INVESTMENT THEME: RENEWABLE ENERGY & CLEAN TECHNOLOGY

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RENEWABLE ENERGY & CLEAN TECHNOLOGY

Overview

Energy is crucial for economic and social development, yet over 1.2 billion people still lack access to electricity worldwide.[i] In Africa, 600 million people lack access to electricity. Only seven Sub Saharan African countries have electricity access rates greater than 50%, and the rest of the region has access rates of just 20% on average. Even where access rates are high, the consumption of electricity is constrained by supply. Excluding South Africa, electricity consumption in Sub Saharan Africa is just 150 kilowatt-hours per capita, far lower than other emerging markets.[ii] Demand for power continues to outstrip availability and the situation is expected to worsen due to significant population growth, which is expected to double by 2050.

Countries with less than 80% access have consistently lower GDP per capita. Electricity consumption and economic growth are also highly correlated, and development without a step change in consumption rates is considered impossible.[iii] Electricity is also provided at very high cost. Most of Sub Saharan Africa's electricity is fossil-fuel produced, an expensive method of power generation which also has adverse effects on the environment. Furthermore, in many countries outside of South Africa, the commercial, industrial and residential sectors rely on diesel-powered generators, which is four times more costly than grid power. This high cost of energy makes Sub Saharan Africa's industries far less competitive than they could be with access to cheaper power.

Despite the challenges of the current energy crisis, the region boasts tremendous capacity for power generation, and much of it is in the form of renewable energy. McKinsey & Company estimates that Africa's entire capacity, including renewable and non-renewable sources, could provide 12 terawatts (TW) of energy for the continent. The vast majority of this potential comes from solar (with a staggering 11 TW in capacity), with substantial contributions from hydro and wind. Natural gas is also a large potential source of energy, which, although not renewable, provides fewer greenhouse gases than coal or oil. The environmental impact of Africa pursuing a renewable energy strategy is immense: "If sub-Saharan Africa aggressively promotes renewables, it could obtain a 27 percent reduction in CO2 emissions; this would result in a 35 percent higher installed capacity base and 31 percent higher capital spending (or an additional [US]$153 billion)."

Beyond production lies the challenge of distribution. Being able to connect to high-voltage from the main grid is the critical link for industry and households to access full electricity service. Aside from industrial consumption, which accounts for half of energy consumption in Africa, residential connection presents huge challenges. Rural, disparate populations make connection to the national grid prohibitively expensive. Distributed, off-grid, renewable sources for households, schools, clinics and small businesses in rural areas may be among the most cost-effective and easily penetrable solutions for overcoming the lack of access for the hardest-to-reach populations. Finally, large-scale cooperation between governments, regional bodies and private sector players is needed to produce the best outcomes in the energy sector, including environmental impact. Mega-projects and regional integration agreements, as well as strong policies promoting investment in renewable sources, will

ENERGY SECTOR IN SUB SAHARAN AFRICA

Total population:
973 million

Urban population:
40%

Population with access to electricity:
24%

Installed generation capacity (excluding South Africa):
28 Gigawatts

Electricity consumption (excluding South Africa):
150 Kilowatt hours per capita

Average energy tariff:
US$0.13 per kilowatt hour (compared to US$0.04-0.08 in developed countries)

Number of days per year of power outages experienced by manufacturers:
56 days

likely provide the most balanced approach to ensure supply, access and affordability for all Africans.

Investment Opportunity

It is estimated that by 2040, the demand for electricity in Sub Saharan Africa will have increased four times from 2010 consumption levels. Total annual demand is forecasted to be about 1,600 terawatt-hours, requiring 345 GW of capacity to deliver. The capital requirements for building the infrastructure to deliver this capacity is US$490 billion, with another US$345 billion in transmission and distribution.[iv] In the last 20 years, many countries have increased access for private investors to participate in the generation and distribution of electricity. [v] In particular, new opportunities for investors have opened up as governments have recognized the potential for renewable energy technologies and have undertaken liberalisation processes to take advantage of it.

Investment opportunities in renewables and clean technology generally aim to either increase the production of power or solve the distribution challenge. The bulk of the investment will likely come in the form of "megaprojects" which create the infrastructure for power generation and distribution. Investment in these projects has risen sharply, increasing by 50% in 2014 alone. Several initiatives have increased the scope of energy investment, including US President Barack Obama's US$7 billion "Power Africa" plan, which is expected to generate 30,000 MW of cleaner power over 5 years. Some international bodies, including the United Nations and the International Energy Agency, are promoting an integrated African supergrid, which would promote sustainable energy and reduce costs by up to 30% in some countries.

Investment in grid capacity is typically done with private-sector financing.[vi] Financing models such as public-private partnerships (PPPs) and contracts with independent power producers can ensure private sector incentives, while allowing asset ownership, operational costs, and payments to be structured optimally. South Africa's Renewable Energy Independent Power Producer Programme (REIPPP) is a recent example of a successful partnership between government and the private sector to roll-out renewable energy projects.

Investment in renewable energy is also made through the development of companies and new technologies that reduce energy consumption or allow households to generate their power needs off-grid. Some entrepreneurs believe that off-grid technologies will "leapfrog" the need for grid power in the same way that cell phones have exceeded the penetration of landline telecommunications in Africa. Investing in innovative technologies that reduce the energy needs for industry and consumers will also allow for more efficient use of existing capacity.

Investing in renewable energy is not without significant challenges. Challenges exist when large monopolies do not allow small energy producers to feed into the main grid. To encourage private investment, energy markets will need to be opened and deregulated. Other barriers that hamper progress include lack of scale, lack of competition, high transaction costs, high perceived risk and cost of capital, and limited institutional capacity. However, with the scale of investment required and with Africa's economic and environmental future at stake, the time is ripe for developing models and delivering innovative solutions to channel private sector investment into renewable energy.

INDUSTRY SEGMENTS & KEY PLAYERS (MID- AND DOWNSTREAM)

Supply/power generation, transmission and distribution
Utilities and independent power producers providing power generation, transmission and distribution; Companies providing off-grid solutions, such as stand-alone solar systems

Project developers
Companies developing new energy projects

Human resources
Project managers, engineers, maintenance providers, analysts, electricians, operators and installers

Manufacturers
Companies providing and maintaining machinery, electric lines and transformers

Technology
Hardware and software; Companies developing and deploying management systems (such as "smartgrid" technology)

Financiers
Governments, development finance institutions (DFIs), professional fund managers, pension funds and private investors

CASE: GREEN PIONEER ACCELERATOR

Green Pioneer Accelerator

Overview

The Green Pioneer Accelerator (Green Pioneer) is an early-stage business investment readiness/accelerator programme that identifies companies with the potential to scale products or services that reduce energy consumption or mitigate/adapt the effects of climate change. Green Pioneer is hosted by two Africa-based accelerators: Impact Amplifier (South Africa) and Growth Africa (Kenya), in partnership with VC4Africa, an online community for African entrepreneurs and investors, and Hivos, the primary funder of the program. The 4-month program, held simultaneously in Cape Town and Nairobi, assists companies and entrepreneurs to take their ventures from proof-of-concept to investment-ready. Upon graduation, companies are given the opportunity to pitch their business plans to impact-focused and traditional angel investors and early stage venture capital funds. Green Pioneer's inaugural class of entrepreneurs included a waterless sanitation solution, off-grid electricity systems, agri-processing, sustainably-sourced tea and bio-fuel solutions, amongst others.

Business and Impact Model

Entrepreneurs are selected through a rigorous, multi-phase selection process that assesses the business's viability, management team strength, and impact on climate change. The program aims to take the businesses from product or service development to investment-readiness, providing a pipeline of viable deals for impact-focused investors. Following the Green Pioneer Accelerator programme, Impact Amplifier took up the investment mandate in South Africa to raise capital for three of the Green Pioneer businesses on a success-only basis. Going forward, the Green Pioneer Accelerator will focus on accelerating sustainable agriculture businesses. Impact Amplifier has also created a new accelerator brand, funded by Stichting Doen, called Eco-Innovators, which will focus on other green economy ventures.

Investment

Green Pioneer is a grant-funded program and participants pay a nominal cost (approximately US$200) to attend. Hivos, the primary funder of the program, earmarked EUR€100,000 (EUR€50,000 for each country) for investment into the participant companies, via a convertible note.

COMPANY PROFILE	INVESTOR PROFILE
Company: Green Pioneer Accelerator	**Investor:** Hivos, an international development organisation based in the Netherlands
Website: www.impactamplifier.co.za, http://growthafrica.com, and https://vc4africa.biz	**Website:** www.hivos.org
Legal structure/ownership: The accelerator is a program and not a legal entity	**Investment type:** Grant, with the anticipation of investing via a quasi-equity instrument into participating companies upon completion of the Accelerator programme
Industry segment: Business advisory services for clean technology start-ups	**Investment size:** EUR€100,000 earmarked for investment
Business model: Investment readiness services, capital raising and post investment business development support	**Investment date:** September and October 2015
Countries: South Africa, Kenya	**Investment return:** Varies based on deal
Customers: 20 early-stage, high-impact businesses with the potential to scale products and services that mitigate climate change	

CASE: MAINSTREAM RENEWABLE POWER

Overview

Mainstream Renewable Power develops, finances, constructs and operates large-scale wind and solar energy plants. While Mainstream operates globally, it has a particular focus on emerging markets, and has a significant presence in Africa. Mainstream currently has nearly 10,000 megawatts (MW) of wind and solar energy projects in development and has nearly 700 MW in projects under construction or in operation across South Africa, Ireland, Chile and Canada. As a developer, Mainstream has been the largest recipient of the South African Renewable Energy Independent Power Producer Procurement Program (REIPPPP)'s project awards, with 848 MW of projects awarded.

Business and Impact Model

Mainstream participates in greenfield development, joint ventures and project acquisitions. In South Africa, Mainstream works in partnership to submit bids in response to procurement programmes, mainly through the South African REIPPPP, which was launched in 2011 and has since channeled circa US$14 billion in private sector investment into South Africa with the aim of contributing over 4,000 MW of renewable energy into the South Africa power grid. In addition to development, Mainstream also manages projects through the construction and operational phases and seeks to retain an equity stake in each project to enable long term cash flows. Mainstream also markets bespoke renewable energy solutions for large corporations (such as IKEA in various markets), although the company has yet to deliver a project with this model in Africa.

Investment

For each of its projects in REIPPPP, Mainstream assembles a consortium of investors to commit equity to the projects and also works with banks and lenders to arrange senior debt financing. The investment consortia generally comprise local commercial banks, local and foreign investment funds and Black Economic Empowerment partners in South Africa. A shareholding is typically also granted to a community trust, which benefits the local communities in which the projects are located. An example of this investment structure was a ZAR 9 billion consortium for three power projects awarded in Round 3 of REIPPPP, which included equity investment by Thebe Investment Corporation, Lekela Power (a joint venture between Mainstream and Actis), the IDEAS Managed Fund (managed by Old Mutual Investment Group), Futuregrowth Asset Management, Genesis Eco-Energy, and local community trusts set up for each of the projects. The mandated lead arranger for the senior debt of the Round 3 projects was ASBA Bank Limited.

COMPANY PROFILE

Company: Mainstream Renewable Power

Website: http://mainstreamrp.com

Legal structure/ownership: Private, for-profit company

Industry segment: Renewable energy, including onshore and offshore wind and solar

Business model: Market-led projects for utilities and investment companies as well as partnerships with corporate clients; Mainstream operates at any stage of the investment process from identification through to long-term operation

Countries: Mainstream's Africa presence currently includes projects in South Africa, Ghana and Egypt

Customers: Utilities, investment companies and global consumer brands

INVESTOR PROFILE

Investor: Investment consortium led by Mainstream Renewable Power, and including Thebe Investment Corporation, Lekela Power, Old Mutual Investment Group, Futuregrowth, Genesis Eco-Energy and local community trusts

Investment type: Equity and debt

Investment size: ZAR 9 billion

Investment date: February 2015

Investment return: Undisclosed

CASE: M-KOPA SOLAR

Overview

M-KOPA Solar is on a mission to make high quality energy affordable to everyone. The company develops, manufactures, and finances off-grid solar solutions that make solar power affordable for low-income households. In the markets where M-KOPA operates, the majority of households rely on kerosene for lighting without access to the national electricity grid. Kerosene is harmful to health and to the environment, with a high risk of fire. M-KOPA offers a low-cost alternative that provides clean, reliable energy for lighting and powering homes. M-KOPA has sold more than 250,000 units in Kenya, Tanzania and Uganda to-date, and approximately 25,000 payments are made through the systems daily.

Business and Impact Model

M-KOPA sells solar products to low-income households on a pay-per-use instalment plan. M-KOPA's proprietary platform, which requires no installation, combines GSM technology with a solar power kit to allow instalment and "pay-as-you-use" financing. The latest product design, the M-KOPA III, has an 8-watt solar panel, a battery, two LED lights with switches, a torch, a USB phone charger and a portable, solar-powered radio. Customers acquire solar systems for a small deposit (about US$35) and then purchase daily usage "credits" for US$0.45, or less than the price of traditional kerosene lighting. After one year of payments, customers own their solar systems outright and they can use the system for free or upgrade to more power. M-KOPA distributes its product through a network of 1,500 direct sales agents, supported by 85 customer service centers. Repayment rates are 95 percent, and a study in 2014 revealed that 97 percent of households using M-KOPA's solar system reported that they were saving money compared to the previous use of kerosene.

Investment

In 2014, Commercial Bank of Africa fronted a US$10 million commercial-grade syndicated debt facility as part of a US$20 million funding round. This investment marked the first time that a commercial loan was secured through mobile money provider M-PESA receivables and unique in that the loan book consisted of low-income borrowers, many without bank accounts. Lenders included the Bill and Melinda Gates Foundation, LGT Venture Philanthropy, Imprint Capital and the Netri Foundation. The funding was part of an expansion to reach one million homes by 2018.

COMPANY PROFILE	INVESTOR PROFILE
Company: M-Kopa Solar	**Investor:** Commercial Bank of Africa, with the Bill and Melinda Gates Foundation, LGT Venture Philanthropy, Imprint Capital and Netri Foundation
Website: www.m-kopa.com	**Website:** www.cbagroup.com
Legal structure/ownership: Private, for-profit company	**Investment type:** Syndicated debt
Industry segment: Renewable energy	**Investment size:** US$10 million in a commercial-grade syndicated debt facility as part of a US$ 20 million funding round
Business model: Lease-to-own portable unit that receives mobile credits on a pay-as-you-use plan which leads to ownership of the unit within 12 months. Customers with good payment history are able to access finance for more lighting and other productive assets like smart phones, water tanks and energy-efficient cookers	**Investment date:** February 2014
Countries: Kenya, Tanzania and Uganda	**Investment return:** Undisclosed
Customers: Over 200,000 homes in East Africa	

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ENDNOTES

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[iii] Castellano p 6.

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[vi] Castellano p 48.