

IMPACT ASSESSMENT

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Executive Summary

The Light Up Sulawesi impact assessment was conducted by Kopernik fellow, Syarifah Amelia, between June and August 2015. This project distributed 50 d.light S300 solar lights in Soppeng district, South Sulawesi from October 2013 to October 2014 in partnership with Asosiasi Pedagang Kaki Lima Indonesia (APKLI). The project originally aimed to target people in villages who had no access to electricity. However, during the impact assessment it was discovered that the targeted villages had gained access to electricity during the crowdfunding and technology procurement process. Therefore, in the end, the distribution plan had to be adjusted accordingly.

The data for this impact assessment was collected in July 2015 and consists of 19 interviews with solar light users who purchased the technology from APKLI. The technology buyers included in the survey were characterised by:

- high level of education, with 63 percent graduating from university;
- a regular income, whether from their own business or from a salary; and
- buying the solar lights in spite of having access to electricity.

Because of the unanticipated change in electrification of the area, distributing solar lighting was no longer a necessity for providing people with a sustainable lighting source. However, respondents were still interested in obtaining the technology for the following reasons:

- the perception that the technology was innovative, unique, and easy to use.
- an interest in the instalment scheme offered, whereby a series of payments could be made over time instead of one payment up-front.
- an interest in using the technology as a portable charger for mobile phones at home and during travel.

The Light Up Sulawesi project was successfully implemented by the local partner in terms of selling all of the technologies and returning the agreed repayment to Kopernik to be reinvested in their phase two project. However, findings show that the buyers of the technology were not those initially targeted

and those categorised by Kopernik's mission of "connecting simple, life-changing technology with people who need it the most."

Kopernik expects that when solar lights are sold to off-grid, last mile communities, these technology users can benefit through income savings, health improvements and productivity gains. Such results were not found from this project. This impact assessment raises important issues, as well as recommendations for future projects, to ensure that Kopernik's technology can make the biggest impact by reaching those communities who need it the most.

Image 1. Rice fields near Soppeng city



Project Background

Project Objective

This project was approved and implemented based on the original proposal and targeted sales towards people living in villages with no access to electricity in Soppeng district, South Sulawesi. The proposal submitted by Asosiasi Pedagang Kaki Lima Indonesia (APKLI) intended to target the Timusu village where the hilly part of the village had no access to electricity access.

Kopernik

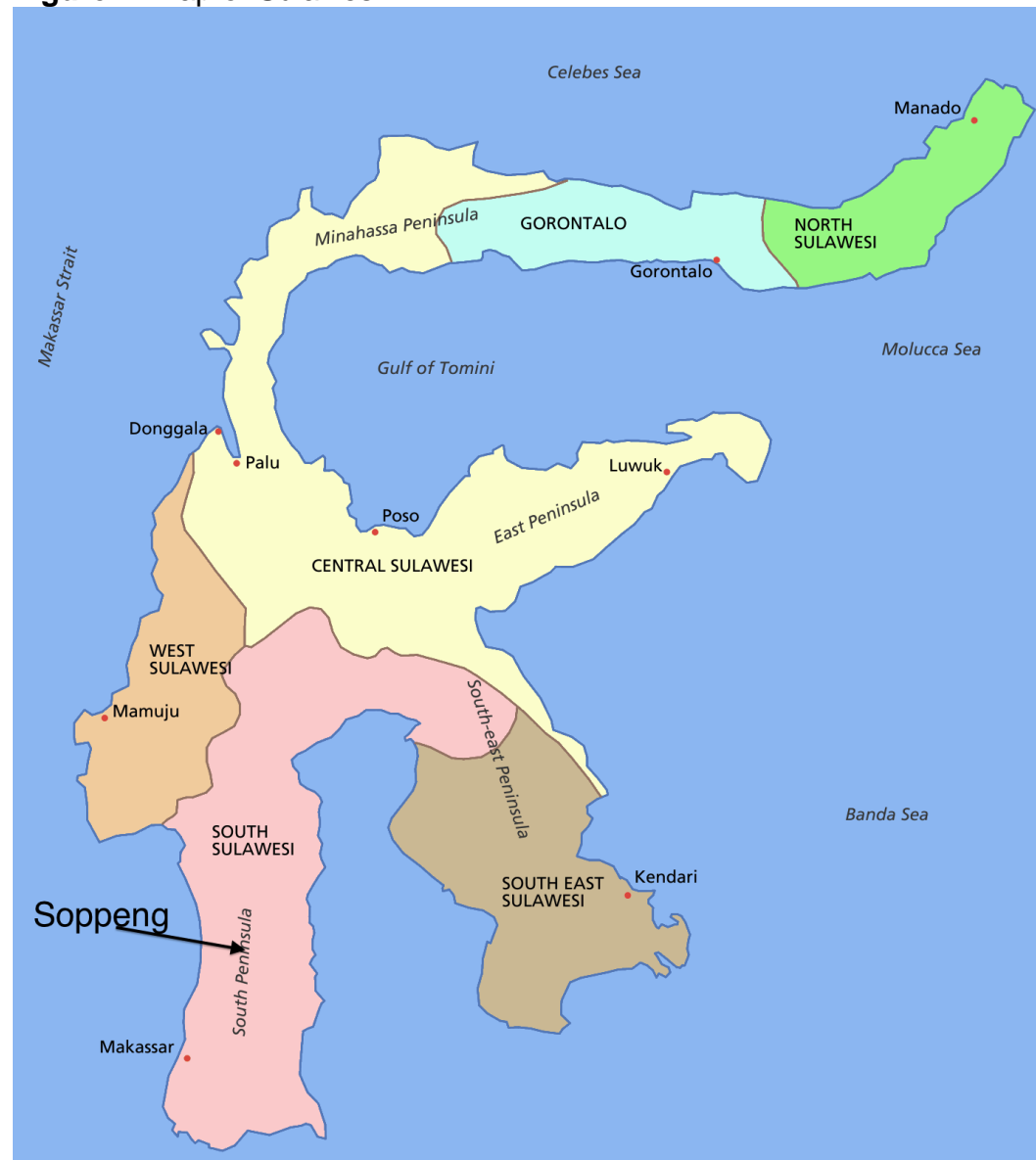
Kopernik is a non-profit organisation that focuses on distributing life-changing technology to last mile communities. Kopernik balances a philanthropic and business approach to distributing technology. Our donors fund the upfront costs of introducing technologies and creating micro-business opportunities in remote communities. The money raised from product sales is reinvested in more technology for the last mile.

Our Local Partner - Asosiasi Pedagang Kaki Lima Indonesia (APKLI)

Asosiasi Pedagang Kaki Lima Indonesia (APKLI) is an association of micro-business owners that has branch offices all over Indonesia. APKLI in the Soppeng district was founded by Andi Muhammad Ilham in 2011. The association focuses on micro-business empowerment through capacity building, training, access to capital facilitation, and simple technology.

Snapshot of Location

Figure 1. Map of Sulawesi



Soppeng is one of 23 regencies in South Sulawesi province. It is located approximately 192 km north of Makassar, the capital of the province, and it takes around four to five hours to reach the city from Makassar. Soppeng district's capital is Watansoppeng and the district covers 1,337,99km² in area. The district consists of eight sub-districts: Lalabata, Liliriaja, Lilirilau, Gandra, Citta, Donri-donri, Marioriwawo, Marioriawa and 70 villages.¹

¹ BPS Provinsi Sulawesi Selatan, Sulawesi Selatan dalam Angka 2014

The socio-economic indicators of Soppeng² are as follows:

- The population of Soppeng city is 225,512 people consisting of 47 percent male and 53 percent female.
- The Gross Regional Domestic Product (GRDP) is IDR4,254,000,000 (US\$294,813), which equates to IDR18,868,099 (US\$1308) per capita.
- A significant proportion of the population works in the agriculture sector (38 percent), largely in rice, maize, cacao, and tobacco.
- Soppeng is known as the main producer of rice in South Sulawesi province.
- The poverty line is calculated at IDR202,666 (US\$14) per capita per month,³ while the national statistics are at a higher amount at IDR312,328 (US\$21.65) per capita per month.
- The total population in Soppeng who are living in poor conditions are 9.43 percent.

In general, Soppeng is a city with relatively high levels of income, low poverty and good infrastructure. The roads are quite good and there is now access to electricity throughout the province.

Image 2. Street scene from Soppeng city



² Ibid

³ Ibid

Project Implementation

The Technology

The d.light S300 solar light provides bright light at a wide angle, illuminating an entire room. It features four brightness



settings, providing up to 16 hours of light at the strongest setting and 100 hours of lights on the weaker bed-light setting. The d.light S300 solar light also charges mobile phones, and comes with a USB port allowing multiple types of phones to be charged. A battery indicator shows the charge level. It is lightweight (300g) and comes with an ergonomically designed handle and top strap, which offers maximum flexibility for use in the home, workplace, or outdoors.

Distribution Mechanism, Pricing & Payment

APKLI started the distribution process in October 2013, distributing a total of 50 units of d.light solar lights. The technology was sold at a price of IDR350,000 (US\$24.26) per unit with the option of purchasing the technology using monthly instalment payments.

The local partner felt that promoting the ease of use of the product and the affordable payment option would be the most attractive sales strategies for the potential buyers. The revenue raised from sales in the Light Up Sulawesi project will be reinvested into a second phase, Fire Up Sulawesi, bringing fuel-efficient cookstove technology to the people of Soppeng.

When working as a village facilitator, the head of the local partner, Andi Muhammad Ilham, observed that electricity supply has not been reaching all households in the villages where he worked. Therefore, when APKLI proposed the project, their intention was to target people in the hilly part of the villages who had no access to electricity. Based on his observations and experiences, Andi considered that Timusu village was most in need and that residents were able to afford the cost of this technology.

During the time between submitting the project proposal and receiving the technology for distribution, electricity was provided in the village by Indonesia's state-owned electricity company, Perusahaan Listrik Negara (PLN). The distribution plan continued in a larger target area, but a lack of electricity was no longer the driving force behind the purchase of the technology for buyers. Kopernik was not made aware of the change in circumstances related to the electrification of the area at this time.

Impact Assessment

Process & Methodology

The primary data for this impact assessment was collected by conducting surveys among technology buyers based on a sample of the target population. However, the following challenges were faced in conducting the survey:

- The area where the technology was used was bigger than the area where the technology was initially distributed. Thirteen units were bought in Soppeng to be used in other districts.
- The remaining 37 units were purchased to be used in Soppeng but sometimes with multiple purchases resulting in a total number of 25 buyers.
- The electronic records of sales kept by the local partner were damaged and the data could not be recovered prior to the impact assessment.

Due to the small number of buyers actually living in Soppeng, the available population to survey was only 25 buyers. Based on the availability of respondents and criteria fulfilment, a total of 19 respondents were interviewed. Due to the scattered location of respondents, data collection took three weeks to complete.

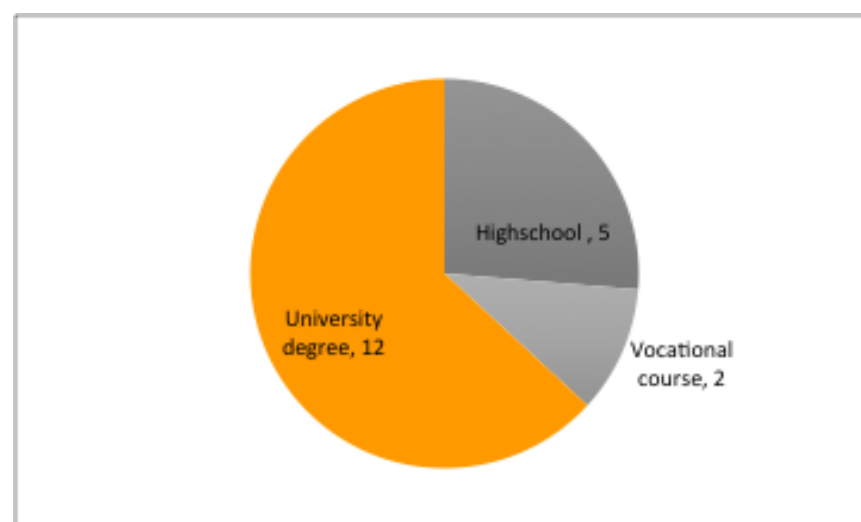
Characteristics of Technology Buyers

The characteristics of respondents (one per household) from 9 villages within Soppeng city are listed below:

Gender	10 females and 9 males
Age	Average age 39, (range between 27 and 67 years old)
Marital status	89% married
Household size	On average 4.6 members and 1.5 children
Education	63% completed undergraduate university studies
Employment	89% employed
Monthly Income (average)	IDR3,755,555 (US\$264)
Access to electricity in Soppeng	16 of the 19 have access to electricity in their primary residence and 3 responses do not have access to electricity in their secondary residence in Soppeng
Access to drinkable tap water	Only 1 of the 19 respondents has access to drinkable tap water

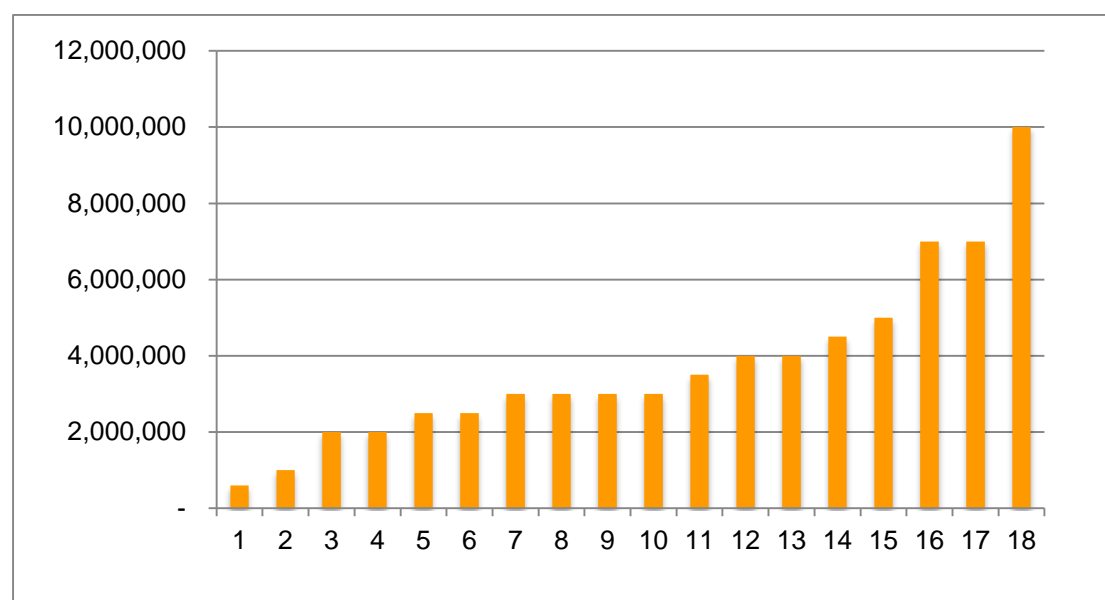
As seen in Figure 2, 12 respondents (63 percent) have completed undergraduate study at University and the lowest education level of respondents is high school.

Figure 2. Level of respondents' education



As seen in Figure 3, the average household income is IDR3,755,555 (US\$264) with the lowest income of respondents at IDR600,000 (US\$42) and the highest at IDR10,000,000 (US\$702).⁴

Figure 3. Monthly income (IDR) (n=18)



Of the 89 percent of respondents who are employed; their occupation varied from business owner, farmer, teacher and civil servant. The respondents who are unemployed, are housewives or retired civil servants.

Sixteen of the 19 respondents (84 percent) have access to electricity. For the remaining three respondents who reported not having access, it is in their secondary home only in the mountains near their farming land, not in their primary homes where they live for the majority of the time.

As opposed to the majority of projects Kopernik undertakes, the buyers in this project are atypical, in that they had quite a high level of education and enjoyed a regular income whether from their business or salary. They also had access to electricity and were not reliant on kerosene, candles or batteries to provide household lighting. Given the characteristics of the technology buyers, it was

⁴ One response was excluded from further income analysis as it was considered an outlier, with a reported monthly income of INR25,000,000 (US\$1755).

not possible to measure anticipated project outcomes of Kopernik's projects, such as improved health, income saving and time-saving benefits. '

Purchasing Decision

Although solar lights were no longer necessary, as electricity was available, respondents were still interested in obtaining the technology. The survey shows that five respondents (26 percent) bought more than one solar light. Based on further observations and discussion, it was discovered that these buyers acted as resellers or lent/gave the extra units away to family members. The highest number of units purchased by one buyer was eight units, but only one unit was retained and used by the initial buyer. As mentioned above, respondents in this survey were only those who both bought and used the technology directly.

Multiple reasons were reported for purchasing the solar lights, with about half of the respondents citing discussions with the local partner or their friends who convinced them to buy the product.

The factors driving the purchase of the solar lights are explored in the following sections, and include affordability, appeal of the technology, limited access to electronics and the appeal of the instalment scheme.

Affordability

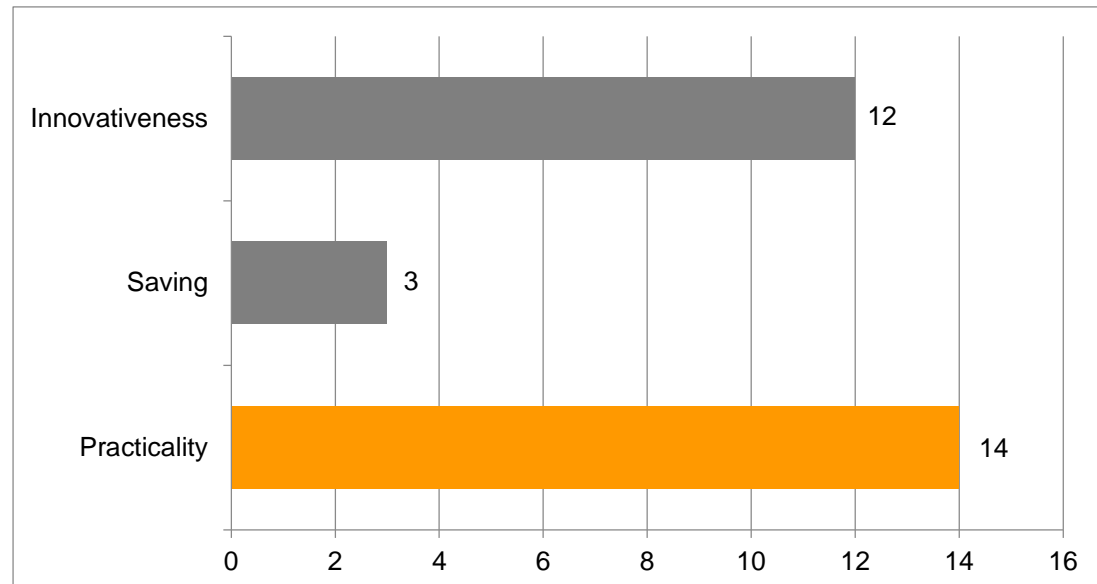
From the 19 respondents interviewed, 74 percent stated that the price of the technology is affordable and 21 percent said that it is cheap. Due to the buyers' regular and stable income and the fact that instalment payments could be used to pay for the product, the respondents did not in general have any problem affording the technology.

The Appeal of the Technology

As seen in Figure 4, the appealing points of this technology, are reported as practicality, its innovativeness, and the fact that solar can help to save money as an alternative lighting source to electricity. Twelve out of 19 respondents who mentioned uniqueness or the innovation of the product as one of the

technologies' most appealing points, were also those who had a high level of education and had graduated from University.

Figure 4. Appealing points of the solar lights (n=19)



Note: Respondents can select multiple responses

The data also show that a higher education level correlates to a higher level of disposable income and the purchasing decision shifting from only buying products that are a necessity, to buying products that are seen as more 'luxury'. While the lights do have benefits to these buyers, its main appeal is that it is new and exciting and their friend has one.

Limited Access to Electronics

Another factor that is believed to have influenced the sale of solar lights is the limited availability of electronics shops in Soppeng. When it comes to buying electronics, most people from Soppeng prefer to go to Makassar, the capital city, which is four to five hours drive away in normal traffic. Technology products like the d.light S300 solar light are therefore not accessible in Soppeng, but only in the capital city, Makassar.

Popularity of Instalment Payments

In Soppeng, buying goods with an instalment program is common for people with or without a regular income. Farmers buy fertiliser and seeds, paying half

the total price as a down payment and the remaining amount in monthly instalments, or upon agreement after harvest time. In the government offices and schools, employees often have regular instalments collected from them after pay day each month. This practice is common because the merchants feel government employees are safe to offer credit to because they have a regular salary and are easily tracked down.

Some respondents stated that they had credit with multiple merchants and found that this was a good method for purchasing goods. As APKLI offered an instalment program to purchase the solar light, this further attracted them to buy the product. Civil servants who had already purchased the solar light, suggested that APKLI could approach their offices on pay day like the other merchants and increase their sales further but no more stock were available when this was suggested. The instalment program for the technology was considered affordable for most people, paying a monthly contribution of IDR35,000 (US\$2.43).

User Satisfaction and Usage

When this survey was conducted, respondents were using the technology for around 20 months, with the exception of one light, all 18 lights were reported to be still in good working condition. The satisfaction rate of this technology ranged between satisfied (37%) and very satisfied (63%).

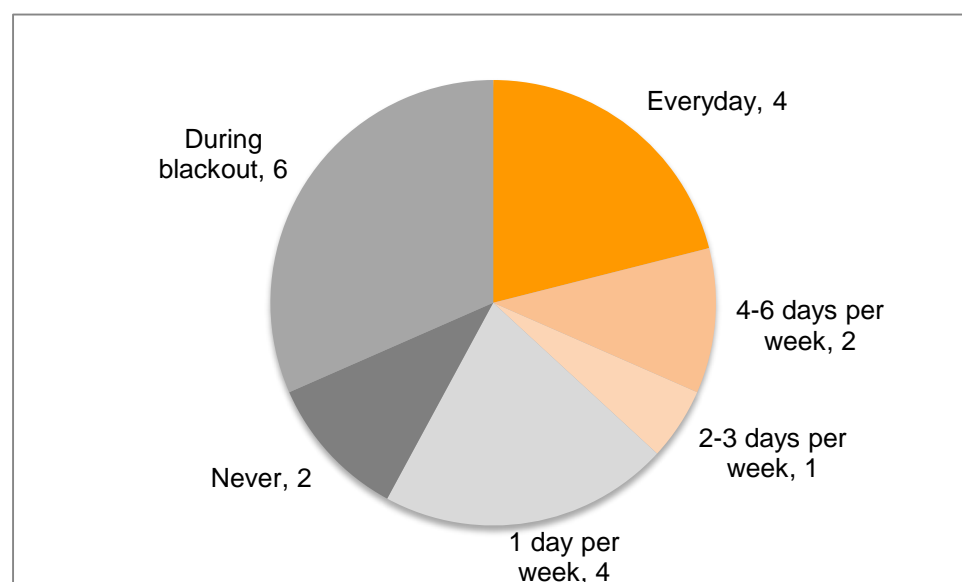
Product Ratings

Respondents rated the lights highly in terms of their brightness, running time, durability and charging speed.

Quality	Rating (n=19)
Brightness	4 out of 5 stars
Running time	4 out 5 stars
Durability	4 out of 5 stars
Charging speed	3.75 out of 5 stars

As seen in Figure 5, there is a range of reported usage patterns with four respondents using the solar light on a daily basis.

Figure 5. Frequency of product usage



Among the respondents, there were only three people (out of 19) who used the technology in the way that it was originally intended; as a lighting source in an un-electrified area. While these buyers had electricity access in their main houses, they used the d.light solar lights as the primary lighting source in their farming house.

Changes in User Habits and Other Impacts

Surprisingly, one of the most popular uses for the solar product was as a portable phone charger both at home and while travelling. While some of the respondents use the technology as a lighting source only during power outages, 17 of the 19 respondents reported that they often use it as power source to charge their mobile phones, whether at home when the electricity is actually on or while in the car or bus, moving around. All respondents agreed that the charging speed is quite fast if the d.light S300 is used in this way.

The only challenge in using the technology was the fact that the solar panel needs to be outside (in sunlight) to charge. As this was forgotten on a regular basis, it was uncharged when the charger needed to be used. This again is an issue related to infrequent use as in most cases when the light is being used

every day, the family will rig up the solar panel on their roof so that it is always charged and can easily plug in to the light/charger located inside the house and therefore never goes flat.

Sixty eight percent of the respondents also confirmed the intention to buy a replacement product once their light stopped working (it has five-year expected lifetime) and all respondents recommended the product to others. This involved not only verbally promoting the technology or texting their friends about it, but also showing it to other people, using it when gathered with others and even lending the product to friends, particularly for recharging mobile phones.

Image 3. Local technology enthusiasts



Effectiveness of Project Delivery

Local Partner and Project Implementation

The local partner, APKLI, indicated that they were happy to work with Kopernik. Andi felt that access to innovative technology was helping the people in his community. He described the biggest challenge in implementing this project as time management. Andi was operating APKLI as a 'one man band' and was committed to his role as a village facilitator, which didn't always leave enough time to efficiently implement the project. While Andi is full of ideas and spirit for development and innovation, he admits it is not always easy to manage a team of volunteers and implement his ideas successfully.

Sales Strategies and Promotional Activities

The first step APKLI took to sell the technology was to promote it in five target villages, Timusu, Rompegading, Jampu, Watutoa and Appanang. These villages were already a part of the Program Nasional Pemberdayaan Masyarakat (PNPM) - the National Community Empowerment Program. This is a program that APKLI has participated in since 2008. PNPM deployed village facilitators to work together with village cadres. Andi Muhammad Ilham, the head of APKLI, was the designated village facilitator for the PNPM program in this area. Andi's experiences with this program over seven years gave him good access to the community members and the benefit of already having good relationships with people in these five villages which meant he was a trusted visitor who people would listen to when promoting a new product.

Using his connections with the village cadres, Andi collected information on important dates in each village that related to upcoming village meetings and events. Based on this information, he knew when to submit a formal letter to the head of the village's office to gain permission to attend the meeting or event to introduce the solar lights.

Andi was usually allocated a slot at the end of the village meeting to promote the technology. He would introduce his organisation, its cooperation with Kopernik, and provide a quick demonstration on how to use the technology and

what its benefits are. At the end of his presentation, Andi would provide his contact number and mention the village cadre as an alternative contact for those who wanted to buy the technology.

During the product demonstrations, the most common questions raised were whom to contact and how to pay. Questions were also often asked about the product's warranty. Andi would also relate the after-sales service he could provide, and told potential customers that they could contact him directly if they had any problems with the technology or contact the village cadre who would help them to contact him. Many of the potential buyers were also keen to have hands-on experience with the technology and asked to try it themselves at the end of the presentation.

To expand his target market, Andi also approached his wider circle of friends, and those of his wife. His wife, Nur Azizah, is actively involved in the local women's farming group and also promoted the solar lights within this network. She also participates in many Blackberry messenger groups and used this method as a way of promoting the technology more widely.

As mentioned before, some people bought multiple units of the product and acted as resellers. APKLI permitted these 'agents' to increase the end user price by IDR50,000 (US\$3.47) so that they received a commission for the sale. The difference in pricing, luckily, did not create problems among the buyers.

Repayments

APKLI were quite flexible on the instalment payment terms and this created some problems in collecting the instalment payments where many people were late in paying.

The payment could be made by transfer to the local partner's bank account or paying in cash directly to Andi or via the village cadres. APKLI never reminded or insisted the buyer to make the instalment payments at a particular time because they believed that the people would pay when they had money. The decision to divide the instalments across ten months was taken with the

consideration of having an extra two months as buffer time for late payments as the payback period to Kopernik was twelve months.

When people did not pay on time, the local partner assumed the buyer would top up the payment in the following month. Unfortunately this wasn't always the case, and the local partner admitted they borrowed from their own organisation's funds so that they could pay back Kopernik on time. Luckily two months on they had successfully collected all instalments and the money could be paid back. Putting this kind of pressure on the local partner is not Kopernik's intention and it would have been better if the local partner discussed the situation at the time with Kopernik, to renegotiate the repayment schedule and timeframe.

Image 4. Local partner, APKLI, reviewing stock of the solar lights and cookstoves



Recommendations

1. Kopernik should discuss the intended target market for the Light Up Sulawesi project with APKLI and decide together whether any changes need to be made for the second phase project, Fire Up Sulawesi.
2. Kopernik should improve communications with the local partner to ensure vital information and expectations regarding the project implementation are discussed and that the project milestones are regularly reviewed and revised, if needed.
3. Kopernik should be more specific in defining the characteristics of the target communities.
4. Kopernik should discuss time management challenges that the local partner has raised and potentially change the implementation timeline for the Fire Up Sulawesi project.

Kopernik's Response to the Report and Recommendations

Kopernik was surprised to learn through the impact assessment process conducted by the Kopernik fellow that the lights were in fact sold to people who have access to electricity, and not those communities living without access, which was the agreed project proposal. Kopernik understands that the situation changed during the funding and procurement process and would normally learn of this change during monitoring calls conducted by Kopernik before the technologies were shipped to the project location. An alternative plan would have been agreed. Communication at the time, was not well managed by Kopernik and the ideas surrounding Kopernik's target market were not clear to the local partner, which Kopernik must take responsibility for.

Before this impact assessment was conducted, Kopernik had already agreed to continue its relationship with APKLI and move forward with a second phase project based on information submitted in the final report for Light Up Sulawesi.

Issues raised in this report and accompanying recommendations will be addressed by Kopernik shortly through a series of meetings held with the local partner to agree the next steps and improve the relationship for the Fire Up Sulawesi project that is currently being implemented.

Kopernik believes that improvements have been made in their project management processes since the implementation of Light Up Sulawesi. A Memorandum of Understanding clearly outlining the roles of both parties and an agreement to participate in monthly monitoring calls with Kopernik will ensure that these problems will not be repeated for the Fire Up Sulawesi project.

Image 5. The road leading out of Soppeng with rice fields on either side



Annex - Impact Stories

Arizal and Family, Batubatu, Soppeng, South Sulawesi



Local family, from left to right, Hj. Syarifah, Risma, Muhammad Amin and Arizal.

I took public transport (*angkot*) to travel from Soppeng city to Batu-batu, a village in Mario Riawa sub-district. The *angkot* I travelled in was unusual with a unique interior as the driver had decorated the dashboard with old rear-vision mirrors. It was Ramadhan fasting month, the weather was hot, all the windows were open and the music was loudly blaring throughout the trip. Yet, I was very excited because my destination was known as one of the tourist spots of Soppeng. Batu-batu village is famous for the Lejja natural hot springs, and Rumah Seratus, a replica of a traditional Buginese home.

In Batu-batu, I first interviewed Arizal, (37 y.o) who learnt about the solar lights through participating in social media groups where, Chica, Andi's wife had advertised the product. Chica is his college friend and she told him about the product using BB messenger. He bought the technology because he thought the light was innovative and durable.

“I put the solar panel on the roof, and I have never taken it down from there since the beginning. Yet, it is still OK, it has never broken even after being exposed to strong rain and sunlight. It’s very durable! I use the d.light S300 solar light every day to charge my mobile phones.”

Hj. Syarifah (64 y.o) is a retired civil servant. She is Arizal’s mother. She bought the technology too after Arizal recommended it. She uses the technology as a back-up, just in case there is an electricity black-out.

“I use the lantern as a back-up, in case the electricity goes out. Although this rarely happens, I feel safety that I have it in my room and I find it easy to use.”

Hj. Muhammad Amin (67 y.o) is a farmer. He bought the technology from Arizal. He has electricity in his house, yet he bought it because it helps him to light the way when he visits his friends or when he monitors his rice fields at night. He was very proud of his solar light and was happy that he purchased it.

“The lantern is very useful for me. I use it when I go out at night. I can use it to go and visit my friends whose home is far away. I lend them my lantern to charge their mobile phone too because they don’t have electricity in their house. They really want to buy a solar light if they are available again.”

Risma (30 y.o) is a housewife. She is Arizal’s sister in law. She bought the technology from Arizal, but unfortunately when the technology arrived it was broken. Risma contacted APKLI to tell them the problem and a replacement was delivered. She was very satisfied with the after-sales service she received from Andi.

“I got a new product as a replacement for my lantern that was not operating well. The process was easy, fast and Pak Ilham (Andi) was very helpful.”

The people I interviewed in Batu-batu all had different experiences with the technology but were all satisfied with their purchase. It was a long trip but it was worth it to learn how they appreciated this technology.