

Early-Stage Financing in Green Sectors in Sub-Saharan Africa

Executive Summary

Sub-Saharan Africa's (SSA) growth potential and gains in economic development are increasingly threatened by the impacts of climate change, including reduced agricultural productivity, increased exposure to coastal flooding and extreme climactic events, and greater risks to human health. With greater awareness of such harmful effects, SSA governments and their development partners are looking to green entrepreneurs for innovative solutions to these challenges. And indeed, entrepreneurs in SSA have begun to seize this opportunity by producing a diverse range of goods and services in the off-grid energy, climate-smart agriculture, waste management, and water & sanitation sectors.

However, green entrepreneurs in SSA also face a range of challenges, with access to early-stage finance a particularly frequently cited constraint. According to the International Finance Corporation (IFC), micro, small, and medium-sized enterprises in SSA countries face a financing gap of \$331 billion, with smaller and younger firms facing proportionately greater difficulties.¹ Yet, surprisingly little is known about the patterns of early-stage financing in SSA, including the profiles of investors and distribution of funding by sector, country, and type of instrument.

To fill these knowledge gaps, this study tracks data on over 800 disclosed investment transactions associated with 157 green firms and involving 336 identifiable investors in SSA countries over 12 years between 2006 and 2017. It also draws on interviews with 41 investors, grant providers, and intermediary organizations to fully understand the opportunities and challenges investors perceive to face in identifying, investing, and managing investment in early-stage green firms. Together, the investment transaction database and the qualitative interviews highlight several notable patterns in how early-stage capital is being deployed among green firms in SSA:

- Two-thirds of investment in early-stage green firms were provided by impact investors, donors, foundations, and development finance institutions (DFIs). Most active investors in this field are international and driven by an investment objective to support early-stage green firms in SSA. Local investors account for only 13 percent of early-stage investors.
- Investment stage: Early-stage investment into green firms in Sub-Saharan Africa is growing slowly compared to growth-stage financing. A total of \$1.4 billion, including \$141 million in grants, has been raised by green firms in SSA in both early- and growth-stage financing deals between 2006 and 2017. Of this, early-stage financing stood at \$448 million, including \$90 million in grants. Early-stage investment transaction grew 1.9 times between 2012 and 2017, a rate slower than growth-stage financing at 4.3 times during the same period.
- Geography: Investment is mostly concentrated in the East African market, though there are emerging trends of movement towards West Africa. Green firms operating exclusively in East Africa raised over 50% of all early-stage investment. Including those operating in East Africa and elsewhere in SSA, the investment volume goes up to nearly 90%, with many of these green firms having begun their operations in East Africa and then expanding to the rest of the continent.
- Sector: The bulk of investment capital (81%) to early- and growth-stage green firms in SSA over the past 12 years has gone towards off-grid energy sector, especially among firms that combine

¹ IFC (2017). [MSME Finance Gap: Assessment of the Shortfalls and Opportunities in Financing Micro, Small and Medium Enterprises in Emerging Markets](#). International Finance Corporation.

solar energy solutions and mobile payment (the proverbial 'pay as you go' (PAYG) model). The off-grid energy sector has demand across SSA, driven by new and underserved markets in the region, specialization within the emerging off-grid industry value chain, and different energy solutions for commercial and industrial customers. In contrast, the other green sectors—climate-smart agriculture, water management, waste management—have seen very little investment, although investment transaction data analysis reveals early signs of a new growth dynamic in the climate-smart agriculture sector.

- Investees: Investment is geared towards green firms with international founders. Green firms with international founders raised 83 percent of total early-stage investment, while firms with local founders accounted for 7 percent.
- Financing instruments: Equity and debt are most commonly deployed financing instruments, with equity accounting for 39 percent of early-stage investment into green firms and debt for 21 percent. Grant funding, accounting for 20 percent, remains essential to help early-stage firms grow and scale up by enabling them to test new products and business models, especially in the off-grid energy sector. However, there are also concerns by investors that the availability of grants may be distorting incentives away from commercial viability and leveraging private sources of financing.

The study's findings show that early-stage green firms in SSA tend to be less suited for venture capital (VC) style investments that have been successful in building the software and electronics sectors in developed countries. Even in advanced economies with more funding, greater number of investment-ready firms, and higher willingness to pay of customers combined with public sector incentives, green firms do not fit the risk, return, or time profile of VC investors. Consequently, impact investors interested in social or environmental benefits and open to financial returns that range from below market to risk-adjusted market rate may remain the best fit for the early-stage green firms in SSA. The study also points to increasing investment activities by corporations that are interested in making strategic investment to test the waters for future mergers and acquisitions (M&A) targets or partnerships to move up the learning curve in the latest business model or product in the green sector.

What could these groups do to increase the availability of early-stage finance for green firms in SSA?

- New types of investment vehicles and instruments, such as specialized sector-focused funds, 'venture building' funds, and flexible capital vehicles that reflect green firms' business lifecycle;
- Engagement of local commercial financial institutions (CFIs) and availability of early-stage financing in local currency through capacity building of and line of credit to local CFIs, locally based funds, and local currency debt fund;
- De-risk mechanisms, such as first-loss capital, partial credit guarantees, and co-investment and matching funding;
- Strategically deployed grants for less developed sectors and geographies, and alongside or preceding investment for early-stage green firms to have a smoother capital curve; and
- Stronger pipeline of investable deals through collaboration among investors and business support intermediaries on investment readiness, pre-investment technical assistance (TA) support facilities, and deepening knowledge of investors on green sectors, as well as local entrepreneurs on engaging investors.

Table of Contents

Executive Summary	1
Acknowledgements	4
Introduction	5
Growth of green sectors is increasingly recognized as important for sustainable and inclusive development in Sub-Saharan Africa	5
Entrepreneurial and early-stage financing ecosystems in Sub-Saharan Africa are nascent.....	7
Early-stage businesses in green sectors face particular difficulties in attracting finance	7
Bridging the knowledge gap on early-stage financing for green firms.....	10
Methodology	12
Patterns of early-stage financing in green firms in Sub-Saharan Africa	16
Growth of Investment in Green Firms in Sub-Saharan Africa.....	16
Impact-oriented investors provided a bulk of early-stage investment in green firms	19
Equity and debt are most commonly deployed financing instrument, but grants have catalyzed development of green sectors	24
Investment activities are disproportionately concentrated in DESCOS, East Africa, and towards international founders and international investors.....	29
Emerging opportunities to grow green sectors in Sub-Saharan Africa	38
Off-grid energy sector has significant room for expansion and growth.....	38
Innovations in climate-smart agriculture sector.....	41
Emerging investor groups with potential to grow	43
Bridging the gaps and accelerating early-stage financing in green firms in Sub-Saharan Africa	45
Development of new types of investment vehicles and instruments	47
Increasing engagement by local commercial financial institutions and expanding availability of early-stage financing in local currency.....	49
Unlocking capital from risk-averse investors through de-risking mechanism.....	52
Strategic Deployment of Grants	55
Strengthened Pipeline of Investable Deals	56
Conclusion	60
References	61
Annex 1: List of investors, grant providers, and intermediary organizations interviewed and interview questions	64

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Introduction

Growth of green sectors is increasingly recognized as important for sustainable and inclusive development in Sub-Saharan Africa

An increased focus on green sectors in Sub-Saharan Africa (SSA) has taken on salience as the region's tremendous growth potential and gains in economic development are threatened by the impacts of climate change—such as reduced agricultural productivity, increased exposure to coastal flooding and extreme climactic events, and increased risks to human health.² The region also suffers from some serious environmental problems, including deforestation, soil erosion, water scarcity, ineffective waste management, and water, land, and air pollution, prompting policymakers to pursue growth in a manner that does not endanger the region's natural environment.

With greater awareness of the harmful effects of climate change on economic growth and on development, governments including those in SSA have prepared national plans for aggressive growth in both climate mitigation and adaptation solutions, including investing in renewable energy, building low-carbon cities, and promoting climate-smart agriculture. Given that the SSA region is particularly vulnerable to the impacts of climate change, not only will its adaptation challenge grow significantly in the coming decades, but it will also create opportunities for the development and scaling of various adaptation solutions. With that in mind, SSA governments have begun to invest public resources and seek significant private investment in implementing these climate solutions.³

Entrepreneurs in SSA have begun to seize this economic opportunity by producing a diverse range of goods and services in the off-grid energy, climate-smart agriculture, waste management, and water & sanitation sectors (See **Error! Reference source not found.** for definitions of green sectors covered in this study). Whether it is M-Kopa Solar, which has brought affordable solar-powered electricity services to 600,000 off-grid households through a pay-as-you-go (PAYG) mobile-phone based payment service and created 2,500 jobs in East Africa⁴ or Sanergy, which has built and managed nearly 1,7000 toilets with 50,000 daily uses in Kenya⁵, green firms are playing an increasingly visible role in delivering climate-resilient and low-carbon development in SSA.

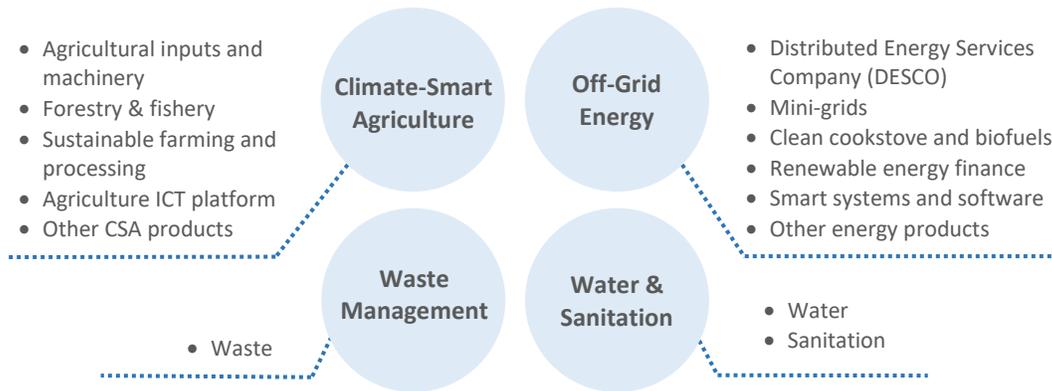
² IPCC (2007). [Climate Change 2007: The Physical Science Basis](#). Intergovernmental Panel on Climate Change

³ IFC (2016). [Climate Investment Opportunities in Emerging Markets](#). International Finance Corporation.

⁴ M-Kopa. [Our Impact](#). Website accessed on May 9, 2018

⁵ Sanergy. [By The Numbers](#). Website accessed on May 9, 2018

Figure 1. Green sectors and sub-sectors covered in the study



<p>Climate-smart agriculture sector covers technologies and business model innovations that provide an integrated approach to managing landscapes—cropland, livestock, forests, and fisheries—in a manner than addresses the interlinked of food security and climate change, including:</p> <ul style="list-style-type: none"> • Agricultural inputs and machinery: businesses that sell inputs such as seeds, fertilizers, pesticides or livestock feed that are environmentally friendly or particularly well adapted to local and changing climates or that sell farming equipment such as irrigation systems or water pumps; • Forestry & fishery: businesses in the wood value chain (including plantations and processors) and fish farms, fishing equipment retailers, or fish protein processors; • Sustainable farming and processing: businesses that help make agricultural food chains more sustainable by promoting products and farming methods that improve yields, reduce or replace the use of harmful inputs, or reduce food waste; • Agriculture ICT platform: businesses that use information and communication technology (ICT) to connect actors in the agricultural value chain and thus increase transparency, educate stakeholders, or improve access to markets; and • Other CSA products: A catch-all category for businesses that do not fall into the previous categories. Examples include agricultural insurance and certification businesses. 	<p>Off-grid energy sector covers technologies and business model innovations that increases customers’ access to electricity or allow cooking to be done more efficiently while reducing harmful impacts on the environment, including:</p> <ul style="list-style-type: none"> • Distributed Energy Service Companies (DESCOs): businesses that provide electricity through stand-alone systems for lighting, appliances, and productive assets to households in off-grid areas or areas with an unreliable grid system. Also includes renewable energy applications for productive uses such as solar pumps; • Mini-grids: businesses that build and/or operate village-, town- or district-scale electrical distribution networks either unconnected to, or able to operate autonomously from, the main electrical grid; • Clean cookstoves and biofuels: businesses that manufacture and/or distribute cookstoves and fuels that enable efficient fuel use, low emissions, and safety; • Renewable energy finance: businesses that facilitate financing renewable energy projects or firms; • Smart systems and software: businesses that provide smart metering or other energy management systems and payment software including pay-as-you-go; and • Other energy products: A catch-all category for businesses that do not fall into the previous categories. Examples include efficient heating and cooling, solar-powered internet, etc.
<p>Water & sanitation sector covers technologies and business models that provide access to clean drinking water both on- and off-grid, water-saving technology for households and businesses, and access to clean toilets.</p>	<p>Waste management sector covers technologies and business models based on the collection, storage, and recycling of waste, as well as the reduction of waste.</p>

Entrepreneurial and early-stage financing ecosystems in Sub-Saharan Africa are nascent

Further development of green markets requires the emergence of a dynamic entrepreneurial ecosystem in these sectors. On the one hand, Africa's entrepreneurial potential is high: 22 percent of the working-age population in Africa are starting or running new businesses. This is the highest rate in the world, compared to 18 percent in Latin America and 13% in Asia, and African women are much more likely to start businesses than women elsewhere.⁶ On the other hand, entrepreneurs in SSA continue to face significant challenges because the entrepreneurial space is still relatively young and needs to address some fundamental gaps typical of developing economies.⁷ Indeed, high rates of entrepreneurship could also be indicative of self-employment being the only career option available considering extremely high levels of poverty, high rates of under-employment, and the lack of formal employment options.⁸

There are many challenges to unlocking the region's entrepreneurial potential, including inconsistent government regulations, unfavorable business environment, weak infrastructure, and more. But none is as frequently cited as inadequate access to capital, especially for early stages of business development. An estimated finance gap of \$331 billion exists for micro, small, and medium-sized enterprises in Sub-Saharan Africa, with smaller and younger firms face bigger financing gaps.⁹

The lack of access to early-stage financing by businesses in SSA is a result of several high-risk characteristics. First, SSA is generally rated as riskier than other regions on multiple dimensions including political stability, currency risk, business environment, poor infrastructure and supply chains, as well as customers with limited ability to pay and a small talent pool for management teams. As a result, investment rates in SSA lag those of peers such as in emerging and developing Asia and Latin America and the Caribbean.¹⁰ Second, the financing of small and early-stage firms is globally rated as riskier than of large and growth-stage firms while requiring higher transaction costs. Furthermore, market opportunities are limited by a weak entrepreneurial pipeline (i.e., potential, nascent and new entrepreneurs) and underdeveloped entrepreneurship-supporting structures and mechanisms: incubators, hubs, and mentorship network that nurture and prepare an adequate deal flow are found only in a handful of cities and countries and there are uncertainties regarding to the effectiveness of many that are currently operating.

Early-stage businesses in green sectors face particular difficulties in attracting finance

This study focuses on financing landscape for early-stage green firms in SSA who are pioneering new or deploying proven business models to deliver innovative solutions in climate-smart agriculture, off-grid

⁶ According to the [African Economic Outlook 2017](#), a report jointly produced by the African Development Bank Group (AfDB), the Organization for Economic Cooperation and Development (OECD), and the United Nations Development Programme (UNDP). In Nigeria and Zambia, 40% of women start businesses, compared with 10% or less in industrial countries.

⁷ Sub-Saharan African entrepreneurs face some of the world's toughest business conditions. Most countries in this region perform poorly in the World Bank's Ease of Doing Business surveys.

⁸ Jacqui Kew, Mike Herrington, Yana Litovsky, and Helen Gale (2013). [Generation Entrepreneur? The state of global youth entrepreneurship](#). Youth Business International and Global Entrepreneurship Monitor

⁹ IFC (2017). [MSME Finance Gap: Assessment of the Shortfalls and Opportunities in Financing Micro, Small and Medium Enterprises in Emerging Markets](#). International Finance Corporation.

¹⁰ IMF (2018). [Public Investment Efficiency in Sub-Saharan African Countries: What Lies Ahead?](#) International Monetary Fund.

energy, waste management, and water & sanitation sectors. In addition to a myriad of challenges faced by early-stage entrepreneurs everywhere as well as region-specific constraints to entrepreneurship described earlier, green entrepreneurs in SSA face an additional set of unique difficulties beyond the traditional start-up development lifecycle that make them even tougher to scale up:¹¹

- Most product offerings in green sectors are not widely known and therefore green sectors tend to be “push” markets where the firms and other like-minded stakeholders need to work actively to build the market, rather than simply addressing an existing market with new offerings. The customer base in most green sectors is fragmented and typically features customers with different needs and varied purchasing power (e.g. customers for drip irrigation products within a single country cultivate a variety of crops on farms of different sizes in varied climates and have varying capacity to pay). This kind of customer fragmentation creates challenges for green firms in segmenting the market and targeting products to customers appropriately. Risk- and price-sensitive customers are often wary of investing in products that are unknown, offered by a company they do not know, and rarely available in local shops. Awareness of green products also requires customers to understand unfamiliar technology, policy and regulatory issues (e.g. solar panel subsidies), and customer financing options. Given the immaturity of green sectors, firms experiment repeatedly with business models to build the market and create demand for their products, and investors and customers tend to act tentatively in comparison to more mature sectors.
- Green firms must often navigate challenging political and regulatory landscape. Many green sectors are heavily regulated. Governments play key roles of regulators, enablers, and, at times, customers for these sectors. Without clear and well-implemented policies and regulations, it is difficult for green firms to be successful. Stand-alone solar home systems in the off-grid energy market may be one of the early moving green sectors because its dependence on regulations is lower than, for instance, mini-grids, which have pricing, grid-connectivity and other regulatory considerations. Moreover, while subsidies have played an important role in scaling some green sectors like climate-smart agriculture and water & sanitation, they also have the potential to create market distortions.
- Green firms face economies of scale challenges since they operate in sectors which need to reach geographically dispersed low-income customers in rural areas to scale. This problem is especially notable in the off-grid energy and climate-smart agriculture sectors. Customers in these sectors are difficult to reach because of poor infrastructure and fragmented value chain. Such customers also tend to be risk averse and have limited disposable income to spend on new green products and services. The more a green firm expands to serve these customers, the more likely that the marginal cost of production or service delivery will increase rather than decrease as in other sectors.
- Green markets are generally characterized by long development cycles, significant capital requirements, a need to pivot business models, and few exit opportunities to date. In recent years, some green firms have emerged with business models that utilize technology platforms

¹¹ These challenges are described in detail in infoDev (2017). [Innovations for Scaling Green Sectors](#). World Bank Group. Washington, DC.

and data analytics, such as Angaza’s smart payment system targeted to off-grid solar companies as customers, that do not require significant capital requirements. However, most green firms who have more hardware-driven products and business models require a large amount of upfront and/or working capital to build and scale their businesses. Inadequacies in infrastructure and logistics services are also key obstacles for green firms that rely on imported components (e.g. mini-grids, water purification systems). As a result, it can be challenging for green firms to scale beyond the start-up phase into successful growth and commercialization stages. Some enterprises report growth rates of less than 10 percent after the initial four to five years of operation, a pace not commensurate with achieving wide-scale impact or accessing traditional early-stage investment. While there are many green firms that have grown at a faster rate, the green sector’s average growth rate is perceived by many investors to be slower than that of digital or health care sector.

For commercially-minded investors such as venture capital (VC) funds that invest in many high-risk start-ups with a bet that a few can quickly achieve scale to address a high-growth market and provide large pay offs within a short time framework, early-stage green firms in SSA are not attractive for investment. They are slow to grow which delays the investor payback period and need for intensive management support which VC investors don’t usually have internal capacity to address. Even in advanced entrepreneurial ecosystems and much deeper markets such as the US, the VC model is considered inappropriate for the risk, return, and time profiles of green firms. Indeed, Silicon Valley VC funds lost half of their \$25 billion investment into clean energy technology start-ups between 2006 and 2011 as the start-ups failed to bring the expected growth and return.¹²

Consequently, early-stage green firms remain primarily the domain of impact investors that intend to have a positive social or environmental impact through investment and can sustain their funds with financial returns that range from below market to risk-adjusted market rate. But even from impact investors, green sectors have historically received less investment compared to non-green sectors: 40 percent of the \$131 billion assets managed by emerging market-focused impact investors is in financial services and microfinance, compared to 25 percent in energy, food and agriculture, waste management, and water & sanitation sectors combined.¹³ And within green sectors, investors tend to gravitate towards growth-stage businesses where the risk of failure is significantly lower given the stronger market traction, established revenue stream, and a more experienced management team. Qualitative evidence from over 40 interviews with investors, intermediary organizations, and entrepreneurs conducted as part of this study strongly suggest that early-stage green firms are highly constrained by the lack of appropriate capital at ticket size between \$100,000 and \$1 million.

At the same time, investors have long voiced the lack of high-quality investment opportunities with track record in green sectors. This is mirrored in the number of impact investment funds outgrowing the number of high-impact firms in Africa.¹⁴ According to Global Impact Investing Network (GIIN), there are 107 organizations that are investing in Southern Africa alone, and investors have strong interest in

¹² Benjamin Gaddy, Varun Sivaram, and Francis O’Sullivan (2016). [Venture Capital and Cleantech: The Wrong Model for Clean Energy Innovation](#). MIT Energy Initiative Working Paper.

¹³ GIIN (2018). [Annual Impact Investor Survey 2018](#). Global Impact Investing Network. The statistics is across all geographies.

¹⁴ Rachel Keeler (2016) [Homing In on Realistic Impact Investment Strategies in Africa](#). Stanford Social Innovation Review. March 1, 2016.

investing in SSA in near future.¹⁵ Similarly, approximately one third of the 3,000 public and private institutional investors surveyed by the World Bank Group is interested in investing in clean technology and agribusiness sectors in emerging markets and developing economies.¹⁶ Many of these investors are looking for firms with track record of profitability, strong management teams, and with potential to achieve strong social impacts. Unfortunately, investors find that these “safe bet” firms are rare, and investors are courting a select few safe bet firms in SSA.¹⁷

Bridging the knowledge gap on early-stage financing for green firms

Beyond few well-known examples, the patterns of investment in early-stage green firms in SSA are not well understood due to (so far) limited data. In 2013, the International Finance Corporation (IFC) reviewed more than 160 publications and documents related to public and private financing of green growth and climate-related activities and found that the challenges facing investors are well-documented across the board.¹⁸ However, nearly all studies either focus on large, later-stage firms or lump firms at all stages together for analysis. The specific challenges facing investors actively supporting or considering investing in early-stage green businesses are underrepresented in the existing literature, which seldom distinguishes investors’ experience by investor types (e.g., angel investors, impact investors, VC funds, and development finance institutions) or covers specific geographies like SSA. Most importantly, existing literature provides little detail beyond discussing the importance in supporting early-stage green firms.¹⁹

This study set out to depict the patterns of early-stage investment in green firms through identifying characteristics of investors, investees, and investment transactions. Specifically, the following questions were approached from the lens of investors and their experiences investing in green firms:

- Who are the active investors driving investment in early-stage green firms in SSA?
- What are the patterns of investments by sector and geography?
- What are the characteristics of entrepreneurs receiving investments?
- What types of instruments have investors used in deploying capital to early-stage green firms?
- What are emerging growth trends in green sectors in SSA that might attract additional capital in the coming years?

Following the analysis of patterns of early-stage financing in green firms and emerging opportunities to grow green sectors in SSA, this study presents a set of ideas that investors and development agencies can use to increase the availability of early stage finance for green firms. As the following analysis shows, with few exceptions the ecosystems and markets for green entrepreneurs in Africa remain

¹⁵ GIIN (2016). [The Landscape for Impact Investing in Southern Africa](#). Global Impact Investing Network. According to GIIN (2018). [Annual Impact Investor Survey 2018](#). Global Impact Investing Network, 44% of the investors surveyed plans to increase their investment in SSA in the coming year.

¹⁶ World Bank (2018). [Hope or Hype? Attracting Investors to Emerging Markets and Developing Economies](#). Blog published on July 30, 2018. World Bank Group.

¹⁷ GIIN (2018). [Annual Impact Investor Survey 2018](#). Global Impact Investing Network.

¹⁸ IFC (2013). [Mobilizing Public and Private Funds for Inclusive Green Growth Investment in Developing Countries](#). International Finance Corporation. Washington, DC.

¹⁹ The geographical coverage of existing literature mainly focuses on North America, Europe, China, India, Brazil, and South Africa, leaving the rest of developing countries unexplored.

nascent. As a result, early stage finance to green entrepreneurs in SSA is likely to remain an area led by impact-driven investors and institutions. While the report's general audience includes all stakeholders in green finance, the recommendations and ideas for improving the availability of early stage finance to green firms in SSA are therefore primarily geared to impact-oriented actors.

Methodology

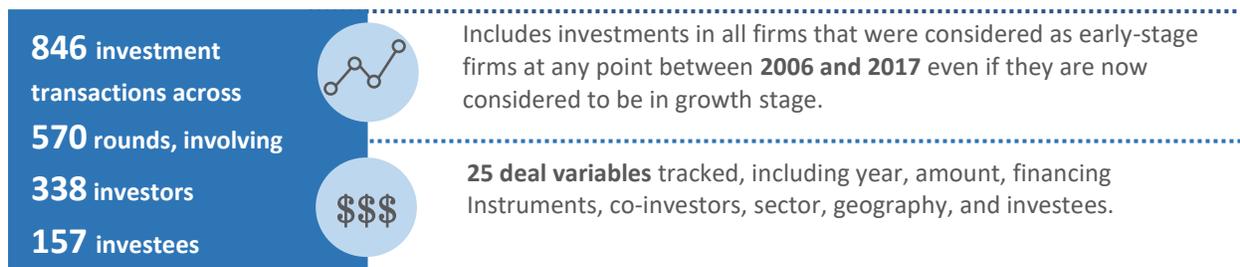
Database: To analyze patterns of early-stage financing for green firms in SSA, the study tracked disclosed investment transactions in green firms in SSA countries over 12 years between 2006, when early-stage financing of green firms begins to appear in publicly available information, and 2017. The database covered 846 investment transactions across 570 rounds involving 336 investors and 157 firms.

Investment transaction refers to financial contribution from one investor to one company, and round refers to financial contribution provided to one company by one or more investors within the same fundraising effort, usually at the same time. For each investment transaction, the database recorded or estimated using available information 25 variables including year, investment amount, financing instrument types, co-investors, sector and sub-sector, geography, and categories of investors and investees.

Defining investment: The term ‘investment’ refers to all forms of capital, including debt, equity, mezzanine, and grant. Some investors do not consider grants as traditional form of investment, which is generally understood as provision of capital with some return expectations. However, inclusion of grants in the investment transaction database was considered important to illustrate capital flow to early-stage green firms at the broadest level. The database covers grants above \$100,000 provided to firms that also received investment capital (i.e. non-grant funding in the form of equity, debt, mezzanine, and others), considering a catalytic role of grants in developing green sectors. Early-stage green firms that have received grants but have not raised non-grant funding were not included in the investment transaction database. Although how non-grant investors view these firms as investment opportunities will help understanding how to improve the investment pipeline in this sector, the diversity of grant programs and sizes of grants available to early-stage green firms in SSA and limited availability of the data made it challenging to incorporate these into the study.

Defining early-stage investment: The database also distinguished early- and growth-stage investment by classifying all pre-seed, seed, and series A rounds as early-stage investment and series B or later rounds as growth-stage investment.²⁰ The database includes investments in all firms that were in an early stage at any point between 2006 and 2017 even if they subsequently moved into a growth stage. Timing of receiving a grant was used to classify whether it was an early- or growth-stage grant: grants received before a Series A investment are considered early-stage and grants received after Series A are considered growth-stage.

Figure 2. Investment transaction database at a glance



²⁰ This distinction is particular to this study. In wider investment community, Series B may be considered early-stage.

Investor categories: The study classified investors into nine categories.

<p>Angel</p> <p>Individual or a group of angel investors investing personal capital into business. Some become active advisors to the business.</p>	<p>Accelerator with fund</p> <p>An incubator or accelerator that provides grant or commercial funding to the ventures it supports.</p>	<p>Commercial investor</p> <p>An investor who provides risk capital to start-ups or early-stage ventures, typically a venture capital or private equity fund, with no explicit impact intention.</p>
<p>Corporate investor</p> <p>An investment vehicle funded and operated by a corporation that invests for strategic or commercial purposes.</p>	<p>Development finance institution</p> <p>Specialized development banks capitalized by (collections of) national governments to support private sector development in developing countries.</p>	<p>Donor</p> <p>Specialized programs or agencies of international government with explicit objective to support the growth of green firms in developing countries.</p>
<p>Foundation</p> <p>Organizations with non-profit status funded either by charitable donations, endowments from wealthy individuals, or public funding. Foundations typically provide grants.</p>	<p>Impact investor</p> <p>An investor seeking an explicit social and/or environmental impact objective alongside a financial return.</p>	<p>Others</p> <p>All other types of investors such as commercial and investment banks, asset managers, non-bank debt providers, crowdfunding platforms, industry associations, and local government programs.</p>

Investors were also categorized by their location into three groups: (1) international investors (with no presence in Sub-Saharan Africa); (2) international investors with local offices (with at least one office in the region but headquartered elsewhere); and (3) local investors (headquartered in Sub-Saharan Africa).

Investee categories: The database tracked the location of the investees' headquarters and operations. Founders' origin and education were used to characterize them into four groups: (1) international founders; (2) international and local founders; (3) local founders with international education; and (4) local founders.

Data collection and validation: Information captured in the database is mostly from publicly available data on investor and investee websites, platforms such as Crunchbase.com and Pitchbook.com, and investor interviews. In a few cases, investors reviewed the database and provided additional information regarding their portfolios. All database entries were validated with at least one additional source such as press releases and firm websites. Twelve entries that could not be validated by a second source were omitted in the database. These excluded transactions are unlikely to have introduced bias into the data – all of them involved the most frequently observed variables (i.e., international founders, international investors) and sectors and investor types represented in this group were broadly similar to the overall database. The database was checked against data from Bloomberg New Energy Finance and the Cleantech Group databases which are key leading databases on financing for green firms and green project finances. These databases included about 100 investment transactions involving early- and growth-stage green firms, which is approximately one eighth of the database built for this study. The authors are confident that the database is comprehensive and captures the universe of early-stage financing for green firms in SSA.

Data estimation: Over three fourths of investment transactions have complete information on key variables – investor, year when investment transaction took place, investment transaction size, and financial instrument used. For one third of the investment transactions recorded, it was not possible to verify information for all variables using publicly available information. For instance, a total amount of investment for an investment round involving several investors was published, but the exact amount of investment by individual investors was not disclosed. Where possible, missing variables were estimated based on the available information such as how many investors were involved in the investment round and a known range of investment size for a given investor.

Potential limitations and caveats: The study made every effort to ensure the integrity and comprehensiveness of the database, however, some limitations and caveats apply and should be highlighted. Analysis has been conducted in a conservative manner not to overestimate investments, and the trends uncovered through this research and conclusions are likely to be directionally correct.

- **Undisclosed investment transactions:** Most common source of the data was press releases or websites of investors and investees. It is possible that certain types of investors and investees are inherently more likely than others to publish their recent transactions in English and they are over-represented in the dataset. For example, websites of US or European investors and investees often include information on their investment transactions, whereas local commercial banks do not typically publish their investment activities. Angels, angel groups, and crowdfunding platforms are typically reluctant to share information about their activities for strategic reasons and due to a reluctance of personal exposure. As a result, the database may not fully represent all investment activity to early-stage green firms. Efforts were made to ensure that the database is as comprehensive as possible by checking against existing databases (e.g. Bloomberg New Energy Finance) and seeking local experts to check the list of investors and investees.
- **Estimation for missing data:** Not all publicly disclosed investment transactions have verified information for all key variables. For instance, investment round size is typically published but investment transaction amount per investor participating in the round is not always disclosed. In such cases the transaction size was estimated using available data, such as the size of the round and number of co-investors, the published range of ticket sizes of the investor, or the type of investor. Each transaction was rated with a ‘confidence level’ to indicate the level of uncertainty in the data. Confidence level was reduced with each estimation that was required as well as based on the quality of the available data on which the estimate was based. More than 70% of transactions ended up with a confidence score of 8 or higher.
- **Potential bias introduced by incomplete data:** An analysis of investment transactions with less complete data revealed that certain types of transactions that accounted for a smaller percentage of the total database were relatively more commonly incomplete. Investment transactions in the CSA sector, by local investors, and by non-impact-driven investors were more likely to be missing data on more variables. This suggests that data quality and availability could possibly also have influenced overall results of the study to a degree. Overall, however, the authors are confident that the data is directionally correct and that the study’s conclusions hold.

Future iterations of this study may seek to improve the data collection methodology to increase the completeness of the dataset, reduce biases, and ensure accuracy. For example, covering data in languages used in SSA other than English and expanding the interviewee base to capture a greater number of investors representing different investor categories, as well as interview or survey firms about investment they may or may not have received.

Stakeholder interviews: In addition to the quantitative analysis based on the information collected in the investment transaction database, the study draws on interviews with 41 investors, grant providers, and intermediary organizations based or active in Sub-Saharan Africa. Interview questions covered on investment strategies, objectives and performance (investment thesis, requirement, risk management, performance, success factors), types of financial instrument and vehicles used (types and trends), structure of the fund / organization, views on green sectors (attractiveness, challenges, solutions), post-investment support (type, amount, delivery models, demand), and efforts to scale up (a full list of the interviewees and sample interview questions is provided in Annex 1). In preparation for the interview, the team conducted research to profile the investor and identified key investment transactions in its portfolio that could be discussed in depth and used to draw out insights on investment strategies, views on investing in green sectors, etc. The study also reflects discussions from two workshops with investors, grant providers, intermediary organizations, and entrepreneurs on the topic of early-stage financing for green firms in Sub-Saharan Africa in 2017 and 2018 in Nairobi, Kenya.

Patterns of early-stage financing in green firms in Sub-Saharan Africa

The data analysis and interviews uncovered several notable patterns in the sources of capital and where it is being deployed:

- Investment growth: Investment in early- and growth-stage green firms have grown rapidly, but the growth has been slower in early-stage investment.
- Sources of Capital: Impact investors, donors, foundations, and development finance institutions (DFIs) provided the bulk of early-stage investment into green firms in SSA. Corporate and commercial investors are becoming more engaged in supporting green firms. New classes of investors, including corporate and commercial investors, who can potentially be a source of untapped capital have emerged.
- Financing instruments: While equity and debt have been most commonly deployed, grants have catalyzed the growth of green sectors. Innovative instruments, such as mezzanine, hybrid equity, and convertible notes with revenue share, are desired by investors but thus far are seldom used.
- Investment concentration: investment activities are disproportionately concentrated in distributed energy services companies (DESCOs) and East Africa. International investors who dominate the field have mainly invested in international founders.

Growth of Investment in Green Firms in Sub-Saharan Africa

Early- and growth-stage investment in green firms has grown rapidly

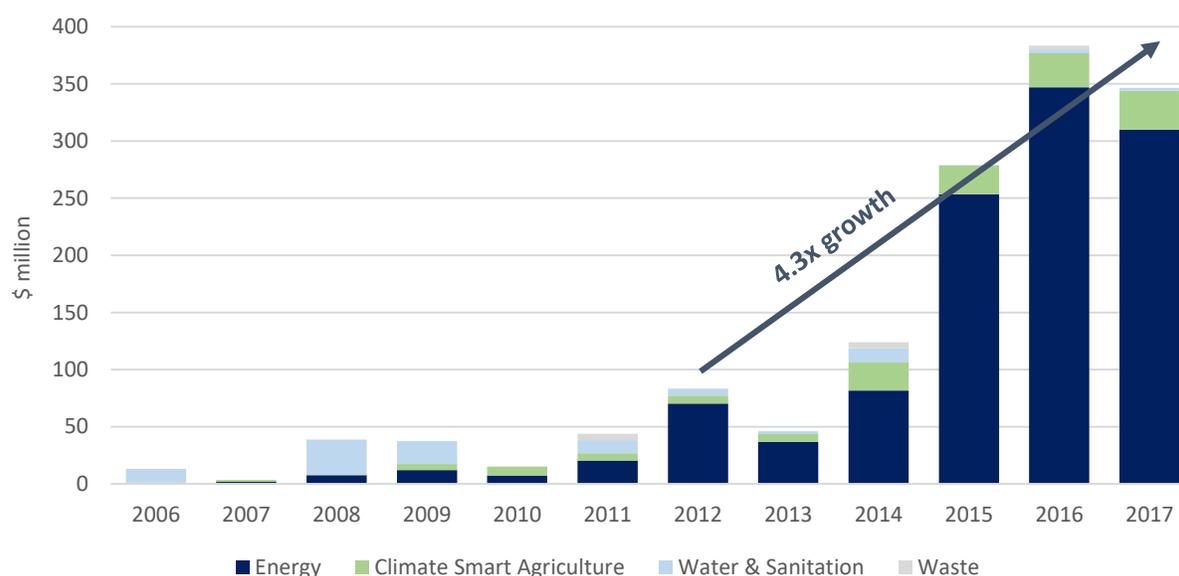
Between 2006 and 2017, approximately \$1.4 billion has been raised by green firms in Sub-Saharan Africa in both early- and growth-stage financing deals. This includes \$141 million in grants, accounting for 10 percent of total investment during the same period. After limited activity in the first five years, investment picked up in 2011 and grew 4.3 times between 2012 and 2017. Almost half of all investment in early- and growth-stage green firms during this time was made in 2016 and 2017 (\$383 million and \$346 million, respectively).

The total investment volume estimated by this study is comparable to published data on relevant sectors and geography. A survey of fund managers, foundations, banks, family offices, pension funds / insurance companies, and DFIs by Global Impact Investing Network (GIIN) shows that investors were managing \$228 billion in assets by the end of 2017, over half of which was invested in developing countries with \$27.3 billion in Sub-Saharan Africa.²¹ Assets under management by these investors in early- and growth-stage firms in energy, food & agriculture, and water, sanitation & hygiene in SSA are estimated around \$3 billion (1.3 percent of the \$228 billion).²² This figure is greater than the study's estimate of \$1.4 billion, but it includes all of food & agriculture sector, not just climate-smart agriculture, and covers a longer time period to include when the investors first made investment, which goes as far as 20 years ago.

²¹ GIIN (2018). [Annual Impact Investor Survey 2018](#). Global Impact Investing Network.

²² Ibid. This figure is estimated based on the statistics that SSA accounts for 12%, energy, food & agriculture, and water, sanitation & hygiene sectors account for 24%, growth-stage firms account for 35%, and early-stage (i.e. seed- and venture-stage) firms account for 11% of the total assets under management.

Figure 3. Total early- and growth-stage investment into green firms in Sub-Saharan Africa between 2006 and 2017 (\$ million)



This study's estimate is also comparable to a figure published by Partech Ventures, which reported that African off-grid start-ups raised \$237 million in equity and debt investment.²³ This is equivalent to the amount raised by African online & mobile consumer services start-ups (e.g., e-commerce, education technology) and nearly double the amount raised by African fintech start-ups in 2017.

The amount of funding received by early- and growth-stage green firms in SSA is well below the \$2.1 billion equity investment provided by impact investors to clean energy businesses in India between 2010 and 2016.²⁴ This is no surprise considering that impact investing in India is more mature than in SSA: it is a billion-dollar-a-year industry supported by diversified and complementary sources of capital involving both impact investors and conventional private equity and VC funds, bigger ticket sizes, more mature sectors, and an increasing number of exits and returns realized.

As seen in Figure 3, early- and growth-stage investment into green firms in SSA has been concentrated in the off-grid energy sector. While the climate-smart agriculture, waste management, and water & sanitation sectors collectively quadrupled in terms of the amount of investment raised, the off-grid energy sector, particularly its distributed energy services company (DESCO) sub-sector accounted for 81 percent of total early- and growth-stage investment in SSA between 2006 and 2017 (detailed discussion on the investment patterns by sector is discussed in the next chapter).

Compared to growth-stage, investment in early-stage green firms has grown slowly

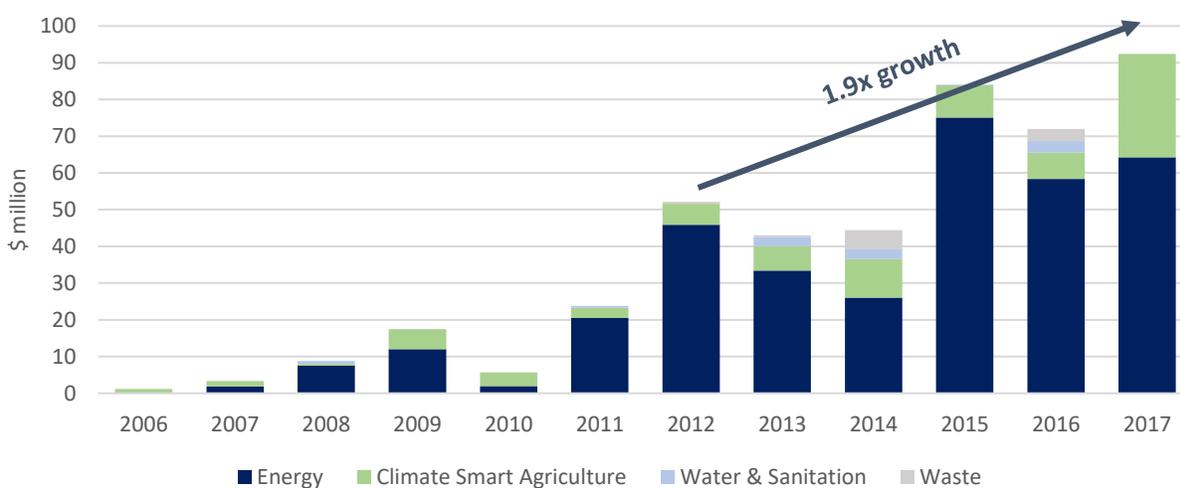
Investment in early-stage green firms in SSA stood at \$448 million including \$90 million in grants between 2006 and 2017, or roughly one third of total investment in both early- and growth-stage green

²³ Cyril Collon (2018). [In another record-breaking year, African Tech Start-ups Raised US\\$ 560 Million in VC funding in 2017, a 53% YoY Growth](#). Published in LinkedIn on February 20, 2018. Investment transaction database recorded \$243 million raised by early- and growth-stage DESCOs in 2017.

²⁴ The investment amount was calculated based on the information published in McKinsey & Company (2017). [Impact investing: Purpose-driven finance finds its place in India](#).

firms. Compared to early- and growth-stage investment, early-stage investment was less concentrated in off-grid sector, with green firms in climate-smart agriculture and waste management sectors accounting for a greater share of total early-stage investment. Growth of early-stage investment transaction by count was slower at 1.9x between 2012 and 2017 (versus 4.3x for early- and growth-stage investment). Early-stage investment volume is smaller than growth-stage investment because of slow growth in the number of transactions but also smaller ticket sizes (the average early-stage investment per investor was \$1 million in comparison to \$7.9 million for growth-stage deals), as well as a smaller number of investors investing early-stage firms compared to those who invest in growth-stage or mature firms. Limited availability of early-stage capital is also observed in other emerging markets: Latin America and the Caribbean are ahead of SSA in terms of the amount of investment assets under management, and the rest of the emerging markets—Eastern Europe and Central Asia, South Asia, South East Asia, and Middle East and Northern Africa—trailing behind SSA.²⁵

Figure 4. Total early-stage investment into green firms in Sub-Saharan Africa between 2006 and 2017 (\$ million)



The total investment volume for early-stage green firms in SSA estimated by this study is comparable to published data on relevant sectors and geography: it is estimated that investors are managing \$722 million in impact investment assets in early-stage firms in energy, food & agriculture (including but not limited to climate-smart agriculture), and water, sanitation, and hygiene sectors.²⁶

Based on investment volume, transactions under \$1 million accounted for 8 percent of the total recorded early- and growth-stage investment volume. Interviewed investors noted that the high risk of investing in green business models (sector and technology risk) in Africa (country risk) forces investors to seek the relative safety of later stage deals.

²⁵ GIIN (2018). [Annual Impact Investor Survey 2018](#). Global Impact Investing Network.

²⁶ Ibid. This figure is greater than the study's estimate of \$448 million, but it includes all of food & agriculture sector, not just climate-smart agriculture, and covers a longer time period to include when the investors first made investment, which goes as far as 20 years ago.

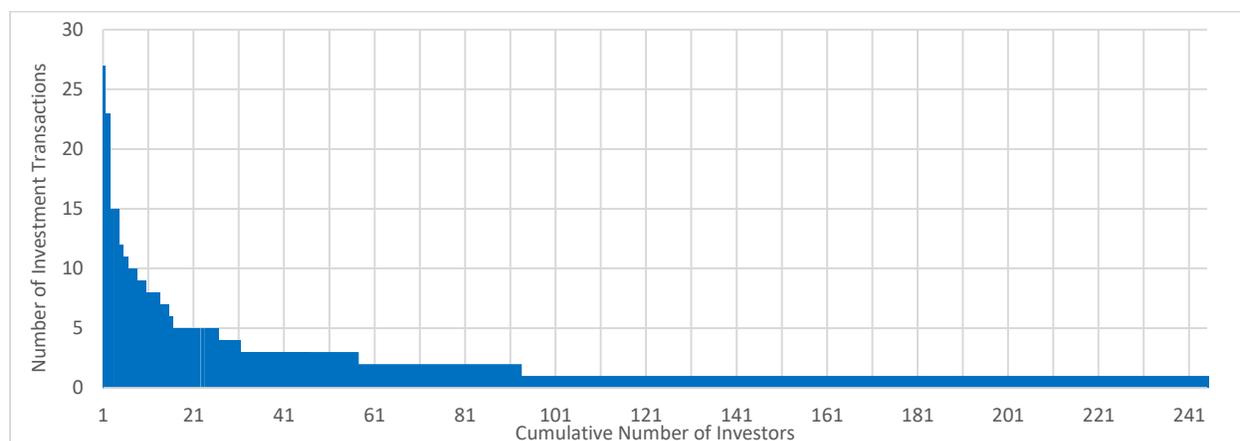
Impact-oriented investors provided a bulk of early-stage investment in green firms

Between 2006 and 2017, 248 investors invested in early-stage green firms in SSA. Additional 90 investors invested in growth-stage, but not in early-stage, green firms, making the total number of investors of early- and growth-stage green firms in SSA to 338. This section highlights who are the most active investors in early-stage green firms in SSA, with an analysis of two groups of investors with distinct investment patterns depicting the early-stage capital flow into green firms in SSA.

Most active investors

On average, investors in early-stage green firms in SSA made \$2 million investment in 2.3 transactions, while median investment size and number of transactions was smaller at \$0.8 million in 1 transaction. This suggests a small number of investors invested a greater amount of capital with a long tail of investors who have invested a small amount of capital. The distribution of early-stage investors by number of investment transaction is similarly distributed: a small number of investors was involved in multiple transactions with a long trail of investors who have invested once or twice, as seen in the figure below.

Figure 5. Distribution of investors of early-stage green firms in Sub-Saharan Africa by number of investment transactions



All investors who made early-stage investments into green firms were categorized into three groups based on their level of activity: most active, moderately active, and first-time investors.²⁷ Investors with four or more green firms as investees and those who invested \$2.5 million or more in at least two green firms were considered most active investors. Moderately active investors are those who made investment into more than one but less than four firms. First time investors are those who made only one investment into one firm.

The 43 most active investors collectively invested \$279 million (inclusive of grants) into early-stage green firms across all four sectors. While these most active investors accounted for only 20 percent of total investors, they provided 58 percent of total early-stage investment.²⁸ 80 percent of the most active

²⁷ In some investment transactions, investor names were not disclosed or it was not possible to disaggregate a group of angels who invested in the same investee. This affected 30 transactions worth roughly \$40 million which were excluded in this categorization, accounting for approximately 10 percent of total early-stage investment in green firms in SSA.

²⁸ In terms of the number of early-stage investment transactions, these most active investors accounted for 50 percent of the total investment transactions.

investors were impact investors, donors, foundations, and DFIs, and they provided half of total early-stage investment. In contrast, there were only three commercial and corporate investors among most active investors, and they accounted for only 4 percent of total early-stage investment.

Table 1. Most active investors in early-stage green firms in Sub-Saharan Africa

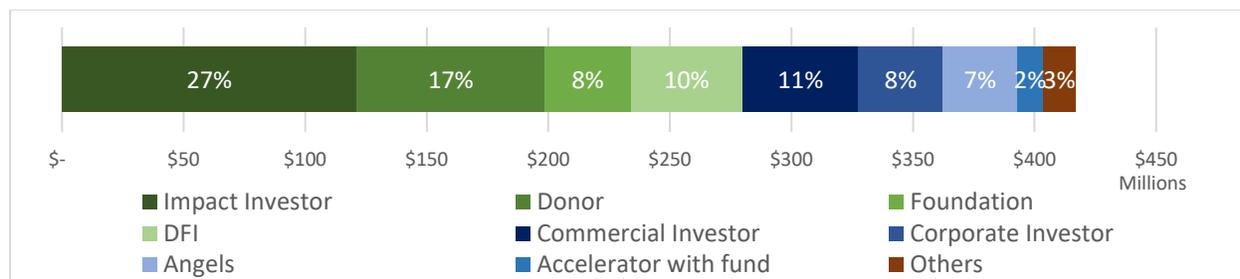
<p>Angel</p> <p>Andrew Reicher Peter Saunders Prabhakant Sinha</p> <p>Accelerator with fund</p> <p>FACTOR[e]</p> <p>Commercial investor</p> <p>Standard Chartered Bank</p> <p>Corporate investor</p> <p>Engie Rassembleurs d’Energie First Solar</p> <p>Development finance institution</p> <p>DEG Overseas Private Investment Corporation (OPIC) and its Africa Clean Energy Finance Initiative</p> <p>Donor</p> <p>AECF Energy and Environment Partnership Global Alliance for Clean Cookstoves InfraCo Africa Investment Fund for Developing Countries Swedish International Development Cooperation Agency (Sida) United States Agency for International Development (USAID) and its Development Innovation Ventures (DIV)</p>	<p>Foundation</p> <p>Bill and Melinda Gates Foundation DOEN Foundation Grameen Crédit Agricole Foundation Shell Foundation</p> <p>Impact investor</p> <p>Acumen AgDevCo AHL Venture Partners AlphaMundi Group Bamboo Finance Blue Haven Initiative Calvert Impact Capital Ceniarth DOB Equity Energy Access Ventures Global Innovation Fund GreenTec Capital Partners GSMA Injaro Agriculture Capital Investisseurs & Partenaires Novastar Ventures Omidyar Network Pearl Capital Partners Persistent Energy Partners Soros Economic Development Fund Treehouse Investments</p> <p>Others</p> <p>SunFunder Trine</p>
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These most active investors adopted a wide range of investment strategies for investing in green firms in Sub-Saharan Africa. On one side, there are investors, such as the Africa Enterprise Challenge Fund (AECF), who invest in many firms but with very small capital (often in the form of grants) per each firm. On the other side, there are investors such as DEG, who only invest in a few firms but put in more than \$2.8 million of early-stage capital in each of their investees.

Nearly two thirds of the \$446 million early-stage investment into green firms in Sub-Saharan Africa including grants were provided by 108 impact investors, donors, foundations, and DFIs (see

Figure 6).

Figure 6. Breakdown of early-stage investment by investor type (\$ million)



Impact investors, defined as investors seeking an explicit social and/or environmental impact alongside a financial return, were the most important financiers of green firms in SSA, having provided \$122 million in 161 investment transactions, which account for over a quarter of all early-stage investment both by volume and number of transactions. They were active in all four green sectors and their support was especially significant for non-energy sectors compared to other investor types. Impact investors were mainly equity investors to green firms, and they often provided follow-on investment when the green firms raised additional capital at both early- and growth-stages.

The capital deployed by impact investors in many cases comes from donors, foundations, family offices, and DFIs. GIIN reports that among emerging market focused impact investors 37% of capital came from DFIs (21%), family offices (10%), foundations (4%), and endowments.²⁹ Foundations and family office appear to be particularly important sources of capital for equity-focused investment funds and small funds, which are more likely to invest in early-stage enterprises.

Donors and foundations together supported green firms at a similar level to impact investors, having provided \$116 million in 174 investment transactions. They mainly provided grants and were active in supporting green firms across all four sectors while favoring off-grid energy sector.

DFIs invested \$45 million in 15 transactions, accounting for 10 percent of total early-stage investment by investment volume and number of transactions. DFIs mainly provided debt investment into off-grid energy sector green firms and provided significantly greater support for green firms that moved onto growth-stage (i.e., the volume of investment in growth-stage firms was more than five times greater than early-stage firms).

While the database did not track LPs of impact investors, many of them include donors and DFIs. It should be noted that donors and DFI's role in providing access to finance for early-stage green firms in SSA extends beyond their direct investment into firms.

²⁹ GIIN (2018). [Annual Impact Investor Survey](#).

Table 2. Early-stage investment in green firms in SSA by impact investors, donors, foundations, and development finance institutions (DFIs)

	Impact Investors	Donors	Foundations	DFIs	Sum
Number of investors	55	24	23	6	108 (44% of all investors)
Number of investments	161	112	62	15	350 (60% of all investment count)
Volume of investment	\$122 million	\$77 million	\$38 million	\$45 million	\$282.0 million (63% of all investment volume)
Frequently used financing instrument	Equity (67%)	Grant (80%)	Grant (73%)	Debt (70%)	Debt (20%) Equity (33%) Grant (30%)
Frequently invested sector by volume	Off-grid energy (63%)	Off-grid energy (79%)	Off-grid energy (75%)	Off-grid energy (97%)	Off-grid energy (74%)
Note: Depending on the nature of the program, government-funded programs were categorized as either donors or DFIs.					

These investors continued their support as some of the green firms raised growth-stage funding. Impact investors, donors, foundations, and DFIs together invested \$565 million, accounting for 59 percent of the total growth-stage investment into green firms. DFIs more than doubled their contribution in growth-stage investment, while donors played a substantively smaller role in growth-stage investment. Impact investors' contribution in growth-stage investment was similar to early-stage at 27 percent, and they added a significant amount of debt capital to support growth-stage green firms while continuing to provide equity investment into these firms.

Although impact investors, donors, foundations, and DFIs have played the anchoring role in capital flows to green firms, half of all investment made by these investors into both early- and growth-stage green firms was directed at the seven leading DESCOS – M-Kopa, Off Grid Electric, Mobisol, Nova Lumos, Greenlight Planet, d.light, and BBOX. These investors' support into these leading firms at \$442 million is equivalent to their total investment into early-stage green firms across all four sectors at \$448 million. DFIs, particularly, concentrated their investment in DESCOS mainly at growth-stage.

These same companies, however, were able to raise investment from investors who are less risk-tolerant and/or impact-oriented (e.g. between 2012 and 2013, Azuri Technologies received equity investment from a VC fund called IP Group, debt investment from Barclays, and grants from USAID and AECF), which raises questions about additionality of investment from impact-oriented investors. One explanation is that funding from donors and foundations enabled these firms to expand into un(der)served markets and these experienced DESCOS may present the highest likelihood of successfully providing much needed access to electricity to rural and marginalized customers in these countries. Investment choices of impact investors and DFIs could be interpreted with a similar explanation, though there remains a division of opinion on what could have been the best use of capital in supporting the growth of green firms in Sub-Saharan Africa.

Corporate and commercial investors

Corporate and commercial investors are becoming more engaged in supporting early-stage green firms. The level of investment activities is currently low at 19 percent by volume, but they are poised to play a crucial role in scaling up the green firms to eventually build green sectors in SSA.

Between 2006 and 2017, 69 commercial and corporate investors invested \$82 million in 93 transactions into green firms, mostly in the form of equity, accounting for 19 percent of total early-stage investment by volume. About one third of the corporate and commercial investors was moderately active investors, with the rest first-time investors. In comparison, 53 commercial and corporate investors invested \$268 million in 74 transactions into growth-stage green firms during the same period, also mostly in the form of equity but some in debt.

There were 13 commercial and corporate investors who participated in both early- and growth-stage investment transactions, often providing follow-on capital to the same firm. This was the case with Draper Fisher Jurvetson's investment in d.light, Schneider Electric's investment in SunFunder, and Solar City's investment in Off-Grid Electric.

By investment transaction volume, green firms in the mini-grid, clean cookstoves and biofuels, and DESCO sub-sectors were most favored by early-stage commercial and corporate investors who invested \$21 to \$25 million each in these sub-sectors. In comparison, growth-stage commercial and corporate investors deployed \$124 million in DESCOS, \$57 million in water & sanitation, and \$25 million into agriculture inputs & machinery firms. Importantly, the DESCO figure does not include the ENGIE acquisition of Fenix, for which data are not available. As a result, the \$124m DESCO investment is substantially higher, and an even larger proportion of the total.

Corporate investors have thus far been mainly strategic investors investing in new business models being developed and tested in their sector. Powerhive, whose original funders included the U.S.-based corporate investor First Solar, raised \$20 million from Caterpillar, Total, and others and \$12 million from Italian utility ENEL to expand its operation in Kenya and regionally. Ausar Energy received investment from two French corporate investors, ENGIE and Adetel Group, for its operation in Francophone Africa. Greater investment interest and activities from corporate investors in mini-grids are expected in coming years, as their investments are seen as an opportunity to better understand mini-grid business models and assess whether these can be scaled up and potentially expand their customer base. In climate-smart agriculture sector, Safaricom, a leading Kenyan mobile network operator and owner of a dominant mobile banking service, M-PESA, invested in iProcure and M-Farm that operate mobile platforms to provide agricultural supply chain management intelligence to farmers and suppliers.

Drivers of commercial investors investing in early-stage green firms are more difficult to predict based on their investment activities to date, as most of them have invested only in one firm. Growth-stage commercial investors were heavily focused on DESCOS, injecting \$128 million into 6 market-leading firms in 27 transactions, which accounted for 76% of all growth-stage commercial investor activities.

Investors and intermediary organizations welcomed the increasing engagement from corporate investors who can bring the know-how, resources, and scale to take their investees to the next level. The possibility of corporates serving as potential customers, especially for green firms targeting business customers in the CSA sector, was also considered positive.

Equity and debt are most commonly deployed financing instrument, but grants have catalyzed development of green sectors

Investment into early-stage green firms in SSA was mainly in the form of equity, debt, grant, mezzanine, and other types of financing instrument. This section provides a summary of how different categories of investors used these types of financing instrument across sectors. Equity was the most widely used instrument, accounting for 39 percent of the total early-stage investment by volume. Debt and grants were less common at 21 and 20 percent, respectively. Mezzanine accounted for only a small portion of the investment by volume at 5 percent.³⁰

Table 3. A summary of debt and equity early-stage investment into green firms in Sub-Saharan Africa

	Equity	Debt
Number of investors who made at least one equity or debt investment	101	53
Number of investment transactions*	167	84
Volume of investment	\$175 million	\$92 million
Average size of investment	\$1.0 million	\$1.1 million
Frequented range of investment size	\$0.1 to 0.25 million (21%) \$1 to 1.5 million (22%)	\$0.1 to 0.25 million (30%) \$0.25 to 0.5 million (27%)
Sector breakdown by number of investment transactions		
Climate-smart agriculture	25% (of which 27% is in agriculture inputs and 37% is in agriculture ICT platforms)	14% (of which 67% is in sustainable farming)
Off-grid energy	71% (of which 36% is in DESCOs, 24% is in clean cookstoves, and 20% is in renewable energy finance)	82% (of which 28% is in DESCOs and 57% is in clean cookstoves)
Water & sanitation	3%	4%
Waste management	1%	0%

*Note: Number of investment figures refer to investment transactions with known or estimated investment amount. There were additional 39 equity and 8 debt investment transactions where the investment amount is not known.

Equity is the predominant means of early-stage financing

Equity was the most popular financing instrument for early-stage investment into green firms (\$175 million). The off-grid energy sector, led by the DESCOs, clean cookstoves and biofuels, and renewable energy finance sub-sectors, received 71 percent of the early-stage equity investment by volume. Within CSA, the agriculture ICT platform and agriculture inputs and machinery sub-sectors were favored over other sub-sectors. Although small in volume, early-stage green firms who are utilizing innovative technologies in the energy and CSA sectors, such as Farmcrowdy, Trine, and Lendable, have attracted equity investors, indicating that they see in these business models a high potential to scale quickly. Investors also provided \$424 million in growth-stage equity investment, 76 percent of which went to supporting DESCOs.

Impact investors and angels were the most active investor categories for early-stage equity investment at 43% and 23%, respectively. Commercial and corporate investors provided 38 percent of growth-stage equity investment. The emergence of investment activities by commercial and corporate investors

³⁰ Other types of financing instruments, including equity and debt, guarantee, and results-based financing accounted for 4 percent of total early-stage investment, while 11 percent of the investment transactions did not specify financing instruments.

suggests that the DESCO sub-sector, which accounted for 66 percent of total growth in equity from commercial and corporate investors, has begun to mature. In order to sustain investor engagement, DESCOs will have to demonstrate that their technology and business model can generate long-term returns greater than debt capital investment.

Most early-stage equity investments were sized between \$100,000 to \$1.5 million, although there were only a few investments with ticket sizes between \$750,000 and \$1 million. Growth-stage equity investment was more widely distributed across different ticket sizes with the most popular size being between \$3 to 4 million.

Debt is the second most popular, with a rising share of commercial lending

Debt accounted for roughly a quarter of the total early-stage investment into green firms (\$92 million). The off-grid energy sector, led by clean cookstoves and biofuels and mini-grids, received 82 percent of the early-stage debt investment. Investors provided additional \$395 million in growth-stage debt investment, 64 percent of which went to supporting DESCOs.

By volume, DFIs, impact investors, commercial investors and corporate investors were the most active investor categories for early-stage debt investment. DFIs, impact investors, and commercial investors were the most active growth-stage debt investors. Local commercial financial institutions (CFIs) have been hesitant to extend loans to green firms: the investment transaction database captured 14 transactions by 11 local CFIs.³¹ Local CFIs are less aware of, experienced, and/or interested in the green sectors, which are very different from traditional project financing that they have historically focused on. They are also conservative lenders, often requiring large collateral which many green firms – both in early- and growth-stages – cannot provide.

There are, however, positive signs that have driven commercial lending to gradually increase in recent years: (1) improved perception of asset values, evidenced by higher values being assigned to solar home systems and the value of consumer receivables; (2) growing trust by commercial banks due to the ability to electronically monitor cash flows via mobile payment applications; and (3) emergence of using a special purpose vehicle that consumer payments are directed to and pays investors interest and principal on a priority basis.³²

The bulk of early-stage debt investment was sized between \$100,000 to \$500,000. Growth-stage debt investment was more widely distributed across different ticket sizes with the popular sizes being between \$1 to 2 million and \$5 to 15 million.

While equity investment has been more common for green firms overall, more mature firms, particularly in the DESCO sub-sector, require large amounts of working capital to finance inventory and pay-as-you-go schemes. Such firms are likely to seek more debt capital. This is already evidenced in the largest investment rounds in recent years: M-Kopa in 2017 raised \$80 million debt financing from 7

³¹ Investment transaction database may have missed some of the financing provided to early-stage green firms by local CFIs as many of them tend not to publish information on the transaction, unlike other investor categories such as impact investors who list their portfolio companies on their websites. However, the investor and entrepreneur interviews conducted by the study and infoDev (2017). [Innovations for Scaling Green Sectors](#) support the view that local CFIs are not very active in lending to early-stage green firms due to unfamiliarity and green firms not able to meet local CFI's requirements to obtain loans (e.g., lack of collateral).

³² Dalberg and Lighting Global (2018)

investors composed of DFIs, a local commercial bank, impact investors, and a commercial debt financier, and Nova Lumos in 2016 raised \$90 million, \$50 million of which was in debt from OPIC.

Grants remain important for catalyzing growth, although they can also distort incentives

Between 2006 and 2017, early-stage green firms in SSA received \$90 million in 153 grants, which comprised 20 percent of total funding to green firms. The off-grid energy sector received the bulk of the grant funding (72 percent), followed by CSA (18 percent), water & sanitation (6 percent), and waste (4 percent) by dollar volume.

The size of early-stage grants was somewhat unevenly distributed. The most popular grant size was between \$100,000 and \$250,000, but there was also a secondary peak between \$1 and \$1.5 million. Growth-stage grant investments were more evenly distributed across different ticket sizes with popular sizes being between \$250,000 and \$500,000 and \$1.5 to 2 million.

Grants were provided by mainly donors and foundations, which as noted above contributed 36 percent of all the capital to date. The leading grant providers were the United States Agency for International Development (USAID), the Africa Enterprise Challenge Fund (AECF), Shell Foundation, the Africa Clean Energy Finance Initiative (ACEF) of the US Overseas Private Investment Corporation (OPIC), and the Energy and Environment Partnership (EEP). These grant providers have provided over half of the grants to early-stage firms.

According to the stakeholder consultation, grant funding remains essential to help early-stage businesses grow and scale up.³³ Major success stories have come out of early-stage grant support that incentivizes businesses to test new products and business models, especially in off-grid solar (e.g. Shell Foundation's grant funding for R&D allowed d.light to develop a wider range of new and more innovative products to the market). In the absence of patient investment capital, grants can provide the much needed early-stage capital to endure long timelines to profit, and cover other very high up-front costs associated with things like developing new technology, establishing distribution networks, or consumer education.³⁴ Furthermore, grants can be critical to driving commercial investment into underserved markets by helping businesses lay the groundwork that can enable them to raise commercial investment.

The catalytic role played by grant funding is particularly evident in the off-grid energy sector. During the earlier years between 2012 and 2014 when the off-grid energy sector was just beginning to grow, the share of grants was larger at 25 percent. During this period, investors provided \$26 million in grant funding to early-stage green firms, half of which went to the clean cooking and DESCO sub-sectors. During the later years between 2015 and 2017, investors provided \$33 million in grant funding. Despite an increase in volume, grant capital's share of total investment declined to 17 percent. During 2015-17, grant funding went to mainly to early-stage green firms in mini-grid, clean cookstoves and biofuels, smart systems and software, and DESCO sub-sectors, which in some cases reflects grant funding flowing

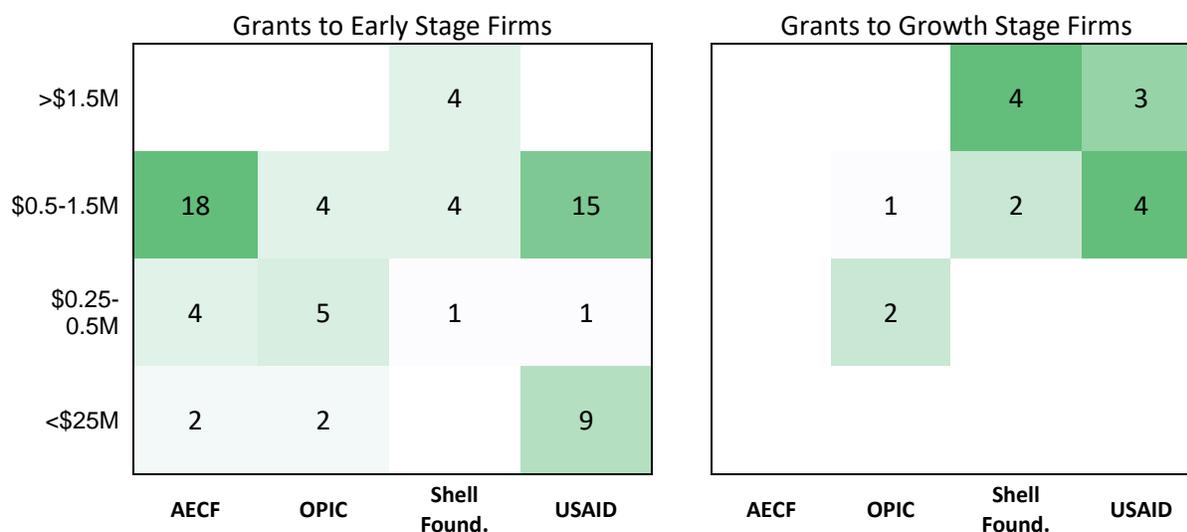
³³ The investment transaction database shows the types of investment a firm has obtained since its launch. However, information regarding where the investment was intended to be used was not always available and therefore was not captured in the database. Even if an intended use of the investment is known, it is not possible to verify whether it was indeed used to finance the activities that are set out at the receipt of the investment. As a result, it was not possible to quantitatively assess whether grant funding was essential to help early-stage firms to grow and scale up.

³⁴ KPMG (2017). Private Sector Grants: Holding Their Own in an Impact Investing World. Impact Paper 19.

into immature sectors in need of support, and in others, grant funding to more mature firms to support higher risk innovation.

Notably, grant funding has not been limited to only early-stage firms. Eight growth-stage DESCOS received \$45 million in grants (87 percent of all growth-stage grants), which is 3.3 times the total amount of grants to early-stage DESCOS. Many of these grantees, some of whom also received grants as early-stage green firms, used the funding to enter new markets or develop new products. Leading grant providers in early-stage green firms – except for AECF – also funded growth-stage green firms (see Figure 7). In the case of USAID, Shell Foundation, and the Bill and Melinda Gates Foundation, the average size of grants to growth-stage green firms were 2.3 to 3.5 times larger than the average size of early-stage grants, while other grant providers had similar size grants regardless of the business stage of the green firms.

Figure 7. Number of grants to early- and growth-stage firms for selected investors by grant size



On the other hand, investors and intermediary organizations expressed concerns that grant providers have taken “safe bets” by funding a small number of mature firms and sectors (i.e. DESCOS) rather than spreading out the funding and/or supporting riskier business models or less developed sectors. Because of the large amount of grant funding into growth-stage DESCOS that have attracted commercial investment, some investors and intermediary organizations were disappointed that these grant providers could have played a larger role in risk-mitigation and catalyzing sector growth. Some also questioned whether grant funding potentially had a crowding out effect by distorting the sector from leveraging private sources of financing.

However, it should be noted that many of these large-size grants to growth-stage green firms were raised for expanding to new markets in Western and Central Africa or industry-wide development that would support the entire off-grid energy sector. For instance, Shell Foundation has led the formation of the off-grid energy trade association GOGLA, and supported efforts to reduce energy sector market-level barriers in Rwanda, Uganda and Ethiopia. USAID provided grants to Mobisol to launch SolarHub, a software platform to streamline operations, payments, and logistics. Seeing the need to push the frontier in these specific areas within the DESCO sub-sector that are still immature and/or riskier, grant

providers are also staying true to their mission while reducing their exposure to enterprise risk by supporting more experienced green firms who may be better prepared to execute new product and market development plans. It should be also noted that many grant programs, such as the USAID's Development Innovation Ventures (DIV), makes staged bets similar to a VC fund in that it increases grant ticket size over time based on the firm's performance and results.

Box 1. Investor highlight: Shell Foundation

Shell Foundation has been one of the leaders in the development of the off-grid energy sector in Africa through building scalable market-based solutions. Although principally providing grants, the foundation takes a long-term partnership approach: it is willing to support private enterprises who are addressing market gaps successfully over an extended period through several stages of growth and engages with grant recipients more like that of an equity investor than a grant provider.

Between 2006 and 2017, Shell Foundation provided 20 publicly disclosed grants, totaling \$27 million, in both early- and growth-stage green firms in the off-grid energy sector in Sub-Saharan Africa.³⁵ Shell Foundation provided early and sustained multi-year commitment to green firms that led the market growth such as d.light and M-Kopa. They also made strategic, catalytic investment to fill gaps in financing through responsAbility (i.e. working capital facility providing loans up to \$3 million for fast growing energy enterprises), CrossBoundary Energy (e.g., a project finance fund dedicated to commercial and industrial solar projects), and Lendable.

With its wide and deep sector expertise, the foundation also takes on market-level challenges inhibiting growth of all enterprises in the sector. It has supported Global Off-Grid Lighting Association (GOGLA), Global Alliance for Clean Cookstoves, and a dozen incubators including FACTOR[e] Ventures to support industry facilitation and market development through these intermediary organizations.

Innovative instruments are desired by investors but have seldom been used in practice

Many investors interviewed noted that mezzanine financing instruments hold a big potential as they can produce current income returns, avoid exit pressures, are not as dilutive as equity, and avoid the inherent challenge of valuing very early-stage businesses. However, they are also risky, as most early-stage firms' cash inflow may not be greater than cash outflow (i.e. cash flow negative) and subsequently they cannot make payments back to investors.

Other potential instruments include hybrid equity and convertible notes with revenue share that allow investors to receive current income returns, create aligned incentives to generate revenue growth, and enable firms to avoid a fixed interest cash flow burden. While excited about the potential of mezzanine financing, the investors also cautioned against the unproven stage of these instruments. The likelihood of high transaction costs is also a challenge for smaller sized investment opportunities (e.g. under \$1 million) that many early-stage green firms represent.

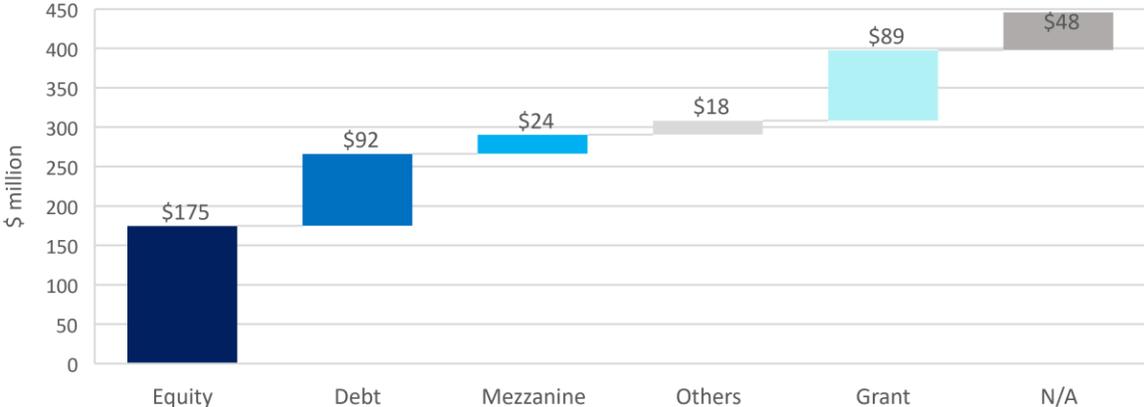
Thus far, traditional instruments dominate capital flows, suggesting that the high transaction costs outweigh the potential benefit of mezzanine financing instruments. Most non-grant investments into early-stage green firms between 2006 and 2017 have been made in the form of equity (49 percent) or

³⁵ Because the investment transaction database relied on publicly available information, it has not captured all activities. Subsequently, these figures underestimate the number, dollars and strategic diversity of the foundation's activity. More information on the portfolio can be found in Shell Foundation (2018). [Investor Portfolio Review](#).

debt (26 percent). Mezzanine instruments of \$22 million accounted for only 6 percent of total non-grant investment by volume.³⁶ All of them were in the form of convertible debt and sized between \$100,000 to \$500,000, with few outliers that were larger than \$1 million. Mezzanine financing instruments were used in only two transactions in the growth-stage investment.

Investors and intermediary organizations highlighted the need for a better shared understanding of roles and responsibilities of different types of investors, especially regarding what each investor wants to specialize in terms of business growth stages, sector, geography, and whether it wishes to be a first mover versus supporter of expansion. Furthermore, multiple investors with different offerings are rarely at the same table to discuss how much risk investors are willing to take and what structures can accommodate this risk appetite for a specific early-stage investment opportunity. Mapping out the investors who are active and could be more active in this field would identify gaps to fill and promote better coordination among investors, as well as more regular and structured discussions among investors on interesting investment opportunities.³⁷

Figure 8. Early-stage investment by financing instrument types (by volume, 2006-2017)



Investment activities are disproportionately concentrated in DESCOS, East Africa, and towards international founders and international investors

Flow of early-stage financing to green firms in SSA has highlighted concentrations in certain sectors, geographies, and investee groups. This section describes the investment patterns and explores the potential drivers behind.

Distributed energy services companies (DESCOs)

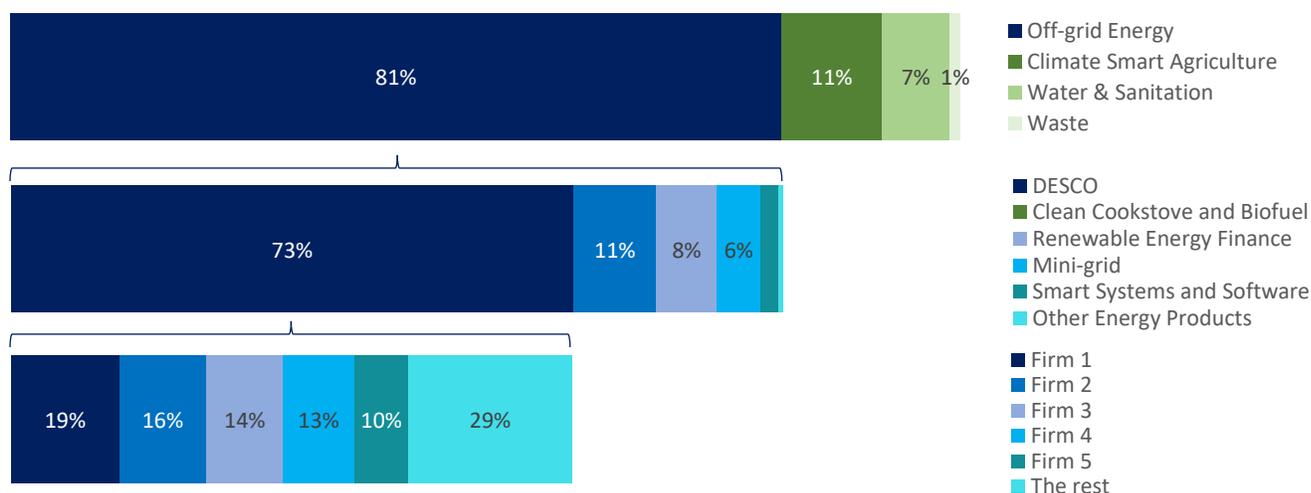
Early- and growth-stage investment into green sectors in SSA has been disproportionately concentrated in off-grid energy sector, as mentioned in previous sections. While the climate-smart agriculture, waste

³⁶ Some noted a possible reporting bias where green firms do not mention when they receive convertible loans/mezzanine financing and report it as equity investment.
³⁷ VCs active in investing in tech firms in SSA have proactively created a shared database called “[Africa Tech Open Data Base](#)”, which includes types of funds, sector focus, a list of firms they have recently invested, contact information, and when to approach them.

management, and water & sanitation sectors collectively quadrupled in terms of investment raised, the off-grid energy sector, particularly its distributed energy services companies (DESCOs) sub-sector, accounted for 81 percent of total early- and growth-stage investment in SSA between 2006 and 2017. During the same period, investment in CSA accounted for 11 percent, water & sanitation 7 percent, and waste management 1 percent.

It is not surprising that Sub-Saharan Africa’s off-grid energy sector, driven by the DESCO sub-sector, has attracted a substantial majority of total investment. Fueled by technological advances and innovative business models, the global off-grid sector has taken off in a major way. An estimated 130 million off-grid solar products have been sold globally since 2010, ranging from small portable lanterns to 100+ watt solar home systems capable of powering appliances such as TVs and fans.³⁸ In 2016 alone, total sales amounted to over 30 million devices, generating an estimated \$1 billion in revenue in SSA and South Asia. It is further predicted that annual off-grid solar sales will total 70 million units and \$8 billion in revenues in 2022.³⁹ In all this, SSA has emerged as an important regional market, in addition to South Asia.⁴⁰

Figure 9. Sector- and sub-sector breakdown by volume in both early- and growth-stage investment (\$ million)



This research confirms the rapid growth of the DESCO sub-sector. DESCOs, especially businesses that use a variation of the pay-as-you-go (PAYG) business model, accounted for approximately 73 percent of total investment into green sectors in SSA. The PAYG model combines rapid innovation in solar, batteries, and LED lights with the transformative power of mobile communication technology. This allows businesses to build services, sales, and a deep understanding of their customer base at a rapid pace, which in turn is attracting new sources of growth capital into the sector.

Within the DESCO sub-sector, there is further pattern of investment concentration. Seven PAYG firms — BBOXX, d.light, Greenlight Planet, M-Kopa, Mobisol, Nova Lumos, and Off Grid Electric⁴¹ — attracted over \$664 million in both early- and growth-stage investment, accounting for 87 percent of investment

³⁸ Dalberg Advisors and Lighting Global (2018). [Off-Grid Solar Market Trends Report 2018](#). Washington, DC.

³⁹ Ibid.

⁴⁰ infoDev (2017). *Innovations for Scaling Green Sectors*. The World Bank Group. Washington, DC.

⁴¹ These firms are listed in alphabetical order, not by the size of investment received.

into DESCOS between 2012 and 2017. This is almost half of all early- and growth-stage investment into four green sectors in SSA. Furthermore, investors are doubling down on leaders. These seven firms have each raised more than \$20 million in a single round of growth-stage financing, through a combination of equity and grant. The \$90 million raised by Nova Lumos in 2016 is the industry's largest ever investment as of December 2017.

As the off-grid energy sector is poised to expand to underserved markets, the question remains as to whether the dominance by these handful of firms will continue or there will be an emergence of new green firms. This will be driven in part by investor behavior who, based on their perception of risk and return, may invest in the expansion of already successful businesses or invest in new entrants with business models to be tested. As the ecosystem matures with time, one might expect that investors will see a higher returns potential in new companies and that the concentration of investment in a few firms will decrease.

In addition to the growth of DESCOS, other off-grid energy sub-sectors such as mini-grids and renewable energy financing have started to attract investment in recent years. While these prospects make it difficult to predict whether concentration on a handful of DESCOS will be held in near future, it is likely that the off-grid energy sector will continue to receive a lion's share of early-stage financing in green firms in SSA.

Other green sectors

The climate-smart agriculture (CSA), waste management, and water & sanitation sectors have been unable to attract investment at the level seen in the region's off-grid energy sector. Water is potentially an enormous market throughout SSA with about \$40 billion investment opportunities for SMEs between 2015 and 2025,⁴² but very few businesses have reached scale in selling clean water as a product. Compared to a large number of green firms competing to attract investment in off-grid energy sector, there were only 8 and 4 firms in the water & sanitation and waste management sectors, respectively, that raised early-stage investment. While there are many more green firms in CSA operating in the region, most are still in the earlier stages of business development and investment dollar raised, especially in more traditional sub-sectors such as agricultural input and machinery, sustainable farming and processing, and forestry and fishery.

The challenges hindering investments in these sectors are many and complex. Green firms in these sectors are highly dependent on regulatory regimes and the public sector more generally than in the off-grid energy sector.⁴³ The uptake of drip irrigation in CSA sector, for instance, is heavily dependent on factors such as favorable policies and regulations, availability of price support mechanisms such as subsidies, and awareness programs undertaken by government agencies. Similarly, in the water sector, green firms face the challenge of competing in a market where water prices are either regulated or very low, impacting their operational profitability. Furthermore, green firms in these sectors also take longer to reach profitability and may be deemed too slow moving for obtaining the desired returns on investments, thereby increasing the risk perception for investment into these sectors.

⁴² infoDev (2014). [Building Competitive Green Industries: The Climate and Clean Technology Opportunity for Developing Countries](#). The World Bank Group. Washington, DC.

⁴³ Ibid.

Overall, interviews with investors revealed that these sectors haven't yet produced business models that can attract a greater level of investment from the private sector. Investors were particularly bearish on the future potential of the waste management and water & sanitation sectors, in which they felt that major structural and regulatory barriers to scale make it very difficult to run a profitable business. For CSA, investors expressed the hope that business model and technological innovation would allow the sector to attract growing investment. **Error! Reference source not found.** summarizes the investor sentiments on these sectors.

Table 4. Investor sentiment on climate-smart agriculture, waste management, and water & sanitation sectors

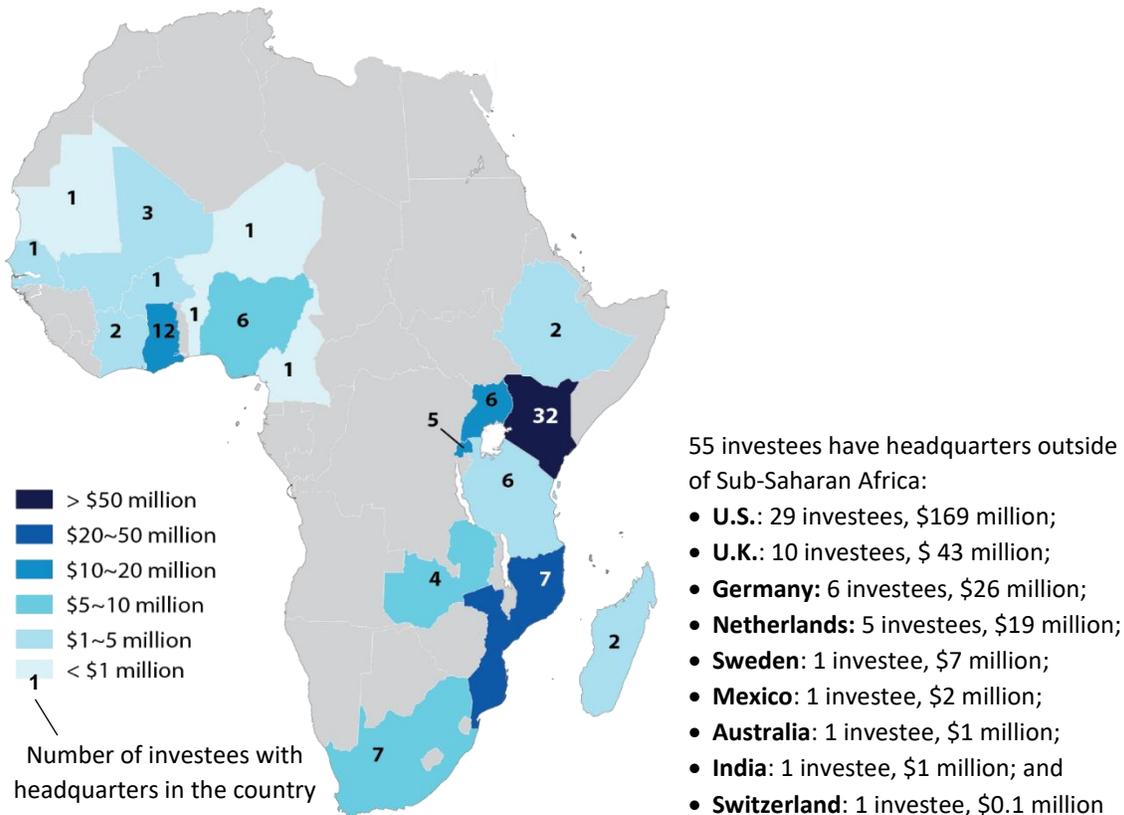
	Climate-Smart Agriculture	Waste Management	Water & Sanitation
Negative Sentiments	<ul style="list-style-type: none"> • Costly last mile distribution is a barrier to scale • Farmers are slow to adapt to new ways • Seasonality of cash flow • Business model or technological innovation so far has been limited • Past failures are discouraging 	<ul style="list-style-type: none"> • Sector is mainly dominated by government agencies and poses challenging infrastructure requirements • Unfavorable regulatory and legal frameworks • High technological barrier • Lack of market for waste-generated products 	<ul style="list-style-type: none"> • Difficulty in pricing products and services • Competition from free substitutes (e.g. rain water), subsidized public utilities, and NGOs • Difficulty in scaling sanitation without public partners due to infrastructure requirements
Positive Sentiments	<ul style="list-style-type: none"> • Technology enabled platform businesses 	<ul style="list-style-type: none"> • Market for waste management is big and thus presents a big opportunity • Public private partnerships could work but will likely to have low and fixed returns 	<ul style="list-style-type: none"> • Smart water solutions, especially those coupled with renewable energy, and water efficiency services • Desalination is commercially viable, but difficult for a start-up to break into

East Africa

The ecosystem for investment into green firms is relatively well established in East Africa. This includes a relatively favorable policy and regulatory environment, relatively developed networks of investors and advisors, and a pool of entrepreneurs. Over 40 percent of 136 green firms who raised early-stage investment is headquartered in East Africa. Even if not headquartered in East Africa, many green firms (71 percent) have one or more local offices in East Africa. For these green firms headquartered in or operating offices in East Africa, Kenya is the most popular location. Investors also favor Kenya as a base of operation, with one of five investors having an office there.

Green firms operating exclusively in East Africa raised over 50 percent of all early-stage investment. Including those operating in East Africa and elsewhere in SSA, the investment volume goes up to nearly 90 percent, and many of these green firms have begun their operation in East Africa and expanded to the rest of the continent. In comparison, green firms operating exclusively in West Africa raised one fifth of early-stage investment raised by those operating in East Africa (i.e. 10 percent). This is despite the fact that the number of green firms operating in West Africa is almost half of those operating in East Africa, which suggests that these firms are likely to be at earlier business development stages compared to East Africa-based green firms.

Figure 10. Early-stage investment concentration by country based on the headquarter locations of green firms who have raised early-stage investment between 2006 and 2017



Kenya became a thriving location for green firms as its business enabling environment, such as free movement of capital, low taxes, access to credit, and ease of starting a business, is better relative to other African countries. In Kenya, solar is mostly exempt from import duties and sales and VAT taxes, and importation is comparatively more streamlined than some other countries in East Africa. Overall, Kenya has a welcoming regulatory environment with few distinctions between foreign and local investors.⁴⁴ It also supports the largest ecosystem in the region, providing more options to partner with suppliers, distributors, and other commercial entities. There are also a number of business consultants, such as Open Capital Advisors, I-DEV International, Dalberg, and Biz Corps, as well as several investor networks and business plan competitions available locally in Nairobi. According to the World Bank’s Ease of Doing Business rankings, it is one of the easier places to do business in East Africa, ranking third in SSA overall.⁴⁵

⁴⁴ GIIN (2016). [The Landscape for Impact Investing in East Africa](#). Global Impact Investing Network. New York.

⁴⁵ The World Bank Group (2017). [Doing Business: Economy Rankings](#).

Table 5. Green entrepreneurship ecosystems in Kenya, Ghana, and Nigeria

	Activity*	Ecosystem Scoring**			Ecosystem Narrative***
		Doing Business Rank	RISE Score	Global Entrepreneurship Index	
Kenya	\$40 million raised 10 investors 27 investees	80	64	18.4	(+) Large concentration of investors (+) Well-functioning mobile money system (+) Public support to turn Nairobi into a financial hub (-) Political instability (-) Large focus on ICT to the exclusion of other sectors
Ghana	\$26 million raised 1 investor 7 investees	120	54	21.2	(+) Strong public and private interest in agriculture (+) Good support ecosystem for start-ups (o) Small but growing seed and angel investment supply (-) Poor access to markets (-) Unfavorable policies
Nigeria	\$6 million raised 3 investors 4 investees	144	21	19.7	(+) Growing recognition of importance of entrepreneurship (+) Active support ecosystem for start-ups (-) Restricted access to foreign exchange (-) High market entry costs (-) Lack of enabling environment and supportive policy

Note:
* Investment amount is a sum of all investments into firms that are headquartered in the country. Counts of investors and investees are for those headquartered in the country.
** World Bank Group (2018) [Doing Business 2018](#), World Bank Group (2018) [Regulatory Indicators for Sustainable Energy](#), GEDI (2017) [2018 Global Entrepreneurship Index](#). RISE score and Global Entrepreneurship Index is out of 100. Denmark's RISE score is 94 and United States' Global Entrepreneurship Index score is 83.6.
*** Kenya: Investor interviews and Intelcap (2015) [Closing the Gap](#); Ghana: ANDE (2017) [Entrepreneurial Ecosystem Snapshot Accra](#), Koltai & Company (2013) [Ghana Entrepreneurship Ecosystem Analysis](#); Nigeria: ANDE. (2017) [Entrepreneurial Ecosystem Snapshot Lagos](#) and Fate Foundation. (2016) [Mapping Study of Nigeria's Entrepreneurship Ecosystem](#)

However, it appears that some investors are becoming concerned that Kenya and East Africa are saturating with investment. Several investors interviewed stated that they were trying to diversify their portfolio away from Kenya, as they believed there were too many investors chasing too few deals leading to increasingly high valuations. In particular, investors are looking to West Africa for future deal flow, with Ghana and Nigeria being cited as particular opportunities. West Africa is the second fastest growing regional economy in Africa, fueled by growth in Ghana and Nigeria. These two countries have received more than half of the impact investing capital deployed in the region between 2005 and 2015.⁴⁶ The ecosystem of enterprise and investor support organizations is growing in both countries, which will be crucial to supporting the development and growth of green firms in this region. Emerging opportunities in West Africa signal high growth potential in the future. However, several barriers remain from both the demand and supply side of developing off-grid solar sector, including smaller country size, dispersed population, lack of appropriate policy and regulatory environments, absence of supporting ecosystems for off-grid solar industry, poor access to finance, and lack of clear information regarding demand and customer segments.

International founders and investors

Two thirds of 157 green firms in SSA who have successfully raised early-stage investment have been founded by expat entrepreneurs. These international founders received 83 percent of overall early-stage

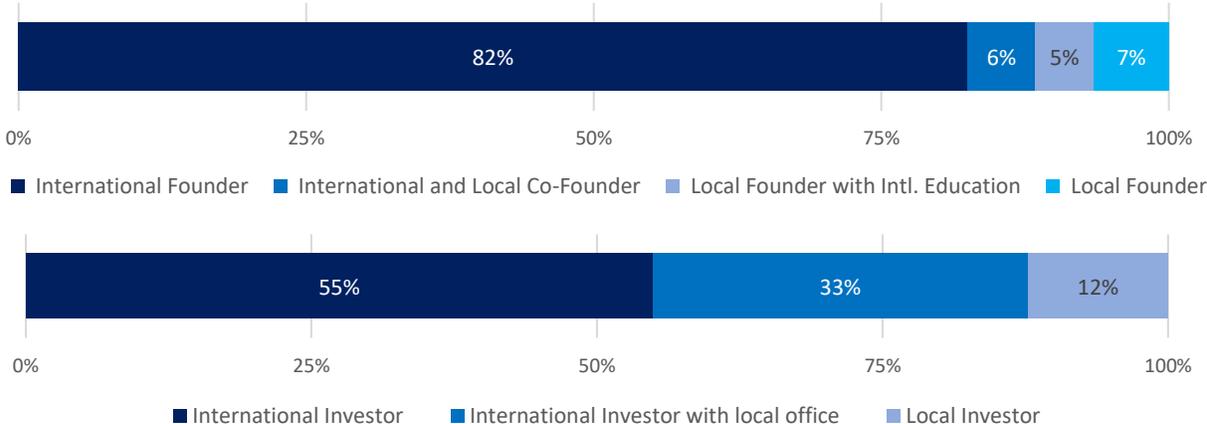
⁴⁶ GIIN (2015). [The Landscape for Impact Investing in West Africa](#). Global Impact Investing Network and Dalberg.

investment in green firms, which is more than 11 times to the investment received by local founders without international co-founder or educational experience outside of their countries. Dominance of international founders attracting investment is also similar in other non-green sectors: more than 90 percent of the funding to East African fintech start-ups since 2015 has benefitted expatriate founders.⁴⁷

This is driven by dominance of international founders in the off-grid energy sector: 83 percent of the 88 off-grid energy firms that received early-stage investment were founded by international founders (a few of them were co-founded with local entrepreneurs). International founders are particularly concentrated in the DESCO, mini-grid, renewable energy finance, and smart systems and software sub-sectors where there are only 5 firms founded by local founders out of 58 firms. And these firms founded by local entrepreneurs are limited to niche products such as efficient air conditioning, solar kiosk, solar powered cold chain, and efficient heat pumps, all of which have not yet scaled or received follow-on investment. Clean cookstoves and biofuels sub-sector, on the other hand, has proportionately more local founders compared to the rest of the off-grid energy sector and two biogas firms have successfully raised growth-stage investment.

The origin of founders varies by region: East Africa has attracted many international entrepreneurs who have founded and headquartered their businesses in Kenya, Mozambique, Uganda, and Zambia. In contrast, green firms headquartered in Southern and West Africa have been largely founded by local entrepreneurs.

Figure 11. Early-Stage investment volume by founder and investor origin (% of total)



Concentration of international talents is also observed among investors. Out of 248 early-stage investors, only 32 are local investors (13 percent). The rest are international investors: three out of four international investors operate without local offices, and they account for over 88 percent of the early-stage investment by count and volume in green firms. No similar distribution data is available for other sectors, but data on impact investors generally shows that local investors are rare across sectors, with one study suggesting that only 18% of all impact investors SSA are headquartered there.⁴⁸ In exploring why local investors made up such a small share of investors overall, those familiar with local ecosystems suggested that this may be due to differences in risk appetite and asset preference. In many countries in SSA, those with capital to invest will allocate it to assets that have limited risk of total loss and that

⁴⁷ Village Capital (2017) [Breaking the Pattern: Getting Digital Financial Services entrepreneurs to Scale in India and East Africa.](#)

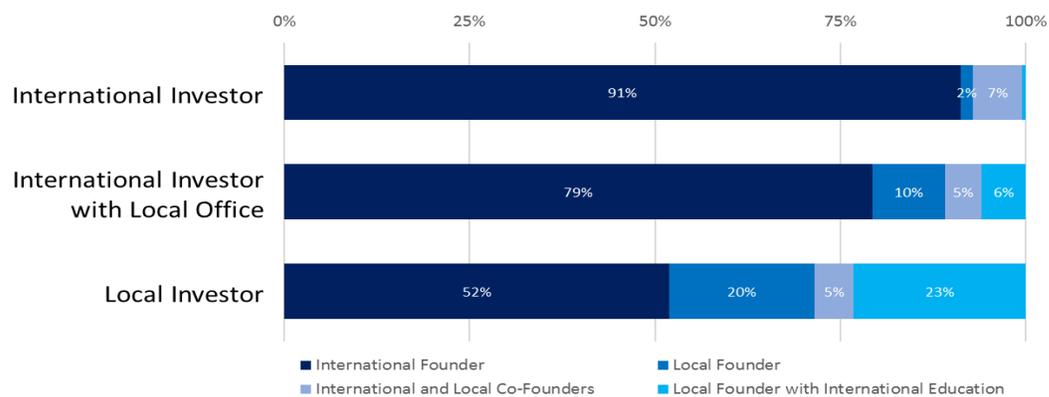
⁴⁸ Investisseurs et Partenaires and FERDI. [Investing in Development in Africa.](#)

produce cash flows as well as capital appreciation. A particularly popular investment choice is the real estate market. Although there are nascent angel investing movements, many investors do not find the risk-return profile of early-stage start-up investing attractive.

Concentration of international founders and investors by count and investment volume in early-stage investment in green firms in SSA is compounded by the observation that international investors were more likely to have invested in international founders. In comparison, local investors were six times more likely to invest in local founders compared to international investors and twice more likely compared to international investors with local offices (see Figure 12).

Investors are aware that better access to deep knowledge of local market conditions and networks of entrepreneurs lead to more robust investment pipeline and portfolio. International investors with a local office made more early-stage investments into a greater number of entrepreneurs, and into more local entrepreneurs compared to international investors without a local office. One international investor interviewed mentioned that they always invest along with local co-investors to leverage their knowledge of the local ecosystems and markets. Others noted that investors who are committed to making a significant number of deals in the region are most likely to set up local offices. Local presence also tends to lower investment transaction costs, which increases the possibility for investors to make smaller and therefore perhaps earlier stage deals.

Figure 12. Early-stage investment volume by investor location and origin of founder (% of total)



The concentration of capital going to international founders raises the question whether there simply are not enough local green firms with investible business models and competent management team in SSA or if there are cultural factors or business networks that gravitate towards international founders.

One factor behind the greater access to early-stage financing by international founders is the network they have access to, from their universities or past experiences in Western countries where the majority of investors are located. The more informal flow of information entrepreneurs have with investors, the more they can attract them and receive their investments, according to interviews with investors. As a result, not having the previous network to be in touch with investors, combined with the fact that these investors are located abroad, becomes a major hurdle for local green firms in their access to early-stage capital.

Another factor is investors' perception and experience with local entrepreneurs. Some international investors noted that they are more comfortable with familiar 'language' and investment pitch style

presented by expat entrepreneurs. They added that local founders often lack polished business pitch skills even if their business models and financials are sound. Several accelerator program managers and investors noted that local founders often build businesses with steady cash flow and are less willing to forego cash flow to rapidly expand and scale. Others observed that local founders tend to be less willing to give up equity share and control over decision-making compared to international founders because their intention is to build a family-owned business. These preferences and tendencies of local entrepreneurs can be at odds with high expectations of growth ambitions that international investors seek, partly due to fund and LP structure.

A study by the Global Accelerator Learning Initiative (GALI) of 2,400 entrepreneurs emerging markets found that cultural bias might be driving investors' perception of local founders as having lower entrepreneurial skills. The GALI research noted that local entrepreneurs are as credentialed and committed as their peers from high-income countries: they have the same or higher levels of education, report higher revenues and more full-time employees, founded significantly more firms on average, and invest similar amount of their own money in their companies.⁴⁹

Based on interviews with investors, this research finds that it is perhaps a combination of investor perception of local entrepreneurs' appetite for risk-taking and a small number of local green firms who lack the proper networks to attract investors that concentrate investment in businesses with international founders.

In comparison, the CSA sector had a greater share of local founders and investors. Almost two thirds of all CSA firms were run by at least one founder from within the region (compared to 41 percent across all sectors) and over half of investments were made into firms with local founders (compared to 12 percent across all sectors). Local investors accounted for a 2.5 times greater share of capital deployed in this sector compared to others. However, the average investment in firms founded by international entrepreneurs was twice as high as those founded by local entrepreneurs. Multiple factors may contribute to the prevalence of local founders in the CSA sector, including the historical importance of the agricultural economy, relative familiarity with agriculture to local entrepreneurs and investors, restricted land ownership and less expat interest in running agricultural businesses in rural areas. However, it is worth noting that there were several high-profile investments in technology-enabled businesses founded by international founders in the CSA sector in 2017.

The role of diaspora is unclear among founders or investors. Approximately half of the local founders across all green sectors have received education abroad and they have raised a similar amount of early-stage investment compared to local founders without international education. AECF (Kenya), Novastar Ventures (Kenya), Pearl Capital Partners (Uganda), Injaro Agriculture Capital (Ghana and Côte d'Ivoire), and Inspired Evolution (South Africa) are most active local investors with three or more early-stage investment in green firms. Founders and management teams of these investors are largely a mix of local professionals with or without international education, with a few expat professionals.

⁴⁹ GALI (2017). [Accelerating Startups in Emerging Markets: Insights from 43 Programs](#). The Global Accelerator Learning Initiative. The survey is based on a sample of 2,455 ventures that applied to 43 accelerator programs operating in 9 countries: 1,172 high-income country ventures that applied to programs run in high-income countries and 1,283 emerging market ventures that applied to programs run in emerging markets.

Emerging opportunities to grow green sectors in Sub-Saharan Africa

Accompanying the patterns of early-stage financing in green firms in SSA are emerging opportunities that could fuel the growth of green sectors in the region. The off-grid energy sector will continue to grow as DESCOS expand their operations to new and underserved markets. Specialization within the off-grid energy value chain and businesses that deliver higher power solutions will diversify the drivers of the off-grid energy sector's growth in coming years. New innovations are observed in climate-smart agriculture sector, mainly led by information technology enabled business models that have attracted investors' attention in recent years, but it will require some time to see whether these green firms will be able to successfully scale their businesses. There are also emerging new investor groups interested in investing in early-stage green firms.

Off-grid energy sector has significant room for expansion and growth

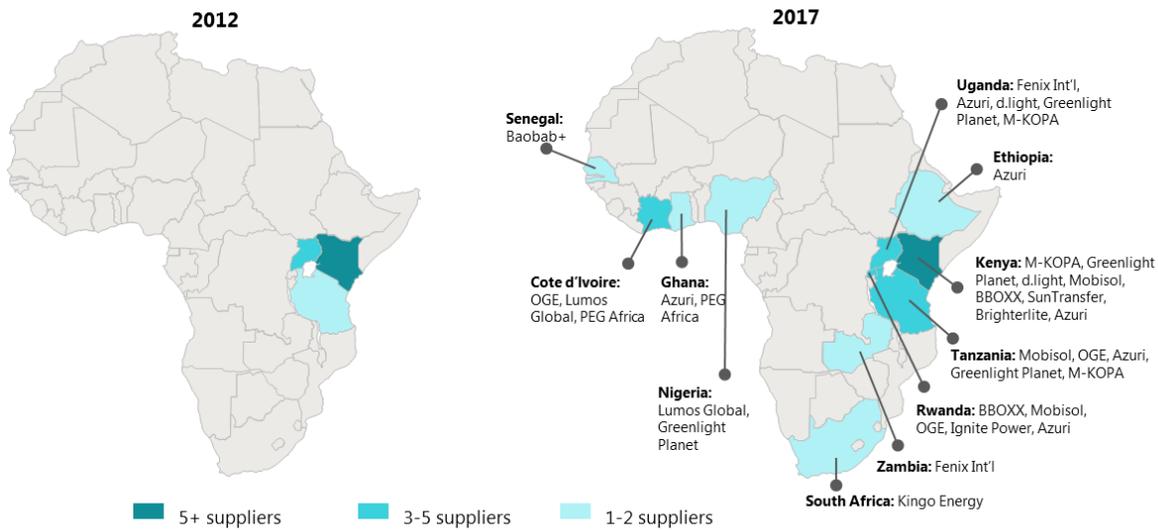
Based on the database analysis, interviews with investors, and literature review, this research supports the notion that a significant room for expansion and development still exists in the off-grid energy sector in Sub-Saharan Africa.⁵⁰ Combined grid and off-grid access to electricity continues to be well below 100%, suggesting continued room for growth even in more developed markets like Kenya. The global off-grid solar market will grow at an annual rate of 25 percent in the next five years, with annual sales of devices expected to increase from 23 million in 2017 to 70 million devices in 2022.⁵¹ It is expected that a considerable portion of this growth will be in SSA. Recent investment trends in the off-grid energy sector are in the following areas: (1) new and underserved countries; (2) specialization within the off-grid energy value chain; and (3) movement up the power spectrum to offer more powerful solutions.

Expansion into nascent and underserved markets with large population such as Ethiopia, Ghana, Nigeria and the Democratic Republic of Congo provide opportunities for growth. About half of the overall African off-grid population are in West and Central Africa. Nigeria, Sub-Saharan Africa's biggest economy and most populous nation, is home to roughly 90 million people with no grid access. Several countries in West and Central Africa are also witnessing wider availability of mobile money, signaling growth potential for PAYG firms. Many of the more established DESCOS began their operation in East Africa, particularly in Kenya where there is a strong mobile money ecosystem. However, a number of DESCOS – both well-established players and new entrants – have begun to penetrate into West Africa, mostly within the last two years. At least 11 firms, including leading East African players have begun to enter West Africa. Leveraging proven business models and cumulative market learning could lead to faster scaling in these new frontier markets, although barriers to market entries such as weak mobile money ecosystems and currency limitations could hinder the growth of these DESCOS.

⁵⁰ There was a debate among investors about the pace of growth. Ceniath has cautioned that the high level of investments in the region, especially in East Africa, is "too much and too fast" for a sector that in their view has not fully solved core business model issues and may struggle under the high growth expectations from investors. Persistent Energy Capital pointed out that not enough capital is flowing into the sector which has huge potential and underserved markets. Greg Neichin, Diane Isenberg, and Mary Roach. "[An Impact Investor Urges Caution on the 'Energy Access Hype Cycle,'](#)" NextBillion. March 2017. Chris Aidun, Dirk Muench, and Rodrigo Weiss. "[Hype in the Energy Access Sector \(Finally!\)](#)", NextBillion. April 2017.

⁵¹ Dalberg Advisors and Lighting Global (2018)

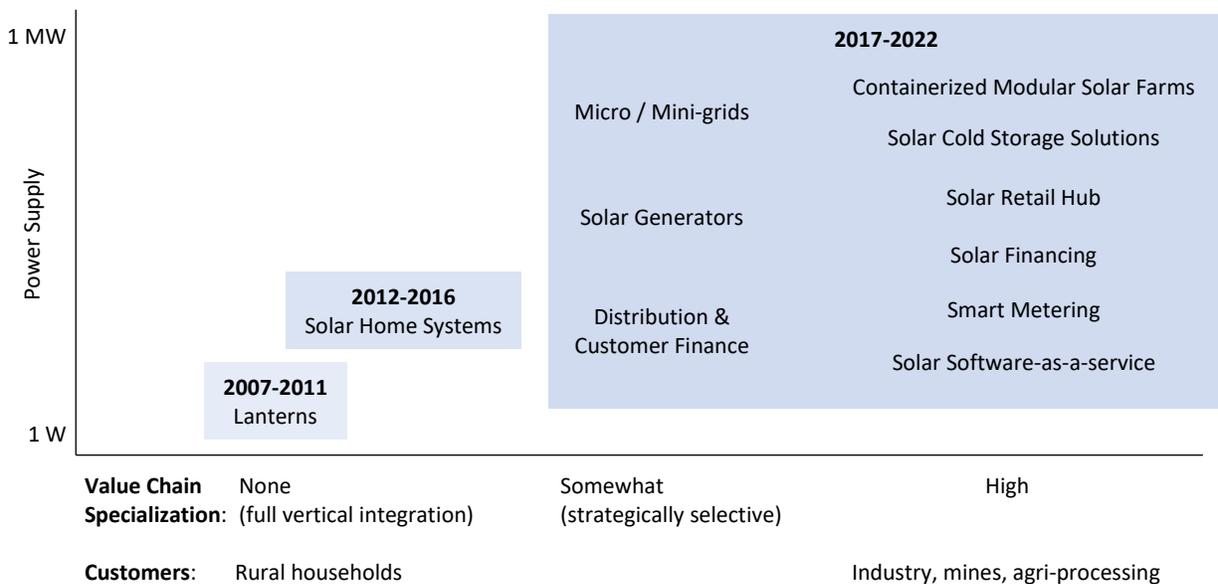
Figure 13. Presence of pay-as-you-go (PAYG) distributed energy services companies (DESCOs) by country in 2012 vs 2017



Note: Dalberg Advisors and Lighting Global (2018). Note: Figure does not consider pilots, only companies with an established sales presence in a country. The data are not exhaustive but are representative.

The off-grid market is moving towards strategically selective specialization, with businesses mastering specific segments of the value chain, away each firm working across the entire value chain, from product development to end-user financing. The movement toward segmentation and specialization is being driven not only by the presence of a more competitive and diverse market but also discerning investors rewarding firms that take advantage of market efficiencies. Several noteworthy examples of specialization which have attracted capital illustrate this trend.

Figure 14. Specialization across the value chain in the off-grid solar sector



Source: Interview with Donn Tice, energy consultant.

- **PAYG software:** Until recently, a solar distributor’s only choice was to sell products offered by a small set of firms whose product and service offering included the software to manage customer payments. For example, a US and Kenya-based firm Angaza is giving distributors the software they need to manage customer payments, usage and other information so they can provide PAYG payment plans to their customers.
- **Low-cost smart metering and customer data:** Mini-grid operators need to monitor and control performance and usage, as well as manage customer collections at a low cost in remote areas, but traditional meters are expensive and provide little to no functionality beyond usage. For instance, Sparkmeter and SteamaCo have developed low cost meters which enable customer pre-payment and offer a range of monitoring and control functions. They also provide data services that allows operators to analyze customer behavior for risk management and product development, improve the design of PAYG financing package, inform strategic and operational decisions, such as marketing and logistics, and improve customer targeting, credit assessment, collections and market research.
- **Renewable energy finance:** Through an asset-backed financing scheme with PAYG services, DESCOs allow underbanked customers to access credit and own solar home systems, effectively acting as alternative lenders. To scale up this business model, DESCOs themselves need to access a large amount of capital, often in the form of debt, to manufacture and/or purchase solar home systems without upfront payments from the customers, and this challenge is compounded as they scale up their operations to acquire customers quickly. A Kenyan firm Lendable’s marketplace lending platform connects alternative lenders, including off-grid energy DESCO, with impact and institutional debt investors. Its proprietary data analytics technology builds predictive models on the probability of repayment on the receivables on leased assets (i.e. solar home systems) and streamlines the debt structuring process for DESCOs by providing a one-stop shop services covering deal origination, due diligence, standardized documentation, payments administration, and post-deal reporting.⁵²

There is untapped demand for products that offer a wider range of energy service. The next priority for households will be off-grid solutions for TV, cooling, and refrigeration, which represents a potential market opportunity of over \$4.7 billion by 2020.⁵³ This expansion into higher power solutions is prompted by rapid development of new technology and expanding customer base from households to commercial and industrial sectors. Mobisol’s 200-watt solar home system serves village shops, rural health stations, community centers, and schools, and BBOX offers 500 watts to 5 kW to SMEs in urban areas.⁵⁴ Redavia rents containerized solar farms in 100kW modular increments of solar capacity to remote industrial off-grid operations (such as mining) in Tanzania and grid-connected commercial and institutional customers in Ghana.

⁵² Jim Kaddaras (2017). [“The Rise of a New Asset Class: Can ‘PAYGo Finance’ Connect Investors to Low-Income Customers?”](#), NextBillion. July 2017.

⁵³ African Business Magazine (2017). [“Opportunities abound in off-grid appliances market”](#) African Business Magazine. August 12, 2017.

⁵⁴ Power Africa. [Tanzanian Communities Electrified by Mobisol](#). August 29, 2017.

Despite progress, mini-grids and clean cookstoves and fuels sub-sectors face challenges

Mini-grids have substantial potential for growth⁵⁵ but still face many obstacles: investors interviewed have raised concerns around a lack of enabling regulatory environment,⁵⁶ low profitability, pre-commercial market needs such as infrastructure requirements, widely different financing needs of the firms, and a lack of standardization of mini-grid technology and distribution systems across different markets. However, there are signs of optimism in the mini-grid sub-sector. Tanzania emerged as a go-to location for mini-grid firms after adopting and revising mini-grid regulatory framework in 2008 and 2015, after which the number of mini-grids doubled to 109 mini-grids.⁵⁷ Types of investors and funding have shifted from grants from foundations and DFIs to large size equity investment from strategic investors, mainly corporate venture capitals (VCs) and commercial investors, including Caterpillar, Enel, Total, and ENGIE. To live up to their promise, mini-grids firms must demonstrate they can compete on cost with other energy access alternatives with a commercially viable business model and the regulatory environment for mini-grid development must be enabled.⁵⁸

A large volume of subsidies from donors have been invested to achieve potentially significant economic, social, environmental, and health impact through clean cookstoves and fuels.⁵⁹ Nevertheless, adoption of cookstoves have been slow and most investors perceive the sector to have few investible firms. However, in recent years, a few green firms have emerged with more viable and scalable business models and received investment from a wide range of investors. Inyenyeri utilizes the recurring nature of fuel purchases rather than stove sales as a revenue stream. KOKO Networks distributes ethanol cooking fuel in partnership with major oil firms and operates fuel ATMs, smart tankers, and a depot system to distribute and collect payment through its mobile and cloud technology platform. These green firms and others have adopted an “energy as a service” approach to delivering clean cooking solutions as successful off-grid solar firms have done in the past. Although still few in number, investors have noticed the positive direction this sub-sector is moving toward and are considering some green firms as attractive for investment, while acknowledging the significant challenges that remain.

Innovations in climate-smart agriculture sector

Historically, Sub-Saharan Africa’s climate-smart agriculture (CSA) sector has attracted very little investment. Between 2011 and 2017, the sector received only one fifth the amount of investment the off-grid energy sector received. Of the investments that did occur, almost none were growth capital and

⁵⁵ Electricity from mini-grids can serve an estimated 140 million rural Africans by 2040 if 100,000-200,000 mini-grids are built. Lily Odarno and others (2017). Accelerating Mini-Grid Deployment in Sub-Saharan Africa. World Resources Institute. Washington, DC.

⁵⁶ This specifically includes issues around freedom to sell power at profitable, cost-reflective tariffs, not at subsidized utility grid rates; the need for clear and stable grid extension plans so companies know who their customers can be and for how long, and the need for clarity about what happens if/when the grid reaches their mini-grid.

⁵⁷ Lily Odarno and others (2017). Accelerating Mini-Grid Deployment in Sub-Saharan Africa. World Resources Institute. Washington, DC.

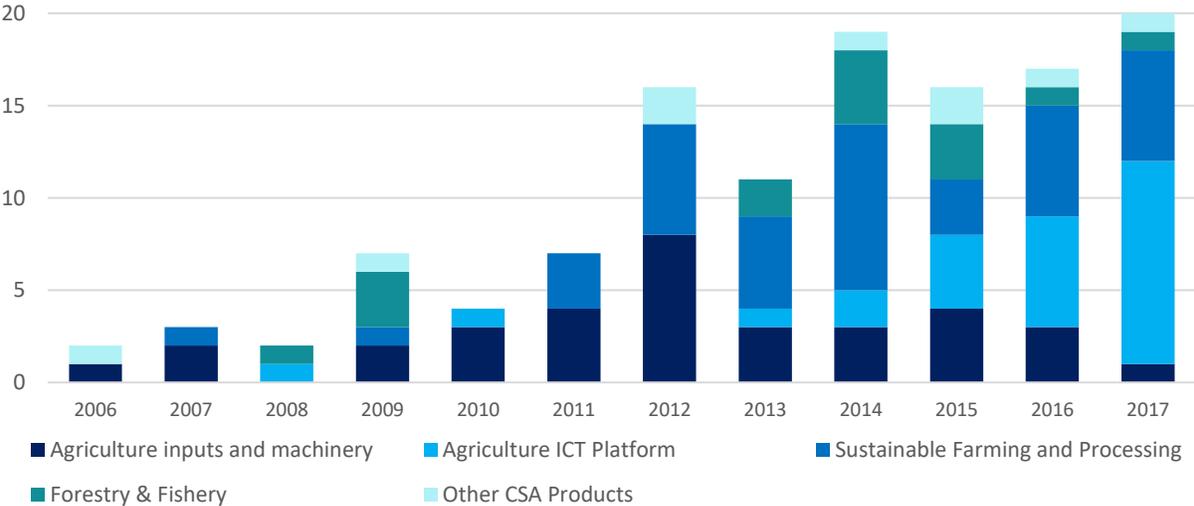
⁵⁸ Eric Wanless and Kelly Carlin (2017). Growing the Minigrid Market in Sub-Saharan Africa. Rocky Mountain Institute. Boulder, Colorado.

⁵⁹ Clean cookstoves are solutions to 3 billion people who depend on rudimentary cookstoves, spend up to 40 percent of household income on fuel and/or 20 hours per week collecting fuel per family, and are exposed to severe air pollution that contribute to 4 million deaths annually. Global Alliance for Clean Cookstoves (2018). Clean Cooking Solutions: An Emerging, Investible Sector. Presentation. March 2018.

almost all were made by mission-driven investors, including grants that accounted for 20 percent of all financing provided to CSA firms. Investment volume and investor profiles in this sector suggests the relative lack of scalable business models that would attract commercial or growth investors. Investors confirmed that many CSA firms have struggled to scale commercially due to a combination of slow farmer adoption, challenging distribution, and the lack of runway for early-stage firms to achieve economies of scale. Additional barriers include seasonally dependent working capital needs and a lack of innovation in a sector characterized by out-grower schemes. At least one investor spoke of their past failures in this space and their resulting re-focusing on other sectors. These concerns are evident in the decreased investment into more traditional input businesses and out-grower schemes.

In recent years, however, the sector has seen substantial growth in investment, driven by growing investment in technology-enabled firms that uses software or hardware innovation to deliver goods and services in more efficient ways, to reduce information gaps, or to reduce post-harvest losses in the agriculture ICT platform sub-sector. These firms received investment from commercial and corporate investors (including 1776, Wamda, Africa Tech Ventures, Safaricom, and Savannah), which had previously not been investing in the CSA sector. Some are cautiously hopeful that technology could help scale businesses in the CSA sector in similar ways to how PAYG technology helped off-grid energy access businesses scale. However, it is too early to see such a success story can be replicated. The agriculture ICT platform sub-sector is nascent with a small number of firms and only one firm has raised growth funding. Investors with experience in the agriculture sector further cautioned that newly active technology investors may not fully appreciate that traditional challenges of the sector, such as last-mile distribution, farmer adoption, and asset intensive logistics, will remain barriers to scale even for many enterprises with tech-enabled business models.

Figure 15. Investment rounds in the CSA sector by Sub-Sector (2006-2017)



Emerging investor groups with potential to grow

First-time investors

The research uncovered a large group of first-time investors who made only one investment (including grants) into an early- and growth-stage green firm, accounting for less than a quarter of all investments. 36 angels, 27 commercial investors, and 16 corporate investors together represent nearly 60 percent of the first-time investors. Most of these investors joined co-investors to fund green firms that either raised multiple (including previous and subsequent) rounds of funding or raised their first round of investment in 2017. These investors predominantly invested in well-known off-grid energy sector firms such as Lendable, Powerhive, and Rensource, but also select climate-smart agriculture ICT platform firms including Dudutech and Farmcrowdy.

In order for green sectors to grow and contribute to resilient and low-carbon economic development, green firms need to demonstrate commercial attractiveness, and large and growing commercial capital investment would be a strong indicator. The needed capital flow must come from not just increased investment activities from currently active grant providers and impact investors but also commercial and corporate investors, particularly those who will invest in more than one green firm and provide follow-on investment as the firm scales.

First-time investors could potentially be a source of untapped capital for green firms, but difficulty in understanding their investment motivation and experience makes it difficult to predict how much of the potential could be actualized. It is uncertain whether these first-time investors have had a positive, negative or mixed investment experience. In most cases, it is too early to tell as the investments have been made only recently and/or returns may take time to realize. It is also uncertain what factors motivated their investing in green firms: some may have been based on relationships with co-investors and others may be testing and learning the sector. In order for one-off investors to become repeat and committed investors in green firms, investor outreach is needed to better understand their investment motivation and experience to-date.

In between the most active investors and first-time investors lie the moderately active investors, half of whom have only invested in two green firms. Among them are Fenway Summer Ventures, Kenya Climate Ventures, Mercy Corps Social Venture Fund, Techstars, and Y Combinator who are fairly new to the field with their first investment in 2015. This group of investors could possibly invest in additional green firms in the region and eventually become most active investors over time. However, similar to the first-time investors, a better understanding of their motivation to invest in green firms and experience to date will be helpful to further incentivize the moderately active investors to join the ranks of most active investors.

Sector-focused investors

Most of the investors identified in this study have a generalist or multi-sectoral approach to their portfolio development and have not taken. This is understandable given that investors want to diversify their risk and green businesses typically have high capital intensity, distribution and/or supply chain challenges, and riskier cashflows due to customer adoption and product financing. However, in recent years, there has been an emergence of specialized investors with deeper knowledge of the challenges and opportunities of investing in specific sectors.

To date, this has primarily occurred in the off-grid energy space. For example, Energy Access Ventures (EAV) and KawiSafi Ventures (KSV) are bringing their knowledge and expertise to bear upon a single sector. Both are the only venture firm specifically focusing on the access to energy market in Sub-Saharan Africa. EAV has a broader geographic mandate, and investments in d.light, Off-Grid Electric, PEG, PAYGO Energy, and Sunculture. KSV focuses on East Africa (mainly Kenya and Rwanda), with investments to-date in d.light, BBOX, and Lendable.

Bridging the gaps and accelerating early-stage financing in green firms in Sub-Saharan Africa

This study provides insights into early-stage investment trends for green firms in the SSA region over the past decade, particularly focusing on the past 5 years. The trends point to the rapid scaling up of the DESCO sub-sector (particularly in East Africa) and emerging strategic areas (particularly in off-grid energy and to a lesser extent in climate-smart agriculture). All of this demonstrates momentum in the flow of capital to entrepreneurs developing and scaling green businesses in Sub-Saharan Africa.

Despite the growth, the research also uncovers several gaps in both the scale and diversity of capital sources and where the capital is being invested to support the growth of early-stage green firms in SSA.

- Few investors and entrepreneurs are truly local. The types of capital and investment terms often do not match green firms' needs and capabilities (e.g. investors often look to invest larger amounts of capital than early-stage firms need, and investors do not have capacity to provide pre- and post-investment technical assistance that early-stage firms need to grow). Finally, most of the capital in the past ten years has been invested by international investors and directed toward international founders. Firms led by international founders have catalyzed growth of green sectors in SSA in the last decade. However, the potential of local founders and local investors to leverage their intimate understanding of the local market conditions in growing green businesses has been largely untapped to date. It is therefore desirable to find ways to (1) increase the total amount of capital flowing to the SSA region and deploy it more effectively to meet the needs of green firms; (2) increase the share to local founders receiving investment while continuing to invest in international founders; and (3) encourage local capital formation and investment.
- Most of capital has been invested in off-grid energy firms, particularly DESCOs, while investment in other sectors with significant development and climate impact, such as agriculture and water, is low. Business innovations including the PAYG model and the continued decrease in the price of solar power technology have made this an attractive sector for investors and has created a "pull" effect. Off-grid energy sector has also benefited from significant success stories such as M-Kopa that got international attention including that of investors. Other sectors and sub-sectors have yet not seen a similar set of factors that have attracted diversified investor interest in a similar way.
- Large parts of Sub-Saharan Africa remain un(der)served. Investment to date has been highly concentrated in East Africa. Although existing businesses may ultimately expand to other parts of SSA, these markets are diverse and require highly localized adaptation of their business models. In addition to encouraging the geographic expansion of successful East African innovators, it would likely help accelerate sector development to also encourage local innovation, entrepreneurship and investment in currently un(der)served countries, particularly those in West, Central, and Southern Africa.

How might these gaps begin to be addressed? Several ideas emerge from the study, including developing new types of investment funds and vehicles, ways to de-risk commercial capital, strengthening the pipeline of quality investments, strategic deployment of grants, and accelerating knowledge of key eco-system actors involved in the investment process. It should be noted that some of these ideas are not exclusively to expand access to capital for early-stage green firms as they are more

general instruments that can benefit later stage firms in other sectors too (i.e. line of credit and credit guarantees).

Many of these ideas are new and thus have limited implementation experience to determine whether they can directly contribute to promoting greater investment in early-stage green firms. For ideas that have been implemented in the past, such as investment readiness program, existing literature is limited in terms of analyzing causal evidence about their effectiveness, particularly studies involving randomized experiment.⁶⁰ This study aims to provide descriptive evidence using case studies to illustrate different ideas that are being designed or tested in support of increasing investment into early-stage firms and their outcomes wherever possible. In the following sections, these ideas are discussed in greater detail.

Table 6 Summary of ideas for bridging the gaps and accelerating early-stage financing in green firms in Sub-Saharan Africa

Ideas	Primary Actors and Actions
Development of new types of investment vehicles and financing instruments	<ul style="list-style-type: none"> • DFIs, Donors, Foundations, or Impact Investors can establish specialized sector-focused or ‘venture building’ funds, or flexible capital vehicles and financing instruments that reflect green firms’ business lifecycle.
Increasing engagement by local commercial financial institutions and expanding availability of early-stage financing in local currency	<ul style="list-style-type: none"> • DFIs and Donors can enhance capacity of local commercial financial institutions and provide a line of credit to extend local currency financing to green firms. • DFIs, Donors, and Impact Investors can establish locally owned and managed investment funds and funds that provide local currency financing directly to green firms
Unlocking capital from risk-averse investors through de-risking mechanism	<ul style="list-style-type: none"> • Donors and Foundations can provide subordinated capital (e.g., first-loss capital) for investment vehicles • DFIs and Donors can fund risk mitigation facilities (e.g., partial credit guarantees) to lower risks in lending to green firms • Donors and Foundations can co-invest along with other investors or provide matching funding on concessional terms
Strategic deployment of grants	<ul style="list-style-type: none"> • Donors and Foundations can expand grant funding to less developed sectors and geographies and integrate it more effectively into the investment cycle
Strengthen pipeline of investable deals	<ul style="list-style-type: none"> • Donors and Foundations can promote collaboration among investors and business support intermediaries, set up pre-investment advisory facilities to support early-stage firms in the capital raising process, deepen investors’ knowledge on green sectors, training local entrepreneurs on how to engage investors, and expanding the pool of local entrepreneurs and business communities in green sectors.

⁶⁰ Cusolito, Dautovic, McKenzie (2018) Can Government Intervention Make Firms More Investment-Ready? A Randomized Experiment in the Western Balkans is an exception. This study found that investment readiness increases, as measured by scores in a pitch competition, and that these scores are in turn predictive of future investment readiness and outcomes among firms. However, the treatment effects of investment readiness program are not statistically significant.

Development of new types of investment vehicles and instruments

Several investors noted the challenge of investors being constrained by their fund mandate (e.g., constraints on stages of investment or amount of investment) and suggested permanent capital vehicles which can fund green firms over their life cycle. Below are ideas for making capital to become more flexible and suited for the characteristics and needs posed by early-stage green firms.

Specialized sector-focused funds

While the bulk of active investors in SSA region's green firms to date have been generalists who principally provide risk capital to early-stage firms, recent years have seen the emergence of a few sector-focused funds, principally around off-grid energy. DFIs, donors, and foundations can help establish sector-focused funds that can drive performance by possessing a deeper understanding of their specific sector in which their portfolio firms operate. Examples are KawiSafi Ventures and Energy Access Ventures, which invest exclusively in early- and growth-stage firms in the off-grid energy sector. While specialized sector-focused funds have the advantage of possessing deep market knowledge and expertise, their performance could be vulnerable to the fact that there is little diversification in their portfolio companies.

KawiSafi is a \$110 million fund established in 2016 by Acumen with funding from public and private capital, including the Green Climate Fund⁶¹ (\$25 million), Acumen, and other investors.⁶² It aims to invest \$2 to 10 million in 10 to 15 off-grid energy companies, initially in Kenya and Rwanda and has a funding dedicated to providing TA. KawiSafi Ventures has invested in three DESCO and renewable energy finance firms to date. Energy Access Ventures is also a fund focused on the off-grid energy sector in SSA, supported by Schneider Electric, an energy management multinational corporation, and public investors including several European DFIs.⁶³ It has invested in early- and growth-stage green firms operating in East and West Africa delivering solar home systems, solar water pumps, solar powered cold storage services, and clean cooking with PAYG technology.

'Venture building' funds

Donors and foundations can also help establish 'venture building' funds that combine sector knowledge, risk capital and high-touch support. A venture building' fund would provide individualized, hardware-oriented technical expertise to investees over a long duration of time alongside provision of capital. This is distinct from the cohort-based, short-term programs run by accelerators, typically targeted for digital technology firms. Notable examples include FACTOR[e] Ventures, a start-up accelerator with a fund established by Shell Foundation and Persistent Energy Capital, which provide early-stage capital with significant technical expertise and industry knowledge to provide hands-on venture building support to their portfolio firms. The increase in this new breed of venture building funds would enable de-risking of

⁶¹ The Green Climate Fund (GCF) is global fund created by the United Nations Framework Convention on Climate Change (UNFCCC) to use public investment to stimulate private finance for climate mitigation and adaptation in the form of grants, loans, equity, or guarantees.

⁶² GCF (2018). [Projects + Programmes: KawiSafi Ventures Fund in East Africa](#). Green Climate Fund

⁶³ These include the European Investment Bank, CDC of the United Kingdom, the French Facility for Global Environment / Fonds Français pour l'Environnement Mondial (FFEM), the OPEC Fund for International Development, and Proparco of Groupe Agence Française de Développement (AFD)

firms operating in the frontier (i.e., new markets, new technologies, and/or new business models) and create a bridge to growth-stage capital.

Flexible capital vehicles or financing instruments that reflect green firms' business lifecycle

Green firms often take longer to mature, are perceived high-risk, and the size and mix of their capital needs change over time. Yet most of investors that are currently active in investing green firms in SSA manage single instrument vehicles, mainly equity or debt. For instance, typical venture funds have 5 to 7 year growth-and-exit requirements and debt funds commonly have 1 to 2-year lending tenors. However, many green firms have growth rates of less than 10 percent after the initial 4 to 5 years of operation, a pace not commensurate with qualifying for available equity and debt investment capital.⁶⁴ This is not to mention that green firms in SSA have few exit opportunities to date (i.e. ENGIE's acquisition of Fenix is among the few investment exit in green sectors in SSA as of 2017; no green firms in SSA have raised investment through an initial public offering (IPO)).

New investment vehicles could be designed by donors, foundations, or impact investors with the flexibility to invest grant, debt, equity, and/or mezzanine through the firm's development and growth lifecycle. Similarly, existing investors could use more flexible financing instruments that reflect green firms' development and growth lifecycle. By deploying innovative instruments where appropriate, such as revenue share, royalty, and targeted convertibility mechanisms, these vehicles could balance the needs of investors and early-stage green firms in terms of time horizon for business growth and investment return.

A notable example is revenue share agreements, where the investor receives an agreed upon percentage of a company's revenue stream over a certain period of time. These offer investors to participate in the growth of an early-stage green firm without purchasing ownership and have a more visible path to liquidity than an equity investment exit would.

Village Capital have used revenue share agreements or flexible debt with 9 out of its 70 early-stage portfolio companies, and they explain that this allowed them not to be limited to companies with a narrowly defined growth profile but to invest in non-traditional but still high-potential companies.⁶⁵ In one case, Village Capital's investee was given the flexibility and runway to grow its business under the revenue sharing agreement, repaid the investment faster than projected, and later raised a traditional Series A where Village Capital participated as an equity investor.

Even though the use of flexible financing instruments has been advocated by many, it is still limited in developing countries. Many investors are unfamiliar with and uncomfortable that their remuneration entirely or at least largely depends on the performance of the investee company in terms of revenue and/or profits. Some may be limited to making equity or debt investment due the expectations of their LPs. Profit or revenue sharing agreements can be cumbersome to manage because they require a high degree of informational symmetry between investors and managers in the investee company based on detailed financial reporting and auditing. One investor noted that flexible financing mechanisms are not attractive because their complexity (e.g., tax) and uncertainty in payment schedule can be a deterrent to later stage investors.

⁶⁴ infoDev (2017). [Innovations for Scaling Green Sectors](#). World Bank Group. Washington, DC.

⁶⁵ Victoria Fram (2017). [Why An Equity-Only Investment Strategy Overlooks Many Promising Entrepreneurs](#).

There are several ways to expand the use of flexible financing instruments by impact investors, family offices, or other investors with a longer-term investment horizon or investment capital with flexible terms with a willingness to accept a high risk presented by early-stage firms. Increasing awareness and understanding about flexible financing mechanisms among investors and potential investees could be done through training programs. Such initiatives would cover how different instruments can serve different financing needs at specific stages of the business life cycle, the advantages and risks implied, the complementarities and opportunities for leveraging between flexible financing instruments, and experiences of those who have successfully used the flexible financing mechanisms. More experimentation with flexible financing mechanisms, in terms of the types of instruments used and post-investment management practices, could further boost the development and adoption of flexible financing instruments for early-stage green firms in SSA.

Increasing engagement by local commercial financial institutions and expanding availability of early-stage financing in local currency

While green firms in SSA prefer and seek local currency debt to finance their working capital, domestic interest rates are usually too high for these firms, especially for those having to finance equipment upfront (e.g., solar home systems and water purification machines) for customers who may pay back over a long time. Moreover, local commercial financial institutions (CFIs) are often reluctant to lend to early-stage green firms on commercial terms. As green sectors are relatively new and rapidly evolving, local CFIs do not have a good understanding of these sectors, particularly how the supply chain and consumer financing works. As a result, CFIs perceive that these green firms present a high risk of default given their insufficient track record and lack of collateral to secure loans.

Capacity building of local commercial financial institutions

There is increasing recognition of the role local CFIs can play in promoting investment in green sectors, and these institutions will continue to play an important role over the next decades in scaling up sustainable and inclusive development in SSA. Enhancing the capacity of local CFIs, such as commercial banks, leasing companies, and specialized debt funds, to increase access to debt financing for early-stage green firms could spur growth of these firms in both existing and underserved markets in SSA.

Local CFIs have several unique advantages in driving the growth of green sectors in the region. They have in-depth knowledge of their own markets, a good understanding of their customers' demands, and they are able to tailor their product offerings to local requirements. In addition, local CFIs can provide financing in local currency.

However, the deployment of early-stage financing to green firms through local CFIs has not been adequate, primarily because of the actual or perceived risk associated with green sectors. In this regard, multilateral development banks including the World Bank and African Development Bank, among others, can provide the initial impetus that drives the development of green finance products. Such efforts could include (1) providing technical assistance to support the development of green finance products, (2) promoting knowledge of green finance products across local CFIs, and (3) fostering collaboration at multiple levels. For CFIs that find technology and business model risks of early-stage green firms to be still too high even with these supports, DFIs could consider providing partial

guarantees in the case of default for further incentivization local banks to finance early stages of green businesses.⁶⁶

Line of credit to local commercial financial institutions

In addition to capacity building, DFIs could provide local CFIs a dedicated line of credit for expanding early-stage financing to green firms in their countries. Not only this would allow local CFIs with the capital available to support the green sectors, but the experience of implementing the special loan program would help them become more familiar with the sectors and borrowers, which could potentially lay the foundation for these local CFIs to consider lending to early-stage green firms beyond the provided line of credit from DFIs.

The World Bank Group is currently designing a program to expand off-grid electrification in West Africa, blending technical and financial capacity building efforts at regional and at country level. It seeks to provide funding for regional development banks to establish line of credits for eligible CFIs operating in the region. With this dedicated funding, CFIs will offer short- to medium-term loans, in international or local currency, to solar equipment distributors, DESCOS, productive end users of off-grid solar equipment (e.g., farms using solar water pumps; commercial and industrial SMEs running machinery), and off-grid public institutions such as schools and health centers. The program will also provide CFIs targeted TA in the areas of due diligence, portfolio supervision, and hedging, etc., in effort to enhance their understanding of capital structure, funding needs, and risk profiles of different types of green firms operating in the off-grid energy sector.

Locally based funds

As the research findings show, very few active investors in Sub-Saharan Africa have an “on the ground” footprint. A high proportion of early-stage financing currently provided to green firms in SSA originates from funds headquartered outside of the region (88 percent of all investors) and looking for investment opportunities, often without local offices (only 38 percent of international investors have local offices). This limits these investors’ outreach and effectiveness in developing an investment pipeline, as reflected in a greater proportion of their capital invested in green firms led by international founders. In comparison, local investors were six times more likely to invest in local founders compared to international investors without local offices.

More locally based funds, either with an exclusive or strategic focus on green sectors, could raise the total amount of capital provided to early-stage green firms in SSA while expanding access to early-stage financing for local founders. These funds would be led by investment teams and leadership that have the local market intelligence, business networks and contextual knowledge, and can put this capital to work with greater local knowledge. Such funds could operate independently or serve as local / regional partners for international investors who do not have the infrastructure and connection to go deeper in identifying and assessing investment opportunities in local markets. Interviews revealed that this is how

⁶⁶ A notable example can be found in Syndicate Bank in the Indian state of Odisha which was initially hesitant to lend to entrepreneurs installing solar lighting systems citing high risk. After SELCO Foundation, partnering with Armstrong Foundation, deposited a partial risk guarantee fund in case of any defaults, Syndicate Bank expanded its lending to these entrepreneurs. More information can be found in Selco Foundation (2017). [Indian enterprises are banking on solar loans for sustainable energy access to tribal hamlets](#). Accessed in September 2018.

a number of international investors without local offices, ranging from impact investors to angels, have identified co-investment opportunities in SSA that have been brought up and led by other investors with greater local connections. Corporate investors and family offices⁶⁷ that typically invest directly in green firms could consider supplementing their direct investing with taking appropriate stakes in small local funds in exchange for the opportunity to make co-investments.

In acknowledging the need for a local fund that can provide more patient, flexible, and risk-tolerant capital between \$250,000 to \$1 million for early-stage green firms in Kenya, the World Bank Group's Climate Technology Program provided a grant funding to help establish Kenya Climate Ventures, an 'evergreen' investment company that provides risk capital and management assistance to early-stage green firms in Kenya.⁶⁸ Structured as an open ended fund, KCV has built a management team overseen by the Board and Investment Committee, most of whom bring deep local knowledge and investment experience and linkages with local ecosystem intermediary organizations. Since its establishment in 2016, it has invested in 6 early-stage green firms in off-grid energy and climate-smart agriculture sectors with an average size of approximately \$400,000. The World Bank's anchor funding covers the initial set-up and operation of the investment company, building an initial investment portfolio, and post-investment technical assistance (TA). KCV aims to raise capital from additional public and private investors with a strategic interest in the green space as well as leverage co-investment and follow-on capital for its portfolio companies. The World Bank is currently developing a similar fund in Ghana.

Although not specific to support green firms, USAID has also partnered with Investisseurs & Partenaires (I&P), an impact investment group based in Paris, to launch three locally managed and locally funded investment funds in Senegal, Niger, and Burkina Faso.⁶⁹ These funds will each initially provide small interest-free and collateral-free loans to early-stage firms, along with pre-investment TA related to investment readiness and networking. Launched in 2016, this partnership anticipates supporting 52 early-stage firms by the end of 2019.

Box 2. Investor highlight: Investisseurs & Partenaires

Investisseurs & Partenaires (I&P) is a French impact investing firm dedicated to small and medium-sized enterprises (SMEs) in Sub-Saharan Africa and in the Indian Ocean. I&P's mission is to support the development of responsible and profitable African SMEs that can create local "added value" and long-term employment, and generate positive social, environmental, and governance impacts. A team of 40 investment professionals based in Paris and seven African offices in Burkina Faso, Cameroon, Côte d'Ivoire, Ghana, Madagascar, Niger and Senegal manages four pan-African funds representing a total of € 192 million.⁷⁰ Since its creation in 2002, I&P has invested in 80 companies in 15 African countries, and operating in various sectors, including health, microfinance, agro-industry, building materials, renewable energy, education, and transport.

Its first fund IPDEV 1 fully invested € 11 million into 25 SMEs and 8 microfinance institutions in 10 SSA countries, and the fund is to be fully divested by 2019 with over 20 exits. Its second fund IPDEV 2 is currently establishing a network to incubate and sponsor 10 local funds in Senegal, Burkina Faso, Niger, Cote d'Ivoire, Ghana,

⁶⁷ Family offices are professional investment arms (or independent investment advisory firms) serving high net worth individuals and families.

⁶⁸ infoDev (2017). [Designing an Innovative Financing Model for Early Stage Clean Technology Companies: Kenya Climate Ventures](#). The World Bank Group.

⁶⁹ USAID (2017). [Partnering to Accelerate Entrepreneurship. I&P: Expanding Impact Investing in West Africa](#). U.S. Agency for International Development.

⁷⁰ I&P (2018). [An Impact Investor Dedicated to African Entrepreneurs](#). Presentation to European Investment Bank.

Madagascar, Mali, and Cameroon that aim to support 550 early-stage firms with investment needs from € 30,000 to € 330,000. Its IPAE 1 funds fully invested € 54 million into 29 SMEs, and I&P had the first closing of IPAE 2 that target to invest € 80 million to 30 to 40 SMEs with financing needs from € 300,000 to € 3 million.

In addition to providing capital in the form of minority equity participation, quasi-equity, and loans, I&P provides technical and strategic support to meet the growth needs of its portfolio companies. The I&P team develops long term partnerships with its investees, sharing management expertise and knowledge that is useful for improving business strategy, structuring, and success. This has been possible by raising both investment capital and grants from its LPs including DFIs, donors, corporate investors, family offices, and foundations. I&P expects to offer financial returns ranging from 3 to 10 percent.

While it is too early to tell whether these initiatives are working effectively, they certainly hope to open up a new capital base for commercially viable local entrepreneurs that are not on the radar of international investors, as well as a bridge between local entrepreneurs and international investors.

Local currency debt fund

In addition to supporting local CFIs to lend in local currency, DFIs, donors, and impact investors can establish a debt fund to provide loans in local currency directly to green firms. In 2018, the African Development Bank and Nordic Development Fund, together with Calvert Impact Capital, All-on Nigeria and Global Environment Facility together established a \$100 million blended finance debt fund called the “Facility for Energy Inclusion Off-Grid Energy Access Fund”.⁷¹ The fund is structured as a tiered debt fund mobilizing both equity investors and senior lenders but will also act as a sole investor. It aims to provide loans in local and hard currencies ranging from \$2 to 10 million to growth-stage off-grid energy firms in Sub-Saharan Africa, with a primary focus in East Africa, Côte d’Ivoire, Ghana and Nigeria. It hopes to crowd in local financial institutions as co-lenders. While this fund is for growth-stage green firms, DFIs, donors, and impact investors could collaborate to establish similarly structured local currency debt funds targeting early-stage green firms.

Unlocking capital from risk-averse investors through de-risking mechanism

Efforts to moderate risk associated with investing in early-stage green firms could help new and first-time investors to deploy their more risk-averse capital. Possible de-risking mechanisms and instruments include catalytic first-loss capital by investors willing to take greater risk in supporting early-stage green firms, partial credit guarantee programs for local CFIs, and co-investment / matching funding. De-risking also includes improving the quality and creating a pipeline of investment-grade projects, which may involve the use of grants at the early stages of projects.

⁷¹ AfDB (2018). [African Development Bank, Nordic Development Fund, Global Environment Facility and Calvert Impact Capital partner in US \\$55-million investment into Off-Grid Energy Access Fund](#). Website accessed on August 26, 2018.

First-loss capital

First-loss capital sets forth which investor will bear first losses and the amount of loss, which improves the investee's risk-return profile and thus catalyzes the participating of investors that otherwise would have not participated.⁷² First-loss capital can be incorporated into a capital structure via a range of instruments including grants, equity, subordinated debt, and guarantees. In equity and subordinated debt, the willing investor takes the most junior equity / debt position in the overall capital structure and takes first losses while seeking risk-adjusted returns. Grants and guarantees could also include a set amount of first-loss, which would enhance moderation of risks beyond the *pari passu* guarantees and general grants. First-loss capital providers are typically foundations, high net worth individuals, family offices, donors, and DFIs who are often able and willing to take on greater financial risks in return for achieving non-financial objectives.

SunFunder, a specialist financial intermediary that has raised over \$62 million between 2013 and 2017 and made more than 100 loans to 37 off-grid solar companies primarily operating in SSA, presents an example of how first-loss capital has crowded in other investors.⁷³ First-loss capital from high net worth individuals, foundations and impact investors has catalyzed SunFunder's investment vehicles to scale and attract institutional investors. SunFunder has utilized a 15 percent first-loss junior layer to reduce risks for senior investors and unlock additional capital in its funds. When it was first introduced in 2014, there was a limited appetite from investors to participate in this junior layer, even with significantly higher interest (i.e., higher return opportunity), as the sector was young. However, in following years, DOEN Foundation, The Rockefeller Foundation, and Facebook among others invested in this junior layer for SunFunder's subsequent debt funds, which encouraged participation of senior investors consisting of DFIs and impact investors.⁷⁴

SunFunder's debt fund strategy successfully offered different investors with varying risk appetites an opportunity to deploy their capital into off-grid energy sector: in early years high net worth individuals took riskier positions that allowed foundations and impact investors, who then paved the way for public institutional investment by DFIs in later years. SunFunder also carefully structured concessional pricing: in earlier funds, senior investors were offered lower interest rate for taking less risk. In more recent funds, SunFunder relied on catalytic capital provided by long-term partners to offer more market-reflective returns around 5 to 8 percent to new investors while remaining competitive for its borrowers compared to other direct lending by concessional investors.⁷⁵

SunFunder's experience highlights the significant multiplier effects of catalytic capital bringing in new investors into the green sector as well as bringing the investment opportunities in the sector to a more sustainable commercial model.

Partial credit guarantees

Local CFIs in SSA typically require up to 100% cover for their loans in the form of collateral and guarantees, and many prefer hard assets as collateral and find it hard to assess the value of receivables, especially when these are from many small, rural customers using PAYG technology. Partial credit

⁷² GIIN (2013). [Catalytic First-Loss Capital](#). Issue Brief. Global Impact Investor Network.

⁷³ SunFunder (2018). [Scaling Energy Access with Blended Finance: SunFunder and the Role of Catalytic Capital](#).

⁷⁴ Ibid.

⁷⁵ Ibid.

guarantee programs funded by DFIs, donors, and governments can mobilize local and international private lenders to increase the size and tenor of their investments to green firms while demonstrating the long-term commercial viability of lending to green firms.

For instance, USAID's Development Credit Authority (DCA) partners with financial institutions to provide partial credit guarantee services to implement projects and support entrepreneurs in a number of sectors including off-grid energy, agriculture, and water sectors. DCA usually provides a 50 percent *pari passu* guarantee on loan principal, either in local or foreign currency, with maturities of up to 20 years, for individual loans or at the portfolio level.⁷⁶ The guarantees are often paired with TA that strengthens the borrowers' abilities to repay loans or financial institutions' lending capacities in new sectors. Working with Power Africa's Beyond the Grid initiative, DCA has a \$75 million partial credit guarantee services program in the off-grid energy sector to support investors.⁷⁷

The World Bank Group's proposed off-grid electrification project in West Africa that will provide line of credit to local CFIs also plans to utilize risk mitigation programs and facilities supported by different development partners. One possible partner is International Finance Corporation's Small Loan Guarantee Program, which guarantees 50 percent of loans that local CFIs extend to SMEs and provides TA to CFIs to develop financial services products targeted at SMEs. African Guarantee Fund is another program that supports CFIs in SSA to increase their financing to SMEs in the region through partial financial guarantee and capacity building assistance.

Although not within the SSA, China Utility-based Energy Efficiency Finance for SME program by the International Finance Corporation (IFC) is a considered a successful case study in broadening early- and growth-stage green firms' access to local commercial bank financing. IFC provided guarantees (50 percent) for loans up to approximately \$3 million to energy efficiency and renewable energy SMEs and technical assistance to local bank partners, who have quickly exceeded the target amounts of loans disbursed and expanded financial products related to green sectors.⁷⁸

Co-Investment and matching funding

DFIs, donors, foundations, and governments can play an additional catalytic role in de-risking investment by co-investing in specific deals or providing matching funding. A notable example is the Up-Scaling program of the German DFI, DEG, that finances investments of early-stage SMEs in developing countries with preference for those with a high development impact and operating in SSA or India. The program provides grant funding of EUR 500,000 for an investment deal of EUR 1 million or above (which keeps DEG's financing at maximum of 50 percent of the total investment volume), and the funding is to be repaid within 5 years if the investment is successful, as defined by pre-defined financial criteria such as cash flow, revenue, or profit.⁷⁹ This allows other private investors to limit their exposure in the deal and gives the firm additional runway to achieve its growth targets without further equity dilution or large financing costs.

⁷⁶ USAID (2018). [Development Credit Authority: Putting local wealth to work](#). U.S. Agency for International Development.

⁷⁷ USAID (2017). [Powering Africa, Beyond the Grid](#). U.S. Agency for International Development.

⁷⁸ IFC (2014). [Executive Summary: Mid-term Evaluation of the CHUEE 3 Program](#). International Finance Corporation.

⁷⁹ DEG (2017). [Up-Scaling Program: Overview](#).

Strategic Deployment of Grants

Grants have played a catalytic role in the development of green sectors, with several grant awardees having grown their businesses over the years and raised growth capital from commercial investors. The availability of free capital in the form of grants can be a huge boon to green entrepreneurs facing financing challenges. At the same time, while there are several sources of grants from international funding agencies and private foundations, the funds can be limited, and competition can be considerable. Grants can also come with limits or restrictions on how they can be used.

Grants for less developed sectors and geographies

To amplify the potential impact of grants, grant programs could more actively target underdeveloped sub-sectors, markets and/or entrepreneur segments. Many of the existing grant programs such as USAID's Development Innovation Ventures program and Power Africa took a full sector development approach to help the off-grid energy sector. They not only provided grant funding directly to early- and growth-stage DESCOS but also addressed market level barriers that can help entire industries to grow, such as building a community of practitioners and collecting customer insight and data.^{80,81} In contrast, existing grant programs in agriculture sector typically focus on research & development (R&D) or market development. For instance, The Bill & Melinda Gates Foundation has invested \$2 billion in the sector, directing its grant funding to R&D, policy analysis, and developing access and market systems. While U.S. African Development Foundation invested in \$44 million in agriculture sector in SSA in 2017, its grant funding and TA were directed to agricultural cooperatives rather than private firms.⁸²

New grant programs can be developed to grow currently underserved off-grid energy sub-sectors such as mini-grids, as well as climate-smart agriculture, waste management, and water & sanitation sectors. Early-stage green firms in these sectors often have untested business models or technologies and thus would greatly benefit from grant or concessional funding for further commercialization before they can be more attractive for equity and debt investors. Similarly, new grant initiatives could be set up to support early-stage green firms operating in countries and regions that are not as mature as East Africa.⁸³

Grants that are more effectively integrated into the investment cycle

As this research shows, many grant makers have provided grant funding at different stages of the firms' development. In some cases, grants were deployed alongside or preceding investment capital for product and/or market development, building new distribution channels, as well as organizational capacity building. These examples, while in small numbers, demonstrates how strategic grant makers

⁸⁰ Catherine Cheney (2016). "[Why This \\$5 Million May Matter Most for Off Grid Electric.](#)" Devex, January 7, 2016.

⁸¹ Chris Jurgens (2017). "[Reaching Deep in Low-Income Markets: What Have We Learned?](#)" Omidyar Network. November 6, 2017.

⁸² USADF (2018). [Creating Pathways to Prosperity for Underserved Communities in Africa](#). United States African Development Foundation.

⁸³ As there is limited amount of resources available for grants or concessional funding, a push to develop more nascent green sectors and markets could mean diverting resources away from the off-grid DESCO sector. However, it is difficult if not impossible to determine, based on investment transaction databases or stakeholder engagement, whether the off-grid DESCO sector has matured enough and do not need grant funding urgently. As a result, it should be noted that this research does not comment on when and how donors, foundations, and DFIs should exit off-grid DESCOS.

can closely engage and coordinate with investors on the provision of funding to allow early-stage green firms to have a smoother capital curve.

Grants can also be flexible, allowing green firms to experiment with different approaches for financing, distribution, and customer segment experimentation. Grants for market building efforts, for instance, could be used for opening up new, untested markets and creating distribution networks there, thereby enabling firms to expand faster than otherwise possible.

USAID's Development Innovation Ventures (DIV) three-tiered staged non-reimbursable grant model has specifically addressed the need of early-stage entrepreneurs.⁸⁴ Stage 1 grants ranging from up to \$200,000 over three years are tailored toward proof of concept/initial testing; Stage 2 grants ranging from \$200,000 to \$1.5 million over three years are geared toward testing and positioning for scale; while Stage 3 grants ranging from \$1.5 million to \$5 million over five years are for taking proven solutions to scale. Since its inception, DIV has provided 96 grants totaling more than \$11 million in Stage 1, 68 grants totaling \$60 million in Stage 2, and 4 grants totaling \$20 million in Stage 3.⁸⁵ Off-Grid Electric has accessed the different stages of support as they scaled up.

Strengthened Pipeline of Investable Deals

While capital concentration in a handful of green firms in SSA has many root causes, one is the number and quality of investable firms. Investors consistently and over time reported that accelerating momentum on investing activity and capital flows requires a strong investment pipeline. Efforts to educate investors and investees to deepen their knowledge on the green sectors and investment readiness could also further prime the pipeline of investible deals. This is in the context of generally nascent entrepreneurial ecosystems across Sub-Saharan Africa where collaboration across investors, enterprises, and intermediary organizations is not very active or nearly absent due to the limited capacity and resources available to these ecosystem actors.

Collaboration among investors and business support intermediaries on investment readiness

Advisory firms and other entrepreneurship development intermediaries, such as incubators and accelerators, play an important role in building pipeline of investment opportunities for potential investors. These intermediaries at times may not have a pulse on whether the early-stage green firms they are supporting meet the investment theses and criteria of prospective investors, and this reduces the chance for these firms to raise capital. Therefore, it is important to improve performances of intermediary organizations in building pipeline of high-quality investment opportunities. Furthermore, improved communication and collaboration among investors, advisory firms, and other entrepreneurship intermediaries on investment readiness of green firms would benefit effectiveness and efficiency of all parties involved. Donors and foundations can play an important role in facilitating this collaboration.

⁸⁴ USAID (2018). [DIV's Model in Detail](#). Website. Accessed on August 25, 2018. United States Agency for International Development.

⁸⁵ USAID (2018). [Development Innovation Ventures](#). Website. Accessed on September 26, 2018, United States Agency for International Development.

Pre-investment technical assistance support facilities or funding

When coming across green firms who are interesting but not yet ready for investment, investors could inform advisory firms and entrepreneurship development intermediaries to provide pre-investment TA and increase the prospects of investment. While there are a few programs targeting this area, there is a general lack of this kind of expertise and service providers—lawyers, consultants, and people who understand investors to help companies raise capital and structure deals—in SSA. Targeted, tailored support requires an upfront commitment of resources, but has proven effective in preparing potential targets for investment and building high-quality deal flow. Two notable examples are Africa Enterprise Challenge Fund (AECF)’s AECF Connect and the Investment Readiness Program under the USAID’s Partnering to Accelerate Entrepreneurship (PACE) initiative.

AECF Connect is an initiative funded by Swedish International Development Cooperation (Sida) that has helped AECF grant recipients to raise over \$36 million follow-on capital for scale up.⁸⁶ Its range of services run from fundraising documentation review, investor identification, and due diligence preparation all the way to term negotiation and advice on legal documentation. AECF Connect has enhanced the AECF’s position as a feeder fund for other investors, by not only providing capital to initiate projects but also leveraging more private sector capital into these projects over time. This in turn has enabled AECF to demonstrate an increased return on its grants and loans program.

Under the PACE Investment Readiness Program, Open Capital Advisors’ (OCA), a management consulting and financial advisory firm based in East Africa, worked with five impact investors and provided tailored pre-investment support for the early-stage firms working with these potential investors. Over the three-year period, the program screened 63 high-potential early-stage firms from a newly sourced pipeline of 222 businesses, many of whom had not actively considered outside investment to drive their growth.⁸⁷ From these, OCA provided over 7,000 cumulative hours of tailored support to 15 early-stage firms selected by the partnering investors, and six of them later raised \$2.3 million investment.⁸⁸

While the amount of capital raised by these firms may look small, partnering investors noted the pre-screened pipeline of over 200 early-stage firms as one of the most important benefits of their participation, considering that many of them originally lacked formal documentation to be considered by investors. Common skill gaps identified from the program included: (1) financial modeling to the quality investors expect; (2) accurate identification and segmentation of customers and markets; and (3) prioritization of an actionable, executable growth strategy, all of which present areas for support and mirror common challenges in sourcing appropriate skills by early-stage firms in SSA.⁸⁹

The program’s results demonstrated the potential of tailored pre-investment support to increase the pool and quality of investible early-stage businesses in SSA. It also highlighted that a successful investment readiness program requires significant coordination from accelerators, intermediaries, different types of investors, and donors. These different entities contribute in different ways to strengthen the ecosystem in which early-stage businesses operate—business support, markets, finance,

⁸⁶ For more information, see the website of AECF Connect at <https://www.aecfafrica.org/portfolio/aecf-connect>

⁸⁷ USAID (2018). [Supporting Early-Stage Entrepreneurs in East Africa: Learnings from the USAID PACE Investment Readiness Program](#). United States Agency for International Development.

⁸⁸ Ibid.

⁸⁹ Ibid.

human capital, research and development. Collaboration amongst them can increase the competitiveness of early-stage entrepreneurs to attract investor funding.

Donors and Foundations can also support new or existing local funds by providing technical assistance (TA) in the structuring and fundraising phase or by providing funding to the fund managers to provide pre- or post-investment TA to their portfolio companies. Shell Foundation, for example, has supported new local fund managers in India in developing a scalable early-stage investment model for green firms. The USAID PACE program and MEDA M-SAWA Technical Assistance Facility⁹⁰ are examples of support to fund managers in providing technical assistance to their portfolio.

Deepening investor knowledge of green sectors

As the research shows, there is a small set of investors who have developed significant sector knowledge to navigate and assess investment opportunities from a sectoral standpoint. Most investors active in investing in green firms in SSA are generalists who do not have in-depth knowledge of the green sectors and sub-sectors. Programs that connect generalist investors with industry experts and more experienced investors in these sectors can help them better understand and evaluate potential investment opportunities in the sector and potentially increase investment in this space. This could be done through intermediary organizations, with the support from donors and foundations.

For instance, Acumen's Pioneer Energy Investment Initiative seeks to cultivate greater understanding of emerging markets and their customers by sharing insights, research, and impact data collected from its portfolio firms with the public and private sectors.⁹¹ Similar efforts but also more targeted towards sharing information with generalist investors can be undertaken.

Similarly, for investors seeking to explore new markets to invest in, market intelligence and linkages with regional investor networks and entrepreneurship ecosystem development organizations would enable these investors to have a better sense of these markets. They could facilitate the sharing of best practice and/or undertaking relevant research, as well as mapping of sector ecosystem actors, thereby increasing visibility and access to information for investors about key sector ecosystem players.

The Lighting Africa program of the World Bank Group, for example, provides market intelligence on the off-grid lighting market in Africa, including research on market size, customer ability to pay, distribution channels and investment trends.⁹² Given that the non-energy sectors are even less well understood by market participants and would-be investors, creating similar initiatives for the climate-smart agriculture, water and sanitation, and waste sectors could be very valuable.

Finally, beyond making direct investments into green firms, investors can engage in targeted initiatives to support the overall ecosystem. For instance, they can fund recurring industry reports to provide up-to-date information to entrepreneurs and investors and share best practices in investment.

⁹⁰ For more information, please see description here: https://www.andeglobal.org/page/MEDA_TA

⁹¹ Acumen (2017). "[Acumen Launches Pioneer Energy Investment Initiative to Build the Off-Grid Energy Sector and Bring Power to 8 Million People by 2026.](#)" April 24, 2017.

⁹² Lighting Africa (2018). [Market Intelligence](#).

Building local entrepreneur knowledge on engaging investors

The research shows that one factor that has led to greater capital flows to international founders is the familiarity of these entrepreneurs with the language and expectations of current investors who are mostly international. A significant challenge for green sectors in SSA region is that the sector ecosystem is generally fragmented and underdeveloped with few options of established, central spaces for connecting investors and investees.⁹³ Many green firms in SSA region are not members of professional associations or other formal networks, which makes finding investible enterprises a challenge for investors.⁹⁴ Robust networks, incubators, and accelerators could potentially facilitate opportunities to connect green firms with potential investors and invest in entrepreneur development to nurture promising ventures. Investor engagement training and coaching for local entrepreneurs as well as more proactive facilitation and linkages between local entrepreneurs and active investors can help entrepreneurs better prepare for engaging active investors in investment conversations.

Expanding the pool of local entrepreneurs and business communities in green sectors

The number and share of local founders receiving investment could increase from having more local entrepreneurs being active in the green sector. Particularly, if local serial entrepreneurs who have successfully developed businesses in other sectors found new or join existing green firms they could inject their business acumen and potentially elevate the likelihood of local green firms to succeed and raise investment. Increasing connectivity between local business communities and networks with some of the green sectors which are more internationally oriented (e.g. renewable energy finance, agriculture ICT platform) could also expand the pool of local talents in the green sector.

⁹³ Michael Kubzansky and others (2011). *Promise and Progress: Market-Based Solutions to Poverty in Africa*. Monitor Group.

⁹⁴ UNDP (2015). *Impact Investment in Africa: Trends, Constraints, and Opportunities*.

Conclusion

This study has described patterns of early-stage investment into green firms in Sub-Saharan Africa, with a particular focus on understanding the challenges and opportunities faced by investors in identifying, investing, and managing investment in early-stage green firms. The study's reliance on analysis of an investment transaction database covering 336 investors and 157 green firms in Sub-Saharan Africa over a decade long period and detailed investor interviews has uncovered several notable patterns in the sources of capital and where it is being deployed. Based on those findings, the study identifies ideas that can be deployed to accelerate and deepen investment into early-stage green firms in Sub-Saharan Africa and other emerging markets.

Early-stage investment into green firms in Sub-Saharan Africa has grown in the last decade. However, much more can be done. Challenges persist in breaking the concentration of this limited early-stage capital to firms in certain sectors (i.e., PAYG businesses in off-grid energy) or geographies (i.e., East Africa) or firms headed by international entrepreneurs.

The study provides a review of ideas to unlock additional investment capital for early-stage green firms:

- Develop new types of investment vehicles and financing instruments
- Increase engagement by local commercial financial institutions and expanding availability of early-stage financing in local currency
- Unlock capital from risk-averse investors through de-risking mechanisms
- Deploy grants strategically
- Strengthen pipeline of investable deals

This study is based on understanding patterns of early-stage investment into green firms in SSA. Its insights could be further deepened by additional analysis of various programs and initiatives that have been implemented to support the growth of early-stage green firms in SSA to help stakeholders in evaluating which ideas have yielded positive results and therefore would be interesting to expand or replicate elsewhere. For instance, mapping the evolution of grant, early- and growth-stage financing over the course of the maturity of the off-grid energy sector could provide insights on the role and timing of these different types of financing from international and domestic investors. The findings of this research can also speak to conditions in other emerging markets too as the challenges felt by early-stage green firms in SSA are shared across different regions. At the same time, further research focusing on other emerging markets including South Asia and South-East Asia can help uncover the region-specific challenges and opportunities, if any, faced by investors in those markets.

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Annex 1: List of investors, grant providers, and intermediary organizations interviewed and interview questions

To adequately understand many different types of investors' motivations and investment strategies for supporting green businesses, this study conducted extensive outreach to investors and intermediary organizations listed below.

Investors

- Acumen
- AHL Venture Partners
- AlphaMundi Group A.G.
- Andrew Reicher
- Bharat Fund/Infuse Ventures
- Blue Haven Initiative LLC
- Ceniarth
- DOB Equity
- Energy Access Ventures
- Engie Rassembleurs d'Énergie
- eVA Fund II
- Factor[e]
- Global Innovation Fund
- Global Partnerships/Eleos
- Grassroots Business Fund
- GroFin
- Inisitor Seed Fund
- Investisseurs & Partenaires
- Kenya Climate Ventures
- Novastar Ventures
- Palladium - Impact Investing
- Pearl Capital Partners
- Persistent Energy
- Schooner Africa Fund
- Triple Jump/DGGF
- VilCap Investments
- Yunus Social Business

Grant Providers

- African Enterprise Challenge Fund
- Overseas Private Investment Corporation (OPIC)
- Shell Foundation
- United States Agency for International Development (USAID)

Intermediary Organizations

- AfricaFunded
- Bertha Centre for Social Innovation and Entrepreneurship
- Business Partners International
- Early Bird
- Energy4Impact
- Global Alliance for Clean Cookstoves
- Global Off-Grid Lighting Association
- Good Energies
- GrowthAfrica
- Intellectap
- Iungo Capital
- Kenya Climate Innovation Centre
- Open Capital Advisors
- Transformational Business Network

Interview questions covered the following questions. In some cases, specific investment round and/or transaction was discussed in detail.

Green sector attractiveness and challenges

- Attractiveness: What attracts you to early-stage green firms? Does this attractiveness vary by sector, geography, or target segment (e.g. base of pyramid)? What attractive new sectors, countries or trends do you see emerging? What are the drivers of this attractiveness? Are you planning to make more early-stage investments in green firms (and if so why)?
- Challenges: What challenges do you face when sourcing and closing deals? What challenges do you face when managing your investments?
- Solutions: How do you overcome these challenges?
- Non-finalization: What are the key reasons that you do not finalize investment in early-stage green firms?

Investment strategies, objectives, performance

- **Thesis:** What is your investment thesis regarding early-stage green firms? How has this thesis and your strategies and aims evolved over time? How do you see this thesis and your strategies and aims evolving in the future?
- **Requirements:** What are your minimum requirements to make an investment into early-stage green firms? Are you typically a lead investor? Do you require co-investors? Are there other co-investors or types of co-investor that you tend to invest with?
- **Risks:** What risks are you willing to take? What risks are you not willing to take? How do you manage key risks?
- **Performance:** What does success look like for you? What key performance indicators do you measure? How are you performing and how does this compare to your expectations (e.g. returns, timeframes)? How do you balance financial success versus social and environmental benefits from your investments?
- **Success factors:** What pre- and post-investment activities do you take to drive success (internal success factors)? What are key external success factors that contribute to performance?
- **Exits:** Have you exited any investment in early-stage green firms? Who/what type of organization did you exit to? Please share more details on the story and how you achieved this exit if possible.

Types of financial instrument and vehicles used:

- **Types:** What types of financial instruments and vehicles do you use and why? How do these instruments and vehicles align with your investment strategies? Do they vary by geography, sector, segment (e.g. base of pyramid) or stage?
- **Trends:** What trends do you see going forward in the types of financial instrument and vehicle used?

Fund / organization structure: Fund's investors, time horizon, and management fees, hurdle rates, carry rates

Technical assistance:

- **Type and amount:** What level and type of post-investment support to the investee do you think is necessary? What is your organization doing in this respect?
- **Models:** What technical assistance (TA) models have you seen that are effective?
- **New:** What new TA approaches would help investors be successful in early-stage green firms?

Scale up, gaps and supporting interventions

- **Support:** Did you and / or your portfolio companies benefit from any support mechanisms? What are the key improvements that could be made to these support mechanisms to help you make successful investments in early-stage green firms?
- **New entrants:** Do you see the emergence of new stakeholders that can help accelerate investments into early-stage green firms? Which ones? What would need to change to encourage new investors from other sectors to invest in early-stage green firms?
- **New initiatives:** What government / donor / foundation interventions would help catalyze investing in early-stage green firms? (Explore briefly where possible whether this varies by geography, sector, or segment?) What do you think are key considerations to bear in mind when designing these interventions?

Other Lessons: What lessons and best practices could be learned from other sectors or geographies? Do you have other recommendations to enable scale up of investments in early-stage green firms in your focus markets and sectors?