

**ETH Zurich and
Solafrica**

March 2017

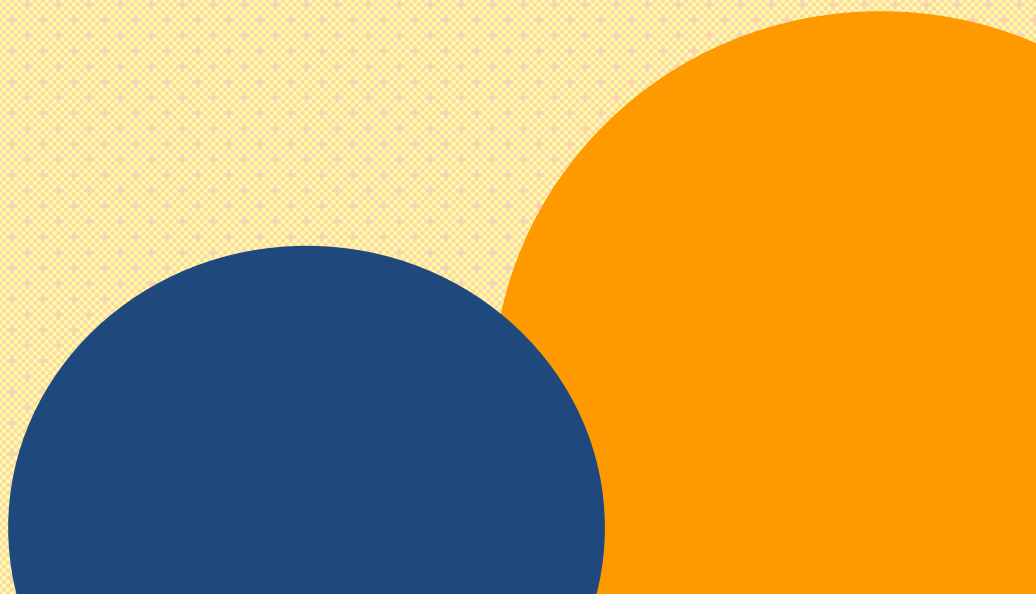
Impact Study

A two-year observation on Solafrica's development project in Kenya

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Acknowledgements

I wish to thank (in alphabetical order) Billy Ramogi, Brighton Akuku, Cédric Marty, Joel Jeanloz, John Okello, Dr. Kuno Roth, two students who visited the Ramogi Resource Center in Summer 2015 (Tobias Kloeffel and Lisa Keppler), and the whole research team for sharing their time and experience.

I am also thankful to all the students and technicians trained at the Ramogi Resource Center and customers of Kenya Solar Solutions, Ltd. served in 2016 for their time. Their experience has been of paramount value during the conduction of my research.

Finally, I am indebted to Prof. Dr. Stefano Brusoni for his support throughout the whole research project. His feedback has guided my thoughts and steps during the long journey of this research.

The Chair of Technology and Innovation Management (D-MTEC, ETH Zurich) has partially funded this research project.

All mistakes are my own.

Introduction: Impact in a nutshell

BEFORE (2009-Early2015)

- Frequent **dropouts** from training programs
- Certificates of participation issued without **any final examination**
- **0 stable jobs** created in the local community
- **Various attempts** to diffuse solar technologies in the local communities
- **Scant evidence of continued use** of solar technologies
- **Scant evidence** of any continued activities in the local communities

AFTER (Mid-2015 to date)

- **30 students, 7 teachers, and 9 technicians** trained
- Certificates of participation issued after passing a **final exam**
- **14 jobs created** in the local community and in the NGO
- **56 solar lamps sold** in the local community
- **19 continued users** of solar lamps (out of 19 interviewees)
- **Ongoing accreditation** process for the training center and **local partnerships** with Siemens Foundation and Strathmore University

The present report shows the impact that Solafrica, a Swiss NGO, has created in a rural community of Kenya (Abura, Homa Bay County).

The considerations presented here refer to the period **from April 2015 to February 2017**, during which Ms. Barbara La Cara (ETH Zurich) and Prof. Dr. Stefano Brusoni (ETH Zurich) conducted a qualitative, participative study in collaboration with Solafrica (a Swiss NGO) and two local organizations in rural Kenya (i.e., the Ramogi Resource Center and Kenya Solar Solutions, Ltd.).

The implementation of the study involved **three main stages**: 1) a retrospective analysis of Solafrica's development project in Kenya from 2009 to early 2015, 2) a participative study of the project from April 2015 to July 2016, and 3) a follow-up analysis of the impact created in the community (from August 2016 to February 2017). During the study, the support of two MSc students from ETH, Solafrica's members, and personnel from the local organizations (see appendix A1 for further details) was pivotal.

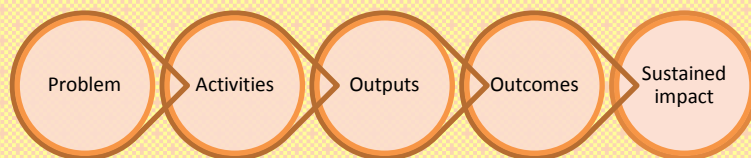
The report consists of **four parts**. Part 1 presents the framework used for the impact assessment. Part 2 provides the impact assessment of Solafrica's project in Kenya until 2015, while Part 3 presents the impact assessment of the project from 2015 to February 2017. Part 4 concludes.

Part 1. Impact assessment framework

We build upon and extend **Fowler’s (1997) framework** for the assessment of development initiatives to assess the impact of Solafrica’s project in the rural community of Homa Bay County (Kenya).

As Figure 1 shows, development projects typically start with the identification of a social problem to solve. The NGO then plans and implements activities in the local community with the aim of solving the problem. The impact assessment concerns the efforts put in carrying out the activities (outputs) as well as the short-term and long term effects of these activities in the community (outcomes and impact).

Figure 1. A framework for impact assessment of development NGOs’ initiatives. Adapted from Fowler (1997)



The present report describes how **Solafrica has succeeded in creating an impact in the local community** by flexibly adopting the framework above to the local context.

Over time, Solafrica developed engagement processes and training content (inputs) that ultimately enabled the NGO to understand the local community’s problems and how to solve them together with the local organizations and people (joint inputs) in order to create a sustained impact in the community (Figure 2).

Figure 2. A successful framework for creating sustained impact (The Solafrica case)



“Impact concerns **long-term and sustainable changes** introduced by a given intervention **in the lives of beneficiaries**. Impact can be related either to the specific objectives of an **intervention** or to unanticipated changes caused by an **intervention**”
[Blankenberg, 1995]

“When young people become more aware and active on **climate change** issues and are shown the available solutions, they become more interested and could help or influence the other generations.”

[Solafrica’s Annual Report, 2011]

Part 2. Until Early 2015

2.1 Problem

In 2009, Dr. Kuno Roth and Mr. Joshiah Ramogi - the former a member of Greenpeace Switzerland, the latter an intern at Greenpeace - founded Solafrica in Bern as a spin-off from Greenpeace. The idea was to set up a nonprofit organization whose mission was to help rural Kenyan communities in the **fight against global warming**.

For the fight against global warming to happen, local people would need to receive knowledge about solar energy and solar technologies from Switzerland (i.e., **knowledge transfer from Switzerland to Kenya**) and gain practical skills through solar trainings and workshops provided locally by **Swiss experts**. Eventually, awareness about solar energy and skills about solar technologies would enable local people to find employment as solar technicians.

2.2 Activities

In 2009, Greenpeace Switzerland, in collaboration with Greenpeace South Africa, organized a solar training for people living in the slums of Nairobi (Kenya).

Swiss experts on climate change and carpentry designed the training programs. The training included a theoretical and a practical part on solar technology and lasted about three weeks. Students were expected to learn about solar energy, how to manufacture solar torches and install solar home systems (SHSs). In 2010, Joshiah Ramogi founded the Ramogi Resource Centre (RRC) in Abura, Homa Bay County. Since then, RRC has hosted solar trainings organized by Solafrica. **Greenpeace and Solafrica provided training machines, solar materials and training content to the local community.**

“The training took 4 weeks: the first part was to introduce to people climate change, **global warming**, just to have a clear background, it was most likely theory, presentations, PowerPoint [...] in the practical part, **they actually installed a solar PV in this center**, in the office of the Kibera Youth Community program.”

[Local trainer, Interview]



Solar training, where?

2009-10: Kibera and workshop in Kogelo
 2012: Abura
 2013: Abura
 2014: Abura
 2015: Abura, trainees from Kilifi

2.3 Outputs

Between 2010 and early 2015, Greenpeace Switzerland and Solafrica offered **overall five solar training programs** in rural Kenya. Greenpeace Switzerland provided a first training as pilot project in Kibera (Nairobi) in 2009. The training program continued with the production of 1,000 solar torches between 2010 and 2011 in Kibera and Kogelo. Solafrica organized the remaining four trainings in Abura at the Ramogi Resource Center. The last training was organized for students coming from Kilifi. Beyond the training programs, Solafrica engaged in the dissemination of different types of solar technologies in the community.

Solar technologies used in the training and disseminated in the community varied over time

In 2009, Greenpeace aimed at engaging the community with photovoltaics (PVs) and solar torches. Since the Swiss design of the torches was not compatible with the local trainees' skills, Greenpeace changed the design and boosted the production of a simplified type of torches between 2010 and 2011. In 2012, Solafrica abandoned the production of solar torches and focused on installations of SHS during the training. It also included demonstrations with solar cookers, solar driers and water purification systems in the training. Between 2014 and 2015, Solafrica added demonstration with solar chills (small solar panels connected to refrigerators for vaccinations) and new curricula (computer, business, and group formation) to the training content to motivate students.

Which solar technologies?

Figures 3-6. From left to right: Solar torches, solar cooker, photovoltaics, and solar chill.



2.4 Outcomes

Solar Training

Over the period considered, **Solafrica trained ca. 85 students**. Students came from Kibera (30), Homa Bay County (39), and Kilifi (16).

Between 2013 and 2015, **Solafrica struggled with attracting students** to training programs and with keeping students, who were attending motivated until the end of the training.

In 2015, **to incentivize students' participation to training, Solafrica introduced a final exam** on both theory and practice as condition to receive the certificate. Still, six students **dropped out** from the course, before completing the computer course.

Many solar trainings Few motivated people

“There are people who just want to come here just to waste their time [...] **they're not interested, then you see their motivation to go down when they come to the training** [...] we also experienced that not a lot of ladies apply because they think it's a job for men only”

[Solafrica's Co-Founder and local organizations' President, Interview]

“We are offering to young people a training and green jobs. To my perception **they were not really interested in it, nor really going for it, because they didn't see any chance to sell [solar technologies]** in Kenya, so there was no emotional contact and it was maybe a boring work, I don't know, we were far away.”

[Solafrica's Co-President, Interview]

“All the 16 participants successful passed the exams. [...] **Only 10 students have managed to complete** the computer course.”

[Internal Report, May 2015]

Solar technologies disseminated from 2009 to 2015

50 solar torches
Ca. 15 solar home systems
0 solar cookers
4 solar chills

“Since the project’s inception in August 2009, approximately 1,000 portable solar lamps have been produced. The assembled lamps are sold at subsidized rates in Africa and **very poor kids get the lamps for free, thanks to donations from Switzerland** named ‘One child One lamp’, whereby a customer buys 2 lamps and receives 1.”
[Solafrica’s internal report, 2011]

Solafrica’s initial idea was also to enhance women entrepreneurship through the production of solar cookers. However, **no solar cookers** were installed in the rural community of Homa Bay County.

Between 2014 and 2015, Solafrica installed **4 solar chills** in four dispensaries in Homa Bay County as part of a collaboration with the local government.

Dissemination of solar technologies

Between 2009 and 2015, Solafrica disseminated different types of solar technologies in Kibera and Homa Bay County.

Between 2009 and 2011, Solafrica tried to sell solar torches in Kibera. The too high price of the torches (ca. 35 CHF) did not allow uptakes of the technology. Solafrica then opted for renting the torches to local kiosk owners and managed to rent ca. 10 torches. The management of the rents did not work quite well either, since kiosks were not registered. Solafrica finally tried to disseminate the torches through the “One child One lamp” donation strategy. Swiss donors donated **50 solar torches** to poor children in Kibera.

Solafrica also installed **ca. 15 small-sized solar home systems** (i.e., a 35Wh-photovoltaic panel) on the roofs of schools and private houses in Kibera, Kogelo and mainly in Homa Bay County. Many of these installations occurred during the practical part of solar training and served as demonstrations in the community. Remarkable was the installation of a solar home system at **Sarah Obama’s house in 2009**. In 2012, the solar learning center in Abura was named after former President Obama’s grandmother in 2012.



Figure 7. Installation of a solar home system at Sarah Obama’s house in Kogelo (2009)

Plenty of effort Little long-term impact in the community

“We tried between 2010 and 2013 with these **[solar] torches** and I think it was management failure: [...] we almost went bankrupt because **we didn't see early enough that it didn't work**, it was when we slightly changed in the solar learning center”

[Solafrica's Co-President, interview]

“We installed **[solar] home systems** and people were playing with the systems, with the wires, with batteries, **people were just messing-up with the systems for curiosity**, people just have that habit of playing with something.”

[Trainer, interview]

2.5 Impact

Awards

Solafrica's project in Kibera (solar training and manufacturing of solar torches) won the Swiss, Nature Prize in 2010 as a pioneer project for sustainable development. The impact of Solafrica's training and dissemination activities in rural Kenya (Kibera and Homa Bay County) was quite different.

Short-term employment

Only 4 trainees out of 30 people trained during the solar training in Kibera (2009) found employment in the manufacturing and commercialization of the solar torches. Two of them were actually involved in farming activities at the Kibera Youths Center and earned a salary from cropping. The solar training provided in Abura from 2012 to 2015 provided employment to only two solar technicians. Kenya Solar Solutions, Ltd. (a solar company founded by Joshiah Ramogi in 2013 in Abura) hired the two technicians for occasional installations in the community.

Short-term use of solar technologies

The impact of solar technology dissemination in terms of continued use of the technology was not long-term as expected. Local users were found not to use properly their solar home systems. Solar chills were found to be used for cooling sodas instead of vaccinations.

“This **[fourth] fridge** also inexplicably turns off every once in a while, also it is too cold, it only can be used for storing sodas, instead of the life-saving vaccines/medicine for which the Solar-chill was installed in the first place. **This makes the solar chill project a 100% failure.**”

[Research diary]

Part 3. After Mid-2015

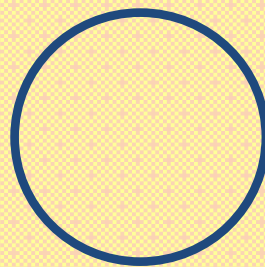
3.1 Inputs

Our participatory study started in April 2015. Back then, it was clear to Solafrica that it **needed to change its approach to the project** in Homa Bay County.

At the beginning of our study, Solafrica was asking itself how to engage the local community and build local competences through solar technology. Solafrica decided to focus on two issues:

- First, Solafrica needed to **understand what the local community's needs** for solar training and solar technology were.
- Second, it **needed to understand how to build local skills to sell and maintain solar technology** in the community in order to create a sustainable, long-term impact in the community.

Until that moment, the **charitable** (providing free solar training programs and free technologies as needed) **and top-down** (defining the problem to solve and implementing activities locally to solve it) approach to development **had failed** to create a sustained impact in the community.

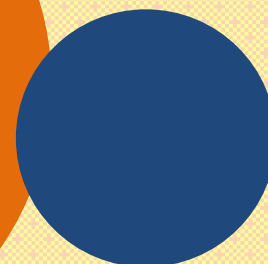


"I really think we need local people. It cannot be that we send people from Switzerland that look after; **there is need to have clarity so that we know their needs [local people's needs] and how to solve them.** Up to us from Switzerland to solve the challenges, if they need our help to solve them"

[Solafrica's Co-President, Interview]

"If we know exactly perfectly **how to incentivize people in Africa** that would be amazing but we don't, it's just a different culture and **we still haven't fully figured it out how to incentivize people, I wish we did"**

[Solafrica's board member, interview]



Awareness about solar energy

For our sample, **solar energy is a growing source of energy in Kenya (73%)**, good for the environment (40%), and needs little maintenance (40%).
[Multiple answers possible]

Respondents

n = 30
Men (85%)
Farmers
Average age: 30y
Education: Form Four

Devices at home

Radios (92%), cellphones (88%), TVsets (77%), laptops and cameras (50%)
[Multiple answers possible]

Factors considered for purchasing solar energy

Our sample was willing to purchase solar energy from a **trustworthy solar company (61%)**, which provided a **flexible payment plan (25%)** and offered a **reliable solar technology (11%)**
[Multiple answers possible]

3.2 Problem

Survey (Aug-Sep 2015)

To understand the local community's needs for solar energy, Ms. La Cara from ETH Zurich designed a survey for Solafrica to be administrated door-to-door by a Swiss student (Mr. Engler) and an employee from Kenya Solar Solution (KSS) Ltd in Abura. The goal of the survey was threefold. First, the survey aimed to help Solafrica in understanding the **local community's awareness** about solar energy.

Second, it aimed at understanding the **local needs for using solar** energy at home.

Third, it wanted to help Solafrica and KSS in assessing the local community's **willingness to pay** for solar energy.

The sample used mostly one source of energy for lighting. The most used source of energy was **paraffin/kerosene lamps (70%) for domestic lighting**. Firewood was the second most used source of energy (15%).

On average, the sample was **quite willing to switch to solar energy as source of energy** for domestic lighting (the sample's average score was 6, on a 7-point Likert scale).

When asked about the maximum amount to pay for daily use of solar energy and for solar installations, respondents selected **the least expensive price options** (respectively 0.5-2.0 CHF for daily use of solar energy and 50-100 CHF per installation of a SHS).

Participants contacted by the Swiss student, as compared to answers given to the Kenyan employee, mostly selected the lowest prices.

The survey was a first attempt to ask local people about their own needs for solar energy. However, results **did not address the incentives (beyond lighting) to use** in order to engage local people to learn about and adopt solar energy.

We needed to **find another way** to get inputs from local people.



3.3 Joint inputs

Participatory Rural Appraisal (Jan-Mar 2016)

In early 2016, Ms. La Cara started to design for Solafrica a training program that deployed participatory techniques and tools common in rural communities (i.e., Participatory Rural Appraisal, in short PRA). In March 2016, Ms. La Cara together with a student from ETH, Ms. Nanayakkara, provided the newly designed training to a Kenyan assistant (Ms. Njoroge).

Figure 8. Ms. Njoroge (left) and Ms. La Cara (right) during the PRA training in Zurich, March 2016

The training lasted 8 days and took place in Zurich (ETH). The main objectives were the following:

- Understanding the local community’s prior knowledge about solar energy and **how solar energy** and technology could **improve local people’s lives**
- **Linking the local community’s needs** for solar energy/technology to the broad issue of **climate change** as well as to complementary uses of solar energy and technology
- Creating **scenarios of potential users** of solar technology in the rural community to be implemented in a further solar training in Abura. For each type of potential users, we aimed at understanding their needs for solar energy as well as stakeholders and relationships involved in their decision-making processes of purchasing solar energy/technology
- **Creating selling and trouble-shooting narratives** to be used by solar technicians during the purchasing process of solar energy /technology (i.e., pre-sales, during the sales, and post-sales phases). We aimed at using narratives to **incentivize** local people to use solar energy and to **build local skills to sell and maintain** solar technology

We created eight possible scenarios. Together with Ms. Njoroge, we adapted the schedule and content of the new training program to the local community’s needs and habits.

“Your school does not have any access to power from KPC or solar energy. Students in your school are complaining because they all have to work hard to finish their syllabus in time every day from 7 am to 5 pm. Teachers are complaining because the students often come to class unprepared. Students cannot revise the syllabus at home in the evening because there is no power at their homes. They need a place where they can study and revise their syllabus for the following day. You know that in Kenya all the schools are graded according to the performance of the students. If students do not come prepared to class, they underperform. You want that your students perform well in a way that your school can get a high grade and attracts other students in future.”

[PRA tools: School’s headmaster scenario, Archival data]

3.4 Activities

On the right, we show the timeline of the activities conducted in Switzerland (Zurich) and in Kenya (Abura, Homa Bay County).

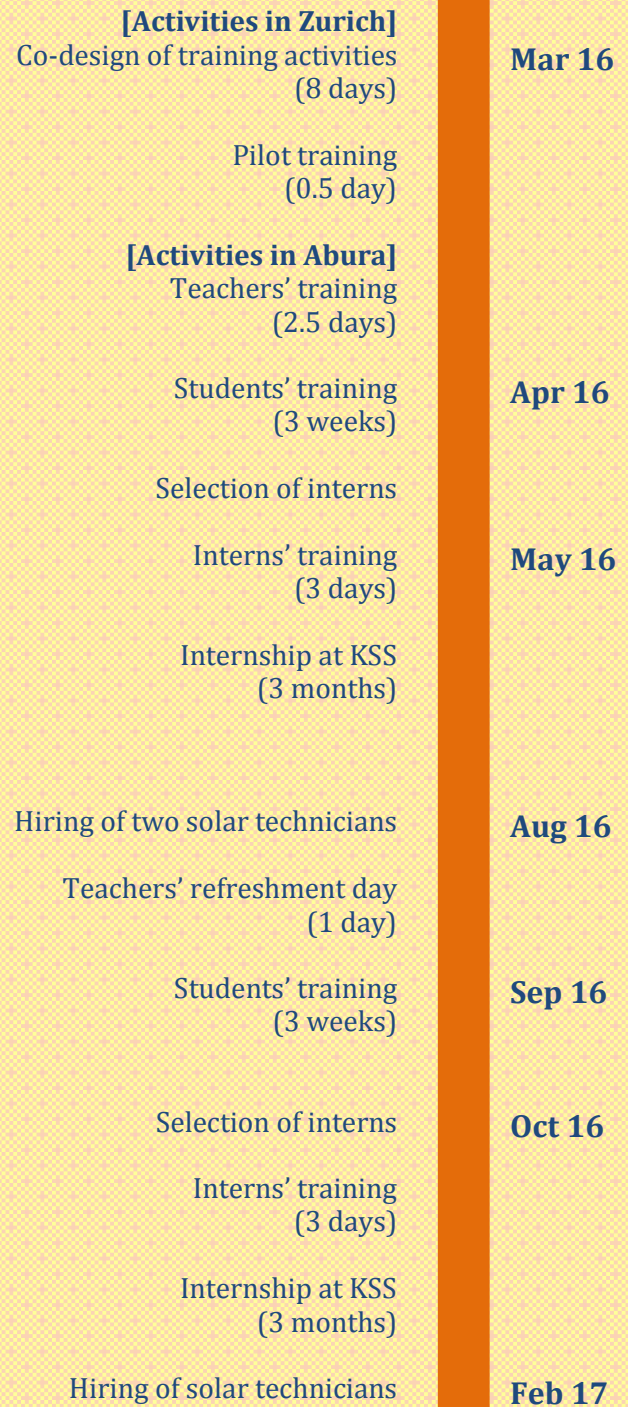
The main goals of the activities were:

- Implementing a **participative training** that motivated local people and helped them link their daily problem to climate change
- **Integrating the new PRA tools with the old content of the training** (knowledge about solar energy/technology, computer, entrepreneurship and group formation) through engaging local teachers
- Implementing a **market-based strategy** to disseminate solar technologies in the community that leveraged on incentives for local people to use solar energy
- **Separating and coordinating** training activities at RRC and dissemination activities of solar technology at KSS over time

3.5 Outputs

In 2016, Solafrica (in collaboration with the local organizations and ETH Zurich) implemented the following activities:

- 1 **pilot training** to test the implementation of the new training with Ms. Njoroge (Zurich)
- 2 training programs for the local **teachers**
- 2 solar training programs for local **students** with a participation fee and final certification upon passing a final exam
- 2 training programs for selected students from the prior students' training (i.e., **interns' training**) to provide more insights about the technology to sell and strengthen selling and trouble-shooting narratives
- Two 3-month **internships** at KSS in Homa Bay County to allow local technicians to gain experience in selling solar lamps and incentivizing local people to use solar energy through the narratives and a flexible payment plan
- A **franchising system** that employed KSS' best interns as franchisees. Interns were recruited upon their sales performance during the internship



“We discussed the [time]table with the teachers and agreed that the participants shall be evaluated through a test. In the timetable we made a few changes because we had to include the tools and the affirmation for [Ms. Njoroje]”
 [RRC’s report, Archival data]

3.6 Outcomes

Participation in training

- All the **7 teachers** participated in the teachers’ training and contributed to further adjust the new training schedule
- **30 students trained** in total (16 in April and 14 in September) of which 8 were female
- **All the students paid** for a participation fee (ca. 50 CHF) to cover food and accommodation’s expenses at RRC for the whole training period
- **26 students attended the entire training, took and passed the final exam**, which in turn allowed them to receive a final certificate. Drop-outs (two per students’ training) were justified by medical reasons
- **9 interns trained** on solar lamps, 5 of these were female

Dissemination of solar technology

- **56 solar lamps disseminated** in Homa Bay County. 19 lamps were sold during the first internship (May-Aug 2016) and 37 during the second internship (Oct16-Jan17)
- **2 types of solar lamps disseminated:** 32 Oolux lamps and 24 Barefoot lamps (see details below)
- **All the customers paid** KSS for the solar lamps purchased (ca. 80 CHF for an Oolux lamp and ca. 150 CHF for a Barefoot lamp) either in cash or through a flexible payment plan (called locally “higher purchase system”)
- A **franchising system** implemented



Figure 9. (Above) Students’ graduation at the end of students’ training, Abura (September 2016)

Figures 10-11. For the sake of simplicity, in this report, we refer to Oolux (left) and Barefoot (right) solar systems as to solar lamps. Oolux and Barefoot are Pico Solar Photovoltaic (PV) systems. They can be used for charging small electrical devices beyond providing light. The Oolux PV system has two light bulbs, short cables, a 5Wh-solar panel, and a 13-month warranty. The Barefoot PV system has four light bulbs, longer cables, a radio, a 6Wh-solar panel, and a 24-month warranty.



3.7 Impact

We relied on follow-up interviews with students, interns and customers to measure the impact of training and dissemination activities in the local community. We assessed the impact of training activities on long-term employment and on the dissemination of solar technology. We also checked for any continued use of solar technology in the community.

Long-term employment

Two months after the end of the students' training programs, we conducted follow-up interviews with the **students**.

We interviewed 18 students (10 from the first training and 8 from the second):

- **6 students found a job in the local community** (i.e., two teachers, a tax collector, a solar technician hired by another solar company, and two students opened up respectively a poultry firm and a restaurant) and **1 student improved her career profile** as a teacher
- 3 students were applying for a job at solar companies and **5 students went back to school** with higher motivation to finish their studies and apply for a job
- **3 students were unemployed**; they were taking care of sick relatives

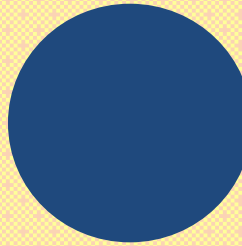
In the meantime, also the local organizations and Solafrica hired new personnel.

7 people hired by the local organizations:

- Ms. Njoroge became Chief Education Officer at RRC
- RRC and KSS hired their own managers
- RRC hired a cook, a gardner and employed one of KSS' employees as a driver
- KSS hired the best two interns from the first internship. Unfortunately, data collection ended before we could document the hiring of new interns from the second internship

A new project manager at Solafrica

In 2016, Mr. Schlegel succeeded Mr. Ramogi in the project-management of the Kenya project. Mr. Ramogi became the President of the two local organizations.



**13 long-term jobs
created in the local
community
and 1 at the NGO**

“He told me that he is actually a secondary school teacher now at Abura High school and the certificate really boosted his resume when he was applying. The training also boosted his self- confidence and now he also understands society problems and how one can identify solutions.”

[Student, Follow-up interview]

Impact of training on dissemination

We interviewed KSS interns to understand how the narratives that they developed during the students and interns' training helped them to disseminate the solar lamps in the local community.

We found that the **narratives helped the interns to provide potential users with incentives to purchase solar technology**. In one case (Intern 1), an intern managed to sell a solar lamp to a customer of another solar company.

In this section, we report a few citations from the interviews.

“The customer had two wives and fifteen children but both houses for his two wives had **[the competitor’s] solar [lamp]**. [...] The reason why the man took the lamp was because the intern told him that he actually had the option of **buying with higher purchase [system]**.”

[Intern 1, Follow-up interview]

“The narratives he used were that, **the Oolux lamps will help your children study even at night**, your wife can now prepare meals and have some family time as she helps children do their homework and preparations for the next day, **it is cheaper than using kerosene lamps** and the light from the Ooolux lamps is brighter than that of the kerosene lamps.”

[Intern 2, Follow-up interview]

“The intern told him **‘you can actually use it for business** for example charging phones with it for your neighbors and you charge them 20 KES [ca. 0.20 CHF] per phone and in a good month you will make approximately 9000 KES [ca. 90 CHF]’. **[The client] did not hesitate and bought the lamp for his first wife.**”

[Intern 3, Follow-up interview]

Continued use of solar technology

In November (four months after the end of the first internship), we called clients of KSS served by the first interns to assess whether they were still using the solar lamps and for what purposes. We found that **all the 19 clients were still using the solar lamps**. Most of them were using the lamps at home (e.g., Client 1). Others were sharing the use of the lamps with their neighbors or just promoting the purchase of a solar lamp in the community (e.g., Client 2). Others were even making money by using solar lamps (e.g., Clients 3 and 4).

However, data collection ended in February 2017 and we were not able to interview customers served during the second internship.

“He told me that actually most neighbors bring their phones for charging and he also **benefits from the charging systems.**”

[Client 3, Follow-up interview]

Continued activities in the community

At the time of writing, **Solafrica and the local organizations were working on setting up partnerships** with Strathmore University of Nairobi and Siemens Foundation in Kenya to replicate the impact of training programs with others students and technicians in Kenya.

“The lamp was in good condition [...] He is sure that **his children’s health has improved** for they no longer inhale the smoke produced by using the kerosene lamp. He also **feels safe** because the light is bright and **now saves money from not buying kerosene.**”

[Client 1, Follow-up interview]

“She said [that] some neighbors’ children usually come to **do their homework at her place.**”

[Client 2, Follow-up interview]

“She said [that] she actually uses [the lamp] for both the home use and *mama mbogas* kiosk use. She sells vegetables and in the evening **she carries the lamp and extends her business hours.**”

[Client 4, Follow-up interview]

Part 4. Conclusions

In the present report, we documented Solafrica's (a Swiss NGO) efforts over time to engage a local community in rural Kenya and empower it of the use and maintenance of solar technology.

We described how **Solafrica's initial, top-down and charitable approach to local development did not allow the NGO to create a sustained and long-term impact in the local community**. The approach started with a pre-defined problem to solve in the community (global warming) and continued with the design and implementation of activities by the Swiss NGO in the local community in order to solve the problem. Despite the NGO's efforts, impact in the community was minimal and short-term.

In mid-2015, **Solafrica realized that it needed to change its approach to engagement**. First, it needed to understand the local community's needs for solar training and solar technology; second, it needed to understand how to build local skills to sell and maintain solar technology in the community.

Between 2015 and 2016, Solafrica engaged with the local community to understand this latter's needs for solar energy (bottom-up problem definition). Together with the local community (two local organizations and a Kenyan research assistant) and in collaboration with ETH Zurich, Solafrica developed and implemented new training and dissemination activities in the local community (joint inputs and activities).

In the report, **we documented how the new approach to development, that Solafrica has adopted, enabled the NGO to create a long-term, sustained impact in the local community** in terms of long-term employment, dissemination through a market-based strategy, and continued use of solar technology.

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Appendix A1. The Research Team



Elias Kost
Solafrica's Chief Executive Officer since 2013



Raphael Engler
Solafrica's board member
Previously, MSc student (semester project in 2015) and research assistant for TIM Chair (ETH Zurich)



Florian Schlegel
Solafrica's Project-manager for Kenya since 2016



Joshiah Ramogi
President of Kenya Solar Solutions Ltd and Ramogi Resource Center (Abura, Kenya) - Solafrica's Co-founder and Project-manager for Kenya until 2015



Phyllis Njoroge
Chief Education Officer, Ramogi Resource Center - Previously, research assistant for TIM Chair (ETH Zurich)



Stefano Brusoni, Prof. Dr.
Professor of Technology and Innovation Management (TIM Chair, ETH Zurich)



Barbara La Cara
PhD Candidate and Change Leader (TIM Chair, ETH Zurich)



Randi Nanayakkara
MSc student (semester project in 2016) at TIM Chair (ETH Zurich)

Switzerland

Solafrica

Swiss NGO, founded in 2009 as a spin-off of Greenpeace Switzerland. Solafrica's main objective is to promote solar energy and energy efficiency in Africa. Solafrica believes in the synergies of combining environmental protection and social development.

Chair of Technology and Innovation Management (ETH Zurich)

The Chair of Technology and Innovation Management is a Chair of the Department of Management, Technology and Economics (D-MTEC) at the ETH Zurich. It is interested in understanding how innovation happens in technology-intensive environments.

ETH zürich

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Chair of Technology and Innovation Management

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Kenya

Kenya Solar Solutions, Ltd.

Social solar enterprise operating in Homa Bay County (Kenya). Its goal is to distribute solar energy to people living in rural Western Kenya.

Ramogi Resource Center

Non-profit organization that provides training programs in Abura (Homa Bay County, Kenya). Since 2012, it hosts the Sarah Obama Solar Learning Center.

Sample

We collected data mainly from four organizations - Solafrica; Greenpeace; Ramogi Resource Center and Kenya Solar Solutions, Ltd. - and from their stakeholders.

A2. Overview on research activities

Timeline of the research project and data collection

Data collection lasted from April 2015 to February 2017 and involved the following five phases.

Phase 1: Apr-May 2015

Gathering information from our sample in preparation for the fieldwork in Kenya.

Phase 2: Jun-Dec 2015

Gathering information from the field (Switzerland and Kenya) to help Solafrica understand how to engage the local community. In Kenya, Mr. Engler kept a diary to describe events and conversations occurring and meta-notes, capturing his reflections on particular events. Ms. La Cara guided data gathering by interacting with and interviewing Mr. Engler by remotely from Switzerland. Ms. La Cara also engaged in probing interviewing with key informants from Kenya and Switzerland, as well as participated in meetings held by Solafrica in Switzerland.

Phase 3: Dec 2015 -Apr 2016

Ms. La Cara and Mr. Engler acted as action researchers to develop engagement tools and activities together with Solafrica and the local organizations. Ms. La Cara, supported by Ms. Nanayakkara, trained Ms. Njoroge about PRA to adjust and later implement the PRA tools in the community.

Phase 4: Apr-Jul 2016

Ms. Njoroge begun her fieldwork in the local community. Ms. Njoroge also succeeded Mr. Engler in data gathering from Kenya. She kept a diary and meta-notes and interviewed key informants in the community. In the meantime, Mr. Engler participated in the activities of Solafrica in Switzerland. Ms. La Cara guided and coordinated the activities of both research assistants.

Phase 5: Aug 2016-Feb 2017

Ms. La Cara conducted follow-up meetings and interviews with key informants from Kenya and Switzerland. Ms. Njoroge kept a diary until November and conducted follow-up interviews in the local community following Ms. La Cara's lead.

More than 3,900 data points

Recorded face-to-face interviews and conversations, diary entries, reflections, archival data, pictures, Skype calls and chats, WhatsApp chats, emails, participant observations, websites screenshots over time.

Data analysis

In this section, we show in detail how the data supported our research (i.e., data analysis).

Data analysis involved mainly three stages:

- **Retrospective analysis** of Solafrica's past trainings in Kenya from 2009 to early 2015,
- **Participative study** to document Solafrica's activities in Kenya and Switzerland from April 2015 to July 2016,
- **Follow-up analysis** of the impact of training programs and solar technology dissemination in the local community (from August 2016 to February 2017).

1. Retrospective analysis of Solafrica's past training in Kenya

Data used: Retrospective interviews - Archival data - Webpage archive - Pictures - Skype calls

2. Participative study 2.1 Understanding Solafrica's and local organizations' activities

Data used: Emails - Research diary - Reflections - WhatsApp chats - Skype calls - Archival data - Interviews - Participant observations

2.2 Documenting the implementation of new activities in the community

Data used: Emails - Research diary - Reflections - WhatsApp chats - Skype calls - Archival data - Interviews - Participant observations - Pictures

2.3 Assessing local community's needs for solar energy

Data used: Survey data (i.e., "market analysis") - Flipcharts - Pictures - Emails - Research diary - Skype calls - WhatsApp chats

3. Follow-up study

Data used: Follow-up interviews with students, interns and key informants from Solafrica and local organizations - Interviews with clients - Flipcharts used during the training - Pictures - Emails - WhatsApp chats - Reflections - Skype calls - Participant observations

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