

HERi MADAGASCAR: UPSCALING THE ENERGY KIOSK CONCEPT

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Miantso kiosk (Analamanga region)
Source: HERi Madagascar

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KEYWORDS

- SOLAR ENERGY KIOSK
- RURAL PRE-ELECTRIFICATION
- FRANCHISE
- FEMALE ENTREPRENEURSHIP
- RURAL MARKETING

This article focuses on the experience of HERi Madagascar, a social enterprise that develops energy access solutions for the most vulnerable rural populations, through the implementation of a network of solar energy kiosks throughout the country. The article discusses the lessons learned in the development of the business model in order to understand the challenges in upscaling the system.

INTRODUCTION

In Madagascar, rural populations have very limited incomes (mainly based on agriculture) and are on the lowest level of the power consumption pyramid. The communities must cope with seasonal revenues and also lack awareness on modern, affordable energy solutions. Hence, they always turn to traditional energy solutions for basic services (such as lighting). In these circumstances, how can we reach the most vulnerable rural populations with modern, reliable and affordable energy services, while prioritizing socio-economic development and minimizing impacts on health and the environment?

This is the challenge that HERi Madagascar, a social enterprise created in 2011, is addressing through the development of a “pre-electrification”¹ model based on the implementation of solar energy kiosks (SEKs). These SEKs offer energy solutions with an emphasis on social considerations in the heart of off-grid rural villages in Madagascar. The kiosks are franchised, managed by local businesswomen, and offer sustainable solutions and modern energy services, based on the sale/rental of solar equipment for individuals (rechargeable lamps, telephone charging) or the community (refrigeration, printing). The combined actions of sale/rental, rural marketing and local services have allowed the company to expand its network, in January 2016, to 44 SEKs across the country and to strengthen the technology and impacts model prior to a commercial upscaling phase. While the financial profitability of the business model has not yet been achieved, each kiosk is financially autonomous within a period of two years. Based on this initial success, the company plans to extend its network to 150 SEKs by 2018 and use economies of scale to move toward a financially sustainable model, while maintaining wider socio-economic benefits.

¹ Understand as a prior step to electrification. Unlike electrification, end users are not connected to a grid or are not energy self-producer.

1. PORTRAIT OF HERi MADAGASCAR, AN ENERGIZING SOCIAL ENTERPRISE

1.1. GENERAL PRESENTATION OF THE ENTERPRISE

HERi Madagascar is a social enterprise that builds and manages a network of SEKs installed in the heart of remote and non-electrified villages, through a franchise model. Its main goal is to make products and services with a high social value available to as many

people as possible, through an appropriate sale or renting system⁶. Thus, HERi seeks to provide sustainable solutions to improve the quality of life in rural areas.

The HERi energy kiosks are franchised and managed by local businesswomen (female entrepreneurs). Currently, HERi Madagascar has 44 kiosks located in seven regions - Analamanga, Itasy, Vakinankaratra, Bongolava, Alaotra Mangoro, Vatovavy Fitovinany, Haute Matsiatra. In 2016, HERi will also extend to the Atsimo Antsinanana region.

Its inclusive business model has been recognized by the German government and by the ACP-EU facility, which has given its support to the PowerKiosk project (HERi Madagascar, ICCO, Solar Kiosk), which benefits from being able to compare lessons learned from the implementation of the kiosk model in three different countries - Ethiopia, Kenya and Madagascar. In particular, this feedback from the commercial exercises will allow HERi to extend its network to 150 kiosks in Madagascar by the end of 2018.

MADAGASCAR FACES “ENERGY STARVATION” (MAGRIN, 2008)

Madagascar, with an estimated population of 23.5 million in 2014², is experiencing what could be described as an “energy starvation”, characterized by a very low energy consumption due to a very limited access to energy, and in particular to electricity. In 2014, the national electricity coverage was only 15%. Over 78% of the Malagasy population lives in rural areas where the rate of electrification is barely 4.8% (WWF, 2012). By the end of 2014, subscribers to the national grid of JIRAMA (Jiro sy RAno MAlagasy, the national water and electricity utility) numbered fewer than 475,000, i.e. one subscriber for every 49 people across the country (Groupe de Réflexion Energie, 2014)³.

The average power consumption per individual per year is 48.53 kWh⁴ – for comparison, average consumption in sub-Saharan African countries (excluding South Africa) is 150 kWh. In addition, average per capita energy consumption is stagnating at around 0.2 toe/year (compared to 1.6 toe/year/inhabitant in the World in the same period). This energy consumption is dominated by wood energy and its derivatives for cooking needs (83%) and by oil products for the operation of diesel generators and lighting (14%), by the still widespread use of kerosene. Electricity accounts for less than 2% (Fondation Energies pour le Monde, 2012). In 2015, the “Doing Business”⁵ indicator ranked Madagascar 188th of 188 countries with respect to connection to electricity. The principal reason was the waiting time for a new connection to the grid, estimated at 450 days.

Energy production is also very low. In order to meet a growing energy demand, a total power of 350 MW was installed in the country in 2014, of which thermal production has the lion’s share, despite renewable energy resources. Although only intended to be a short-term solution, this makes the country dependent on fluctuations in the price of oil. 75.2% of electricity production in rural areas is supplied by thermal power plants (ORE, 2015).

2 <http://data.worldbank.org/country/madagascar>

3 The Groupe de Réflexion Energie is a platform bringing together several actors of the energy sector (private companies, technical and financial partners, civil society, members of the government, etc.) which meet approximately once a month and make recommendations for improvement to the Ministry of Energy and Hydrocarbons.

4 <http://www.indexmundi.com/g/r.aspx?v=81000>

5 The “Doing Business” indicator analyses small- and medium-sized enterprises nation-wide and measures the regulations applying to them throughout their life cycle. The purpose of this indicator is to provide an objective basis for understanding and improving the regulatory environment for business around the world. Structured around 10 themes, the indicator aggregates the average per country for each theme. One of these themes focuses exclusively on access to energy. Overall, the Indicator ranks Madagascar 163rd of 189 for 2015. Source: <http://www.doingbusiness.org/madagascar/>

6 This idea follows the precept raised by Bellanca and Garside, 2013

Figure 1. Network of HERi Madagascar kiosks in January 2016 - Source: FERDI

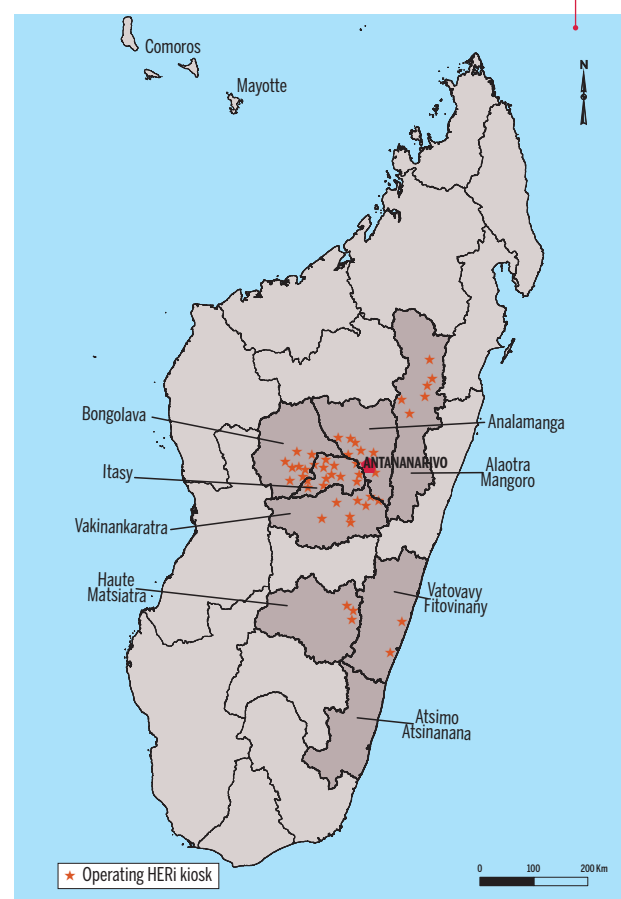


Table 1. Expansion of the HERi SEK network by region and by year

Regions	2012	2013	2014	2015	Total	2016 forecasts
Analamanga	2	5			7	4
Itasy			6	6	12	3
Vakinankaratra			2	6	8	
Bongolava				7	7	4
Alaotra Mangoro				5	5	10
Vatovavy Fitovinany				2	2	12
Haute Matsiatra				3	3	12
Atsimo Antsinanana						11
TOTAL	2	5	8	29	44	100

1.2. SELECTION OF VILLAGES

Although there is no “typical village”, the enterprise identifies a number of selection criteria, taking into account the limited financial capacity of rural households. For instance, the villages must, comply with criteria such as non-connection to the national grid, accessibility by motorcycle even during the rainy season, a minimum average demography of 250 households or coverage by a GSM telephone network. A field team of six people is dedicated to the selection of villages.

Shortlisting (5 days): Villages are shortlisted at the headquarters in Antananarivo, on the basis of the socio-economic data available from the National Institute of Statistics (INSTAT). The search focuses mainly in and around those regions where HERi is already present. The experience of the field team is combined with recommendations from the local authorities, the Agency for the Development of Rural Electrification (Ader), and non-governmental organizations (NGOs). This process creates multiple sources of information used to identify and rank the villages. Finally, it is increasingly common for local authorities or villagers to contact the enterprise head office directly to request the installation of a SEK in their village. All requests are considered if they are located in the regions where the enterprise operates. For logistic and budgetary reasons, at least six villages in the same region must be shortlisted before proceeding to the next step, namely the “preliminary field trips”.

Preliminary field trips (10 days): The field team undertakes trips to the sites in order to meet with the local authorities and populations of the shortlisted villages. Surveys are conducted with a few households (approximately 30 per village), and with local socio-economic centers (NGOs, health centers, schools, grocery stores, cooperatives, etc.). Next, focus groups are organized by the team to help finalize the energy profile and economic development of the villages by canvassing all participants. The visit concludes

with the search for a potential female entrepreneur, as well as the identification of an available plot of land (usually in the heart of the village or close to the marketplace) before undertaking negotiations with the authorities. The field team spends one and a half days in each village on average.

Final decision: The final decision to set up a kiosk in the village is taken by the management team at the headquarters, after the field team’s presentation, negotiation with local authorities and selection of a female entrepreneur. On average, the time spent between the shortlisting phase and the opening of the kiosk is approximately two months.

1.3. SELECTION OF THE FEMALE ENTREPRENEUR

The selection of kiosk managers is a crucial step because they are the direct interface between the social enterprise and customers. They are responsible for increasing the commercial activities and they strengthen the impacts of the services offered. This step starts with consultation with local authorities once they have confirmed their interest in having a kiosk in the village. They generally recommend women involved in the social life of the community who have business experience. HERi also invites applications from women by putting up posters in the village (during the shortlisting phase). The goal is to encourage interested candidates to demonstrate their interest by directly contacting the team and arranging their own travel to the head office for the first interviews. After confirmation following a written and oral evaluation, the selected female entrepreneurs immediately start preparing the construction of the kiosk and officially changing their status. They then receive on-the-job training for three weeks (one week prior to the opening of the kiosk and two weeks after the official opening). These courses focus on commercial management of the kiosk, customer relations, communication, cash management, ITs, and basic maintenance of the solar electrical system.

The decision to choose female entrepreneurs followed naturally from the initial selection of pilot villages carried out by HERi Madagascar in 2012. It became clear that women are generally more available by daytime than men, who are responsible for farming activities. Their sales experience in the markets also gives them useful interpersonal and business skills. Moreover, assigning this professional role to women emphasizes their important contribution within the community and their independence, consistent with the social values embraced by HERi Madagascar. The reaction of men to the fact that the kiosk is managed by a woman varies between villages and between regions. Sometimes it disrupts the social norms of the



Figure 2. Services offered by HERi SEKs
Source: HERi Madagascar

village during negotiations with the local authorities, but never to the point where HERi has had to reconsider this criteria since all villages have accepted it. In addition, men often help their women to apply for the position, and also to invest because they are reassured by the support provided by HERi in terms of training and investment.

1.4. THE TECHNOLOGY USED

The solar photovoltaic (PV) technology perfectly fits with the SEKs' needs: it allows the system to become quickly operational, allows for modular production, requires little maintenance and is easy to use. Each SEK has six PV solar panels installed on the roof for a total capacity of approximately 1 kW⁷ (870 Wp⁸). The installed power is modular and can be increased or reduced according to changing demand. The electrical system is intuitive and based on "plug-and-play" models. It allows the system to adapt to rural needs, facilitates its use by the manager, and can power a wide range of electrical devices. The system includes two 180 Ah GEL batteries⁹ to store the energy, a load regulator (to ensure safety and optimize battery life by regulating charging and discharging) and a 450 W converter (which converts direct current into alternating current and limits the appliance use to a 450 W threshold). Exceptionally, 1,000 W converters were installed in two kiosks in order to increase the entrepreneurs' ability to use multiple devices simultaneously. The available connections are direct current/DC¹⁰ (mainly used to charge lamps, mobile phones and radios) and alternating current/AC (to power other electrical devices). Both solar and electrical equipment are imported from Germany. Since the launch of the first kiosk in December 2012, HERi has experienced no technical problems. The only incidents usually occur a few days after the opening of each kiosk, when the entrepreneurs (despite the operating recommendations and warning) overload the system by plugging in too many appliances, thus exceeding converter capacity.

⁷ From a study of energy needs during the initial surveys, a one kilowatt capacity was identified as suitable for initiating several activities and supplying a broad enough selection of electrical appliances.

⁸ Wp = Watt peak. Unit representing the maximum power of electrical production of a solar system, when of solar radiation conditions are optimal.

⁹ GEL batteries were preferred because they have a relatively long useful life: 8 years.

¹⁰ DC (Direct Current): 12 volts; AC (Alternating Current): 220-230 volts

This is not an alarming issue, since the system shuts down for safety reasons and automatically restarts within a few minutes.

1.5. PRODUCTS AND SERVICES OFFERED BY HERi KIOSKS

HERi Madagascar offers three types of services, the details of which are available on the website www.beheri.com.

There are three categories of services offered by each SEK. **Charging** includes recharging lamps (only rechargeable at the kiosk), built-in battery radios (commonly referred to as "card radio") and mobile phones. The rechargeable lamps are supplied to the SEK female entrepreneurs by HERi Madagascar. Unlike other enterprises, HERi does not rent or recharge car batteries or solar batteries due to the fragility of the equipment, the investment cost and the logistical constraints it would cause. However, a supplier study is currently being conducted to identify lighter, more robust battery models to facilitate transportation and reduce the risk of damage.

Sales cover a range of devices such as autonomous solar lamps (often with a built-in panel), mobile phones, FM radios, Solar Home Systems (SHS), and energy-saving stoves.

Service provision involves provision of products and services selected by the female entrepreneurs themselves to develop commercial activities useful to the community: printing and copying services, refrigeration of fresh products (yoghurt, fruit juice, etc.) for community use or commercial use, video projection for entertainment or dissemination of news programs, etc. The female entrepreneurs invest personally in the services and products according to local demand, potential socio-economic impacts and profit opportunities that their activities could generate. This "tailored" portfolio of services and products allows the enterprise to maximize its social impact through the SEK and give the female entrepreneurs an additional source of income. Each SEK is unique, and so are its services. Table 2 presents the number of kiosks offering given services proposed in HERi's portfolio¹¹.

¹¹ This data must be considered with caution given that the most recent kiosks have not yet, or only barely, expanded their portfolio of productive/commercial services.

"HERI MADAGASCAR'S EXPERIENCE SHOWS THAT LOW INCOME HOUSEHOLDS ARE WILLING TO PAY MORE FOR A MEDIUM OR HIGHER QUALITY PRODUCT!"

Table 2. Productive and commercial services installed in 2015

Product/Service	Number of kiosks offering the service
Camera	10
Refrigerator	24
Printer	19
Blender	18
Laminating machine	4
Game console	3
HiFi speaker	4
DVD player	2
Electric hair clipper	2
Television	25

RECHARGEABLE LAMPS AND RENTAL SERVICE

The rental and home delivery of rechargeable lamps are the common services available in every kiosk and are the priority services, since the prime objective of HERi is to increase access to clean, quality lighting for the isolated rural populations. They benefit all consumers, including those who generally cannot afford modern solar products.

Quality and low power consumption are the main criterion of the product portfolio. In addition, the choice of including lamps with strong and diffuse light is preferred in order to illuminate a room and avoid the harmful effects of weak and concentrated¹² lighting on the eyes. HERi Madagascar's experience shows that low income households are willing to pay more for a medium or higher quality product. The price indicator does not always prevail¹³. Two types of lamp are currently available for rent in the kiosk network, and home delivery is free for customers registered on a monthly subscription.

The rental of rechargeable lamps is HERi Madagascar's main activity and the main source of income for the female entrepreneurs (approximately 75% of SEK revenue).

¹² The Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR) of the European Commission highlights the adverse effects on health of too low artificial light, in particular for reading (SCENIHR, 2012). Madagascar does not yet have standards on brightness, so HERi Madagascar has promoted brightness standards similar to those defined by the European Union. Hence, entry range lamp brightness is at least 50 lumens.

¹³ This confirms the lesson learned highlighted by Graf et al., 2013.

Table 3. Characteristics of the two rechargeable lamps rented at the HERi kiosks

Brand / Model	Lumens	Autonomy	Daily rental price*	Monthly subscription	Aims to replace
FOSERA Scandle	160	8 hours	MGA 300 (€ 0.10)	MGA 7,500 (€ 2.30)	Candle
SUNKING Solo	50	12 hours	MGA 200 (€ 0.06)	MGA 4,500 (€ 1.40)	Kerosene

* 2015 average exchange rate: EUR 1 = MGA 3,254.75 (<http://www.banque-centrale.mg/index.php>)

2. OVERVIEW OF THE IMPACT OF HERi KIOSKS ON COMMUNITIES

HERi SEKs and the tailored portfolio of products have been developed with the aim of optimizing the socio-economic impacts of the activities. As the main service developed by the enterprise, the rechargeable lamp rental service is the offer for which an impact analysis is currently most relevant. The bulk of collected data derive from the study conducted by ENDEVA¹⁴ in February 2015, focusing on the impacts observed in the first seven pilot SEKs. 292 people were interviewed (contractors, assistants, mayors, community chiefs, teachers, traders, lamp users, lamp non-users, kiosk customers) through individual interviews and focus groups. The FOSERA Scandle lamp clients observed many positive benefits, in particular for health, education, safety, expenditures and even income. 80% of respondents would recommend the use of this innovative lighting solution. Today HERi is trying to consolidate this impact study by extending the scope of the analysis to all products/services offered, and by developing new projects, internally or in partnership, on related issues (management of drinking water, agriculture, etc.). Therefore, the enterprise aims to have a positive impact on the daily life of rural communities, beyond improving access to a source of clean and bright light.

2.1. IMPACT ON EDUCATION

Most rural households use kerosene lamps or candles to light their homes at night. Children are forced to study with poor lighting, which is a source of discouragement and frustration. Thanks to the use of rechargeable lamps, children report greater enthusiasm for their studies and state they study on average 25 minutes longer per day.

The village of Avaratsena (Analamanga region) is a good illustration of the impact of SEK activities on education: the success rate for official examinations in primary and secondary school has risen from 65% in 2013 (the year the kiosk opened) to 100% in 2014. To be fair, this increase is not solely due to the use of rechargeable lamps, nevertheless, the Director of that primary school stated that the "availability of the lamp has played a major role in the improvement of school results, especially during study periods. Not all students are regular users throughout the year, but nearly 90% of students rented a lamp a few weeks before examinations¹⁵". The students' fulfillment and their desire to learn and to succeed would also seem to have grown in villages where HERi Madagascar is established today.

¹⁴ <http://www.endeva.org/>

¹⁵ Ms. Hantsa Rakotomalala, Director of the Primary School of Avaratsena village



Students of Miantso village working using a FOSERA solar lamp - Source: HERi Madagascar

2.2. IMPACT ON HEALTH

The harmful effects of kerosene lamps on children's health, particularly on their eyesight and respiratory system, are well documented (Bruce et al., 2000). Pneumonia is the primary cause of infant mortality in Madagascar¹⁶. Two thirds of customers who replaced their kerosene lamps by the rechargeable lamps available for rent in the SEK claim to have observed a clear improvement in their health. These statements are supported by the representatives of the Basic Health Centers (CSB), who have observed a decline in cases of respiratory infection, particularly among newborns, in all the villages where HERi Madagascar is present. The impact on health is even greater thanks to HERi's promotion of ADES stoves¹⁷, which is a state-of-the-art cookstove that drastically reduce the emission of smokes and harmful gases during cooking, while cutting in half the coal and wood consumption.

Moreover, most kiosks offer refrigeration services whose high profitability and important commercial nature are complemented by a huge impact on nutrition and access to varied food (refrigeration of fresh natural juices and multivitamin yoghurts). Mothers actively encourage their children to consume these fresh products.

2.3. IMPACT ON THE ECONOMY

Monthly expenditure for lighting (kerosene, candles and batteries) represents approximately 5% of the average monthly income¹⁸ of rural households, i.e. approximately MGA 6,500 (EUR 2). The villagers welcome the quality to price ratio and reliability of the lighting solutions HERi Madagascar offers, expressing satisfaction with the quality and cleanliness of the light source and above all the sale price. Set at MGA 4,500 per month (EUR 1.40), the rental fee makes rechargeable lamps an economic alternative to traditional light sources.

Some villages are particularly isolated and the installation of a SEK allows populations to significantly decrease travel time to purchase fuel and candles, recharge telephones, print documents or photos, etc. This saved time has a value and therefore represents a high opportunity cost¹⁹.

The SEK activities and their economic impacts are appreciated by consumers, who highlight the increased opportunities for job creation: each HERi entrepreneur employs between 1 to 5 part-time assistants. Overall, the enterprise has created more than 158 direct jobs (at head office and SEKs level), 110 of them in the villages. Grocers, tailors and other local entrepreneurs can work later in the evening, and have observed a significant increase in their income. Local retailers of traditional fuels (kerosene and diesel) are likely to be impacted negatively by the introduction of SEKs. However, the behavioral changes are not immediate, and rural populations in Madagascar are generally attached to their habits. In consequence, the penetration rate (in the communities) of the energy services HERi Madagascar offers does not significantly affect the commercial activities of retailers. These shop owners are also gradually integrated into "sub-entrepreneurship" networks (as distribution points) in order to make the most of their experience and their wide consumer networks to disseminate renewable energy technologies.

¹⁹ The concept of opportunity cost is based on the idea of a ranking of tasks or occupations. A rational man is one who, after studying the various ways of spending his time at any given moment, chooses the one with the least opportunity cost, i.e. the one that least sacrifices what he considers important.

Sewing with a FOSERA lamp
Source: HERi Madagascar



¹⁶ <http://www.unicef.org/madagascar/fr/health.html>

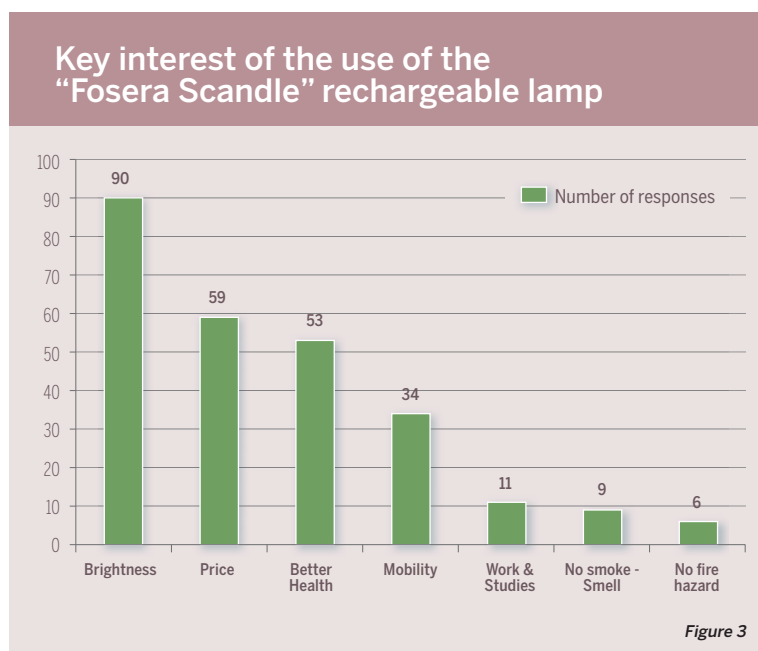
¹⁷ "Agence de Développement de l'Énergie Solaire" a Swiss NGO promoting the production, marketing and distribution of improved stoves in Madagascar and partners HERi Madagascar.

¹⁸ Over 80% of rural households work in the informal agricultural sector, with an average monthly income estimated at MGA 131,200 (approx. EUR 40) according to the report of the Groupe Réflexion Énergie published in 2014. The HERi experience shows us that a large number of rural households live on only MGA 80,000 per month (approx. EUR 24.50).

2.4. IMPACT ON SAFETY

Some regions and villages in Madagascar are regular victims of vandalism and crime, or located in “red zone”²⁰. However, in these locations, people truly appreciate HERi Madagascar’s impact in improving safety conditions. Darkness eases theft of livestock and crops which remains the main assets of the villagers. They report that the bright light and self-sufficiency provided by the rechargeable lamps allow them to patrol or maintain a human presence throughout the night. Above all, the users are satisfied to be able to keep a light on all night without spending more money.

The numbers presented in Figure 3 are to be considered with caution because the surveys undertaken by Endeava were focused on parents that use the rechargeable lamps. Figure 3 summarizes the answers of 262 people to the following question: “To your opinion, what is the main advantage of the Fosera Scandle lamp?”.



3. LESSONS LEARNED FROM HERI'S SOCIAL BUSINESS

3.1. WOMEN ENTREPRENEURSHIP AND THE FRANCHISE MODEL

Simply introducing innovative and affordable technology cannot be enough to create lasting change in the consumption habits of rural communities, especially when they have very little awareness of solar technologies and the opportunities for productive use of renewable energies. HERi Madagascar’s activities have revealed that the quality of the local SEK management is a key success factor for the development of activities and for the strategic visibility of the company.

The women entrepreneurs, who are residents of the village where the kiosk is located, analyze the market, select products with high added value for the communities, and determine the marketing strategy to be implemented at the village level. Their initiative allows the SEKs to become local life hubs, and structures for lasting socio-economic development. They employ one or more assistants

as required, working mostly on part-time, for the lamp delivery and recovery service. The entrepreneurs can also create product distribution points in grocery stores for villages that are not covered by the kiosk’s activities, in order to increase the penetration of the offers. Ultimately, the franchise model is based on a bottom-up strategy, built on the needs expressed by the users and the sales and services provided by the entrepreneurs.

In order to further support their efforts, HERi gives them training in financial management, rural marketing, customer service and technical use of the electrical equipment. The enterprise also organizes activities to raise awareness among consumers, local authorities and public service centers (schools, health centers, etc.). To this end, HERi invites all entrepreneurs twice a year to the head office in Antananarivo, to take part in additional training courses as well as to share the good practices, challenges and lessons learned from their activities.

The female entrepreneurs pay HERi Madagascar a fixed monthly fee of MGA 40,000 (EUR 12) for the rental of the kiosk (including the electrical system), and an additional variable fee for the electricity costs and the number of rechargeable lamps in stock²¹. The wages of the entrepreneurs and their assistants are covered by the profits generated by the commercial activities of each SEK. However, the viability of the model is largely based on the entrepreneurial skills of these women and their ability to increase the SEK’s sales. With monthly income that is often 80% higher than the average wage in rural areas, the female entrepreneurs have a comfortable situation that, paradoxically, does not encourage them to progress further and therefore increase their activities. HERi Madagascar has to make additional efforts to raise the awareness of female entrepreneurs on the financial opportunities of diversifying their offers. The entrepreneur selection method is also constantly being improved in order to identify active and committed women.

²⁰ The “red zone” is a local expression designating nearly 200,000 square kilometers spread over the entire island where the government has little or no control and banditry prospers.

“THE ENTERPRISE HAS CREATED MORE THAN 158 DIRECT JOBS (AT HEAD OFFICE AND SOLAR ENERGY KIOSKS LEVEL), 110 OF THEM IN THE VILLAGES.”

²¹ The female entrepreneurs lease the rechargeable lamps from HERi, and then rent them to individuals.

Table 4. Example of the average monthly income of a HERi entrepreneur

	Price	Unit	Total
Average monthly costs for a female entrepreneur			
Fixed fee/kiosk rent	MGA 40,000 (€ 12)	1	MGA 40,000 (€ 12)
Fee for rechargeable lamps	MGA 4,500 (€ 1.40)	100	MGA 450,000 (€ 140)
Average of the other variable fees	MGA 40,000 (€ 12)	1	MGA 40,000 (€ 12)
Salary of two assistants	MGA 80,000 (€ 24.50)	2	MGA 160,000 (€ 49)
Total average monthly costs			MGA 690,000 (€ 212)
Average monthly income for a female entrepreneur			
Income from lamp rental	MGA 7,500 (€ 2.30)	100	MGA 750,000 (€ 230)
Income from other products/ services	MGA 190,000 (€ 58)	1	MGA 190,000 (€ 58)
Average monthly income of kiosk activities			MGA 940,000 (€ 290)
AVERAGE NET MONTHLY INCOME / ENTREPRENEUR			MGA 250,000 (€ 77)

3.2. THE IMPORTANCE OF AWARENESS-RAISING AND MARKETING CAMPAIGNS

HERi Madagascar develops awareness and marketing support tools for all beneficiaries and local stakeholders. The awareness activities are crucial because rural populations have very little awareness of renewable energies and the risks of using traditional options (kerosene, firewood, etc.). In addition, some households that have already invested in small low-quality solar systems are disappointed by the performance of these products, and by extension are disappointed in solar technology in general. Therefore explanations about the operation of a solar system and raising awareness about purchasing intermediate or higher quality products are not only valuable for individuals but also prevent solar technology being permanently discredited in rural areas.

Rural consumers tend to use several energy sources. Despite the introduction of a new energy solution, some households keep using fuels (mainly kerosene) in addition to the solar energy services, due to their limited purchasing power. This is not surprising, since full energy transitions are never immediate, but occur gradually over time.

To support the female entrepreneurs and to keep up with the changing consumption patterns of populations, HERi's sales representatives help the entrepreneurs organize campaigns to raise awareness and provide information, as well as events, aimed at households, local authorities, schools and health centers. Targets include people within the villages where the SEK is located and those of the surrounding hamlets. In Ampano village, daily lamp rental increased from 50 to 250 following an awareness campaign conducted in 2013 in partnership with the local farmer association TARATRA²², which in particular gives Ms. Saholy, the kiosk entrepreneur, an ongoing

training on communication and management. The innovative technology of ADES energy-saving stoves sold in the SEKs allows households to reduce their wood/charcoal consumption, while preserving their cooking habits. Thanks to awareness campaigns on stove use and to the dissemination of testimonial videos, the sales number on the stoves during the launch in the village of Avaratsena was 300% higher than the overall sales forecasts. This innovative product, sold on average at around MGA 12,000 (EUR 3.70), is three times more expensive than the regular stove that people generally use. But thanks to a strong rural marketing strategy and the establishment of an installment plan for payment, the sale was a real success.

Once kiosks are up and running in the village, they play an additional role in facilitating message transmission and collection of information. The kiosk is a natural communication hub and a strategic site for bringing innovative products to market, subject to finding suitable payment methods. Twice a year, all kiosk entrepreneurs are invited to take part in supplementary common training and to share their experience and insights regarding good practices with the other female entrepreneurs, in order to ensure continuous improvement of their activities and the sustainability of the model.

Ms. Saholy, SEK entrepreneur in Ampano (Analamanga region) rents over 400 lamps a day
Source: HERi Madagascar



²² The TARATRA peasants association of Ampano offers agricultural training, and is a reliable intermediary between the farmers of Ampano and the surrounding hamlets, and the agricultural collectors eager for quality produce.



Figure 4. Example of rural marketing by HERi Madagascar
Source: HERi Madagascar

Rural marketing is a tailored communication and marketing strategy based on a thorough analysis of the local market and of the constraints related to rural consumers (levels and seasonality of income, etc.), using the most effective communication channels in rural areas, such as word-of-mouth and user reports. HERi relies its strategy on raising awareness at all levels (local authorities, public administrations, households, etc.), trying to involve as many end-users as possible.

In the poster above, Mr. Henry, inhabitant of Ampano village, shares his experience on the benefits of the telephone recharge service available in the SEK. By disseminating this poster in the targeted villages and the surrounding hamlets, the number of phone charging clients at the kiosk increased to over 310% within a year. Since then, similar tailored marketing campaigns were initiated across the SEK network.

3.3. PAYMENT AND COLLECTION METHODS

Given the important impact that seasonal incomes²³ in rural areas have on the cashflow of SEK customers, the development of tailored, easily comprehensible payment methods is key for the viability of energy service provision at the SEKs. The monthly subscription constrains households to cash out the rental fee at the end of each month, before renting the lamps for the following month. But people do not always have money at that time, which results in recurring collection problems for the entrepreneurs. To address this issue, HERi's sales representatives and the entrepreneurs have set up various payment methods: subscriptions can be weekly, biweekly or monthly; consumers have the possibility of paying during the harvest season; and a prepayment model has been developed (the user pays at the start of the rental period rather than at the end). Prepayment involves a specific cash flow management, limits the risk of outstanding payments and gives the entrepreneur a clearer vision of their monthly income. Thus, flexibility remains the best way to deal with these challenges that are typical of rural areas in Madagascar, and has allowed HERi to report collection rates of approximately 85%²⁴ (payment of monthly subscriptions by lamp-rental customers).

3.4. DETERMINANTS OF THE MODEL'S FINANCIAL PROFITABILITY

Despite a viable franchise model, the business model is not yet sustainable. HERi Madagascar is not yet able to cover its operating costs and to extend its SEK network without recourse to external funding. Setting up the SEKs requires huge investments (SEK structure, PV solar technology, electrical appliances, etc.) and significant qualified human resources.

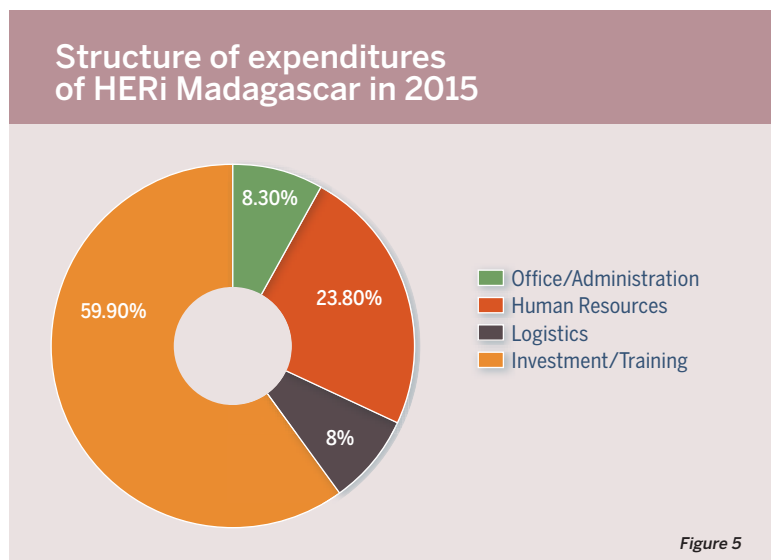


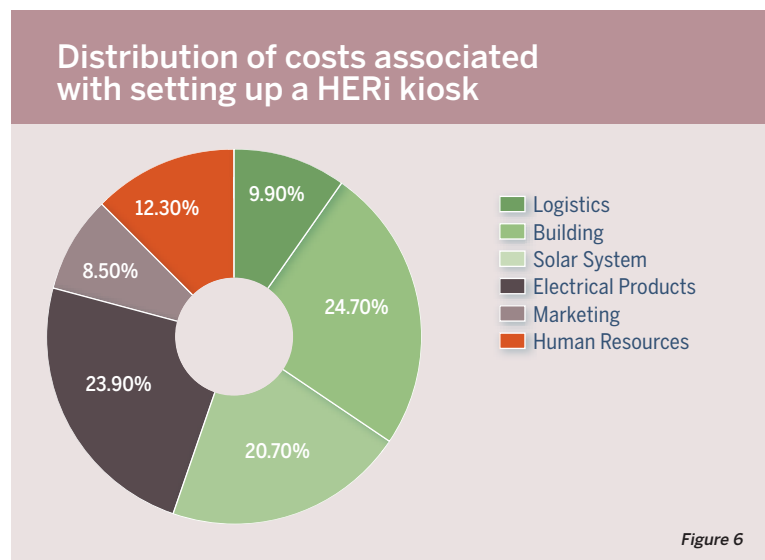
Figure 5

²³ Insofar as income depends mainly on agriculture, rural populations go through "hunger gaps" during several months of the year, and have more financial leeway during the harvest.

²⁴ For comparison, the national water and electricity utility, JIRAMA, reports an average collection rate of around 60% in rural areas.

As a guide, setting up an energy kiosk represents an investment of between EUR 25,000 and EUR 50,000 depending on the kiosk's services and products, the size of the building and the solar system, and the particularity of the village or the region. Figure 6 shows the distribution of average costs associated with setting up a kiosk²⁵.

“GIVEN THE IMPORTANT IMPACT THAT SEASONAL INCOMES IN RURAL AREAS HAVE ON THE CASHFLOW OF SOLAR ENERGY KIOSK CUSTOMERS, THE DEVELOPMENT OF TAILORED, EASILY COMPREHENSIBLE PAYMENT METHODS IS KEY FOR THE VIABILITY OF ENERGY SERVICE PROVISION AT THE SOLAR ENERGY KIOSKS .”



²⁵ The percentages are to be considered with caution since they are averages given here as a guide.

Third and latest version of the HERi SEK building
Source: HERi Madagascar



Since its creation, HERi Madagascar has developed optimization and adaptation strategies in order to increase its revenues and strengthen its operational model, with a view to achieving a sustainable business model in the long-term.

The first strategic axis is based on the optimization of SEK design. The first kiosk model combined a metal structure (imported) and a wooden architecture. The high construction cost²⁶ led HERi Madagascar to switch to a brick model in 2014, which, moreover, makes use of available local resources (labor, bricks). In early 2015, the kiosk architecture was again redesigned to improve the quality and reproducibility of the kiosk infrastructure, still using durable materials, and with the unchanged aim of reducing costs and promoting the use of local construction materials. The changes to the design between the first and third versions halved construction costs.

The second strategic axis focuses on diversification of the enterprise's activities and the creation of new partnerships. In this context, HERi Madagascar has developed a "turnkey" model, allowing other development actors (private sector, NGOs, etc.) to buy the SEK model in order to increase the impact of the innovative services that they offer in off-grid rural communities. The service allows HERi Madagascar to diversify its areas of operation, and especially to quickly generate a net income, from the sale of the equipment (building and electrical system) and of design, training, marketing monitoring and assessment services²⁷. The turnkey kiosk concept also allows the enterprise to increase its impact through the activities of its partners, and to expand the network of energy kiosks throughout the island. The first turnkey kiosk, sold to a Swiss NGO for the village of Antanety (Analamanga region), was built within the grounds of a public school and generates a regular additional income for the parents' association. A contract has also been signed with another international NGO for the construction of four turnkey kiosks, with delivery scheduled for the first quarter of 2016.

The third strategic axis is based on the development of complementary activities, such as the direct sale of solar products in the kiosks and in urban areas, and other internal projects to strengthen the impacts of activities related to energy service provision. In particular, HERi Madagascar is developing a partnership with

Bionexx (an agribusiness company specializing in the extraction and purification of aromatic and medicinal plants) under the "HAGRI" program. This project will ignite strong partnerships between the energy sector and the agricultural sector. In other words, it aims to strengthen the local economic dynamics and perpetuate the transfer of energy costs to rural clients, whose income will increase through the agricultural program, thus further improving their access to the energy services offered by the SEKs.

Finally, the fourth strategic axis deals with the up-scaling of the model. The profitability of HERi's business model relies heavily on economies of scale directly related to the expansion of the SEK network across the country. Since supplying an isolated kiosk requires proportionally higher costs than supplying a group of kiosks, pooling the monitoring, support and product delivery actions will reduce logistical costs and lead the company to a lasting and commercially viable model. HERi Madagascar has set itself the goal of establishing a network of at least 150 kiosks in order to benefit from the economies of scale and thus achieve a degree of financial profitability. The European Union's support through the PowerKiosk project, which started in 2015, is intended to help reach this goal by 2018. This project will fund at least 80 kiosks in four regions of south-east Madagascar (Haute Matsiatra, Amoron'i Mania, Ihorombe, Vatovavy Fitovinany). To this end, a second HERi office was opened at the end of 2015 in Fianarantsoa (Haute Matsiatra region) in order to facilitate the implementation of the Powerkiosk project.

²⁶ Most materials were imported, which significantly increased the share kiosk construction costs in the investment, compared to other necessary investments.

²⁷ These services include training on the model and the management tools, continuous training and supervision of the kiosk manager, a follow-up/evaluation, marketing campaigns and communication media.

"THE PROFITABILITY OF HERI'S BUSINESS MODEL RELIES HEAVILY ON ECONOMIES OF SCALE DIRECTLY RELATED TO THE EXPANSION OF THE SOLAR ENERGY KIOSK NETWORK ACROSS THE COUNTRY."

CONCLUSION

Through its rural pre-electrification activities, the social enterprise HERi Madagascar has carved out a position for itself on the Madagascar energy scene. Its inclusive business model and its franchised local management model helped the company reach off-grid rural communities and offer local solutions for energy provision, tailored to the needs of these low-income populations. The design of the HERi SEK and its local management by native women have led to strong integration and acceptance within the communities, which could pave the way for widespread electrification projects in the future.

However, despite the success of the franchise model at the village level, the enterprise has yet to achieve financial profitability. HERi Madagascar has to fine-tune its business model to ensure its sustainability. Profit margins from business activities and redistribution of income must be adjusted in order to allow the business to recover its costs while remaining sustainable. Innovation and growth must be supported by diversification of the offers and the establishment of win-win partnerships with other organizations. Such collaborations, with the agricultural

sector for instance, will continuously promote the transfer energy costs to rural consumers. HERi Madagascar has developed various tools for rural marketing, awareness-raising, support and training, which have ensured the success of the model in the pilot phase and secured important funds. Socio-economic considerations are central to the activities of the social enterprise, which must now strive to efficiently balance out upscaling, financial sustainability and broadening the impacts. Commercial objectives should always tie with social goals, and ensuring financial recovery should not affect the quality of HERi's activities.

For the SEK model to grow, collaboration between rural electrification actors and the organizations developing the SEK concept is essential. HERi Madagascar recognizes the importance of sharing experiences and ideas on good practices. In particular, the PowerKiosk project - implemented in Ethiopia, Kenya and Madagascar - helps capitalize on lessons learned from the SEK model and consolidate HERi Madagascar's business model in its commercial upscaling phase.

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