Bridging the Gap to Commercial Success for Energy Access Businesses

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Introduction

The last 6-7 years have seen a proliferation of commercial ventures attempting to "crack" the energy access "nut". Commonly referred to as "Pay-as-you-go", "Paygo" or "PAYG" businesses, these companies sell solar home systems, lights and appliances on credit to off-grid consumers. Mobile phone networks, together with system controls on products sold, enable PAYG companies to sell solar products on credit because a company can shut off a customer's access if she/he does not make required payments. These features have created an attractive business model: remote control and software automation enable companies to manage hundreds of thousands of small payments inexpensively, leading to attractive financial returns at scale.

This pioneering of a commercial solution to energy access has begun to permeate several regions of off-grid Africa and promises to spread further over the next 5-10 years. The Global Off-Grid Lighting Association (GOGLA) estimates that sales of PAYG systems reached 2-2.5 million by the end of 2017, with average annual growth of approximately 140% from 2013 to 2016.[1] The sector[2] has raised nearly $800m from 2012 to 2017.[3]

The challenge, however, is daunting. Today solar home system solutions (both PAYG and cash sales) have reached only 1% of the off-grid market.[4] UN Sustainable Development Goal 7 (SDG7), ensuring access to affordable, reliable, sustainable and modern energy for all by 2030, will be missed by an estimated 100 million households at current growth rates. It is estimated that over 200 million households will need to secure modern energy from off-grid solar home systems to reach SDG 7– 34% of total energy access.[5]

This landscape appears to present an attractive opportunity for business builders seeking both impact and commercial success. Two-thirds of investment in the off-grid sector, however, is concentrated in just four companies, often referred to as the "first wave" of companies.[6] As well as this, growth across the PAYG sector has begun to flatten. As a result, the struggle of the second wave of PAYG companies to raise capital to pursue unserved off-grid markets has become more difficult. Effectively, the second wave is suffering dampened investor optimism over the first wave of PAYG companies.

How do we interpret these developments? Why is growth flagging? What is needed to spur private investment?

Shell Foundation and Persistent Energy Capital have been active in developing the PAYG sector from its inception: Shell Foundation as a donor, investor and thought leader, and Persistent as a venture builder of many of the second wave PAYG companies. In recent years, we have partnered with many investors and donors, in particular the UK Department for International

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[1] *Off-Grid Solar Market Trends Report 2018,* GOGLA.

[2] Data includes the entire off-grid solar sector (i.e., cash sales as well), but 80% of the sector revenue comes from PAYG sales. Ibid.

[3] Ibid.

[4] *Achieving SDG 7; the Need to Disrupt Off-Grid Electricity Financing in Africa,* Shell Foundation and Catalyst Off-Grid Advisors.

[5] Ibid.

[6] GOGLA.

Development (DFID) and the United States Agency for International Development (USAID), to better understand how to build momentum for growth in the PAYG sector. We hope that our learnings can help inform how to accelerate progress.

This article will therefore explore why the PAYG sector is perceived as lagging: our view of what is happening and why. We will also explore what the sector needs to remain on track to reach maturity and SDG7's promise of energy access.

Through many years of working with social enterprise pioneers, Shell Foundation has consistently seen social enterprises struggle to find support in their formative stages of development. Tectonic shifts in people's lives – like access to energy – are slow and difficult. The PAYG sector is not a technology-driven sector like the Internet or social media that can easily scale on relatively small amounts of capital. Yet, the promise – and the need – to reach over 200 million households with off-grid solar solutions can be met if donors and impact investors reinvigorate their support and private investors ready themselves as these businesses evolve into handsome opportunities. There is little doubt that the PAYG sector will be an important part of the energy access solution. But with more risk tolerant capital and hands on support years, even decades, can be cut from the time it takes PAYG businesses and their entrepreneurs to bring the sector to profitability. Profitable companies that can pay market rate returns to investors will have unlimited access to capital. With unlimited access to capital, the PAYG sector can grow into a mature, pervasive sector that fulfills the promise of energy access for all.

PAYG Sector Disappointment

Why has the PAYG sector grown more slowly than anticipated? Our experiences from working with an array of PAYG companies, across different stages and geographies, have taught us a few lessons:

1. *Building distribution networks in emerging markets takes longer than anticipated*. Iterating and calibrating distribution business models has taken time. Many PAYG businesses are pursuing customers who have never been reached by any other consumer service/finance business (i.e. a business willing to maintain a customer relationship by extending credit). Reaching these customers, developing the culture of sound buying on credit and maintaining long-term relationships involves many people, is difficult to organise and does not scale like a typical tech business. Moreover, sales and payment experience are needed to learn customer behaviour and adjust sales strategies and product offerings to meet customer preferences, payment patterns and liquidity cycles. Data must be collected and interpreted to do this. This is ordinarily a slow process, but it is even harder for PAYG companies because they must build the data collection and analysis capabilities to handle and interpret data. Understanding the results and experimenting with solutions requires testing time. Properly developed, there is the potential to create substantial long-term consumer relationships built on service and trust that will significantly improve lives and generate company value.

2. *Consumer habits have surprised many*. Most early entrants into the PAYG sector assumed that lighting and mobile phone charging were so essential, and solar solutions so effective, that customers would only default on their payments in extreme circumstances. This has turned out not to be the case – food, school fees and other items of daily life take priority over *continuous* clean lighting and phone charging. While some theorise that this is because lower-income families in target markets are poorer than first thought, others believe that it is simply a matter of customers learning to manage their limited resources while accessing (and understanding) credit. Farmers stop paying for solar home systems as they run short of funds between harvests; others also face cyclical liquidity issues that have created more payment intermittency than anticipated. The result has been lower collection rates and higher costs of operations (i.e., incurring collection, repossession and redeployment costs), straining efforts to achieve profitability.

3. *Overhead costs are substantial – Cap Ex*. The first wave of PAYG companies built their internal systems from the ground up. This has included developing their own hardware products and designing software and database systems to serve their respective customer bases and business. In a sector where profit per customer is relatively low[7] the capital expenditures made to build the software infrastructure of these PAYG companies makes achieving profitability and scaling a challenge. First mover PAYG companies raised capital in the form of concessionary and seed equity to create these bespoke systems. Yet the high costs incurred have been a drag on investor returns and profitability. Understanding the impact of this overhead, investors have no interest in financing costly capital expenditures for the next wave of companies. As a result, these companies struggle to build the software infrastructure needed to handle large numbers of customers.

4. *Overhead costs are substantial – Management*. All PAYG companies were started by entrepreneurs new to this emerging sector, often young expats from Europe or the US. Generally, these managers are more expensive than local founders and management teams. This overhead also burdens PAYG companies with extra costs, impairing profitability. There is a belief that in many markets it is difficult to recruit capable local management teams. If this is true in some markets, it is certainly not true in most of them.

5. *Reinventing the Wheel.* Building a PAYG business is complex. A PAYG business can be understood as a combination of distribution, technology and finance companies. Most PAYG companies are started by young entrepreneurs. Even mature founders – who might be engineers for instance – lack a broad range of skills necessary to grow a business. This is of course natural – one wouldn't expect an engineer to also be an accountant, database manager, software programmer and sales expert. But the result is that every PAYG company has gaps in development. Often management does not even have enough expertise to know *what* they need and *how* to find it. This is particularly true of IT infrastructure, where management often doesn't have the experience to understand what capabilities are needed or how to acquire them. But it is also true in understanding how to design an agent network, negotiate with a telecom to integrate payment systems and deal

[7] Profit margins can be 30-50%, but because the total cost of products is low, profit per customer is low.

with suppliers, customs and other operational issues. Learning from other people's mistakes is easier and cheaper.

6. *Lack of Capital*. While it may seem circular, in fact PAYG companies – particularly the second wave – have not had access to enough capital on reasonable terms to enable them to work through their problems. We aren't talking about whether valuations are too high; it is the difficulty, delay and attention management must devote to fundraising that is the real cost. It is expensive to have up to three people marketing to investors and lenders full time, answering due diligence requests, conducting numerous site visits and maintaining sound investor and lender relations. Slow investor processes have caused almost every second wave company in the sector to run out of working capital at one time or another, idling its sales force from stock outs and losing momentum. These actions take a serious toll on the development of a young business.

In many ways this story isn't new. It has been much the same in every emerging sector, from the railroads to the Internet. The need for risk capital, and the trial and error of learning new technologies, markets and consumer behaviours, have been challenges in each case. Plenty of risk capital fuelled Internet startups in the second half of the 1990s. Many investors lost money, but the rush of capital quickly catapulted the sector to a later stage and probably accelerated its development by a decade.

The good news is that the second wave of companies can, and in large measure has, watched and learned. The product margins for these companies are very attractive and the business model still holds the potential for substantial profits and investor returns. But the PAYG sector isn't ready to stand on its own in the free markets of global capital. Intervention is still needed to realise its potential.

How to Bridge the Gap

Much of Shell Foundation's and Persistent's work over the last several years has positioned them to make recommendations as to how to bridge the gap for the second wave of PAYG companies. The basic formula is simple: hands-on venture building assistance plus capital, as and when needed, is the absolute best for success. If we look at the challenges listed above from the last several years, it is pretty clear that this formula addresses most of them:

1. *Building Distribution Networks*. While every market is different, many are similar and some distribution behaviour – and the mistakes PAYG companies tend to make – span all markets. With hands-on support from experienced venture builders, a PAYG company can evolve into a working model more quickly and thus with less capital.

2. *Addressing Customer Habits.* Like building a distribution network, there are both similarities and differences in customer habits between markets. What a venture builder can do is help a PAYG company experiment with and assess customer habits more quickly based on its experience in other markets.

3. *Overhead Costs*. Shell Foundation and Persistent decided to team up in 2017 to create Catalyst, an IT services company to address the principal overhead challenge of PAYG companies – software platform development (see box overleaf). Catalyst enables PAYG

companies to contract out IT development to an affordable firm that has expertise in addressing the IT needs of companies serving hundreds of thousands of small customers buying on credit.

4. *Reinventing the Wheel*. As a venture builder, Persistent has often helped PAYG companies from the ground up – supplying a CFO, building IT (as noted above), developing the legal and tax structure for a PAYG company and guiding the company through many of the common startup pitfalls of a PAYG company.
5. *Capital*. Even the youngest startups can have an orderly capital raising process if done by experienced fundraisers. Often, however, entrepreneurs learn how to raise capital on the job while concurrently attempting to figure out so many other aspects of their new business. An orderly capital raising process would have two components: experienced advisors to startups and sufficient, reasonably accessible risk capital available so that companies that have potential get the capital they need to prove themselves.

Filling the Gap in IT

In their work developing PAYG companies, Shell Foundation and Persistent concluded in 2016 that IT support was critically needed. A great deal of accessible technology has aided PAYG companies: mobile money payment systems, remote metering control, accounting, inventory management and CRM systems that are affordable for early-stage companies. What PAYG companies lack is the ability to select the optimal applications and integrate them into a working whole – an integrated platform where applications share a database and work together. Both Shell Foundation and Persistent witnessed many companies attempt to build their own solutions at great expense with, at best, mixed results.

Recognising this need Shell Foundation and Persistent came together in 2017 to create Catalyst (www.enable.digital), a unique IT solutions provider focused on the PAYG and other essential services sectors that serve emerging market consumers. Catalyst finds, configures and implements IT applications for PAYG and other companies and develops micro-applications to fill the gaps left by off-the-shelf applications. Today Catalyst is providing these critical solutions to numerous companies and is expanding rapidly to meet significant customer demand.

Case Study

The venture building model can be seen in the case of Persistent's collaboration with SolarWorks!, supported by Shell Foundation. SolarWorks! was a first mover in the off-grid solar space, developing attractive solar home systems and related products for retail sale to off-grid homes. After initial success, SolarWorks! languished as a retailer and manufacturer. In 2015 it approached Persistent seeking assistance to evolve into a PAYG company. Together SolarWorks! and Persistent developed a business plan to launch a PAYG business in Mozambique, a market where over 20 million people do not have access to electricity. The

partners selected and integrated a metering solution into SolarWorks!' products, built a local team and launched in Mozambique in late 2016.

Over time Persistent helped SolarWorks! prepare to scale on various fronts. The first step was to "dis-integrate", i.e. discontinue manufacture and sales of its own products in favour of lower cost, high-quality third-party products, while keeping the unique SolarWorks! design. Next, as the growing business struggled to maintain its accounting systems, Persistent offered one of its finance specialists to join SolarWorks! senior management. Persistent's professional functioned as a part time CFO and worked as an integrated member of the SolarWorks! team, sorting out their accounting, building up their reporting systems and giving both SolarWorks! and Persistent visibility into the company's operations at a critical time. Persistent also provided advice to SolarWorks! on corporate structuring and other legal and tax matters, reducing the need for expensive third-party legal advice. At the same time, Persistent supported SolarWorks! in developing a solid IT infrastructure, bringing in Persistent's sister company Catalyst to build SolarWorks!' IT backbone. (See box on p.5).

From early 2016 through September 2018, Persistent and SolarWorks! collaborated to ensure that SolarWorks! had adequate capital to thrive. While most of this capital came directly from Persistent, SolarWorks! worked with Persistent to convince existing shareholders to invest more capital. Persistent brought in new investors and arranged and negotiated debt financing for SolarWorks!.

The collaboration has been a great success. SolarWorks! has now installed more than 10,000 systems and is growing at more than 1,200 a month. An experienced full time CFO has joined the team. In early October, SolarWorks! concluded a strategic investment from EDP Renováveis SA, the renewables affiliate of Portuguese energy company Energias de Portugal SA, one of the most successful renewable energy companies in the world. SolarWorks! is also in the process of securing $6m in working capital loans from two institutions. Together these financings will secure SolarWorks!' growth for the next two years.

SolarWorks! would not have achieved what it has today without Persistent's collaboration. While the capital Persistent provided was necessary to that success, it would not have been enough without deep collaboration between Persistent and SolarWorks!.

Ensuring the Future

We are convinced that the second wave of PAYG companies will advance the growth of the commercial off-grid energy access sector. How quickly they do so will depend on the two-pronged approach described here: hands on collaboration by experienced venture builders and adequate early-stage risk capital.

By no means should anyone write a blank check to numerous entrepreneurs around sub-Saharan Africa and South Asia and simply wish them luck. That, in many respects, is how the first wave of PAYG companies was developed. Capital must not only be risk tolerant – able to tolerate the true, unvarnished risk of developing PAYG businesses – it must also be "smart".

By smart capital we mean that investment, be it risk tolerant venture capital, concessionary capital or a hybrid, must come with the sector experience and acumen needed to enable a

PAYG company to put that capital successfully to work. This in effect is the venture building model that Persistent Energy Capital has evolved into with the help of the Shell Foundation, DFID and USAID.

The venture building model creates a partnership between investor and PAYG company. Persistent has extensive experience in the sector. Persistent has seen and made many mistakes in building PAYG companies. It knows many of the pitfalls and growth bottlenecks companies will face and helps them engineer around them. It also can fill knowledge and skill gaps in a PAYG company's management while it builds to a high level of competence.

Ensuring the Future

Shell Foundation and Persistent remained convinced that the PAYG sector will be a critical component of reaching SDG7 – and it will be done by commercial enterprises that open an entire new consumer market. With access to energy and credit, lives of many off-grid families will improve.[8] While the PAYG model and the companies operating in the sector will no doubt evolve and change as the sector grows and matures, they will become a permanent feature of the energy landscape in sub-Saharan Africa and South Asia. The question is how long they will take to achieve their potential. With estimated needs in the range of $3-5bn in equity, debt and other support over the next five years, the donor and impact investor community must redouble its efforts to bring this sector to commercial scale. This support needs to include not only PAYG companies but also the related ecosystem. Venture builders like Persistent, and policy and thought leaders like Shell Foundation, can work faster with more support and resources.

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[8] A recent GOGLA study concluded that access to solar home system electricity has increased income by unlocking additional work hours and providing additional jobs. *Powering Opportunity; the Economic Impact of Solar,* GOGLA at 12. In turn, this access to off-grid electricity has been made possible by the PAYG model of extending credit to unbanked people. Somewhat similar is the experience with property reform in Peru in the 1990s – by creating a working system of private land ownership, many people without access to credit were able to access credit by mortgaging their property. *Property Reform in Peru* NYU Marron Institute of Urban Management, Brandon Fuller, December 3, 2009.