

WORKING PAPER

Taming the Strange Beasts: Servicing and the Future of PAYGo

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November 2018

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EXECUTIVE SUMMARY

The emergence of pay-as-you-go (PAYGo) solar has been one of the most exciting trends in energy access over the past several years. It is a scalable model for distributed energy that could reach millions of off-grid households. At its core, PAYGo solar is an affordability solution that connects loan repayment to energy use. Over 2.5 million households have acquired solar through PAYGo companies, but the sector needs more capital in the form of receivables financing to continue growing (Dalberg Advisors and Lighting Global 2018).

What made the PAYGo sector successful is now holding back new firms and commercial investment. The original model connected manufacturing, distribution, and financing activities to serve off-grid, unbanked customers (see Figure ES-1). This allowed firms to ensure quality service and manage customer relationships.

As the quality of solar home systems (SHSs) improved and off-the-shelf software platforms emerged, the

new entrants left the design of hardware and development to suppliers and turned their attention to distribution and financing. This new structure, called PAYGo 2.0 (Winiecki 2018), can be seen in Figure ES-2.

Similar gains can be made by decoupling the retail/distribution value chain from financing. This would allow debt investors (on *or* off balance sheet) to isolate receivables risk (i.e., customer nonpayment) from the risks of the originating company (e.g., that they may not be profitable). It would also allow companies to outsource financing to financial institutions that have greater expertise in managing credit risk and larger balance sheets. We call this PAYGo 3.0, and an example can be seen in Figure ES-3 (note that other versions could see the operator retain more control).

Doing this means re-envisioning the engine of PAYGo success: servicing. In traditional credit sectors, loan servicing means sending invoices, collecting

FIGURE ES-1. PAYGo value chain framework

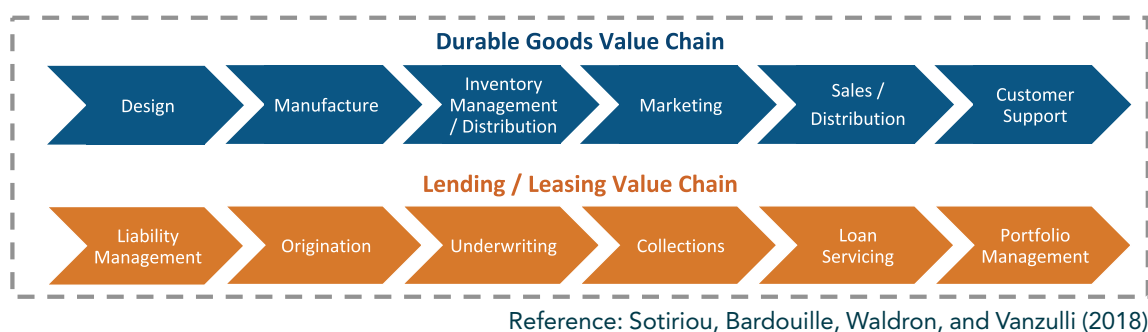


FIGURE ES-2. PAYGo 2.0—Unbundling manufacturing/development from PAYGo provider

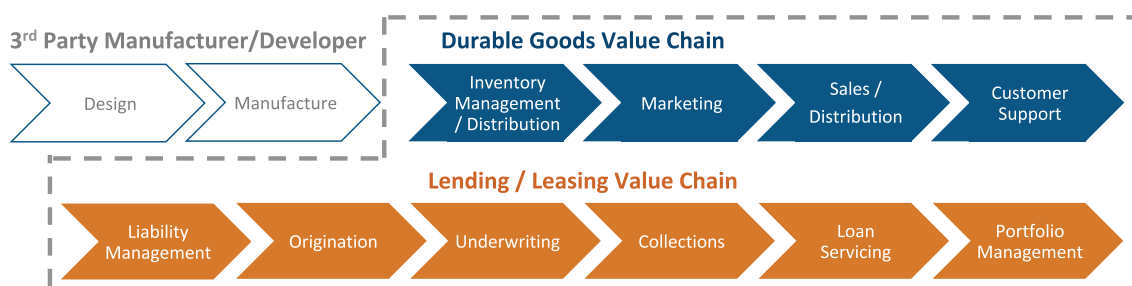
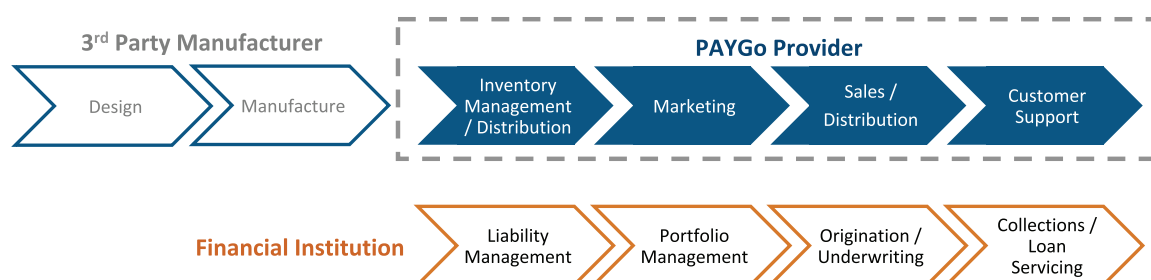


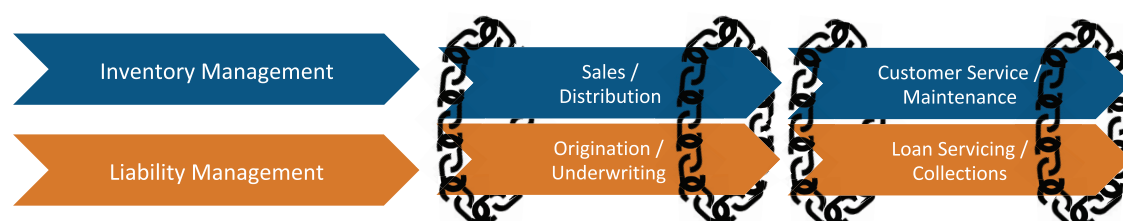
FIGURE ES-3. PAYGo 3.0—Unbundling financing activities

payments, reminding borrowers to pay, and acting when they don't. PAYGo solar servicing is more complex. The connection of financing and use means that collections are directly linked to device management. But the connection between use and loan repayment also means that any physical product issue—any loose wire—will lead to non-payment and must be quickly addressed. These links, visualized in Figure ES-4, led to the creation of software platforms that manage financial records *and* track SHS performance—call centers that troubleshoot loose wires with customers *and* restructure their delinquent accounts. Because it is both high touch and technically complex, the quality of PAYGo servicing has an enormous effect on portfolio health.

Separating the retail and financial functions of a PAYGo company will not be easy. It will mean accurately pricing internal transfers, deciding on a sustainable business model for both sides, creating centralized underwriting processes, splitting up customer service functions, and moving to more standardized systems

and financial products. But these changes can bring substantial benefits. Investors are more likely to finance receivables when that's all they are assessing. Third parties can potentially finance and service PAYGo loans, but only if, at a minimum, they have the option of servicing independently of the originating company. Even PAYGo firms that want to keep all elements of servicing in house would benefit from being able to analyze their respective units. And potential investors may value having a way to recover their capital, should the originator become insolvent.

This is the risk that creditors are taking (or shrinking from) in the PAYGo sector. If *only* an originator can service a portfolio (largely the case) and that originator is not profitable (also often the case), then the value of its security (i.e., receivables) in the case of insolvency is likely to be severely impaired. Without a viable backup to the originator, any investment into PAYGo receivables is a bet on the financial health of the originator, even in structures specifically designed to avoid that risk.

FIGURE ES-4. Servicing linkages between PAYGo value chains

This is not a theoretical concern. We contacted 12 leading PAYGo firms and asked them about their backup service arrangements. Several had plans for investors or internal units to take over country operations and wind down a portfolio. One had taken over a competitor's portfolio and run its systems, with some success. The rest had no backup plan.

Luckily, there are several options that can be deployed in the short-to-medium term.

- Contingency plans where investors take control of the originator's systems and rehire key staff can help to maintain continuity should the servicer falter or fail.
- Financial institutions—whether banks or nonbanks—can provide finance directly to PAYGo consumers and become the servicer.
- Licensors of PAYGo software already have detailed knowledge of the most complex servicing component. They could explore offering backup servicing as an additional service.
- Competitors can arrive at bilateral agreements in certain markets to service each other's assets under pre-agreed conditions. They can also purchase one another's loan books and service active customers, if their systems are compatible.
- As PAYGo solar and other asset finance sectors grow, there may be a large enough market to support a commercial backup servicer, which could operate on its own or as part of an investor or service company.

Servicing is the beating heart of PAYGo's strange beasts—companies that combine elements of clean energy service companies, retailers that sell durable goods through diverse distribution channels, and financial institutions that provide leasing that makes valuable assets affordable for low-income customers.¹ As the sector grows and matures, we anticipate more specialization and standardization. The “beasts” are likely to get a little less strange, but they will be larger and more resilient. Reaching that stage may require separating SHS and loan service functions, without sacrificing service quality or customer protection. For many companies, it will also require finding a backup to give investors the security they need.

PAYGo solar is not an average opportunity. Distributed solar is becoming a viable energy option. Customers that have never seen the inside of a bank are being approved for loans they desperately need. But this sector is too young and too strange to unnecessarily risk financial disruptions. Customers need this to work, and for it to work, there must be safeguards.

1 See Sotiriou, Bardouille, Waldron, and Vanzulli (2018).

INTRODUCTION

The emergence of pay-as-you-go (PAYGo) solar as a viable channel for scaling distributed energy has been one of the most exciting trends in energy access over the past several years. For the first time, we have a potentially scalable model that could bring distributed, modern energy to millions of people.

At its core, PAYGo financing for solar is not just an energy solution, it is an affordability solution. The upfront cost of distributed solar had been too high for decades. PAYGo solar companies borrowed a trick from mobile phone companies and electric utilities: they embedded lockout technology in solar home systems (SHSs) that allowed them to offer prepaid service to customers using mobile money. They connected usage payments to financing and extended that financing to unbanked, off-grid customers—both breakthroughs that have major potential for the financing of other assets. Over 3 million SHSs have been sold on PAYGo contracts in the past five years, thus unlocking modern energy and formal financing for people who had never had access to either.

But much more needs to be done for the sector to deliver basic energy access to the hundreds of millions of people who will remain off-grid for the foreseeable future. To truly scale up the PAYGo opportunity, the sector needs the following:

- More companies operating in more markets. In a universal access scenario for Africa, the Shell Foundation and Catalyst Off-Grid Advisors estimate that nearly 300 new operating companies will need to reach scale across the continent.
- Sustainable companies that demonstrate an ability to produce profits without regular injections of equity or grants.

- Much more capital, especially debt. In its 2018 Off-Grid Solar Trends Report, Dalberg estimated that PAYGo providers will require about \$3.5 billion in receivables financing between 2017 and 2022. Cumulative investment in the sector to date is still less than \$1 billion.

Reaching those hundreds of millions will require more innovation. The title of this paper references “Strange Beasts: Making Sense of PAYGo Business Models,” which shows how the original PAYGo model is a strange beast comprising an unusual combination of manufacturing, distribution, and financing activities (Sotiriou, Bardouille, Waldron, and Vanzulli 2018). This vertically and horizontally integrated structure was designed out of necessity, one that arguably no longer exists. We are already long past the point where PAYGo providers need to develop their own hardware or product management software. Specialized partners can do this faster, better, and cheaper. And as the PAYGo solar sector continues to mature, greater specialization can enable broader participation from a wider range of actors.

This separation and outsourcing, the illusive “taming” of these strange beasts, is not easy. For some companies, it may not even be desirable. A series of existential decisions face PAYGo firms, new and old:

- What kind of company do we want to be? Where can we add the most value?
- What kind of financing will sustainably fuel our growth, instead of impede it?
- How can we structure our company to attract that kind of financing?

Companies that want all their operations under one roof will want to know which operations are performing well at a given time. Companies that want to

outsource financing or loan servicing will need to extricate those activities. And investors in the receivables of *either* type of company will want to know that outstanding balances can still be collected should something happen to the originator. This is no trivial risk.

Despite its tremendous promise, the PAYGo industry is still young and challenging. Entrepreneurs and investors should expect and prepare for some failures. To plan for the future and prepare for unpleasant contingencies, there needs to be more focus on loan servicing in the PAYGo sector. It is the link between energy and finance, an area where uncoupling can unlock future growth—

and a major risk for investors. If capital recovery depends on the originating company—which is the only entity that can service its units and loans—then receivables investors risk substantial losses should that firm become negligent or insolvent.

This paper explores the strategic importance of PAYGo servicing in detail. The next sections introduce the PAYGo solar model and revisit its value chains structure to highlight the strategic importance of servicing; look at the various receivables financing options for PAYGo firms; explore the risk of complete reliance on PAYGo originators for servicing; and conclude with recommendations.

THE VALUE CHAINS WITHIN PAYGo SOLAR

PAYGo solar is the common term for rooftop SHSs that are sold and/or distributed on a financed basis, which lowers the upfront cost of a small-to-medium size SHS from \$60–200 to \$10–50. If customers can afford the upfront deposit and meet some basic criteria, the PAYGo company will lease them a system, usually on a lease-to-own basis. Once customers have an SHS, they prepay for days of energy use. When they run out of days, the system shuts off and cannot be used again until another payment is received.

In a lease-to-own model, this continues until the customer has purchased the contracted amount of days (anywhere from 6 to 60 months of energy). At that point the SHS unlocks permanently, although the provider may offer an option to relock the SHS to finance another device, such as a phone or cookstove.

PAYGo is a capital-intensive business. Companies extend asset-based loans to low-to-medium income households for up to three years (more, in some cases). Although these loans may be highly profitable on a per-unit basis, the capital is not recovered for months or years. Like any lender, these companies will struggle to scale rapidly without capital to finance their growing receivables.

This paper focuses on the PAYGo solar sector; however, entrepreneurs in Africa

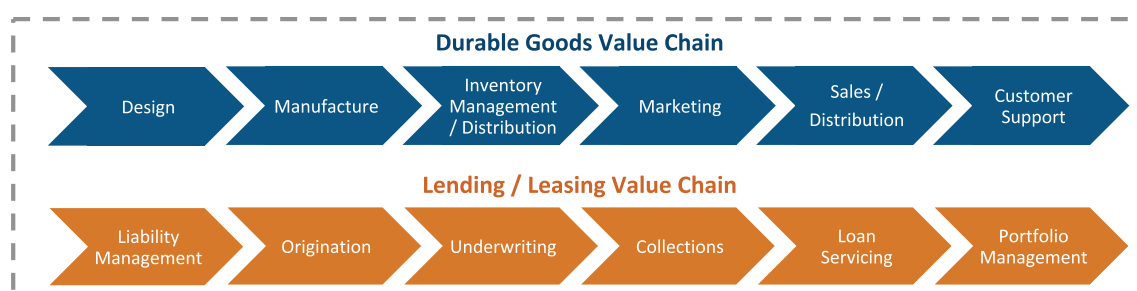
and Asia are already applying the same financing model to other types of assets. Companies around the world are running into the same challenge: there are no well-developed ecosystems for small-scale consumer asset financing or equipment leasing in the places where people need those assets the most. This paper aims to be useful to entrepreneurs who are exploring ways of financing access to their products.

The most successful “first generation” PAYGo companies—which still account for about 90 percent of the sales in the sector—create their own PAYGo hardware, develop software to manage it, build their own distribution networks, and finance their sales on their own balance sheets. The PAYGo firm is both distributor and underwriter, retailer and bank. Each of these two main businesses (three, if you include manufacturing), in turn, conducts many specialized activities (see Figure 1).

Recently, the product/retail side of PAYGo solar has become noticeably “decoupled” as firms have outsourced activities to specialists. Two important trends have driven this shift:

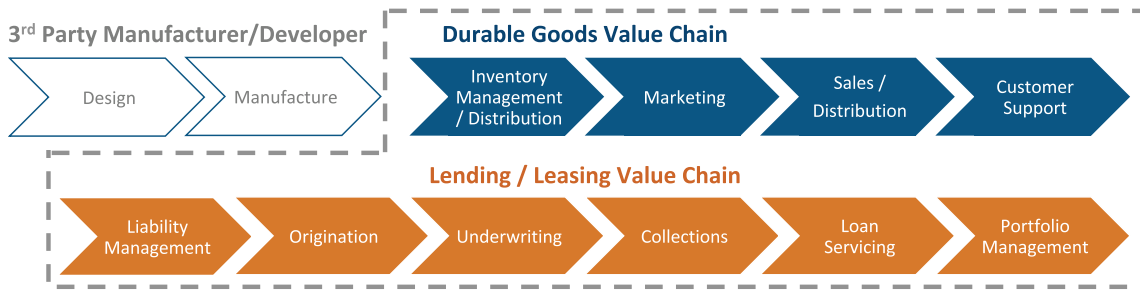
1. **Hardware.** Solar manufacturers have begun licensing PAYGo-ready SHS. Local firms can order kits from quality manufacturers, white-label them

FIGURE 1. PAYGo value chain framework



Reference: Sotiriou, Bardouille, Waldron, and Vanzulli (2018)

FIGURE 2. PAYGo 2.0—Unbundling manufacturing/development



with a local brand or co-brand with the manufacturer, and focus on distributing and financing.

2. **Management platforms.** Concurrently, companies have begun to license PAYGo management software, which are closely linked to the hardware. These software platforms handle sales, registrations, billing, mobile money payments, system (un)locking, remote device monitoring, and more. They help distributors manage a large portfolio of distributed assets from several manufacturers.

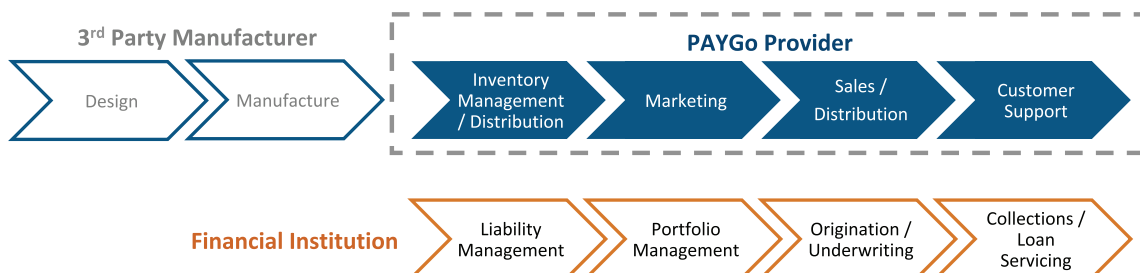
New firms now face a shorter path to market and can offer customers a wider range of off-the-shelf products at a variety of price points, all managed by off-the-shelf software. This is “PAYGo 2.0,” where unbundling of the value chain reduces upfront costs and adds flexibility, which allows new operating companies to be created and to enter the market faster (Winiecki 2018). The value chain framework for a PAYGo 2.0 provider can be seen in Figure 2.

Whither PAYGo 3.0?

Although it may have gotten significantly easier to get a product to market, there has been no equivalent change in the financing operations of the leading PAYGo companies. Providers have kept origination, underwriting, and servicing in house, and most PAYGo loans still sit on the balance sheet of their originators.

PAYGo companies, new and old, could benefit from decoupling the retail/distribution value chain from financing. This would allow debt investors (on or off-balance sheet) to isolate receivables risk (i.e., customer nonpayment) from the risks of the originating company (e.g., that they may not be profitable). It could also allow companies to outsource financing to financial institutions that have credit expertise and balance sheets. Looking at an example in Figure 3, one can see a PAYGo provider that manages distribution and owns the customer relationship, while being able to scale far more rapidly. Other versions of PAYGo 3.0 could see the operator retain more control.

FIGURE 3. PAYGo 3.0—Unbundling financing activities



But many factors have kept PAYGo solar providers from decoupling their financing operations in this way, including:

- **Unwilling partners.** With few exceptions, local banks and microfinance institutions have not been enthusiastic about financing PAYGo solar end borrowers. They often are not familiar with the sector or they lack the deep network penetration to efficiently reach PAYGo customers. They are also wary of relying on PAYGo providers for underwriting and servicing, and PAYGo customer relationship management (CRM) systems may not meet the regulated standards for core banking systems.
- **Resource constraints.** Internal restructuring to create legally distinct, financial institution-like subsidiaries is difficult and time-consuming. Given the many operational and financial challenges these firms face, such an effort may not be a top priority. Although some companies have started to go down this path, we may not see evidence of change for some time.
- **Customer ownership.** Companies universally believe (and are likely to be correct) that there is significant value in their long-term relationships with clients. After establishing a payment history, digital payment capability, and remotely securable collateral, they can continue to serve their customers at significantly higher margins—financing more assets like larger systems or cookstoves or offering nonasset financing for essential needs such as school fees.
- **Moral hazard.** Financial value chain decoupling may reveal misaligned interests. In an integrated business, there are incentives to sell as many systems as possible, but the company is also fully accountable for any

decline in repayment rates. This is not to say that a short-term impetus to sell cannot overwhelm portfolio quality (arguably what happened in the early years of PAYGo). But credit losses should drive companies to balance growth with quality. Belief on the origination side of the business that a third party bears all receivable risk—that it is no longer responsible for onboarding good customers that will repay—can be a recipe for disaster.

- **Loan and asset servicing linkages.** When a customer's lights stop working, they will stop paying. Conversely, when a customer stops paying, their lights must stop working. This connection of use to financing demands tight coordination across the value chains.

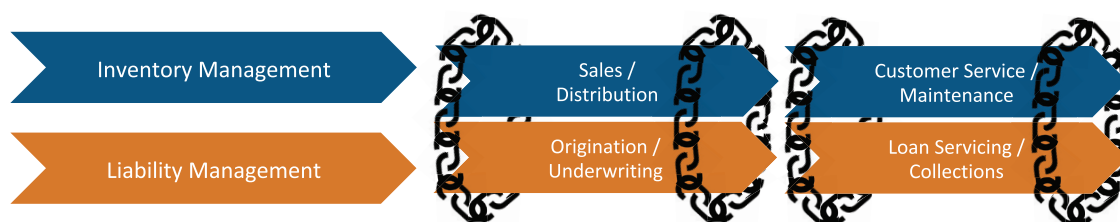
Many of these barriers will fall with time. Partners will emerge as companies develop longer track records and more standardized business models. Resource constraints can be overcome, and companies can partner without losing the customer relationship or misaligning incentives. But servicing is the key to enabling PAYGo 3.0, which involves unlocking sustainable receivables financing and allowing new business models to enter the PAYGo sector.

Servicing

“Servicing” can be defined as:

“All the various activities that the originator would have, in normal course of business, performed in relation to the obligors—sending invoices, monitoring collections, sending reminders, taking recovery action, and so on—and all the activities in relation to distribution of the cash so collected to investors are covered by the catchall word *servicing*” Fabozzi and Kothari (2008).

Although this definition is slightly apropos to asset-backed securities in the

FIGURE 4. Servicing linkages between PAYGo value chains

United States, the core role of servicing is well defined: a servicer acts as an intermediary between obligors (i.e., end borrowers) and investors.

In the PAYGo solar sector, loan servicing narrowly means collecting payments, unlocking devices, restructuring delinquent accounts, repeatedly reaching out to delinquent customers, and repossessing units in default. However, because use is linked directly to payment, PAYGo servicing effectively includes other activities, such as product repairs, troubleshooting mobile money issues, customer service, call center management, and unit monitoring. And as the sale of a PAYGo asset is also the origination of a PAYGo loan, sales and underwriting remain both tightly linked and constantly in tension. If Figure 3 represents a possible future, then Figure 4 is the present.

Servicing is the linchpin of PAYGo solar's success

Although this claim may sound dramatic, we absolutely believe it to be true:

- PAYGo solar is a combination of two businesses, with the customer-facing service function acting as the bridge between them. A PAYGo operator promises its customers that it will service their SHS, and it promises its investors that it will service the loans it has originated. These may sound like separate actions—in most credit sectors they *are* separate—but in this case, they are strongly linked.

The financing-to-use connection ties collections to device manage-

ment. But the connection of use to loan repayment also means that any physical product issue—any loose wire—will lead to nonpayment and must be quickly addressed. Therefore, software platforms manage financial records *and* track SHS performance and call centers troubleshoot loose wires *and* restructure delinquent accounts.

- PAYGo servicing is technologically complex. The CRM platform at the core of PAYGo servicing monitors units, reconciles and processes mobile payments, and then transmits unlock codes to the customer's phone or other device. This requires several interactions with mobile network operators (MNOs) and aggregators of payment or SMS services. Any operational issues with the CRM platform directly affects loan repayment.
- PAYGo servicing is high touch. PAYGo customers' revenues fluctuate and so do their payment patterns. Currently, most PAYGo "underwriting" involves ensuring the customer can pay an up-front deposit. As a result, even the best companies have relatively high delinquency rates. To be successful, PAYGo companies need efficient call centers to contact customers who are delinquent and to work with the customers to restructure their payment plans. In many cases, staff will need to visit delinquent customers to collect payments or repossess systems. This type of servicing has much in common with

microfinance, where “loans are created, nurtured, and serviced by the field officer who maintains a regular franchise with the borrower” (Rozas and Kothari 2010). However, high-touch models make any servicer migration difficult, and there are few if any examples of a successful servicer migration in microfinance.

- The difference between a high-quality PAYGo servicer and a poor one is of massive financial consequence. It is generally true in most credit sectors

that the quality of a servicer determines the value of the receivables they are servicing. The same is true of PAYGo, except more so, because of the sheer number of functions that affect customer repayment.

There is no PAYGo solar without effective servicing. And for most companies, servicing continues to link the two value chains. This has enabled PAYGo firms to ensure quality and grow to where they are today. But it may act as a barrier to new forms of financing.

OPTIONS FOR FINANCING PAYGO SOLAR

Four distinct models—on-balance, off-balance/capitalization, captive finance, and direct financial inclusion financing—have been used in similar industries to fund receivables. In this section we examine their applicability to the PAYGo sector. These models can be viewed on a continuum based on the extent to which the financing value chain is separated from the originating company, with on-balance sheet at one end and outsourcing financing to banks at the other end (see Figure 5).

There are trade-offs along this continuum, and choosing a receivables financing strategy requires knowing where a company adds value and playing to those strengths. PAYGo receivables financing models need to be scalable in local currency. The models presented here are not mutually exclusive, and we would expect PAYGo solar to emulate microfinance's strategy of financing receivables with a mix of on-balance sheet debt and securitizations, with deposits possibly playing a role.

When assessing the applicability of these models to the PAYGo sector, we consider three questions:

- Will the financing structure create misalignment of incentives?

- What are the strategic implications for companies' business models?

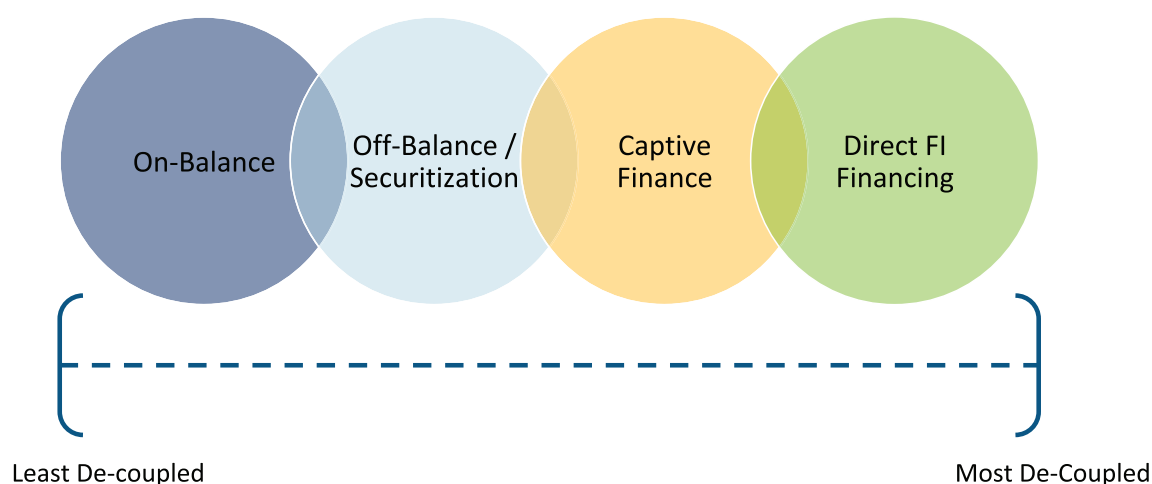
- What are the servicing requirements of each financing model?

On-balance sheet financing

On-balance sheet borrowing facilities, in various forms, are the most basic form of debt capital. They are commonly structured as fixed-term or revolving loans of varying maturities. These facilities typically focus on cash flow aspects of the business as a whole as the key credit criteria: how much cash does the business generate relative to its ongoing loan repayments? This model is best suited for companies with a track record of cashflow and profitability that lenders can assess and lend against.

Asset-based lending (ABL)—a form of on-balance sheet lending—is increasingly being used in the PAYGo sector. In ABL, the lender does not rely on corporate cash flows to secure loan repayment. Instead, it lends against the physical and financial assets of the company such as inventory and receivables. The company retains ownership of the receivables and uses them as collateral to raise finance on balance sheet. The key lender criterion is an assessment of the value of the

FIGURE 5. Spectrum of financial de-coupling for receivables financing options



assets to establish a “borrowing base” against which they lend. Given that the assets of PAYGo companies are mostly its customer receivables, this financing model could be highly relevant.

In on-balance sheet models, the PAYGo company is fully integrated with the originator and servicer under the same roof. Incentives should be fully aligned. Lenders under this structure are explicitly taking both operating company and receivables risk.

Off-balance sheet structures

In an off-balance sheet receivables structure, companies sell receivables to a separate entity—typically a special-purpose vehicle (SPV) or a factoring company—to separate the risk of the receivables from that of the originator/operating company.² The core objective of this structure is to allow lenders to assess the receivables risk in isolation (i.e., there is no ongoing risk exposure to the originator), which enables companies to standardize their fundraising process to potentially attract different types of investors and achieve better terms. In factoring, the purchaser typically assumes the primary servicing role whereas, in SPV structures, the originator typically retains this function. Investors that buy receivables off balance sheet will focus on portfolio quality and the expected cash flow generated by the pooled receivables. Companies normally will also raise on-balance sheet corporate loans to fund different capital requirements.

Off-balance sheet: Securitization

Securitization is a type of off-balance sheet structure in which the SPV raises debt by issuing receivables-backed securities or bonds. This has become a

common way for companies to finance receivables in developed markets, with standardized structures for sectors such as mortgages and credit cards. Other sectors are starting to securitize as well.

In developed markets, securitization functions within a robust ecosystem that includes third-party consumer credit scores, ratings agencies, and specialized backup servicers. Large volumes allow borrowers to amortize the high structuring and service costs across a large ticket size.

SPV and securitization can create the greatest risk of moral hazard. In developed markets, consumer credit scores are important as a check on receivables quality at the time of purchase, while backup servicers mitigate the risk of a primary servicer (an originator) going under. Credit card and mortgage servicing is highly standardized and thus can be easily replicated by one of several backup servicers, who can take the place of the originator with little to no impact on the value of the receivables.

Captive finance companies

Captive finance companies (FinCos) are wholly owned subsidiaries of manufacturing and distribution groups. Their only function is to finance customers’ purchases of the group’s products, effectively acting as an in-house bank. The FinCo and the manufacturing and distribution group are operationally and financially distinct (i.e., each has its own balance sheet) and can be funded and analyzed separately. The FinCo can generate a significant proportion of the group’s overall revenues.³

The use of captive FinCos is most commonly associated with vertically integrated manufacturing companies (e.g., cars and agricultural equipment). Up

² For a more detailed discussion of securitization in general and as applied to distributed energy, see Aidun and Muench (2016).

³ Captives of U.S. auto companies contribute, on average, one-third of the group’s total profits (Deloitte n.d.).

to 30 percent of all equipment purchases (including cars) in the United States are now financed through captive FinCos, the largest of which include John Deere, Volvo, and Caterpillar (Frechette, Gerard, and Wiener n.d.). From a company perspective, this model means the servicing obligation stays within the group, and the customer relationship is also retained, which may be valuable for future sales opportunities. Since the product company and FinCo ultimately have the same ownership, some of the risks of misalignment that can exist with off-balance sheet receivables financing structures may be mitigated. Both subsidiaries are incentivized to generate sales volume, but also to ensure the quality of the loans. The FinCo, like any financial institution, may choose to finance its receivables with on-balance or off-balance sheet debt.

Outsourcing to banks and other financial institutions

Most consumer finance in developed markets is provided by banks or non-bank specialty finance companies. Once again, auto loans are a good example. As described earlier, in the United States, auto loans can be provided by captive finance companies, but banks and specialty auto finance companies that focus on consumers with poor credit ratings also provide financing. These lenders develop programs with dealerships that identify potential customers with the right credit profile and then sell cars to them. Customers make a down payment and finance the balance with a loan from the specialty lender, who purchases portfolios of these loans in bulk. In addition to credit ratings, these lenders can use their own data analytics to further refine their underwriting process.

From the dealership's perspective, this is a purely cash sale, and it does not get involved in the financing value chain. Importantly, when the specialty auto

lender takes on the consumer loan, it also takes on the loan servicing (monitoring, collections, repossession), which is a core business for it and the key to long term sustainability and profitability.

Trends in PAYGo financing

Most of the debt in the PAYGo SHS sector has been raised on-balance sheet. Lending structures range from corporate-type term loan facilities, ABL structures, and hybrids. In all cases, funds are primarily used to grow the receivables book, and the primary asset security available to lenders are these receivables.

At the same time, alternatives have emerged over the past few years. Several companies raised debt off-balance sheet in 2017 and 2018. In the long term this could allow them to develop scalable capital-raising programs and attract commercial investors, although it is unclear whether commercial investors, particularly local ones that could lend in local currency, have the appetite for this type of asset. An important caveat to existing structures in the PAYGo sector is that most lenders still have recourse in various forms to the originator, in the case where repayment rates sink below certain targets. In a true off-balance sheet transaction, that recourse would not exist.

Several PAYGo companies are also experimenting with outsourcing the financing value chain so that they can reduce operational complexity and focus on product development, manufacturing, and/or distribution. Financial institutions are understandably reluctant to fund receivables on a nonrecourse basis without having an active role in underwriting and/or servicing. In lieu of those, PAYGo operators have provided significant financial guarantees, thus limiting the immediate financial benefits of the partnership. As we've already highlighted, PAYGo companies are often reluctant to give up their long-term relationship with the customer.

TABLE 1. Comparing financing options for PAYGo solar companies

	Off-balance	On-balance	Captive FinCo	Direct financing by third-party financial institution
Who originates?	PAYGo company	PAYGo company	PAYGo OpCo	PAYGo company or financial institution
Who services?	PAYGo company	PAYGo company	OpCo services the SHS, FinCo the loan	PAYGo company or financial institution
OpCo risk exposure to lender	Ostensibly No , but unless a backup servicer is available to handle payments processing and device maintenance, then Yes	Yes . This assumes that the provider remains integrated, with a single OpCo/FinCo balance sheet. There can be partial mitigation of OpCo risk through monitoring, covenants, recourse to shareholders, etc.	No , if the FinCo's servicing is sufficiently independent of OpCo	No , if financial institution is the servicer. Yes , if the PAYGo company remains the servicer
Moral hazard	High . There can be partial mitigation if asset quality is sufficiently transparent at the time of sale.	Low . OpCo fully exposed to receivables risk, so should be incentivized to manage asset quality	Moderate . Depends on the incentive structure of the OpCo and independent underwriting from FinCo	Depends on division of labor between the PAYGo company and financial institution on underwriting and servicing.
Financial value chain decoupling?	No , unless it is a factoring model where servicing is transferred	No	Yes , particularly if they become distinct legal entities	Yes , assuming it is outsourced to a third-party financial institution or captive FinCo.

Table 1 compares the various financing options across a range of variables. As the table makes clear, servicing the receivables portfolio is of utmost importance, no matter which finance option is used. Unfortunately, the servicing arrangement of most PAYGo models limits their ability to create a captive FinCo, isolate receivables risk, or outsource financing to a third party.

Isolating loan servicing from the management of physical products could yield sizeable returns. Investors are more likely to finance receivables when that is all they are assessing. Third parties can potentially finance and service PAYGo loans, but only if, at a minimum, they have the option of servicing

independently of the originating company. Even PAYGo firms that want to keep all elements of servicing in-house would benefit from the ability to analyze the respective units separately. Separating the retail company from the financing entity will take time and experimentation.

What would it take to get to PAYGo 3.0?

Some or all of the following steps may be needed to encourage more financial institutions and investors to participate in the sector:

- **Accurate transfer pricing.** Within an integrated company, who pays

for which parts does not matter as much as it does for separate entities. When financial statements are separated for the distribution and financing entities, accurate transfer pricing will be a precondition for any accurate analysis.

- **Decoupling customer service.** It still may be helpful for customers to have a single point of contact with the PAYGo provider. But once customers' issues are assessed and triaged by the PAYGo provider, separate service units may need to step in. Several companies already have established this approach for repayment issues, which allows for closer monitoring and potential transfer of the repayment function to an external party.
- **Centralized and automated underwriting.** Although not directly related to servicing, having a centralized, auditable process would give finance partners a better understanding of the customers they are financing. It can also give the credit operation more control over the growth of sales. If early portfolio quality is suffering, then underwriting criteria can be raised on some or all customers. Credit scoring for established PAYGo customers is an important first step.
- **Discrete, small-scale pilots.** Nothing will replace the level of comfort that develops over time as two organizations work together. To expose new partners to their operations, PAYGo firms may want to share data on discrete pilots, or de-risk the participation of potential partners.
- **Standardize operating systems.** As a rule, traditional financial institutions struggle with custom software integrations. Robust servicing ecosystems exist in other credit sectors because financial products and systems are harmonized across businesses.

These steps will not only make it easier to attract financing and facilitate specialization, they will also make it far easier for investors to guard against possible shocks.

Growth in receivables financing will require PAYGo providers to have another entity that is able to service their outstanding loans

Although servicing has been the linchpin of PAYGo's success, further growth will depend on more standardization and greater security.

- To uncouple the financial value chain, which would enable investors to more easily assess receivables risk and providers to focus on activities where they have a competitive advantage, the distributing and financing entities need to be separated. Investors and partners need transparency on how the financing operation is run, particularly if they are going to run it themselves.
- Any investor that is taking receivables as collateral will need a strategy to recover that capital without relying solely on the originator. If the originator becomes insolvent or delinquent in its duties, investors will require some type of backup servicer. Otherwise, the risk of customer repayment will not be effectively isolated from the risk of the originator, and all debt is effectively at the group level. Even in the case of a PAYGo operator that sees servicing as a core business and is borrowing on-balance sheet, a credible backup servicing option would greatly improve the overall risk profile and lead to better borrowing terms.

The latter is a significant and underappreciated risk in the PAYGo sector. No matter how receivables are financed, it warrants both contemplation and mitigation.

STATE OF BACKUP SERVICING IN THE PAYGO SECTOR AND THE IMPLICATIONS FOR DEBT FINANCING

Transferring risk

In off-balance sheet financing and other transactions, assets must be moved off the books of the originator. That movement takes place in a “true sale,” which is the legal term for a “sale of a receivable by the owner to another person, such that the receivable is protected from claims against the seller’s assets in the event of the seller’s insolvency” (Simmons & Simmons 2016). This transfer creates an important protection for debt investors.

From a customer perspective, nothing changes after a true sale has been made. Customers pay for solar, and the system turns on. Those payments go to the new owner of the debt, but that shouldn’t matter to customers; they don’t even need to change the number they send payments to or the account number they use. That’s because the payments don’t flow directly to the investor. Payments are still processed by the servicer, but they are automatically separated from the servicer’s revenue, and then collected and passed on to the investor. Legally, those loans do not belong to the originator anymore. Originators just handle the money. Making a “true sale” means

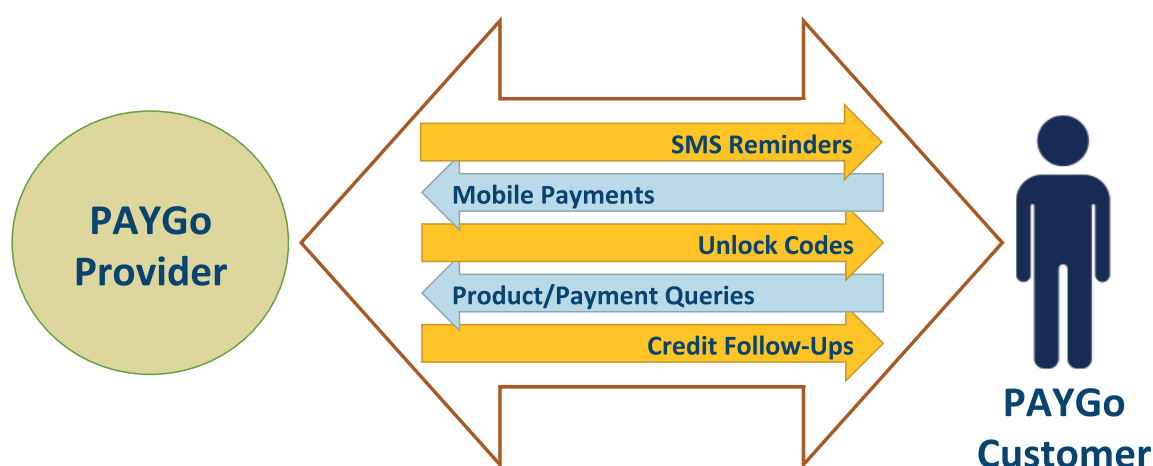
that receivables become ring-fenced and bankruptcy-remote from their originator—the risk of customer nonpayment is now legally and financially distinct from all the risks of the originating enterprise.

But that is true only if another entity can service those loans. Otherwise, it is merely an “illusion”:

“Securitization transactions are presumably independent of the originator due to the legal isolation the transaction achieves due to ‘true sale.’ However, the truth of the sale might turn out to be a glib illusion if the servicing platform is so intimately originator-dependent that it is difficult to perceive its transfer” (Fabozzi and Kothari 2008)

Unfortunately, servicing platforms that are “intimately originator-dependent” are exactly what we see in the PAYGo sector. Collecting payments is just one of many customer-facing functions that a PAYGo company carries out, and it is not easy to disentangle from the others. Figure 6 illustrates the customer’s perspective; they rely on a single point of contact for every interaction, which makes outsourcing just one of those problematic.

FIGURE 6. The PAYGo provider-customer relationship



BOX 1. Case Study of EcoEnergy

The PAYGo sector in Pakistan may be nascent, but with more than 65 million people living off-grid, it's growing rapidly and proving to be an exciting area for experimentation. When the Norwegian firm Brighterlite ran into financial difficulties, it looked for ways to guarantee service to its clients.

Not wanting customers or the sector's reputation to suffer, and seeing an opportunity to grow its customer base overnight, EcoEnergy, which sells and services high-quality solar solutions, purchased Brighterlite Pakistan's portfolio of 3,000 customers for \$100,000. This included 1,100 active customers, who EcoEnergy needed to service using Brighterlite's own, noncompatible systems. Despite the systems issues, two-thirds of clients with working systems remain active with EcoEnergy, and the company plans to cross-sell products to the entire customer base.

Source: Interview with Shazia Khan, CEO of EcoEnergy Pakistan (2018)

Current backup servicing arrangements in PAYGo

We contacted 12 leading PAYGo companies and investors to ask them whether there was anyone else who could take over servicing outstanding loans/customers on short notice in case of a bankruptcy:

- One company did not have a backup servicer in place but did have experience taking over the servicing of a competitor's portfolio (see Box 1).
- Three had "living wills" or rundown plans wherein the holders of senior originator or SPV debt have a pre-existing plan to take over and use the originator's systems until the portfolio was paid down (see Box 2). A "skeleton crew" of key staff would be retained at significantly higher salaries, given the lack of future opportunities at the defunct PAYGo company. They would keep the PAYGo provider's core CRM systems and call center running to provide a minimal level of customer service and loan servicing.
 - Two of these companies had raised debt on their balance sheets, while the other had created an off-balance sheet facility.
- A company that had several local subsidiaries planned to use a group-level expansion team that could function as a floating, backup servicer in the event of a national subsidiary becoming insolvent. The team could be onsite and integrated relatively quickly. An important assumption in this scenario is that the bankruptcy of the national subsidiary does not bring down the group.
 - This company had raised debt both on- and off-balance sheet
- The rest had no concrete plan in place for backup servicing:
 - Roughly half had considered the problem and developed theoretical solutions but had not been incentivized by investors to put them into place.
 - The other half were considering the problem for the first time during our conversations.

The existing options of investor-led rundown or group-level takeover are good first steps. If there is no backup servicer, the solution may be to recycle the pieces of the originator that would be needed by investors or other business units to manage a rundown. But this solution still depends on backup systems being established in case of technical issues and employees having sufficient goodwill and/or short-term remuneration to stay onboard a sinking

ship. These solutions are significantly better than nothing, but are not sufficient to attract cheaper, commercial capital at scale.

Can we have a “true” transfer of risk in PAYGo?

Whether financed on-balance, off-balance, or by a third party, the risk of customer nonpayment on PAYGo receivables is tied tightly to the risk of

BOX 2. Rundown scenario

What are the objectives? The objectives are to maximize the value of a PAYGo receivables portfolio in the case of insolvency of the PAYGo company. In this situation, lenders will seek to extract as much value as possible from the physical and financial assets securing their loan, which for PAYGo companies are predominantly inventory and receivables. Lenders may develop a “rundown scenario” to better understand the capacity of the receivables base to pay down the loan balance, thus allowing for better credit risk analysis of a potential transaction.

When would a rundown happen? This would happen when the company is unable to service its debt because of a worsened financial situation and equity investors are unwilling or unable to contribute additional capital to service the loan. At this point, restructuring is no longer an option.

What does it mean? When a rundown is activated, the company stops originating new loans or spending time and money on noncore activities, such as marketing, research and development, etc. Operating expenses and staff are drastically downsized to the strict minimum needed to liquidate remaining inventory through cash sales to customers or other companies and to maximize cash collection from current customers.

Lenders can project the estimated cashflows that can be collected from customers (accounting for a potential increase in delinquency rates once the company's bankruptcy becomes public knowledge and/or servicing quality deteriorates) and the time needed to pay down the outstanding debt with these cashflows. A discounted offer for immediate purchase creates an initial influx of cash, while the rest trickles in over time. Overall recovery is about 90 percent.

Lenders can be given the right to initiate the rundown scenario within loan documentation.

What are the limitations? Assumptions on how delinquency rates will increase within a portfolio postcompany insolvency and on the company's ability to liquidate inventories at a reasonable price are difficult to make ex-ante and have not been tested in practice. It also may be difficult to properly incentivize company staff and management to stay on to manage the portfolio through a rundown, although this could be mitigated by increasing short-term salaries.

the originator. If the originator becomes insolvent and a backup does not come online quickly, the value of those receivables will be severely diminished, if not wiped out. Given that no PAYGo originators are currently profitable and relatively few originators have a plan in place for backup servicing, this is clearly a problem.

Muench and Aidun (2016) surfaced this issue when describing the benefits and risks of securitization for the off-grid sector:

“For all practical purposes the originating DESCO is the only entity that can effectively serve as servicer to collect the SPV’s customer contracts and service the customers’ systems.”

To be clear, Muench and Aidun argue that a backup servicing industry should emerge over time, but we are not there yet. The bottom line is that PAYGo receivables are not bankruptcy-remote just because a legal contract says they are or because they cannot be claimed by the originator’s creditors. They are bankruptcy-remote only *if they still have value after an originator bankruptcy*. In many cases, that value would be severely impaired—hence the “glib illusion” that Fabozzi and Kothari allude to.

Some investors argue that rundown scenarios like the one described in Box 2 are viable mitigants. Others believe that the servicer risk has been adequately priced in, and/or that there are sufficient equity buffers acting as security. Although some may disagree on these points, all agree that a viable backup servicer would provide higher levels of security for the lender and would ultimately lead to a more resilient sector.

Options to outsource and backup servicing in PAYGo

Decoupling the financial value chain and mitigating servicing risk are both criti-

cal to reach the scale PAYGo solar can achieve by making companies more sustainable, efficient, and resilient. Investors and companies need to prioritize viable servicing options. These options can vary greatly in the scope of services provided, which may affect repayment (see Box 3).

The ability to outsource debt collection to third parties is necessary to unlock investment. It is also a risk. Because the incentives to treat customers fairly and with respect may not be as well-aligned with third parties, industry stakeholders need to supervise the conduct and operations of the third parties. Customers deserve transparency and fair treatment from any servicer.

Licensor-licensee arrangements

The uncoupling of the product value chain that was described earlier has been made possible by providers licensing PAYGo-ready hardware and software management tools to numerous local distributors. These providers are well-positioned to offer a stand-alone servicing product that could operate in backup or primary mode. The offering might be an extension of CRM licenses and could include call center functionality and credit/data analytics (Tiers 1-2 in Box 3).

A model more suited for backup servicing could be used by licensors that are running their own PAYGo operations. This would allow them to step in and provide servicing under certain circumstances. Licensors’ combination of hardware, software, and operational expertise makes them ideal backup servicers to their licensees, and they could potentially maintain a high-level of customer service (Tiers 1-4) until a new licensee is found. To a lesser degree, this may also work with licensees acting as backups to the licensor. Conversations with both licensors and licensees indicate that there is support for this idea.

BOX 3. Backup servicing requirements in the PAYGo sector

Because PAYGo servicing comprises a wide array of functions, backup service arrangements may not need to replicate each of those functions. Backup services could be described as four tiers of activity. Additional services will be more expensive, but they could produce higher levels of repayment.

Tier 1. CRM software, payment processing, and remote lockout.

Tier 2. Call-center operations and SMS updates (in addition to all functions of Tier 1).

Tier 3. Physical maintenance and delinquency management (in addition to all functions of Tier 2).

Tier 4. Upgrades and cross-selling (in addition to all the functions of Tier 3).

Partnerships with established financial institutions

Existing financial institutions (whether banks, microfinance institutions, or other specialists) can and should play a bigger role in servicing financial assets. They have the expertise, systems, and capital that could bring large benefits (Waldron 2018). At the same time, PAYGo companies could help financial institutions reach new customers, develop lower-cost digital delivery models, and better use data/technology to manage credit risk. According to McKinsey (2018), these will be critical success factors for African retail lenders.

The idea is not new, but it is worth repeating.⁴ If PAYGo companies can collaborate and co-brand with mobile operators on the distribution side, why can't they do the same with financial institutions on the servicing side? Collaboration could feature different levels of operational integration and transfer of responsibility, which could shift over time as collaboration deepens. Depending on how they are structured, these partnerships could also allow PAYGo companies to decouple servicing without completely losing control of the customer relationship.

Competitor arrangements

The potential market for entry-level household solar is upwards of 50 million households. We've barely scratched the surface of that. If we accept that there is room for numerous companies in many markets *and* that servicing is a key part of solving the energy access challenge, then it might make sense for competitors to work together.

Bilateral arrangements are one option. Although execution may be complicated, competing PAYGo companies could install backup systems and provide regular data updates to a trusted third party. If a predefined emergency (the terms of which would be spelled out in the loan agreement) occurs, the competitor could access those systems and begin servicing its competitor's clients.

However, the preferred option is to enhance technical standardization and interoperability in the sector. If data structure and communication protocols in PAYGo systems are harmonized, one PAYGo company could simply purchase the portfolio of a struggling competitor and seamlessly assume servicing its

⁴ See Muench, Waldron, and Faz (2016).

outstanding clients and upgrade well-performing customers.

Either of these options would provide high value for end-customers, because their new servicer would offer them more holistic service (Tiers 1-4) and additional financing.

Specialized PAYGo servicer and a PAYGo bank

In the longer term, there may be a business case for a dedicated backup servicer in the asset financing sector. Functioning like backup servicers in auto, mortgage, and credit card markets, this entity could have preinstalled backup systems. It would receive regular data dumps that would enable it to process payments and manage units on short notice (although the former may require more planning/integration with the payment operator). The addition of a call center that could reroute service calls to the originator would be an important step in assuaging customer concerns, as would a proactive messaging strategy. A field service team with some backup inventory would complete the operation, but this may be unnecessary for shorter-term loans. Service options including Tiers 2, 3, and 4 could all be made available on short notice.

However, because the sector is small, the specialized servicer may have to be donor-supported initially or operate as a subsidiary of a larger organization. The first option could serve as an immediate mitigant in core PAYGo markets. It could also transition into the second option: a servicing company operating within a bank *for* PAYGo companies. That PAYGo bank could have the following attributes:

- Management by experienced PAYGo veterans
- Mobilization of local deposits from PAYGo companies and other asset companies
- Ability to raise wholesale debt from local banks to complement deposits
- Core banking systems that are designed to handle PAYGo cash flows
- Subsidiaries that support clients with a variety of business-to-business services, such as backup servicing or credit analytics

Working closely with such a financial institution would help PAYGo companies to access cheaper funds, streamline their financial reporting, and optimize their operations.

RECOMMENDATIONS AND CONCLUSION

Our research and experience prompt the following recommendations:

- Industry stakeholders need to recognize that expanding the servicing ecosystem beyond originators is a crucial step in the development of the PAYGo sector.
- Donors should direct more funding to develop backup servicing arrangements. While this may not be as glamorous as deploying new solar units, it will better enable the sector to scale while also strengthening companies' resiliency.
- Debt investors should understand the risks they are taking and how these relate to the rest of the PAYGo value chain. They should push PAYGo companies to better mitigate servicing risk.
- PAYGo providers need to find a way to standardize and outsource certain activities without disrupting their overall functions. Creating captive FinCos, developing partnerships with established financial institutions, or even simply delinking their product and loan servicing are all viable ways to help the sector scale more sustainably.
- Financial institutions that want to expand their retail operations need to develop partnerships with PAYGo companies to leverage their combined strengths. Donors and development finance institutions should use their funding to catalyze and support these partnerships.
- Creating industrywide standards for PAYGo hardware and software would allow for rapid servicing migration

and alleviate many of the risks presented in this paper.

Servicing is the beating heart of PAYGo's "strange beasts." Companies must determine how to retain the dynamism and quality service that enabled their success, which may include letting go of the parts of their businesses that others can do better. These decisions will determine the optimal strategies for reaching tens of millions of off-grid and unbanked households.

At the same time, investors and companies need to realize that, in the absence of a viable backup servicer, any investment in PAYGo receivables is a bet on the entire value chain. Servicer risk is endemic to this and other nascent credit sectors, regardless of financing modality. Whether extending a commercial loan backed by receivables, financing the receivables themselves, or even financing the end solar customer, creditors will need to estimate probability of default and loss given default. To do that, they need to understand whether servicer risk means there is zero recovery in the case of an enterprise collapse or if there are backup strategies that can collect on outstanding debt.

PAYGo solar is not an average opportunity, and the risks associated with it are real. Distributed solar is, for the first time, becoming a viable source of energy for millions of people. Customers that have never and will never see the inside of a bank are being approved for the loans that they desperately need. However, this sector is both too young and too "strange" to risk financial disruptions, especially unnecessarily. Customers both present and future need this to work, and for it to work there must be safeguards.

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ACKNOWLEDGMENTS

The authors of this paper would like to thank a number of people who took the time to read various drafts and provide helpful feedback: Chad Larson, Machal Karim, Christine Eibs Singer, Dan Murphy, Dan Gode, Xavier Faz, and Julia

Abakaeva. In addition, we would like to thank each of the PAYGo providers who were willing to discuss their servicing arrangements and brainstorm with us. Special thanks go to Shazia Khan and EcoEnergy for sharing their story.