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WORKING PAPER

THE IMPACT INVESTORS' BLIND SPOT: LOCAL CLEAN ENERGY ENTREPRENEURS IN KENYA

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EXECUTIVE SUMMARY

Highlights

- Impact investors have been criticized for investing mainly in foreign-owned clean energy access companies and ignoring local entrepreneurs in Africa. This working paper looks at the investments made by impact investors in clean energy access in Kenya, which has been the hub of renewable energy access investment in Africa.
- Impact investors have almost exclusively invested in companies developing pay-as-you-go solar home systems (PAYG SHS) and in mini-grid technology. This approach appears to be guided by the expectation that these business models, which allow consumers to pay for electricity in small amounts, will grow rapidly to provide electricity to millions of people across the continent.
- Local Kenyan-origin entrepreneurs have been building different types of businesses that focus on distribution of products and implementation of clean energy systems. These businesses are growing at a slower pace than PAYG SHS and mini-grids, but several of them are profitable and create positive socioeconomic impact.
- Given their growth trajectory, local entrepreneurs can absorb relatively modest amounts of capital and deliver a positive return to investors.
- Current impact investors who invest equity cannot meet the needs of local entrepreneurs because they are incentivized to invest large amounts of capital in investments that can generate higher returns on exit. We therefore recommend the creation of a debt fund that can make relatively small individual investments.

CONTENTS

Working Papers contain preliminary research, analysis, findings, and recommendations. They are circulated to stimulate timely discussion and critical feedback, and to influence ongoing debate on emerging issues. Working papers may eventually be published in another form and their content may be revised.

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Introduction

Impact investment aiming at generating both financial and socioeconomic returns is critical to achieve universal energy access. Off-grid energy access companies have absorbed about US$1.7 billion worldwide in disclosed investments in the period 2010 to 2018. The pace of investment has accelerated in the last few years. At the same time, impact investors have been criticized for investing only in foreign-owned companies and not local entrepreneurs, particularly in Africa.

Impact investors are being criticized for bias, and demands are increasing that they change their patterns of investing. Impact investment managers tend to come from developed countries and prefer to invest within their network. A recent report from Oxfam has argued that impact investors ignore impact criteria and disproportionately invest in companies that can provide financial returns, across all sectors. Critical voices from within the industry (including a Village Capital report) suggest that investors should have greater local engagement, modify their investing criteria, and invest in what entrepreneurs need.

About This Paper

This working paper is the fourth in a series of publications. The previous publications in this series have looked at implementation strategies in clean energy access (Yonavjak et al. 2013), appropriate policy measures for clean energy access (Doukas and Ballesteros 2015), and an examination of the role that development finance can play in accelerating PAYG energy access (Sanyal et al. 2017). Our paper on PAYG energy access had noted the concentration of investments in foreign-owned foreign-managed companies. This working paper is an early analysis of the alleged bias in impact investment. We examine the type of investments made by impact investors in clean energy access and draw comparisons with the type of businesses that local entrepreneurs are building. We examine whether there is reason to justify the criticism of impact investors, identify the underlying causes, and offer solutions.

We focus on Kenya, which has been the hub of clean energy access investments in Africa. The country also has the oldest World Bank-supported incubator for environmental enterprises and a vibrant entrepreneurial culture. This provides the background and evidence to examine whether impact investors have invested in local entrepreneurs and explore experience to date.

Approach and Methodology

We interviewed impact investors, local entrepreneurs, and customers. We interviewed 20 impact investors to understand their investing criteria. We surveyed local entrepreneurs to understand their business models and understand their financing needs. We then selected five of these local enterprises and undertook an impact assessment of a sample of their customers. We also shared and received feedback from entrepreneurs and investors in a meeting in Nairobi.

Conclusions

Impact investors in the clean energy access sector have almost exclusively invested in PAYG SHS and in mini-grid companies. The companies have been involved in the development of the product (the solar product and the associated software) and in deployment (selling the product on credit to customers). A plausible reason why impact investors have focused exclusively on these two models is that they are perceived as being able to grow (scale) rapidly. The reason for this perception is that these business models have incorporated mobile and information technology components. Africa has millions of people living without access to the electricity grid. These businesses enable customers to have access to electricity by allowing them to pay small amounts regularly with mobile money. The companies can remotely monitor the systems and provide maintenance services. New customers can be signed up and serviced at low marginal cost using a call center. PAYG business models are evolving to include productive load applications, such as solar pumps.

On the other hand, local entrepreneurs, without exception, have been building very different types of businesses. Instead of developing the products and technology in the PAYG SHS and mini-grids, they are distributing PAYG products (manufactured by international companies) and implementing mini-grids. They are also setting up larger systems, such as rooftop solar panels for industries and commercial establishments. They are setting up solar pumping systems for drinking and agricultural use. In addition, they are working with other forms of renewable energy, such as agricultural biomass. Investors perceive that these businesses cannot grow as rapidly as PAYG SHS and mini-grids and have the following three concerns about this diversified approach:

- The distribution of products is vulnerable to competition as other companies could also start importing and selling products.
- The larger systems will always require more expensive services to scope and install.
- Renewable energy sources, such as agricultural biomass, are often fraught with quality and supply issues.

Local entrepreneurs have built profitable, though small businesses. Two key trends are working in their favor. First, the PAYG industry is being unbundled. This means that some companies are specializing in different parts of the value chain and on the customers they serve. Product manufacturing companies are manufacturing various types of renewable energy-based products. Software companies are developing systems for monitoring and payment. Local companies that know the local customers and market dynamics can focus on distribution and credit provision. Second, with the falling costs of renewable energy, various customer segments, such as companies, farmers, industries, and municipalities, have an incentive to buy these products and services. This has created new opportunities to set up customized renewable energy systems for a wide variety of applications.

There is a vicious circle at play that prevents local entrepreneurs from building large companies. They cannot (or perceive that they cannot) access impact capital, so they set their sights on building a smaller company. The smaller company cannot raise money and remains small and under-invested.

Companies distributing PAYG products deliver multiple levels of impact. Companies have the flexibility to sell and distribute a wide variety of products, including electricity systems of various sizes, electrically operated barber kits, fishing boat lights, pumps for farmers who own fields of different sizes. They can test-market various product types as they themselves do not have to bear the investment in product development. Companies that are implementing mini-grid systems also deliver impact; however, we were not able to determine what type of business models exist.

In the limited area of clean energy access that we examine in this working paper, our conclusion is that existing criticism of the impact investing industry is possibly misplaced. International impact investors have invested in local entrepreneurs in India where the investing targets seem to have met their criteria. They have invested in PAYG providers and mini-grid developers not necessarily to maximize financial returns, but to see rapid impact in terms of households electrified. However, impact investors do follow the venture capital mode of investing: large bets in technologically strong companies with business models that can scale fast and provide a high return on exit. This venture capital mode of impact investing has been good for the PAYG and mini-grid businesses but is not appropriate for the businesses that local entrepreneurs are building.

Recommendations

Our recommended solutions are twofold. In the short term, use the industry trends to target investments at profitable growing local enterprises through instruments and structures that recognize that these companies will be profitable but remain relatively small. This will help prove that local entrepreneurs are investment-worthy. In the longer-term, help build the capacity of local entrepreneurs to grow businesses that can meet the needs of growth (scale) that many international investors find valuable.

Local currency debt would address the needs of the relatively more advanced local entrepreneurs. The availability of local currency debt would level the playing field for Kenyan entrepreneurs, and they would not need to set up elaborate off-shore structures that enable receipt and repatriation of foreign currency debt along with complex hedging mechanisms. International development financial institutions have the ability to partner with local banks to make these loans possible through provisions of lines of credit.

We recommend that investors in impact funds also encourage impact fund managers to experiment with local currency debt fund structures. There is a window to do this in the absence of commercial bank lending. This would enable impact fund managers to make smaller-value local currency debt investments in companies that would probably grow to only modest sizes. Current impact funds may not be able to make these investments. They make mainly equity investments, and the incentive structure for the managers is weighted in favor of making larger individual investments. This makes them more interested in PAYG and mini-grid companies that require larger amounts of capital. A possible structure suggested is an investment

fund that invests in debt (and not equity) and is evergreen (i.e., not forced to liquidate all its investments within a limited period).

Donors and foundations should use their funds to support impact investors in covering the hedging cost to make local currency lending possible. This would free impact fund managers to focus on identifying creditworthy companies. Donors and foundations can additionally support investors with grants to meet the strategic capacity-building needs of local entrepreneurs so that local entrepreneur success stories can be created.

INTRODUCTION

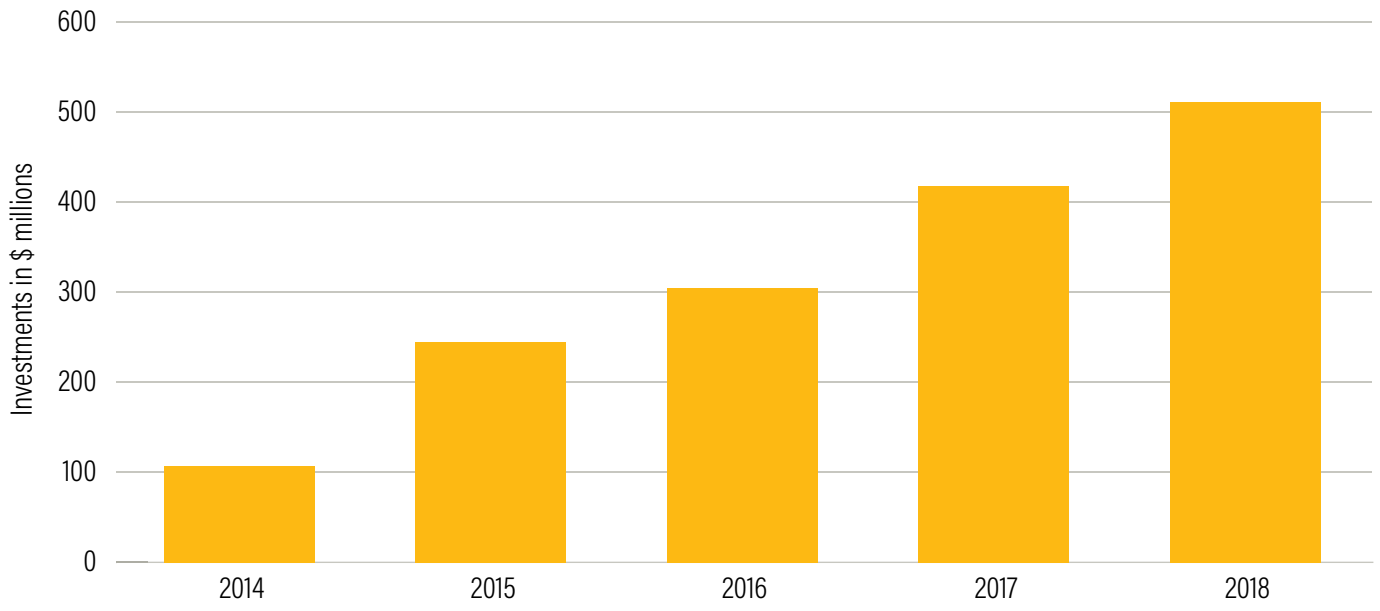
Investment Trends to Achieve Energy Access

The United Nations Sustainable Development Goal 7 (SDG 7) targets the provision of affordable, reliable, and modern energy services to all by 2030. Nearly 153 million people gained access to electricity annually in 2016 and 2017, but 840 million people are estimated to lack electricity access (United Nations 2019).

Off-grid energy access companies operating across the globe have absorbed about $1.7 billion in disclosed investments in the period 2010 to 2018. Figure 1 indicates the increasing amount of investment in the last five years. The year-on-year investment growth rate over the previous year was 24 percent in 2016, accelerating to 37 percent in 2017 and then returning to 22 percent in 2018. (Wood Mackenzie 2019).

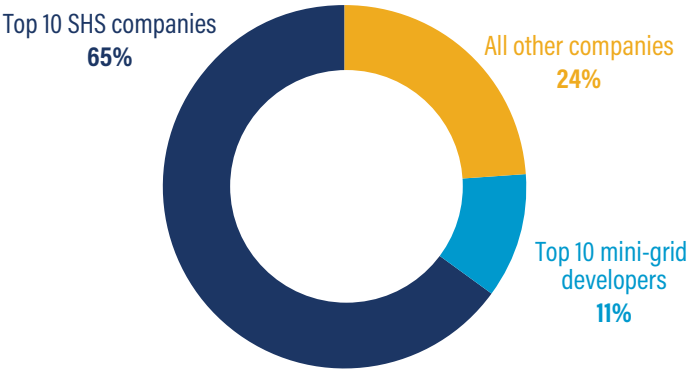
Investors include both public and private funds. The top four investors on the public funds side include FMO (the Dutch Entrepreneurial Development Bank), Norfund (Norway's Development Financial Institution), CDC Group (UK's Development Financial Institution, and the U.S. International Development Financial Institution. The top five investors on the private funds side include responsAbility, SunFunder, Helios Investment, Social Investment Managers and Advisors (SIMA) Fund, and DBL Partners. Investors on both the public and private side deploy both equity and grants as instruments. Transaction sizes have been increasing. The average equity transaction value doubled from 2017 to 2018, and the average convertible note transaction grew almost 5.5 times, compared to the previous year.

Figure 1 | **Annual Growth in Global Investment in Off-Grid Energy Access Companies**



Source: Wood Mackenzie 2019.

Figure 2 | **Concentration of Investment in the Top 20 Companies**



Source: Wood Mackenzie 2019.

The investments are highly concentrated in relatively few companies. The top 10 Solar Home System (SHS) market leaders worldwide have raised about $1.1 billion since 2010. The top 10 mini-grid developers worldwide have raised $190 million. Altogether, 20 companies have raised 76 percent of total disclosed investment. The concentration is also high in terms of products and business models. Eighty-one percent of the total disclosed investment amount is in SHS and smaller solar systems. Ninety-one percent of the disclosed investment is in PAYG systems. (Wood Mackenzie 2019).

The mini grid business model commenced after the SHS PAYG business model, and this partly explains why the top 10 mini-grid developers have raised substantially less capital than the top 10 SHS companies. Companies in productive load (for example providing renewable energy solutions to the agricultural sector) have also started raising impact capital, as shown by the successful capital raises of SunCulture (a solar irrigation company)[1] and InspiraFarms (a cold storage company).[2] It is likely that, over time, additional investments will flow into mini-grid developers and productive load companies.

KEY TAKEAWAY: Investment has been accelerating in the off-grid energy access companies but is highly concentrated in terms of the number of companies, products, and business models being supported.

The Issue with Investment Concentration

Previous research by World Resources Institute (WRI) has indicated that the majority of PAYG companies operating in Africa are foreign-owned and foreign-managed (Sanyal et al. 2017). The concentration of investment—76 percent of the total invested amount in 20 companies in the period ending 2018—and the increasing size of deals indicate that capital has been further concentrated in foreign-owned and foreign-managed companies. This concentration of investment in foreign-owned and foreign-managed companies has since been noted by other researchers and seems to be prevalent in sectors other than clean energy. A report by Village Capital has noted that 90 percent of investments in digital financial services enterprises in East Africa during the period 2015–16 went to companies with at least one European or North American founder (Stratchan et al. 2017).

The issue of investment concentration in foreign-owned and foreign-managed companies has come up in multiple industry-level discussions. Fiona Mungai, managing director of Endeavour, Africa (an entrepreneurial support organization) and Dr. Christie Peacock, founder and chairman of Sidai Africa (a company supplying livestock and farm inputs to farmers) noted:

> ". . . there is a growing backlash against impact investors among local entrepreneurs in Africa, who are becoming increasingly frustrated at the bias investors have shown in favor of expatriate-founded business."[3]

Adva Saldinger, an associate editor of Devex, in her article "Local Entrepreneurs on Funding Access: The System Is Broken," noted:

> Many entrepreneurs . . . lack access to the knowledge, venues, and organizations that can help them get the capital to grow. Those lacking some tie to the West—be it an education, a fellowship, or a co-founder—rarely get access to capital.[4]

Impact investments are intended to generate positive, measurable social and environmental impact alongside a financial return.[5] Other researchers have noted that tensions exist between impact investors and local entrepreneurs operating in low- and middle-income countries. These tensions relate to investor expectations and even the investor commitment to achieve impact. (Jones 2019). Industry-level efforts are starting to address the problem. Catalyst Off-Grid Advisors and Open Capital Advisors have launched Venture Builder, a blended finance company that would provide early-stage investment to African-owned local distributors. In a white paper released in October 2018, the two organizations laid out the various challenges that prevent entrepreneurs

from raising capital.[6] The paper proposed to provide technical and management-level capacity building, alongside investment, to enable the local distributors to implement PAYG functionality. In October 2019, Venture Builder announced that it had received support from DOEN Foundation, Shell Foundation, Facebook, and the U.S. Agency for International Development.[7]

Commentators have provided the following explanations for the lack of investment in locally owned African companies from impact investors specializing in this area:

- Impact capital is sourced from Western nations, and impact fund managers lack experience investing in African markets. They favor foreign entrepreneurs from their own social or business network (Strachan et al. 2017).
- Impact investors often sacrifice social and environment impact returns in favor of financial returns (Jones 2019; Bolis et al. 2017).
- Foreign entrepreneurs can build detailed business plans and financial models that international impact investors want (Jones 2019).
- Foreign entrepreneurs can build businesses that have a larger information technology component (Mungai and Peacock 2017; Strachan et al. 2017).

Most commentators have indicated that there is a wide gap between local entrepreneurs and international impact investors. Their main suggestions are summarized as follows:

- International investors should engage with local entrepreneurs, hire local staff, and focus on searching for local entrepreneurs (Mungai and Peacock 2017).
- International investors should try to understand what local entrepreneurs need and specifically address those needs (Jones 2019).
- Incubators and investors should provide support to entrepreneurs to strengthen their business skills (Murphy and Zellar 2018; Saldinger 2019; Strachan et al. 2017).
- Donors and foundations should provide support to investors to invest in local entrepreneurs by providing them grants that would enable them to do early-stage deals and cover additional due diligence and legal fees. An example is the support provided by Mott Foundation to Sun Funder to provide loans to African-owned enterprises.[8]

There is another issue with investment concentration. The failure of any one of the larger companies is likely to scare private investors away from the entire sector. The Wood Mackenzie strategic report warned of an investing cliff: "Investments are chasing a few companies, which are possibly over-valued, operating in adjacent and overlapping geographies seeking to meet aggressive growth expectations from VCs and mostly prioritizing market share over profitability" (Wood Mackenzie 2019). Since the publication of the Wood Mackenzie report earlier this year, Mobisol, one of the PAYG companies,[9] has gone into insolvency, and its assets have been acquired by ENGIE.[10] For the broader purpose of reaching SDG 7 goals, it is important that investors diversify their investment approach or breadth. The fact that there are only a few companies operating in this area leads to another risk. Failure of even a few companies would rob policymakers of the option of using decentralized solar as an effective means of rural electrification.

Objective and Scope

The objective of this working paper is to explore these themes. Our aim is to scrutinize in a specific sector (clean energy access) the perception that impact investment has largely bypassed local entrepreneurs. We also examine whether local entrepreneurs are building businesses that could be invested in. We then examine the reasons why this investment is not happening and try to develop solutions that address these underlying causes.

The working paper examines the specifics of this issue in Kenya. Kenya is the global hub of clean energy access companies operating in the PAYG model, which, as we have noted, has attracted an overwhelming share of international investment. Kenya also hosts the oldest of the climate innovation centers set up under the World Bank Infodev program, which has supported several local clean energy entrepreneurs. The Kenya Climate Innovation Center was set up in 2012. Outside the clean energy access sector, Kenya has a thriving entrepreneurial environment and is a middle-income country.[11] This macroeconomic environment offers the opportunity for private businesses to start up, acquire customers, and raise capital.

It is not the objective of this paper to criticize foreign entrepreneurs. Foreign entrepreneurs making East Africa their home are bringing talent, ideas, technology and finance to the continent. Indeed, the objective of the paper is its exact opposite. We aim to create greater value by fostering an environment where entrepreneurs are evaluated on a more equal footing.

The primary audience for the paper is investors in impact funds focused on clean energy. The secondary audience is both public-sector donors and private foundations that are supporting entrepreneurial ecosystems in Kenya. We also aim to inform entrepreneurs about the actions they can take, given our analysis of the challenges posed in raising capital from international capital.

Following this introduction, Chapter 2 explores the distribution of investment. Chapter 3 investigates the local entrepreneurs in detail. We conclude with our analysis of the causes and recommended solutions.

Methodology

This working paper is the product of ongoing WRI initiatives in clean energy policy and financing. It builds on previous publications in the series, which focused on implementation strategies for renewable energy services in low-income rural areas and the policy and regulatory challenges facing the sector. We interviewed 20 impact investors who have invested in at least one decentralized renewable energy enterprise. Appendix A provides the interview protocol that we used. These interviews focused on the financial and social return expectation of these investors in addition to information on the size of their portfolio, investee profiles, and the state of their future fund raising. We also interviewed several local entrepreneurs about their business models, their turnover and profitability, and growth plans. We selected five of these entrepreneurs for impact assessment. During the two-hour-long in-person interview with the entrepreneurs, we sought to learn about each company's vision of social impact alongside the operation models that had enabled impact creation. Finally, we visited and conducted focus-group discussions with the customers of the five entrepreneurs to validate the impact that the entrepreneurs claim that they have been creating. We focused on last-mile customers in some target markets, especially on women, ethnic minority groups, and economically marginalized populations. We discussed customer satisfaction extensively to find out product quality as well as services they received to maintain the effective use of the products. The gender balance in the focus groups was carefully chosen to reflect the gender dynamics of the customer base. Appendix B provides an overview of the focus groups that we recruited. Finally, we presented our findings and obtained feedback on possible solutions from a group of investors and entrepreneurs in Nairobi in December 2019.

EXAMINING THE MAGNITUDE OF THE PROBLEM

Clean Energy Access Investment in East Africa and Other Regions

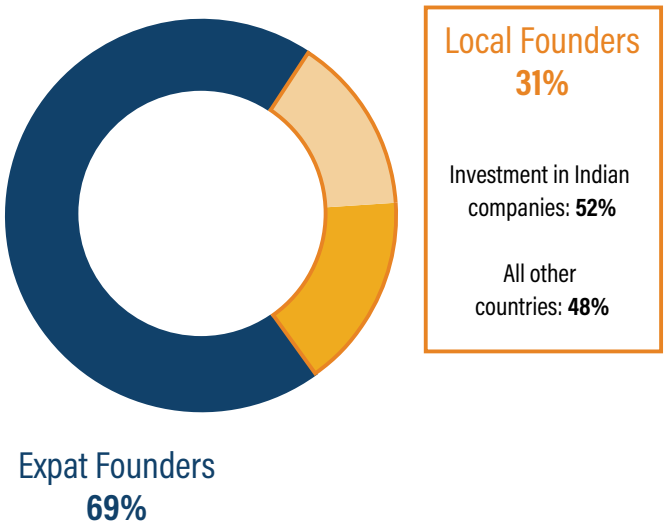
In this section, we examine the issue of local versus foreign distribution of investments in clean energy access. As we have noted earlier, off-grid energy access companies have absorbed about $1.7 billion in disclosed investments in the period 2010 to 2018. The top 10 SHS companies (by way of investments received) have absorbed $1.1 billion in investments, and the top 10 mini-grid players (again by way of investments received) have absorbed $190 million in investments. The top 10 SHS companies all operate in the PAYG mode. Appendix C provides an analysis of the founder origins and the geographical areas of operations of these companies. We make the following conclusions:

- Of the top SHS and mini-grid companies that operate in Africa, only one has a founder with origins in the African region.
- Of the top SHS and mini-grid companies that operate outside Africa (India, other parts of Asia, South America), only one does not have a founder with origins in the region the company operates in.

This analysis seems to indicate that African entrepreneurs have not been able to build SHS PAYG and mini-grid development companies that have attracted large sums of investment capital. On the other hand, international investors investing in companies operating outside Africa do not seem to be hesitant in investing in companies that are founded by entrepreneurs from that region.

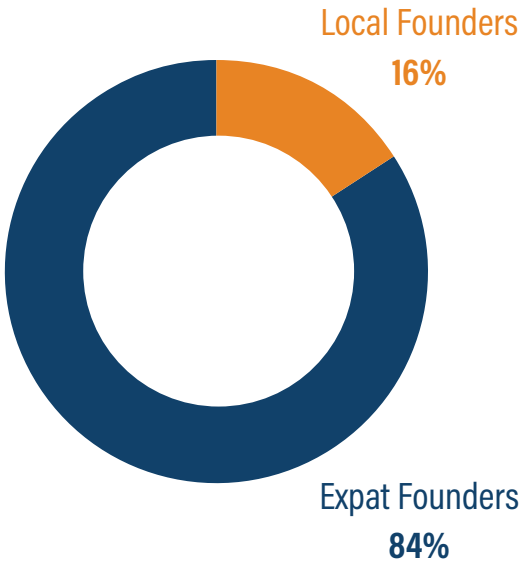
To understand whether the issue of local investors not being able to attract investment is purely Africa-related, we analyzed 174 impact investment transactions by the 19 investors that we interviewed (Appendix C). Data were drawn from the Crunchbase database from each of the investors and research on the company's founders. We analyzed 174 investments across sub-Saharan Africa and India. Both these regions have seen significant impact investing activity. We found that 69 percent of investments analyzed were in companies with exclusively expatriate founders. The 31 percent of companies with local founders were all clustered in India, which accounted for over half of all investments in local founders. These 174 investments were across all sectors, including agriculture, health, and livelihoods. Of the transactions reviewed, energy-specific investments made up 17 percent of the

Figure 3 | **Founder Origins of 174 Impact Investments Analyzed**



Source: Authors.

Figure 4 | **Founder Origins of 30 Energy-Related Impact Investments Analyzed**



Source: Authors.

transactions; and of these investments, only 16 percent were in companies with a local founder. This analysis seems to indicate that African entrepreneurs have not been able to raise capital across sectors. The trend is not limited to clean energy. However, it also does seem that this is an Africa-specific problem. Impact investors seem to have invested in local founders in India.

KEY TAKEAWAY: In clean energy, international capital has largely gone to entrepreneurs who are operating in Africa but who are not from the region. In other regions, international capital has been invested in founding teams that are local.

Investor Expectations and Patterns

In this section, we analyze investor expectations with respect to clean-energy investments. Previous WRI research (Sanyal et al. 2017) has indicated widespread investment in the PAYG sector. This includes investments by individual angel investors and family offices, venture capital, private equity, and corporate venture capital (strategic investing). In this working paper we look at the investor expectations primarily of impact investors. Impact investors consider socioeconomic returns along with financial returns in their investment criteria. Of the 20 investors we interviewed, two were foundations with an energy access program, one was a development finance institution that has invested directly in enterprises, one was a solar rooftop leasing company, and one a network of angel investors. The other 15 were impact investment managers. The following is a summary of our main findings:

- Of the 20 investors, 13 have local staff in Kenya.
- Seven investors focus specifically on energy or environment. They are Ariya Capital, DOEN Foundation, Kenya Climate Ventures, Factor [E], Shell Foundation, SunFunder, SIMA, and Treehouse Investments.
- Most impact investors invest in multiple sectors, including agriculture, livelihoods, health, and education. For these non-specialized investors, clean energy forms a relatively small portion of their respective portfolios.
- Equity is the most common instrument for investing in enterprises. Ten of the nineteen investors indicated that they use equity. The nine investors who do invest in debt include two (Ariya Capital and Camco) that finance projects and one (OPIC) that is a development financial institution.

- Fifteen of the twenty investors prefer ticket (transaction) sizes that exceed $500,000 and prefer to invest in companies that can absorb more than $1 million.
- Several of the investors are trying to raise their next funds. These are likely to be larger, in which case, targeted average investment sizes would rise.
- There is negligible interest among domestic angel investors in clean energy companies. Our discussions with the local angel investor network indicated that angel investing was limited to information technology and related areas.

Our discussions indicate that many of the investors were aware that local entrepreneurs did not seem to have access to investment capital. They also indicated that there are several challenges in investing in local entrepreneurs (which we introduce in the next section and expand more fully in Section 4). The example of Kenya Climate Ventures is useful. Kenya Climate Ventures is a Nairobi-based investor with a focus on early-stage deals in the climate-friendly space. The fund has been seeded by DANIDA and UKAID. Three investments have been made to date, and the single investment in clean energy access is in Sistema.bio, a biogas company founded by entrepreneurs from Mexico.

Local Entrepreneurs in Kenya

In this section we analyze the types of local companies that exist in the clean-energy access space. We found local entrepreneurs building clean-energy companies mainly in the following areas:

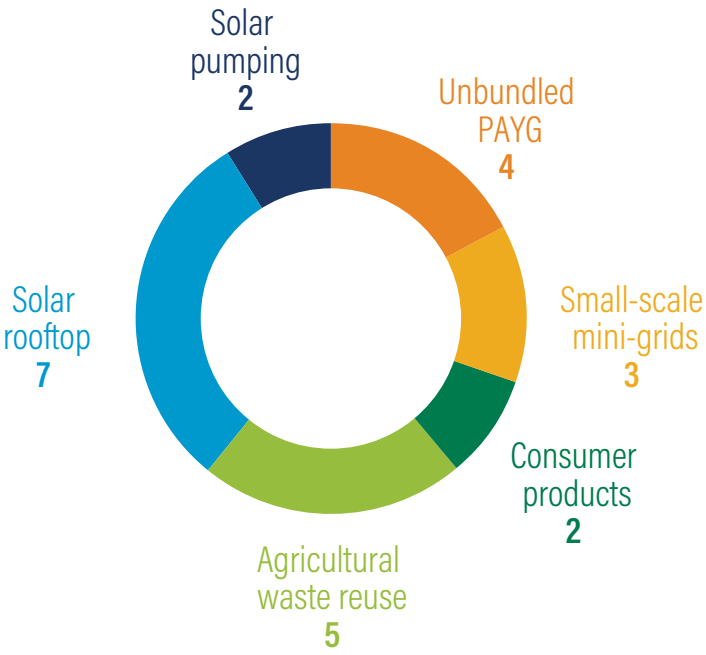
- Unbundled PAYG: companies that are distributors of PAYG-ready products. They provide both last-mile distribution, customer service, and consumer credit. They do not manufacture the products but sell the PAYG-ready products of others on credit.
- Small-scale mini-grids: companies that have developed a few mini-grids using small hydro or solar technology either as a developer (selling to another organization that operates the grids) or as an operator (selling and collecting the electricity themselves).
- Consumer products: companies selling solar home systems and solar lanterns or cook stoves on a cash or a loan basis. Like the unbundled PAYG companies, they sell the products of other companies. Unlike them, they do not provide consumer credit. They sell the product outright or partner with a financial institution that provides the customer with a loan.
- Agricultural waste reuse: companies that are using agricultural waste to manufacture biomass pellets, biofuel, biogas, and biofertilizers. They sell to both institutional customers and retail customers.
- Solar rooftop and water heaters: companies installing solar rooftops and water heaters for a variety of residential, commercial, and industrial clients. The companies procure the solar panel and other components and size, assemble, install, and service the equipment.
- Solar pumping: companies installing solar systems for pumping water for drinking and agricultural use. The companies procure the solar panel and other components and size, assemble, install, and service the equipment.

We interviewed 25 companies across the six main areas (Appendix E).

In the clean-energy sector, local entrepreneurs are building companies across multiple subsectors; whereas international impact investment is concentrated mainly on PAYG. The common element of the PAYG sector and mini-grid companies supported by investors is the focus on products enabled with information technology. The information technology features allow companies to track customer usage, and customers to pay in small amounts using mobile phones. Because companies can track how the system is being used, they can also provide remote maintenance. This combination of ready-made products and information technology addresses concerns around scalability, a key issue of concern with investors. This feature is now being expanded to other products, such as solar pumps, which can also be sold on a PAYG basis. These companies are also generating investor interest.

There are concerns that local entrepreneurs who are building the types of businesses described above will struggle to grow as they are not building technologies and processes that will enable them to reach and service increasing number of customers at decreasing costs. For example, companies who are distributing PAYG-ready products (as opposed to those who are manufacturing them) will be restricted to specific geographies. They may find it challenging to expand outside the county in which they operate, let alone expand outside Kenya. Most PAYG companies that have attracted impact investors have operations in multiple countries and ambitions to expand across the continent. Companies developing solar rooftop or solar pumping solutions have to generally examine each

Figure 5 | **Local Entrepreneurs Interviewed by Business Models**



Source: Primary data from this study

customer's specific requirements before implementing a solution. Companies selling briquettes made from agricultural waste have to deal with uneven quality as their input material may vary.

There are also concerns around corporate governance. Many local businesses are run by small entrepreneur teams, sometimes from the same family. Several of these entrepreneurs have not worked in any large business enterprises before. They do not invest in establishing professional accounting systems or creating a more broad-based corporate or advisory board. Many of the entrepreneurs value their control of the company and are not willing to sell shares in lieu of external investment. We recognize that these are legitimate concerns from the point of view of equity investors. The local entrepreneurs could be building profitable businesses that deliver value to a set of customers but are not necessarily of the type that are suitable for external equity investment.

KEY TAKEAWAY: International impact capital has been focused on PAYG and mini-grid companies that have off-the-shelf lighting products with built-in information technology components. These companies have held out the promise of rapid growth. Local entrepreneurs are building different types of businesses. The technology suite of local entrepreneurs is more diversified and requires more up-front scoping and sizing. Instead of building off-the-shelf products and technology, they are distributing tailored PAYG products and implementing mini-grids. Instead of only targeting households without electricity, they are targeting institutional customers. Impact investors seem to be skeptical about these companies' ability to grow and create impact.

Entrepreneurial Support Ecosystem in Kenya

Kenya enjoys a strong entrepreneurial support ecosystem in the form of capacity development organizations, incubators, and entrepreneur labs. We came across 18 such organizations in Kenya. Of these 18, 4 specialize in environmentally friendly businesses. Appendix F offers details about all incubators.

The Kenya Climate Innovation Centre (KCIC), set up in 2012, provides incubation and financing in the form of grants and repayable loans to Kenyan entrepreneurs and new ventures that are developing innovative solutions in energy, water, and agribusiness to address climate-change challenges. KCIC is an initiative supported by the World Bank's infoDev and is funded by the United Kingdom's UKAid and the Danish Ministry of Foreign Affairs. KCIC also has a partnership with Autodesk Foundation that enables it to support companies with repayable grants. KCIC has supported nearly 200 companies since inception. Kenya Climate Ventures, which focuses on investing in environmentally friendly enterprises, is a subsidiary of KCIC.

The National Environment Trust Fund (NETFUND), a state corporation, provides direct financing through scholarships, grants, awards, and prizes to promote best practices in environmental management. Between 2015 and 2018, NETFUND developed more than 60 green businesses.

Crossboundary Labs is helping 18 mini-grid developers throughout Kenya, Tanzania, Nigeria, and Zambia to test business model innovations. It is run by the Crossboundary Group and supported by Rockefeller Foundation, Shell Foundation, and UKAID.

GET.invest operates a finance catalyst that links small and medium renewable energy projects and companies to providers of finance.

This strong entrepreneurial support system coexists with the lack of investment flowing to local entrepreneurs. The incubation system aims to connect entrepreneurs with investors. However, local entrepreneurs are not building businesses for which investors have shown a clear preference. Given that the investors have been seeking a specific type of business, it has not been possible for incubators to attract capital to local entrepreneurs.

FINANCIAL AND IMPACT RETURNS

Expectations on Financial Returns

In this section, we examine whether there are entrepreneurs who have made sufficient progress and who could expand further, given external investment. For entrepreneurs to be able to attract external investment, they would have to exhibit reasonably strong financial parameters, opportunity for growth, and professionalism on the part of the founders. Investors in private companies do not have objective benchmarks to judge these parameters and use their experience to get a sense of whether to invest. During our interviews with investors, we tried to identify some commonly used investability criteria and what they involve (Table 1). In addition to these criteria, the ability of the investor to get an exit is important. The ability to provide the exit is derived from these assessment criteria. A company that is growing with strong positive financial metrics and has a strong management is more likely to provide multiple exit options.

Based on our analysis, local entrepreneurs who are building the following four types of clean energy companies are likely to be able to provide both financial and socioeconomic returns:

- Unbundled PAYG: companies that are distributors of PAYG-ready products. They provide last-mile distribution, customer service, and consumer credit.
- Agricultural waste reuse: companies that are using agricultural waste to manufacture biomass pellets, biofuel, biogas, and biofertilizers.
- Solar rooftop and water heaters: companies installing solar rooftops and water heaters for a variety of residential, commercial, and industrial clients.
- Solar pumping: companies installing solar systems that pump water for drinking and agricultural use.

The companies selling consumer products (cook stoves and solar systems) on a cash or a loan basis face strong competition from PAYG companies. PAYG companies provide the product and the customer credit in an integrated package, making it easier for customers to buy and use the product. The companies setting up small mini-

Table 1 | **Enterprise Assessment Criteria**

INVESTABILITY CRITERIA	COMPONENTS OF CRITERIA
Does the enterprise exhibit strong financial parameters?	Customer base
	Turnover/revenue growth
	Profitability and unit economics
Does the enterprise have the ability to grow?	Competitive advantage
	Geographical areas for further expansion
	Distribution channels and partnerships
Does the enterprise have a professional and seasoned founding team?	Entrepreneur background
	Number of cofounders

Source: WRI analysis.

Table 2 | **Local Entrepreneur Customer Base and Drivers for Financial Growth**

LOCAL ENTREPRENEUR CLEAN-ENERGY COMPANY TYPE	TYPICAL CUSTOMER BASE	DRIVER FOR GROWTH
Unbundled PAYG	Households Farmers Fishermen	Economic benefits of electricity compared to using kerosene/batteries
Agricultural waste reuse	Factories Schools Agricultural industry	Economic savings of using waste biomass as opposed to firewood and the regulation prohibiting the use of firewood
Solar rooftop & water heaters	Commercial establishments Industries	Economic benefits of solar electricity: lower cost than grid electricity and savings on fuel to heat water
Solar pumping	Local government Municipalities Nongovernmental organizations	Economic benefits of solar electricity: lower cost than diesel generator in the absence of the grid

Source: WRI analysis.

Table 3 | **Local Businesses Meeting Investment Criteria**

LOCAL ENTREPRENEUR CLEAN-ENERGY COMPANY TYPE	EXAMPLES OF LOCAL ENTREPRENEUR
Unbundled PAYG	Deevabits, Mwezi Solar Sun Transfer
Agriculture waste reuse	LeJan Energy, Zynagro, KenCoco
Solar rooftop & water heaters	Astonfield
Solar water	Epicenter

Source: WRI analysis.

grids also find it hard to grow as they struggle to make a profit from individual mini-grids.

Table 2 summarizes the customer base and the driver for growth in each segment.

In Appendix G, we provide details of seven businesses run by local entrepreneurs that, in our opinion, meet the criteria laid out in Table 1. Table 3 summarizes these businesses.

Our interviews with the companies indicated that in terms of financial performance, three of the companies have annual revenues of about $1 million, and two have revenues of around $2 million. Two of the companies have revenue below $1 million. All the companies have positive earnings before interest, lease, and depreciation expenses (EBILD). (Positive EBILD indicates that the company's operating expenses are lower than income.)

We noted two broad trends that might increase financial returns from local entrepreneur-run businesses: unbundling of the PAYG sector and falling costs of renewable energy. These two trends provide opportunities to invest in the types of businesses that local entrepreneurs are building.

Unbundling of the PAYG sector

There are four components of the PAYG business: the product (for example, the solar home system), the software (that allows customers to pay using mobile money and activate the product and companies to remotely monitor energy use and payment), the distribution and marketing infrastructure (including sales agents, technical service personnel, etc.), and the customer finance component (deploying the solar systems in larger numbers of households and getting paid over a period of time). The PAYG companies that have attracted large amounts of

capital were obliged to raise this amount of capital because they needed to control all four components. They were manufacturing the product; developing the software; investing in marketing, distribution, and service; and providing the customer finance.

However, this is not the only possible model. Among the older PAYG companies, Azuri Technologies has always followed a so-called distribution model under which it partners with a local company that takes over the distribution and marketing infrastructure. In the case of Azuri, its main distribution partner in East Africa is Raj Ushanga, a well-established company whose original business was the import and export of beads.

This trend is being further accentuated by the specialist PAYG software companies like Angaza[12] and specialist product manufacturers such as Omnivolatic.[13] The specialist software and product companies have allowed local enterprises like Deevabits, Mwezi Solar, and Sun Transfer to market a whole range of products, including electric barber kits, fishing lights, and pumps. These products are sold on a PAYG basis without the local company having to invest in either the product or the software development. The local enterprise can focus on its area of strength and be responsive to customer needs. Unbundling should also accelerate the SDG of achieving universal energy access. Previous researchers have noted that a large number of smaller enterprises—or units of a large enterprise—can bring the most appropriate technology, market-building strategies, and business models to local segments of the highly fragmented energy access market (Miller Center of Social Entrepreneurship 2015).

The unbundling of the PAYG sector is likely to expand both product categories and business models in the sector. Unbundling should also lower entry barriers. Companies need not undertake the risk of managing the entire value chain (technology and product development, manufacturing, and distribution). They can focus on distribution, switching to a new product if the need arises.

In Appendix H, we categorize some business models and product categories that may emerge. The emergence of new categories should open up investing opportunities.

Falling costs of renewable energy

In Kenya, as elsewhere in the world, renewable energy is becoming cheaper than fossil fuel energy. According to a report published by Bloomberg NEF, rooftop solar prices in Kenya are very close to electricity prices from the grid at $0.15/kWh. This allows customers like Astonfield to be able to service a wide variety of customers, including offices, retail centers, factories, agri-processing units, hospitals, and educational institutions. There is widespread interest among these customers in the benefits of installing solar rooftops even though the market started only in 2016 (BNEF 2019). The availability of financing options, such as loans or leases (by Ariya Capital, responsAbility, and Zohari Leasing), could further expand the market as these options enable the customer to pay cash up front for the system.

Even outside the solar rooftop sector, renewable energy is becoming cost competitive with fossil energy. In rural areas and the agriculture sector, for example, our focus group discussions with the farmers suggest a 50 percent increase in income after installing a solar pump. This is because their farms were previously rain-fed or irrigated using gasoline-driven pumps. Irrigation helps them improve farm yields in periods of unpredictable weather, and eliminating the need for petrol reduces costs.

While the household electricity and mobile charging market is being served by the PAYG companies, the markets serving institutional customers and productive uses are only emerging. Local entrepreneurs entering these markets can develop competitive advantage. Setting up larger-scale systems like solar rooftops and solar water requires services in the form of sizing, local fabrication, assembly, and installation. Agricultural waste reuse businesses require local connections and knowledge. The features of these businesses would possibly work in favor of local entrepreneurs.

Social and Economic Impact Returns

Range of impacts

Despite the small and falling size of funds available, we found that local entrepreneurs have created significant impacts on the ground by taking advantage of their cost-efficient impact models. Some of the impacts have been unanimously observed across different product lines in different local contexts. The products and services have reduced energy expenditures at the level of households or micro businesses. They have also brought livelihood opportunities, which, when combined with energy savings, have improved overall incomes. When the new income generation benefits women or youth or socioeconomically marginalized groups, it improves overall well-being.

Table 4 | **Socioeconomic Impacts Generated by Local Entrepreneurs**

LOCAL ENTREPRENEUR CLEAN-ENERGY COMPANY TYPE	ECONOMIC IMPACTS		SOCIAL IMPACTS
	PRICE OF THE PRODUCT AND PAYMENT PLAN	SCALE OF ECONOMIC IMPACTS	
Mwezi, solar fish lights	16,500 Ksh. Payment plan involves 10% down payment and 80 Ksh daily installment for 6 months.	1,000 Ksh saving per night, compared with renting and fueling kerosene lights. Women boat owners can increase their revenue by 50% (equivalent to ~140,000–350,000 Ksh/month per boat because the fish lights boost production.	Economically empowering women boat owners who are culturally prohibited to fish and rely on reselling fish bought from men inside and outside of the family.
Magiro, mini-grid	The utility bill is a fixed amount of ~200 Ksh per month. The connection fee is 15,000 Ksh. The payment plan involves 5,000 Ksh initial payment and installment on the monthly basis to cover the rest.	Saving of 35,000 Ksh connection fee for using grid power. Typical monthly bill saving is up to 7,000 Ksh. For those productive users who could not afford grid connection, the mini-grid has enabled businesses to be open for longer hours and has led to income growth between 350 Ksh and 5,000 Ksh per day.	Employing youth helped empower men and women aged between 18 and 35 years through economic prosperity and technological skills.
SunTransfer, solar appliances	69,000 Ksh for solar pump and 45,000 Ksh for barber kit. Downpayment 30,000 Ksh for solar pump and 3,000 Ksh for barber kit. 12–15 monthly installations for the balance (plus interest), which is 3,000-4,000 Ksh per month.	For solar pump users: Profit increase is between 150,000-300,000 Ksh per season (combining the fuel saving from diesel pumps and revenue increase driven by productivity increase). For barber kit users: Saving 9,000 Ksh per month to replace the traditional shavers. Revenue increase is between 20,000 and 40,000 Ksh per month with more efficient shavers.	Increasing income-generation opportunities for smallholder farmers (users of solar pumps) and self-employed barbers (users of barber kits).
Deevabits, solar lights	600–8,000 Ksh depending on the product. Daily installment varies between 25 and 50 Ksh after downpayment, which is 500-750 Ksh.	Energy bill saving between 800 and 3,000 Ksh per month due to reduced use of kerosene lamps. For productive users, profit increase has been between 1k and 12k per month due to longer operating hours.	Following women-run distribution models that involve reaching out to potential customers in remote areas and economically empowering women distributors and improving their social and family status.

Source: WRI analysis.

Table 4 summarizes the impacts that we identified on the basis of our group discussions, extracting trends and patterns from anecdotal narratives, including the following observations:

- Customers believe that investing in renewable energy products is a viable choice for economic reasons. The benefits of the renewable energy products outweigh the cost even in the short term for most customers.
- When grid power is missing or not reliable, local customers spend extra to procure the off-grid appliances. But that cost is quickly offset by revenue growth. For instance, the solar fish lights, which were designed to attract a particular type of fish and improve fish production, cost 16,500 Ksh per unit. Women boat owners typically pay 10 percent of the total cost (1,650 Ksh) and take the next six months or so to clear the balance, paying 80 Ksh as a daily installment. The solar lights help generate at least 4,000 Ksh in additional revenue per day and reduce 1,000 Ksh of energy expenditure, which in total is significantly higher than the incurred solar cost. The economic benefit of the solar lights is very important to the women boat owners. They are culturally prohibited from fishing and rely on reselling fish bought from the fishermen at wholesale prices. Therefore, women's economic well-being is inherently sensitive to the volume of fish they can get from the fishermen. The solar light provides remarkable help in enabling these women to be more financially independent.
- When grid power is available but too expensive for poor consumers, alternatives provided by entrepreneurs can offer access to financially more viable options. For instance, one entrepreneur established a hydro mini-grid in the village where the grid power is available. Many users do not connect to the grid because of its high cost. With the mini-grid power, the connection fee alone can save users 20,000 Ksh compared to the cost of grid power.[14] To use a certain amount of power, the users are charged a flat rate each month. The flat rate makes energy spending more predictable for the users and generally offers more savings (up to 7,000 Ksh per month).
- Solar appliances have brought more business opportunities for micro business customers. Off-grid products represent a multi-front offer: providing new businesses, increasing business revenue (through extending business hours or improving productivities), or reducing both fixed and variable costs. For instance, our assessment shows that to start a new barbershop business, the total investment cost of purchasing a new solar barber kit can be offset by increased revenue alone in one to two months.
- Customers benefit more when a flexible payment plan is in place to make the products more affordable. In a conventional PAYG model, installments are paid regularly over a certain period of time. This payment model can still cause challenges for micro business owners who have low business seasons when cash flow barely covers their living expenses. Some of the entrepreneurs provide even more flexible payment schemes that charge daily but allow zero payment during the days when customers have no income, until the prices are paid in full.

Impact-creation models

On the basis of the evidence we collected, we suggest that the enterprises in our sample creating socioeconomic impact share the following common factors:

- Local entrepreneurs have knowledge about local needs. They understand the language, the culture, and overall customer needs, among other factors, that govern the success of product launches. They also understand the challenges and struggles that customers may face in marginalized and remote markets. Their local knowledge drives the development of locally tailored products and services, including the financing models that suit local needs and enhance product affordability.
- Local entrepreneurs build effective distribution channels through local partnerships. The entrepreneurs benefit from social networks that are rooted locally, especially in the areas where they grew up or have stayed for a long period of time. Social capital helps them reach out to the local markets in a more effective manner. We have seen three ways in which this can happen:
  - Local entrepreneurs partner with local microfinance service providers and leverage their customer bases to market the solar product. This way, the business is naturally situated in an enabling environment where products can be more affordable and are more likely to create impacts.
  - Given that the local business is essentially expanded through word of mouth, these entrepreneurs employ individual distributors to connect to last-

mile customers. They use the networks that each distributor owns to personally reach out to potential customers who would not otherwise have heard about the products and their benefits.

- Local entrepreneurs collaborate with local stores to get their products sold locally together with other daily essentials, thereby improving the availability of the products and enhancing the effectiveness of customer outreach.

- Local entrepreneurs understand ways and means to meet the service needs. They hire locally sourced operation and maintenance supporting agencies to handle troubleshooting and process customer complaints in a more responsive manner. The only negative feedback received during the customer group discussions concerned one of these businesses removing the local customer care agent. The customers had already experienced more difficulty in getting their service needs met. A follow-up conversation with that entrepreneur confirmed that the removal of the local customer services agent was due to lack of funding for the overall operation. With more funding investment, we believe that the local presence for customer services is one advantage that local entrepreneurs should not sacrifice in exchange for bigger markets.

Sales of any product are contingent on the product suitability, affordability, and availability, as well as the customer awareness. During the impact assessment, we found that in typical circumstances much of the information needed to address these issues is not available because local customers do not usually communicate needs and challenges explicitly. Daily engagement with or inherent familiarity with local needs is ultimately the key offering that these local entrepreneurs can bring to the table and that can enable them to deliver the impacts that investors seek to create. An unbundled PAYG model, which allows local entrepreneurs to invest in these aspects and meet local needs, tends to receive high customer satisfaction and hence big impacts in the local markets.

THE UNDERINVESTMENT PROBLEM: EXPLORING UNDERLYING CAUSES AND POSSIBLE SOLUTIONS

Underlying Causes

The analysis so far seems to indicate that impact investors and local entrepreneurs in clean energy businesses have very different expectations. In our opinion, there are systemic reasons that lead to this difference.

Investment economics

The equity fund structures and the economics of the fund business are key challenges to investing in local entrepreneurs. Typically, funds are structured as close-ended. The investment managers raise the money from outside investors (limited partners) with the promise to return their money with a return at the end of a fund period. The fund period is typically seven to eight years. The investment managers invest the money over the first few years of the fund so that their investments can grow in value. They spend the last few years exiting (selling) the investments. The investment managers get a percentage of the total fund amount (typically 2 percent per year) to pay themselves and their staff as well as cover all expenses of running the fund (office, travel, accounting, and legal). They additionally get a certain percentage (typically 20 percent) of the total returns of the fund, provided that the return crosses the promised threshold (the hurdle rate). Post exit, the investors in the fund will have to be paid in foreign currency.

Several of the fund managers indicated that managing a fund of less than $50 million was economically unviable as the typical yearly fee would not be sufficient to pay salaries and other fixed costs. Indeed, several of the investment managers we interviewed are planning to raise their next funds in the range of $80 to $100 million. At the same time, they have found it difficult to manage more than 10–12 equity investments and have to both invest the entire fund amount and exit the investments within the typical fund period. Therefore, they have to invest larger amounts in individual deals in order to ensure that they complete the investments within the limited time period. This works against local entrepreneurs who need smaller amounts of capital. Local entrepreneurs are distributing products and implementing solutions, as opposed to developing (expensive) technology. Investment fund managers often do not find it worthwhile to invest in the

time required for due diligence on these companies that can absorb only small amounts of capital, preferring larger and more established players. Foreign-owned companies have set up elaborate structures to accept foreign currency investments and provide exit options to investors in foreign currency. (Sanyal et al. 2017). All this makes investments in foreign entrepreneurs easier than investing in local entrepreneurs.

Cultural attitudes toward risk

Closely related to the issue of investment fit is the cultural issue of attitude toward risk. The majority (16) of the 20 investment funds that we interviewed had international fund managers and international investment committees. Investment managers want to invest in companies that can grow (scale) rapidly with the expectation that rapid growth will allow the investee company to achieve an attractive valuation. The valuation would then allow the investor to sell (exit) before the end of the fund period.

The focus on fast growth means that entrepreneurs tend to invest aggressively in marketing, sales, and product development. The investment often outstrips the revenues, and they meet the cash gap by raising additional investment amounts. In other words, the companies incur a loss but still acquire customers aggressively by investing more and more, prioritizing market share over profitability. Indeed, industry observers believe that the PAYG companies that have attracted large amounts of capital have not turned a profit and are burning cash even as they pursue growth.

The ambition of building potentially very large companies through this risky method of remaining afloat by raising more and more capital does not come naturally to Kenyan entrepreneurs. Their ambitions are more often confined to building a medium-sized profitable company. There are two reasons for this:

First, Kenyan entrepreneurs do not have access to the amounts of capital that are required to pursue this high-growth strategy. Second, they do not have the necessary social and economic cushion to handle failures. It is widely perceived that the Western world has a far higher tolerance of risk and failure. Business failure may not wreck the career of a young international entrepreneur. She could return to her home country and seek a job in a multinational company with her experience of running a business in an emerging country. The local Kenyan entrepreneur would, on the other hand, be scrambling to find a job and make ends meet in a country where social security systems are not strong. This cultural difference between local and foreign entrepreneurs is also reflected in the relative hesitation on the part of local entrepreneurs to part with equity (and therefore control) in their companies. This hesitation further hinders their ability to raise investment capital.

Quality of engineering and management education

The quality of technical and management education (either real or perceived) in Kenya was the other reason cited for the low level of investment in Kenyan clean energy access entrepreneurs. Investors who were familiar with clean energy investments in other regions pointed out that in India, local-origin entrepreneurs have garnered the majority of investment, a point we have already noted in our analysis. We analyzed the education profiles of 15 clean-energy access companies in India that have secured investment. The details are available in Appendix I. The summary of our analysis is that, of the 15 Indian companies that secured investment, 10 companies were founded by entrepreneurs who had studied in highly reputed engineering and management schools in India. The five that did not study in India had the following backgrounds:

- Two (Simpa Networks and Orb Energy) had foreign-origin entrepreneurs
- Two (Frontier Markets and ONergy) were set up by Indians with significant international work experience
- One (Freyr Energy) was set up by entrepreneurs who had studied at Yale and Purdue in the United States

This implies that the benefits of studying in an internationally reputed educational institution is a key reason why local entrepreneurs get funded by international investors in India. This is probably because the investors see the education as a signal for the quality of the management team. The fact that international entrepreneurs have come to Africa to set up businesses is also a reflection of the fact that universities in the Western world have academic programs that are designed to develop student interest in this topic. For longer-term capacity building in the local ecosystem in Kenya, public investment in higher education is critical. In the medium term, opportunities could be made available to bright students to study and work in internationally reputed academic institutions.

Identifying Solutions

The underlying causes of low investment in local entrepreneurs are systemic, and there are no immediate quick-fix solutions. It will be impossible for investors to change their attitudes if their economic incentives are aligned only with deploying large capital into high-risk, high-return companies. It is not easy to change deep-rooted attitudes to risk, and academic institutions of international repute take decades to build. The solutions proposed in this working paper try to address some of the underlying causes and take advantage of the opportunities provided by businesses run by local entrepreneurs. It will take several years to show success, but a start needs to be made.

Alternate investment instruments

Debt is a recommended financial product for investment in Kenyan entrepreneurs who have already reached a certain size. It would be in line with reported local entrepreneurs' ambitions to build profitable, medium-sized companies at a relatively slow pace of growth. This conservative management style is well-suited to debt that can be serviced from operating cash flows of the company. Our interviews indicate that Sun Funder, which provides debt to solar companies, has made several investments in locally owned businesses. Sun Funder's loan sizes are often in the range of $250,000 to $1 million. This size is more appropriate for local entrepreneurs, and Sun Funder has also provided loans of less than $250,000. Sun Funder indicated that it has received support from the Mott Foundation and IKEA Foundation to invest in local East African entrepreneurs. This has allowed Sun Funder to subsidize part of the transaction costs. Sun Funder also reported that its investors, such as Calvert Foundation, are also sensitive to the number of loans provided to local East African entrepreneurs.

Local bank lending ideally should be the recommended solution. In our previous paper (Sanyal et al. 2017), we have argued that international development financial institutions should use lines of credit to commercial banks to stimulate lending to companies in the PAYG (and more broadly the clean-energy sector). Commercial banks should use cash flows from end customers as security instead of collateral to make credit to the sector more accessible. Governments can take on the currency depreciation risk so that commercial banks can lend in local currencies. We strongly recommend that international development institutions explore this option with local partner governments and financial institutions.

In the absence of lending by local financial institutions, specialized debt investors have the opportunity to fill in. Our interviews also indicated that investors are experimenting with debt fund structures. At the lending level, for example, debt investors reported trying to experiment with a medium-term (five-year) loan product that has a low interest rate but includes a small equity stake or a revenue share. The product acts like a quasi-equity or a mezzanine product because it allows the borrowing company to conserve cash and the lender to get economic returns from the growth of the company's business. Debt investment fund managers were also working with the Africa Guarantee Fund and the USAID Development Credit Authority to mitigate their lending risks. Much of this activity today is targeted at the international PAYG companies, but these structures can be adapted for a specialized local debt investor for local clean energy companies. For debt funding to make a serious impact on the challenges that we have identified, debt providers should have the flexibility to lend in either foreign currency or local currency. Companies in the solar rooftop sector hold customer contracts in U.S. dollars while those working in the other identified sectors often hold customer contracts in the local currency. Specialized debt investors would in all likelihood be raising money from international investors who would have to be paid back in hard currencies. They would need support from foundations to cover the hedging costs so that they could lend in Kenyan shillings to local entrepreneurs. Debt may also offer an opportunity for investors with somewhat lower risk appetite than those who currently invest in equity impact funds to participate in this sector.

Another investment structure that impact-oriented foundations could consider is results-based financing. Results-based financing is a way to target grants at private companies to ensure that impact results are actually obtained. In our previous paper (Sanyal et al. 2017), we have discussed how a results-based financing mechanism operated by SNV Netherlands Development Organisation and funded by multiple donors helped PAYG companies to expand in Tanzania. A results-based financing program would give local entrepreneurs the confidence to invest in marketing and sales. However, such a program cannot be a substitute for investment and can only supplement private-sector investment.

Alternate investment structures

As we have already seen, the closed-fund equity structure is an obstacle to investing in local companies. There are two possible solutions to the problems imposed by typical closed-fund structures. Both are aimed at eliminating the need to invest within the relatively short period of about five years. The alternative structures are that of an evergreen fund and that of a holding company. An evergreen fund is an open-ended fund structure with no termination date. In a holding company structure, a company owns the investments, and because a company can exist indefinitely, the investments can be held for a long period of time.

In both structures, the removal of the time restriction can potentially help in two ways. First, it allows investment managers to be patient with early-stage companies as they experiment with their business models. Second, it removes the pressure on investment managers to invest larger amounts in companies to complete the investing and exit cycle within the stipulated time.

The disadvantage is that it is difficult to forecast when an investment can be liquidated. In closed-end fund structures, investors can be promised return in a stipulated time frame. This is much harder in an evergreen structure. This means that the lead investor in "evergreen fund structures would have to adopt a long-term view and accept that the holding would be illiquid for unpredictable periods of time.

Debt funds lend themselves relatively easily to an evergreen structure. Individual investors in the fund can invest to get their money back within a specified time period, and the fund manager has the freedom to raise additional capital. The fund managers can also make fresh loans out of repayments.

Alternative approaches to capacity building for entrepreneurs

Incubators typically provide mentoring services from external advisers, advice on business plans, and connections with investors.

We believe that entrepreneurial support services are best provided by early-stage investors themselves. They would have the necessary influence on company founders, access to information, and a broad alignment of interests. Fund investment managers offer common services to a portfolio of companies. These services help companies access management expertise that they would find difficult or expensive to build on their own. A good example is the technical assistance provided by Business Partner International, which provides debt to African small and medium enterprises (SMEs). Under the technical assistance facility, the SME can hire the technical expert of its choice to address a need of the enterprise. In the experience of Business Partners International, SMEs that use this facility have a better financial track record than those that do not.[15] In the field of clean energy, Persistent Energy is a specialized investor in the off-grid sector in Africa that provides services in the area of finance and accounting, capital raising, human capital, information technology, and business analytics.[16] Seed funds, such as the Savannah Fund[17] and The Baobab Network,[18] offer customized enterprise acceleration services.

CONCLUSIONS

Discussion is growing about the level of investment flowing to foreign entrepreneurs versus local entrepreneurs in Africa. This is an area where there has been little rigorous research, and our working paper attempts to focus attention on this area of concern. By focusing on one sector (clean energy access) and one country (Kenya), we have attempted to provide a detailed understanding of the problem and recommend solutions.

Our finding is that, while it is true that investors have invested in foreign entrepreneurs operating in Kenya, they have also invested in local entrepreneurs in India, another country with an energy access problem. Impact investors, who look to balance financial and socioeconomic returns, have almost exclusively invested in PAYG SHS and mini-grid development companies. These companies have been growing rapidly to provide electricity access to millions of people. Impact investors are now extending financing to PAYG productive load companies (such as solar pump companies) as these business models emerge.

Local entrepreneurs have been building different types of businesses in solar and cook stove sales on cash and credit, individual mini-grids, bioenergy to institutions, solar pumps to farmers, and solar-powered drinking water to communities. One possible reason for their inability to raise impact capital is the fact that they are not building the core technology (the product with the information technology components in their businesses, which can help track customer usage, and facilitate remote maintenance and mobile payments).

PAYG companies have the ability to sell to and service increasingly large numbers of customers at steadily decreasing costs. The unbundling of the PAYG business model allows local companies to work with specialized software vendors and achieve economies of scale without the need to invest large amounts of capital in product and technology development.

From the perspective of impact creation, it is possible that local entrepreneurs, freed from the responsibility to develop and manufacture products, could focus still more on understanding market needs, developing local partnerships, and servicing customers. Our limited survey does not allow us to draw broad conclusions on the advantages, if any, that local entrepreneurs have; but it does allow us to conclude that international companies should be considering partnering with local companies to leverage individual strengths and maximize impacts. Our study also indicates that impact investors should be paying more attention to the impact being created by unbundled PAYG business models.

A broad local entrepreneur support ecosystem exists in Kenya, but the difference between investor expectations and local entrepreneur actions is stark. There are some systemic reasons for this. Investment managers invest mainly in equity and do so in a manner that they can return the money (with profits) to their investors within a stipulated period of time. This means that they would like to invest larger amounts in a relatively small number of companies because it is difficult to manage a large number of small investments. They would want entrepreneurs to invest in marketing and sales and grow rapidly even at the cost of current profitability. The problem of different investment requirements is further compounded by the perception that local entrepreneurs do not have the same level of technical and managerial expertise as do foreign investors.

Targeted investment structures are required that help investors address the opportunities provided by businesses run by local entrepreneurs. Perceptions are harder to address, and the best way is to demonstrate success stories. Supporting a few local entrepreneurs who have already made progress in their businesses and proving that they have the ability to raise capital, further expand their business, and provide investors a return would encourage investors to look more broadly at the opportunities offered by local entrepreneurs. Successful local entrepreneurs would also encourage other Kenyans to follow their path.

RECOMMENDATIONS

Solutions require conscious effort over time. We offer a set of recommendations to the following key stakeholders:

Investors in Impact Funds

Investors can encourage investment managers to explore opportunities and experiment with both structures and instruments. Investment structures that allow them to invest relatively small amounts of capital in a larger number of companies and investment instruments that would allow steady returns could help local enterprises. Investors in impact funds that set out to address the problem should have the patience to experiment and wait for results.

Donors and Foundations

Donors and foundations can help entrepreneurs directly in four ways. First, we recommend that investment in local entrepreneurs be accompanied by capacity development support (technical assistance). Donors and foundations should make this possible through grants. Second, we recommend that donors and foundations help accelerate local entrepreneurs through targeted results-based financing schemes. Third, we recommend that these entities support the broader local entrepreneur ecosystem. This would include supporting networks of local entrepreneurs with each other and with foreign entrepreneurs and angel investors. Fourth, foundations can help local entrepreneurs articulate the impact they are creating. Foundations can facilitate independent impact assessment firms in analyzing the impact and communications professionals to showcase it to a global audience. Donors and foundations could also have a long-term, although indirect, impact by providing scholarships to students to study at international institutions.

Local Entrepreneurs

Local entrepreneurs who are struggling to build their businesses do not have the luxury of time. We recommend that they take advantage of networking opportunities to interact with global entrepreneurs and international angel investors and build a culturally diverse team that can bring different experiences, skill sets, and networks to the daily challenges of running a business. We also recommend that they create support networks among themselves to be able to leverage expertise and networks.

Government

In many countries, the development of the local entrepreneur ecosystem is a matter of national government priority. In the long term, investing in public education that allows the nation's brightest students, irrespective of financial ability, to get access to international quality education helps in building a vibrant entrepreneurial ecosystem. In the interim, the Kenyan government can explore other ways to support local entrepreneurs. One mechanism is to provide a loan guarantee that can facilitate commercial bank lending to the sector. Local currency debt that is made available without the provision of collateral would enable local entrepreneurs who have already reached a certain size to grow to the next stage. There are several other policy tools on which the government can focus: providing results-based financing grants to local entrepreneurs, providing preferential treatment in government procurement programs, and encouraging foreign businesses to create joint ventures.

Upcoming Research

We recommend that the scope of the study be expanded both in geographical and sectoral terms. In East Africa, we would recommend studying any in-country variations. We would also recommend a closer look at any regional variations within the African continent. This paper has noted that the issue of under-investment may not be only restricted to clean energy. We would recommend examining the issue in the context of other sectors, particularly environmental sectors. We would also recommend a cross-country analysis that examines the importance of local entrepreneurship.

The cross-country comparison should also include an analysis of how policies can affect the development of an indigenous entrepreneurial class that has the ability to attract international capital. In this paper, we have noted briefly that impact investors have invested in local entrepreneurs in India and that Indian entrepreneurs seem to have benefited from studying in internationally reputed academic institutions. Indian entrepreneurs, unlike Kenyan entrepreneurs, also evolved from the 1950s to 1990s under a relatively protectionist import substitution macro-economic environment.

Our preliminary study indicates that local entrepreneurs who come from the local communities have intimate knowledge of market niches and that their local knowledge drives the development of locally tailored products and services. These are the underlying reasons for their success on the ground in terms of impact creation. Future studies should use more rigorous samples and draw generalizable findings from these common factors of success. The analysis of the strengths of local entrepreneurs would help impact investors to create diversified portfolios. It would also help international companies to create partnerships with local companies to maximize impact.

We also recommend that other researchers study the impact created by local entrepreneurs in more detail. This would help to develop ways to further increase the socioeconomic impact of off-grid energy systems. It would also be useful to study an impact per unit per dollar invested in solar home systems versus larger systems like solar pumps. Impact investors should examine alternative approaches to optimize their impact with a given amount of investment dollars.

APPENDIX A. METHODOLOGY TO INTERVIEW INVESTORS

Questionnaire conducted with 19 investors

CATEGORY: OVERALL FUND INFORMATION
What is the size of your fund?
Sectors that you cover for impacts
What are the broad investing criteria? ☐ Financial return ☐ Impact metrics and methodologies of impact measurement
Typical transactions ☐ stage of business investment ☐ ticket size ☐ type of investment instrument (debt, equity, royalty) ☐ Investment model

CATEGORY: PORTFOLIO DISCUSSIONS
For each portfolio company, discuss (please research the portfolio in advance) ☐ Sector ☐ Rationale for making the investment ☐ Any other comments
Given that you invest in East Africa how do you hedge for this risk?

CATEGORY: LOCAL ENTREPRENEUR
Have you looked at investing in companies with local entrepreneurs?
If you have, what is the main challenge that you have had?
Do you have plans to have another fund? If so, what would be the size and sectors?

Source: Research methodology for this study.

APPENDIX B. OVERVIEW OF CUSTOMER FOCUS GROUP DISCUSSIONS

BUSINESS AND PRODUCT	LOCATION OF THE FGDS	GENDER DYNAMICS IN THE CUSTOMER BASE	GROUPS INVOLVED
MWEZI, SOLAR LIGHTS	Ndeda Island, Sirongo Beach, Siaya County,	Women are not allowed to fish but only rent out boats to exchange for a right of buying fish at wholesale prices from the fishermen to whom they rent the boats	Fishermen group (7 men) Boat owners' group (8 women)
MAGIRO, MINI-GRID	Mihuti Village, Njumbi Location, Kangema Ward, Murang'a County	The customer base is composed of both men and women	General customer groups (mixed gender groups, 4 men and 4 women)
SUNTRANSFER, SOLAR APPLIANCES	Oloitoktok town, Kajiado County	The customers are mostly men, especially for the two products covered by the discussion	General customer groups (13 men, customers of two solar products)
DEEVABITS, SOLAR LIGHTS	Masii town, Masii Ward, Machakos County Tulimani Ward, Makueni County	The customer base is largely women, benefiting from the business's all-women distribution model	General customer groups (mixed gender groups, 1 man and 8 women). Distributor group (8 women)

Source: Primary data from this study.

APPENDIX C. FOUNDER ORIGINS OF THE TOP 20 COMPANIES IN OFF-GRID ENERGY ACCESS

Top 10 Solar Home System Mini-Grids

COMPANY	FOUNDER ORIGIN	GEOGRAPHIES OF OPERATION
Zola Electric	United States	East and West Africa
M-KOPA Solar	North America	East Africa
d.light	North America	Worldwide
Lumos	Israel	West Africa
Greenlight Planet	American-Indian team	Worldwide
Mobisol	Europe	East Africa
BBOXX	United Kingdom	Across Africa
Kingo	South America	South Africa, South & Central America
Azuri	United Kingdom	Across Africa
Simpa Networks	North America	India

Source: Wood Mackenzie 2019; WRI analysis.

Top 10 Mini-Grid Developers

COMPANY	FOUNDER ORIGIN	GEOGRAPHIES OF OPERATION
Powerhive	United States	East Africa
StarSight	Europe	West Africa
Husk Power	India	India
Yoma Micropower	India	South/South east Asia
OMC	India	India and Africa
PowerGen Renewable Energy	North America	East Africa
Rensource	Nigerian-European team	West Africa
REDAVIA	North American-European team	West Africa
Standard Microgrid	South Africa	South Africa
Mera Gaon Power	India	India

Source: Wood Mackenzie 2019; WRI analysis.

APPENDIX D. INVESTOR PROFILES

INVESTOR	SECTOR FOCUS	FINANCIAL INSTRUMENTS	AVERAGE INVESTMENT SIZE ($)	NAIROBI OFFICE
Acumen	agriculture, financial inclusion, education, energy, health, housing, water	debt, equity, mezzanine	750,000	Yes
Africa Enterprise Challenge Fund	renewable energy, agriculture	grants, zero interest loans	250,000–1,000,000	Yes
AlphaMundi	agriculture, clean energy	debt, equity	250,000–2,000,000	Yes
Ariya Capital	clean energy	debt, equity	3,000,000–10,000,000	Yes
CAMCO	renewable energy, carbon credits	debt, equity	5,000,000	Yes
DOEN Foundation	clean energy access	debt, grant	500,000	No
Factor [E]	energy, agriculture, waste and resource management, sustainable mobility	equity	200,000–700,000	Yes
Gray Matters Capital	health, education, agriculture, financial services	revenue share	50,000–250,000	No
Gray Ghost Ventures	last mile logistics, health and wellness	equity	750,000–3,000,000	No
Kenya Climate Ventures	clean technology, agriculture	equity	100,000–2,000,000	Yes
Novastar Ventures	bottom of the pyramid products	equity	100,000–6,000,000	Yes
OPIC	energy generation	equity, debt	5,000,000–25,000,000	No
responsAbility	financial inclusion, agriculture, energy (energy efficiency, energy access)	senior debt, mezzanine	300,000–5,000,000	Yes
Rockefeller Foundation	energy access, health	various	1,500,000–5,000,000	No
Shell Foundation	sustainable energy, sustainable mobility	grants, repayable grants	100,000–300,000	No
SIMA Funds	clean technology, microfinance	debt	1,000,000–5,000,000	Yes
SunFunder	clean technology	debt	1,000,000–2,000,000	Yes
Treehouse Investments	climate change mitigation (including energy access), infrastructure, consumer goods	equity, debt (public and private)	250,000–2,000,000	No
Viktoria Ventures	technology	equity	50,000–-300,000	Yes
Zohari Leasing	equipment leasing across various sectors (including solar)	leases	100,000– 500,000	Yes

Source: Primary data from this study.

APPENDIX E. LOCAL ENTREPRENEUR PROFILES

SECTOR	COMPANY	BUSINESS
Unbundled PAYG	Deevabits	Solar products (home systems, lanterns) on PAYG basis using women agents
	Mwezi Solar	Solar products (home systems, fishing lights) on PAYG basis and cook stoves (not on PAYG basis)
	Raj Ushanga	Main distributor of Azuri's home systems
	Sun Transfer	Various solar products (home systems, barber kits, solar pumps) on PAYG basis
Small scale mini-grids	Strauss Energy	Builds roof-integrated solar panels and mini-grids
	Magiro Hydro Electric	A hydro power mini-grid in Murung'a County
	Skynotch Energy (Mutunguru Hydro)	A hydro power mini-grid on a community-private ownership model in Meru County
Consumer Products	Consumer Choice	Alcohol-gel-based cooking fuel and stoves
	Scode	Cook stoves and solar products
	Wisdom Innovations	Energy efficient cook stoves
Agricultural waste re-use	Kings BioFuel	Biomass briquettes for industrial and educational institution use
	LeJan Energy	Biomass briquettes for industrial and educational institution use
	Olkario Bio	Biomass briquettes for industrial and educational institution use
	Safi Organics	Bio-charcoal fertilizers
	Zynagro	Biofuel from cotton seed waste
Solar rooftop and water heating	Astonfield	Solar rooftops
	Imexolutions	Solar rooftops
	Offgen	Solar rooftops
	PowerPoint Systems	Solar rooftops
	Plexus	Solar rooftops and water heating
	Questworks	Solar rooftop
	Go Solar Works	Solar rooftop and water heating
	Urba Solar	Solar rooftop
Solar water	Epicenter	Solar water systems for drinking & agriculture
	Mibawa	Solar drinking water systems

Source: Primary data from this study.

APPENDIX F. ENTREPRENEUR SUPPORT ORGANIZATIONS IN KENYA

INCUBATOR	FOCUS
Crossboundary Labs	Africa
	Mini-grid
Endeavour	Worldwide presence including Kenya
	Multiple sector
Entrepreneurs Hub	Kenya
	Multiple sector
Get.invest	Africa
	Renewable energy
GrowthAfrica	Headquartered in Nairobi with presence in other parts of the continent.
	Multiple sector
IBM SmartCamp	Worldwide presence including Africa
	Information and mobile technology
Kenya Climate Innovation Center	Kenya
	Climate-friendly businesses
Miller Center	Virtual
	Social entrepreneurship sector
Nailab	Kenya
	Multiple sector
NETFUND	Kenya
	Climate-friendly businesses
PassionProfit	Kenya
	Multiple sector
Pangea	Headquartered in Oslo, presence in Nairobi
	Multiple sector
Savannah Fund	Seed fund and accelerator
	Headquartered in Nairobi with presence in other parts of the continent.
	Multiple sector
Sinapis	Worldwide
	Faith-based entrepreneurs
Stanford Seed	Worldwide
	Multiple sector
The Baobab Network	Seed fund and accelerator
	Africa-wide presence
	Multiple sector
TechBridge Invest	Headquartered in Norway, presence in Mombasa
	Multiple sector
Villgro	India and Kenya
	Health care (in Africa)

Source: Primary data from this study.

APPENDIX G. DETAILED PROFILES OF SELECTED ENTERPRISES

Type: Unbundled PAYG

INVESTABILITY CRITERIA	DEEVABITS	MWEZI SOLAR	SUN TRANSFER
Does the enterprise exhibit strong financial parameters?	Has a customer base of 10,000 systems on a PAYG basis	Profitable at earnings before interest and depreciation level	Positive earnings before interest and depreciation level. Has a long track record of payment fidelity from end customers
Does the enterprise have the ability to grow?	Present in 5 counties with 150 agents	Monthly sales have grown more than 10 times in one year	Has 6,000 systems in the market
Does the enterprise have a professional and seasoned founding team?	Founder David Wanjau has previous experience in running a business. He has received mentoring from Miller Center and also a Power Africa grant	Three-member founding team. Teddy Odindo and Jack Ayieko have significant local experience. Mike Sherry from the UK was the previous CFO of a large British multinational.	Dr. Gathu Kirubi has a doctorate from the University of California-Berkeley. He has received debt capital from KfW and DEG but not equity capital.

Type: Agricultural Waste Reuse

INVESTABILITY CRITERIA	LEJAN ENERGY	ZYNAGRO
Does the enterprise exhibit strong financial parameters?	The company has ongoing orders with major customers. Profitable operations	One of the largest cotton ginning factories in Kenya
Does the enterprise have the ability to grow?	Sales have grown four times in the past year	Company has a large base of cotton farmers assuring supply of the agricultural waste
Does the enterprise have a professional and seasoned founding team?	Founders Jane Wangari and Lenny Githinji have also recruited angel investor Sjors Jensen, who is actively involved in operations	The CEO Taher Zavery is part of a business family and has also been mentored by the Stanford Seed program

Type: Solar Rooftop and Water

INVESTABILITY CRITERIA	ASTONFIELD	EPICENTER
Does the enterprise exhibit strong financial parameters?	The company has ongoing orders with major customers. Profitable operations	The company has business with large development partners for drinking water and has a consumer base for agricultural pumps
Does the enterprise have the ability to grow?	Sales more than doubled between 2018 and 2019	The company has grown in Kenya and expanded to nearby countries
Does the enterprise have a professional and seasoned founding team?	Founder Ameet Shah, a University of Cambridge graduate, has worked in the global financial industry. He has also run a solar company in India.	Founder Mary Njue is an experienced engineer with years of work experience in reputed companies.

Source: Primary data from this study.

APPENDIX H. POSSIBLE BUSINESS MODELS AND PRODUCT CATEGORIES THAT MAY EMERGE FROM PAYG UNBUNDLING

POSSIBLE BUSINESS SEGMENTS
Companies distributing products of global PAYG companies and providing customer credit
Companies distributing and managing logistics of products of global PAYG companies but not providing customer credit
Companies distributing products of manufacturers (other than nonglobal PAYG) companies integrated with third-party software
Local financial institutions using PAYG software and local distributors to provide customer credit
International crowd-funding platforms using PAYG software and local distributors to provide customer credit
Companies assembling products/supplying components for global PAYG companies
Companies specializing in operations and maintenance possibly across multiple product and brand categories
Companies installing and running the mini-grids for global mini-grid companies

POSSIBLE PRODUCT CATEGORIES
Household: TVs, laptops, computers, smartphones
Household: cooking and heating
Agriculture: pumps, cooling

Source: WRI analysis.

APPENDIX I. EDUCATION PROFILES OF INDIAN CLEAN ENERGY ACCESS ENTREPRENEURS WHO HAVE RAISED IMPACT CAPITAL

COMPANY	BUSINESS	INVESTORS	FOUNDER EDUCATION		
			IITS*	IIMS/ISB*	NITS*
Cygni	Efficient Solar Home Systems	Caspian Endiya			Yes
E-Hands Energy	Remote solar systems	Oikocrediit	Yes		
Ecozen Solutions	Solar Pump controller Solar Cold Storage	Omnivore Caspians	Yes		
Frontier Markets	Distribution	Acumen DOEB Foundation			
Freyr Energy	Rooftops/ Microgrids	DOEN Foundation			
Greenway Grameen	Cook stoves	Acumen Caspian		Yes	Yes
Envirofit India	Cook stoves	Shell Foundation			Yes
Husk Power Systems	Microgrids	ENGIE Shell Technology Ventures	Yes		
Inficold	Solar Cold Storage	Shell Foundation	Yes		
Mera Gaon Power	Microgrids	Insitor Fund			
Mlinda	Microgrids	DOEN Foundation Good Energies Foundation Ikea Foundation		Yes	
ONergy	Solar Products	Caspian DOEN Foundation OikoCredit			
Orb Energy	Rooftops/Home systems	Acumen Bamboo Rianta Shell Foundation			
Selco	Solar Home Systems	DOEN Foundation Good Energies Foundation Halloran Foundation	Yes		
Simpa Energy	PAYG Solar Home Systems	DOEN Foundation Developing World Markets ENGIE			

Note: * IITs = Indian Institutes of Technology. IIMs = Indian Institutes of Management. ISB = Indian School of Business. NITs = National Institutes of Technology.

Source: WRI analysis.

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ABOUT WRI

World Resources Institute is a global research organization that turns big ideas into action at the nexus of environment, economic opportunity, and human well-being.

Our Challenge

Natural resources are at the foundation of economic opportunity and human well-being. But today, we are depleting Earth's resources at rates that are not sustainable, endangering economies and people's lives. People depend on clean water, fertile land, healthy forests, and a stable climate. Livable cities and clean energy are essential for a sustainable planet. We must address these urgent, global challenges this decade.

Our Vision

We envision an equitable and prosperous planet driven by the wise management of natural resources. We aspire to create a world where the actions of government, business, and communities combine to eliminate poverty and sustain the natural environment for all people.

Our Approach

COUNT IT

We start with data. We conduct independent research and draw on the latest technology to develop new insights and recommendations. Our rigorous analysis identifies risks, unveils opportunities, and informs smart strategies. We focus our efforts on influential and emerging economies where the future of sustainability will be determined.

CHANGE IT

We use our research to influence government policies, business strategies, and civil society action. We test projects with communities, companies, and government agencies to build a strong evidence base. Then, we work with partners to deliver change on the ground that alleviates poverty and strengthens society. We hold ourselves accountable to ensure our outcomes will be bold and enduring.

SCALE IT

We don't think small. Once tested, we work with partners to adopt and expand our efforts regionally and globally. We engage with decision-makers to carry out our ideas and elevate our impact. We measure success through government and business actions that improve people's lives and sustain a healthy environment.