



LIGHT UP OECUSSE PHASE 3

IMPACT ASSESSMENT

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Executive Summary

Kopernik, in partnership with Fundasaun Esperanza Enclave Oecusse (FEEO) made 2,339 more solar lights available in Oecusse in the third phase of the Light Up Oecusse project, 1,316 d.light S250 and 1,023 d.light S10 solar lanterns. Kopernik also teamed up with d.light to design and conduct a training workshop for all FEEO staff members to master maintenance and repair skills for d.light products.

Kopernik Fellow Fita Arief went to Oecusse in early 2012 to monitor the project's progress and conduct impact surveys.

Oecusse is an isolated enclave on the north coast of Timor, bordered by the Indonesian territory of West Timor. Approximately 45 percent of Oecusse's population of 64,000 live below the poverty line. Almost every household in the enclave reports that there is at least one month each year when they do not have enough food to eat.

Lighting in Oecusse is a pressing problem. Very few people have access to electricity. At the time Kopernik launched the Light Up Oecusse project, 92 percent of households relied on fuel-powered kerosene or gas lamps for light because there was no other option. Aside from the negative health effects of kerosene smoke, the cost of kerosene in Timor-Leste's rural areas is almost double the cost in urban areas, further marginalizing the most vulnerable communities.

The surveyed households reported they have **reduced their monthly spending on lighting expenses by 81.6 percent** on average.



The people interviewed were extremely happy with their d.light, with **75 percent finding the product 'very effective'**, and the remaining 25 percent as 'effective'. One respondent said, "We don't need to buy kerosene anymore, and we can save money to pay the children's school fees." Another said, "I save \$20 per month."

Project Background

Project Objectives

Kopernik is an online marketplace connecting people in the developing world with innovative, life-changing technologies. Kopernik partnered with Fundasaun Esperansa Enklave Oecusse (FEEO) to make life-changing technologies available to people living in remote communities in the Oecusse district of Timor-Leste.

This report constitutes the third phase of the Kopernik’s Light Up Oecusse project that was started in mid 2010 when FEEO submitted an initial proposal to Kopernik. In January 2012, Kopernik delivered an additional 738 units of the d.light S250 to Fundasaun Esperansa Enklave Oecusse’s (FEEO) office and 500 units of the d.light S10 for the third phase of Light Up Oecusse. The total amount of lights distributed to date for the entire project is as follows:

Light Up Oecusse	Units of d.light S10 	Units of d.light S250 	Total
Phase 1	745	247	992
Phase 2	725	725	1450
Phase 3	500	738	1238
Total	1970	1710	3680

The purpose of the impact assessment was to:

1. Develop a clear understanding of the ongoing needs of the customers,
2. Determine if the solar products are continuing to have a positive impact on the customers' lives.

This assessment was designed to test the following hypotheses. Solar lights will:

1. Save people money on lighting fuel (and charging mobile phones)
2. Be a safer, healthier and more convenient lighting source
3. Increase the range of activities people can pursue in the dark
4. Increase the length of time people can spend on nightly activities
5. Ease pressure on the environment
6. Increase the use of mobile phone

Snapshot of Location

Oecusse is an isolated enclave on the north coast of Timor, bordered by the Indonesian territory of West Timor. Approximately 45 percent of Oecusse's population of 67,000 live below the poverty line. Almost every household in the enclave reports that there is at least one month each year when they do not have enough food to eat.

Transport to and from Dili is limited, and the cost of basic goods is higher in Oecusse than in the capital. Transport within Oecusse is also difficult, especially during the wet season when the poor condition of the roads and bridges deteriorates even further.



Common Practices Relating to Technologies

Very few people in Oecusse have access to electricity and 92 percent of households rely on fuel-powered lamps (mainly kerosene) for light. When they can afford it, most people in Timor burn 1.5 – 2 litres of kerosene a week. One liter of kerosene costs about US\$1.25 in urban settings but in remote areas doubles to US\$2 - \$2.50.

A lack of light limits the amount of time communities can devote to income generating activities such as sewing, repairing fishing nets, weaving and cooking snacks for sale. It also affects school study, community meetings and general household lighting.

Our Local Partner: Hope Foundation of Oecusse Enclave

FEEO (Hope Foundation of Oecusse Enclave) is a local NGO founded in 2009 and based in Oecusse district. It supports the development of rural communities by mentoring self help groups, improving agricultural production and working to make local production methods sustainable. FEEO also supports youth groups to be active in cultural and sports activities, works to support women's participation in private and public life, and strives to keep students in school.

Project Implementation



The Technology

The d.light S250 solar lantern is a white LED light equipped with an external solar panel that can also charge mobile phones. It has four brightness settings and can provide from eight to 100 hours of light after each full charge, depending on the brightness required. The product description from the manufacturer indicates that the lantern has a lifetime of five years or more when handled properly.

The d.light S10 is a high-quality solar LED lantern which offers a bright and durable replacement for kerosene lanterns. It provides even space lighting for the home, workplace, or on the go. It can function as a general light source or serve as a primary task light. Its solar panel is integrated into the lantern itself. When fully charged, it provides between four and eight hours of light depending on the brightness setting. The product's lifespan averages three years.

Distribution Mechanism, Pricing & Payment

The prices charged for the lights were set by FEEO, taking into account the unit price of the technology, the capacity of households to pay, the value that households placed on the technology, and the savings in recurring expenses that the technology would bring. The prices were set as follows:

Technology	Specification	group members	Non-group members
S10 d-light 	Hours of Light (after 1 full day of charge): <ul style="list-style-type: none"> • 4 hours with HIGH setting • 8 hours of light with LOW setting 	\$5	\$6
S250 d-light 	Hours of Light (after 1 full day of charge) <ul style="list-style-type: none"> • 4 hours with HIGH setting (for studying/precision work) • 6 hours of light with MEDIUM setting (for cooking) • 12 hours of light with LOW setting (socializing) • 100 hours of light with BED setting (resting/sleeping) 	\$10	\$12

This price was determined to be appropriate because it was low enough for the lights to be accessible (on a repayment scheme) by even the poorest households.

The FEEO staff members continued to sell and deliver the solar lights to individuals in self-help groups commonly found in Oecusse at an appropriate price within their socio-economic context. FEEO staff members have worked incredibly hard to sell 240 units of d.light S250 and 84 units of d.light S10 from Phase Three's inventory. This is a

considerable accomplishment considering that the light deliveries took place in the peak of the rainy season, which meant that the roads deteriorated due to heavy rains and access to remote villages highly depended on the ability to safely cross rivers. However, as with previous phases, the rainy season did not deter the adoption of the d.light solar lanterns and there were no issues with charging the light despite cloud cover and rain.

Deliveries of the rest of the inventory from the third phase will carry on until May, and the Kopernik team believes that by then FEEO will be able to sell all of the remaining stock.



Over 1200 d.lights from the third phase shipment reaching FEEO' ceiling of the FEEO office!

Additional Support

Distributing solar lights to those who need them in Oecusse requires effort and teamwork, but if the lights break or need repairs after regular wear and tear and the team is unable to address that problem, then the work is futile. Kopernik is determined to light up the entire enclave of Oecusse, which is why it implemented trainings and provided additional support to the local partner to sustain the impact of this project.

To address maintenance issues from the shipment of d.lights between December 2010 and April 2011 for the first phase of Light Up Oecusse, Kopernik teamed up with Derek Ngai from d.light to conduct a training session in January for all thirteen FEEO staff members. The staff members received in-depth instructions about product specifications, maintenance and care, and warranty policies. During the training, under Derek's supervision, FEEO staff mastered how to do basic repairs, such as replacing batteries, and became experts regarding all things d.light. With this new set of skills, the FEEO team is prepared to better accommodate the needs of all Kopernik's technology customers in Oecusse.



Derek Ngai (left) showing how to take a d.light S250 apart and replace the batteries inside.



FEEO training group photo

Impact Assessment

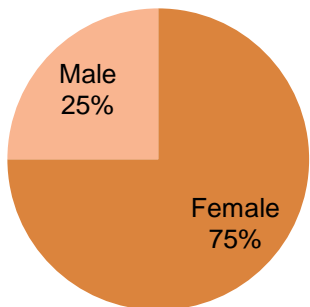
Process & Methodology

Surveys with d.light customers from the third phase were conducted earlier in 2012. All survey respondents were extremely pleased with the d.light they had received. There were 24 people surveyed who were previously interviewed in the baseline survey conducted in January 2011—almost exactly a year prior.

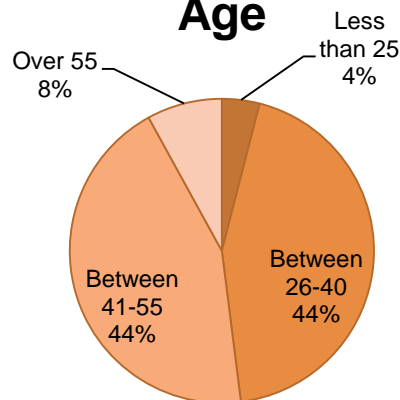
Results of Impact Assessment

Demographics

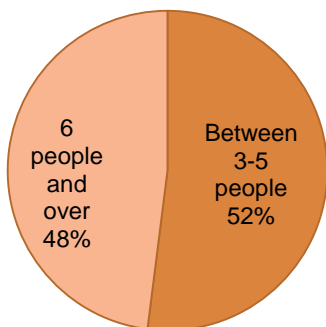
Gender



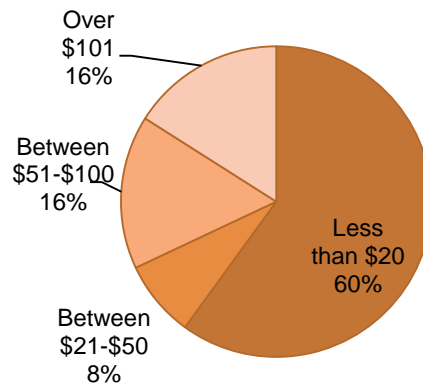
Age



Household Size



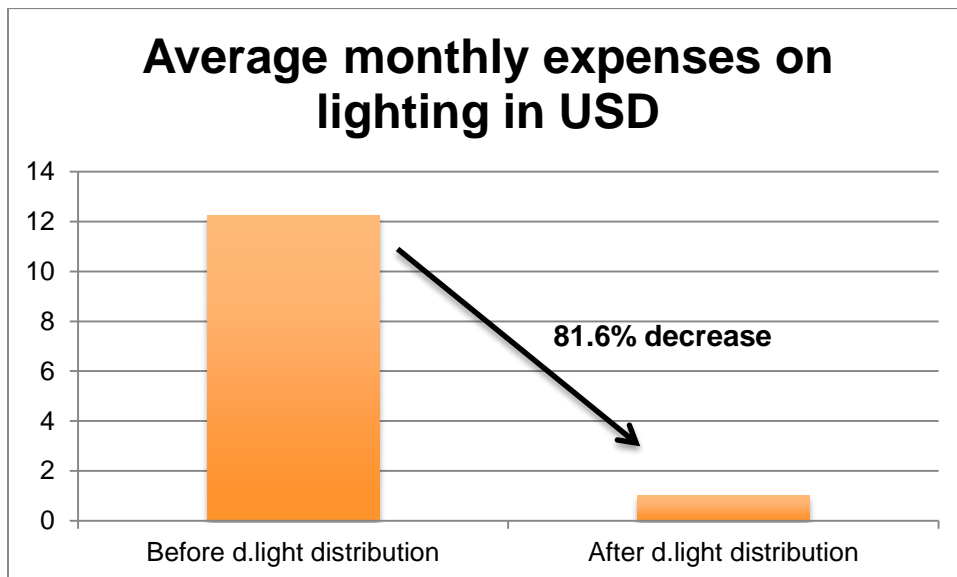
Household monthly spending



The respondents lived in four of the 18 *sukos* (administrative divisions) in Oecusse: Costa, Lifau, Malelat, and Taiboko. The four *sukos* are located in two of Oecusse's four sub-districts, Passabe and Pante Macassar.

The customers report significant benefits that the light has brought to their lives.

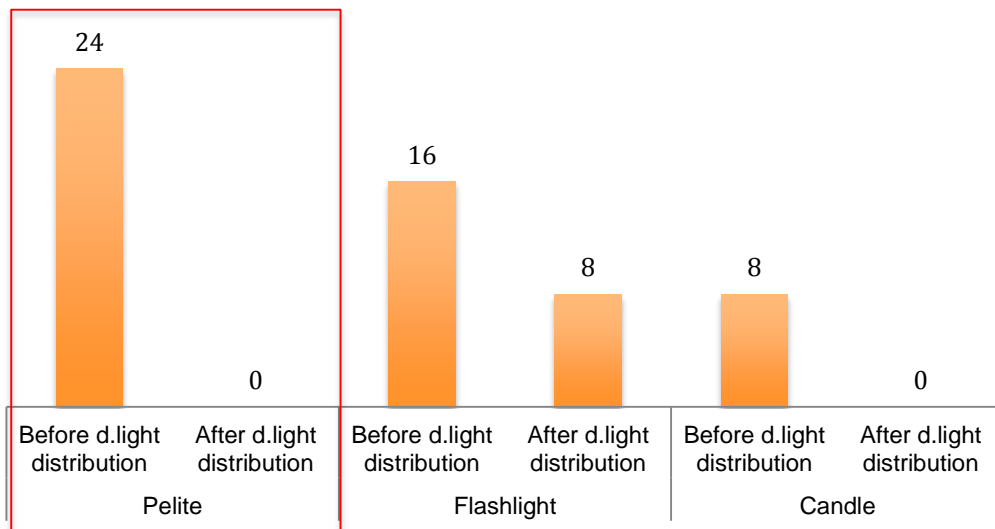
Average monthly spending for lighting was reduced significantly before and after using the d.light.



For all the 24 survey participants above, the d.light has substituted the use of *pelite* (kerosene lanterns) that are costly and dangerous as they can potentially cause great damage to the typical thatched houses in Timor-Leste when malfunctioning. These *pelite* were the main source of lighting before the solar lights arrived. Two participants reported that the solar lights have even replaced the electric lighting, their preferred choice before.



Sources of Lighting

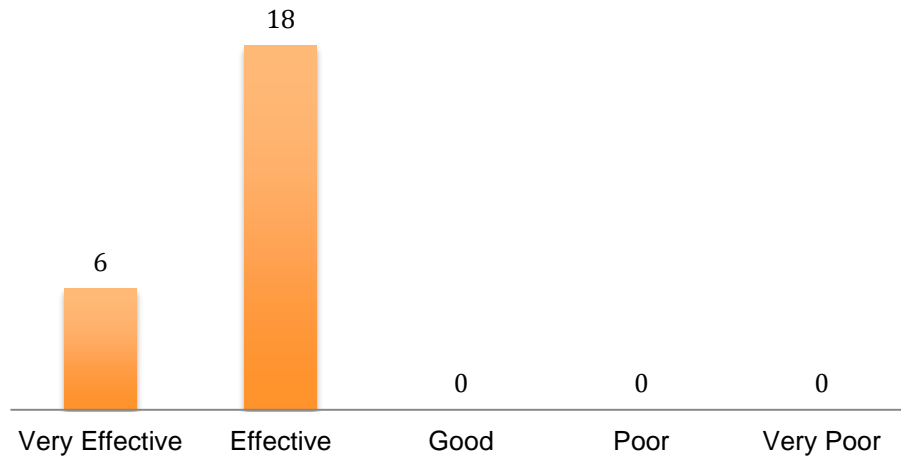


The majority of the respondents mentioned that they still keep the *pelite* at home as a back-up lighting option, but that they also rarely ever use it.

All 24 respondents say they liked the solar lighting because it reduced expenses or eliminated the need to buy kerosene altogether. Aside from the reduced dependence on kerosene and the zero cost of solar energy, the customers also pointed out brighter lighting and no air pollution as being other key benefits of the d.light.

The d.light customers were all satisfied with their purchase and gave favourable feedback about the technology.

Technology Rating



Households that purchased the lantern in the third phase of Light Up Oecusse project used the d.light in the same variety of ways as the beneficiaries from the previous phases: for children to study and do homework, for women to cook and hand weave *tai* (traditional fabric in Timor-Leste) and straw mats, and for the family to spend quality time together at night. For the third phase, customers reported their average daily use of the d.light in a household was 4 to 5 hours. This was the same amount of hours they used *pelite* before, although some participants reported using the d.light for up to 11 hours.

The suggestions and additional comments given at the end of the survey were mainly concerns regarding the maintenance of and care for the d.light. The Kopernik team believes that the newly trained FEEO staff will be able to assist them and ensure sustained product use for the future.

Annex

Field Stories

Crossing Rivers, Up the Mountain

By Fita Arief, Kopernik Fellow

Last week, we welcomed Derek Ngai from d.light to conduct training in Oecusse. We also managed to have a field trip together to Suni Ufe and Molo, two of the off-grid villages in Oecusse. I felt nervous after having been informed by FEEO staff that we will be crossing two flooded rivers. Thankfully, the sun was shining during the trip and no flood occurred.



The d.light training at the FEEO office

We started our trip at 10:00am. The team consisted of Derek, myself, Merita (FEEO director), Tobias (FEEO acting director), and other FEEO staff. We took motorbikes to Lifau River because the car that was supposed to take us didn't show up. We stopped our motorbikes on one side of the river, leaving us to cross the river on foot. On the other side a few of FEEO's staff members were nervously waiting for us and intensely watching every step we made. After we successfully crossed, they then transported us to a truck. Thirty minutes later we crossed another river, which this time seemed quite dry. The rice fields that I had seen along the way indicated that planting season had just begun.

An hour on the bumpy road brought us to the first village, Suni Ufe. People had been informed in advance that we would come, so as soon as we arrived a crowd began to form. Coconuts were prepared for us for the welcoming drinks. Merita then introduced us to the group and explained the purpose of our trip. I walked around and took some pictures of the d.lights that were charging in front of their houses.



There is a speck of d.light orange in many front yards at Uin Molo village!



People are happy with their d.lights. I overheard people say encouraging words about how the d.lights are impacting their lives:

"We don't need to buy kerosene anymore, and we can save money to pay children's school fees."

"I save \$20 per month!"

"I don't have to cross the river anymore to buy kerosene since I started using the d.light."



Our youngest technology beneficiary yet!

On the way back we stopped by Molo village to get lunch. Apparently the FEEO staff already arranged to prepare lunch there for us. There were lots of people--men, women and their children--who gathered around waiting for us.

After lunch, we had an opportunity to talk with people. Once again I heard the same responses about d.light.

There was an old lady who said that she has not had to buy kerosene since she purchased the d.light and that she has been using her d.light for almost a year now and still has not changed the battery.

“I don’t need to buy kerosene and save the money to buy food and soap.”



d.light S250 users in Oenunu village of Oecusse

We headed back at around 4:30pm accompanied by a beautiful sunset. It was a wonderful trip.