop IPP wind project (60 MW) was procured under REFiT. The project collapsed after local resistance led to delays and the depletion of funds (Eberhard et al. 2018). Godinho and Eberhard (Godinho and Eberhard 2019: 16) state that no projects awarded under the FiT policy have been commissioned.

Similarly, in 2006 to be incorporated into the energy mix as part of a national energy plan supported by Danida (Energy Commission 2006). It received a FiT scheme, which catered for projects in wind, hydro, solar, biomass, landfill, sewage gas, solid waste geothermal and ocean energy, etc. as part of a Renewable Energy Act in 2011 (Meyer-Renschhausen 2013: 60). Since then, however, it has barely moved, according to Obeng-Darko because power is a highly politicised area with a major emphasis on national electrification and universal access through grid extension, but with little regard for renewables (Obeng-Darko 2019a, Obeng-Darko 2019b). This means that the required supporting institutions have not been established, most importantly an independent renewable energy authority that could facilitate private investments. Chemouni and Dye mention two rather small solar projects procured using FiT (Chemouni and Dye 2020). The short length of power-purchase agreements has been identified as a factor limiting investor interest (Mahama 2018). Whereas Ghana has the highest access rate in Sub-Saharan Africa after South Africa, only 0.5% of its power came from renewables in 2018.

Explanations in the literature for these different outcomes between FiT and other procurement modalities are not uniform, but price, funding and risk are repeatedly mentioned. The Uganda example suggests that constant iterations are required to attract bidders. Furthermore, and maybe because of this, African governments have tended to prefer directly negotiated contracts, which are perceived to be simpler and quicker (Eberhard et al. 2016). It is worth noting that in Uganda several renewable IPP projects are now supposedly being developed outside the GET FiT window and without subsidies (Get FiT Uganda 2019, 7), though it is unclear if this also means that no donor funding mechanisms or guarantees are involved. The multiple objectives with less transparent price-setting and potential subsidisation under FiT schemes may also raise concerns among decision-makers. In Nigeria, a number of

projects in a FiT scheme stalled due to uncertainties over tariffs, which were later renegotiated, as well as the lack of risk guarantees (Adeniyi 2019). The latter suggests that a less unambiguous involvement of development finance could be an issue.

Evidence also suggests that the direct involvement of both government and donor agencies may be required to make projects reach financial close. As noted by Kruger and Eberhard (2019: 34), the prominence of donors in Zambia led many bidders to perceive the GET FiT there as donor tenders, not government ones. A similar emphasis on involving government and donors has been observed in Kenya's experiences with IPP outside the REFiT scheme (Hansen et al. 2018). Its 310 MW Lake Turkana Wind Power project, Africa's biggest wind-power project, was an unsolicited bid that led to a directly negotiated power-purchase agreement (Newell and Phillips 2016: 45, Godinho and Eberhard 2019: 23). It involved donors like Danish IFU, a Finnish government fund, Norfund and Vestas, the producer of the turbines, as well as risk guarantees from first the World Bank and then the AfDB. However, Eberhard questions whether directly negotiated contracts generally are simpler and faster (Eberhard et al. 2018). Kenya has retained FiT in the new Energy Act of 2019, seemingly with a bigger emphasis on rural electrification (GOK 2018b, GOK 2019).

### **Auctions**

Internationally, auctions for long-term electricity contracts for IPPs were initially introduced in the 1990s (IRENA 2013). However, renewable energy auctions only became a tool in procuring low-cost energy in the 2000s, a time when commodity prices were rising and the cost of renewable energy technologies declining. Whereas FiT originally had the partial goal of supporting the development of technology and industrial capacity, auctions were more focused on bringing down costs. This has led to criticisms that auctions benefit the big corporate actors (Toke 2015). Auctions can be technology-specific if the goal is to promote certain technologies, like Denmark's first auction for offshore and nearshore wind in 2004, but they can also be technology-neutral if the aim is to acquire least-cost energy (IRENA 2013). Auctions are used for bids from independent power producers (IPP) for long-term contracts with an off-taker, typically a government-owned utility (IRENA 2018: 8). Some distinguish between auctions and competitive tenders, where the latter involve other criteria for awarding a contract than pure price, but in practice most processes involve more criteria, and the terms 'auctions' and 'competitive tenders' are often used interchangeably (IRENA 2018, Kruger and Eberhard 2018).

In Africa south of Sahara, the introduction of auctions was slower than elsewhere, but they have been taking off over the last few years, with solar being the predominant source of energy. This mirrors the international trends, where in 2017-18 solar accounted for 52% of renewable energy auctioned, followed by onshore wind (36%) and offshore wind (9%) (IRENA 2019). Other renewable technologies are miniscule in comparison. Several countries are now on the auction path. South Africa introduced auctions as part of its Renewable Energy Independent Power Producer

Procurement Programme (REIPPPP) in 2011 and has since conducted seven rounds and attracted investments to the tune of USD14.64 billion (ibid.: 47). As part of its GET FiT programme in 2014-15, Uganda had a separate auction window for solar funded by the EU, which not only funded the facility and the development of standardised documents, but also paid for a tender agent, who implemented the tender on behalf of the government, appraised the bids and prepared for the decision by an investment committee made up of 'seven independent international renewable energy sector and infrastructure investment experts' (IRENA 2018: 30; see also above under FiT).

A major new auction programme is the IFC-led Scaling Solar, which seeks to address the fact that many African countries have had renewable energy projects underway but have struggled to reach financial close due to a lack of government capacity to manage IPP processes and a lack of interest from larger and more experienced developers and banks (IFC, not dated). Overall, it aims to reduce costs, partly by achieving scale, and partly by developing a model that can be implemented in more countries through public-private partnerships. The approach provides a one-stop shop of the World Bank's investment and advisory services that allow governments to implement a fast-track procedure with technical assistance and previously developed template documents, and therefore also with bankable project documentation and credit enhancement in the form of various guarantees (World Bank) and political risk insurance (MIGA) (ibid.). It is supported by the Private Infrastructure Development Group, the UK's Department for International Development, USAID and Power Africa, the Ministry of Foreign Affairs of the Netherlands, and the Ministry of Foreign Affairs of Denmark.

The first country to conduct an auction for solar was Zambia in 2015. Since then, Scaling Solar has expanded to Ethiopia, Madagascar, Senegal and Togo (IRENA, 2019). Ghana, Malawi, Mauritius and Namibia are also reported to have solar underway using an auction design (IRENA 2018; Kruger et al., 2018). In Ethiopia, the first IPP project was facilitated by USAID's Power Africa Transactions and Reforms Program, and the World Bank also became involved (World Bank 2019, Multiconsult 2019). The project is reported to have suffered delays (IJGlobal 2019). A scheduled later phase with two IPPs was to be facilitated by Scaling Solar. Most countries' auctions are of recent date, with less or little systematic subsequent analysis of the experiences, and this section therefore focuses more on the early experiences with Scaling Solar, especially from Zambia, where more information is available.

Generally, the Scaling Solar projects come with conditions, although their degree differs from one country to another depending on the state of the latter's implementation of energy-sector reforms. In Zambia, which already had some IPP involvement in its power sector, the conditions were not so strict. By comparison, support for Ethiopia, which had been less forthcoming in implementing reforms, came as part of a growth and competitiveness programme with the power sector as a major component and with strict preconditions, namely the passing of a proclamation and

directive with a regulatory framework and institutions for Public Private Partnerships (World Bank 2018). The initial USD1200 million support in 2018 (with another USD500 million in 2020) included the restructuring of EPP debt and a reform of tariffs, which had undermined the sector's financial viability. The Bank expected (ibid.: 18) that the 'majority of PPP will be in renewable energy'.

The importance of PPP frameworks seems to relate to a recurrent financing model in the Scaling Solar projects with approximately 25% in equity by private sponsors and the rest financed through loans and guarantees from various World Bank entities and, at times, other donors (World Bank 2017, World Bank 2019, IFC 2019, African Review 2019). In Zambia and Senegal, state entities were also equity holders in the joint ventures with private developers to the amount of 20-25% of equity, but it is not clear whether this is part of the required private equity or additional to it.

In Zambia, the Scaling Solar project was implemented by the country's Industrial Development Corporation (IDC), a state-owned enterprise with a 25-year power-purchase agreement (PPA) with the Zambia Electricity Supply Corporation Limited (ZESCO) (Stritzke 2018). Initially, IDC aimed at a project of up to 100 MW, but it was soon split up into two projects to reduce the risk of non-performance by a single developer in the auction programme. The programme was set up as two-stage, sealed-bid, pay-as-bid tenders that exclusively prioritised project price in the bid-scoring process (Kruger and Eberhard 2019).

Scaling Solar projects tend to be evaluated very positively. In Zambia it has been deemed a success, with tariffs at the time of their announcement being some of the lowest for utility-scale solar PV in the world (Kruger et al. 2019). Similarly, in Ethiopia, the first two solar PPPs under a new PPP framework resulted in the lowest-ever solar tariffs in Africa, initially framed as part of the Scaling Solar Program's standardised approach (World Bank 2020).<sup>14</sup> However, the true risks and costs of the new competitive procurement modalities are not always clear. Kruger et al. (2018) point to the significant 'school fees' and 'transaction costs' involved in auctions (18 and 53), a reference to the premium that must be paid in new markets that are perceived to carry a higher risk from an investor perspective. There are more explanations for the lower prices achieved in Zambia's auctions compared to Uganda's, but one aspect Irena identifies (2018: 54) is partial risk guarantees and deeper multilateral development bank lending. The existence of such lending and risk mitigation mechanisms has been highlighted as a key feature in most African auctions (Kruger et al., 2018: 20). Furthermore, additional finance is often needed for electricity infrastructure investments in order to integrate renewable projects into the grid (see, for instance, IRENA, 2018, 18; Kruger and Eberhard, 2018, 8).

<sup>14</sup> At the end of 2017 the first IPP contract was signed with Corbetti Geothermal, a foreign-owned entity with some donor involvement (Gordon 2018). However, the project was delayed and a new power purchasing agreement for a smaller project was signed in 2020 (Djunisic 2020).

Furthermore, the complexity of the market-led approaches that are currently being promoted for new renewable energy deployments is significant and raises questions about the sustainability of the approach in countries with limited technical and managerial capacity. Even a country like South Africa, with its sophisticated financial sector, struggled with its legal and financial advisory capacity when it embarked on renewable energy auctions (Meier et al. 2014). The need for various types of capacity could be even more of an issue in countries with less developed energy and financial markets. In Zambia, there is evidence that the one-stop-shop approach that was meant to address the lack of capacity and coordination on the host government side turned out to pose significant demands on the implementing partners that resulted in significant delays in implementation. The IFC sees this as reflecting the complexity of the public private partnership approach involving multiple partners.

There is a political as well as a technical and managerial side to the challenges Scaling Solar faced in Zambia. Technically, delays were caused by an unexpected need to adapt the model document templates, a government request for a minority stake, a lack of clarity in terms of government incentives, and land access affecting clarity over land ownership and the suitability of the chosen sites (Stritzke 2018, Kruger et al. 2019). The IFC itself was surprised by the adjustments and the need to customise the standardised approach (IFC no date, 13).

On the political side, the Zambian scheme operated with the direct backing of the president, who had ordered its initiation to solve a power crisis caused by drought in 2014-15, but this did not mean that all government partners felt the same urgency or understood what a PPP approach with an Independent Power Producer (IPP) in solar entailed (Kruger et al. 2019). Whereas the Scaling Solar initiative aimed to deliver 'competitively priced solar energy from private IPPs' within two years, the Zambian projects were marred by delays, with financial close of the two projects only in December 2017 and June 2018 respectively. Only in March 2019 did the first project begin production, almost one and a half years late (IFC, Kruger and Eberhard 2019).

These problems might be because the Zambian project was the first of its kind both for the government and the IFC. However, it could also point to a wider challenge with capacity on the government side that was not solved by the one-stop-shop approach. Whereas the IFC claims to have built capacity by including government staff through the process of running the tender process, government stakeholders themselves expressed concerns about sustainability in a DFID-requested assessment (ICED, not dated). The IFC itself acknowledged that countries might need more general support 'prior to or in parallel with' the programme, for instance, as

part of World Bank public-sector projects (IFC, not dated: 13).<sup>15</sup> This mirrors experience from past energy-sector reform programmes suggesting that a medium- to long-term perspective, comprehensive and coordinated engagement, and incremental change may be more sustainable than quick and stealthy interventions (Lee and Usman 2018, IDEV 2019, Foster and Rana 2020, IEG 2020).

A similar point about the need to build host-country capacity can be made for the construction and maintenance of the physical infrastructure itself, where it has been reported that in both Uganda and Senegal construction was ‘largely carried out by expatriates’ (IRENA 2019: 79). Evidence from the Zambia case suggests that more can be done to facilitate local participation and local content (Kruger and Eberhard 2019). Experience, however, also suggests that getting involved in the production of technologies remains a challenge in small markets with limited public- and private-sector capacity (Hansen et al. 2020, Larsen and Hansen 2020).

### **Support for off-grids and mini-grids**

Energy access at scale may be achieved through large-scale on-grid electricity projects, aggregated off-grid and mini-grid solutions.<sup>16</sup> Historically, governments tend to favour the former, which are believed to be the least-cost option in improving energy access for more people (Sergi et al. 2018, Noppen 2014: 16). For large parts of the population that live in remote areas, however, the former may often be a more promising avenue to obtaining energy services. Given the greater emphasis on improving access in recent years, off-grid and mini-grids are increasingly being prioritised by donors and governments alike (World Bank and ESMAP 2019, Johnstone and Garside 2019). In these market segments there is also an increasing focus on creating markets and using market instruments. The shift in approaches to rural electrification and off-grid technologies can be observed in respect of both stand-alone systems like lamps and solar homes and mini-grids. Moreover, the two are also increasingly linked in larger programmes aimed at improving access in rural and underserved areas.

The shift in approaches can be traced back to the 1990s, when some bilateral donors like German GIZ shifted from a focus on developing and spreading technologies to an emphasis on supporting local institutions and the market-based development of small-scale solar systems that included support for marketing, as well as financing mechanisms for the poor (Foley 1992, Kozloff 1995). The shift was often linked to the promotion of donor countries’ own products, an emphasis that was pronounced in USAID interventions, but is also likely to have played a role for other donors,

<sup>15</sup> For more information about experiences with the implementation of the first Scaling Solar in Zambia, see Learning by Doing, Scaling Solar Zambia 1, IFC PPP Advisory Services, June 2018; Kruger, W. and A. Eberhard (2019). Zambia Country Report. [Report 4: Energy and Economic Growth Research Programme](#).

<sup>16</sup> There are different definitions of off-grid solutions. Often, a distinction is made between mini-grids, which are localised power networks, and standalone systems like solar panels or even smaller lamps for homes and institutions, but they are often all just labelled ‘off-grid’ (see IEA 2019: 64).

including GIZ. Stand-alone lamps, solar home systems and the like have been expanding more rapidly than mini-grids, with more than 100 million systems being sold in Africa alone over the last two decades and almost five million people gaining access through solar homes in sub-Saharan Africa in 2018 alone (IEA 2019). By comparison, the current planned expansion, involving an additional 4000 mini-grids in different African countries with an average of 800-4000 beneficiaries, will reach a maximum of 16 million (own estimates based on World Bank and ESMAP 2019: 2-3).

Whereas there seems to be a strong demand-driven element in the stand-alone off-grid market, donor interventions can be traced back to its very beginnings, and there is still a degree of subsidiation by both government and donors. Kenya, which is estimated to be one of the largest off-grid solar markets in the world, provides a good example (Ockwell and Byrne 2017). As elsewhere on the continent, in the 1980s and 1990s support tended to focus on experimentation, that is, the development of domestic technical products, adaptation and local designs of international products and, as part of this, training technicians. However, approaches began shifting in the late 1990s, as two larger initiatives show. First, from 1998 the GEF-funded and IFC-implemented Photovoltaic Market Transformation Initiative aimed to transform the market through finance in the form of loans to consumers and suppliers (ibid: 12). However, this was deemed a failure, as there were very few installations due to minimum deals being too large. It was followed by another market development intervention, a joint IFC and World Bank Lightning Africa initiative piloted in Kenya and Ghana in 2009, followed by programmes in a number of countries with grants aimed at promoting the market for solar products for lighting and mobile-phone charging. These programmes link rural dealers with suppliers, facilitate access to finance across the value chain, and educate consumers (Ibid: 127-28). A Climate Innovation Center was set up in the 2010s as part of a bigger initiative under the World Bank that had a stronger focus on linking technologies to financing for local entrepreneurs and SMEs (Ockwell and Byrne 2017: 147).

Whether because of donor support, better products or more affluent consumers, sales of small solar-power systems – pico-solar – skyrocketed in East Africa in the 2010s, reaching millions of installations (World Bank 2017). In Kenya, 320,000 solar home systems with a capacity of 8-10 MW had been installed by 2010, and at the end of the decade 1-2 MW were being added annually (Pedersen 2017). Financial and technological innovations helped drive this growth in markets with a pay-as-you-go (PAYG) model where only some of the full price of a solar product is paid upfront before the consumer can take it home, followed by later instalments and the switching off of power in case of non-payment (World Bank and Gogla 2020). Whereas private companies have largely driven the development of this market, there is also evidence that development assistance has been part of it as well, although its share is unclear.

Off-grid technologies were also gradually being integrated into more general energy-system planning, albeit not on a scale comparable to grid extension electrification. An early example of the more systematic focus on rural transformation through electrification is 'The Uganda Energy for Rural Transformation Project' that began in 2001/2 on the back of a larger general power-sector reform program and included grid extension, as well as mini-grids and stand-alone solar panels for private homes and public institutions (World Bank 2009b). This was implemented by the Government of Uganda with World Bank support. A Rural Electrification Agency was established under the Ministry of Energy in Uganda as a sign of the more programmatic approach that was to emerge in other African countries in the years ahead. The approach also included an emphasis on market-driven approaches. As part of this, the emphasis on building the capacity of key stakeholders like private businesses, which were to drive the projects, as well as public agencies, NGOs and financial institutions increased with a focus on fostering the commercialisation of renewable energy and enhancing service quality. Donors initially included the World Bank, UNDP and Global Environment Facility, but also came to involve bilateral and NGO support.

The fact that rural electrification through new renewable energy was often more a donor than a government priority can be observed in Mozambique, where the Fundo de Energia (FUNAE), a national energy fund, was established in 1997 with assistance from Danida to promote access to low-cost, sustainable and alternative sources of electricity in rural areas. However, it has relied on donor funding, and progress in using the project to achieve rural access has been limited ('less than 1% of households have benefited from off-grid connections') (Power et al. 2016, Cotton et al. 2019: 10, see also Kirshner and Power 2019). As in many other countries, the Mozambican government has prioritised the electrification of rural public institutions, as well as facilitating large-scale power projects. A similar example can be found in Ghana, where Danida supported the making of a Strategic National Energy Plan 2006 – 2020, which set targets of 10% renewable energy and 30% penetration of rural electrification through renewable energy. However, the necessary supporting institutions and detailed planning did not materialise, and despite donor-supported activities the emphasis on grid extension continued, with little progress being made in reaching the renewable energy targets (Energy Commission 2006, World Bank 2018a, Obeng-Darko 2019a and b). In Tanzania, incentives to promote off-grid renewable energy emerged in the late 2000s with World Bank and donor support, but state entities have not been very welcoming to involving IPPs in decentralised rural electrification and developers have been wary of risks. Also, the tariffs were set too low to attract private investors, and most mini-grids are therefore owned by government utilities or constructed with donor financing (Meier et al. 2014, Odarno et al. 2017, Movik and Allouche 2020).



Generally, financing of off-grid solutions remains limited compared to grid-connected investments, but it has increased in countries like Kenya, Tanzania and Uganda (IEA et al. 2020: 32). The lack of government interest could also have to do with the fact that grid extension is the cheapest way to reach most people. Off-grid therefore becomes economically attractive mainly when remoter areas are targeted for electrification (IEA 2019). Indeed, electrification has become a bigger priority in a number of countries as they grow richer. The falling costs of renewables and better-quality products are contributing to this drive, but so do political incentives. Several countries have become more interested in mini-grid and stand-alone approaches using new forms of renewable energy as a way to reach their remoter populations. In Ghana, this has also been linked to electoral competition, where solar panels have been targeted to selected areas to win votes (Brass et al. 2020). A similar correlation between elections and the targeting of services has been observed in countries like Kenya, Mozambique and Uganda, but research on this is still limited (Sergi et al. 2018, Trotter and Maconachie 2018, Cotton et al. 2019).

Whereas donors have supported mini-grids through various schemes, approaches have become more systematic as more emphasis is placed on improving access. One of the more general conditions for World Bank support seems to be a least-cost power extension plan. The World Bank's Energy Sector Management Assistance Program (ESMAP) has also established a Global Facility on Mini Grids to mainstream mini-grids into its operations, as well as national electrification programmes (World Bank and ESMAP 2019: 8). Similar to the trends analysed above, this approach emphasises market-driven development. ESMAP lists ten building blocks that need to be put in place to support market drivers. Whereas it is recognised that improving access requires public funding, the focus is on how to crowd in private-sector finance (ibid: 8-9). Nonetheless, the World Bank's own financial commitment to mini-grids accounts for an average of 25% of investments. Other donors and possibly government funding should be added on top.

An example of the approach can be seen in Nigeria, which has been highlighted as a frontrunner, with the largest mini-grid programme in Africa after Senegal (ibid.). The Nigerian Electrification Project took off in 2018 with World Bank support, but it was predated by the World Bank's Country Partnership Strategy of 2014, which had power-sector reform as an important component, including the Sustainable Energy for All access agenda, as well as a detailed rural access expansion plan, viable pilots for off-grid electricity and feasibility studies for investments in renewable energy (World Bank 2014b). Whereas a Rural Electrification Agency (REA) had been established in 2005/6, the Rural Electrification Fund that was to finance activities was only established after guidelines had been adopted in 2017. The Electrification Project has solar hybrid mini-grids and stand-alone solar systems as its first and second components, which have received World Bank funding of USD150 million (out of USD 330 million) and USD75 million (out of USD 305 million) respectively. For both components 'market-based' approaches were to be followed, and the remaining finance is to come from the private sector (World Bank 2018e). This project

built on previous, but much more sporadic experiences with mini-grids, typically pilot projects which all involved donor finance (ibid., World Bank and ESMAP 2017).

Again, there is evidence of host-country capacity constraints. In recent off-grid and mini-grid projects, promotion of the new approaches and technologies means that there is a need to build additional capacity. When a major EUR133.8 million new 'Off-grid Solar Access Project for Underserved Counties' was initiated in Kenya through a World Bank credit approved in 2017, it was noted on the one hand that the implementing institutions, the Ministry of Energy and Petroleum, KPLC and REA, had past experience of implementing World Bank projects, while on the other (World Bank 2017a: 31) support for capacity-building was still needed because of the more complex management systems required for private-sector participation. Among other things, this implied the procurement of 'an experienced Facility manager' as well as the need for 'adequate technical expertise in renewable energy and financial markets to effectively monitor the Facility manager'. It also noted, therefore, that substantial resources have been set aside 'to ensure an adequate skill set is hired from the market for all three [government] agencies.'

#### **Box 4. Off-grid and mini-grids in Kenya**

In Kenya, a number of donor initiatives and donor-supported schemes and initiatives can be observed for mini-grids and household solar systems over the last four decades. The Kenyan government has long prioritised extending the existing grid and building on existing state utilities. A Rural Electrification Authority (REA) was established in 2007, followed in 2008 by a rural electrification master plan that was to be implemented over several phases. It also included hybridising of existing diesel-based mini-grids with solar PV and wind, which received support from the World Bank's Scaling-Up Renewable Energy Program (SREP) (Pedersen 2017, Hansen et al. 2018). However, REA was generally more about connecting rural schools and clinics to the grid than giving the poorer segments of the population access to power (Sergi et al. 2018: 63, Godinho and Eberhard 2019: 25). Grid extension and connecting more consumers to the existing grid were also major elements in the Last Mile Connectivity Program, approved in 2014. With a National Electrification Strategy from 2018 that was developed in partnership with the World Bank, the government also recognises the key role off-grid technologies can play. The Strategy aims at universal electrification in Kenya by 2022.

Though on the increase, support for various off-grid solutions has thus been less consistent until recently. This includes the hybridisation of existing fossil-fueled mini-grids with renewable technologies (Hansen et al. 2018). Tax exemptions for solar products, which are controlled by the Kenyan government and have been seen as an indicator of government interest, have been introduced and removed several times over (Ockwell and Byrne 2016). They have been in place since around 2015, and Kenya is now being picked out for having adopted international standards on these products, which should facilitate market growth, as well as providing a stable regulatory framework for mini-grids (Gordon 2018, World Bank and ESMAP 2019, IEA 2019). Kenya is estimated to be one of the largest off-grid solar markets in the world, especially for solar home systems (Ockwell and Byrne 2016: 71).

Mini-grids are also on the increase in Kenya, partly due to cheaper technology and innovative models for pay-as-you-go for services provided by mobile companies (Gordon 2018). Most of these are solar-powered. The state utilities, with grids owned by the Rural Energy Agency and operated by KPLC, are still a significant player in mini-grids, with 20 MW of installations, but they have been overtaken by private actors with 66 MW of installations (World Bank 2017). Many of these are concentrated in more densely populated areas, leaving smaller rural towns unserved. Linked to the National Electrification Strategy, an Off-Grid Solar Access Project for Underserved Counties with funding from DFiD and the World Bank is seeking to address this through hybrid mini-grids based on PPPs, stand-alone solar systems for households through 'incentives for solar off-grid companies' and Solar Water Pumps for Community Facilities provided by private sub-contractors. This programme will follow the three principles of 'diversification, private sector participation, and flexibility' (ibid: 17). Spain and German KfW and GIZ have also been supporting specific projects, and Norfund and Sida have increasingly focused on off-grid, though the extent of latter's presence in Kenya is unclear (Sergi et al. 2018).

## **PERSPECTIVES FOR FUTURE DONOR SUPPORT**

Development assistance for new renewable energy in Sub-Saharan African countries has changed significantly in recent decades. To some extent this reflects changes in technologies that have matured and become more price-competitive, but it also reflects the fact that priorities have shifted among recipient countries and donors. Whereas support for new renewable energy has existed since the 1970s, it was only in the 2000s that it started being more systematically integrated into power-sector development and planning, first through rural electrification, but later being increasingly streamlined into broader energy-sector projects and programmes. As demonstrated in the previous sections, donor finance for new renewable energy in Sub-Saharan Africa has increased over the same period and is increasingly being used to mobilise additional private finance for power-sector investments. The deployment of new renewable energy is increasing rapidly as a consequence, albeit from a low starting point.

However, the political economy of energy in different countries that has limited the scope of reform in the past is unlikely to have disappeared. Past experience suggests that many host governments may accept market-led approaches in order to attract finance for specific investment projects, but they may not necessarily buy into the long-term goal of introducing more competition in the energy sector. More research in and knowledge of the political economy of renewable energy is needed, but the evidence presented in this report suggests that similar differences between the climate change agenda and the implementation of energy projects on the ground can be observed today. Although many African countries have signed up to the Paris agreement, it is therefore also worth noting that Chinese investments in energy have been on the increase in a number of countries and often display other priorities, notably a continued interest in large-scale hydropower and fossil-fuel projects with questionable sustainability records, as well as state-owned and controlled power production. We would therefore like to point to a number of perspectives in development assistance to new renewable energy:

### **Moving new renewable energy to scale requires continued funding, but also acknowledgement of different interests and objectives**

Whereas funding for new types of renewable energy has increased, significant financing gaps remain both for facilitating a transition to cleaner energy and for improving access to modern forms of energy in Sub-Saharan Africa. The evidence in this report suggests that the two can be made compatible, but that the respective dynamics differ from one country to another. One important factor in this respect has been the convergence of donor-and recipient-country agendas on improving access after the turn of the century. This made western donors, including the World Bank, more pragmatic in their approaches to power-sector reform, while some recipient countries were also more open to new renewable energy technologies, not necessarily for emission reduction purposes, but due to the availability of donor

funding. More progress seems to have been made in countries with limited or no fossil fuels, which have accordingly chosen new renewable energy technologies out of energy security concerns in order to develop domestic sources of energy and diversify their energy supplies. For donors, it is important to recognise these different interests and to be realistic about how to bridge them. This may imply more funding for new renewable energy, but it could also involve more support for domestic private-sector involvement through local content and CSR instruments, which have been identified in several studies as important for increasing recipient-country interest in such technologies.

### **Ensuring a balance between support for market development and support to government entities**

The promotion of market-led approaches is a dominant feature of western aid to energy sectors and has helped promote new renewable IPP projects on a scale that has led to record low prices. However, this paper also suggests that there may be tensions between reducing the cost of new renewable energy technologies through market-led approaches on the one hand and the sustainability of these approaches in African countries with other priorities on the other. In light of this, it is worth discussing whether the significant resources spent on facilitating private-sector involvement always may represent the best use of funds. An increasing number of studies from outside the energy field show that financial instruments, including concessional finance, grants and subsidies, should be carefully selected and designed based on an analysis of the individual market in order to ensure additionality and avoiding crowding out private investments. As we have shown, the energy sector has itself produced a number of experiences. FiT projects have generally not been a success, but there are a few exceptions. The Zambian and Kenyan experiences point to potentially wider problems with market instruments that are promoted by western donors in such contexts and that touch on the managerial, financial and technical elements of the package. The frequency with which procurement processes have been initiated as a response to drought itself points to problems with planning in a number of countries.

### **Not undermining longer-term capacity-building in the quest for cheap energy**

The complexities involved in making market-led approaches work is significant, and it is increasingly clear that they pose a challenge to government and host-country capacity. This point can be made in general for unbundling and liberalisation, which increase the number of government entities and regulatory functions, but evidence from earlier experiences with the market-led approaches to procurement that are currently being promoted suggest that it is only becoming more pertinent. Support to capacity-building has increased, but the recurrent power crises in a number of countries, as well as the recent histories of the oversupply of energy in Kenya, Rwanda and Ghana, suggest that planning capacity is crucial. Relatedly, the evidence from the FiT schemes, auctions and competitively procured mini-grid

projects, where donors play a major role in structuring projects and their implementation, suggests that this could also be an issue for procurement. Finally, bearing in mind that energy security is a concern for decision-makers in African countries, the capacity to integrate new renewable energy technologies with less predictable power flows in the energy system is crucial. Support seems to be linked to specific projects and interventions, there being less focus on capacity at the system or sector level, although this is clearly needed as well. Evaluations and studies have confirmed this by suggesting that a medium- to long-term approach and more comprehensive efforts to build capacity are important, though needs are likely to differ from one country to another (Lee and Usman 2018, IDEV 2019, IEG 2020).

### **Ensuring donor coordination as well as independent advice**

The number of donors involved in energy-sector support is significant, and this paper suggests that donor support continues to have a role to play. However, the involvement of multiple donors does also make energy-sector management more complex for recipient countries. For instance, in Ethiopia, the World Bank sees itself as leading the coordination in assisting the government in ‘developing a strong pipeline of IPPs’ (World Bank 2019: 24), with USAID and Denmark being key partners in IPP development, and with a number of other donors and development finance institutions also involved in the sector. Donor support should be based on a division of labour and complementarity between various donors – including bilateral and multilateral donors – and their respective comparative advantages, obviously reflecting recipient-government priorities. However, it should also be kept in mind that donor agencies may have interests in promoting specific types of projects and programmes; bilateral donors may have commercial strongholds in particular technologies and financial institutions may have particular financial products to sell. This raises questions regarding the interests of donor organisations as well, and whether support for recipient countries should include more independent advice.

### **The need for flexible approaches**

Although energy-sector planning that takes a medium- to long-term perspective is important in order to bring about the energy transition, there is a need for constant iteration and adaption because technologies change and mature and because contexts differ. This also implies that a one-size-fits-all approach is not always the best, and that approaches in general should not incorporate agendas that are over-ambitious. Instead, intermediate reform options in countries that are too small to have the capacity or that lack the capacity or will to create competitive power markets may be a more constructive way forward (Foster and Rana 2020: 43).

## REFERENCES

- Abegaz, B. (1999). *Aid and reform in Ethiopia*. Aid and Reform in Africa, Project of the World Bank. 167-226.
- Adeniyi, F. (2019). *Overcoming the market constraints to on-grid renewable energy investments in Nigeria*: Oxford Institute for Energy Studies. OIES PAPER: EL 37.
- AFDB (2016). *The New Deal on Energy for Africa: A transformative partnership to light up and power Africa by 2025*. African Development Bank Group.
- African Review (2019). *ENGIE and Meridiam sign for solar PV projects in Senegal*. Published 22 July 2019: <https://www.africanreview.com/energy-a-power/renewables/engie-and-meridiam-sign-for-solar-pv-projects-in-senegal>. Accessed 18 September 2020.
- Andersen, O. W., Hansen, H. and Rand, J. (forthcoming). *Evaluating financial and development additionality in blended finance operations*. OECD Development Co-operation Working Paper.
- Asress, M. B., Simonovic, A., Komarov, D., and Stupar, S. (2013). Wind energy resource development in Ethiopia as an alternative energy future beyond the dominant hydropower. *Renewable and Sustainable Energy Reviews*, 23: 366–378.
- Baker, L. (2017). Post-Apartheid Electricity Policy and the Emergence of South Africa's Renewable Energy Sector. In *The Political Economy of Clean Energy Transitions*, D. J. Arent, C. Arndt, M. Miller, F. Tarp and O. Zinaman (eds.). Oxford University Press.
- Baker, L., and Phillips, J. (2019). Tensions in the transition: The politics of electricity distribution in South Africa. *Environment and Planning C: Politics and Space*, 37(1): 177–196.
- Baker, L., Newell, P., and Phillips, J. (2014). The Political Economy of Energy Transitions: The Case of South Africa. *New Political Economy*, 19(6): 791-818.
- Barnard, S., and Nakhooda, S. (2014). *The effectiveness of climate finance: a review of the Scaling-up Renewable Energy Program*. ODI. Working Paper 396.
- Bhamidipati, P. L., Haselip, J., and Elmer Hansen, U. (2019). How do energy policies accelerate sustainable transitions? Unpacking the policy transfer process in the case of GETFiT Uganda. *Energy Policy*, 132: 1320–1332.
- Brass, J. N., Schon, J., Baldwin, E., and MacLean, L. M. (2020). Spatial analysis of bureaucrats' attempts to resist political capture in a developing democracy: The distribution of solar panels in Ghana. *Political Geography*, 76: 102087.

BusinessDay (2019). *Ghana has so much electricity that it is costing \$450m a year*. BusinessLIVE 10 November 2019: <https://www.businesslive.co.za/bd/world/af-rica/2019-11-10-ghana-has-so-much-electricity-that-it-is-costing-450m-a-year/>

Cabré, M. M., Gallagher, K. P., and Li, Z. (2018). Renewable Energy: The Trillion Dollar Opportunity for Chinese Overseas Investment. *China & World Economy*, 26(6): 27–49.

Ćetković, S., and Buzogány, A. (2016). Varieties of capitalism and clean energy transitions in the European Union: When renewable energy hits different economic logics. *Climate Policy*, 16(5): 642–657.

Ćetković, S., Buzogány, A., and Schreurs, M. (2017). Varieties of Clean Energy Transitions in Europe: Political-Economic Foundations of Onshore and Offshore Wind Development. In: *The Political Economy of Clean Energy Transitions*, D. J. Arnt, C. Arndt, M. Miller, F. Tarp and O. Zinaman (eds.). Oxford University Press.

Chemouni, B., and Dye, B. (2020). *The Contradictions of an Aspiring Developmental State: Energy Boom and Bureaucratic Independence in Rwanda* (SSRN Scholarly Paper ID 3544089). FutureDAMS Working Paper 008. Social Science Research Network.

Chen, Y. (2018). Comparing North-South technology transfer and South-South technology transfer: The technology transfer impact of Ethiopian Wind Farms. *Energy Policy*, 116: 1–9.

China Daily (2018). Kenyan president opens Chinese-built electricity station. China Daily 31 May 2018: <https://www.china-daily.com.cn/a/201805/31/WS5b0f6518a31001b82571d6b6.html>

Convergence (2019). *The State of Blended Finance 2019*.

Cotton, M. D., Kirshner, J. D., and Salite, D. L. J. (2019). *The political economy of electricity access: Lessons from Mozambique*. Research Report. Oxford Policy Management.

Darko, D., Kpessa-Whyte, M., Obuobie, E., Siakwah, P. Torto, O, and Tsikata, D. (2019). *The context and politics of decision making on large dams in Ghana: an overview*. FutureDAMS Working Paper 002. The Future Dams Research Consortium.

Degefu, D., He, W., and Zhao, J. (2015). Hydropower for sustainable water and energy development in Ethiopia. *Sustainable Water Resources Management*, 1(4): 305–314.

Department of Minerals and Energy (2003). *White Paper on Renewable Energy*. Republic of South Africa.



- Djunisic, S. (2020). Corbetti geothermal project in Ethiopia secures govt PPA. *Renewables Now* 17 April 2020. Accessed 24 June 2020 on <https://renewable-snow.com/news/corbetti-geothermal-project-in-ethiopia-secures-govt-ppa-694059/>.
- Dornan, M., and Shah, K. U. (2016). Energy policy, aid, and the development of renewable energy resources in Small Island Developing States. *Energy Policy*, 98: 759–767.
- Dye, B. (2020). *Rwanda's Electricity Boom and the Danger of Too Much Power*. The Policy Practice. FutureDAMS Consortium.
- Eberhard, A., and Gratwick, K. (2005). The Kenyan IPP experience. *Journal of Energy in Southern Africa*, 16(4): 4-17.
- Eberhard, A., Gratwick, K., and Kariuki, L. (2018). Kenya's lessons from two decades of experience with independent power producers. *Utilities Policy*, 52: 37–49.
- Eberhard, A., Gratwick, K., Morella, E., and Antmann, P. (2016). *Independent Power Projects in Sub-Saharan Africa: Lessons from five key countries*. World Bank Publications.
- Edjekumhene, I. and N. Dubash (2002). 'Ghana: Achieving public benefits by default'. In *Power politics: Equity and environment in electricity reform*, N. Dubash and S. Rajan (eds.). Washington DC: World Resources Institute: 117-138.
- Energy Commission, Ghana. (2006). *Strategic National Energy Plan 2006 – 2020*. Main Report. Energy Commission.
- ESMAP (2019). *Energy Sector Management Assistance Program: Annual Report 2019*. ESMAP Team.
- Foley, G. (1992). Renewable energy in third world development assistance: Learning from experience. *Energy Policy*, 20(4): 355–364.
- Foster, V., and Rana, A. (2020). *Rethinking Power Sector Reform in the Developing World*. Washington, DC: World Bank.
- Gboney, W. (2009a). Policy and regulatory framework for renewable energy and energy efficiency development in Ghana. *Climate Policy*, 9(5): 508–516.
- Gboney, W. (2009b). *Promoting Technology Transfer and Deployment for Renewable Energy and Energy Efficiency in Ghana*. Climate Strategies.
- Get Fit Uganda (2019). *Annual Report 2019*. Accessed 29 May 2020 on <https://www.getfit-uganda.org/annual-reports/annual-report-2019/>.
- Godinho, C., and Eberhard, A. A. (2019). *Learning from Power Sector Reform: The Case of Kenya* (SSRN Scholarly Paper ID 3373359). Social Science Research Network.

- GOK, Government of Kenya (2007). *Kenya Vision 2030: A Globally Competitive and Prosperous Kenya*. Republic of Kenya.
- GOK, Government of Kenya (2018a). *National Energy Policy*. Ministry of Energy, Republic of Kenya.
- GOK, Government of Kenya (2018b). *Updated Least cost power development plan 2017-2037*. Republic of Kenya.
- GOK, Government of Kenya (2019). *Energy Act, 2019*. Republic of Kenya.
- Gordon, E. (2018). *The politics of renewable energy in East Africa*. Oxford Institute for Energy Studies. OIES Paper: EL 29.
- GOU, Government of Uganda (2007). *The Renewable Energy Policy for Uganda*.
- Hafner, M., Tagliapietra, S., and de Strasser, L. (2018). 'The Challenge of Energy Access in Africa'. In *Energy in Africa: Challenges and Opportunities*, M. Hafner, S. Tagliapietra, & L. de Strasser (eds.). Springer International Publishing.
- Hale, T., Liu, C., and Urpelainen, J. (2020). *Belt and Road decision-making in China and recipient countries: How and to what extent does sustainability matter?* ISEP and BSG Report.
- Hansen, U. E., Gregersen, C., Lema, R., Samoita, D., and Wandera, F. (2018). Technological shape and size: A disaggregated perspective on sectoral innovation systems in renewable electrification pathways. *Energy Research & Social Science*, 42: 13–22.
- Hansen, U. E., Nygaard, I., Morris, M., and Robbins, G. (2020). The effects of local content requirements in auction schemes for renewable energy in developing countries: A literature review. *Renewable and Sustainable Energy Reviews*, 127: 109843.
- Howell, J. (2011). 'Rural Electrification and Renewable Energy in Ethiopia'. In *Environmental Policy Review: Key Issues in Ethiopia 2011*. Colby College Environmental Policy Group.
- Hughes, L., and Rogei, D. (2020). Feeling the heat: Responses to geothermal development in Kenya's Rift Valley. *Journal of Eastern African Studies*, 14(2): 165–184.
- ICA, Infrastructure Consortium for Africa (2018). *Infrastructure Financing Trends in Africa – 2017*. Accessed 16 April 2020 on [https://www.icafrica.org/fileadmin/documents/Annual\\_Reports/IFT2017.pdf](https://www.icafrica.org/fileadmin/documents/Annual_Reports/IFT2017.pdf).
- ICED (no date). *ICED Evidence Library. Case Study: IFC's Scaling Solar Programme, Zambia*. Infrastructure & Citites for Economic Development.

- IDEV (2019). *Evaluation of the African Development Bank Group's Program Based Operations: Energy Governance Cluster*. African Development Bank Group.
- IEA (2019). *Africa Energy Outlook 2019*. IEA, Paris
- IEA (2020a). *Africa and Covid-19: Economic recovery and electricity access go hand in hand*.
- IEA (2020b). *Sustainable Recovery*. World Energy Outlook Special Report in collaboration with the International Monetary Fund.
- IEA, IRENA, UNSD, World Bank, WHO (2020). *Tracking SDG 7 | Progress Towards Sustainable Energy*. The Energy Progress Report 2020. Accessed 26 June 2020 on [https://trackingsdg7.esmap.org/?utm\\_content=buffer88602&utm\\_medium=social&utm\\_source=twitter.com&utm\\_campaign=buffer](https://trackingsdg7.esmap.org/?utm_content=buffer88602&utm_medium=social&utm_source=twitter.com&utm_campaign=buffer).
- IEG (2006). *New Renewable Energy. A Review of the World Bank's Assistance*. Accessed 23 November 2020 on <http://www.oecd.org/derec/worldbankgroup/37815762.pdf>
- IEG (2019). Implementation Completion Report (ICR) Review for an Electricity Expansion Project. KE-Electricity SIL, 2010. Report Number: ICRR0021330.
- IEG (2020). *Renewable Energy: Evaluation of the World Bank Group's support for electricity supply from Renewable Energy resources, 2000–2017*. Independent Evaluation Group, World Bank.
- IFC (2019). *Press release: Two Scaling Solar Projects in Senegal Advance to Construction with IFC Financing Package*. Published 18 July 2019 on <https://pressroom.ifc.org/all/pages/PressReleaseAll.aspx/>. Accessed 18 September 2020.
- IFC. *Scaling Solar: The Complete Package*. International Finance Corporation. World Bank Group. <https://www.ifc.org/wps/wcm/connect/f4df6171-1018-4003-ad9d-938ce4866c15/scaling-infra-solar-08.pdf?MOD=AJPERES&CVID=mSCZFCY>
- IJGlobal (2019). Ethiopia's REGREP on reality. Published 1 May 2019 on <https://ijglobal.com/articles/139663/ethiopias-regrep-on-reality>. Accessed 23 November 2020.
- Ing.dk (2017). *Vestas skal bygge minimølle til afrikanske minigrids*. Ingeniøren. Published 11 January 2017: <https://ing.dk/artikel/vestas-skal-bygge-minimoelle-afrikanske-minigrids-191856>. Accessed 23 September 2020.
- IRENA (2013). *Renewable energy auctions in developing countries*. International Renewable Energy Agency.
- IRENA (2018). *Renewable energy auctions: Cases from sub-Saharan Africa*. International Renewable Energy Agency, Abu Dhabi.

- IRENA (2019). *Renewable Energy Auctions: Status and trends beyond price*. International Renewable Energy Agency, Abu Dhabi.
- IRENA (2020). *Renewable Power Generation Costs in 2019*. International Renewable Energy Agency, Abu Dhabi.
- Johnson, O., Muhoza, C., and Osano, P, Senyagwa, J and Kartha, S. (2017). *Catalysing investment in sustainable energy infrastructure in Africa: Overcoming financial and non-financial constraints*. Working Paper 2017-03. Stockholm Environment Institute.
- Johnstone, K. and B. Garside (2019). *Accelerating energy access with aggregation*. IIED Insights, October 2019.
- Kazimierczuk, A. H. (2019). Wind energy in Kenya: A status and policy framework review. *Renewable and Sustainable Energy Reviews*, 107: 434–445.
- Kebede, K. Y., and Mitsufuji, T. (2017). Technological innovation system building for diffusion of renewable energy technology: A case of solar PV systems in Ethiopia. *Technological Forecasting and Social Change*, 114: 242–253.
- Kebede, S. (2013). Geothermal exploration and development in Ethiopia: Status and future plan.
- Kirshner, J., and Power, M. (2019). ‘Electrification and the everyday spaces of state power in postcolonial Mozambique’. In *Electrifying Anthropology: Exploring Electrical Practices and Infrastructures*, S. Abram, B. R. Winthereik and T. Yarrow (eds.). Bloomsbury Academic.
- Kong, B., and Gallagher, K. (2020). *Chinese development finance for solar and wind power abroad*. GCI Working Paper 009. Global Development Policy Center.
- Kozloff, K. (1995) Rethinking development assistance for renewable electric power. *Renewable Energy* 6(3): 215-231.
- Kreibich, N., Hermwille, L., Warnecke, C., and Arens, C. (2017). An update on the Clean Development Mechanism in Africa in times of market crisis. *Climate and Development*, 9(2): 178–190.
- Kruger, W., and Eberhard, A. (2018). Renewable energy auctions in sub-Saharan Africa: Comparing the South African, Ugandan, and Zambian Programs. *WIREs Energy and Environment*, 7(4): e295.
- Kruger, W., and Eberhard, A. (2019). *Zambia Country Report*. Report 4: Energy and Economic Growth Research Programme.
- Kruger, W., Eberhard, A. and Swartz, K. (2018). *Renewable Energy Auctions: A Global Overview*. Report 1: Energy and Economic Growth Research Programme.

- Kruger, W., Stritzke, S., and Trotter, P. A. (2019). De-risking solar auctions in sub-Saharan Africa: A comparison of site selection strategies in South Africa and Zambia. *Renewable and Sustainable Energy Reviews*, 104: 429–438.
- Larsen, T. H., and Hansen, U. E. (2020). Sustainable industrialization in Africa: The localization of wind-turbine component production in South Africa. *Innovation and Development*, 0(0), 1–20.
- Le, T.-H., Nguyen, C. P., and Park, D. (2020). Financing renewable energy development: Insights from 55 countries. *Energy Research & Social Science*, 68, 101537.
- Lee, A. D., and Usman, Z. (2018). *Taking Stock of the Political Economy of Power Sector Reforms in Developing Countries: A Literature Review*. The World Bank.
- Mahama, M. (2018). *Renewable Energy Planning and Regulatory Policy: Tools for Sustainable Electricity Generation and Low Carbon Development. The Case of Ghana*. Pan-African University, Institute for Water and Energy Sciences. <http://repository.pau-wes-cop.net/handle/1/251>
- Meier, P., Vagliasindi, M., and Imran, M. (2014). 'Case Study: Tanzania'. In *The design and sustainability of renewable energy incentives: an economic analysis*. The World Bank.
- Meyer-Renschhausen, M. (2012). Evaluation of feed-in tariff-schemes in African countries. *Journal of Energy in Southern Africa*, 24(1): 56-66.
- Michaelowa, A., and Michaelowa, K. (2011). Old Wine in New Bottles? Does Climate Policy Determine Bilateral Development Aid for Renewable Energy and Energy Efficiency? In *International Development Policy: Energy and Development*, G. Carbonnier (eds.). Palgrave Macmillan UK.
- Morris, M., Robbins, G., Hansen, U. E., and Nygaard, I. (2020). *Energy and Industrial Policy Failure in the South African Wind Renewable Energy Global Value Chain: The political economy dynamics driving a stuttering localisation process*.
- Mostert, W. (2010). *Publicly Backed Guarantees as Policy Instruments to Promote Clean Energy*. SEF Alliance Publication. UNEP.
- Movik, S., and Allouche, J. (2020). States of power: Energy imaginaries and transnational assemblages in Norway, Nepal and Tanzania. *Energy Research & Social Science*, 67: 101548.
- Müller, F., Claar, S., Neumann, M., and Elsner, C. (2020). Is green a Pan-African colour? Mapping African renewable energy policies and transitions in 34 countries. *Energy Research & Social Science*, 68: 101551
- Multiconsult (2018). *Scandinavian Investments in Renewable Energy in Developing Countries*.

- Multiconsult (2019). *Metahara Solar Power PV Plant: Environmental and Social Impact Assessment*. Volume 1: Main report. Ethiopian Electric Power.
- NEPAD-OECD (2009). *Boosting Africa's energy sector through carbon finance*. Ministerial Meeting and Expert Round Table, NEPAD-OECD, Africa Investment Initiative.
- Newell, P., and Phillips, J. (2016). Neoliberal energy transitions in the South: Kenyan experiences. *Geoforum*, 74: 39–48.
- Noppen, D. (2014). *Evaluation of Sida financed interventions for increased access to Electricity for poor people*. Sida.
- Obeng-Darko, N. A. (2019a). Renewable energy and power: A review of the power sector reform and renewable energy law and policy nexus in Ghana. *Africa Review*, 11(1), 17–33.
- Obeng-Darko, N. A. (2019b). Why Ghana will not achieve its renewable energy target for electricity. Policy, legal and regulatory implications. *Energy Policy*, 128, 75–83.
- Ockwell, D., and Byrne, R. (2017). *Sustainable Energy for All: Innovation, Technology and Pro-Poor Green Transformations*. Routledge.
- Ockwell, D., Byrne, R., Hansen, U. E., Haselip, J., and Nygaard, I. (2018). The uptake and diffusion of solar power in Africa: Socio-cultural and political insights on a rapidly emerging socio-technical transition. *Energy Research & Social Science*, 44: 122–129.
- Odarno, L., Sawe, E., Swai, M., Katyega, M. J. J., and Lee, A. (2017). *Accelerating Mini-Grid Deployment in Sub-Saharan Africa*. World Resources Institute and Tatedo.
- OECD (2018). *Sector Financing in the SDG Era, The Development Dimension*. OECD Publishing, Paris.
- OECD/UNCDF (2019). *Blended Finance in the Least Developed Countries 2019*, OECD Publishing, Paris.
- OEF (2020). *Electricity Networks in a Net-Zero-Carbon Economy*. Oxford Energy Forum Special issue: 124. Oxford Institute for Energy Studies.
- Parthan, B., Osterkorn, M., Kennedy, M., Hoskyns, St. J., Bazilian, M., and Monga, P. (2010). Lessons for low-carbon energy transition: Experience from the Renewable Energy and Energy Efficiency Partnership (REEEP). *Energy for Sustainable Development*, 14(2): 83–93.
- Patel, S., Shakya, C., and Rai, N. (2020). *Climate finance for hydropower: Incentivising the low-carbon transition*. IIED Issue Paper January 2020.

- Pedersen, M. (2017). *Rural electrification through private models: The case of solar-powered mini-grid development in Kenya: Exploring the hybrid nature of private business models and the interplay between new players and existing structures in the Kenyan rural electrification regime*. DTU.
- Power, M., Newell, P., Baker, L., Bulkeley, H., Kirshner, J., and Smith, A. (2016). The political economy of energy transitions in Mozambique and South Africa: The role of the Rising Powers. *Energy Research & Social Science*, 17: 10–19.
- Sachs, J. D., Woo, W. T., Yoshino, N., and Taghizadeh-Hesary, F. (2019). Importance of green finance for achieving sustainable development goals and energy security. *Handbook of Green Finance: Energy Security and Sustainable Development*.
- Sarkodie, S. A. (2019). *Lessons to be learnt from Ghana's excess electricity shambles*. The Conversation. 5 August 2019.
- Satoguina, H. (2006). Analysis of CDM experience in Morocco and lessons learnt for West African Economic and Monetary Union. Case study: Benin, Burkina Faso, Niger and Togo. I *HWWA Discussion Papers* (Nr. 354; HWWA Discussion Papers). Hamburg Institute of International Economics (HWWA).
- Schwerhoff, G. and M. Sy (2017). Financing renewable energy in Africa: Key challenge of the sustainable development goals. *Renewable and Sustainable Energy Reviews*, 75: 393-401.
- Sergi, B., Babcock, M., Williams, N. J., Thornburg, J., Loew, A., and Ciez, R. E. (2018). Institutional influence on power sector investments: A case study of on- and off-grid energy in Kenya and Tanzania. *Energy Research & Social Science*, 41, 59–70.
- Shen, W. (2020). China's role in Africa's energy transition: A critical review of its intensity, institutions, and impacts. *Energy Research & Social Science*, 68, 101578.
- Siciliano, G. and F. Urban (2017). *Chinese hydropower development in Africa and Asia: Challenges and opportunities for sustainable global dam-building*. Routledge.
- Stewart, H., Uitto, J., and Wells, M. (2009). *Contributing to Global Benefits or Supporting Local Sustainable Development: Evidence from a Global Evaluation of UNDP's Program*.
- Stritzke, S. (2018). 'Clean energy for all': The implementation of Scaling Solar in Zambia. *World Journal of Science, Technology and Sustainable Development*, 15.
- Teka, M. (2006). *Energy policy of Ethiopia*. Geothermal Energy Conference, Addis Ababa, Ethiopia.
- The Nation (2020). *How too much energy generation short-circuited Kenya Power*. The Nation. Published 25 August 2020.

Toke, D. (2015). Renewable Energy Auctions and Tenders: How good are they? *International Journal of Sustainable Energy Planning and Management*, 8: 43–56.

Trotter, P. A., and Maconachie, R. (2018). Populism, post-truth politics and the failure to deceive the public in Uganda's energy debate. *Energy Research & Social Science*, 43, 61–76.

UNFCCC, United Nations Framework Convention on Climate Change (no date). Introduction to Climate Finance. Accessed 25 November 2020 on <https://unfccc.int/topics/climate-finance/the-big-picture/introduction-to-climate-finance>.

USAID (2017). *Power Africa: A 2017 Update*. Fact Sheet, Published 4 December 2017 on <https://www.usaid.gov/news-information/press-releases/dec-4-2017-fact-sheet-power-africa-2017-update>. Accessed 2 October 2020.

World Bank (2009a). *Energy Strategy Approach Paper*. World Bank.

World Bank (2009b). *Implementation Completion and Results Report (Credit no. 3588A, 35880) on a credit in the amount of US\$49.15 million and a GEF grant in the amount of US\$12.12 million the Republic of Uganda for an Energy for Rural Transformation project in support of the first phase of the Energy for Rural Transformation Program*. December 23, 2009. Report No: ICR00001288.

World Bank (2012). *Project Appraisal Document on a proposed credit in the amount of SDR 129.2 million (US\$200 million equivalent) to the Federal Democratic Republic of Ethiopia for the Electricity Network Reinforcement and Expansion Project (ENREP)*. May 2, 2012. Report No: 66932-ET.

World Bank (2013). *Toward a Sustainable Energy Future for All: Directions for the World Bank Group's Energy Sector*.

World Bank (2014a). *Implementation completion and results report (IDA-37120 IDA-47950 TF-56092) on a credit in the amount of SDR104.9 million (US\$132.7 million equivalent) an additional credit in the amount of SDR119.2 million (US\$180 million equivalent) and a global environmental facility grant in the amount of US\$4.93 million to the Federal Democratic Republic of Ethiopia for an Energy Access Project*. May 30, 2014. Report No: ICR2518.

World Bank (2014b). *International Bank for Reconstruction and Development International Development Association International Finance Corporation and Multilateral Investment Guarantee Agency Country Partnership Strategy for the Federal Republic of Nigeria For the Period FY2014-FY2017*. March 13, 2014. Report No. 82501-NG.

World Bank (2017a). *International Development Association Project Appraisal Document on a proposed credit in the amount of EUR 133.8 Million (US\$150 million equivalent) to the Republic of Kenya for an Off-Grid Solar Access Project for Underserved Counties*. July 5, 2017 Report No: PAD2008.



World Bank (2017b). *Project Appraisal Document on a Proposed Ida Guarantee in the amount of up to US\$3.5 million equivalent to the Republic Of Zambia and on a proposed IFC Financing consisting of an A-loan in the amount of up to US\$15 million, a senior loan in the amount of up to US\$15 million from IFC acting as implementing entity of the IFC-Canada Climate Change Program (IFC-CCCP), and USD interest rate swaps representing a loan equivalent exposure of up to US\$3 million to Bangweulu Power Company Limited for the West Lunga Scaling Solar Energy Project*. January 25, 2017. Report No: 110675-ZM.

World Bank (2018a). *KENYA: KPLC Refinancing*. Financial Solutions Brief. World Bank Group.

World Bank (2018b). *Program document for a proposed development policy credit in the amount of SDR 430.1 million (equivalent to US\$600 million) and a proposed development policy grant in the amount of SDR 430.1 million (equivalent to US\$600 million) to the Federal Democratic Republic of Ethiopia for the Ethiopia Growth and Competitiveness Programmatic Development Policy Financing*. Report No: PGD55.

World Bank (2018c). *International Development Association Program Appraisal Document on a proposed regular credit in the amount of SDR 176.9 million (US\$250 million equivalent) and a proposed scale-up facility credit in the amount of US\$125 million to the Federal Democratic Republic Of Ethiopia for the Ethiopia Electrification Program*. February 7, 2018. Report No: 119032-ET.

World Bank (2018d). *International Development Association Project Appraisal Document on a proposed credit in the amount of SDR 14.2 million (US\$20.0 million equivalent) to the Republic of Ghana for the Ghana Energy Sector Transformation Initiative Project*. June 21, 2018. Report No: PAD2576.

World Bank (2018e). *International Development Association Project Appraisal Document on a proposed credit in the amount of SDR 243.4 million (US\$350 million equivalent) to the Federal Republic of Nigeria for the Nigeria Electrification Project May 31, 2018*. Report No: PAD2524.

World Bank (2019a). *Private Participation in Infrastructure (PPI): Annual Report*.

World Bank (2019b). *Program Appraisal Document on proposed IDA guarantees in the amount of US\$10 million to the Federal Democratic Republic of Ethiopia for the Renewable Energy Guarantees Program - Phase I as part of a multiphase programmatic approach for the Ethiopia Renewable Energy Guarantees Program with an overall financing envelope of US\$200 million*. April 29, 2019. Report No: 136433-ET

World Bank (2020). *Program Document for a proposed development policy credit in the amount of SDR 136.4 MILLION (US\$187.8 million equivalent) and a proposed development policy grant in the amount of SDR 226.8 million (US\$312.2 million equivalent) to the Federal Democratic Republic of Ethiopia for the Second Ethiopia Growth and Competitiveness Programmatic Development Policy Financing*. Report No: 146308-ET.

World Bank and ESMAP (2017). *Mini Grids in Nigeria: A Case Study of a Promising Market*.

World Bank and ESMAP (2019). *Mini Grids for Half a Billion People: Market Outlook and Handbook for Decision Makers*. Technical Report 014/19.

World Bank and Gogla (2020). *Off-Grid Solar Market Trends Report 2020*.

Yuliani, D. (2016). Is feed-in-tariff policy effective for increasing deployment of renewable energy in Indonesia? In: *The Political Economy of Clean Energy Transitions*, D. J. Arent, C. Arndt, M. Miller, F. Tarp and O. Zinaman (eds.). Oxford University Press.