



Mobile for Development Utilities
Kamworks
Introducing GSM-enabled PAYG Solar
in Cambodia



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Mobile for Development Utilities

The Mobile for Development Utilities Programme promotes the use of mobile technology and infrastructure to improve or increase access to basic utility services for the underserved. Our programme focuses on any energy, water or sanitation services which include a mobile component such as mobile services (voice, data, SMS, USSD), mobile money, Machine to Machine (M2M) communication, or leverage a mobile operator's brand, marketing or infrastructure (distribution and agent networks, tower infrastructure). The Programme receives support from the UK Government.

Author: Rahul Shah

The Innovation Fund

The Mobile for Development Utilities Innovation Fund was launched in June 2013 to test and scale the use of mobile to improve or increase access to energy, water and sanitation services. In two phases of funding, grants were competitively awarded to 34 organisations across Asia and Africa. Seed grants were awarded for early stage trials, Market Validation grants for scaling or replication of business models, and Utility Partnership grants to foster partnerships between utility companies and innovators.

The specific objective of the Innovation Fund is to extract insights from the trial and scaling of these innovative models to inform three key questions for growing the sector:

- How can mobile support utility services?
- For a mobile-enabled solution to be adopted at scale, what building blocks are needed?
- What are the social and commercial impacts of delivering community services to underserved mobile subscribers?

These insights, as well as grant-specific learning objectives, are included in individual case studies such as this one, as well as thematic reports that will be published throughout 2015 and 2016.



This document is an output from a project co-funded by UK aid from the UK Government. The views expressed do not necessarily reflect the UK Government's official policies.

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Executive Summary

Kamworks is a Cambodia-based solar energy company providing a wide range of solar energy solutions. In November 2013, the M4D Utilities Programme awarded [Kamworks](#) a Seed grant of GBP 114,968. The purpose of the project was threefold:

- To develop pay-as-you-go (PAYG) solar home systems (SHSs) with GSM-based machine-to-machine (M2M) connectivity
- To trial the sale or rental of 300 such systems in rural Cambodia and
- To integrate with mobile money for payment collection

Kamworks offered off-grid customers SHSs through a 24-month loan term or a perpetual rental, including customer support and maintenance. Kamworks developed M2M connectivity for the SHSs to monitor system usage and performance, while providing the ability to remotely switch on or off the SHS.¹ From May 2014 through November 2015, Kamworks sold or rented a total of 505 SHSs, exceeding the target of 300 SHSs in May 2015.

To implement the project, Kamworks developed a partnership with [WING](#), the dominant mobile money service in Cambodia, for payment collection and signed a mobile data service agreement with [Cellcard](#), a mobile network operator (MNO). SHSs were sold either through a marketing partner (Planet Finance or PFTA) or directly by Kamworks' sales agents. Systems were financed by [VisionFund](#), an MFI partner, Kamworks or [Kiva](#).

The key objectives of the grant were to validate the business model as well as to determine what extent the GSM network coverage would support the deployment of M2M-enabled SHSs. Key findings include:

- **Customers used perpetual rental as a low-risk, low-commitment way to test the SHS:** Only 27% of respondents of Kamworks' consumer insights survey said they were interested in renting an SHS in perpetuity. However, once the perpetual rental option was available, 65% of customers chose it. Of the customers who signed up for rental, 48% transitioned to rent-to-own or repaid their systems fully by the end of November 2015. Thus, a high proportion of customers used rental as a low-risk, low-commitment trial before deciding to buy the SHS.
- **Rural Cambodians are fast to adopt new payment channels through mobile money:** WING, the dominant mobile money operator, has widespread presence in Cambodia. 98% of Kamworks' customers appreciated the convenience of paying using WING mobile money.
- **Crowdfunding platforms can provide low-cost funds to finance innovative projects:** Systems rented out or sold on credit by Kamworks independently of VisionFund were funded by a mix of Kiva loans² and Kamworks' funds. At the end of 2015, Kamworks had raised USD 157,000 through Kiva loans for 244 customers to purchase SHSs. Each loan was funded about twice as fast as the average Kiva loan.³ Thus, Kiva proved to be a very convenient avenue for Kamworks to raise funds. After the initial setup and training of the Kamworks team, management and processing of Kiva loans imposed a very low overhead.
- **Customers preferred the largest system and bought appliances once they had increased access to electricity:** 75% of customers opted for the SHS100. 51% of surveyed customers bought new appliances after experiencing the quality of the SHS

1. Kamworks refers to the switching hardware and GSM communications module together as the GSM switch.

2. Kamworks registered as a Kiva Experimental Partner in September 18, 2014 with a credit limit of USD 50,000.

3. Kamworks took an average of 3.6 days to fund a loan of USD 643 as of December 31, 2015. It took an average Kiva partner 6.7 days to fund a loan of USD 415. See partner details for Kamworks at <http://www.kiva.org/partners/407>

and its ability to generate more energy than they previously had available.
Of those who bought appliances, 71% purchased a flat-screen LED TV, and 15% purchased a fan.

- Maintaining a high rate of on-time repayment⁴ is a challenge:** The proportion of on-time payments dropped from 100% in October 2014 to 47% in October 2015 for the rent-to-own portfolio. Part of the problem was lack of consistent mobile coverage which prevented many systems from being switched off remotely. This created perverse incentives for customers and those within their immediate social circle to delay or default on payments. Further, Kamworks staff who were supposed to authorize the switching off of SHSs were reluctant to do so because they were apprehensive of being seen as unfair when they switched off a system in coverage. This highlighted the need to enforce the consequences of delinquency promptly but fairly, and led Kamworks to implement much stricter

repayment processes. Kamworks also employed an experienced and qualified credit officer to improve customer vetting as well as strengthen the overall lending and collections process.

Through this Seed grant, Kamworks, in partnership with Cellcard and WING, has refined its business model for PAYG solar in Cambodia. Kamworks trialed both the perpetual rental and rent-to-own models with different types of financing – internal, MFI and Kiva. The grant also allowed Kamworks to refine its PAYG hardware design so it is ready for large-scale manufacturing, and to develop its PAYG software technology to the point where it can be licensed.

Kamworks plans to accelerate the sales of its SHSs as a certified supplier to the French Development Agency's (AFD) Green Microfinance Fund and through the United Nations Capital Development Fund (UNCDF) Cleanstart SHIFT Challenge Fund.

Source: Kamworks



A banner announcing Kamworks sales demo

4. Repayment rate is for 195 rent-to-own systems funded by Kamworks only. As per VisionFund, their portfolio of 173 systems had a 100% repayment rate as of June 2015.

Introduction

Kamworks is a solar energy company based in Phnom Penh, Cambodia, providing a wide range of solar energy solutions. Its portfolio includes products such as custom-designed solar systems, the award-winning MoonLight® solar lantern and GSM-enabled SHSs.

Since its inception, Kamworks has focused on providing high-quality solar products at an affordable price. Its SHS range was designed in partnership with rural customers, to address the specific requirements of the local market. After initially selling SHSs on a cash basis and experimenting with MFI financing partnerships

as early as 2009, Kamworks launched a programme to scale up credit sales in 2013. In parallel, Kamworks designed its own GSM-enabled SHS technology, with the vision to offer credit, either on its own balance sheet or in partnership with MFIs or other financing partners, with collection of payments using mobile money.

To overcome the limitations of a weak vendor ecosystem in Cambodia, Kamworks developed a strong “Do-It-Yourself” culture. For example, Kamworks manufactured the plastic casings for the SHS in-house.

Key Facts

FIGURE 1

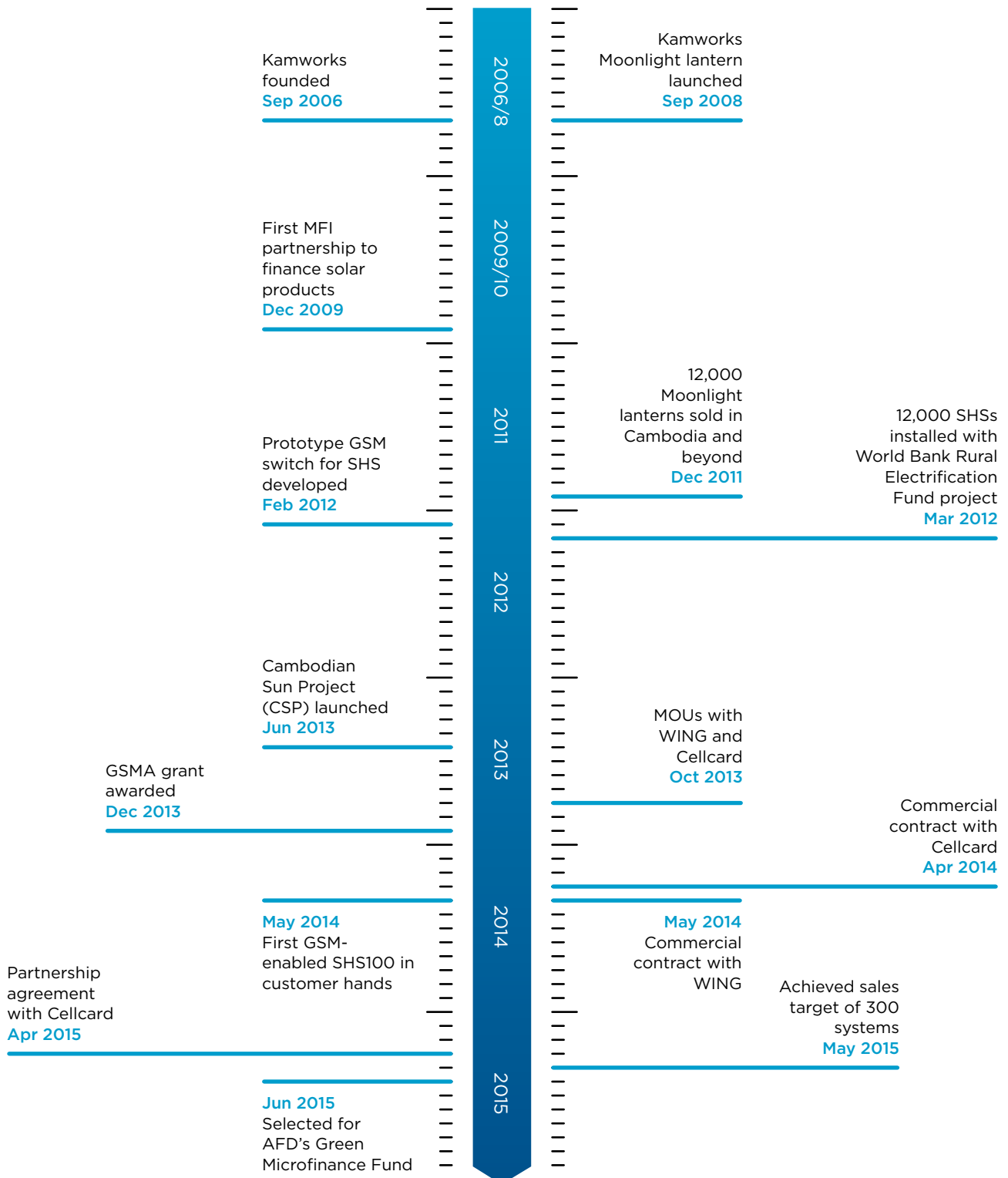
Company overview as of November 2015

Name	Kamworks
Sector	Energy (Solar)
Year Established	2006
Country Footprint	Primarily Cambodia. Moonlight also sold in Malawi, Tanzania, Nepal, Bangladesh, Surinam, Thailand, Philippines, Australia, Netherlands and Indonesia
Product/Service	Pay-as-you-go SHSs (40W, 60W and 95W)
Market Segment	Off-grid households and small enterprises
Total systems/ Customers served	<ul style="list-style-type: none"> 300 GSM-enabled SHSs sold or rented by May 2015 under the grant-funded project with an estimated 1,500 beneficiaries 505 GSM-enabled systems sold by November 2015 in total
Use of Mobile: Technology and Partnership	<ul style="list-style-type: none"> M2M connectivity for remote monitoring and control Mobile money for customer payments Automated and manual SMS and phone call reminders to customers

Kamworks' growth timeline is depicted in Figure 2.

FIGURE 2 Source: Kamworks

Kamworks' growth



Grant Objectives

The objectives of Kamworks' Seed grant were as follows:

- To develop pay-as-you-go (PAYG) solar home systems (SHSs) with GSM-based machine-to-machine (M2M) connectivity
- To trial the sale or rental of 300 such systems in rural Cambodia and
- To integrate with mobile money for payment collection

Kamworks initially planned to rent out the SHS100 (95W) for a USD 30 monthly payment in perpetuity. The expected learnings for the broader pay-as-you-go solar sector, as defined by Kamworks at the outset of the project were:

- To validate the perpetual rental business model, especially willingness and ability to pay in Cambodia, as well as measure conversion and retention rates
- To test the assumption that Kamworks would be able to rely only on a GSM connection to communicate with the SHSs.

Market Opportunity

Addressable Market

The market opportunity for Kamworks' offering is characterised by Cambodia's low electrification rate of 34% (18% in rural areas and 97% in urban areas).⁵ In contrast, about 99% of the population of 15.3 million has access to GSM networks.⁶ This means 65%, or 9.9 million, are within the addressable market that could leverage GSM networks in order to access new energy models and services. The majority of this market is the 80% of the population that lives in rural areas.⁷

Mobile Ecosystem

Cambodia's market penetration of unique mobile subscribers is 54% which is well above the South-East Asia regional rate of 45%.⁸ In 2014, there were six mobile operators in Cambodia. Metfone led with a market share of 50%, followed by Smart (28%) and Cellcard (16%).⁹

Mobile money in Cambodia is currently offered by WING¹⁰ which has 1,800 agents and nearly a million registered customers.¹¹ WING has adapted its service to meet two constraints specific to the Cambodian market:

1. Cambodia operates with two currencies, the Cambodian Riel, and the US Dollar. WING supports both currencies.
2. Most feature phones¹² do not support Cambodia's national language, Khmer. To overcome this language barrier, WING offers the over-the-counter (OTC)¹³ model, where an agent uses his own account to transact on behalf of the customer.

Many new mobile money services are expected to launch in the near future which may challenge WING's current domination of the market.¹⁴

5. GSMA estimates based on IEA data for 2012

6. GSMA estimate

7. World Bank Data Bank, 2014. <http://data.worldbank.org/indicator/SP.RUR.TOTL>; <http://data.worldbank.org/indicator/SP.POPTOTL>

8. GSMA Intelligence, Q4 2014

9. GSMA Intelligence, Q4 2014

10. GSMA Mobile Money deployment tracker: <http://www.gsma.com/mobilefordevelopment/programmes/mobile-money/insights/tracker>

11. Financial Inclusion in Cambodia is Trending Digital: <http://www.cgap.org/blog/financial-inclusion-cambodia-trending-digital>

12. As per GSMA Intelligence data for Q4, 2014, more than 76% of phones in Cambodia were feature phones

13. A transaction is considered OTC when it is conducted through an agent's account on behalf of the customer. See Mobile Money 2015 State of the Industry Report: http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2016/03/SOTIR_2015.pdf

14. New Players Shake Up Mobile Money Market: <https://www.cambodiadaily.com/news/new-players-shake-up-mobile-money-market-103353/>

Market Assumptions

Kamworks began operations based on the following assumptions about their target customers, made as part of their grant proposal:

- As of 2013, nearly 75% of households did not have access to electricity. Only about 0.7% of households use solar systems meaning that nearly all who are not served by the grid are in the addressable market.
- The government objective of electrifying 70% of households by 2030,¹⁵ will still leave at least 30% of the population without reliable access to energy.
- GSM coverage would be ubiquitous in Kamworks' sales areas.
- In rural areas, domestic appliances are most often powered by car batteries charged at a local battery charging station. The unit cost of electricity (USD/kWh) from batteries ranges from USD 2.78/kWh for a 70Ah battery to USD 3.51/kWh for a 50Ah battery.¹⁶
- Customers would pay for an SHS that frees them from the inconvenience of transporting heavy batteries for recharging,¹⁷ gives advance warning when energy is running low and is safely enclosed in a sturdy case as opposed to having open, loose wires as with the battery.

Source: Kamworks



An automotive battery used to power a home

15. Sustainable Energy for All Forum: <http://www.se4allforum.org/content/cambodia>

16. Assumptions: (1) Battery costs USD 1/Ah, (2) Battery life is nine months, (3) Battery is charged on alternate days and (4) Cost per charge is USD 0.50.

17. A 70Ah battery weighs about 22 kg

Business Model

Value Proposition

Since 2008, Kamworks has locally developed its own range of SHSs with solar panel capacities between 20W and 160W. Those systems were distributed through two different channels: direct sales with full payment upon installation and through a partnership with microfinance institutions that provide specific loans for the system.

Before the SHSs, Kamworks had developed the MoonLight, a solar lantern adapted to the local market. Even though it costs only USD 15, the upfront cost of the MoonLight lantern is sometimes an obstacle to purchase. Since 2010, Kamworks has operated a

scheme where local entrepreneurs rent MoonLights to villagers for a weekly fee and share revenues with Kamworks. This model has proven to be successful, with a very high rate of rental and retention. Based on this experience, Kamworks' concluded that customers would value the opportunity to rent SHSs.¹⁸

Kamworks' value proposition is delivered through the business model components discussed in detail in the following sections, including products and pricing structure, sales, marketing, distribution, and on-going service.

Products and Pricing

Initially, Kamworks planned to offer only the SHS100 (95W) for a monthly rental fee of USD 30. However, a customer insights survey undertaken just as sales were beginning indicated that 77% of potential customers favoured owning the SHS, so Kamworks added a 24-month rent-two-own option to their offering.

Following the survey, Kamworks also tested the market for smaller system capacities (40W and 60W) that better matched potential customers' current spend on energy. Simultaneously with the survey, Kamworks

validated its product technology by installing the first GSM-enabled systems under the Cambodian SUN Programme (CSP).¹⁹

The configurations and prices of the SHSs in Kamworks' portfolio are shown in Figure 3. In addition to the components listed below, customers can use small appliances, such as a hair shaver, with an inverter. Customers can also purchase or rent 9W LED lamps each with a 10m cable, switch and lamp holder. The full price list is specified in Appendix 2.

18. A rental model offers service at lower monthly payments than a lease-to-own model but requires payments in perpetuity, like a traditional utility.

19. The Cambodia SUN Programme was initiated by Kamworks with financing partners in 2013 to enable financed purchase of SHSs. See <http://www.kamworks.com/news-details/new-solar-home-system-project-launched-in-cambodia/>

FIGURE 3 Source: Kamworks

Kamworks products and prices²⁰

System type: Panel and battery size	Components included	24-month rent-to-own		Perpetual rental	
		Monthly prepayment	Total price	Deposit ²¹	Monthly cost
SHS100: 95W panel 100Ah battery	<ul style="list-style-type: none"> • Rooftop metal pole mounting system • Solar cable (12m) • Battery box including battery status display and 2 plugs for appliances • Charge controller • Automatic circuit breaker • Extension box with 2 additional plugs 	USD 35	USD 840	USD 25	USD 20
SHS60: 60W panel 55Ah battery		USD 25	USD 600	USD 25	USD 15
SHS40: 40W panel 55Ah battery ²²		USD 22	USD 528	USD 25	USD 10



A Kamworks SHS100 kit

20. All prices are quoted in USD as it is the de facto currency in Cambodia

21. Refundable on cancellation after six months

22. A software setting limited the usable capacity of the battery to differentiate between the SHS40 and SHS60

It is important to note that Kamworks offered a monthly payment plan with a fixed payment amount rather than a fully flexible payment plan²³ which is popular in East Africa. The reason is that Kamworks

envisioned scaling the offer after the GSMA-funded pilot project, and a fully flexible option was considered as too risky for the type of funding Kamworks could access within the project timeline.

Use of Mobile: Technology and Partnership

Technology: At the core of Kamworks' PAYG service is machine-to-machine (M2M) connectivity and mobile money. A SIM card embedded in the SHS enables two-way communication via the GSM network between the system and Kamworks' central server, which maintains customer account and payment information. The payment process includes the following steps, which are represented in Figure 4:

1. Kamworks sends SMS reminders to the customer five days before payment is due, on the due date and five days after the due date, if the payment is still pending.
2. Customer pays in cash at a WING shop.²⁴
3. The WING agent uses bill pay from his mobile money account to transfer the payment to Kamworks' merchant account.²⁵ The transaction uses the USSD channel of whichever mobile network operator the WING agent is a subscriber.
4. Customer receives an SMS acknowledgement of the payment.
5. The WING server transfers payment and account information to the Kamworks server.
6. The Kamworks server maintains account status. The server software credits the customer account for the next month. As long as the account is in good standing, the server does not send any message to the SHS.
7. In case payment has not been received 10 days after the due date, call centre staff contacts the customer before authorising the disabling of the SHS.
8. Once the authorisation is issued, the server generates a command to turn off the SHS which is sent via SMS over the Cellcard network. On receipt of payment, an SHS that was previously turned off due to delinquency is turned on automatically via an SMS command. This command does not require staff intervention as does the process of turning off an SHS.

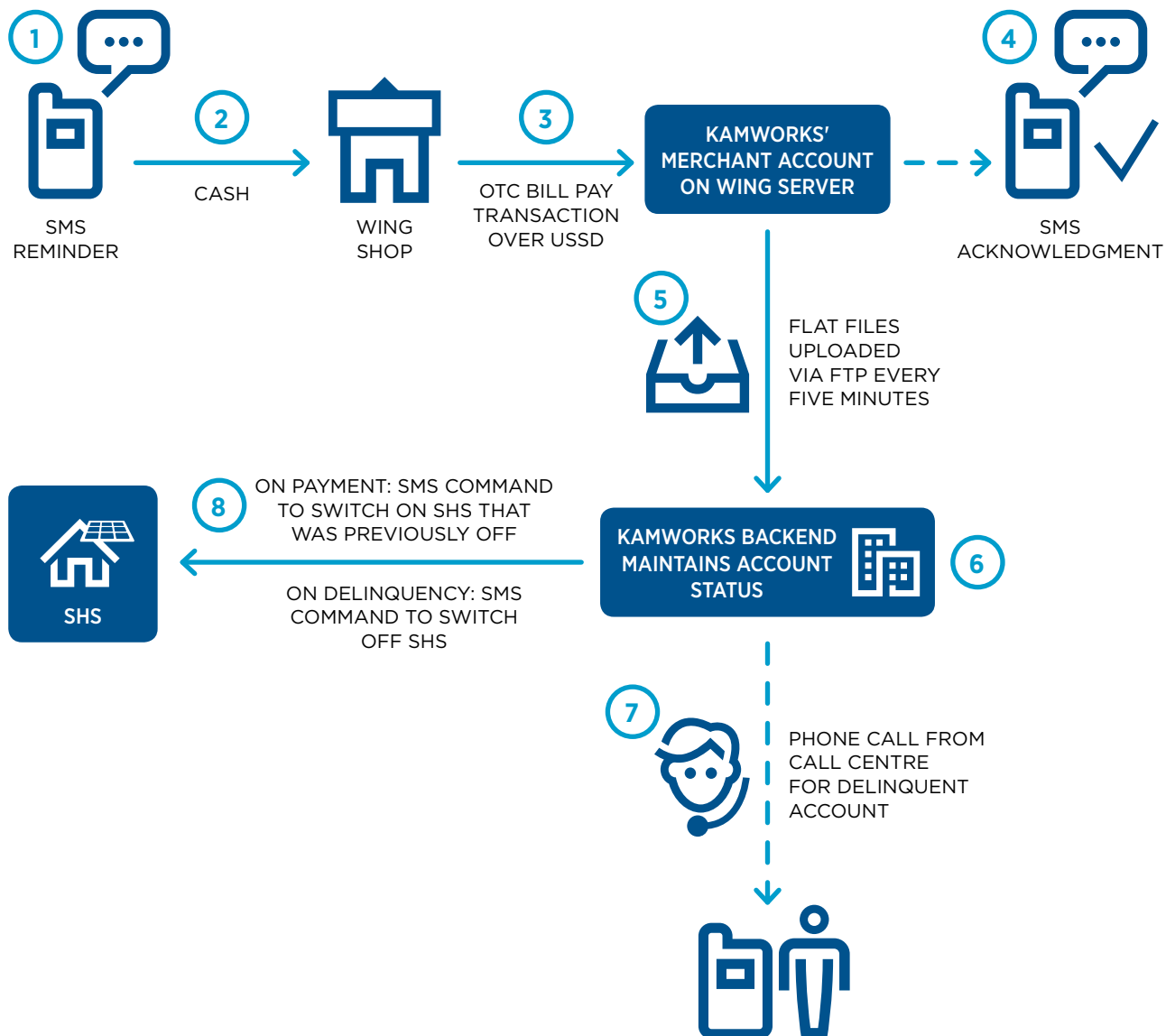
23. Plans which allow a customer to pay for just a day at a time, if he so desires.

24. Customers could also make a payment using their own WING account but they all preferred to use the OTC model, i.e., to have a WING agent make payments on their behalf.

25. Initially, WING and Kamworks investigated the possibility of implementing a full API integration between their backend systems. However, due to the short timeline available for implementation and the scale of the pilot, it was finally decided to start the project with a more standard option.

FIGURE 4

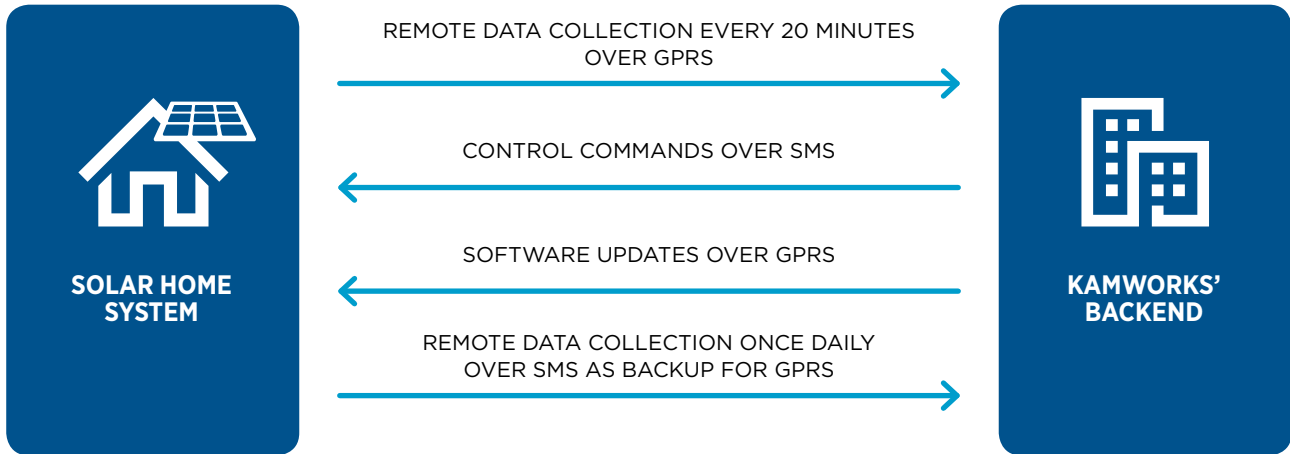
Kamworks' pay-as-you-go process



Apart from using mobile in the PAYG process, Kamworks also uses it to monitor usage and performance as well as to initiate software updates over Cellcard's GPRS network. Information on the SHS is collected every 20 minutes to understand usage patterns, analyse system functionality and performance as well as inform future design. This is illustrated in Figure 5.

FIGURE 5

M2M communications over Cellcard's GSM network



Kamworks controlled the SHS through a variety of commands. The most important of them are:

- Switch on/off
- Retrieve real time data
- Manage the system LED display
- Restart or reset the SHS

Kamworks monitored the following parameters during the project:

- Identification and system data such as
 - » IMEI²⁶
 - » Hardware and firmware version
 - » System status, specifically error states and debug messages

- Power data such as
 - » Battery and solar panel voltage
 - » Currents in and out
 - » Energy in and out
 - » State of charge of the battery
- Strength of the GSM signal
- Internal clock

Example plots of battery current and battery voltage are shown in Figure 6.

26. The International Mobile Station Equipment Identity (IMEI) is the electronic serial number of a mobile phone or other terminal device on a GSM network. It is used to identify devices on a network.

FIGURE 6

Battery current and voltage waveforms from a Kamworks SHS



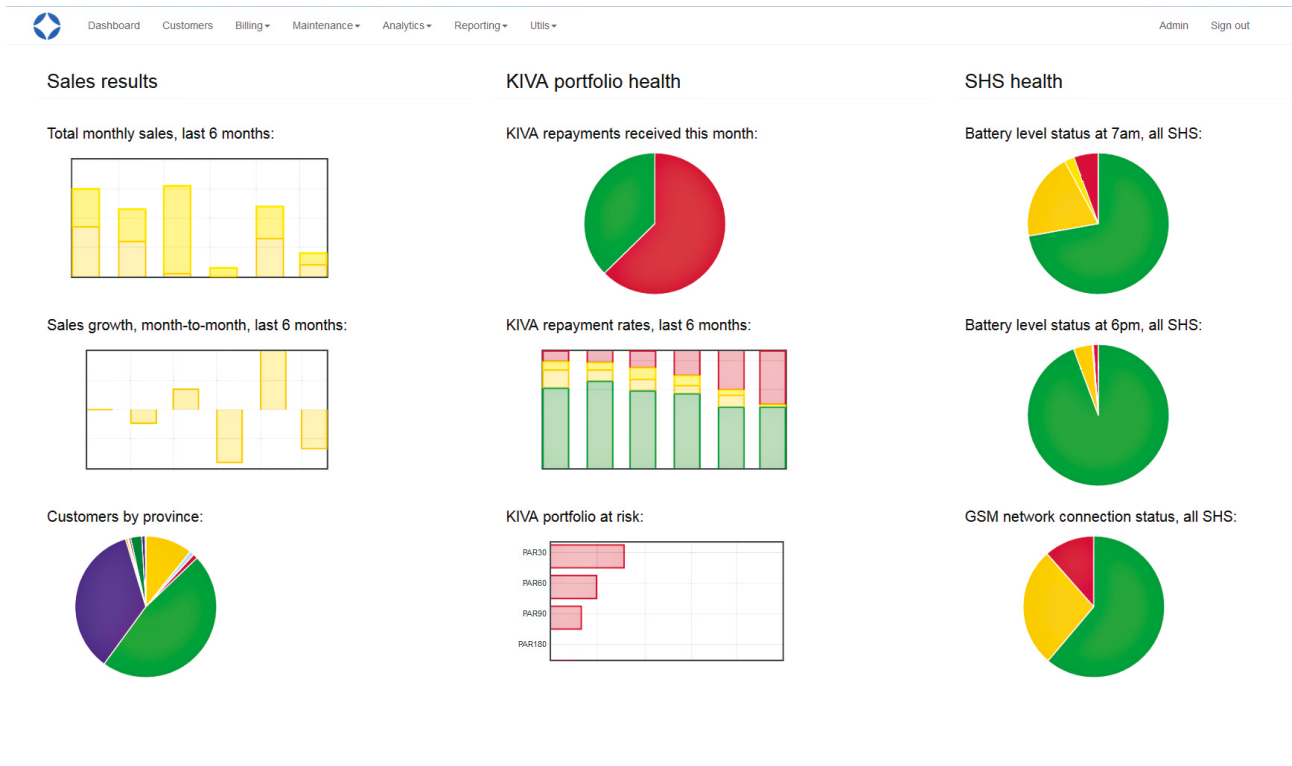
Kamworks currently uses the data to:

- Provide real-time information in dashboards and graphical visualisation of key information to the technical support team
- Create aggregate, portfolio-level reports

A sample of the information presented in the dashboard is shown in Figure 7.

FIGURE 7

Sample dashboard



To improve maintenance operations and customer ownership experience, Kamworks is developing additional features to highlight under or over-usage of systems, automate troubleshooting, and analyse and predict battery health.

Partnership with a Mobile Operator: For this project, Kamworks’ partnership with Cellcard was focused on favourable connectivity plans for the SHS. As shown in Figure 8, Cellcard offered better connectivity rates once they formalised a partnership²⁷ with Kamworks in April 2015. WING offered Kamworks the standard transaction fees.

FIGURE 8

Cellcard plan for Kamworks

	Standard rate	Kamworks rate	Comments
One time SIM cost	USD 1	free	
Monthly data connectivity plan per SIM	USD 2	USD 2	Reduced to USD 0.5 following the partnership agreement.

27. Kamworks sponsorship press release: <http://www.cellcard.com.kh/kamworks-sponsorship>

Marketing, Sales, Distribution and Customer Service

Beyond products and pricing, Kamworks' success depended on careful attention to the key business components of marketing, sales, distribution and customer service. Figure 9 describes Kamworks' operations within these business components in Cambodia.

FIGURE 9

Description of Kamworks' operations for core business components

Business Component	Structure & Strategies
Marketing	<p>Outsourced, then insourced:</p> <ul style="list-style-type: none"> Initially worked with Planet Finance (PFTA) to market the SHS but took charge when faced with low sales <p>Using an influencer:</p> <ul style="list-style-type: none"> Set up demo systems at home of village chief Village chief invited community members for a sales presentation by Kamworks and endorsed the SHS. Village chief received a small incentive for each SHS sold <p>Marketing promotion:</p> <ul style="list-style-type: none"> Used large banners, posters throughout village and flyers for people making inquiries Promoted products via radio spots in Kampong Chhnang province
Sales, Financing and Payment Collection	<p>Initial financing partnership with VisionFund:</p> <ul style="list-style-type: none"> VisionFund credit officer accompanied sales agent to each demo and they jointly followed up with interested customers <p>Ultimate financing through Kiva or by self-finance:</p> <ul style="list-style-type: none"> Kamworks sales staff collected data and performed first evaluation of creditworthiness Project manager at head office gave final credit approval Collected payments, initially in cash and eventually with mobile money <p>Sales organisation and training:</p> <ul style="list-style-type: none"> Hired sales staff but transitioned them to entrepreneurs to reduce burden on cash flow Formed partnership with the NGO People in Need (PIN) to recruit and train entrepreneurs in sales to supplement its own efforts Maintained responsibility for technical training <p>Sales promotion:</p> <ul style="list-style-type: none"> Trialed programme where existing customers got a small commission for referrals Conducted a lottery where an existing customer would receive a free TV for referrals

<p>Distribution</p>	<p>Two levels of distribution and service centres:</p> <ul style="list-style-type: none"> Established two levels of distribution with the national hub in Phnom Penh and regional district hubs in Kampong Chhang, Kampong Thom, Battambang, and Kratie
<p>Service</p>	<p>Installation:</p> <ul style="list-style-type: none"> Had internal installation team, but decided to hire, train and certify installers from local company to reduce costs and enable scalable operations With patchy sales initially, balanced high per-system installation cost with variable installation time <p>After-sales service:</p> <ul style="list-style-type: none"> Issued customer ID cards with account number, monthly payment amount and Kamworks' WING reference number Made follow up call one week after installation to ensure customer satisfaction Provided free maintenance during two-year warranty period Did first service visit three months after installation, and then every six months Set up 24x7 customer service hotline. Provided same day support for issues that could be resolved over the phone. Aimed to service within 72 hours in case visit was required



Customer with Kamworks promotion poster



Kamworks' delivery vehicle to transport up to four SHS100

Results

Implementation Timeline

The timeline in Figure 10a highlights the major events in the product development and mobile partnerships timeline. Similarly, Figure 10b depicts the major events in the sales, marketing and financing partnerships timeline.

FIGURE 10A

Product development and mobile partnerships timeline

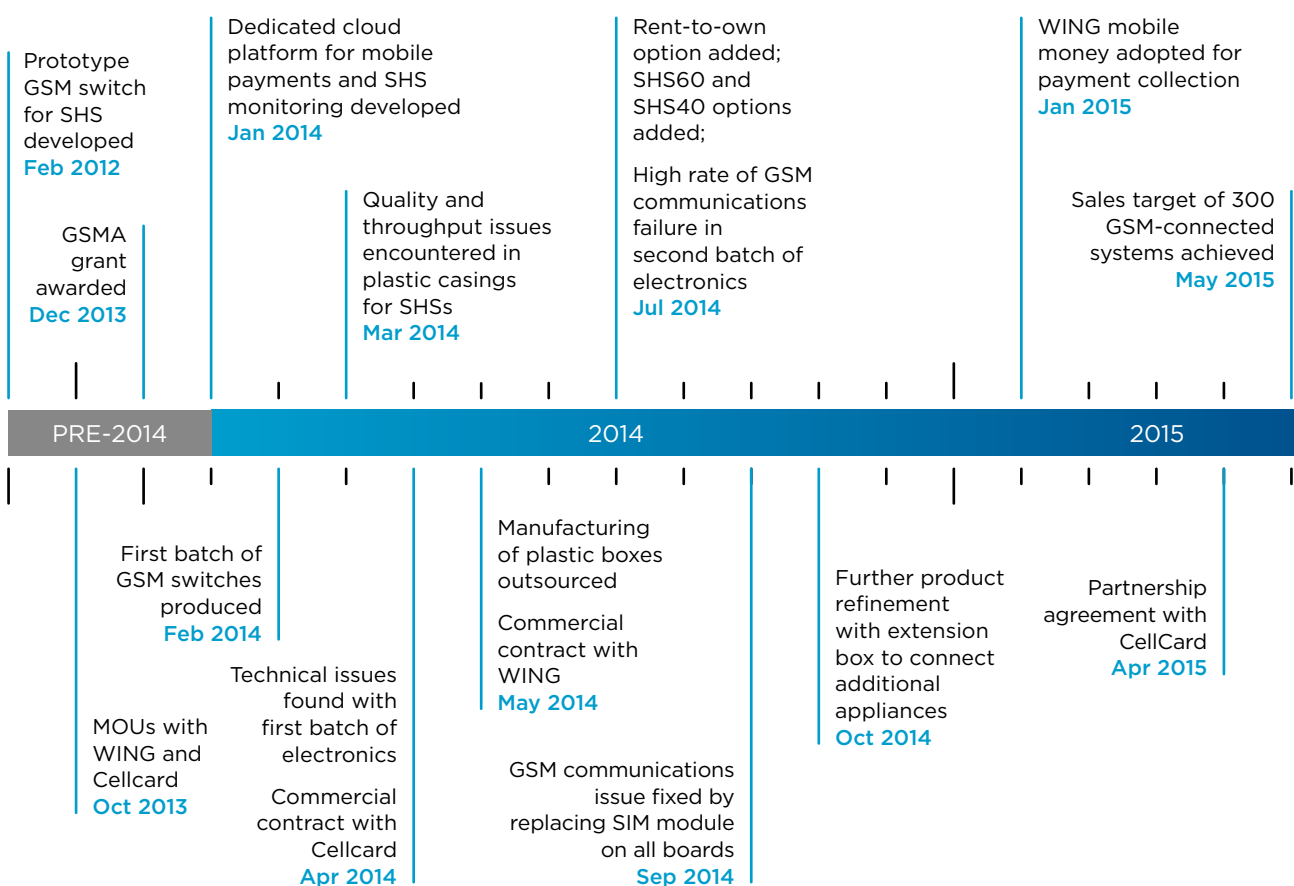
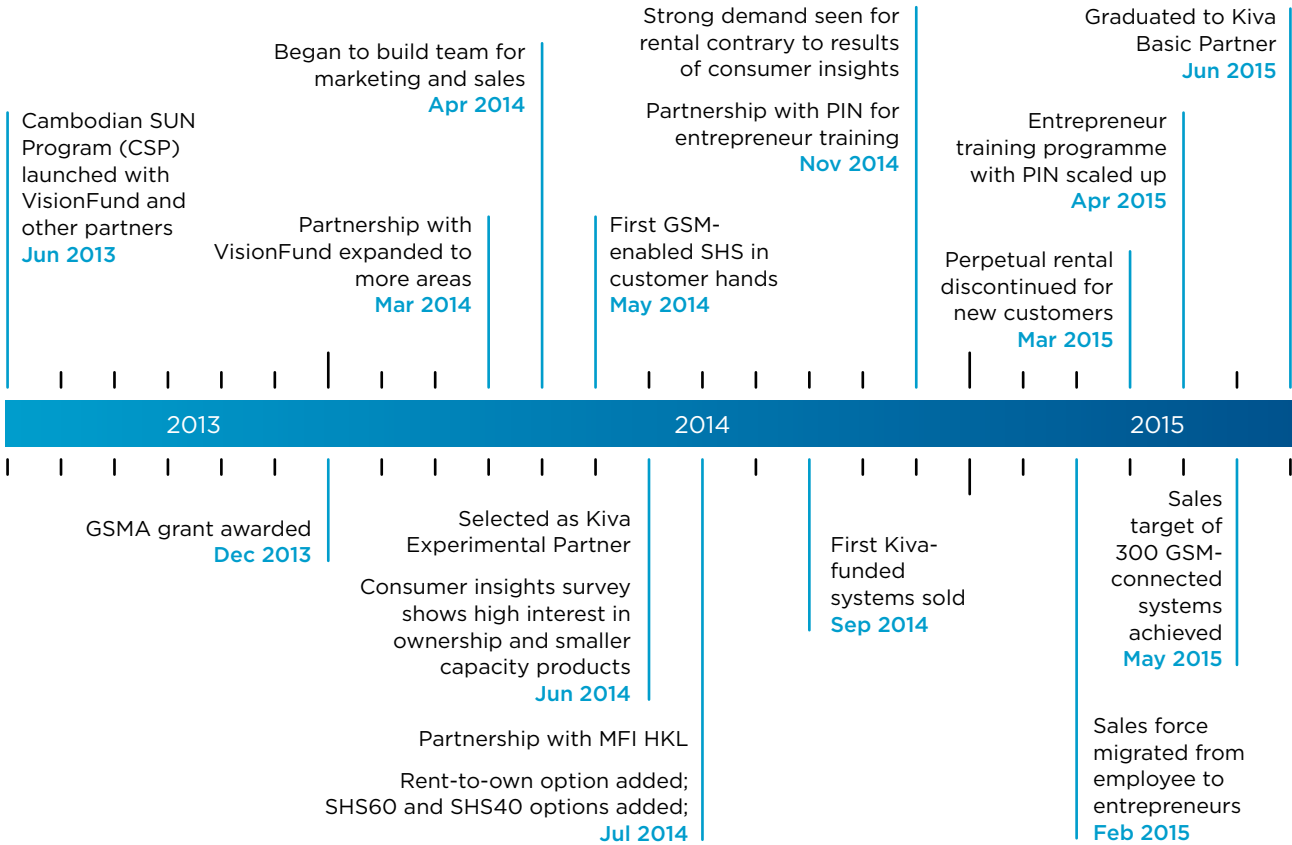


FIGURE 10B

Sales, marketing and financing partnerships timeline



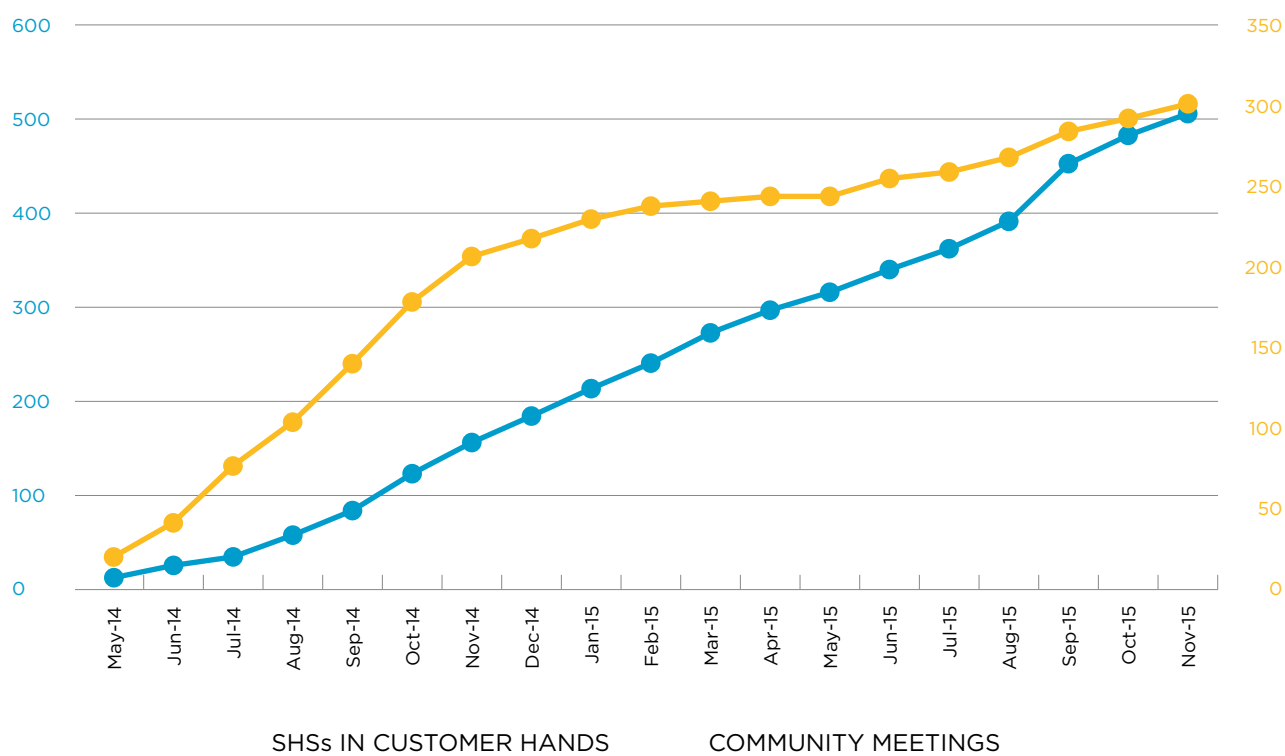
Business Viability

Sales

From May 2014 through November 2015, Kamworks sold or rented a total of 505 SHSs reaching their target of 300 SHSs in May 2015. In the same period, Kamworks conducted 300 community meetings to demonstrate the product. Figure 11a shows the progression of sales and community meetings.

FIGURE 11A

Cumulative sales progression and number of community meetings



SHSs IN CUSTOMER HANDS

COMMUNITY MEETINGS

Together, the two curves show the increasing effectiveness of Kamworks' community meetings. The average number of monthly community meetings fell from 29 to eight. Despite the fewer meetings, the average sales per month increased starting in September 2014, when Kamworks introduced financing by Kiva and began to convert its salesforce from employees to entrepreneurs.

As shown in Figure 11b, the average conversion rate per meeting²⁸ rose consistently from a low of 0.47 to 1.68. The conversion rate of interested customers to sales²⁹ also improved from 6.6% to 23.7%.

Potential reasons for improvement in the effectiveness of community meetings and the sales process are:

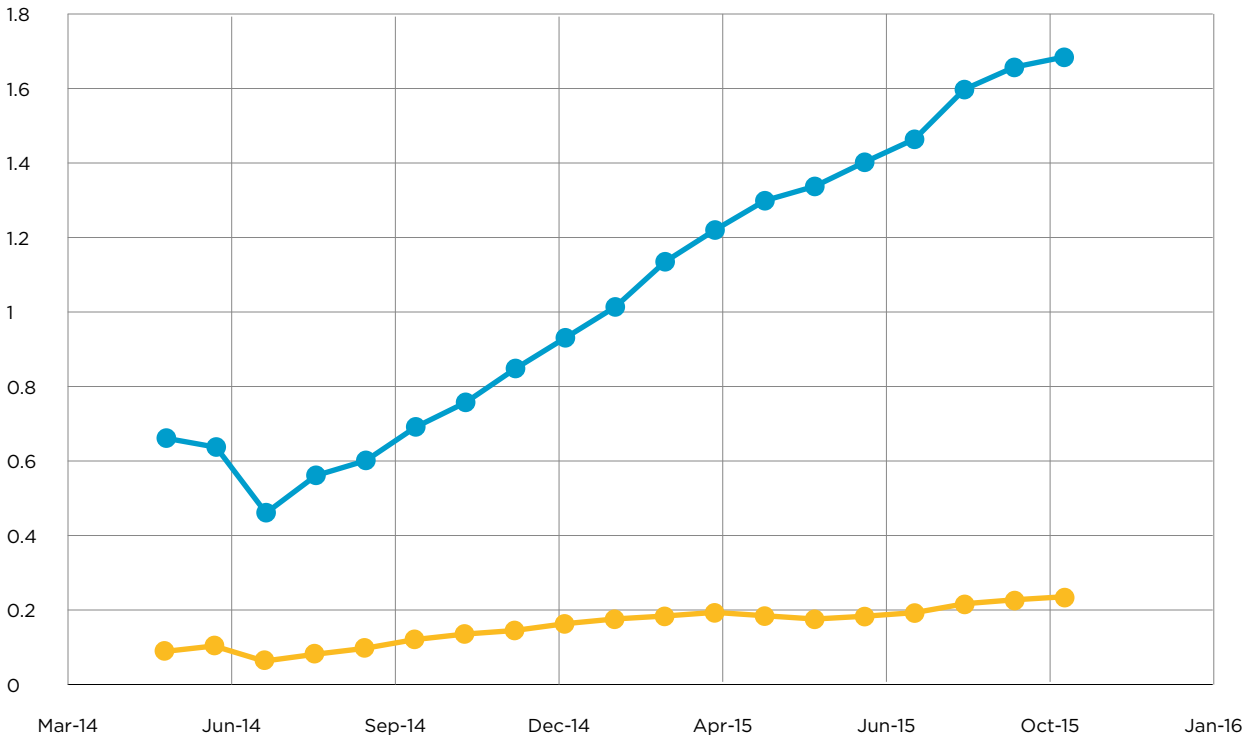
- Increase in time spent on demos and the capabilities of the demo unit (Kamworks experimented with a TV, DVD player and fan with the demo)
- Improvement in the marketing materials (flyers, banners, tree posters)
- Higher levels of motivation among the entrepreneurial salesforce
- Improvement in the training of the sales representatives and entrepreneurs after Kamworks insourced the process
- Improvement in the customer buying experience after Kamworks took control of the credit checks for Kiva-funded sales

28. The conversion rate per meeting is computed as the number of SHSs sold in a month to the number of community meetings conducted in that month.

29. After a demo at a community meeting, some customers registered their interest in acquiring an SHS. The conversion rate of interested customers is the ratio of the number of SHSs sold that month to the number of interested customers.

FIGURE 11B

Cumulative indicators of effectiveness of demos and post-demo follow-ups³⁰



AVERAGE CONVERSIONS PER COMMUNITY MEETING

AVERAGE CONVERSION RATIO OF INTERESTED CUSTOMERS

The sales progression reveals the following key findings about customer demand:

Kamworks’ target customers strongly prefer higher capacity SHSs: In response to the findings of its consumer insights survey, Kamworks diversified its portfolio to include the SHS40 and SHS60 to target multiple customer segments. Kamworks expected the increased density of sales to help optimise sales and service operations.

However, in line with Kamworks’ initial hypothesis, customers overwhelmingly chose the SHS100. Of the 505 systems rented or sold to customers, 381 (75%) were SHS100. Of the remaining, twice as many customers preferred the SHS60 systems to the SHS40. Thus, Kamworks’ customers show a distinct preference for high capacity systems.

30. Some care should be exercised in interpreting these ratios. While there is no time lag between the numbers of community meetings and interested customers, there is a variable time lag between these numbers and the SHSs sold or rented depending on how long credit checks take and systems are recorded as sold. Cumulative statistics blur this delay and that is why they are preferred here to monthly statistics.

Offgrid energy consumption behaviour in Cambodia³¹

In most East African markets, small SHSs are extremely popular as a superior alternative to carbon-based fuels for lighting. These systems are often the first to bring electricity to homes. However, the situation in Cambodia is radically different. Many homes use automotive batteries, charged by a diesel generator operator, to electrify their homes. This solution is unwieldy as the batteries are very heavy and leaves the home without power when a battery is being charged. However, given that potential Cambodian customers of SHSs are accustomed to using electricity stored in large batteries, there is less aspirational value for solar in Cambodia than in East Africa. Instead, the Cambodian market for electricity is largely commoditised.

Evidence that electricity is a commodity can be seen in many homes where people have bought inverters to drive commonly available AC appliances. It is not uncommon for people to own multiple batteries so they can drive several appliances. Virtually all homes visited already had multiple lights and fans. One home had a 1.2kVA inverter and a 42-inch Samsung LCD TV.

Below is a photo of a typical entertainment device that supports DVD playback and playback from a pen drive over USB. This device costs USD 20-30 and a fully charged 50Ah car battery will power it for about four hours.

Source: Kamworks



EVD – A locally popular entertainment device

Rental offers a low-risk, low-commitment option to test the SHS: 77% of respondents of the consumer insights survey said they were interested or strongly interested in buying an SHS on credit, because they aspired to own it, versus 27% who were interested or strongly interested in renting it.³² However, while the rental offer was available for six months, 65% of customers (46 of 71) chose rental as their starting offer.

As part of the rental contract, customers were allowed to switch from rental to rent-to-own with a part of their rental payments being credited towards their purchase. (See Appendix 2 for details.) Of the customers who signed up for rental, 48%³³ transitioned to rent-to-own or repaid their systems fully. Thus, a high proportion of customers used rental as a low-risk, low-commitment trial before deciding to own the SHS.

31. Extract from a GSMA blog [Decentralised Energy Market in Rural Cambodia – A site visit to Kamworks](#)

32. These were two separate questions which asked respondents to state their preference for buying or renting on a scale of 1-5, with 5 being 'strongly interested'. That is why the percentages do not add to 100%.

33. 22 of 46 or 48% of rental customers chose to convert while 16 cancelled contracts. Meanwhile, Kamworks continues to honour the remaining eight rental agreements.

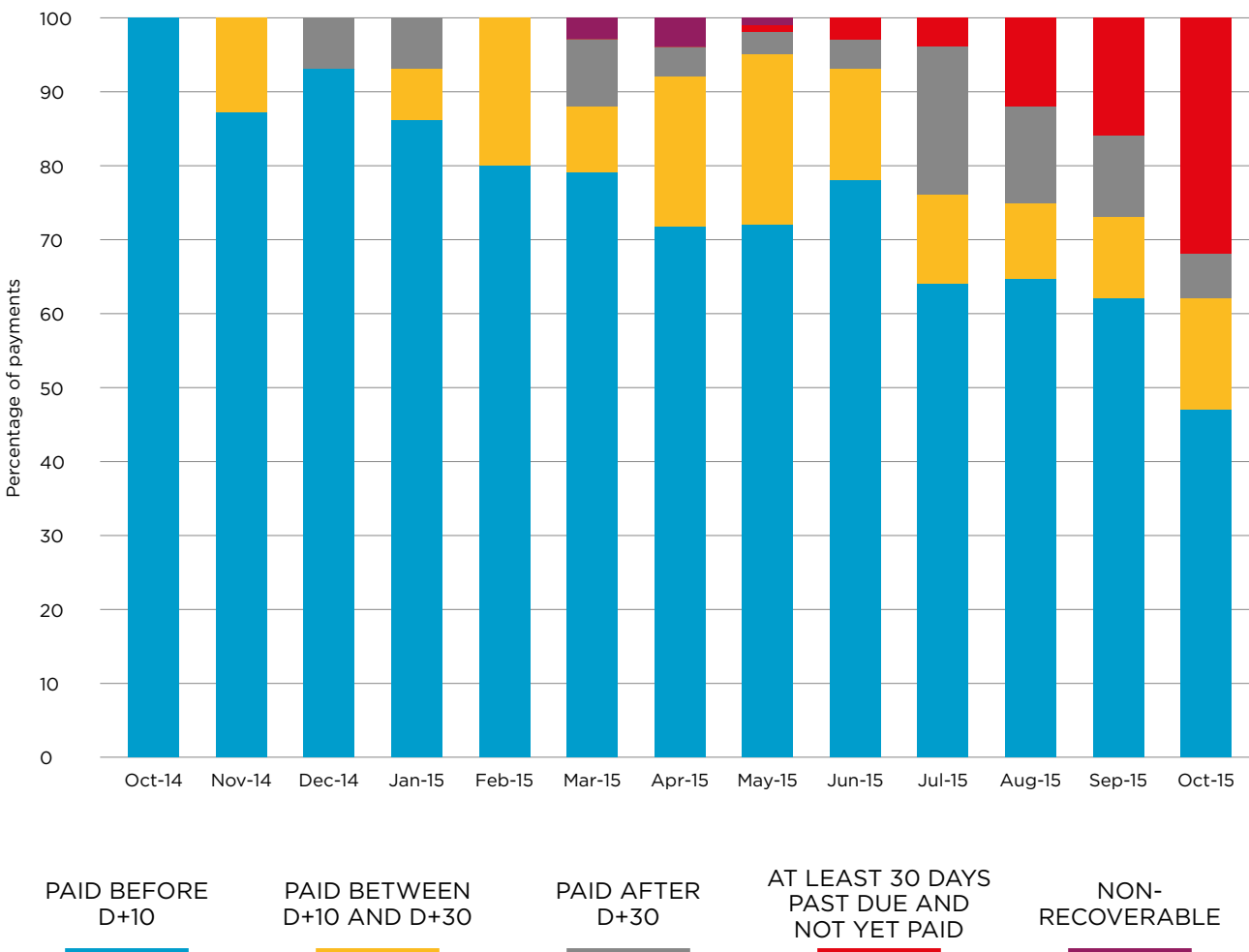
Repayment

As shown in Figure 12a and Figure 12b for 195 rent-to-own SHSs, Kamworks suffered from declining on-time repayment rates even as sales progressed.³⁴ In October 2015, 47% of customers made payments before ten

days past the due date.³⁵ A further 32% of customer accounts were overdue by at least 30 days.³⁶ Invoices were classified as “Non-recoverable” when a customer was considered to have defaulted on the loan on a case-by-case basis.

FIGURE 12A

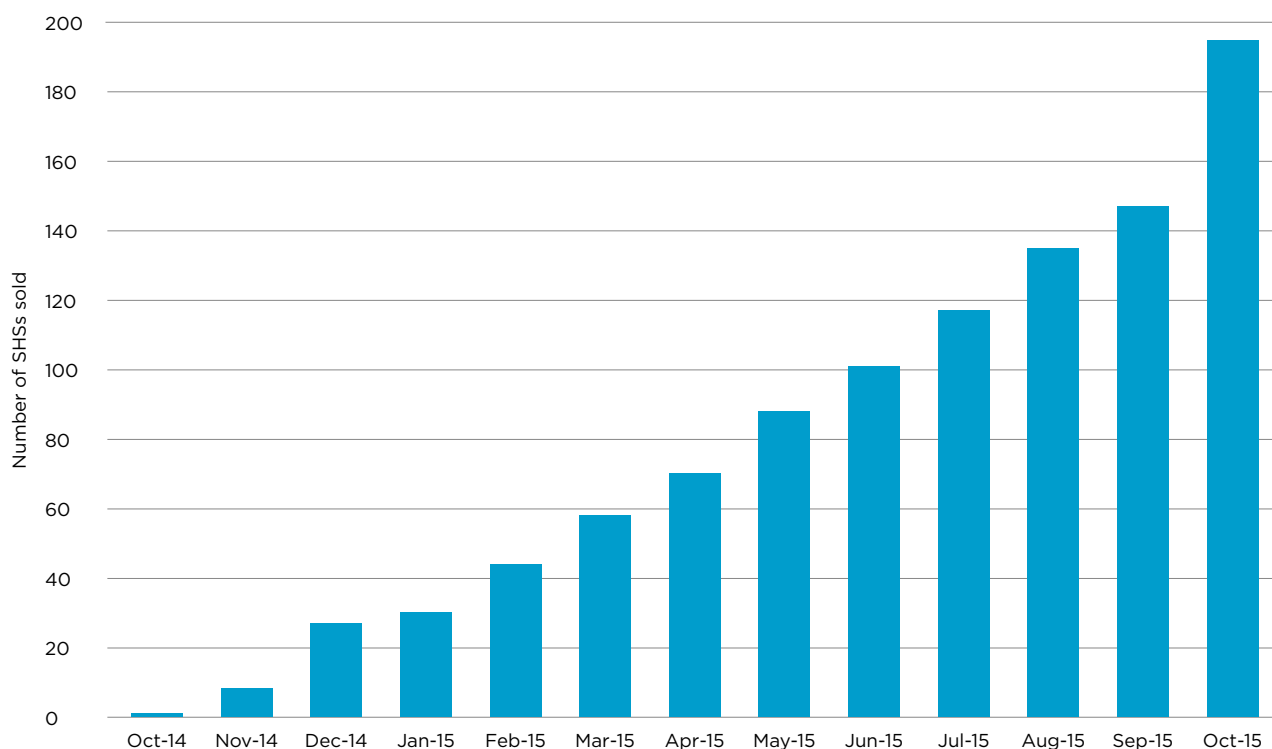
Payment status of Kamworks-financed rent-to-own systems



34. Repayment data for systems financed by VisionFund is not available. Data reported here is only for systems that Kamworks collected payments for, i.e., systems financed by Kamworks directly or through Kiva. Further, data is presented here for only the rent-to-own portfolio as the perpetual rental offer was short-lived and several customers chose to transition to the rent-to-own plan.
 35. Denoted as 'D+10'. In general, (D+n) denotes n days after payment is due.
 36. Denoted as 'At least 30 days past due and not yet paid'

FIGURE 12B

Sales progression of Kamworks-financed rent-to-own systems



There are at least three potential reasons for the declining repayments:

- 1. Batteries charged with diesel generators are an easy fall-back option for Kamworks' customers:** Almost all Kamworks' customers used automotive batteries as their primary power source before acquiring an SHS. These customers kept their batteries as a back-up option in case the SHS did not generate sufficient power or was shut off. Reverting to batteries did not significantly impact their energy consumption experience. They lost the convenience and flexibility offered by solar charging but were still able to use their appliances, perhaps for shorter times. Thus, the consequences of default were more an inconvenience than a significant change in quality of life (as would be the case when a PAYG customer has to switch back to kerosene for lighting or cannot watch TV when the only available power source is shut off).
- 2. Bad payment habits were created due to inconsistent switch off of delinquent customers' systems:** As per design, an SHS is switched off with a control command sent over SMS only after the switch off is authorised by a Kamworks staff member.³⁷ However, 13% of the SHSs sold had no mobile coverage, and another 22% did not have reliable mobile coverage. Due to unreliable network coverage, some SMSs were not delivered leading to inconsistent customer experience. In some areas, word-of-mouth spread about the perceived unfairness and encouraged even more customers to push the envelope. Further, some staff became reluctant to authorise the switching off when neighbours with similarly delinquent accounts seemed to be treated differently. Kamworks is now enforcing consistent application of the policy by its staff.

37. In the pilot phase, Kamworks decided to employ manual intervention in the deactivation of the SHS, rather than automatically switch off the SHSs as soon as the payment was considered late. With the experience of the partner installation company having previously mixed up customer and SHSs forms, it was considered better to wait to switch off, rather than to take the risk of wrongly turning off good paying customers, which could have created very bad word-of-mouth at the beginning of the project.

- 3. Credit was given to more risky customers:** When Kamworks took charge of the credit process for Kiva-funded loans, they also took responsibility for vetting customers' creditworthiness. The first steps of the credit evaluation process were performed by salespeople who had no previous experience in this role and also had sales targets to meet. Despite final validation by a manager experienced in the MFI sector, Kamworks may have offered credit to less creditworthy customers. This conflict of interest is now resolved by using dedicated field credit officers, who are responsible for credit evaluation.

Source: Kamworks



A mobile phone being charged with a Kamworks SHS

Cost-benefit of M2M communications

Kamworks learned the following lessons about the cost-benefit of using M2M communications to remotely monitor and control the SHS:

Limited reach of the GSM network prevented Kamworks from consistently switching off systems which encouraged customers to delay payments in some areas: Using M2M communications for remote monitoring and control requires that each system has reliable mobile coverage. As discussed earlier, this created perverse incentive for customers to delay payments. As a result, Kamworks is considering to alter its design so that credit balance is maintained on the SHS and the system can autonomously switch off when credit expires and switch on when credit is purchased.

Although M2M improves operational efficiency, it is difficult to precisely quantify its benefit: Kamworks developed a cloud platform where the M2M data is collected and analysed. This data allows technical staff to quickly troubleshoot customer issues, and avoid sending technicians to the field to first assess the situation. While this reduces operational costs, Kamworks has found it difficult to precisely quantify the benefit.

Another benefit of M2M was that customers appreciated Kamworks' ability to remotely check system health and quickly resolve some issues.

Early difficulties with hardware development

Developing and manufacturing new hardware is inherently risky and unforeseen problems can cause significant delays: Kamworks encountered the following quality issues with hardware that diverted management time:

- 25% of the first version of the GSM switch were found to be defective due to incorrect components and low quality soldering used by the manufacturer. Kamworks had to manually test all boards and fix the defective ones.
- 75% of the second version of the GSM switch were unable to connect to the GSM network. After troubleshooting with support from Cellcard, Kamworks found that the GSM modules of the boards were not functioning properly. Replacement parts were ordered and the boards were locally repaired. The entire process took three months.

Kamworks limited the functional changes in the third and final version of the GSM switch. There were no hardware issues with the third version.

Refinements to Operations

Perpetual rental offer had more traction than predicted by the consumer insights survey, but was discontinued primarily due to its high working capital requirement: During the time Kamworks offered rental contracts, 65% (46 of 71) customers opted for it. The rental model requires higher working capital than the rent-to-own model leading to a longer payback period. Further, the rental model imposes a perpetual operating cost to maintain the system and periodic capital expense to replace systems at end of life. On the other hand, the rental model enables a perpetual relationship with an acquired customer and all the advantages inherent to such a relationship. Despite the high demand for rental, Kamworks decided to withdraw it for new

customers primarily because Kamworks could not access financing to scale it. Although Kamworks has stopped offering the rental option for the time being, the company may revisit this option in the future when it has the necessary financial flexibility.

After experimenting with various financing and marketing partners, Kamworks chose Kiva for financing and took control of marketing for the duration of the project: Kamworks formed a partnership with PFTA and VisionFund, one of Cambodia's largest MFIs, for marketing and financing of SHSs in Kratie province. The roles of the partner organisations were defined at the outset as follows:

PFTA

- Identify target areas based on lack of grid access, community demographics and income, and track record of repayment (with VisionFund input)
- Do sales demos and a follow-up visit to the homes of customers interested in purchasing the system, often immediately after the demo

VisionFund:

- Accompany PFTA staff for sales demos and conduct credit checks on customers interested in buying the SHS
- Own the loan and collect payments

Even though the roles were clearly defined, there were difficulties stemming primarily from a lack of scale and misalignment of incentives. For example, the requirement for VisionFund staff to participate in SHS sales meetings came on top of their other duties. At one point, this resulted in only 33% of sales demos being supported by VisionFund staff. Credit officers were also not necessarily incentivised to process SHS loans quickly, as those loans represented only a small part of their portfolio. This resulted in delays for credit checks and subsequent loan approvals, which slowed sales. Eventually, a total of 173 systems were financed by VisionFund.

Confronted with this situation, Kamworks decided to independently pursue sales in villages within VisionFund's coverage area, but which were not served by VisionFund. A few of these loans were financed by Kamworks but the large majority were financed through Kiva and managed by Kamworks.

Kamworks became a Kiva Experimental Partner in May 2014 with a USD 50,000 credit line and graduated to

a Kiva Basic Partner with a USD 200,000 credit line a year later. As of December 2015, Kamworks had issued 244 Kiva loans worth USD 157,000 with an average loan amount of USD 643.

Another component of Kamworks' sales expansion strategy was to partner with additional MFIs. In July 2014, Kamworks formed a partnership with HKL in Battambang province and set up and trained a new sales team. With this new partner, customers would have to travel to the nearest HKL branch to apply for their loan, which proved to be a high barrier to entry. Kamworks offered to pre-process the loans and support the customers in the application process but this did not solve the issue. Sales stopped in Battambang after eight months.

Sales organisation structure – Is an entrepreneur model more efficient than an employee model?:

Kamworks began to build its project sales team in April 2014. With active churn in the sales team however, the repeated management cost of training began to prove burdensome. Moreover, sales were initially slow and even though the compensation of the sales team was a mix of fixed and variable, the fixed component became a strain. For these reasons, Kamworks began transitioning its salespeople to an entrepreneur model in October 2014 with purely commission-based compensation, starting with the most successful salespeople to set inspirational examples. These former salespeople stood to make more money through the entrepreneur model so most switched willingly. Some salespeople quit but sales were not heavily impacted.

The entrepreneur model is much more flexible, with reduced overhead for the administration team and reduced fixed costs. The challenge of controlling the effective work of sales representatives in remote provinces is also reduced. However, the long term success of the entrepreneur model remains to be proven.

Customer Benefits

Kamworks customers are very satisfied: Over 90% of surveyed customers³⁸ stated they are very satisfied with their SHS, while the remaining are at least somewhat satisfied. 19% of customers are extremely likely to recommend Kamworks and 79% are very likely to do so. Finally, all customers strongly agree that their quality of life has improved because they have better lighting and more electricity for children to study, are able to watch TV for longer and feel more secure at night.

Source: Kamworks



Kamworks customer with SHS100

Customers improved domestic consumption and productivity: The mean reported hours of energy used doubled to nearly eight hours per day with the SHS from nearly four hours per day with batteries. 25% of all surveyed customers said they could work longer hours due to the SHS while 64% said they worked the same number of hours. 12% of customers reported using their SHS for business but none reported an increase in income.

Customers bought new appliances once they had increased access to electricity: 51% of customers bought new appliances after experiencing the quality of the SHS and its ability to generate more energy than they previously had available. Of those who bought appliances, 71% purchased a flat-screen LED TV, and 15% purchased a fan.

Customers appreciated the convenience of Kamworks over battery charging: All surveyed customers were already familiar with WING mobile money and had used it before buying the SHS. All customers also previously used automotive batteries as their primary source of electricity.

All customers strongly preferred to make a monthly trip to the WING shop to make a payment over making several trips per week to the charging station to get their battery charged. Only 2% of surveyed customers would prefer another payment channel because the WING agent is far from their home. 99% of customers said they were better able to predict how long power would last as compared to an automotive battery.

Customers were split on whether they spent more or less on electricity: 49% of customers said they spent less on electricity while 33% say they spent more.

38. These responses were obtained from Kamworks' endline surveys of 81 customers. Percentages are based on the number of responses received to a question, not on the entire sample.

Mobile Industry Benefits

Kamworks leveraged M2M communications with connectivity offered by Cellcard and WING’s mobile money service for this project. The scale of this pilot was relatively small so the absolute numbers in terms of benefits to the mobile industry are correspondingly small. Further, Kamworks offered a fixed payment plan which meant a single mobile money transaction per system per month.

However, thanks to this project, Cellcard saw potential in a relationship with Kamworks to increase its M2M deployments and get on-the-ground feedback on mobile coverage and signed a partnership agreement in April 2015. An abstract of the press release is shown in Figure 13. Through this partnership, Kamworks was able to get a significant discount on monthly connectivity fees as shown in Figure 8.

FIGURE 13

Abstract of Cellcard press release

The screenshot shows the Cellcard website interface. At the top right, there are language selection buttons for 'ENGLISH' and 'KHMER'. Below these are social media icons for Google+, Facebook, Line, Instagram, and YouTube. A search bar is located below the social media icons. The main navigation menu includes: HOME, 4G LTE, OFFERS, DATA, REWARDS, SERVICES, and SUPPORT. The content area displays a press release titled 'KAMWORKS SPONSORSHIP PRESS RELEASE' dated 'As of April 20, 2015'. The text of the press release describes a partnership between Cellcard and Kamworks to provide mobile-enabled solar energy to off-grid rural Cambodian communities. It mentions that the project aims to enhance the quality of life for people who lack access to affordable and reliable energy sources through innovative technology. The project commenced last year in Kratie, Kampong Thom, Kampong Chhnang, and Kandal and aims at serving over 10,000 rural households over the next 30 months. The partnership with Cellcard will help move the project's reach further, allow remote monitoring, management and servicing of the solar systems, as well as provide data access through Cellcard's extensive and reliable mobile network. Cellcard's CEO, Ian Watson, is quoted as saying, "M2M communication will become increasingly important in Cambodia. Cellcard aims to be at the forefront of new technological developments and its M2M platform and services allow Kamworks to confidently provide customers with reliable service. Working together with Kamworks, we can achieve a mutual goal of providing solutions that both enhance and enrich Cambodian lives. In this case providing electricity to Cambodian homes everywhere." Kamworks' CEO, Arjen Luxwolda, is also quoted as saying, "We are very excited working with Cellcard to deliver affordable mobile-enabled solar systems. Mobile technology allows us to check solar products from our office in Phnom Penh, which is quick and cost effective. We choose to work with Cellcard because we believe that reliability, security, and ease of integration are crucial to ensure the delivery of high quality solar systems. We are looking forward to continue and extend the collaboration."

Conclusions

The key objective of the Seed grant was to support the development of Kamworks' PAYG solar technology and test the appetite of an underserved South-East Asian market for buying or renting an SHS for domestic use. Kamworks learned several lessons along the way and changed its product portfolio, financing partnerships, structure of its sales organisation and marketing partnership. Kamworks also took a step towards deepening its relationship with Cellcard from a transactional to a collaborative partnership. Kamworks' customers were very appreciative of the option to pay with WING mobile money. They exclusively preferred to use their agent's account rather than opening and using their own account, which is consistent with the popularity of the OTC model in rural Cambodia.

To better align with the expenditures on electricity of poorer customers, Kamworks decided to expand its portfolio to include lower-priced SHS40 and SHS60. However, customers overwhelmingly preferred the largest SHS; the SHS100 comprised over 75% of the SHSs sold.

Kamworks worked through several challenges and met the target of 300 SHSs in May 2015. However, repayments for the SHSs still need to be improved. Kamworks has adopted a two-pronged approach to resolve this problem in the near term:

1. Educating its staff and improving system design so the customer experience is as uniform as possible when credit expires
2. Hiring an experienced and qualified credit officer who can improve Kamworks' customer vetting as well as strengthen the overall lending and collections process.

Other creative steps such as purchasing old batteries from customers so they do not have an easy fall-back option may also help. Kamworks is planning a fundamental change in its system design which would integrate the on/off function into the SHS rather than requiring a control command. With this modification, the M2M capabilities would still be used to remotely monitor system health and download software updates.

Kamworks is currently not able to upsell or cross-sell to their good customers who have already bought an SHS100. An option to remedy the situation is to introduce an even larger SHS into their portfolio or add appliances to its portfolio. Recall that 35% of customers surveyed had bought a flat-screen TV after purchasing the SHS. This indicates an opportunity to sell appliances as long as Kamworks can differentiate itself from the locally available appliances. Kamworks is already planning upgrades to its software platform to improve its customer analytics which will help it to identify target customers for upselling and cross-selling.

In May 2015, Kamworks became a certified solar supplier³⁹ to the AFD's Green Microfinance Fund⁴⁰ through which it will sell SHSs in partnership with MFIs approved by AFD. The programme plans to provide 25,000 households with access to solar equipment by giving low-interest loans to MFIs to finance consumer loans. Apart from a source of financing, being an AFD-certified supplier will give the Kamworks brand additional credibility in the eyes of the consumer. In addition, in February 2016, the Kamworks SHS was selected by the UNCDF Cleanstart SHIFT Challenge Fund to improve access to energy in Cambodia.⁴¹ Together, these programmes will give Kamworks the opportunity improve its hardware and software platforms, fine tune its product portfolio and strengthen its processes.

39. Kamworks was the first to be certified, and three other suppliers have now also qualified as certified partners: <http://www.khmertimeskh.com/news/15590/solar-financing-on-the-way/>

40. AFD Supports Green Microfinance Program in Cambodia: <http://www.akp.gov.kh/?p=53280>

41. Catalyzing greater financing choices for people who want to buy high-quality, affordable energy: <http://shift.uncdf.org/catalyzing-greater-financing-choices-people-who-want-buy-high-quality-affordable-energy-0>

Appendix 1: Case Study Methodology

Overview: This case study is based on learnings that emerged throughout Kamworks' Seed grant through the Mobile for Development Utilities programme. These were tracked through the following:

Grantee reporting: Monthly reports were completed on activities, project risks and mitigation, and key performance indicators. These were discussed during a one-hour call with the grant manager each month. Quarterly reports were completed to document progress on milestones, the grantee's learning objectives, barriers and other key project developments as well as financial compliance.

Customer surveys: Kamworks carried out a consumer insights survey, a midline survey and an endline survey as part of this project. The consumer insights survey was carried out in Kratie (110 participants), Kampong Thom (113 participants) and Kampot (41 participants) provinces in May and June 2014.

The midline survey was done with 28 existing customers in Kampong Thom province in January 2015. The endline survey was conducted with 38 existing customers in Kampong Thom province and 43 existing customers in Kampong Chhnang province in October 2015.

All interviews were carried out in-person.

Limitations of this study: The study aims to provide only the key learnings from Kamworks' grant and cannot possibly cover all the day-to-day learnings from Kamworks. It also aims to share learnings with the broader sector without releasing commercially sensitive data from Kamworks, Cellcard or WING.

The customer surveys are meant to be representative while not necessarily statistically significant to a specified degree of certainty. Customer surveys are known to have limitations in accuracy, particularly around expenditures, income and previously carried out activities, where people often fail to recall these correctly or are influenced by perverse incentives (e.g. stating a lower income than reality thinking it will reduce the future pricing).

Appendix 2: Kamworks' Detailed Price List

Kamworks' detailed price list for the rent-to-own and rental offers is shown below in Figure 14. There was no down payment for the rent-to-own option.

FIGURE 14

Kamworks' detailed price list

SHS40/60/100 pricing	Perpetual rent	Rent-to-own (24 months)		Buy outright
	Monthly fee (USD)	Monthly fee (USD)	Total cost (USD)	Price (USD)
SHS40	10	22	528	396
SHS60	15	25	600	450
SHS100	20	35	840	630
9W LED Lamp Kit	1	1	24	18
Conditions for rental				
Deposit	USD 25			
Minimum contract duration	6 months (free cancellation after 6 months)			
Cancellation fee	USD 25			
Upgrade to bigger system	Free			
Service	Free service visit every 6 months included, free repairs			
Conditions for rent-to-own				
Switch from rent to rent-to-own	New 24 months contract, 50% discount on rental fee already paid			
Down payment (optional)	Down payment entitles buyer to a discount on purchase price. Amount of discount is 20% of down payment.			
Warranty	2 years on the system, 20 years on the solar panel			
Service	Free service visit after 3 months, 9 months and 18 months			

Appendix 3: Kamworks' Experience in Raising Capital through Kiva

Raising capital through Kiva⁴²

Kiva operates a website where its Field Partners such as Kamworks can post loans for interest-free financing by individual lenders from across the globe. Only Field Partners are allowed to post loans. A Field Partner's credit line can range from USD 50,000 to USD 4 million, depending on the credit tier assigned by Kiva. For example, VisionFund Cambodia is a Kiva Field Partner with an active Kiva portfolio of 3,444 loans totalling USD 3.08 million as of December 31, 2015.⁴³

A Field Partner must have assets or operating revenues of at least USD 100,000 and must be able to post at least USD 50,000 in loans in the first 12 months on the Kiva website, with capacity to grow in subsequent years.

Loans can range in size from USD 25 to USD 50,000 depending on credit tier of Field Partner, with terms that can be up to 20 years. Loans are given to Field Partners at 0% interest but Field Partners may charge their borrowers a reasonable interest rate or fee when necessary to maintain a sustainable lending programme.

Clean Energy, Water and Sanitation are among the focus areas of Kiva.

Kamworks' performance versus all Kiva Field Partners⁴⁴

Figure 15 compares Kamworks to all Kiva partners with data from the Kiva website and Figure 16 is a screen capture of a Kamworks loan posting.

FIGURE 15

Kamworks Kiva statistics compared to all Kiva partners as of December 31, 2015

Parameter	Kamworks	All Kiva Partners
Start date on Kiva	September 18, 2014	October 12, 2005
Number of borrowers paying back loans	244	159,312
Loans to women borrowers	36.89%	74.51%
Average loan size (in USD)	643	415
Average time to fund a loan (in days)	3.61	6.70
Total loans (in USD)	157,000	766,225,550
Average cost to borrower	24% APR ⁴⁵	29.71% PY ⁴⁶
Delinquency rate	2.16%	7.86%
Default rate	0.00%	1.25%

42. From "A Guide to Kiva for Potential Field Partners"

43. See partner details for VisionFund Cambodia at <http://www.kiva.org/partners/204>

44. From Kiva's partner page on Kamworks


45. Annual Percentage Rate (APR) represents estimated average cost paid by a borrower to this Field Partner to access a loan posted on Kiva, with that cost annualised and converted into a percentage rate. See https://www.kiva.org/help/solution/what_do_average_cost_to_borrower_and_a_p_r_mean for details.

46. Portfolio Yield (PY) is a Field Partner's financial earnings divided by its average loan portfolio outstanding during a given year. See <https://www.kiva.org/help/borrowingCostComparison> and https://www.kiva.org/help/solution/what_do_average_cost_to_borrower_and_p_y_mean for details. For a comparison between APR and PY, see MFTransparency and MIX Market.

FIGURE 16

A Kamworks loan overview page on Kiva

LOAN OVERVIEW
REPAYMENT SCHEDULE



Working as a farmer for over 30 years, Nhoeb lives in Lvea Village with a wife and child.

Having spent his time raising four children, he wants to have a comfortable life. Currently, he is still farming and lives with his wife and only child while other 3 children start their own family and live separately.

Nhoeb has difficulty in using a battery for home energy. He needs to recharge his battery every week. Seeing the difficulty of using a car battery, he decided to apply to Kiva to help buy a home solar energy system. He believes a home solar energy system can enhance his lifestyle to a comfortable condition.

A loan of \$650 helps Nhoeb to pay for a home solar energy system.

65% funded, \$225 to go

Select amount to lend:

\$25 Lend \$25

Repayment Term	27 months (Additional Information)
Repayment Schedule	Monthly
Pre-Disbursed:	Nov 26, 2015
Listed	Dec 26, 2015
Currency Exchange Loss:	N/A

Your funds will be used to backfill this loan
Repayments will go to you

FIELD PARTNER [Learn more](#)

KAMWORKS
KNOWLEDGE FOR SUSTAINABLE DEVELOPMENT

Kamworks administers this loan.

Social Performance Badges:

- ♻️ [Vulnerable Group Focus](#)
- 🗣️ [Client Voice](#)
- 💡 [Innovation](#)

What to know about this partner:

Field Partner:	Kamworks
Field Partner Risk Rating	★ ★ ★ ★ ★

The cost-benefit of Kiva from Kamworks' point of view

Kiva has been instrumental in the early success of the Kamworks' PAYG programme. Thanks to Kiva, Kamworks was able to prove its concept, while making reasonable margins with relatively low volumes. That was extremely helpful for a small organisation like Kamworks.

The key challenges in becoming a KIVA partner are in management overhead and scaling operations. Kamworks had to adapt or implement new processes to post and follow loans aligned with KIVA requirements. However, after the initial setup

and training of the team, loan management and processing imposed a very low overhead. The second key learning was in the management of the transition from Experimental to Basic partner. Kamworks had anticipated and prepared for the process, but it still took longer than expected.

Overall, Kiva has been extremely beneficial to Kamworks operations. The Basic partnership, that allows organisations to get started within a short timeline and reasonable due diligence, is an excellent process.



For more information on the Mobile for
Development Utilities programme visit:
[www.gsma.com/mobilefordevelopment/
programmes/m4dutilities](http://www.gsma.com/mobilefordevelopment/programmes/m4dutilities)

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