A report commissioned by

MALI: MAPPING THE SUPPLY CHAIN FOR SOLAR LIGHTING PRODUCTS

July 2013

Table of Contents

LIST OF ACRONYMS

AFREA	Africa Renewable Energy and Access Grants Program
AMADER	Malain Agency for the Development of Domestic Energy and Rural Electrification
ANADEB	Agence Nationale du Développement des Biocarburants
ASTAE	Asia Sustainable Energy Program
BoP	Bottom of the Pyramid
ESMAP	Energy Sector Management Assistance Program
GDP	Gross Domestic Product
GEF	Global Environment Facility
GIZ	Deutsche Gesellschaft fur Internationale Zusammenarbeit
IFC	International Finance Corporation
LA	Lighting Africa
LADM	Lighting Africa Development Marketplace
LED	Light Emitting Diode
MFC	Mali Folkecenter Nyetaa
MFI	Microfinance Institution
NOTS	Not One the Same
PPIAF	Public-Private Infrastructure Advisory Facility
PPP	GDP per capita
REEEP	Renewable Energy and Energy Efficiency Partnership
REF	Rural Energy Foundation
SPL	Solar Portable Lanterns
USAID	United Sates Agency for International Development
USD	United States Dollar
VAT	Value Added Tax

CURRENCY EQUIVALENTS

Currency Unit = West African Franc (F CFA)

€1 = F CFA 655.957[1]

[1] The F CFA – Euro exchange rate is fixed. However, it should be noted that while the F CFA – Euro conversions in this paper are the same as at the time of writing, price fluctuation due to recent political insecurity is significant. Data on prices used in this report were gathered between April and June 2013. There may have been significant changes in prices since then.

EXECUTIVE SUMMARY

Situation: Access to affordable and reliable energy, in particular lighting, is limited in Mali. Solar portable lanterns (SPLs) can fulfill this lighting need in a sustainable way.

Complication: The current availability of products that have undergone quality testing and passed Lighting Africa's minimum standards in Mali is inadequate. Although availability is growing, the pace is insufficient to quickly respond to the extensive need and market potential.

Question: What can we learn from the existing distribution channels of LA products, lighting alternatives (including battery-powered torches, candles, petroleum lamps, and solar lamps that have not been quality verified by LA), or similar consumer products, that can then be applied towards augmenting the availability of LA products? Specifically, are there any existing supply chain models or partners that new entrants could tap into?

Answer:
Like existing players, new players wishing to distribute solar portable lanterns in the Mali market face **three acute challenges**, which have a direct impact on success factors for distribution:

- **Low awareness** of SPLs from both consumers and retailers. Compared with East Africa, awareness of solar lighting technology is even lower, limiting incentives for distributors
- **Low affordability** and limited access to finance for both consumers and retailers. Although an SPL does pay off quickly because the non-solar lighting alternatives people currently use have high recurring costs, few people have the total sum available upfront to invest in an SPL and need to actively save/ take out a loan to buy one. In Mali, one of Africa's poorest countries, low affordability is particularly acute and limits uptake
- **Limited after-sales support** structures. Consumer trust in the product (which is difficult to build in the first place due to low awareness and affordability) is quickly eroded if appropriate after-sales support is not provided. Retailers are anxious about their ability to offer after-sales support

These challenges require a more innovative approach to distribution. Distribution strategies that specifically integrate the following elements should be prioritized in Mali:

- Face-to-face/ door-to-door marketing and sales with integrated demonstrations
- Integrated product finance through select financing partnerships
- Simple procedures for warranty claims and after-sales support, with immediate product replacement in the case of breakdowns

Of the existing distributors in Mali, one has adopted an approach integrating all of the above. Not surprisingly, this distributor is experiencing much higher growth in SPL sales than another sizeable distributor, which deploys a much more passive approach.

The distribution of other products in Mali also provides valuable lessons. Three approaches were followed to identify these products:

- **"Usual suspect" products** with a high rural presence. Three subcategories have been identified among these products:
    - ***Cheaper products***, including common lighting alternatives. Tapping straight into the distribution models for these is not an option for SPLs. The research, gathered from shopkeepers who sell the lighting alternatives, gleaned that barriers of both access to finance and lack of retailer awareness stop them from stocking SPLs. There is a clear need for extensive awareness building and credit solutions
    - ***Midrange products*** that are being bought by the rural population themselves, or for them by family members living in urban areas – e.g., mobile phones. These are mostly bought in urban centers and brought back to the villages. Whilst SPL distributors can learn from the urban-to-rural model and seek to copy it, they cannot tap straight into the existing distribution chain for mobile phones. Unlike mobile phones, there's no obvious / tangible pull for SPLs as their advantages are not yet broadly recognized
    - ***More expensive products*** that are being bought by overseas connections and either sent back or brought back to villages. TVs are a good example of this. TVs are owned by 3% of the rural Malian population, that seems like a low number, but on relative terms, it's not that different from the 5% urban ownership and more than can be expected based on income levels. Whilst companies who explicitly target this group of buyers in a structured way have not been identified, SPL distributors could use this supply mechanism. Distributors could tap into concentrations of buyers (e.g., at airports around big annual events that trigger higher levels of travel or in neighborhoods with a high ratio of non-resident / diaspora connections) to focus their demonstration and sales efforts. Demonstration is critical since, unlike for TVs, the demand for SPLs still needs to be created
- **Products that are comparable** to SPLs in both their application and in the key challenges shaping distribution. From a range of products, irrigation pumps and improved cookstoves were selected as most comparable to SPLs since they face similarly low awareness, high upfront costs, and lack local technical knowledge for maintenance. Their distribution models hinge strongly on marketing through demonstrations to build awareness, closely involving local cooperatives and associations who also help provide financing
- **Products or distribution channels which have one or more of the characteristics we identified as "key success factors for distribution"**:
    - ***Integration of marketing/ demonstration and sales:*** Several other products such as slightly higher-end cosmetics, pharmaceutical products and cleaning products are being sold door-to-door with accompanying explanations and demonstrations. This is done through company-proprietary sales channels: company-trained salespeople who work on commission and typically only sell these products, in contrast to the ambulant self-employed salespeople who sell a range of simple, cheap products that do not require explanation or demonstration. These proprietary models sometimes also address the challenge of trade finance by pre-financing the stock for their sellers (which requires significant working capital for the parent company). While these models are currently only applied in urban areas, products do 'trickle down' into rural areas. Alternatively, training rural cooperatives and employing them as a salesforce, would allow for direct rural distribution

- ***Integrated product finance:*** In Mali, no formal consumer credit exists with shops or microfinance Institutions (MFIs). Consumer credit does exist with commercial banks, but only for salaried employees with a bank account. The key examples of integrated finance come from existing successful SPL and irrigation pump distribution models. They typically use:
  - Local cooperatives and village elders to help build repayment guarantees and trust with MFIs. Many MFIs are keen to finance SPLs if they can overcome the risks linked to new rural communities and to consumer credit (vs. credit they typically extend, which is linked to income-generating activities)
  - Local savings and credit circles (again, with cooperatives functioning as intermediaries)
- ***Simple procedure for warranty claims and after-sales support:*** Given the current low local technical knowledge negatively impacting after-sales support, products with low failure rates and a simple warranty claim policy with immediate exchange in case of breakdowns are the best alternative. Such products and warranty policies help build retailer and consumer confidence

Based on the above points, potential entry mechanisms to increase the rural SPL footprint in Mali, include options to either work directly with the rural population or to capitalize on the urban-to-rural distribution models (the latter with a particular focus on the Malian diaspora). These mechanisms include:

- First and foremost, continuing to expand the current model with increased focus on local demonstrations in a village-to-village approach, combined trade finance for resellers, and an immediate exchange-warranty
- Working with local cooperatives as commission-based sales channels to expand the rural footprint and make the rural presence more uninterrupted / stable (and not only dependent on one-off presence / availability at village fairs). Financing the cooperatives' stock to avoid high risk and high working capital requirements for the cooperatives
- Employing a variety of means to further entrench and strengthen consumer credit mechanisms (through savings circles, associations, and MFIs)
- Exploring opportunities to cross-sell SPLs within existing proprietary sales networks, such as co-selling with e.g., improved cookstoves and irrigation pumps (with rural outreach) or with higher-end cosmetics in urban areas
- Building urban proprietary SPL sales networks of commission-based resellers with a particular focus on selling to returning diaspora to achieve increased trickle-down impacts in rural areas
- Reaching out to diaspora for awareness-building and ensuring product availability at specific locations during periods when diaspora travel to rural areas

As anywhere, the market can be supported by complementary public and social sector efforts. For instance, national awareness campaigns (using radio) can supplement actual physical promotions. Similarly, exemption from the Value Added Tax (VAT) would reduce price by approximately 18%, further enhancing affordability. However, these efforts cannot replace physical promotion and awareness building nor can they singularly, fully resolve the existing challenges.

STRUCTURE OF THE REPORT

- Chapter 1 covers the background and context. It includes:

  - Background on the Lighting Africa Program and this study
  - Further context on Mali and the energy challenge in Mali
  - Policy challenges and achievements for solar lighting
- Chapter 2 covers the current supply chain for Solar Portable Lanterns.
  - Beginning with the consumer, it describes where they can buy products
  - It works up towards distributors and explains the two dominant distribution models currently in place in Mali
  - It concludes by describing the challenges experienced with current distribution and implications for success factors for distribution (Annex 4 details challenges further)
- Chapter 3 covers the selection of "comparable" products and their lessons
- Chapter 4 draws conclusions and describes suggested distribution models
- The annexes include further details on:
  - Individual profiles of the key actors involved in the current distribution of SPLs
  - Individual profiles of the key actors deploying distribution models that SPLs could tap into or copy
  - A "phonebook" with contact information for a large set of actors – for ease of utilization, this phonebook is provided in Excel. The annex of this report includes a list of the key categories presented in the phonebook
  - Further details on the challenges experienced in current SPL distribution
  - An overview of SPL products, brands and prices currently available in Mali
  - A description of the research approach, including a list of interviews conducted

1. BACKGROUND AND CONTEXT

LIGHTING AFRICA PROGRAM CONTEXT

The Lighting Africa program, a joint initiative between the International Finance Corporation (IFC) and the World Bank, works to address challenges to the "base of the pyramid" (BOP) population's access to modern lighting. It does this through a comprehensive set of initiatives aimed at mobilizing the private sector and accelerating the development of a robust market for off-grid portable lighting devices in Africa.

The Lighting Africa program has been implemented in partnership with, and funding from, the Africa Renewable Energy and Access Grants Program (AFREA); the Asia Sustainable Energy Program (ASTAE); the Energy Sector Management Assistance Program (ESMAP); the Global Environment Facility (GEF); Italy; Luxembourg; the Netherlands; Norway; the Public-Private Infrastructure Advisory Facility (PPIAF); the Renewable Energy and Energy Efficiency Partnership (REEEP) and the United States.

Lighting Africa has an Africa-wide focus. Pilot geographies were Kenya and Ghana that account for approximately 7% of Africa's total off-grid population[2]. Since then the program has expanded to new geographies on the continent, including the Democratic Republic of Congo, Ethiopia, Liberia, Mali, Nigeria, Senegal, Burkina Faso, South Sudan and Tanzania. Additionally, in 2012 IFC launched a Lighting Asia program that initially centered on India[3].

Thus far, Lighting Africa interventions have included creating market intelligence through targeted market research and publications; serving as a catalyst and forum for private market players via a website, workshops, conferences, and direct advisory activities; developing a quality assurance program through product testing and certification; advocating market-enabling policy reform; and mobilizing financing for off-grid lighting market intermediaries and consumers. Additionally, the Lighting Africa program has included a separately funded Lighting Africa Development Marketplace (LADM) component. To date, the Lighting Africa program has enabled the sale of almost 1.4 million affordable, quality-assured off-grid lighting systems, benefiting an estimated 6.9 million people who lacked access to reliable electricity, and a growth in sales of good quality lighting products of 120% in 2012 as compared to 2011[4].

[2] IEA, WBG, Dalberg analysis.
[3] Lighting Asia website http://www.lightingafrica.org/asia/.
[4] The access to clean light computation is based on the assumption that one solar lantern serves one household, and that each household has five people. This calculation is currently under review to accommodate new market data.

LIGHTING AFRICA SUPPLY CHAIN STUDY: GOALS AND DELIVERABLES

The current Lighting Africa Mali study sits within this Lighting Africa program context, as it maps the supply chains catering to the base of the pyramid (BoP) for Solar Portable Lanterns (SPLs) in Mali. The overall objective of this mapping exercise is to identify the points of leverage across the distribution chain to define the opportunities in getting portable solar lighting products to consumers in Mali. This study defines distribution models, recognizes opportunities to leverage existing networks and channels, identifies success factors and lessons learned, and defines the distribution channels of comparative products that can represent a valid entry point for SPLs.

COUNTRY'S OVERVIEW AND KEY CHALLENGES

Mali is a landlocked country divided into three natural zones: the southern cultivated Sudanese zone, the central semiarid Sahelian zone, and the northern arid Saharan zone. Of its 16 million[5] inhabitants almost 50% are under the age of 15. The population is divided into multiple ethnic groups. French is the official language, but approximately 80% of the population speaks other local dialects. With about 1.2 million square kilometers, Mali is comparable in size to South Africa. With a low population density of 12.6 people per sq. km[6], and only 30 centers with over 50,000 habitants, distribution of products and services is not easy.

36% of the population lives in urban areas, with an annual rate of urbanization of approximately 4.4%. Life expectancy is low at approximately 51 years[7]. The health conditions are precarious; diseases such as hepatitis A, malaria, diarrhea and typhoid fever are frequent. The infant mortality rate is one of the worst in the world at 99/1,000. Adult literacy is 26-30%[8].

The country's GDP was USD 10 billion in 2012 with an annual GDP per capita (PPP) of approximately USD 1,100. Aid money is significant (it represents 13% of GDP), which shows that the role of institutions as shapers of the market is very relevant. Being one of the 25 poorest countries in the world, Mali is highly dependent on agriculture, which accounts for almost 40% of GDP and employs 66% of the population. Between 2000 and 2001 total expenditure on energy sources accounted for approximately 3.3% of household income, split as following: 2.5% on petroleum products (kerosene, gasoline and diesel), 0.4% on electricity and 0.4% on charcoal[9].

The GDP growth of recent years (about 5% annually between 1996 and 2010) has been halted by the surge of local conflicts and declining security. The crisis has resulted in a large displacement of people from the northern provinces to neighboring countries and to the south, resulting in the overcrowding of social services in the south[10].

This analysis cannot ignore the impact of the recent and current conflict on the supply chain in Mali. Distribution has been disrupted in the north and many investors and donors have put their activities on hold (e.g., NGO solar installation activities have been stalled).

---

[5] July 2013 estimates.
[6] World Bank 2012.
[7] World Bank.
[8] UNICEF, Mali statistics.
[9] The World Bank, Expenditure of Low-Income Households on Energy, June 2010.
[10] World Bank.

ACCESS TO ENERGY: THE POTENTIAL FOR SOLAR LIGHTING

Despite improvements in recent years, Mali faces a severe energy shortage. Although access to electricity in the country has more than doubled in the last decade, currently only 27% of the population has access to electricity. In urban areas, access is at 55%, but rurally, only 15%[11] have access. Due to this lack of electricity, a number of different sources of energy are used as a substitute, including fuel woods that dominate the current energy balance. The high level of fuel-wood consumed (80% of total energy sources) creates immense pressure on the country's forests, with a deforestation rate of about 400,000 hectares per annum[12,13]. Other energy sources used in Mali include charcoal, petroleum, biofuel/biomass, hydro, wind and solar, many of which are used complementarily to other sources. The latest available census data provides an overview of the three most popular sources of lighting used by the Malian population in different regions. Kerosene lamps are the most widely used form of lighting both in Bamako and across Mali's eight regions with over a million households using them[14]. This translates into a staggering 44% of all households in Mali, indicating the great potential for solar portable lanterns as a substitute product. Battery powered torches (flashlights) follow with usage by 31% of the population; this is largely a rural phenomenon as the vast majority of households using them are located outside the capital. Electricity usage comes in third with 15% of households. Unsurprisingly, the city of Bamako has the largest share of on-grid electricity usage; 73% of households in Bamako are connected to the grid. However, this is no guarantee for sustained access to electricity as urban areas face very frequent power outages. On the other end of the scale, in the region of Gao less than 1% of households use electricity. In six of the remaining eight regions, less that 10% of households have access to electricity, indicating acute energy inequality compared to the capital. Lastly, a mere 2.4% of households cite solar as an energy source used. The regions of Sikasso and Kayes are the two regions with the highest solar penetration, with 4.8% and 5.6% usage, respectively, reflecting the installation of solar panels in the areas.

The price of alternative sources of lighting varies:

- Battery-powered flashlights: 700-800 F CFA (€1.07 - €1.22)
- Solar-powered flashlights: 3,000 – 3,500 F CFA (€4.57 - €5.34)
- Kerosene lamps: 3,000-5,000 F CFA (€4.57 - €7.62) and approximately 100 F CFA/night of kerosene (€0.15)
- Candles: 200 F CFA (€0.30) /night, or 50 F CFA (€0.08) /candle

Specific market trends provide opportunities for the expansion of solar products:

- Kerosene wick-lamps, candles, hurricane lanterns and battery-powered flashlights are the most common lighting sources used by rural communities in developing countries. Some of the portable solar lighting products are very similar and could be an easy substitution
- The increase in the price of kerosene will stimulate demand for cheaper alternatives
- In the medium to long term, the decreasing price of solar components, LEDs, and batteries will improve the affordability of off-grid solar products in the market

[11] Ministry of Energy and Water, SREP Mali Investment Plan Scaling up Renewable Energy.
[12] Mali Policy and Regulation overview, Renewable Energy and Energy Efficiency partnership (REEEP) database, 2012.
[13] Five Ministry of Energy and Water Resources, Renewable Energy in Mali Achievements, Challenges & Opportunities.
[14] The total number of households in the census came to 2,355,293.

POLICY AND REGULATIONS

Despite ongoing government instability, Mali has traditionally been a model of democracy in Africa and has put a lot of effort into creating a dynamic economy, including political reforms to boost its economy and stimulate investments. In the renewable energy sector, the government of Mali has put in place policy and regulations aiming to create an environment conducive to the development of the sector, with a particular focus on solar energy. Solar energy products are currently exempt from import tax until 2014; this decision represents an important enabler to incentivize the development of the sector. Through the provision of affordable energy services products, the Malian government aims to promote sustainable development with a focus on renewable energy while encouraging investment in the sector. Furthermore, the government has put in place a series of policies and strategic plans to incentivize large-scale renewable energy projects, with an emphasis on provision of services at an affordable cost in rural areas.

Despite this concerted government effort to develop an environment favorable to the development of the renewable energy sector, the solar energy sector still suffers from a number of challenges:

- **Unstructured renewable energy market:** the energy sector is replete with players 'promoting the sector' with no apparent synergy or coordination between them[15,16, 17]
- **Limited regulation for investment in the renewable energy sector:** current regulation does not promote private sector investment and is not conducive to the full involvement of the private sector. This is due to legislative and financial constraints placed on private sector activities including an unfavorable tariff and fiscal system that prevents large scale private sector investment[18]
- **Little enforcement of existing energy policies:** lack of effective implementation of policies and strategies means plans are not always put into practice. Additionally, there is no dedicated body for quality and standard control at customs to guarantee the quality of imported products[19]
- **Incomplete framework for public-private partnerships:** The launch of public private partnerships is rare due to the lack of a clear framework; the general lack of guarantees and incentives does not support private sector partnerships with the public sector[20]

2. CURRENT SUPPLY CHAIN FOR SOLAR PORTABLE LANTERNS (SPLS)

RETAIL AVAILABILITY – WHERE AND FROM WHOM CAN CONSUMERS BUY SPLS?

Solar portable products are available through different "retailers":

3. Dedicated solar energy shops in urban areas: the size of these shops varies, from large distributors to small individual shops; these shops only sell solar products such as solar panels,

[15] SREP-MALI INVESTMENT PLAN Scaling Up Renewable Energy, Ministry of Energy and Water Resources, 2012.
[16] Country Chapter Mali, GTZ 2009.
[17] Renewable Energy Mali, Ministry of Energy and Water Resources, 2011.
[18] Renewable Energy Mali, Ministry of Energy and Water Resources, 2011.
[19] Renewable Energy Mali, Ministry of Energy and Water Resources, 2011.
[20] Renewable Energy Mali, Ministry of Energy and Water Resources, 2011.

solar pumps and solar refrigerators and are mainly located in urban areas where the demand and capacity to pay is higher than in rural areas

4. Household shops ("quincailleries"): located both in rural and urban areas, these shops sell household goods (hardware), ranging from small accessories and appliances to materials for household works
5. General shops: located both in rural and urban areas, these shops provide a wide variety of products, including household hardware and groceries. Generally small in size, their stock of lamps tends to be very limited (usually no more than 2-4 SPLs at a time)
6. Cooperatives: rural cooperatives can operate as distributors to reach members of the community; local NGOs often provide support in terms of awareness building and access to credit
7. NGOs: local and international NGOs have been involved in the distribution of solar portable products to rural areas
8. Gas stations: one importer has recently entered into an agreement to distribute their solar products through a chain of gas stations; although these stations are spread across the country, they are not located in remote rural areas
9. Boutique d'énergie: set up by the operateurs privés[21] who acquired government concessions for rural electrification around Mali; they sell a variety of energy products such as light bulbs

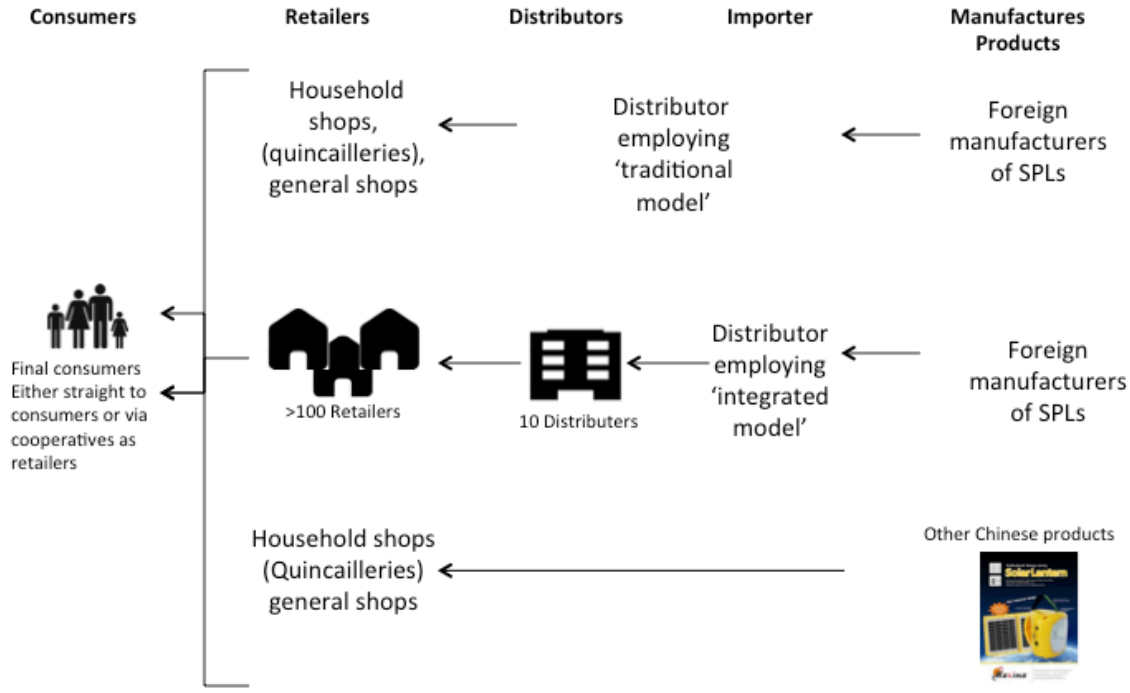
The fieldwork highlighted that, unless they have been explicitly trained by distributors, retailers often **do not understand the solar products** on offer and therefore cannot explain to clients how these products should be used and maintained. Most of the retailers started selling solar products in a very passive way with a lack of clear understanding of the product, its usage and advantages. Thus, they also don't really promote the products to their customers, which keeps the demand quite low and reinforces the impression that there is only a very limited market for SPLs (something many retailers think, driving their hesitation to stock the products). The **lack of training of retailers and technicians** on the ground leads to inadequate maintenance and incorrect repairs.

EXISTING DISTRIBUTION MODELS FOR SPLS

Whilst there are a variety of retailers from whom consumers can buy SPLs, there's only a limited set of distributors, driven by two dominant importers who each employ a very different distribution model, as shown in Figure 1. The remainder of this section details these models. Even though different brands are for sale in similar shops, that does not mean individual shops carry a variety of SPLs: so far, retailers only stock one brand of SPLs each.

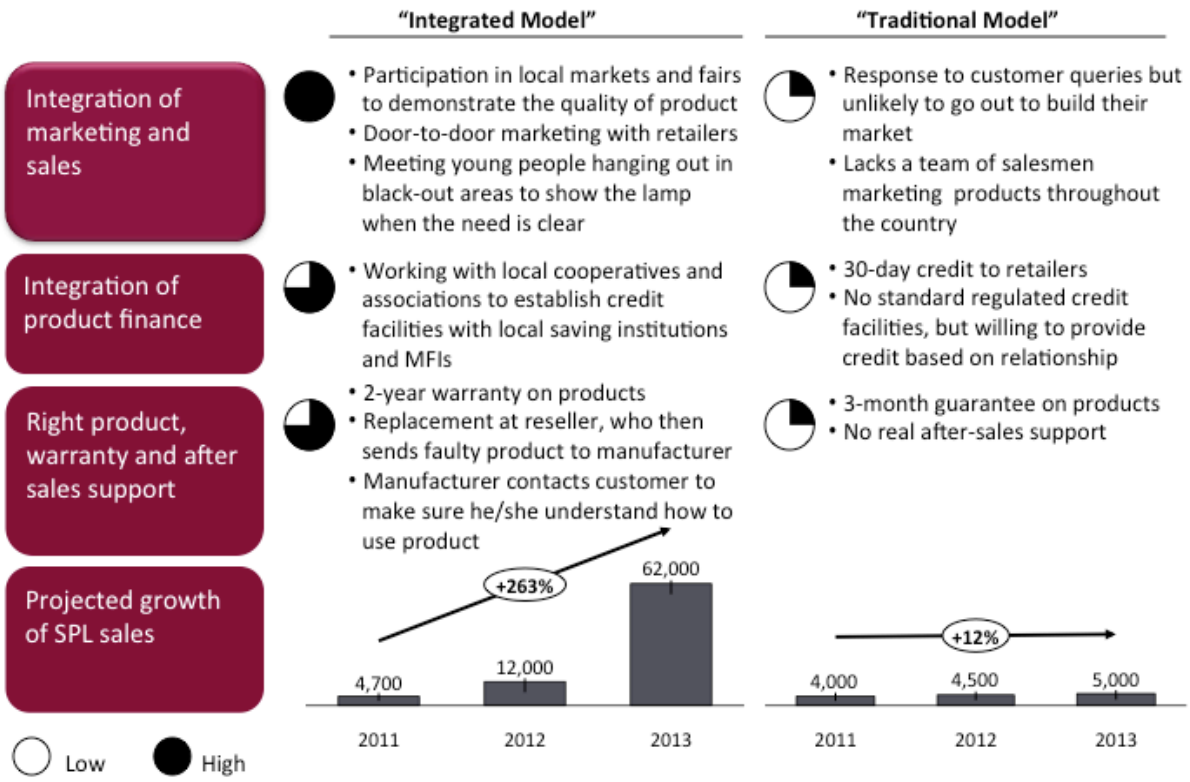
[21] These are officially licensed under the government schemes of AMADER to provide access to energy whilst in return being granted a temporary monopoly.

Figure 1. Main Distribution Models for SPLs



The **two archetypes in distribution models** differ primarily in the level of the importer/distributor's engagement in bringing the products to the final consumers. This engagement factor drives differences in who educates or builds consumer awareness and in the potential availability of financial support. In Mali, the 2 main SPL distributors each employ a different model: the 'integrated' model and the 'traditional' model. The integrated model, which deploys a more pro-active response to the key challenges, shows significantly higher growth. Figure 2 below compares the two models; the remainder of this section describes them in more detail. Annex 1 contains a detailed profile of 3 distributers who've been actively involved in promoting and distributing SPLs in rural areas in Mali.

Figure 2. The Integrated and the Traditional SPL Distribution Models



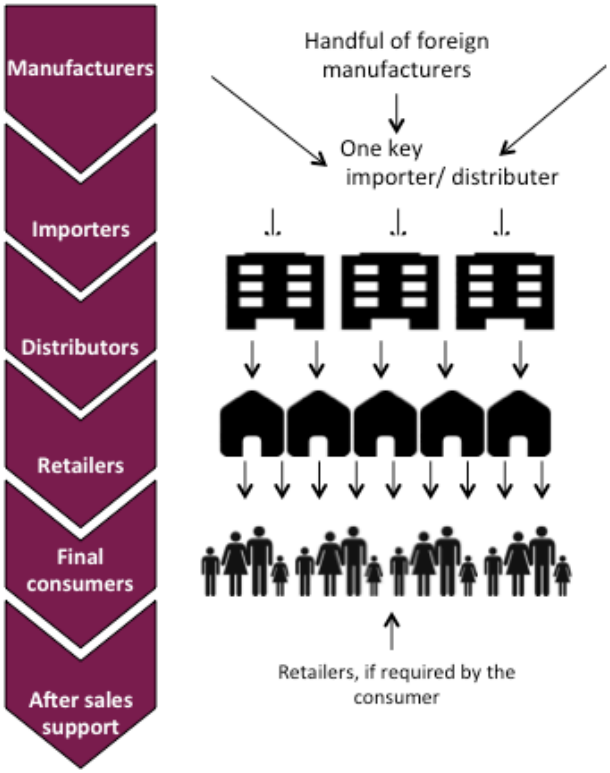
TRADITIONAL MODEL:

- Importer/ distributer sells to resellers who sell to consumers or to other retailers
- Each step of the value chain owns the product when it's physically with them and therefore has its own financing need and business risk
- Partnerships or preferential agreements may exist with certain resellers, resulting in more flexible payment terms
- Some distributors tried to set up regional offices which failed because of insufficient volume
- Importer/ distributor does not carry out specific marketing or consumer education activities to support the product's distribution and uptake

Some large international manufacturers have been using an importer/distributor employing the traditional model to enter the market in Mali. This importer/distributer serves independent retailers, and sometimes consumers, who come to the company's shops for their purchases. This distributer does not have a network of salesmen across the country and has so far used a more reactive approach towards the sales of solar portable lanterns. SPLs represent approximately 15% of the company's turnover, which is mainly driven by sales of larger solar goods (e.g. refrigerators) and installation of solar systems in rural areas in collaboration with the Malian Agency for the Development of Domestic Energy

and Rural Electrification (AMADER). The company has recently launched its own solar lantern; growth projections for the product are unclear but it may open opportunities to be more engaged in the development of the market for SPLs in Mali. This "traditional" company does not have a formal credit facility, but based on experience, loyalty and trust, the company often grants retailers a 30-day payment period. Figure 2 shows the potential bottlenecks and price mark-ups along the supply chain of this company's traditional distribution model.

Figure 2. Price Mark-Ups and Potential Bottlenecks in the 'Traditional' Model



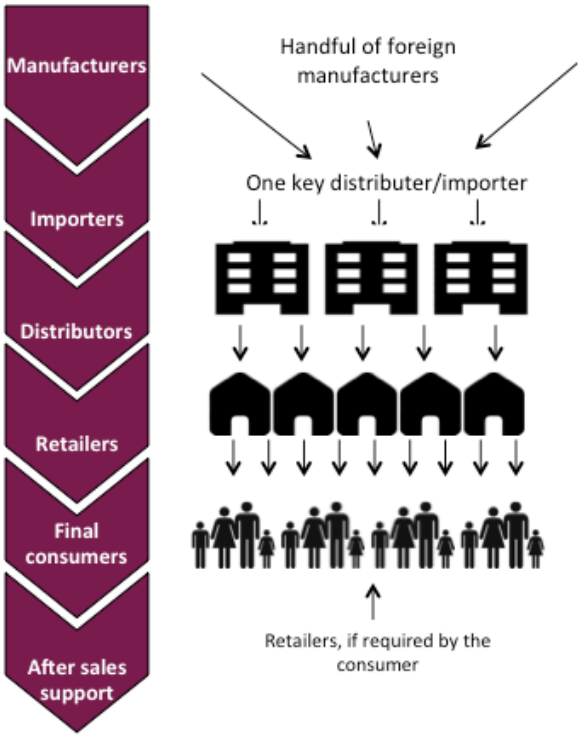
Market players	Sales price cost mark-up (as % of purchase price)	Potential bottlenecks
Manufacturers		
Importers	On average 40%	• One key distributor as entry point which may lack incentives to reach remote areas
Distributors	On average 15%	• High working capital requirement and risk
Retailers		• Low awareness and understanding of product's advantages and use • Lack of consumer finance to support purchasing • Lack of proximity after sales support in rural area • Lack of skills/expertise of local technicians to provide after-sale support
Final consumers		
After sales support		

INTEGRATED MODEL

- Importer works together with distributors and retailers on the ground to reach the last mile consumers
- Education, training, communication, financing and after-sales support are recognized as key components to support the distribution of products and are actively driven by the importer
- Importer shares the financial risk by extending credit to distributors and, subsequently, to final customers
- Local cooperatives often act as resellers (after having been educated by the distributor), supported by ad-hoc financial support to finance their supply chain

Figure 3 below, shows typical sales price mark-ups and potential bottlenecks found along the supply chain in the integrated model. One importer employing this integrated model has an all-encompassing and rather innovative business model, focusing on reducing the strain from access to finance and building consumer awareness particularly in rural areas, thereby addressing some of these bottlenecks. Once the products reach Bamako, the importer employs a network of ten distributors and over 100 retailers across the regions of Kayes, Koulikoro (Bamako), Sikasso, Segou, and Motti. The company has achieved an impressive growth with as many lamps sold in Q1 2013, as in all of 2012. Annual sales for 2013 are targeted to be over 5 times as large, but this may not be achieved due to frequent stock-outs linked to the working capital needs to support the business model. Since January 2013 the company has had almost a month of stock-out, including a full week stock-out in June/ July. The company employs payment terms that allow distributors to pay in 60 days; this formal facility can be extended in specific circumstances (e.g. reduction of sales or lack of payment due to conflict) and is often used as the basis to allow consumers to pay in installments rather than paying the full amount upfront.

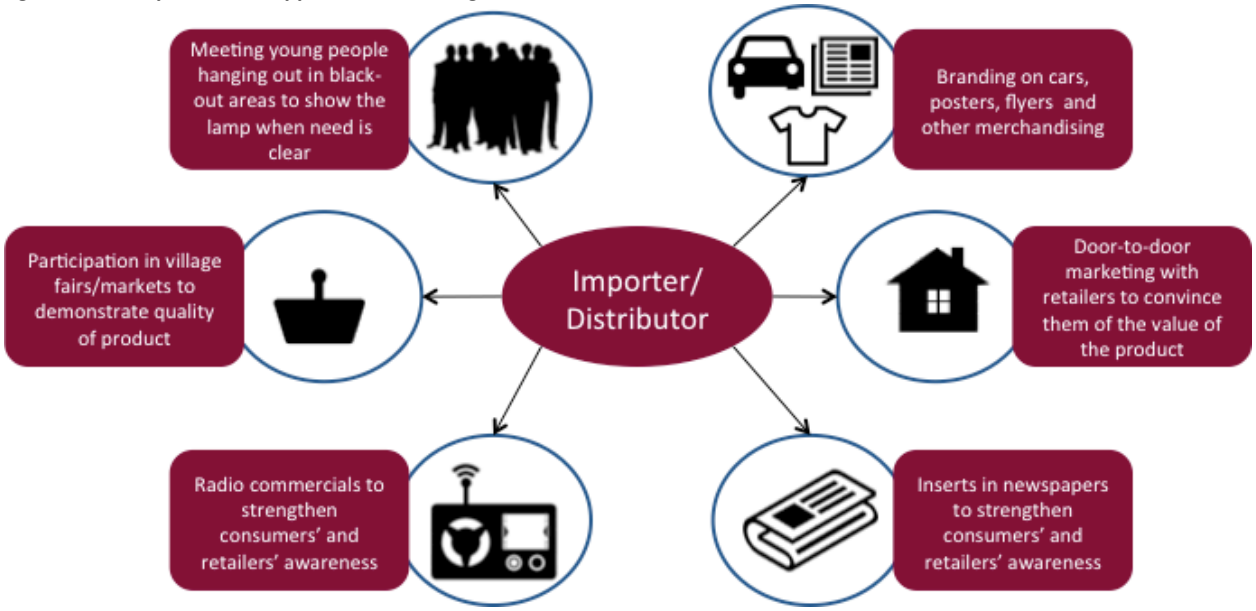
Figure 3. Price Mark-Ups and Potential Bottlenecks in the Integrated Model



Market players	Sales price cost mark-up (as % of purchase price)	Potential bottlenecks
Manufacturers		
Importers	On average 40%	• One key distributor as entry point which may lack incentives to reach remote areas
Distributors	On average 15%	• High working capital requirement and risk
Retailers		• Low awareness and understanding of product's advantages and use • Lack of consumer finance to support purchasing
Final consumers		• Lack of proximity of after sales support in rural area • Lack of skills/expertise of local technicians to provide after-sales support
After sales support		

Specifically, this importer is deploying an effective comprehensive approach to build consumer and retailer awareness across target groups, as shown in figure 4.

Figure 4. A Comprehensive Approach to Building Consumer and Retailer Awareness



Although solar products are available rurally, **coverage is far from complete**. In the "traditional" model there seems to be no systematic or strategic approach to the distribution of products to rural areas**.** Larger distributors don't distribute directly in rural areas. **NGOs frequently get involved to break the deadlock of low awareness - low demand – low supply in the distribution chain**. Retailers may not choose to stock the product because there's not enough demand. As a result, nobody gets exposure to the product and demand doesn't develop. Mali Folkecenter Nyetaa, profiled in annex 1, is an example of an NGO who get involved in this role.

CHALLENGES EXPERIENCED BY SPLS

Existing players in the Mali market face three primary challenges, which have a direct impact on success factors for distribution:

- Low awareness from both consumers and retailers. Awareness of solar lighting technology is even lower than in East Africa, limiting incentives for distributors
- Low affordability and limited access to finance for both consumers and retailers. Solar lanterns already face price elastic demand due to the availability of substitutes with lower upfront costs. Upfront affordability of SPLs for consumers is a particular issue in Mali, given its much lower income level than other African countries with similar consumer prices. Although the lighting alternatives people currently use do have high recurring costs and, therefore, a SPL quickly pays off, few people have the upfront total sum available and they actively need to save/ take out a loan for it
- Limited after-sales support structures. Consumer trust in the product, which is difficult to build due to low awareness and affordability, is quickly eroded if appropriate after-sales support is not provided. Retailers are anxious about their ability to offer after-sales support

Annex 4 provides further information on these challenges.

IMPLICATIONS FOR SUCCESS FACTORS FOR DISTRIBUTION

These challenges require a more innovative approach to distribution. Specifically, distribution methods need to adopt the following:

- Integration of marketing/ distribution and sales. Face-to-face/door-to-door selling approaches that incorporate below the line sales techniques are likely to be more successful in Mali, given the relatively nascent nature of the market
- Integration of product finance. Consumers largely focus on the upfront price so the point of sale needs to be pre-financed. For retailers, financing that allows them to recoup revenues from final sales first, will reduce the need for working capital and hence hesitation to stock SPLs
- After-sales support, which is low hassle for consumers and retailers alike. Products that replace first and ask questions later are likely to be embraced more by local distributors and consumers, as compared to those requiring localized maintenance or a time and cost consuming warranty process

The much larger growth achieved when comparing a company that employ the integrated model to one that employs the traditional model, testifies to the importance of these success factors.

3. LESSONS LEARNED FROM THE DISTRIBUTION OF COMPARABLE PRODUCTS

IDENTIFICATION OF 'COMPARABLE' PRODUCTS

Three different approaches were used to identify comparable products in order to get as wide a variety of comparable products and distribution models to learn from as possible.

- "Usual suspect" products which have an existing high rural presence
- Products which are comparable to SPLs, in both their application and in the key challenges impacting their distribution
- Products or distribution channels which have one or more of the characteristics identified as "key success factors for distribution"

Lessons can be learned from each of these products. The remainder of this chapter covers, per category, a description of the products, a description of the distribution models for these products, and implications/ lessons learned for SPLs.

"USUAL SUSPECT" PRODUCTS WITH AN EXISTING HIGH RURAL PRESENCE

DESCRIPTION OF THE PRODUCTS

In this category, three subcategories have been identified:

- Cheaper products, such as lighting alternatives (battery-powered torches / flashlights)
- More expensive products, which the rural population is buying themselves, such as mobile phones
- More expensive products, which (overseas) connections are buying and either sending or bringing back to villages, such as TVs (which are surprisingly present in rural Mali)

DISTRIBUTION MODELS

The cheaper products (e.g. food, drinks) are sold in the villages themselves, by a variety of local shops and at (weekly) markets. Retailers independently make the decision to stock these products. Retailers generally travel to urban centers to purchase these products (or sometimes ask a member of the family living in an urban area to buy and send those products by bus) and finance their stock themselves. It is rare to see distributors travelling to rural areas except in the context of large fairs that bring together hundreds of people. In line with general practice, retailers may decide to grant consumer credit or allow payment in installments based on trust. Further up the value chain for these products, importers tend to sell their products to their clients (wholesalers, supermarkets and large distributors) on fixed, big markets, of which the market of Dabanani in central Bamako is the most important one. If demand pull is developed, importers are likely to respond by bringing products to these markets, for rural shopkeepers further down the chain to pick up and stock.

For (soft) drinks the story is slightly different. A limited number of 'depositories' hold exclusive distribution contracts per region with the producers. Wholesalers and retailers travel to these deposits and stock directly from there.

The mid-range products, such as mobile phones, which are being bought by the rural population themselves or by family members living in urban areas, are largely bought in urban centers and brought back to the villages, similar to the cheaper products. Sometimes, rural retailers bring the products from the urban centers to resell locally – either on explicit customer demand or backed by a firm faith in the local market. As with the cheaper products, retailers finance these products themselves and may choose to extend credit to customers. The workings of these distribution chains reinforce the finding that physical distribution is not the limiting challenge – if demand exists, distribution will follow suit.

The last category, of more expensive products being bought by (overseas) connections, can reach rural consumers in a variety of ways. The most common 'distribution' is through connections (e.g., diaspora family members living and working abroad) physically bringing the products with them when they come to visit the village. This category includes products that are considered highly desirable for the village and often build status for both the recipient and the "donor", such as TVs.

IMPLICATIONS/ LESSONS LEARNED FOR SPLS

Tapping straight into the distribution models for the **cheaper, omnipresent products** is not an option for SPLs just yet. According to shopkeepers who sell the lighting alternatives, barriers of both access to finance and lack of retailer awareness stop them from stocking these products in the absence of extensive awareness-building and credit solutions.

Whilst SPLs can learn from the urban-to-rural model and seek to copy it, they cannot tap straight into the existing distribution chain for **more expensive products bought by the rural population** like mobile phones, which benefit from a pull from consumers for their recognized usefulness and status. Until consumer awareness has been strengthened, consumer pull/ direct demand for these products is lacking.

The distribution models for the **more expensive products that are being bought by (overseas) connections** offer the biggest potential for SPLs. Whilst the research has not identified companies who explicitly target this supply mechanism in a structured way, SPL distributors could use these practices and attributes. These buyers will not face challenges with affordability and financing and may be a great distribution option if they can be reached and convinced to buy SPLs. In other countries, companies have started to target these diaspora.

For this to become a viable distribution option for SPLs, awareness and demand pull needs to be built for the products among this buyer group and preferably, the 'status' of giving and owning these products needs to be strengthened. To build awareness, a distributor of SPLs could approach this group of diaspora where they are most concentrated. This can either be abroad or in Mali. Abroad, many groups of immigrants are closely connected, often living in the same areas/ neighborhoods, working in the same companies, or interacting closely socially.

Mali, with a population of approximately 16 million people, has 4 million Malians living in diaspora. The Malian diaspora is structured around the Haut Conseil des Maliens de l'Exterieur (The High Council of Malians living abroad). Created in 1993, it is a consultative body composed of representatives elected by national councils of Malians residing in 56 countries. The members of the High Council have an official role in representing the interests and views of the Malian diaspora to the government in Bamako. In their countries of residence, they extend the capacity of the government to strengthen the diaspora's ties to Mali. The French town of Montreuil, for example, launched a development program in Mali's Yelimane region, which is the original home of most of its 6,000 Malian migrants. Approaching these representatives in their respective countries could be a good entry point for companies seeking to boost SPL awareness and sales.

In Mali, distributors of SPLs may be able to connect with these buyers around the time and locations of frequent trips (e.g., school holidays, Ramadan or Tabaski for Muslims, and Christmas for Christians). Demonstrations and sales at the airport around these times could be a very good way to reach the buyers.

An approach like this does need to be thought through carefully and is no guarantee for success as the experience described in Box 1, highlights.

Box 1. Solar Portable Lamps and the Malian Diaspora

One association has started to sell solar portable lamps to the diaspora Malian rural immigrants from the region of Kayes and Segou living in Paris. The project has had limited success so far; approximately 300 lamps have been sold since its inception a couple of years ago.

The association, through an MFI also present in France, reaches out to the Parisian diaspora to introduce the product and build consumer awareness. The immigrants who decide to buy the products transfer the funds to the company's Western Union account in Mali, and the company will then distribute the product to the rural family members. The lamps, sold at 75,000 F CFA (€114.34), are covered by a one-year warranty for manufacturing defaults.

The initiative, although successful so far, is currently limited by the human resources dedicated (2 people – one in Mali and one in Paris) and the relatively high price of the product.

PRODUCTS WHICH ARE COMPARABLE TO SPLS (IN APPLICATION AND CHALLENGES)

DESCRIPTION OF THE PRODUCTS

Based on the criteria that characterize solar portable lamps, the research identified two products as being similar to SPLs. Improved cookstoves and irrigation pumps are both similar to SPLs along a number of dimensions:

- They provide for a basic need and help improve the end-users' quality of life

- They constitute a potential for future financial savings and additional income
- They suffer from limited consumer awareness
- They are relatively costly
- They are (technically) not self-explanatory

Whilst these products may not be the only products meeting all these criteria, the available experiences with these 2 products in Mali provide an opportunity for learning.

DISTRIBUTION MODELS

The distribution models for comparative products illustrated in the tables below are based on insights collected during interviews with AMADER and KickStart.

Table 1. Distribution of improved cookstoves	
Timeline	From 2004
Key partners	AMADER, CARP MALI associated producers of improved stoves

Description of the distribution model	• Local development and production, managed by NGOs, supported by AMADER and executed locally:
	  ○ AMADER partnered with local NGOs that associated local artisans to produce improved cookstoves
	  ○ Local NGOs developed and submitted the project proposal to AMADER for approval and funding
	  ○ AMADER provided financial and in-kind support (e.g. raw materials) on an individual case basis
	  ○ The program has developed different types of improved cookstoves; local producers align production to the standard and quality required
	• Distribution driven strongly by local awareness efforts, using local fairs and associations, and "seeing is believing":
	  ○ Communication, awareness of local communities, and participation in local fairs are important components of the program to guarantee uptake
	  ○ CARP brings together women's associations and sets up "culinary demonstrations" to illustrate the value and quality of improved cookstoves. During the show the same meal is cooked using a traditional cookstove and the improved ones; the potential consumers have the possibility to cook themselves and try the dishes at the end. The comparative test helps to communicate the message and build consumer awareness
	  ○ CARP employs an "animation team" which participates in rural fairs and markets and organizes comparative tests and culinary demonstrations to build awareness not only amongst consumers but amongst distributors as well
	• Cooperatives and associations generally extend a 3-4 month-long credit to consumers
	• The products are covered by a warranty, but maintenance is minimal
	• Retail prices for improved metal cookstoves with ceramic inserts currently available in the market range from 1,500 FCFA to 5,000 FCFA (€2.29 - €7.62)

Outcomes	Over 1.3 million improved cookstoves have been distributed since the beginning of the program, across a wide range of areas (Bamako, Sikasso, Ségou, Kayes, Koulikoro, Mopti, and Gao)
Lessons learned	Success factors • Diversification of promotion strategies and frequent physical/ local demonstrations • Motivation of outlets and groups responsible for distribution • Affordability and the importance of timing sales to when people have cash – promotion and marketing campaigns should be mainly conducted when the farmers/rural inhabitants have liquidity to buy the products in cash (linked to harvesting seasonality), which avoids the need for credit and increases sales Challenges • Product acceptance by the population • Establishment of a system of credit for the purchase of equipment • Involvement of local structures for support Lessons learned • Increase the number of points of sales locations • Increase activities and demonstrations to boost sales • Participation in fairs and exhibitions • Lack of consumer finance and trade finance to support the sales, even when tapping into harvest seasonality contributes to cases of retailers not paying back the distributors due to lack of cash

Table 2. Distribution of Water Pumps	
Timeline	In Mali since the end of 2004
Key partners	KickStart arrived in Mali as part of a consortium to support development (PRO DEPAN) financed by USAID. KickStart was in charge of mini irrigation. Since then the company has been working in the country distributing water/ irrigation pumps, particularly in rural areas.

Description of the distribution model	• Local product development to ensure it meets demands:
	  ○ KickStart developed two types of pumps dedicated to smallholder farmers with limited resources
	  ○ KickStart has a technology and development center in Kenya; once the products are finalized and the quality certified, the products are produced in China by a third party
	• Distribution from China, using local distributors and a large network of retailers:
	  ○ KickStart imports the products, which are produced in China
	  ○ Distribution is ensured through a network of six distributors and over 100 retailers across the entire country (prior to 2012 the organization was acting as distributor as well, working directly with retailers – this was generating high risks and difficulties in managing cash flow)
	  ○ The retailers are selected based on a series of criteria: (i) experience in

	working with local farmers, (ii) availability of a depot or shop to stock the product, (iii) lack of other retailers in proximity, (iv) financial capabilities ○ The distributors are responsible for collecting orders from retailers one a month; the transport from China takes up to three months • Fixed pricing supported by tax exemption: ○ KickStart has a development objective; the products are exempt from import duties ○ Prices are fixed to guarantee a margin and provide incentives to all players across the distribution chain ○ If a retailer buys the product directly from KickStart the price paid will be the same as a distributor would demand • Substantial investment in marketing and education across the distribution chain: ○ KickStart uses leaflets, t-shirt, caps, advertising billboards, fairs and demonstrations in remote villages, radio and TV ○ KickStart organizes annual trainings for distributors and retailers. The retailers are responsible for explaining the installation, use and maintenance of the products to consumers. Following the introduction, the pumps are easy to install and use, and require minimum maintenance • A variety of credit options for payment to distributors were experimented with, but now an upfront cash payment is required: ○ Before 2008: "depot-vente", the pumps were distributed to retailers but only paid for when the final sale to consumers was completed → many retailers were not paying KickStart back ○ In 2008-2009: "credit system", retailers had 60 days to pay for the pumps, if they didn't, they could not receive a new delivery of products → improved the credit management ○ Since 2011: "cash", the products need to be paid for when delivered; in addition, the distributors need to have the financial capacity to order a minimum of 50 pumps at a time – this limits the financial challenge, but also limits the number of distributors who are eligible • Consumers buy on credit from associations they're a member of, with the associations pre-financing the purchase • The products are covered by a one-year warranty based on a "fiche de guarantie" filled out at the time of purchase. This helps KickStart to collect data on the consumers and the products sold across the country
Outcomes	Over 3,000 water pumps have been distributed so far. Despite almost ten years of activity in the country, there are still many areas that are not aware of the product. KickStart is aiming to continue its expansion in other countries using the office in Mali as the regional center.
Lesson learned	<u>Success factors:</u> • Develop a system of distributors across the different regions: (i) facilitate the service and (ii) decrease the financial risk for the organization – a distributor needs to be able to order a minimum of 50 pumps, reducing the stock held by KickStart

	• Introduce a system based on cash payment: (i) help the different actors to consider the system as a business and (ii) engage other financial actors, such as the bank, in the provision of credit or other financial support • Build awareness at the local level: the investment in marketing, education and training is helping to build product awareness of the advantages and, thus, increasing demand <u>Failures/lessons learned</u> • Lack of consumer finance and trade finance to support the system: provision of credit and financial support to cooperatives and associations may decrease the risk and help build a sense of responsibility. KickStart is in discussion with several MFIs and other financial institutions to see if solutions are possible • Lack of long term engagement and partnerships with large NGOs and funders, that may be able to anticipate and guarantee large orders

IMPLICATIONS/ LESSONS LEARNED FOR SPLS

The experience of improved cookstoves and irrigation pumps reinforces the importance of consumer and retailer awareness building, which requires physical demonstrations. As is being done in the more successful SPL distribution models, these models use local structures (cooperatives), events (fairs, markets etc.) and development partners such as NGOs to double down on this effort.

As experience has shown, timing awareness-building activities and sales to the economic cycle of the target population, is important. Trying to sell when people actually have cash (in the harvest season) and at occasions and locations where they're willing to part with it (such as fairs and markets, rather than on a daily basis at home), will certainly help increase sales and decrease the dependency on consumer credit.

PRODUCTS OR DISTRIBUTION CHANNELS WHICH HAVE ONE OR MORE OF THE CHARACTERISTICS IDENTIFIED AS "KEY SUCCESS FACTORS FOR DISTRIBUTION"

DESCRIPTION OF PRODUCTS

As the products differ for each of the success factors, this section will follow the structure of those 3 success factors. Across the different models, a mix of products emerges, including existing successful SPL models, the improved cookstoves as described in the previous section, and higher-end cosmetics, pharmaceutical products, and cleaning products.

INTEGRATION OF MARKETING AND SALES

DISTRIBUTION MODELS AND THEIR DRIVERS IN RURAL AND URBAN MALI

Face-to-face/ door-to-door sales offer the opportunity to do extensive explanation/ demonstration – although it's not a guaranteed solution. Table 3 below describes the current practice for such sales in rural and urban Mali.

Table 3. Characteristics of Face-to-Face Sales in Rural and Urban Areas

	Rural	Urban
Type of product	• Cheap and low quality products, typically not requiring awareness-building or explanation • Electronic products. E.g: batteries, torches ,radio	• Pharmaceuticals, cosmetics, household cleaning products
Companies/ organizations	• Products are sold by individuals sellers or informal companies in the vast majority of cases	• Limited number of companies • Products are sold by individuals sellers or informal companies
Price range	• Variety of price depending of the product sold • Torches: from 500 to 12,000 F CFA (€0.76 - €18.29) • Radio: from 2,500 to 15,000 F CFA (€3.81 - €22.87)	• Electronics: from 500 to 15 ,000 F CFA (€0.76 - €22.87)
Marketing activities	• Explanation of the product usage associated with the demonstration to convince consumer of the quality of the product.	• Demonstrations to show the products' uses, characteristics, qualities and advantages • Promotion of specific products to incentivize purchasing
Payment methods	• Cash payment only	• Cash payment only
Warranty and after sales support	• No warranty or after-sales support in the majority of cases	• Only formalized companies offer warranties and after sales support • In this case the clients address the issues directly to the company and not to the seller
Advantages	• Opportunity to become aware of/experience products they did not know before • Savings on transportation costs	• Opportunity to become aware of/experience products they did not know before • Savings on transportation costs (limited)
Challenges	• Not adapted to rural consumers' cash flow context • Door-to-door only works during weekly rural markets when people are prepared to buy	• Market mostly informal • No complaint or support possible in case of quality issues

In rural areas, door-to-door sales are not done because rural inhabitants lack liquidity and aren't willing to make large purchases on a day-to-day basis. Promotions, demonstrations and sales are typically done during the rural fairs and markets organized weekly or through dedicated events in coordination with village associations and elders. Customers at fairs and markets are generally ready to buy products and the markets and fairs represent an opportunity for resellers and distributors to show and demonstrate the quality of the products to a larger number of potential customers and then follow up with interested individual villages. The products that are available on a day-to-day basis in the villages, either in shops or with ambulant salesmen are typically cheaper products for which demand already exists.

In urban areas, several products including slightly higher-end cosmetics, pharmaceutical products and cleaning products are being sold door-to-door with explanation and demonstration. This is done by company-proprietary sales channels: company-trained salespeople who work on commission and typically only sell these products (in contrast to the ambulant self-employed salespeople who sell a range of simple, cheap products not requiring explanation or demonstration). Such products would include, for example, aloe vera products - gels, tablets, and cosmetics. Such proprietary models not only provide opportunities for education and demonstration, but some of them also address the challenge of trade finance by pre-financing the stock for their sellers (which does require significant working capital for the parent company). These models are at present only applied in urban areas, although products do 'trickle down' from there into rural areas. These sellers are usually dedicated to a particular product or range of products and focus their sales on their own social network but interviews revealed that some distributors are open to sellers selling other products as well, as long as they don't cannibalize on the existing range. In general, distributors recruit the sellers through advertisements (radio, posters) and train them in the different techniques of sales and distribution.

SPECIFIC EXAMPLES, FROM WITHIN MALI AND ABROAD, INTEGRATING DEMONSTRATION MARKETING

As we've seen before, the currently limited awareness implies that consumers need to *see* the improved performance of the product to be convinced of its value. Classical marketing channels, such as radio, TV, and merchandising, are useful but not sufficient.

Three examples, which highlight this, are described below.

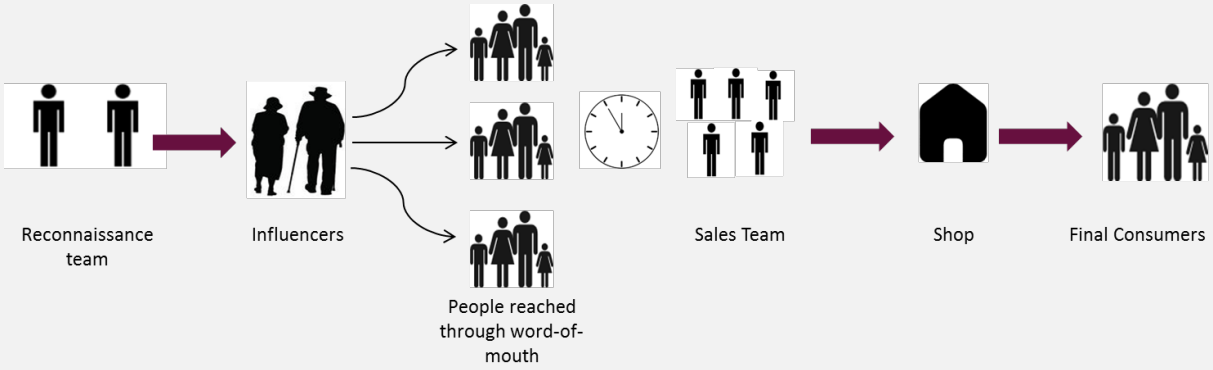
As explained in the previous section, CARP Mali achieved a distribution of over 1.3 million improved cookstoves since the beginning of the program in 2004, including in rural areas. They did so by building awareness through demonstration with both the final customers and potential retailers:

- CARP brings together women's associations and sets up "culinary demonstrations" to illustrate the value and quality of improved cookstoves. During the show the same meal is cooked using a traditional cookstove and the improved ones; the potential consumers have the possibility to cook themselves and try the dishes at the end. The comparative test helps to communicate the message and build consumer awareness
- CARP employs an "animation team" which participates in rural fairs and markets and organizes comparative tests and culinary demonstrations to build awareness not only amongst consumers but amongst distributors as well

One company operating in India has an agent-led model where they train women to go into villages and sell SPLs, which has been really successful in India. They successfully tap into the importance of word-of-mouth by focusing first on village influencers, which they seek out to convert to customers. This model is detailed in box 2, below.

Box 2. Door-to-door model

- A new distribution model was developed for distribution of a solar lamp in India because potential customers did not understand how the product worked through traditional radio/print advertisements:
    - A reconnaissance team was deployed in the region of choice, which would target a small number of influencers in that community (at a ratio of approximately 3 influencers for a village of 1500 residents)
    - Once they had sold the product to those targeted customers the team would leave the village for a few weeks so that those targeted customers could create a buzz through word-of-mouth in their social networks about their positive experience with the solar lamps
    - After several weeks the team returned with a larger team, a bigger splash and testimonials from happy customers to set up a show in the village



Codis Solaire (Coopérative de distribution Solaire) is an organization composed of young people dedicated to the promotion of solar products in Mali. Started as an informal entity, the organization became a formal cooperative in March 2013 with the support of a solar energy manufacturer. Codis Solaire promotes products and services provided by this manufacturer through marketing activities, distribution of product brochures to corporations, NGOs and individuals. Once the contract between the third entity interested in solar products and the manufacturer is formalized, Codis Solaire is paid based on a commission. Due to the infant status of this new partnership, activities have not started yet.

IMPLICATIONS/ LESSONS LEARNED FOR SPLS

Whilst there's no "shortcut" that allows for awareness building in a much more efficient way, SPLs can learn from these experiences. Opportunities exist to:

- Tap into existing company-driven proprietary urban networks (if open to them) and achieve a rural trickle-down from there
- Create their own proprietary commission-driven networks, either with dedicated sales staff in urban areas or with rural cooperatives and associations. The latter are prepared, in exchange for a small fee (~1,000 CFA, or €1.52) to promote and resell the products locally. In working with these, it can be particularly useful to seek the main influencers and create word-of-mouth from their experience
- Work together with other organizations that promote and distribute other products rurally.

- Continue to participate in rural fairs and markets as opportunities for demonstration/ education and sales

In regards to the challenges of affordability and awareness, there is an opportunity to expand the product range to more closely respond to a direct and explicit need. Expanding the product range to include cheaper solar torches as well as solar operated or charged radios is likely to meet a direct and explicit need and fuel demand pull, as shown in table 4, below. Box 3 highlights the benefits radio has had in one community.

Table 4. Opportunities to Expand the Product Range to Respond to Need

Product	Current use/availability	Opportunity going forward
	• A wide variety of supposedly low-quality solar torches under $ 10 is available. • All consumers own and use torches, even when Lighting Africa SPLs are available (e.g., to go into the field at night, whilst SPL stays in the house)	• Good quality solar torches can complement the current use for existing SPL owners, further paving the way for solar products and provide solar options for the poorest
	• Radios are very important in Malian life (radio ownership is 20% vs. 10% average in Africa) • This is being recognized by importers who use radio as the main medium for advertisement.	• Radio is likely to play a key role in further building awareness • The opportunity to operate/ charge radios via solar power (rechargeable batteries or combined lamps/ powers) could be introduced as an additional application • The sales channels for radios may be useful for solar products as well

Box 3. Community Radio Station Enhances Life in a Poor Region of Mali

Radio Daande Douentza has been broadcasting from the small town of Douentza in Northern Mali since 1993. It serves a semi-arid region of subsistence agriculture - most of the population are poor farmers or herders. The radio station broadcasts many types of announcements, entertainment, local music, development issues, education, and community news. About 86% of the local population are regular listeners. After Radio Douentza went on-air, radio ownership in the area is estimated to have jumped by 140%.

Save the Children Fund, which studied knowledge about AIDS prevention in the whole Mopti region, found that those exposed to the radio station were much better informed about AIDS than other areas outside the station's range: 70% of those reached claimed radio as their main source of information. Furthermore, literacy classes had an increase in attendance of nearly 120% after radio announcements (Myers, 2001).

INTEGRATION OF PRODUCT FINANCE

Perhaps counter-intuitively, affordability is still a primary impediment for potential SPL consumers. Although SPLs clearly save costs in the longer term as they avoid the recurring costs that the lighting alternatives entail (where new kerosene, candles or batteries need to be continuously bought), few consumers have the comparatively higher up-front purchase amount ready without dedicated saving or a loan. The need for trade finance is obvious – since SPLs aren't cheap, retailers will need to have sufficient financing to pre-finance their own stock.

Integrating finance into distribution will enhance access to consumer and trade finance and thus product uptake by retailers and consumers alike. This can be achieved through a variety of means, including different credit/ loan options, postponed payment/ an extended payment term, as well as the opportunity to pay in installments and support for saving for the purchase.

In Mali, no formal consumer credit exists with shops or MFIs (it does exist with commercial banks, but only for salaried employees with a bank account). That said, a variety of more informal opportunities exist. Table 5 below, gives an overview of existing credit practices and opportunities. It must be noted that no existing successful distribution models that SPLs can simply tap into were identified and the development of these opportunities will continue to require a significant effort. The remainder of the section details the opportunities for further integrating finance into distribution, and provides examples.

Table 5. Overview or Existing Credit Practices and Opportunities

		General practice on consumer credit in Mali	Current practice with respect to SPLs in Mali	Opportunities to enhance access to finance for consumers
Trade sector	Shops	• No formal consumer credit system (no standard installment-based payment option) • Shops may grant credit on an individual trust-basis	• Occasional trust-based credit • Shops more likely to provide credit if backed by trade credit from supply chain or if supported by NGO investment	• Work with supply chain (preferably backed by their own trade finance) to enable consumer credit
Financial sector	Informal	• Well-established practice of credit and saving circles, both for predefined goals and 'general' saving instruments	• Isolated examples of use of savings circles for SPLs • No dedicated circles for SPLs yet	• Work with NGOs/ village elders to help build and strengthen dedicated saving/ credit circles • Define credit schemes that provide an incentive for the saving/credit circles and associations to promote the products amongst their members (e.g. margin on consumer price is kept by the associations)

	MFIs	• Can provide credit to buy products, but only if product has a 'commercial objective' (e.g., if people use phone charger to set up shop at a local market to charge phones)
		• If loan is granted, 10-15% upfront payment is required and loan duration is <3 months
			• Isolated examples of consumer loan for commercial use
			• Use is limited due to the high interest generally charged
				• Partner with MFIs to support access to lines of credit
				• Distribution chain to work with the MFIs that are already providing loans to think through economics of "saving on expenses" as a basis for a loan, rather than income generation
				• Distribution chain to help MFIs build knowledge of the people who will benefit from this credit to reduce the risk of non-payment - this can be done with the help of local NGOs/associations
				  • Organize potential consumers in groups, associations
				  • Ensure members who receive credit are former members to guarantee solvency (credit history)
				  • Ensure credit is not used to trade
				  • Guarantee consumer price

	Commercial banks	• Consumer credit available for a small subset of potential customers: (i) People with a formal employment contract with a company recognized by the bank, (ii) People with a bank account with the bank	• No practice of credit for SPLs	• Distribution chain to work with commercial banks to secure trade finance for working capital • Distribution chain to work with commercial banks to secure trade finance for microfinance institutions

Saving and credit circles can be key partners in the distribution of SPLs and could be used more widely. Their local presence, long-term knowledge of the members and the financing scheme help overcome some of the most critical challenges faced by MFIs, which are often hesitant to provide finance if there's no history of credit repayment. Once awareness has been built and consumer demand for SPLs has grown, dedicated saving and credit circles for SPLs can be set up. Until then, existing circles could be deployed for SPLs and can be a viable entry point for MFIs into the particular community.

Similarly, **local associations,** cooperatives and groups organized in tontine often pre-finance the purchase of sold lamps and are repaid by the members[22]. This upfront financing can either be based on existing member payments or on the association taking out a loan from an MFI. Since the loan will be larger than individual loans and the association is a more trustworthy partner than an unknown individual, MFIs are more likely to extend loans to these associations than to individuals. The associations' broad availability and well-established networks are key assets to tap into for integrated product finance.

A good example of this is the practice of Kickstart, an organization that distributes irrigation water pumps dedicated to small farmers, which works with cooperatives and associations and individual producers. Kickstart has established a network of distributors and resellers, which is managed by the private sector based on a credit system where the association buys the products for its members who must repay the association / cooperative. To reduce the financial risk (with the sale on credit to farmers) and create a sense of responsibility within the organization, KickStart directs farmers interested in pumps to microfinance structures or banks. This program has allowed KickStart to distribute 991 water pumps in Mali from June 2011 to July 2012, the majority of which went to rural areas.

Microfinance institutions

There is a keen interest from **microfinance institutions** to provide loans to consumers for the purchase of goods, but the actual implementation of a credit scheme rarely takes place for several reasons, show in table 6.

Table 6. Impediments to the Implementation of a Credit Scheme

Limited cash flow to support extended consumer financing scheme	**Lack of knowledge of products** which does not allow a proper assessment of credit risk	**Lack of knowledge of potential consumers/clients** which reduces trust
		

As described above, associations and credit/ saving circles can help to build knowledge of potential consumers/ clients, but this will always be a time consuming effort especially if MFIs aren't present in a

[22] It combines features of a group annuity and a lottery. Each subscriber pays an agreed sum into the fund, and thereafter receives an annuity. As members die, their shares devolve to the other participants, and so the value of each annuity increases. In Francophone cultures, particularly in developing countries, the meaning of the term "tontine" has broadened to encompass a wider range of semi-formal group savings and microcredit schemes.

certain location yet. A faster rollout could be to work with MFIs who have already shown a willingness to finance SPLs if there's a clear income-generating aspect to it (i.e., those with a phone charger). They might be educated, in those areas where they're present, to use the economics of saving on expenses rather than generating income as the basis for the loan.

A third option is to build on experiences from microfinance institutions elsewhere. For example, one solar company in Uganda has set up a scheme in which (existing/ present) MFIs finance household goods and/ or top up existing loans to enable SPL purchases. They have partnered with select distributors. This channel, detailed in Box 4, while not widespread, can be explored for reaching certain geographies within Mali – again, most likely to be successful for existing/ present MFIs.

Box 4. Innovative Financing Model in Uganda

- Systems are sold on a 12-month hire purchase agreement. Once the full payment is made the ownership is transferred to the customer
- A 25% down payment is required (this is around the figure that farmers can afford). The system is installed in 14 days. The credit can be additional to a pre-existent MFI credit to reduce transaction costs
- System inspections are carried out at 30 days and 3 months after installation
- As people are often suspicious of solar power systems, due to bad experiences with poor quality, a warranty provides assurance for their investment
- It is easy to upgrade to additional power (i.e. from 40W to 80W) by signing another 12-month agreement to cover the cost of upgrade with payments being slightly lower than the initial 12-month agreement. This stimulates on-time payment and offers reassurance that the customer has a proven credit record

The experiences of one solar distributor show the challenges of involving MFIs. This distributor is currently working with KIVA, a microfinance institution, to develop a credit scheme for the distributors, which aims to address working capital issues. They have also tried to establish a partnership with Mutual CAMEC, working in the education sector with nearly 8,000 members, Union of Mutual Funds for Education and Culture, and the NGO OIKO that finances associations of wives. Unfortunately, none of these partnerships has been concretized due to the challenges listed above.

IMPLICATIONS/ LESSONS LEARNED FOR SPLS

Opportunities exist to tap into largely informal financing mechanisms:

- Work with local associations and cooperatives to employ existing credit and saving circles
- Once awareness has been built and demand pull has been generated, work with local partners to set up dedicated credit and saving circles
- Work with MFIs already present in target areas, to expand their provision of credit by
    - Topping up existing credit for the purchase of SPLs (reducing transaction costs)
    - Educating MFIs to use cost savings as a basis for credit provision rather than additional income
    - Working with local associations and cooperatives to build MFI knowledge of and trust in the repayment behavior – by e.g., having associations/ cooperatives as MFI customers or linking them to existing credit/ saving circles

- Work with commercial banks (only for distributors/ importers) to set up trade finance and/ or provide a credit line for MFIs

PROVISION OF AFTER-SALES SUPPORT

It may sound obvious but to build confidence in a nascent market, products with low failure rates and a simple warranty policy should be promoted, helping build confidence in retailers and consumers alike.

The Lighting Africa products are all covered, at minimum, by a six-month warranty, but this is not sufficient to guarantee efficient and effective after-sales service because the process to claim the warranty is often tedious. Table 7, below lists some examples of current warranties.

Table 7. Examples of Current SPL Warranties

Warranty	Warranty conditions/process
2 years	• Customers get replacement straight at reseller, who then returns faulty product to distributer • The distributer collects faulty products and sends them back to the manufacturer – distributer is not allowed to open the lamps or try to repair them • The manufacturer replaces the lamps in the following delivery
1 year	• Customers are supposed to get replacement straight at retailer/ distributor – exact practice unclear because of company's limited presence in Mali
6 months	• For one company the warranty starts from the moment the products are delivered to the distributors which limits the actual warranty period for consumers • In a pilot project in Mali the warranty required filling out a form of ~20 pages in English and send to Australia
3 months	• Customers need to bring the product back to the shop to get a replacement

In other countries, a company that is also active in Mali provides the distributors with extra stock, approximately equal to 3% of the order, to allow for immediate replacement when needed. The cost for the extra products is covered as part of the after-sales and customer services provided. This is not the case in Mali, but another company does ensure sufficient stock for immediate replacement.

4. CONCLUSIONS AND RECOMMENDATIONS

Learning from the existing distribution, the challenges faced, and comparable products, potential entry mechanisms to increase (rural) SPL footprint in Mali include the following, all of which are suitable for the current market circumstances of (very) low awareness:

- Work directly with rural populations:
  - First and foremost, continue to expand the current approach with high effort in local demonstrations in a village-to-village approach, combined with immediate-exchange-warranty, and trade finance to resellers
  - Work with local cooperatives as commission-based sales channels to expand rural footprint and make rural presence more continuous, financing the cooperatives' stock to avoid high risk/ working capital requirements for the cooperatives
  - Explore opportunities to cross-sell SPLs in existing sales networks, such as co-selling with e.g., improved cookstoves, irrigation pumps, and water filters
  - Expand opportunities for consumer credit:
    - Work with local credit and saving circles to either employ existing circles for SPLs or set up new structures dedicated to SPLs
    - Work with locally present MFIs to build loans for SPLs:
      - Get them to top up existing loans for SPLs (reducing the burden of transaction costs)
      - Get them to start granting loans not just based on income-generating characteristics, but also based on cost-saving characteristics
    - Work with local cooperatives to involve MFIs who aren't present yet:
      - By providing guarantees and safeguards for MFIs as a basis for consumer loans
      - By acting directly as the MFI client, reducing the burden of transaction costs (as amount is higher) and the default risk (as an established organization rather than an unknown individual). Once loan is granted to cooperatives, they can on-lend to members

- Capitalize on the rural-to-urban distribution and particularly the diaspora in a variety of ways:
  - Continue to expand the current approach of awareness-building amongst rural populations, e.g. in youth hang-out places during black-out nights
  - Explore opportunities to cross-sell SPLs in existing proprietary sales networks, such as with pharmaceutical products in urban areas
  - Build own urban proprietary sales network of commission-based resellers with a particular focus on (returning) diaspora to achieve a trickle-down to rural areas
  - Approach the diaspora abroad through the Haut Conseil des Maliens de l'Exterieur and potential other (social) networks to build their product awareness
  - Subsequently, ensure product availability at the right times/ places when diaspora return to Mali (such as at airports around the major holidays)

Given the low awareness, the substantial costs involved in awareness-building and the limited liquidity and purchasing power of the rural Malian population, an approach which deploys partnerships is likely to work better than a pure private-sector player. This can include a private sector player working with an NGO, government or donor in awareness-building opportunities or a social enterprise which, in and of itself, integrates and balances commercial and social interests.

ANNEX 1. DETAILS OF PLAYERS

A more detailed overview of each of the key players is included below.

Overview	
Name of the entity	**NOTS**
Type of entity	NOTS overall is a social enterprise. Legally, there are a few different entities to split the association (NGO type) from entities which are allowed to make a profit (SARL) and invoice distributors and retailers
Key role	NOTS is a distributor of SPLs in Mali. NOTS is very actively involved in awareness-building and marketing for its distributors
Location/Geographical focus	Regions: Kayes, Koulikoro (Bamako), Sikasso, Segou, Mopti
Maturity	• NOTS started to work in Mali in 2009-2010 • First in rural areas, operations in Bamako since February 2013 • Parent company NOTS Foundation was founded in 2003
History and development	The Dutch-based NOTS Foundation set up NOTS Mali SARL in 2011, to promote and sell solar LED lights. NOTS Mali has been set up to primarily execute two main activities: • Setting up a distribution channel to sell and promote solar LED lights with phone chargers. The ambition of NOTS Mali is to have all kerosene lights in Mali replaced by solar LED lights • Developing a scalable business model to stop fuelwood-driven deforestation in Africa through the development of a new programs to produce charcoal (encompassing total value chain care by communities, incl. reforestation)
Contact	•
Contact person	Mr. Badara Konate, Director
Contact details	badara.konate@notsmali.com
Quote	« There are not yet any microfinance institutions established in Mali that offer financing directly to consumers for the purchase of solar lamps. Currently consumers of SPLs access credit through their associations or groups organized into tontines. Associations pre-finance the purchase of lamps and members repay the loan directly to the association. NOTS is currently working to build an agreement with the microfinance institution KIVA, but this will only provide access to credit for distributors."[23]

[23] Original quote: « Il n'y a pas encore d'institutions de microfinance mises en place au Mali qui offrent des financements directs aux consommateurs pour l'achat des lampes solaires. Actuellement les consommateurs de lampes solaires portables accèdent au crédit par le billet de leurs associations ou groupements organisés en tontine. Les associations préfinancent l'achat des lampes et les membres remboursent le crédit directement à l'association. NOTS est actuellement en train de monter un dossier avec l'institution de micro finance KIVA mais ce sera uniquement pour l'accès au crédit des distributeurs »

Overview	
Name of the entity	**Horonya**
Type of entity	Private sector
Key role	Horonya is a privately- owned importer and distributor of solar products, including portable solar lanterns.
Location/Geographical focus	Shops in Bamako and Kai Country distribution, although it lacks a dedicated sale force
Maturity	Mr. Doucoure, the owner, started to sell solar panels in 1990
History and development	In addition to importing and distributing solar products, Horonya installs solar kits in rural areas together with AMADER. Large international manufacturers have been using Horonya to enter the market.
Contact	
Contact person	Mr. DOUCOURE Bakery – Owner
Contact details	Telephone: +223 20 22 75 92
Quote	"There is a general lack of technical knowledge on solar products. Repairs. Often spend 30 minutes on the phone explaining to people how to use the products."

Overview	
Name of the entity	**Mali Folkecenter Nyetaa (MFC)**
Type of entity	Malian NGO
Key role	Promotes the sustainable management of natural resources and the use of these resources to catalyze local economic growth & sustainable development by working in partnership with rural populations and local entrepreneurs
Location/Geographical focus	Bamako, Mali
Maturity	Set up in October 1999 as an agreement between the Malian Government and the Folkecenter in Denmark. The agreement was that the Folkecenter could contribute its know-how and experience to implement rural development projects in Mali.
History and development	Mali Folkecenter opened in July 1999 at the invitation and request of the Malian president. Since 2009, the MFC has been organized into three programs: Local Economic Development, Good Governance and Decentralization, and Environment, Energy and Climate Change. The MFC has also elaborated its 5-year plan for the years 2009-2013 with specific objectives and intervention areas, designed to meet the needs of MFC's most important partners - the rural and peri-urban populations with which MFC works.
Distribution model	
Outline of distribution model	MFC has been involved in a pilot to distribute SPLs rurally. They worked with both MFIs and women's associations to help build awareness and get first sales off the ground. MFC is not involved long-term in SPL distribution or sales.

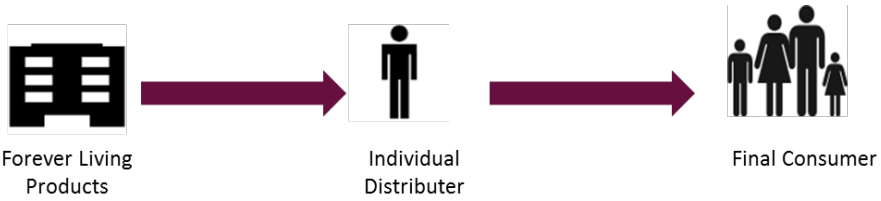
Credit/ financing scheme	• Does not provide credit directly to consumers • Links community associations with microfinance institutions • Creates partnerships with community associations that provide credit to their members
Warranty and maintenance	• Provided by manufacturer through the local distributor • In the pilot run by MFC, no less than ~20% of the products were faulty, but claiming the warranty required consumers to fill out many papers (in English) and send those to an Australian address – which hasn't supported building trust in the product
Involvement in awareness building	• Promotes and raises the awareness of microfinance institutions on opportunities offered by solar products • Raises consumer awareness on solar products and suggests a system of flexible payment
Strategic considerations	
Challenges faced	• Quality of the product, ~20-30% of products broke down within 1-2 months. Warranty required people to fill out ~20 pages and send to Australia – customers are discouraged and it doesn't work in practice • Access to finance for the consumers. MFIs (in regions where there were no cooperatives with credit circles) charged too high an interest rate
Ambitions and strategic plans	Whilst MFC has no direct involvement right now in SPL distribution, the pilot has taught them a number of lessons which are crucial for future projects: • Demonstration of the products, to familiarize consumers needs to be done by people that the consumers or cooperatives know and can identify, to make sure it's credible • Payment modalities – going forward would like to create true broad dissemination. A socio-economic study is needed to understand capacity to pay • Providing products that have an income generating option (e.g. phone charger). Even if all people in a village have the lamp, there's still an income generating option by taking the lamp to weekly markets and offering to charge phones there
Contact	
Contact person	Mahamadou K. Diarra, Program Coordinator
Contact details	Mali-Folkecenter Nyetaa www.malifolkecenter.org BP:E 4211 Bamako (Mali) Tel: +223 2020 0617 Port: +223 67899917 Skype: mahamadou.diarra Email: mahamdou.diarra@malifolkecenter.org
Quote	Mr. Mahamadou Diarra: *The credit formula I would recommend to a consumer is to pay 'half cash - half credit' because of all the models I've encountered this is the one that works best for the following reasons:*

	- The person is assured that they have already purchased half the product *- The person does not feel the weight of too much debt* *- Interest is only charged on half the price of purchase*[24]

[24] Original quote: *«La formule de crédit que je recommanderai à un consommateur est le paiement « moitie cash - moitie crédit » car de tous les modèles que j'ai rencontré c'est celui qui marche le mieux pour les raisons suivantes: La personne est sure qu'elle a déjà acquis le produit de moitie ; La personne ne ressent pas trop le poids du crédit ; L'intérêt n'est chargé que sur la moitié du prix»*

ANNEX 2. DETAILS OF PLAYERS DEPLOYING DISTRIBUTION MODELS THAT SPLS COULD TAP INTO OR COPY

Overview	
Name of the entity	Forever Living Products
Type of entity	Private sector
Key role	Forever Living Products is the world's leading producer and distributor of aloe vera products - gels, tablets, cosmetics
Location/Geographical focus	9.5 million distributors in over 145 countries Offices in Western Africa: Senegal, Ivory Coast, Ghana, Togo, Nigeria
Maturity	Founded in 1978
History and development	A multi-level marketing company that sells aloe vera-based drinks and bee-derived cosmetics, nutritional supplements, and personal care products.
Distribution model	

Outline of distribution model	• Forever Living Products is structured as a multi-level marketing company
	• Any individual who would like to become a distributer registers with the company and goes through a training on the company's products
	• The distributor then purchases "packages" from the company, which contains a variety of the company's products
	• The independent distributor is free to sell to any consumer
	• Established training materials, marketing plan and bonus/remuneration structure – incentivize distribution: *"The harder you work, the more money you make"*
	• New distributors are recruited directly by the current distributors – *Network marketing*
	• Sales staff get products at wholesale prices, and earn up to 43% when they sell them at retail prices
	• In addition:
	  ○ Personal Bonus of up to 18% for sponsoring each new distributor and helping them make sales
	  ○ Group Volume Bonus of up to 13% on each team member as distributors develop into Assistant Supervisors, Supervisors, and Assistant Managers
	  ○ Leadership Bonus for every manager in the downline, starting at a 2% bonus and going as high as a 6% bonus depending where they are positioned in the organization
	 

Credit/ financing scheme	• None, cash payments only
Involvement in awareness building	• The awareness building is mainly done through *word of mouth* • The distributor's network is an important asset to ensure awareness building
Detailed facts	
Size	
Number of employees	• Approximately 30,000 independent distributors between Senegal, Mali, Mauritania, Guinea Bissau, Guinea and Gambia
Product lines	A variety of aloe vera-based drinks and bee-derived cosmetics, nutritional supplements, and personal care products
Strategic considerations	
Opportunities going forward	Distributors can sell other products as long as these products do not compete with Forever Living Products. There is an opportunity to explore a collaboration with the Forever Living Products network for the distribution of SPLs.
Contact	
Contact person	Country Manager: Biram Fall Marketing Manager: Oumar Sall
Contact details	Phone: (+221) 869 3940 Fax: (+221) 820-6691 Email: bfall@foreversenegal.com Email: osall@foreversenegal.com

Overview	
Name of the entity	Mali Tali
Type of entity	NGO/ Microfinance
Key role	Sales of solar portable lamps to the Malian diaspora living in Paris, for their families living in rural areas in Mali.
Location/Geographical focus	Region of Kayes and Segou in Mali, targeting Malian rural immigrants from these regions living in Paris.
Maturity	<2 years
Distribution model	
Outline of distribution model	• The association, through a local MFI present in France, reaches out to the Malian diaspora to illustrate the product and build consumer awareness. The immigrants who decide to buy the products transfer the funds to a Western Union account in Mali owned by Mali Tali, who then distributes the product to the rural family members • The initiative, although successful so far, is currently limited by the human resources dedicated (2 people – of which one is in Mali and one is in Paris) and the relative high price of the product
Credit/ financing scheme	• None
Warranty and maintenance	• One year warranty for manufacturing defaults
Involvement in awareness building	• The organization uses the Malian diaspora in France to build consumer awareness and illustrate the advantages (e.g. savings, improvement in health, better education) for the family living back home
Detailed facts	
Number of employees	• 2-3
Product lines and price	Schneider In-Diya - 75,000 F CFA (€114.34)
Strategic considerations	
Challenges faced	• Limited outreach • Current unstable situation in Mali – the last delivery was sent to Burkina Faso due to local instability • Relatively high price
Ambitions and strategic plans	• Expand outreach in France outside the community living in Paris and its surroundings
Contact	
Contact person	Madame Sira Soumare
Contact details	Telephone: (+223) 76 11 73 74/ 66 58 34 35 Email: siraoum@yahoo.fr

ANNEX 3. PHONEBOOK

A detailed contact list of key players at every stage of the supply chain for solar portable products in Mali has been assembled. The table below presents the categories that are covered in this (Excel-based) contact list.

Group	Name of entity	Role played in value chain	Contact person & Position	Location/ Geo. Reach	Email	Address
Social enterprise	NOTS (Not One the Same)	Large-scale distribution of solar LED lights with phone chargers and microfinance services	Mr. Badara Konate/Director Mr. Sidibé and Mr. Haidara/Regional Account Managers responsible for Sikasso and Segou regions in Mali	Bamako, Mali	badara.konate@notsmali.com	NOTS Mali SARL, Badalabougou, Rte palais de la culture, Rue 113 Porte 1282, Bamako – Mali +223 72 48 43 81 http://www.notsmali.com Badalabougou Sidibé Kandian (Sikasso): +223 77 59 20 09 / + 223 66 90 61 10, and Mahamoudou Haidara (Segou): +223 76 13 11 66 / +223 63 55 50 44.

ANNEX 4. DETAILS ON THE CHALLENGES FACED BY SPLS

LOW AWARENESS

Low awareness from consumers and retailers leads to a lack of pull from both. "Seeing is believing" is crucial – communication via mass media or leaflets, whilst helpful, is insufficient to create pull and, thus, needs to be complemented by door-to-door in-person distribution and marketing.

	Challenge	Illustration
Consumers	• Rural consumers who had not been introduced to SPLs by either sellers or NGOs, often were not even aware of the existence of the products	"The first time I heard about solar lamps is when NOTS organized a demonstration event in our village" – *Habitant of the village of Kaledougoi/ Yorosso*

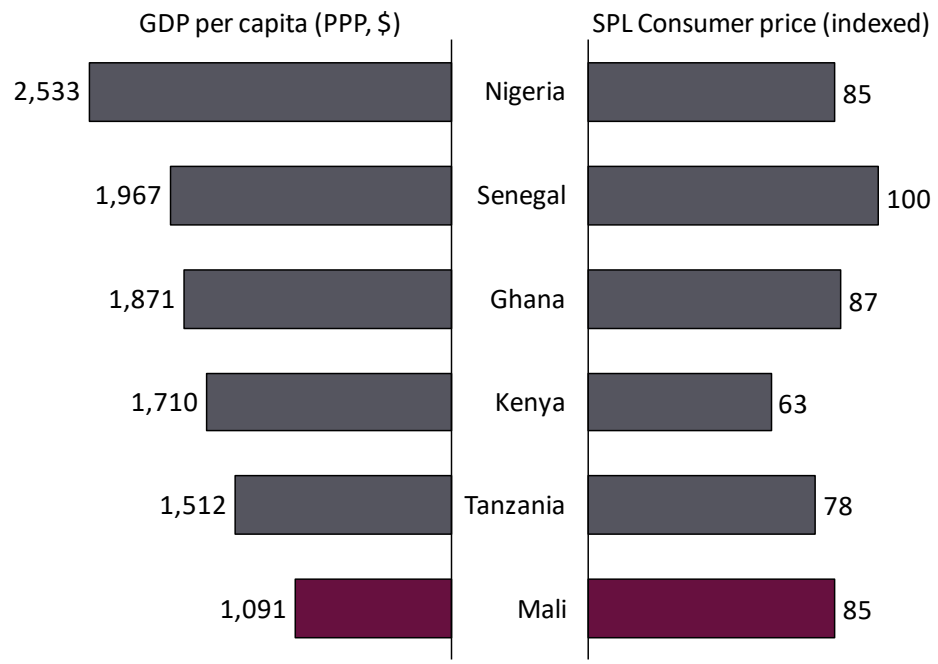
	• It's not enough to just tell:
	  • Consumers who have not had the opportunity to *use* SPLs do not believe in the long-term financial benefit
	  • Consumers don't see the environmental and health benefits until they use an SPL
		"I was sceptical about the value of the lamp; I did not believe it was going to work…We are now thankful to the solar lamps. Since the villagers started using them there are less babies dying at night from breathing petrol gas" – *Chief of the village of Kaledougoi/ Yorosso*

Retailers	• Retailers, particularly in rural areas, even if aware of the existence of SPLs often do not believe in the market potential for these products	"The first 2-3 times [the Account Manager for the region of Sikasso] came to my shop I did not want to listen to him and drove him out of my shop. So many people come to offer products but so few products will actually sell. He kept coming back and thanks to his persistence and eloquence, I was convinced to buy one lamp and try it. I was very happy with the product and impressed by its usefulness and good quality. This is what convinced me to start selling solar lamps. Today lamps are one of the most sold products in my shop. I have never hear that one of my customer was unhappy after he bought one lamp in my shop" –*distributor in Bougouni*

LOW AFFORDABILITY AND LIMITED ACCESS TO FINANCE

Low affordability and limited access to finance for consumers and retailers/resellers leads to limited uptake, even when people do know the product. Limited access to finance for retailers/resellers also leads to supply chain stock-outs.

Upfront affordability of SPLs for consumers is a particular issue in Mali, given its much lower income level than other African countries with similar consumer prices.



Source: Interviews with SPL producers, Global GDP statistics

From a wide range of interviewees, we heard about both the challenges of access to finance as well as the opportunities that credit provides. The opportunities include a variety of (informal, trust-based) options all working around the lack of a formal consumer credit system.

	Challenge	Illustration
Consumers	• All consumers interviewed mentioned the cost of the SPLs as one of the main obstacles to purchasing them. Even when consumers are aware of the products and their value, access to finance to cover the high upfront costs was quoted as a key barrier	"We are willing to buy more products if we can pay on credit. We have used them and we know it's worthy" – *Man of the village of Kaledougoi/ Yorosso* "Payment in installments over time is critical to create true broad dissemination" – *Mr. Mahamadou Diarra, Director of MaliFolke Centre*
Retailers	• Working capital requirements to finance the pipeline of products represents a significant constraint for distribution and volumes	"We are working using our own financial resources and we buy the products that we can afford. With better access to capital we will be able to order more and better quality products" – Mr. Abdoulaye Toure, TPBAT CO "Since January 2013 we have already had 20 days of stock-outs driven by working capital limitations. We expect a full week – 10 days in June" – *Mr. Badara Konate, Director of NOTS*

The existing practice of consumer credit is very informal. A number of options can be tapped into, but none of them will be able to build on a strong existing practice.

		General practice on consumer credit in Mali	Current practice with respect to SPLs in Mali
Financial sector	**Shops**	• No formal consumer credit system (no standard installment-based payment option) • Shop may grant credit on an individual trust-basis	• Occasional trust-based credit • Shops more likely to provide credit if backed by trade credit from supply chain or if supported by NGO investment
	Informal	• Well-established practice of credit and saving circles, both for predefined goals and 'general' saving instruments	• Examples of use of savings circles for SPLs • No dedicated circles for SPLs yet

	MFIs	• Can provide credit to buy products, but only if product has a 'commercial objective' (e.g., if people use phone charger to set up shop on a local market to charge phones)
		• If loan is granted, 10-15% upfront payment is required and loan duration is <3 months
			• Isolated examples of consumer loan for commercial use
			• Use is limited due to :
			  • Low willingness to participate from MFIs due to high risk
			  • High interest charged

	Commercial banks	• Consumer credit available for a small subset of potential customers:
		  • People with a formal employment contract with a company recognized by the bank
		  • People with a bank account with the bank
			• No practice of credit for SPLs

In a market where credit is so nascent and so trust-bound, it is crucial to develop solid systems that avoid failures or perverse incentives, e.g., by not providing credit in cash (which creates an incentive to spend differently).

A specific example is provided by a failed project between the **Rural Energy Foundation** (REF) and a provider of SPLs, which fell flat because of vendors not paying the supplier.

Description

- The Rural Energy Foundation's project aimed to select young vendors in rural areas to become re- sellers of solar torches
- To overcome the financing issues, REF engaged an MFI that provided credit to the re-sellers to purchase the SPLs

Outcomes

- The project did not achieve the expected outcomes because the re-sellers never used the credit to pay for the product received

Lesson learned

- If the MFI had paid the supplier directly from the re-sellers loan, without physically transferring the funds into the re-sellers hands, it could have worked. Given the limited (pilot) timeline for the project, this could not be tested as an alternative

LIMITED AFTER-SALES SUPPORT STRUCTURES

After-sales support structures are limited. Products requiring localized maintenance or a time- and cost-consuming warranty process discourage consumers and retailers.

	Challenge	Illustration
Consumers	• The process to get distributor and manufacturer support (e.g. warranty claims) is often complicated or not existent • Generally the manufacturer provides warranty to the distributors who should be the point of contact in the country. However the system does not work, as either the distributor may refuse to substitute the product or the procedure for the warranty is too complicated	"In a pilot project run by our centre, no less than ~20% of the products were faulty, but claiming the warranty required consumers to fill many papers (in English) and send those to an Australian address – which hasn't supported building trust in the product" - *Mahamadou Diarra, Director of Mali Folk Centre*
Retailers	• Most of the retailers started to sell solar products in a very passive way with a lack of clear understanding of the product, its use and advantages • Given the low availability of the product right now, local knowledge to provide maintenance and after-sales support is limited	"I started to sell solar products without knowing anything about them…I learned with time and by reading a book I received by mail, "*Guide pratique du solaire photovoltaïque*". There are many retailers who like me do not have any knowledge of the product or the market which generates wrong installations, inadequate maintenance and incorrect reparation" – *Daouda Thiam, Thiam Energie solaire*

Although a 20% breakdown rate is too high for such rural distribution, even with better quality products, distributors will need to organize an immediate local replacement and repair center to maintain consumer and retailer trust. The warranty needs to be integrated into the distribution system to establish a trustworthy relationship between the consumer and the retailer.

ANNEX 5. OVERVIEW OF AVAILABLE SPL BRANDS AND PRICES

Product	Price for consumers from retailer (CFA)	Price for consumers from retailer (€)
d.light (S2)	7,000	10.67
d.light (S20)	10,000	15.24
d.light (S300)	17,000	25.92
Barefoot (Firefly mobile family)	14,000 -15,000 14,000 to 16,5000 with MFIs	21.34 – 22.87 21.34 – 25.15 with MFIs
Barefoot (Firefly mobile lamp)	12,000	18.29
Greenlight Plane (Sun King)	12,000	18.29
Horonya (Solar lantern)	17,500	26.68
Indian lantern	19,000	28.97
Schneider Electric solar lantern	75,000	114.34

ANNEX 6. RESEARCH APPROACH AND LIST OF INTERVIEWEES

DOCUMENT REVIEW

During the first phase we focused on web-based research and identified and reviewed existing data and reports. We undertook a review of existing literature, previous studies on the off-grid electrification market, and available statistical studies on Mali.

FIELD RESEARCH

This initial desk review was complemented by on-the-ground field research targeted at the supply chains for solar powered lighting products and comparable goods targeting the BoP. In the execution of this field research, we worked with local surveyors who collected data in the field.

Our team was also on the ground to conduct the key interviews and stayed close to the data collection. We used a variety of instruments – most notably questionnaires, interviews and observation. To enhance quality and comparability, we developed standard approaches and an accompanying data collection manual for use by the field enumerators.

Necessarily, driven by the relatively short duration of this effort, we could not conduct field research in the entire country. In our field research, we focused on:

- *Sikasso*, to the south of Bamako. Sikasso is a region characterized by intense agriculture, particularly cotton. The region has a solar penetration of 4.8%, mainly driven by solar parks/ panels.
- *Ségou*, to the East of Bamako. Ségou is a semi-rural region with a strong presence of factories. The solar penetration is relatively low, approximately 2%. NOTS is active in the region, which provided the research team with additional opportunities for observations and interviews.

These two regions were chosen for their diversity across a number of dimensions:

- Rural *versus* semi-rural area
- Economy based on agriculture *versus* economy based on secondary sector
- Presence *versus* absence of solar parks

The current security situation did not allow for field research north of Bamako, particularly north of Mopti.

INTERVIEWS

A total of almost 100 interviews were undertaken. 73 interviews were undertaken with government representatives, donors, manufacturers, importers/distributors, or retailers across Bamako, and the regions of Sikasso and Ségou. In addition, approximately 20 interviews were conducted with consumers. Most of them were face-to-face interviews, the remaining were conducted over the telephone or Skype. A full list of interviews is included below.

Nr.	Group	Organization	Role played in value chain
1	Donor	UNDP Mali (Renewable energy)	Multi-functional platform for rural electrification focusing on the improvement of rural women's lives
2	Donor	Deutsche **GESELLSCHAFT FÜR** Internationale Zusammenarbeit (GIZ**)**	Installation of solar-powered stations for the recharge of batteries in rural areas
3	Government	Ministry of Energy Mines and Water, National Solar and Renewable Energy Center (CNeSOLER)	Policy and general planning (demand and supply)
4	Government	National Direction of Energy (Ministry of Energy Mines and Water)	Evaluation of the potential of energy, resources and ensuring of their valorization
5	Government	The Malian Agency for the Development of Domestic Energy and Rural Electrification (AMADER) (Ministry of Energy Mines and Water)	Access to electricity in rural and peri-urban areas
6	Government	Agence Nationale du Développement des Biocarburants (ANADEB)	Promoting Biofuels
7	Government	Improve Cookstoves Program (AMADER)	Distribution of improved cookstoves
8	Microfinance	KAFO JIGINEW	Microfinance institution
9	NGO	SolarNow	Ugandan solar product distributor, seller
10	NGO	SharedSolar	Installation of solar systems in two villages in Mali in the regions of Segou and Timbouctu as part of the Millennium Village programme
11	NGO	Mali Tali SARL	Distribution of solar lamps in the region of Keyes through French immigrants
12	NGO	KickStart	Distribution of solar pumps
13	NGO	Afriq Power	Malian entrepreneur supported by American NGO to produce solar panels locally
14	NGO	Government of India	Installation of lighting kits,

			refrigerators and portable lamps
15	NGO	Mali Folkecenter	Initiate a distribution network to bridge the gap between urban and rural retailers to bring portable solar lanterns to rural populations
16	NGO	Rural Energy Foundation	Trains local entrepreneurs and technicians. Provided business and technical support to a national network of 24 iron mongers
17	NGO	Global Village Energy Partnership	Supports and advises energy SMEs in poor rural and peri-urban areas in Mali
18	Private sector	FRES	Dutch company installing solar parks
19	Private sector	Nokero	Manufacturing
20	Private sector	Green light Planet	Manufacturing
21	Private sector	Barefoot Power	Manufacturing and supply
22	Private sector	D-light	Manufacturing and supply
23	Private sector	Aircom	Import, installation and maintenance
24	Private sector	Yandalux (formerly Avelux)	Import, wholesale, installation and maintenance
25	Private sector	Abzesolar.com	A distributor of solar lamps, housed in the Embassy of Burkina Faso
26	Private sector	Diawara Solar	Import, installation and maintenance
27	Private sector	Horonya	Import, wholesale, retail, installation and maintenance, concession operation
28	Private sector	MALISOL	Maintenance and servicing
29	Private sector	N'Tyo Traoré	Retail
30	Private sector	Seeba	Import, installation and maintenance
31	Private sector	Sinergie S.A	Import, retail and installation, and maintenance
32	Private sector	ESKOM ENERGIE MANANTALI	Installation and maintenance
33	Private sector	Hydro Sahel	Installation and maintenance
34	Private sector	Somimad	Import, installation and maintenance
35	Private sector	Thiam Energie Solaire	Import, retail
36	Private sector	Wurth Solergy	Retail, installation, training, and awareness
37	Private sector	Association des Professionnels de	Distribution, installation and

		l'Energie Solaire (APES)	maintenance
38	Private sector	Association des Femmes Ingénieurs du Mali (AFIMA)	Network training awareness
39	Private sector	Association de Développement des Mines et du Solaire (ADMIS)	Network training awareness
40	Private sector	Private operator	Private Operator
41	Private sector	Private operator	Private operator
42	Private sector	Yeelen Kura	Private operator
43	Private sector	Synergie SA	Distribution and maintenance
44	Private sector	SOCOTRA	Distributor
45	Private sector	TME/MALI SARL	Retailer
46	Private sector	MALISOL	Distributor/retailer
47	Private sector	TPBAT CO	Distributor/Importer
48	Private sector	BOUTIQUE BAHINI KAMITE	Distributor/retailer
49	Private sector	MANDE SOLAIRE	Technician/Retailer
50	Private sector	ENERGIE SOLAIRE 2	Distributor/retailer
51	Private sector	EMICOM	Distributor
52	Private sector	COMMERCE GENERAL	Distributor/retailer
53	Private sector	Company générale electricité	Distributor/retailer
54	Private sector	Magadji et Frere	Distributor/retailer
55	Private sector	Simpara la	Distributor/retailer
56	Private sector	Sylla Electronique	Distributor/retailer
57	Private sector	Mohamed Keïta	Distributor/retailer
58	Private sector	G S M Electronique	Distributor/retailer
59	Private sector	Commerce general	Distributor/retailer
60	Private sector	Kayira Electronique	Distributor/retailer
61	Private sector	Mandé Electronique	Distributor/retailer
62	Private sector	SONIKARA SOLAR ELECTRONIC	Distributor/retailer
63	Private sector	Groupe DIABY ET Flis	Distributor/retailer
64	Private sector	G.E.M –Mali	Distributor/retailer
65	Private sector	Station S C B Katiana	Retailer
66	Private sector	Coulibaly Solaire	Retailer
67	Private sector	Commerce Generale	Retailer
68	Private sector	Quincaillerie Pieces Detachées	Retailer
69	Private sector	Centre GLB	Retailer
70	Private sector	Commerce general	Retailer
71	Private sector	Pact Lcom	Retailer
72	Private sector	Bourama Coulibaly Com General	Retailer
73	Social enterprise	NOTS (Not One the Same)	Large-scale distribution of solar LED lights with phone chargers and microfinance services