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REVIEW OF PRIVATE POWER INVESTMENT IN SUB-SAHARAN AFRICA: 2020

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2020 Private Power Investment Trends in sub-Saharan Africa

The COVID-19 pandemic has revealed the extent of the critical energy gap in Sub-Saharan Africa (SSA), but also presents a unique opportunity to fast-track the energy transition. With public capital largely being directed towards the recovery of other economic sectors, the role of private investors in the region's electricity sector has become more critical than ever.

Despite a recent increase in private investments in the region's electricity sector, the pandemic's effect on capital markets caused an abatement in private power sector activities. Only 13 greenfield utility-scale Independent Power Projects secured financing for their projects in 2020, as opposed to more than 70 IPPs earmarked for financial close. The pandemic also impacted the physical development of projects, as construction activities of several IPPs were suspended in April 2020 because of national lockdowns. The shortage of components sourced mainly from China, where travel restrictions were imposed and production activities suspended, further impeded the construction of IPPs. These constraints ultimately highlighted the need for regional diversification of the (renewable) energy supply chain.

The pandemic also stalled or delayed renewable energy auction programmes in the region. Although a few new auction programmes were announced, progress was limited. Apart from a single power project, little or no progress was made on the 37 utility-scale private power projects that had been at the Request for Qualification (or Proposal) bidding stage and had been scheduled to be awarded to prospective bidders across SSA in 2020.

The latter part of the year displayed promising signs of a resurgence as states began to relax lockdowns and gradually reopened their economies. Some countries saw their first IPPs come online, while others ran their first renewable energy auctions. The fact that African Development Finance Institutions (DFIs) now lead the charge to backstop IPPs in the region is good news for the industry. The burgeoning commercial and industrial (C&I) renewable energy sector is also a welcome development, as is the fact that renewable energy and efficient gas-based generators seem to be the generation options of choice for IPPs. Nonetheless, the ongoing threat by some states to renegotiate existing power purchase agreements (PPAs) of IPPs is likely to erode the long-term trust between the private and public sectors.

Financial close

Greenfield utility-scale IPPs that are developed, financed, built, owned, and operated by the private sector remain a crucial source of investment in SSA's power sector (see Fig. 1).

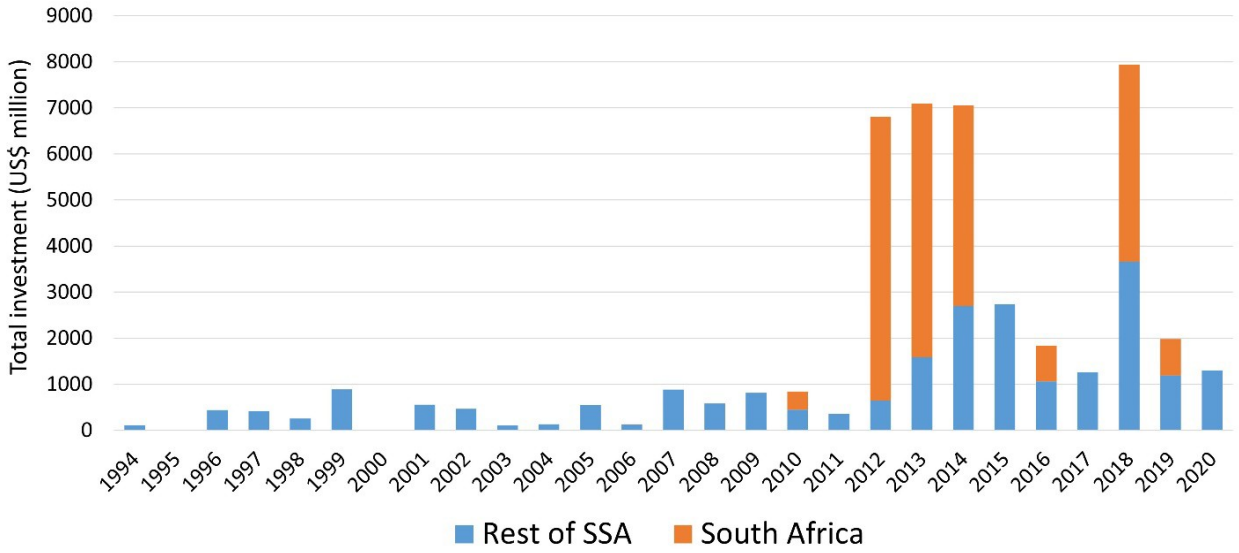

Fig 1: Annual Investment in grid-connected, utility-scale (>5MW) private power projects in Sub-Saharan Africa by year of financial close (Source: Power Futures Lab, 2021)

Eighteen IPPs reached financial close in SSA in 2020, but only 13 projects from eight countries were confirmed to have proceeded to construction. These were:

- Malawi: 46MW Nkhotakota solar PV project.
- Côte d'Ivoire: 253MW Azito Combined Cycle Gas Turbine (CCGT) 4 and 390MW Atinkou CCGT projects.
- Togo: 50MW Sheikh Mohammed Bin Zayed solar PV and 65MW Kékéli Efficient CCGT projects.
- Burkina Faso: 33MW Urbasolar Pâ and 30MW Nagréongo solar PV projects.
- Djibouti: 60MW Ghoubet wind farm project.
- Burundi: 7.5MW Mubuga solar PV project.
- Guinea: 10MW Boké 1, 50MW Boké 2, and 20MW Kamsar solar PV projects.
- Kenya: 35MW Quantum Power Menengai geothermal project.

Solar PV again proved to be a resilient investment option, as eight of the IPPs that reached financial close in 2020 were solar-based. Efficient gas-based power plants, which generally saw a dearth of investments during the 2017-2019 period, seemed to have recovered their market share in the technology mix of newly-financed projects in the region (although this is likely due, in part, to the generally lower total investment volumes for 2020). With a total investment of US$938 million and an installed capacity of 708MW in 2020 alone, efficient and dispatchable gas-based generators will likely prove to be the technology that complements the proliferation of grid-connected renewable energy in the region. However, early indications are that energy storage technologies may displace gas turbines in the future. Figure 2 illustrates the technology mix of these newly-financed IPPs by number and installed capacity.

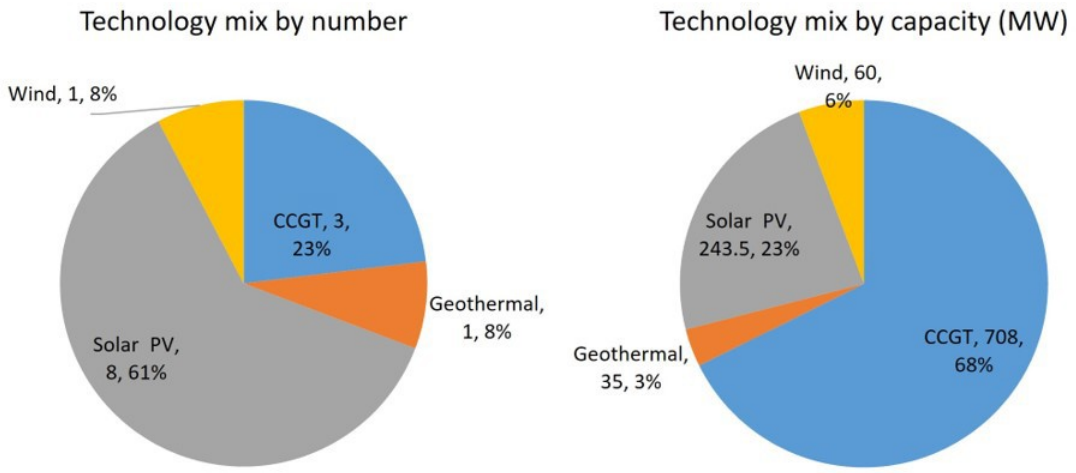

Figure 2: Technology mix of newly financed IPPs in 2020 (a) by number and (b) by installed capacity (Source: Power Futures Lab, 2021)

The 46MW Nkhotakota solar PV project in Malawi, with a total investment of US$69 million, is being developed by a joint venture between the Phanes Group and responsAbility. The project's gearing ratio – a measure of the portion of the project's costs funded by debt vs. equity – is 80:20, with the Overseas Private Investment Corporation (OPIC), now the US International Development Finance Corporation, being the sole debt provider. A 26MW first phase was scheduled for completion before the end of the second quarter of 2020, and full commercial operation of that phase was expected by the fourth quarter. However, the project remains under construction. This plant was one of four solar PV projects competitively procured at a tariff of US$c7.4/kWh in June 2017 under Malawi's first solar tender programme. The other three projects include the 60MW Salima, 20MW Golomoti, and 25MW Lilongwe solar PV IPPs. Salima, developed by JCM Matswani Solar Corp Limited, reached financial close in 2018. Golomoti, also developed by JCM Matswani Solar Corp, and Lilongwe, developed by Voltalia, are at an advanced stage and are expected to reach financial close soon.

Financial close for the fourth phase of Azito, a 253MW Combined Cycle Gas Turbine (CCGT) power project in Côte d'Ivoire, with a total investment cost of US$350 million, was achieved in January 2020. The World Bank's International Finance Corporation (IFC), the lead arranger and global coordinator of funding for the project, organized the full debt package of US$293 million. Debt was provided by the African Development Bank (AfDB), West African Development Bank, OPEC Fund for International Development, PROPARCO, Belgian Investment Company for Developing Countries, German Investment Corporation (DEG), Emerging Africa Infrastructure Fund (EAIF), and the Netherlands Development Finance Company (FMO). The IFC is also providing interest-rate swaps for Euro-denominated debt. The World Bank's Multilateral Investment Guarantee Agency (MIGA) is providing a US$74.6 million guarantee against the risk of breach of contract by the government of Côte d'Ivoire. The completion of this 253MW phase will bring the total installed capacity of the Azito facilities to about 680MW, representing more than 35% of the installed capacity of the whole country. The Azito facilities (I – IV) were previously owned by Industrial Promotion Services West Africa (IPS-WA), ABB, and Electricité de France (EDF). In 2010, Globeleq acquired ABB's and EDF's shares to become the project's main shareholder, along with IPS-WA.

The 390MW Atinkou project was the second CCGT power plant in Côte d'Ivoire to reach financial close in 2020. The plant, sponsored by the Eranove Group and located about 40km west of Abidjan, will operate on a build, own, operate, and transfer (BOOT) basis. IFC, serving as the lead arranger and global coordinator of funding for the project, mobilized the full debt package of US$320 million. Of this, IFC provided about US$100 million, with the remainder coming from the AfDB, FMO, DEG, the EAIF, and the OPEC Fund for International Development. IFC is also providing interest-rate swaps to hedge the project's interest rate risk. Project developer Eranove owns and operates the 544MW CIPREL Open Cycle Gas Turbine (OCGT) project, the largest power plant in Côte d'Ivoire.

Despite the setbacks resulting from COVID-19, 2020 was fruitful for Togo's energy sector. The country saw two utility-scale IPPs with a combined capacity of 115MW (about half the country's current installed capacity of 235MW) commence construction. Togo aims for energy independence by 2030, mainly by developing renewable energy projects. The country has a pipeline of over 100MW of renewable IPPs under development, including two solar PV projects tendered by IFC under the Scaling Solar programme on behalf of the Togolese government.

The 50MW Sheikh Mohammed Bin Zayed solar PV project located in Togo's Blitta region is the first renewable energy utility-scale IPP in the country. The plant, with a total investment cost of US$33 million, is currently under construction after having reached financial close in February 2020. About a quarter of the project cost was provided via a loan from the West African Development Bank. The rest of the debt finance was provided by the Abu Dhabi Fund for Development. The project is owned by AMEA Togo solar, a subsidiary of AMEA Power, a global renewable energy developer headquartered in the United Arab Emirates. The facility is expected to come online in 2021 and sell electricity to the Togo Electric Power Company (CEET) under a 25-year PPA.

On 6 August 2020, Oragroup and the West African Development Bank, co-arrangers of debt of about 60 billion CFA francs (US$138 million), announced that the Kékéli CCGT Efficient Power plant in Togo had reached financial close on 10 July 2020. The other lenders to this project are the Africa Finance Corporation (AFC), Banque Atlantique Togo, Banque Internationale pour l'Afrique au Togo, and NSIA Banque Bénin. The debt package was underpinned by a 14.2 billion CFA franc (US$24 million) liquidity extension guarantee from GuarantCo, which allowed the aforementioned commercial banks, as well as Oragroup, to provide a 14-year loan to project sponsor Eranove. The project came to life after Eranove and the Ministry of Mines and Energy had signed a 25-year concession agreement on 23 October 2018 for the 65MW plant to be located in Lomé. The concession agreement included the development, financing, construction, commissioning, operation, and maintenance of the IPP facility. It followed a competitive tender issued by the government in January 2018. The plant is expected to come online by the third quarter of 2021; it is the second project sponsored by Eranove to have reached financial close in 2020.

The two solar PV IPPs that reached financial close in Burkina Faso in 2020 were among six projects awarded by the state utility SONABEL following a competitive tender process in April 2019. The 33MW Urbasolar Pâ solar PV project, developed by French company Urbasolar, is the second-largest solar power plant in Burkina Faso. The US$36 million project is currently under construction, and is expected to come online in 2021, having reached financial close in February 2020. Urbasolar secured funds for the project through PROPARCO and the West African Development Bank. The plant will be operated on a BOOT basis by Urbasolar for 25 years before being handed over to the state. This is one of six projects, with a combined capacity of 155MW, that were procured in April 2019, all at a tariff of US$c9/kWh, through an

auction programme organized by SONABEL. The 30MW Nagréongo solar PV project also secured finance in 2020, while the remaining four projects are at an advanced stage and are expected to reach financial close soon. Urbasolar has also announced projects in Niger, Togo, and Côte d'Ivoire.

In November 2020, French developer GreenYellow commenced construction work on the 30MW Nagréongo solar power plant, having reached financial close earlier in the year. The power produced by the facility, located in Burkina Faso's Oubritenga province, will be evacuated via SONABEL's distribution network, and sold to SONABEL under a 25-year PPA BOOT contract. The project is expected to be commissioned in mid-2021.

Financial close for the 60MW Ghoubet wind farm near Lake Assal in February 2020 allowed Djibouti to begin work on its first utility-scale IPP. The Djibouti Wind Company Ltd is a consortium that comprises FMO; AFC; Climate Investor One, managed by Climate Fund Managers; and Great Horn Investment Holding, an investment fund set up to develop Djibouti into an economic hub. The wind farm, occupying an area of 395 hectares, will reportedly host about 15 wind turbines. The IPP will also construct a 230kV overhead transmission line, approximately 3.5km long, to connect the wind farm to the grid via the Ghoubet substation.

The 7.5MW Mubuga solar PV project developed by Gigawatt Global Coöperatief, an American-owned Dutch developer, was the first utility-scale IPP initiated in Burundi. The project came to life after Gigawatt Global signed an MoU with Burundi's Ministry of Energy and Mines in July 2014. The UK government-funded Renewable Energy Power Platform (REPP) joined the project soon after, helping to fund development. Debt finance mobilization for the project started in 2017, and the project reached financial close in January 2020 after receiving funding from two equally-sized bridging loans from REPP and South African asset manager Inspired Evolution. The loans will be refinanced by the United States International Development Finance Corporation (DFC) once commercial operations begin. African Trade Insurance's Regional Liquidity Support Fund (RLSF) is providing six months' liquidity cover to mitigate payment default risks, with DFC and Liberty Mutual Insurance providing political risk insurance. REPP will provide mezzanine debt for the project to boost equity returns for the shareholders. The project is under construction and is expected to reach commercial operations shortly.

The financing agreement for Clean Power Generation's portfolio of projects in Guinea was concluded on 22 September 2020. The project portfolio includes three utility-scale solar PV plants: the 10MW Boké 1 and 50MW Boké 2 plants in the town of Boké, in the Boké Region of Lower Guinea near the border with Guinea-Bissau; and the 20MW Kamsar plant in the southern port city of Kamsar, at the mouth of the Nunez River. The agreement between the German developer and Denmark's Frontier Investment Management ApS will result in an investment of around US$76.5 million being allocated for the construction of all three on-grid solar PV projects. The fund will also cover the construction of a 12km transmission line near Kamsar. GET.invest, an EU programme that supports investment in renewable energy products, is providing technical and financial support for the project.

In November 2014, Quantum – along with two other IPPs, OrPower22 and Sosian – signed a 25-year PPA with Kenya Power for a 35MW geothermal plant at the Menengai complex. The agreement included a project implementation and steam supply agreement with the state-owned Geothermal Development Company (GDC). The tariff structure sees Kenya Power pay US$c5/kWh to the IPPs for power generated, and an additional US$c2/kWh directly to GDC for steam supply. The agreement also assigns to the IPPs the responsibility for designing, financing, constructing, installing, operating, and maintaining the plants.

Three 35MW projects had been planned, constituting part of the Menengai geothermal project's first phase, which is expected to add a total of 460MW to the national grid. Progress on the IPPs has been delayed due to issues around the steam resource and a government letter of support. Management issues also plagued the Quantum project, including a shake-up of the company's hierarchy that nearly left the project in limbo. Quantum and the two other projects were later cleared by GDC and granted the necessary licences to begin construction in October 2019. Contrary to claims by certain news outlets, commercial operation had not begun at any of the three projects in 2020. Only Quantum has reached financial close after securing loans to the value of around US$70 million from the African Development Bank, Clean Technology Fund, Eastern and Southern African Trade and Development Bank, and the Finnish Fund for Industrial Cooperation. The other two projects – OrPower22 and Sosian – are still attempting to mobilize funding.

DFI involvement: Financing, credit enhancements, and security arrangements

African DFIs are now leading the charge in mobilizing finance and coordinating credit enhancement and risk mitigation packages for IPPs in the SSA region. While foreign DFIs previously dominated this space, 2020 has shown that African DFIs are developing a growing appetite for providing IPPs with debt finance, credit cover and political risk insurance (PRI). Two regional banks, the African Development Bank and the West African Development Bank, were together responsible for contributing debt finance for about half of the projects that reached financial close in SSA in 2020. The AfDB is rated AAA with a stable outlook by all major rating agencies.

Similarly, the Regional Liquidity Support Fund (RLSF) implemented by African Trade Insurance (ATI) and backed by the German development bank KfW enabled two IPPs to achieve financial close in 2020. Launched in 2017, the RLSF encourages investments in renewable energy in ATI member countries (Benin, Burundi, Côte d'Ivoire, Madagascar, Malawi, Uganda, and Zambia) through a unique and innovative guarantee product that protects IPPs against the risk of late payment by public off-takers. RLSF, with an initial capitalization of €63.2 million, supports small and mid-scale renewable energy projects with an installed capacity of up to 50MW. The first project to benefit from RLSF in 2020 was a partnership with Gigawatt Global on the Mubuga solar plant. RLSF also backstopped the 46MW Nkhotakota solar facility in Malawi. ATI's RLSF is providing six months' liquidity cover for the Mubuga and Nkhotakota facilities for a period of five and 10 years, respectively.

The trend of DFIs providing PRI for operational IPPs, especially in South Africa, continued in 2020. Earlier in the year, BioTherm purchased MIGA guarantees to protect the long-term PPAs of its project portfolio in South Africa. MIGA's guarantees are covering 90% of BioTherm's equity investment for up to US$68.9 million in the Golden Valley and Excelsior wind farms, and US$46.9 million in the Aggeneys and Konkoonsies II solar PV plants. These guarantees enable the developer to realize its investment while being protected against the risks of currency inconvertibility and transfer restrictions, expropriation, breach of contract, civil unrest, and war for 15 years. Eskom's falling credit rating and the South African government's recent stance on renegotiating existing PPAs might have prompted firms such as BioTherm to resort to this additional cover. In total, 36 private power projects, 11 of which are based in South Africa, have taken out MIGA cover since 2018, reflecting growing investor concern in the region regarding the honouring of contracts.

Commercial operations

A large number of the IPPs in SSA that came online in 2020 were among the 26 IPPs approved in 2018 under the fourth round of South Africa's Renewable Energy Independent Power Producer Procurement Programme (REI4P 4). The other IPPs that started operating in 2020 include the 158MW Parc Eolien Taiba N'Diaye wind farm in Senegal, the 100MW Kipeto wind project in Kenya, the 55MW Ossiomo Industrial CCGT Park in Nigeria, the 50MW Kita solar PV plant in Mali, the 8MW Mogadishu solar PV project in Somalia, and the 5MW Hwange solar PV project in Zimbabwe.

The South African REI4P 4 IPPs all reached financial close and proceeded to construction before 2020. Twelve of them completed their construction work and were connected to the grid in 2020. These newly-connected IPPs have added close to 1GW of renewable capacity to the South African grid, helping power utility Eskom reduce its use of expensive diesel-fired peaking power plants to minimize load shedding. These projects are:

- 40MW Aggeneys solar PV, 40MW Konkoonsies solar PV, and 32MW Excelsior wind project developed by BioTherm.
- 68MW Bokamoso and 75MW Droogfontein solar PV projects owned by AIIM.
- 86MW Dyason 1, Dyason 2 and Sirius 1 solar PV projects developed by Scatec solar.
- 140MW Nxuba wind farm developed by Enel Group.
- 110MW Perdekraal East and 140MW Kangnas wind farms developed by Mainstream Renewable Power.
- 75MW Waterloo solar PV plant owned by AIIM.

REI4P has procured about 6.3GW of renewable energy since 2011, and attracted around US$22 billion of investment into South Africa. South Africa's Integrated Resource Plan (IRP) projects that an additional 19GW of solar and wind capacity will need to be procured by 2030.

PPA Contract renegotiations

The 2020 experience highlights the importance of dynamic and least-cost system expansion planning translated into timely competitive procurement windows to achieve balanced investor and development outcomes and ensure IPP sustainability. If investor outcomes (required return on investment) and development outcomes (reliable electricity at competitive prices) are out of balance, there could be an increased risk of the investment deal unravelling.

Since 2018, Kenya and Ghana have been considering renegotiating existing PPAs with IPPs in attempts to lower generation costs because they have more power than they need. The main dispute for both countries is the 'take-or-pay' clause in many of the existing PPAs. This clause compels governments to pay for electricity regardless of whether they consume it or not. The take-or-pay terms (with capacity charges to cover the original financing of the power plants) and the oversupply dilemma have resulted in both Kenya and Ghana paying for electricity that they cannot use and are unable to export because of constraints in cross-border interconnectors.

The Kenya Power and Lighting Company is considering switching to 'take-and-pay' terms for some existing and all new contracts in the electricity sector, allowing it to pay for only what it uses. If Kenya Power succeeds in this (which many stakeholders believe is unlikely), it will decrease investor appetite, especially for renewable energy projects that operate on a 'must-run' basis and need to cover their capital costs.

Because of directly-negotiated projects procured in emergency circumstances when the country over-estimated demand growth, Ghana reportedly pays US$500 million a year in capacity charges for power that it does not use. The Ghanaian government is now seeking to renegotiate existing contracts to switch to take-and-pay terms. Despite negotiations on the matter, IPPs have not yet agreed to change their take-or-pay terms. However, the country has made significant progress in renegotiating more favourable terms in other aspects of existing PPAs.

In September 2020, CENIT Energy Limited (CEL) – wholly owned by the Social Security and National Insurance Trust – became the first IPP to agree to a request by the Ghanaian Ministry of Finance to amend the terms of its PPA. Under the new accord, CENIT will convert its thermal power plant in Tema to a tolling structure, implying that the IPP will no longer be responsible for purchasing the fuel that would have been included in the initial generation tariff. The fuel will now be supplied by the government, thus reducing the tariff paid to CEL. The restructuring of the PPA will result in cost savings for the Ghanaian government of around US$200 million over the 17 years remaining duration of the PPA. The savings are relatively modest over this period because the tolling structure impacts mainly operational costs. The MoU on the restructuring process, which includes the transition to a tolling structure, has already been agreed upon, but a revised contract is yet to be completed. According to the MoU, either the Electricity Company of Ghana or another government intermediary will purchase gas from the Ghana National Petroleum Corporation or the Ghana National Gas Company and will be responsible for delivering the gas to the IPP. CEL will, therefore, no longer have the contractual responsibility to procure the supply and transport of fuel. Contrary to reports that the CEL facility would be transferred to the Electricity Company of Ghana, the conversion to a tolling structure will not include a change in the ownership structure.

In October 2020, the CenPower Generation Company also signed a gas supply agreement (GSA) with the Ghana National Petroleum Corporation, to use natural gas instead of light crude oil (LCO) to fuel its Kpone electricity plant. According to the Ghanaian government, the new agreement will result in savings of US$3 billion over the next two decades. The GSA's execution had been planned and outstanding for some time. CenPower had commissioned the plant on LCO but was ready to operate on natural gas. However, the execution of the GSA was initially held up for bureaucratic reasons. The government has indicated that it wants to convert CenPower Kpone IPP's PPA to a tolling structure. While discussions on this proposal are under way, there is no agreement yet with CenPower on the matter.

Renewable energy tenders

Renewable energy auctions that generally deliver cheap renewable energy IPPs (see Fig. 3) continued to be organized across SSA in 2020, albeit slower than anticipated.

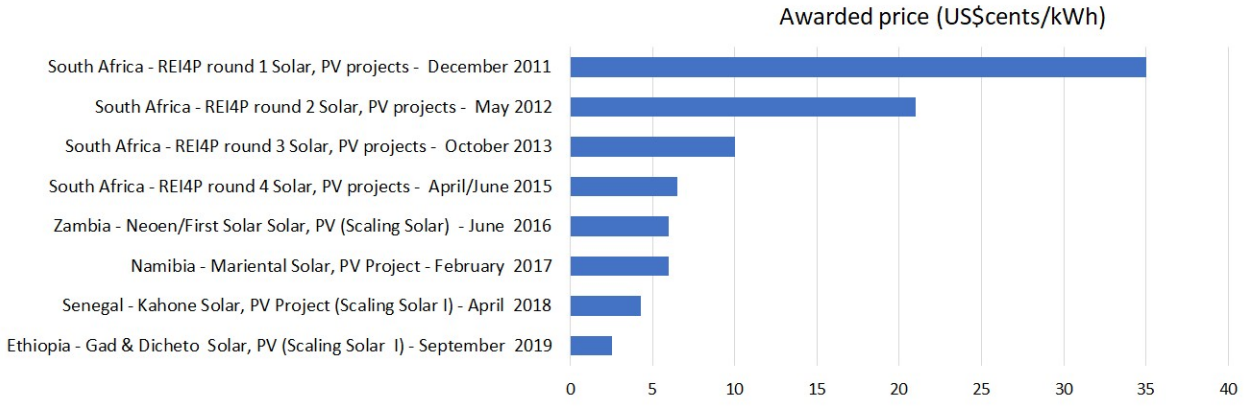

Figure 3: Evolution of record-setting solar PV prices in auctions in SSA (Source: Power Futures Lab, 2021)

Requests for Proposal (RfPs) were issued in five SSA countries (excluding South Africa) for eleven projects representing more than 300MW capacity in 2020. Of these, nine are for solar PV projects. Figure 4 shows a summary of grid-connected tenders in SSA in 2020, excluding South Africa.

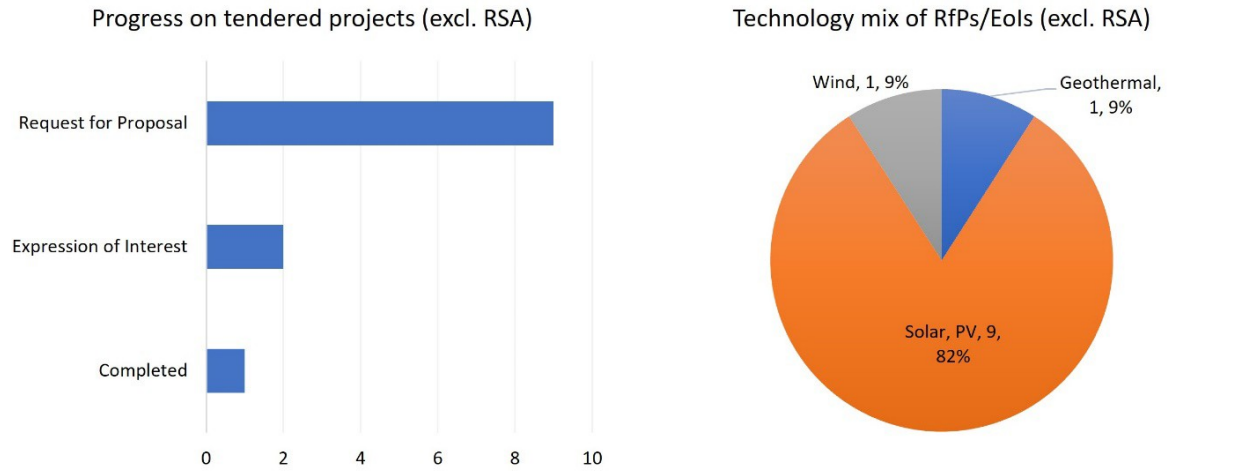

Figure 4: Summary of the progress of grid-connected tenders in SSA in 2020 (Source: Power Futures Lab, 2021)

Renewable energy auction activities commenced in Seychelles in January 2020, after a 4MW floating solar PV project was awarded to Quadran IPP, part of French oil giant Total, at a tariff of US$c9.5/kWh. The tender programme commenced in June 2017, after the Seychelles Energy Commission issued an RfP. The Quadran facility will be developed in Lagoon Le Rocher on Mahé Island, and will sell the power it generates to the national utility under a 25-year power PPA. It is the island nation's first IPP and tendered renewable energy capacity.

In January 2020, Cape Verde rolled out its third renewable energy auction programme after issuing an Expression of Interest notice to qualified international renewable energy IPPs interested in developing two 5MW solar PV plants on the islands of Sal and São Vicente. Selected IPPs will develop these projects on a build, own, and operate (BOO) basis. IPPs had until 31 January 2020 to pre-qualify for the tender. The current status of the tender is unknown.

In March 2020, Gambia's National Water & Electricity Company (NAWEC) issued an RfP notice inviting pre-qualified developers to bid for the development of up to four solar PV plants totalling 20MW in the Banjul region. These projects will be developed under Gambia's US$121 million Electricity Restoration and Modernization Project.

In May 2020, Zimbabwe announced its intention to procure 500MW of solar PV capacity through a competitive process. It is unclear whether this procurement programme will be awarded on an EPC or BOO basis, and if it is related to the 235MW solar PV auction announced in 2019. ZES, Zimbabwe's national power utility, continues to face severe challenges as a credit-worthy off-taker.

Kenya is procuring 140MW in SSA's first geothermal tender. In May 2020, Kenya's state-owned power producer, Kenya Electricity Generating Company (KenGen), pre-qualified five firms after a Request for Qualification had been issued in late 2019, inviting qualified bidders interested in designing, financing, constructing, and operating a 140MW geothermal plant in Nakuru. The qualifying bidders were Ormat Technologies Inc; ITOCHU Corporation; Sumitomo Corporation; Enel Green Power; and a consortium consisting of Engie Energie Services, Toyota Tsusho Corporation, Kyuden International Corporation, and DL Koisagat Tea Estate. Successful bidders will enter into a joint venture with KenGen and transfer the project to KenGen at the end of the PPA term. The facility will be the first public-private partnership (PPP) project developed by KenGen under the PPP Act (2013) and the PPP Regulations (2014).

In August 2020, Burkina Faso's state utility SONABEL launched a tender to build four megawatt-scale PV plants. Two of the projects – with a total capacity of 6MW – will be built in the town of Dori. The other two plants – with installed capacities of 2MW and 1MW – will be built in the towns of Diapaga and Gaoua respectively. This tender follows two successful tenders awarded by SONABEL in 2016 and 2019.

Likewise, in August 2020, the South African Department of Mineral Resources and Energy (DMRE) launched a 2GW technology-neutral Risk Mitigation Independent Power Producer Procurement Program (RMIPPPP) to mitigate short-term electricity supply gaps identified in the 2019 IRP. The projects will be required to provide firm power between 05:00 and 09:00 and are likely to include solar-plus-battery systems or gas plants. Power projects that are selected in the tender will have to begin commercial operations by the end of June 2022.

In October 2020, South Africa's DMRE announced plans to open the bid window for the fifth round of REI4P before the end of the year, but this did not happen. This programme corresponds to the first of a series of bid windows to procure 11,813MW from various energy sources over the next five to eight years. Of this, 6,800MW will be from solar PV and wind; 513MW from storage; 3,000MW from gas; and 1,500MW from coal. The DMRE also issued an RfI for the provision of 2,500MW of nuclear power; responses are currently being assessed.

October 2020 also saw the launch of Mozambique's first renewable energy procurement programme called Promoção de Leilões para Energias Renováveis (PROLER). Through this procurement exercise,

Mozambique's Ministry of Mineral Resources and Energy intends to build a 40MW wind farm in Inhambane and three 40MW solar plants in Dondo, Manje, and Lichinga. The combined CAPEX for the projects is estimated at €200 million. The projects are expected to be assisted with €37 million funding from the EU in partnership with the French Development Agency. The programme is also being implemented with the help of Mozambiquan utility Electricidade de Mocambique, which is likely to be the future buyer of the renewable energy that is generated.

Megawatt-scale Commercial & Industrial (C&I) tenders

Commercial and Industrial (C&I) renewable energy projects continued to gain traction in SSA in 2020. Novel financing options for these projects have also emerged, such as Sun Exchange's blockchain technology for off-grid development and CrossBoundary's open-source approach for increasing investment in infrastructure capital for mini-grids across Africa. Energy-intensive industries such as cloud computing, agriculture, mining, etc., seem to be the early adopters of C&I renewable energy projects.

In November 2020, Mettle Solar and Distributed Power announced a joint investment into a 1MW solar plant that will power Liquid Telecom's East Africa Data Centre (EADC) in Kenya, the largest data centre in East Africa. The IPPs will set up, own, and operate the plant for the duration of the corporate PPA.

Similarly, South African companies are aggressively developing C&I projects due to the inability of Eskom, the national power utility, to meet the country's energy demand. The regulatory reforms and policy decisions required to unlock this market, which can address the country's shortage of power in a cost-efficient and timely manner, have been slow to develop and are incomplete. South Africa's DMRE gazetted an amendment of Schedule 2 of the Electricity Regulation Act that exempts generation facilities, resellers, and self-generators from the requirement to hold a generation license for electricity generation less than 1MW. The National Energy Regulator of South Africa (NERSA) reportedly registered 156 self-generation facilities under 1MW, representing a total installed capacity of 72MW. The need for ministerial approval for deviation from the IRP 2019 prior to NERSA processing generation licences for facilities of 1MW and above has also been removed. There is still uncertainty, however, on whether this ratified directive includes self-generation. In 2020, NERSA reportedly approved five applications in this scheme with a total capacity of 25MW.

Several mining companies operating in South Africa are currently planning to build their own power plants. These include a 200MW solar plant for Sibanye-Stillwater, a 75MW solar facility for Anglo American Platinum, a 40MW solar park for Goldfields, and a 200MW PV plant for Vedanta.

There will likely be more competitive bidding programmes across SSA for C&I solar applications. In May 2020, integrated energy and chemical company Sasol invited bidders to participate in an RfI process for the supply of renewable energy to its local operations. Sasol intends to procure approximately 600MW of renewable energy capacity from IPPs. Interested IPPs were required to demonstrate a generation capacity of not less than 20MW to be developed as a wheeled option from appropriate locations across South Africa, or as an embedded plant near Sasol's facilities. If this programme is successful, it will represent SSA's largest renewable energy procurement programme by a private off-taker.

Sasol also initiated an RfP process in August 2020 for two 10MW PV plants to power its operations in Mpumalanga and Free State provinces. The successful IPPs will own and operate the plants and will sell

power to the factories under long-term PPAs. While this project forms part of Sasol's broader greenhouse gas emission reduction aspiration, it is likely to be unconnected to the 600MW RfI that the company had announced earlier, since the projects in that tender had a minimum size of 20MW.

In July 2020, ArcelorMittal South Africa, Africa's largest steel producer, invited IPPs to participate in an RfI process to supply and manage several solar PV plants at its various production facilities. The company stated that continued unaffordable increases in electricity tariffs were affecting its financial performance. To materially lower electricity prices, improve its control over input costs, and ensure a reliable electricity supply for its operations, ArcelorMittal South Africa intends to enter into a PPA with an IPP to build, own and operate the planned PV power plants. The company currently has six operational sites. It plans to have a 110MW plant installed at its head office site with 10MW each for the remaining five sites, amounting to a combined installed capacity of 160MW. The land for the power plants will be made available to the successful developer(s) by ArcelorMittal South Africa.

In October 2020, Marula Platinum Mine issued a tender for 10MW of solar PV capacity, due to Eskom's unreliable power supply, which it says has significantly affected its production.

Chinese investment

Although Chinese investment in SSA's power sector was zero in 2019, Chinese companies increased their activities in this regard in 2020 (see Fig. 5). The two new projects financed and set to be built by Chinese companies include the 3,050MW Mambilla hydroelectric power project in Nigeria, and an 18MW hydropower project in Mali.

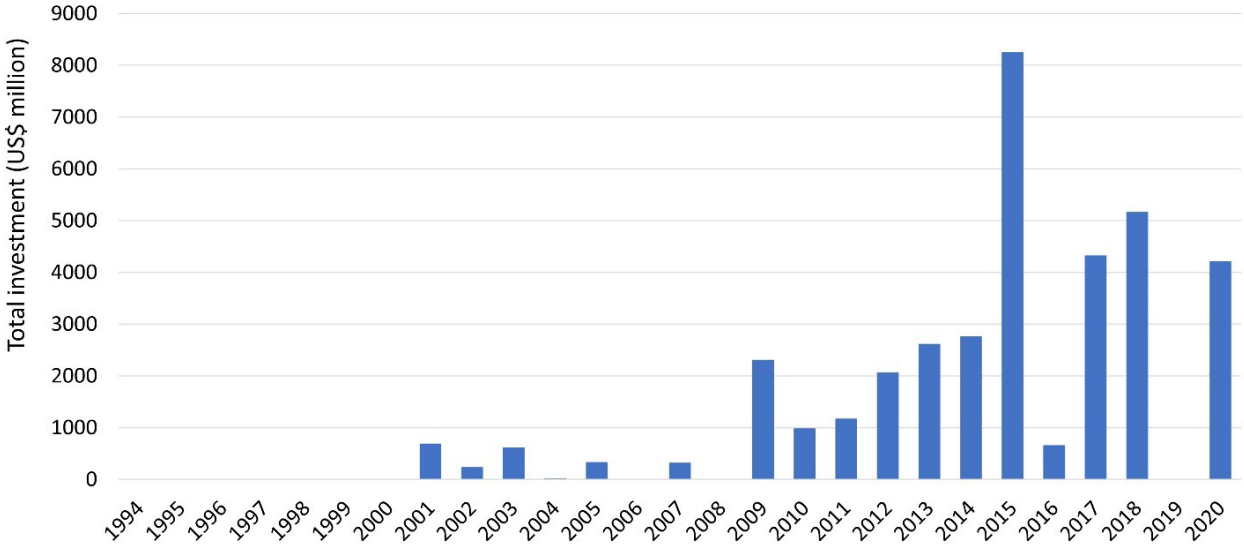

Figure 5: Chinese investment in the Sub-Saharan Africa power sector (Source: Power Futures Lab, 2021)

The Mambilla project, the second-largest hydroelectric plant in Africa, was the first project financed by China in the region in 2020. A consortium that includes China Energy Engineering Corporation and Sinohydro Corporation was expected to commence construction of the project in 2017 after the Export-Import Bank of China agreed to provide a loan amounting to 85% of the total investment cost of

US$5.8 billion. The Chinese bank later withheld financing due to a legal conflict arising from the agreement between the Nigerian government and the project's initial contractor, Sunrise Power and Transmission Company. Sunrise initiated an international arbitration process in Paris, seeking an award of US$2.3 billion from the Nigerian government, after claiming that the government had breached its 2003 agreement with Sunrise by granting a separate contract to Chinese companies four years later. The matter was resolved in 2019 (though details about the settlement were not made public), allowing the project to resume and complete its financing deal with the Export-Import Bank of China. The total project cost has since been revised to US$4.8 billion.

The 18MW Gourbassi Hydroelectric project involves the construction of a dam, a power plant, a substation with overhead lines linking the plant to the grid, and a 154km access road from the project site. In June 2020, China Machinery Engineering Corporation (CMEC) was awarded a contract worth €243 million (US$290 million) by Senegal River Basin Development Authority (OMVS) for the development and financing of the project. This award followed a competitive process organized by OMVS in February 2018 for prospective EPC contractors. The plant – situated on the Senegal-Mali border – will generate electricity and regulate water flows to dams downstream. The project initiator, OMVS, includes representatives of Guinea, Mali, Mauritania, and Senegal. OMVS's aim is for these countries to jointly manage the Senegal River and its drainage basin. The project is envisaged to come online in 2024.

Chinese banks have further pledged to provide the bulk of debt finance for at least five large coal, solar PV and solar-hydro projects totalling 4GW in the region before 2022. The EPCs in all projects are Chinese companies. With solar PV plants currently accounting for less than 3% of Chinese investments in SSA, these new large-scale solar-based projects could signal a surge in solar PV's share in Chinese-funded power projects' technology mix. Some of the projects that are earmarked for financing by China in SSA are:

- 1,300MW CTTM coal-fired power project (EPC contract signed) in Mozambique.
- 1,600MW RioEnergy coal-fired power project (EPC contract signed) in Zimbabwe.
- 200MW Chibombo solar-hydro hybrid project (financing stage) in Zambia.
- 200MW Chirundu solar-hydro hybrid project (development stage) in Zambia.
- 200MW Siavonga solar-hydro hybrid project (development stage) in Zambia.
- 500MW solar PV project (framework agreement signed) in Uganda.

What next?

With financial close for some private power projects being delayed due to the COVID-19 pandemic, 2021 could be a record year for the utility-scale IPP industry in SSA, with financing for a project pipeline of around 2.5GW having been announced. Chinese investment into the region's electricity sector also looks promising, given the large projects being planned. Nevertheless, the successful realization of these projects depends on a set of country, programme and project-specific factors that have proven to be difficult to manage and align.

About Power Futures Lab

Power Futures Lab is a centre of excellence and expertise for Africa and other emerging and developing economies. Based at the University of Cape Town's Graduate School of Business, Power Futures Lab aims to enhance understanding and build capacity in infrastructure investment, reform, and regulation, in support of sustainable development. Further information is available on our website https://www.powerfutureslab.co.za/

Data sources

The data that informed this report emanated from a collection of electricity sector databases maintained by Power Futures Lab. The data quality of the Lab's databases is underpinned by a data-triangulation approach where data is first collected from secondary data sources – including several online news sources, scholarly articles, and blogs – followed by a verification process using a series of databases that include the World Bank's Private Participation in Infrastructure (PPI) database, African Energy live data, Aid data, etc. Finally, these data points are cross-checked with primary data from in-country private and public electricity sector experts. Should readers query the accuracy of any of the data in this note, or are aware of additional projects not mentioned, we invite you to contact the following Power Futures Lab-linked researchers:

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