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Pay-as-you-go Solar: A Revolution in Off-grid Electrification

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Hugo Lucas Porta Hello, ladies and gentleman. I'm very happy to welcome you to today's module on the pay as you go evolution in the off grid solar sector. I would like to thank the International Solar Alliance and the Clean Energy Solution Center who facilitated this webinar series. Some background—some background for me. I'm responsible for energy in the consulting firm, Factor. I joined the company in 2014. And I have been previously director for IRENA, for knowledge, policy and finance and IRENA was responsible for on off grid. In the Spanish government I was also involved in different policies at national and European level.

We are continuing with this lecture is within the module seven on solar off grid. And it's particularly focused on the pay as you go, pay as you go business model for solar home systems for off grid. In this model we will always start with a brief description and definition of what pay as you go represents. And afterwards we will jump into the main body of the presentation. Don't forget at the end of the presentation you will have the opportunity to test your knowledge with a little quiz. The learning objectives which is modeled on pay as you go for accessing to provide our introduction to the functioning of pay as you go business models, a discussion of the founding needs of pay as you go company, an analysis of pay as you go business models, specification landscape, an evaluation of the pay as you go market.

Pay as you go is pioneering, game changing, digital credit system that removes the initial financial worry to solar energy access by allowing consumers to make a series of modest payment to purchase solar energy rather than paying up front for their lighting system. Pay as you go as I mentioned is a solution that addresses both consumer affordability and provides sufficient margins to fuel operational models that can scale. The pay as you go business model—in previous lecture we have talked about the tremendous access gap that needs to be closed. Private off grid energy providers can pay a huge role in this regard. However, their business operation and especially their reasons of profitability are limited by the bankability of the potential consumer base.

Rural households often lack the collateral and the financial power to obtain solar system. They traditionally require up-front investment is unaffordable. The predominantly most prominent solution to this problem is pay as you go financially. Pay as you go company essentially rents consumers a solar home system that comes with a battery, a charge controller, a solar panel, LED bulbs and mobile chargers. Basic systems have enough power to transform light and larger ones could power a small appliance like radios and TVs. The first approaches of this business model were tested already in 2010 in East Africa. The concept has developed into a continuously growing world-wide industry.

On the following slides, we will have a look at how the pay as you go technology achieves what it promises. We will also look at the pros and cons of the business approach because pay as you go not only helps underprivileged consumers to finance their solar projects, but essentially transforms every aspect of the value chain. Last but not least we will analyze the market, it's growth path and its likely future.

Put very simple, the pay as you go approach customer pays only for the electricity they use most often through a mobile money structure. The ______ by regulates usage, services when the customer prepays his use or expires. Under some pay as you go models, the device permanently unlocks at the end of the lease period ______ to the end customer. Difference around the financial model spectrum will be discussed in a minute. One distinctive aspect of the pay as you go revolution is that automatic calculation on a massive scale that is compounding the growth of the model.

On the one hand, digitalized network-based process allows pay as you go operation to learn about the industry. This data is highly important for the _____ as a whole. Being a relatively new industry, there is needed information around market side policy incentive, business model in any financial and operational performance of pay as you go companies. For example, the World Bank and the international financial corporation together with the Global Off Grid Lighting Association, GOGLA, and its members have developed a key performance indicator framework for pay as you go solar energy sector.

The framework seeks to increase transparency around operational and business model performance of energy service providers, explore marketability and reliability and ultimately enable a more robust understanding of the sector. A KPI framework can be a basis for the development of financial bankers, operational toolkits and policy programs that are critical for the sector to grow. Once fully implemented, it will enable the establishment of new industry standards, well defined indicators that quantify the risk factor but also are practical to compute given the industry that the collection *[Break in Audio]* and are useful for both pay as you go companies and financers as a starting point for identifying and assessing investment opportunity.

But on the other hand, the collection of consumers' data raises issues of privacy as customer data are often collected within the customers' full acknowledgement. Pay as you go companies require the customers to sign contracts when they register for credit and there is some evidence that some customers don't understand the full ______ and value of the information collected or on occasion do not provide their consent. According to data collected by Acumen, the impact fund investor, 27 per cent of pay as you go customers felt that agent did not explain the contract to them adequately during the sign-up process. 13 per cent say that parts of the payment plan were unclear.

Another concern arises from the subsequent usage of customers' data. For example, pay as you go payers spoke of their ability to tell if a wedding was coming up in a village based on electricity usage pattern alone which could print advertisement for a wedding loan to make the wedding grander. An investor would see this as a measure of progress potentially repressing loan sharks while others would consider it irresponsible. One reason for the ______ of the model is because its consumers have a higher lifetime value. This slide shows the aging journey of the average consumer that has decided to obtain electrification service in 2010.

This business model with the cash-based model where consumer traditionally pays for the hardware up front, the customer is likely to only buy entry level systems in the beginning. Even the relatively lower up-front cost. In the case-based model, the customer is estimated to eventually also upgrade to some midrange technology. However, only to a late point in time. When summing up, a company supplying this customer over eight years technology, his or her purchase will generate and estimate revenue of less than $400.00 US dollar. It has also been remembered that customers are more likely to switch providers when they are not bound to them via a standard contract. Such ______ may not even manifest necessarily with the regional service and good provider.

With the pay as you go business model, the lifetime value of a customer is larger and the revenue generated from one customer in this period is more than three times as much. Pay as you go is relaxing the norm that customers will only spend up to two to three months of safe disposable income on a given product. Companies often have an _______ energy product level that not only costs the customers different willingness to pay but also includes customers to migrate from basic to more future reach produced over time.

A couple words of funding needs and profitability. The pay as you go sector is the magnet funding in the distributed energy services sector. Founders are more willing to support pay as you go for consistent business models. The ______ of funds going to pay as you go companies has increased rapidly. In 2012 pay as you go companies accounted for 31 per cent of total finance rates which crossed 90 per cent by 2017. Overall from 2012 to 2017, pay as you go business raise 773 million US dollars equal to 85 per cent of all the funds raised by off grid technologies. This is also reflected in a survey of funders where *[Break in Audio]* are represented in this graph. With four out of five clearly pay as you go company are ________ as the business model most able to raise funds.

However, pay as you go models are also more demanding of investments. Pay as you go model have historically required multiple rounds of financing for up-front investment and working capital. As a result, investment needs for a pay as you go company can be up to eight times that of cost fill based companies. There are mainly two reasons. First of all, the pay as you go business case, affordability by extending a consumer loan which however needs to be financed. According to the Global Off Grid Lighting Association, GOGLA, these need to fund receivables can reach, can range from 35 to 55-year company or even higher. As some recent transactions have shown in combination a _______ may require from three to ten US million dollars for founding inventories.

The second reason is vertically integrating pay as you go company require early financing to create extensive distribution network and to develop the software platforms and technology that can enable pay as you go financing and a loan company to sell down the biases in case of loan payment of the installment. With more than five years needed for pay as you go companies to reach profitability, the ______ success of the sector can be seen as somewhat surprising and is by some regarded as a hype that is going to burst.

For years, the fact that the first pay as you go company are reaching a state of maturity also means that the type of funding that is required is changing. Portrayed a but more clearly than on the graph on the slide before, we see here the growth, the specific funding needs of this ______ energy services companies in general. Distributive energy services provided to funding through equity, local and international debt. Equity and grants are the main source of funding available for start-ups. With time on a larger scale, company needs to shift to more local deposits and external borrowing increasing the financial leverage. Vertically integrated pay as you go companies over time are likely to have a visible different funding take place.

One that is characterized by a significant increase in terms of local data as well as foreign financing. Relatively but not absolute increase in terms of equity. You have many companies continue to emphasize equity needs in the short term for best finance condition and possibly allowing system buy in investors to exit from the sector which the market has not seen yet. For the maturing pay as you go businesses, local finance will be important. But it is not yet a strong finance component in this sector. A system transaction always involves a ______ BFI guarantee and tend to be cumbersome to arrange.

Local lenders are conservative and usually emphasize past performance over future projections. This is partially also the regulation driven since local banking, regulation, emphasize the protection of the _______. Internal lending standards often require supervisory for bigger loans and are therefore harder to get. In terms of these obstacles, local land grid wishing to participate in their respect of the off grids around market leaving opportunity to _______ their finance specialist. Local lending in principle is the most suitable way of finance for pay as you go companies as their incomes since have been ______ in local currency as well. That currency mismatch is avoided. The anticipated the developments in data driven APIs would usually benefit the sector in this regard.

The pay as you go revolution has also been accompanied by intent to stick to finance for distributed energy services provider. A program that's simple is that of using a special purpose banker. In a decision a pay as you go company says a *[Break in Audio]* a special purpose banker owned entirely by investors. The customer receivables serve as a collateral for the investor who owns the SPB to investor notes. The financing flows from the investors through the SPB to the pay as you go company. All feed the receivable payments flow from the system full of customers to the SPB. While these represent a suitable way to leverage the working capital needs of pay as you go company to scale and expand their operation, this model is more complicated to set up and also depends on local policy frameworks. It has to be seen how standardized reporting measures and KPI frameworks can formalize this process and also enable emerging players to have access to finance.

Moving on to the pay as you go specification landscape which is needed to describe different types of pay as you go business model. Pay as you go businesses can vary in their form and dimension. As part of this model, we will look at different forms of solar home system ownership that consumers can obtain by portraying the full spectrum of _____ models. The form of ownership is linking to the length of lease and the mode of payment which we will discuss the majority of pay as you go businesses model adopting a rent to own approach financed by consumers through mobile money and one to two-year lease contract. An important aspect of pay as you go company is the activity of companies around the value chain. The first companies active in the pay as you go model follow a highly integrated approach. And still a majority continue to do so using their own in house proprietary internal platforms. In this model, we will discuss why this is the case and why it is likely to change in the future.

The choices that players make along the dimensions both point to the major business model that are emerging and constantly evolving. The following slides shows some combinations of these choices that potentially ae aligning to scale farther and dominate the sector in the coming years. First of all, there are vertically integrated energy services providers which are ________ providers and control most aspects of the value chains from proof of design to payment collection. During the _______ stage of the pay as you go, most new interest choose to invest heavily in all parts of the value chain to compensate for the lack of suitable partners and to control the customer experience as they innovate to find an optimal business model.

We will discuss the issue of this vertically integrated providers in the following, the banker topology describes business model that focus on customer facing function of the value chain including sales, credit assessment, training recruitment and after sale service. PEG Africa has simplified this topology procuring ______ from established off grid players and then investing in infrastructure to support customer acquisition and management. Going forward the market may see increased emergence of such models driven both by system, vertically integrated player system focused to the *[Break in Audio]* and new entrants thrown into the market by the excitement to run in pay as you go are looking to shorten their time by procuring system ______.

Last but not least, the value chain specialists who focus on a specialized chain in one of the same aspects of value chain. Later on, we will look at Paygee a German company specialized in pay as you go ecosystem. Let's now look at the aspect of the pay as you go business model that defines the specification landscape. This graph shows the full spectrum of financing model. However please note that the right side does not apply to pay as you go model. This applies as pay as you go start with prepay and rent and set up in which consumers have very limited ownership or commitment to their plan. Moving away from this solar as series aspect are the perpetual lease and lease to own business model.

The lease to own business model which is the more widespread out of the two includes monthly payment according to a preset payment plan which concludes in consumer ownership. This incentive is often most effective when the prospective timeline to ownership is short. That's reducing the risk of default. Transfer the ownership incentive for customers to complete payments. Many of the customers are not used to the idea of paying for energy as a service and it's in a ______ model require this incentive. In theory, this pay as you go could be operated also in the absence of mobile money infrastructure. For example, for dedicated credit salesmen would however add further overhead.

In East Africa almost, all pay as you go providers are only mobile money. Outside East Africa however, this model of payment is concentrated by lower penetration of mobile money and many customers unfamiliar with using it even when it is available often leading to the building up of arears and debts. Some players have innovated the technology to accommodate payments through mobile _______. Which this innovation lends itself to scalability going forward it may run into regulatory chain, the regulatory challenges.

I say before others rely on cash payment that customer hands to repayment agents This method leads to high cost accrued from agent commission, transportation, security and administrative costs for tracking payments which increases as operation moves to less dense areas. On the other hand, mobile money has been rapidly expanding and is likely to continue to do so paving the way for pay as you go companies. In some countries such as India effort to pursue mobile money adoption are even governmentally supported.

An interesting effect of the expansion of pay as you go business model in the off-grid electrification sector is the impact is it having on financial inclusion. While mobile money infrastructure is a clear precondition for pay as you go business model to work, the acceptance and ease of mobile money services has advanced by this passion of electrification services offer through pay as you go business model. As researched by CGAP from 2015 source. In some countries up to 50 per cent of new customers of pay as you go company has opened their first mobile wallet in order obtain the solar home system. In other words, usage of pay as you go energy services is propelling financial inclusion.

This promoted access to formal financial services has literally driven financial inclusion. But there is more. A customer that has allotted his solar home system device completely as financing it over time through small instalments and prepaid payment is able to use it as a collateral for sustaining other credits. An often-quoted program of the pay as you go company is the system integration that is happening along the value chain. As we have seen before it is among the main reasons for the future investment needs of these business models. According to the global off grid lighting association, almost 70 per cent of known pay as you go operators are vertically integrated while less than a third have chosen to absorb value chains. In other words, most pay as you go businesses are making or assembling their own product, distribute their own product, create a technology platform for running pay as you go operation and run an effective leading bank.

In the early days of the sector, integration was driven by the absence of internal grid. If it doesn't exist, build it was the key to all early off grid energy service providers. Today, vertical integration is mainly driven by the need to control customer experience across the value chain given the quality long term customer *[Break in Audio]* which drive payment recovery and are crucial to the business model and a high lifetime value of customers that we have seen before. Clearly however it is difficult to exist in all parts of the value chain. And hence, efficiency losses are likely to be incurred.

An industry led by strongly integrated business in both cost related barriers to entry to ______. For example, according to the Global Off Grid Lighting Association, a typical supplier has invested between $1 million to $10 million US dollars in developing proprietary software to manage payments and gather usage data. This is very difficult for new players to compete with. As a high cost of human resources and the broad range of function the pay as you go business operates and along the value chain is a financial barrier to those to enter the market. This human resources cost includes the commission for sales team, the salary for a position person, partial service and also all those experts that work in the specialized functions that carry the company, such as design, finance, marketing to name a few.

The industry has since called for the abandoning of the verticalization of value chains. Instead of trying to do it all, pay as you go companies are now looking to specialize in one or two pieces of the proposal including hardware, software, distribution, consumers financing and value-added services. If successful unbundling we create more product options and great opportunity for distributors, financial services provided and end consumers of solar energy. This unbundling lowers the start-up cost for new entrants which allows as second generation pay as you go operators to enter the market more easily and nimbly without building or owning their own hardware or software.

This is turn allows these companies to further specialize in particular elements of the value chain such as distribution, consumer finance or value-added services. Those who are familiar with the previous lecture on access to electricity through off grid technology will know how important this rate of flexibility of new pay as you go operators can be in time on markets where low hanging fruits are scarce. An example of them building a vertically integrated pay as you go mode is *[Break in Audio]* ecosystem.

To show how pay as you go can facilitate business operation beyond the profession of transaction, we will take a look at the case of Paygee, a pay as you go provider that promises to provide a fully integrated ecosystem. Paygee has been launched by Mobisol and provides what could be termed the operating system of the pay as you go solar industry running on this computer as well as mobile devices, the software suite is the digital key for pay as you go business model paving the way for the future management of an entire pay as you go value chain through a single information hub. Available models as part of the ______ suite cover the full value chain, levering in the data that is generated in the process.

The clear benefit of _______ software suite is that it allows for remote access and control of pay as you go products. And most importantly it's minimize operational costs and empowers sales force. The ability of more small startups and established players to drive down overhead cost is the finding for the profitability as a business model in the challenging environment in which they are operating. They Paygee suite is _______. Meaning distributors and manufacturers have a choice for their preferred pay as you go platform including full ______.

So far, we have seen what pay as you go is and what it can be. In the next couple of slides, we will look at the market in general, the distribution and think about *[Break in Audio]* develop in the future. Thus far growth has been limited to countries with a strong mobile money ecosystem. With particular crowding in East Africa. This signals both high growth potential in the future. But also, the challenges of operating successfully and differently within different environments. There are countries in west and central Africa, especially Nigeria and the Democratic Republic of Congo are already showing healthy mobile money growth. India, the largest off grid solar market in the world currently has very low pay as you go penetration corresponding largely to its minimum money market and relatively low uptake of solar home systems to date. It is however first for significant growth in mobile and digital transaction over the next five years.

Mobile money has proved the most streamline mechanism of payment for pay as you go participators. But as pay as you go technology and business models mature and diversify ______ money may be less of a constraint. What will ultimately be a determinant of the pace of dissemination of technology is the ability and willingness of lenders and investors who fund the scaling of the system business model across border as well as the ideas of market entities of new businesses.

Pay as you go for off grid roughly double every year. But recently it's lowered. The customer base of pay as you go solar home systems amounted to 1.5 million homes by October 2017. Driven by readily available mobile money systems and over $200 million US dollars investment in 2016. *[Break in Audio]* faster than most of its companies. However, as a small number of new entrants such as Delight and ______ Power grew rapidly maintaining the pace seen in the past will provide the leaders to grow more ______.

It lies in the nature of off grid companies that many of the areas they are active in are barely touching previously existing services. As such it takes great effort to get up a distribution network and expand operations especially in areas where fruits are not hanging as low as they have been in areas with already saturated markets. The foundation has also found that consumers may buy electricity less than anticipated by businesses hoping for low default rate, especially in cases of ______. It was found to be *[Break in Audio]* back down from the payment plans. As discussed before, the high overhead costs represent a worry for business expansion and new NTLI. One that drains on the profitability of companies in the industry. Last but not least it stands that not for pricing that one of the most defining challenges for the sector will remain to overcome the persistent ______ of capital.

To conclude I want to say the following. Pay as you go definitely presents an innovative technology, one that allows business models to theoretically provide for a consistent rural customers profitability and that allows payers to grow to scale quickly. However, pay as you go companies depend on patient funding source that are willing and able to finance the operation of the business models. These funding sources are more and more so locally and internationally in the form of the finance. But the long-term profitability of pay as you go companies remains deterring of potential investors.

Pay as you go companies are naturally strongly vertically integrated. They are bundling of inefficient companies _______ emergence of specialists and is putting ______ from sustainable goods and services provision. If this is the case and investors are not losing their appetite for the impactful and eventually profitable business in the solar energy sector, then the market will have a chance to sustain and grow substantially. At this point, we come to the end of this module on pay as you go solar. I would like to thank you for your attention. And for your understanding of the contents in the following _______. Thank you.