Interim MacArthur Foundation Report

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I. Executive Summary

Stiftung Solar Energie (StS) is a non-profit organization whose mission is to empower communities through solar energy. Light for Health, one of StS’s main programs, focuses particularly on supporting health workers and facilities in remote and disaster affected areas. When Super Typhoon Haiyan struck the Philippines on November 8, 2013 the country was devastated. Many rural health clinics already experienced unreliable and intermittent access to electricity, but the typhoon completely wiped out access to power (especially in the Visayas region). Many local and foreign aid organizations rushed to help the survivors of the typhoon. These groups included first responders as well as temporary facilities set up to assist with emergency medical care. Many pre-existing clinics were severely damaged in the storm and had difficulty providing aid to survivors.

StS agreed with its partner We Care Solar to facilitate the work of relief workers in the wake of this tragedy. We Care Solar received a grant from the MacArthur foundation to provide 100 Solar Suitcases to StS in order to accomplish this goal. In the months following Typhoon Haiyan, StS partnered with various relief organizations to distribute these suitcases and provide training. To date, 55 solar suitcases have been permanently installed in rural clinics, 8 were sent to temporary health facilities operating in devastated regions, and 10 have been made available for immediate deployment for first responders. These solar suitcases have assisted medical staff in saving countless lives in the aftermath of the strongest typhoon ever recorded on Earth.

StS is continuing to provide long-term support to clinics in Haiyan affected areas, as well as extending its reach to more health facilities and expanding its partner network. This organization is rolling out innovative new technologies such as solar refrigerators and fans to make the work of relief workers even more effective. StS continues to receive feedback from clinics and partners it has worked with, and it uses this information to modify and improve its ongoing projects. With the help of its partners and generous donors, StS will continue to brighten the lives of rural health workers and disaster survivors.
II. Background and Context

Health Care Structure of the Philippines

Key Players
Rural health units (RHUs) and Barangay Birthing Centers (BHCs) serve as primary care providers in municipalities around the country. “BHCs are staffed by barangay health workers, volunteer community health workers, and midwives, while the RHUs are staffed by doctors, nurses, midwives, medical technologists, sanitary inspectors, nutritionists and volunteer health workers” (Ramualdez et al, “The Philippines Health System Review”). Municipal governments control RHUs and BHCs, which focus on providing maternal and child care, nutrition services, and general public health services. Secondary care is the responsibility of provincial governments, which operate provincial and district hospitals. Provincial officials also coordinate health services provided at the municipality level. The Department of Health (DOH) coordinates national healthcare policy. A number of hospitals are also run directly by the COH to provide tertiary care.

The private sector is also an essential element of the Philippine healthcare system. In fact, over 70 percent of health professionals in the Philippines are employed by the private sector (Ramualdez et al). Both non-profit and for-profit organizations operate in the health sector, and run numerous private hospitals and clinics throughout the country.

Disconnect Between Government Policy and Reality on the Ground
Health policies implemented by the DOH are not always practical when applied to remote areas in the Philippines. It is currently unlawful for women to give birth in their homes. Instead, they are required to deliver in a certified RHU or BHC. Although having all women give birth in certified clinics would be great in theory, it is not always possible for women in poor, remote communities to make it to a health facility. The government is unwilling to recognize that a large portion of women in geographically isolated and disadvantaged areas (GIDA) still give birth at home.
Typhoon Haiyan

Background
Super typhoon Haiyan, known locally as Typhoon Yolanda, struck the Philippines on November 8, 2013. Haiyan was the strongest typhoon ever recorded in terms of wind speed (up to 315 km/h), and with 6,300 deaths it was the most fatal in the history of the Philippines (Fischetti, “Was Typhoon Haiyan a Record Storm?”). The typhoon also devastated the country’s infrastructure. The DOH estimates that Haiyan caused over P700 million ($16 million) in damage to 571 health facilities (USAID Fact Sheet on Typhoon Haiyan/Yolanda in Philippines). The storm left the nation’s health system crippled.

Haiyan caused particular damage to the Visayas region in the Central Philippines. The islands of Samar, Leyte, Cebu, Panay, and Palawan were hit especially hard. The typhoon destroyed homes, schools, health facilities, and livelihoods. It is likely that parts of the agricultural sector, among others, may not recover for years to come.

International Response
The total international funding given for emergency aid to the Philippines after Typhoon Haiyan has topped P36.9 Billion ($844 million). A plethora of international aid organizations, charity groups, and emergency relief teams descended upon the Visayas in the wake of the storm.

The volume of charitable donations was astounding, but it was also focused disproportionately on some types of relief. According to Fig 3. Total humanitarian aid for Typhoon Haiyan. Source: OCHA
to data from the United Nations Office for the Coordination of Humanitarian Affairs (OCHA) a relatively small portion of aid was directed towards emergency telecommunications and electrification. Funding for health related aid also lagged behind that for emergency shelters, food security, and livelihood recovery.

**Frequency of Typhoons**

Haiyan was a particularly devastating storm, but typhoons are far from rare in the Philippines. According to CNN, “An average of eight or nine tropical cyclones make landfall in the Philippines each year” (Whiteman, "Philippines Gets More than Its Share of Disasters") Each of these storms has the potential to cause immense damage, as demonstrated by Haiyan. Additionally, the high frequency of storms makes recovery much more difficult. Getting back on your feet is hard when every time you stand up another gust of wind knocks you down. Given the high frequency of typhoons hitting the Philippines, and the increased severity of storms due to climate change, efficient and sustainable relief techniques must be developed and implemented.
III. Stiftung Solar Energie Response

Organizing after Typhoon Haiyan

Collaboration with We Care Solar
The work that Stiftung Solar Energie (StS) performs in the Philippines would not be possible without its partner, We Care Solar (WCS). The Solar Suitcase engineered and produced by WCS has become the primary unit used by StS for bringing solar energy to rural health clinics. WCS not only supplies these units to StS, but also provides technical training and support. StS acts as the distributor of the Solar Suitcases, determining which deployment locations are most appropriate and what local partners will help facilitate its work. Members of the WCS team have even joined Solar Suitcase deployment trips on the ground. StS and WCS continue to work very closely to further their common goal of providing solar power to rural health clinics in the Philippines and improving health outcomes for members of poor communities, especially those that are affected by disasters such as Typhoon Haiyan.

Determining the Approach
Although there were many groups focusing on medical relief, food aid, clean water, and sanitation, there was a lack of effort to bring electricity to areas whose power had been completely knocked out. Emergency relief workers needed better ways to charge communications devices and medical staff had trouble performing procedures at night, among other issues. The government did provide gensets, gas-powered generators, to many RHUs and relief centers, but these devices have largely gone unused due to the high cost of operation (about 3000P/day) and unreliability. Additionally, many RHUs are located in areas that experience frequent “brown-outs,” or power outages. These brown-outs can last several days and make the delivery of babies and other procedures extremely challenging due to the lack of light and inability to charge mobile devices for emergency communication. Therefore, power outages threaten RHUs even if they are on the power grid. Typhoon Haiyan had effectively turned a precarious electricity access situation into a total disaster. Clearly a sustainable solution was needed to provide reliable electricity to health clinics hit regularly by typhoons and brown-outs. In order to most effectively utilize solar suitcases to address these problems, StS implemented its solution in three separate phases in the wake of Typhoon Haiyan. The first phase was assisting first responders and medical relief teams that became active in the immediate aftermath of the typhoon. The second was to provide support to temporary health facilities – consisting largely of charity, NGO, and midwife operated health clinics – that sprouted up after the typhoon. These
temporary facilities either moved locations or ceased operations after a certain period of relief work. The third and final phase was to help permanent health facilities, rural health units and birthing clinics that were part of the existing health care infrastructure prior to Typhoon Haiyan. StS provided solar suitcases to all of the aforementioned types of health care providers, and used different deployment and training strategies for each. Additionally, throughout this process many lessons were learned on how to provide even more effective support health and disaster relief workers in the future.

The Solar Suitcase

The Solar Suitcase is a portable solar energy system that was designed for rural birthing centers around the world. It includes a 12-volt battery. Each unit comes with two solar lights, rechargeable AAA and AA batteries and charger, mobile phone charging plugs, a fetal heart rate monitor (fetal Doppler), and two adjustable headlamps. Starting at a full charge, the two solar lights can be kept on continuously for 30 hours. The standard solar suitcase comes with either a 40-watt or 80-watt solar panel, depending on the usage needs of the clinic.

The equipment is designed to be durable and long-lasting. Both lights are shock proof and water resistant. One of this system’s strengths is its straightforward design. This unit has become Stiftung Solar Energie’s primary tool for bringing reliable power sources to rural health facilities.

Phase I: Emergency Response

First Responders

In order to meet the needs of survivors during the immediate aftermath of Typhoon Haiyan, StS first provided several solar suitcases to emergency workers. These units were not installed in clinics, and were instead distributed to responders who frequently moved between affected areas. These suitcases were used for two primary purposes: charging communications equipment, such as cell phones, laptops, and radios, and providing light for emergency medical procedures. The ability to communicate effectively while on the ground was extremely important in order to formulate a well-coordinated response. These suitcases were given out in December 2013, only weeks after the typhoon struck. Immediately after the first shipment of suitcases from WCS arrived in Manila, StS began searching for first responders to connect with. The relief workers came to the office in Manila to receive
A temporary clinic in Dulag, Leyte was opened in December. It was operated first by Mercy in Action, and later changed hands to the Wadah Foundation. Over 588 babies have been born in the clinic, and care is provided to an average of 1,500 patients per month. Seven midwives, two nurses, and seven support staff regularly use the solar suitcase in their work. In addition to births, the clinic also attends patients with asthma, fever, and suture wounds.

Temporary Facilities
Various temporary facilities were set up in response to Typhoon Haiyan. These facilities were housed in different locations, such as schools and emergency tents. They were run by privately by NGOs, charity organizations, and midwives. Similarly to the units for first responders, these suitcases in temporary facilities were not permanently installed. However, unlike mobile units these suitcases did not frequently move around after their deployment. The suitcases for temporary health facilities were also some of the earliest deployed by StS, making it to affected areas as early as December 2013.

During the response to Typhoon Haiyan, StS sought out facilities set up to care for survivors. Some partners, like Mercy in Action, had worked with solar suitcases before and didn’t need to be trained on the units. The Wadah Foundation Philippines, an arm of the Jakarta-based organization Wadah Titian Harapan, was in critical need of the technology and also required training. Teresa Maniego, the head of Wadah Philippines, travelled to Manila to pick up a solar suitcase and receive training in December. After returning to Dulag, Leyte, where her organization was working at a temporary clinic, Maniego also referred several local midwives providing emergency relief that were also in need of solar suitcases. With the help of Wadah, StS eventually distributed six additional suitcases to temporary facilities in Leyte.

The temporary units were used by aid workers in the aftermath of Haiyan, and were later transferred to permanent locations. These suitcases were used to charge communications and medical equipment, and to power lights used during various medical procedures. Communications devices such as laptops and cell phones were essential for these facilities to contact larger other relief workers. The temporary facilities usually provided primary care and would need to refer severe cases to large hospitals. Unlike birthing clinics, the temporary facilities set up after the typhoon provided a range of medical relief services. However, the lights were also used during the delivery of babies. In total, 8 solar suitcases were distributed to first responders and temporary facilities in the early stages of the StS response.
Phase II: Assessment of Needs and Allocation of Remaining Suitcases

Seeking out Partners
After the distribution of the 15 mobile solar suitcase units, STS focused on how it would use the remaining 85 units provided to it by WCS and funded by the MacArthur Foundation. These remaining suitcases were sent to Manila in several shipments by WCS between March and May of 2014. The initial technical training was provided to STS employees in by WCS after the suitcases were received. This training allowed technicians at STS to gain a thorough understanding of the technology before field deployments were conducted. Therefore, WCS provided both the hardware itself as well as invaluable technical expertise.

The next step after the initial training provided by WCS was for STS to find local partners that were already working in areas affected by Typhoon Haiyan. These partners would assist STS in training local technicians for each deployment, distributing the suitcases to installation locations, and obtaining the feedback and monitoring information from the health facilities after the deployments. STS valued finding partners that shared their mission of empowering individuals and providing sustainable support rather than simply offering hand-outs.

NGO Partners
One of STS’s main partners for deployment and training is Engender Health Philippines. Engender is a USAID funded NGO working in the Visayas region that focuses on issues related to reproductive and maternal health. This organization’s past work has included modernizing operating rooms in rural clinics and training medical staff on infection prevention. Engender enthusiastically accepted the proposal from STS to work together in order to bring solar energy to rural health units.

Another main partner of STS in its Light for Health program is the Zuellig Family Foundation (ZFF). ZFF has been working in the Philippines to improve health care access for the poor since 1997. As with Engender, STS has worked closely with ZFF to ensure proper training of local technicians and distribution of the solar suitcases. The third main partner that STS works with to deploy solar suitcases to health clinics is the Andres Soriano Foundation (ASF). This organization has focused on providing environment, livelihood, education, health, and disaster relief programs to small island communities since it was founded in 1986. ASF acted as the primary partner of STS for the solar suitcase installations in Palawan.
We have also worked with important partners in disaster areas. Mercy in Action is a non-profit organization focused on maternal, newborn, and infant health. They operated a health clinic in Dulag, Leyte in the early months after Haiyan. They eventually passed the clinic it over to the Wadah Foundation. Mercy in Action used two solar suitcases, one that it received through a partnership with We Care Solar and another that was given by StS. They passed the latter one onto Wadah along with the clinic. Mercy in Action and Wadah saved many lives through their quick response, and the solar suitcases proved to be instrumental in their work.

Criteria for Beneficiaries
To ensure that the solar suitcases help the people that need them most, StS and its partners used a fixed criteria to determine which rural health facilities would be eligible to receive installations. The first restriction was that only facilities in areas affected by Haiyan would be eligible to receive suitcases. All of the suitcases were deployed in the Visayas – the region hit hardest by the typhoon – and more specifically in the islands of Leyte, Samar, Cebu, and Palawan. The facilities were also required to be structurally able to adopt a suitcase. This meant that the roof and building were structurally sound, and that the panel and suitcase could be mounted within 11 meters of each other (so that they could be properly connected). These diagnoses were made by the on-site installation teams.

Each facility had to be currently in use (not abandoned after the typhoon) and maternal health care needed to be available 24 hours a day by qualified staff. Temporary facilities were eligible to receive suitcases, as long as the unit was able to be transferred after operations at the temporary site ended. Furthermore, Administrators and technicians were required to be available at each facility where a suitcase was installed, and there needed to be support from the community and/or the DOH. Finally, recipient facilities needed either to be completely off the power grid or to experience frequent blackouts and lack any backup power. The vast majority of the health facilities that received installations were on the grid, but were subjected to persistent power outages. These criteria were strictly adhered to in order maximize the impact of each solar suitcase.

The Approach
Once the various partnerships were solidified and installation locations were finalized, StS began the suitcase deployments. The first group of installations were made in northern Cebu starting in May, followed by northern Palawan in the same month and Samar and Leyte in late June and early July. Although by this time some recovery had occurred in areas hit by Haiyan, most communities were still reeling from the damage and a genuine need for solar energy was observed in every location. The suitcases themselves were deployed in
regional clusters. A total of 55 suitcases were sent to the partners in each location: 4 to the Andrea Soriano Foundation in Palawan, 16 to Engender Health in Cebu, 19 to Engender Health in Leyte, and 16 to the Zeullig Family Foundation and Engender Health in Samar. The suitcases were gathered at central locations within each region where Turnover events were held, which included cluster training for the representatives of each health clinic. Installation teams, which included workers from the partner organization One Renewable, then travelled to the clinics in each region to install the suitcases. The process of the Turnover and the installations will be discussed further in the following section.

Phase III: Deployment to Permanent Facilities

Cluster Training and Turnovers
Cluster training is the second phase of training in the deployment process, after the training of local partner organizations. In this phase all of the suitcases being deployed to a certain region were sent to a central location where the municipal health officers and technicians – employees in charge of on-site maintenance of the suitcase - for each recipient health facility gathered. For example, cluster training for the 16 suitcases deployed in partnership with Engender in Cebu took place in Bogo City, North Cebu in May 2014. In Bogo City the health facility representatives were trained on how to use the various devices that come with the unit and how to use it efficiently so as to maximize battery life. Representatives also signed memoranda that clearly stated their own obligations and responsibilities along with those of StS (see appendix).

These events are called turnovers because the health facility representatives were trained on the solar suitcases, and then a suitcase and solar panel were turned over to them to take back to their home facility. A team then travelled to each health facility in the region and installed the suitcases and panels. The third and final phase of training takes place at each individual facility, referred to as center training.

Center Training and Installations
At each solar suitcase turnover the health facility representatives were notified of the deployment schedule and when they should be ready for the installation crew to arrive at their clinic. It was required that for installations to occur a technician must be present. Some installations were cancelled because the suitcase had not been transferred to the clinic on time, a technician was not present, or other problems arose during the deployment. In fact, five RHUs scheduled to receive suitcases in Samar and Leyte were pulled. All rural health units and birthing centers have an open waiting area, a delivery room, and a recovery room. Larger clinics may have multiple rooms for patients with several beds in each one. The staff of the clinics typically requested that the suitcase be mounted in the delivery room for easy access during medical procedures. The first step of an installation was to mount the suitcase on the wall. Then, the solar panel was assembled and fixed to the roof at an appropriate angle, and out of the shade. For each step in the installation process a clear checklist was followed to ensure quality and consistency (see appendix).

After the panel was installed the homerun cable, which allows power to flow from the panel to the battery, was run from the roof to the suitcase. Next, the solar lights were installed and connected to the battery. Several options were available for the mounting of the solar lights. They could be permanently fixed in a position on the wall or ceiling, several hooks could be installed that would enable a light to be hung in different locations, or a light would be attached to a moveable pole. Generally, one light was installed in the delivery room, and the other was put in the recovery room. In all cases the light cords were secured tightly to avoid snags and the connection to the battery was tested.

While the physical installation of the units were taking place, staff members including doctors, nurses, and midwives were trained on how to properly use and maintain the suitcase. This is what
has been referred to as center training. Center training included a detailed description of each main part of the unit (charge controller, main power switch, charging ports, etc.) followed by hands-on practice operating the lights and charging various devices, such as the fetal Doppler and mobile phones. Part of the user orientations during the installations entailed going through the various feedback forms involved in the use of the suitcases. These forms, which included a weekly maintenance monitoring sheet and monthly feedback form (see appendix), were to be filled out and regularly submitted by the clinic staff for three months after the installation. The partner organization for each cluster (e.g. Engender in Cebu) assumed responsibility for collecting the feedback forms each week.

**Deployment of Other Products**

Although the solar suitcase the primary unit deployed for the Light for Health program, there are other products used to fill specific healthcare related needs. One of the challenges faced by midwives working in remote areas is that the clinic may be difficult for delivering mothers to reach. Although it is illegal for women to give birth anywhere but a designated birthing center or RHU, many times they do not have a choice (a reality largely ignored by the government). In cases where women are forced to give birth in their home midwives need portable lanterns that they can use to facilitate the delivery.

StS provides the NIWA 300 Plus (see left) to midwives so that they can have a portable, lightweight light source. The NIWA is water and shock resistant so that it can remain functional for long periods in the field. Furthermore, a USB port on the back of the unit provides a convenient way to charge mobile phones.

Additionally, health facilities need to refrigerate many vaccines and injections. With frequent brown-outs and no back-up power vaccines cannot be kept in clinics, because prolonged exposure to warm environments will render them useless. One solution that StS has begun to roll out is the solar refrigerator. The solar refrigerator will allow health facilities to safely store life-saving drugs when brown-outs occur the power is knocked out by a disaster. The solar refrigerator is just one example of how StS is working to find a range of appropriate technologies for the unique challenges faced by rural health clinics.

**Phase IV: User Feedback**

**First Responders**

First responders used the solar suitcase in many ways. Dr. Ted Esguerra explained that he used it to charge cell phones, VHF portable radios, iPads, AA and AA batteries for multiple devices, and laptops. Additionally, he said that the two lights included with the suitcase were bright enough for him to set up
camp in disaster areas. The suitcase effectively allowed responders to use numerous devices that they would otherwise be without in emergency situations.

First responders also provided suggestions on how to improve the suitcases and the deployment process in the future. One of the primary concerns was that the suitcase was not mobile enough. It was originally designed for birthing centers, which is not conducive to frequent movement. Users emphasized that a lighter weight suitcase would be beneficial. Additionally, they asked that a model with faster charging capabilities be made available. It was important for them to be able to set up camps quickly and charge communications and medical devices. In terms of the deployment process, first responders mainly wanted a way to pick up the suitcases prepared, fully charged, and without any hassle. The concern was that suitcases were not available immediately after Typhoon Haiyan struck, and could not assist in the immediate aftermath. They seemed willing and eager to support a system in which the suitcases were maintained by StS and kept ready for use by first response teams.

**Temporary Health Facilities**

Temporary facilities dealt not only with births, but a host of other emergency medical concerns as well. Rose Penwell, a Certified Professional Midwife and Field Director of Mercy in Action, explained that the medical staff treated malnutrition, wound care, diarrhea, pneumonia, coughs and colds, lacerations, and various other infections. In terms of maternal care they handled prenatal care, labor and birth, postpartum, newborn care, and maternal nutrition. The suitcase allowed Mercy in Action to provide emergency care when all other power was out. In Penwell’s words, “We were without running water or electricity in our mobile clinic and were all sleeping in tents and even delivering babies in tents... we conducted 116 deliveries in just two months and provided primary care for 1,532 people.” The suitcase provided essential support in an emergency situation where reliability was critical.

The fetal Doppler turned out to be one of the most critical components of the suitcase. Penwell said, “I knew right away in my heart that we needed to launch an immediate response as this is our field of expertise, so the Doppler was phenomenal to have with us.” For a clinic so involved with births, the Doppler was a life-saver.

StS continuously uses the feedback from its partners to develop and improve its programs. Penwell explained that solar refrigerators would be immensely helpful in disaster areas. “We had taken down a generator and were able to power a small refrigerator for our meds but it was quite expensive to run the generator so much,” she said. Fortunately for her, StS is already beginning to implement solar refrigerators in its Light for Health program. Penwell also suggested solar fans and perhaps even solar dryers as useful add-ons to the system. These devices would help keep bedding and clothes dry in the persistent rain.
Additionally, and similarly to first responders, the staff of the temporary health facilities emphasized that a quicker method for deployment would be extremely beneficial when disasters strike. In these situations timing is critical, and if suitcases could simply be picked up and checked out immediately then relief would come more quickly to those in need.

**Permanent Health Facilities**
Permanente birthing centers and RHUs have used the solar suitcases to charge cell phones as well as AA and AAA batteries for use in the fetal Doppler and headlamps. According to the feedback received by StS, the ability to use these devices has dramatically improved the quality of care that the health workers are able to provide on a daily basis. Reliable phone charging allows staff to contact a doctor or hospital when complications occur. The fetal Doppler offers a much more reliable and practical option for determining the health of a fetus compared to a stethoscope. The headlamps provide hands-free lighting that is especially useful when delivering babies. One midwife explained that without a backup source of power she was forced to use the screen of her mobile phone for light during brown-outs. Furthermore, the solar lights installed in the clinics can light up entire recovery and delivery rooms while procedures are occurring. Health workers have commented that the system is easy to understand, which has led to them being used frequently and efficiently.

A major concern among workers at permanent RHUs in Typhoon Haiyan affected areas was the amount of time that it took for the suitcases to be installed. Although the typhoon struck in early November, the first permanent installations did not occur until May. These RHUs face frequent brown outs while on the grid, so the units are no doubt still of tremendous use. However, in the future the solar suitcases could provide more assistance to RHUs if they were installed quickly after power is lost due to a disaster.

**Phase V: Follow-up and Future Plans**

**Mobile Solar Suitcases**
In response to the feedback from first responders, Stiftung Solar Energie asked WCS to provide suitcases that are more mobile than the original units. This means suitcases that are lighter weight and charge more quickly. The new mobile suitcases include a lightweight, foldable 60 watt solar panel. The standard 12 volt battery has been replaced with a lighter weight lithium battery that also charges more quickly. The light weight and fast charging capability of this new model will allow emergency responder to act faster and move more quickly while helping survivors. The 60 watt panel, larger than the original 40 watt unit, will also increase the charging capacity of the unit. This modification will allow EMTs to use a wider range of communications devices in the field.
The Solar Suitcase Emergency Response Repository

In the wake of emergency relief efforts for Typhoon Yolanda, StS has begun addressing the concerns of first responders and temporary facility workers by initiating the Solar Suitcase Emergency Response Repository (SSERR). The idea behind this SSERR is that relief workers can be more effective if they can access solar suitcases immediately after, or even during the warning stages before, a disaster strikes.

The repository will consist of a collection of mobile and regular solar suitcases kept at the StS office in Manila. These units will be continuously maintained by StS and kept ready for deployment at a moment’s notice. Additionally, the repository will include a range of communications equipment (e.g. AA/AAA/C/D/9V battery charger, mini inverter) and medical devices (fetal Doppler, nebulizer, etc.). All powered by solar. Medical relief teams like Mercy in Action will be thankful to find solar fridges in the repository as well. This equipment will be available for checkout by relief workers, and will be returned when they finish their work (checkout periods may range from a few days to several months).

The SSERR provides a good alternative to donating mobile units. In such a case, relief workers would likely use the unit periodically, and keep it stored away while not in use. The SSERR system would ensure that the units are maintained and being used as effectively as possible. Between periods of emergency response the mobile units would also be lent out to medical teams performing medical missions. In the case of a natural disaster, some standard suitcases and panels in the repository could be permanently installed right away into affected RHUs. Therefore, the SSERR benefits every type of beneficiary that StS works with. When Rose Penwell heard about the repository she said that it “sounds fantastic. We would definitely have made use of that as our set up down in the disaster area could easily have put 2 or 3 solar suitcases to good work.” The repository will enhance the ability of StS to provide immediate support to first responders, medical mission teams, temporary health facilities, and permanent health facilities. Fortunately, We Care Solar and various other partners have expressed strong interest in assisting StS with the development of this innovative distribution system. Stiftung Solar Energie hopes to substantially increase its capacity for disaster relief and solar electrification of rural clinics.

Continued Support for Partners and Beneficiaries

One of the primary characteristics of the approach that StS takes to sustainable development is the continued support of its beneficiaries. In order to provide the most effective solutions to the challenges faced by rural health clinics, StS plans to revisit each permanent facility to evaluate the impact of the system and exchange ideas with the clinic staff. Additionally, staff members from We Care Solar plan to return to the Philippines in order to work closely with StS to expand its reach and monitor current programs. Stiftung Solar Energie’s partnerships with suppliers and recipients continue to increase and grow stronger.
Scaling Up
Over the past 9 months the Light for Health program has provided innovative solar technologies to numerous doctors, midwives, NGOs, and charity organizations. StS now plans to extend its support to even more health care workers around the Philippines. The suitcase installations in Palawan, Cebu, Samar, and Leyte have proven to be extremely helpful to medical staff, and a deployment to the island of Panay is now also in the works. StS will continue to focus on working with health facilities in the Visayas region in the central Philippines, an area particularly at risk for natural disasters.

With the expansion of its programs and initiation of the SSERR, StS will continue to seek out potential partners. They are particularly interested in connecting with first response relief teams who would benefit greatly from the mobile solar suitcase units. StS frequently receives referrals from its current partners, and their partner network shows great potential for growth. There are also plans to strengthen partnerships in the public sector, particularly with the Department of Health (DOH). The ultimate goal of StS is to gain substantial support from the DOH in order to have solar equipment for health facilities incorporated into the government budget.

Conclusion
Stiftung Solar Energie has worked closely with its many partner organizations to offer innovative, cost effective, and practical solar energy solutions to disaster response teams and rural health facilities alike. In the aftermath of Typhoon Haiyan the deployment of multiple products, particularly the 100 solar suitcases obtained from We Care Solar through a grant from the MacArthur Foundation, facilitated medical relief teams and rural clinics in their daily operations. Ultimately, the distribution of this technology saved the lives of many mothers, newborns, and disaster victims. In the future StS plans on extending its partner network, strengthening its existing partnerships, offering a wider range of solar products, and initiating innovative distribution systems such as the Solar Suitcase Emergency Response Repository. StS continuously strives to implement creative and sustainable solutions to the most persistent challenges faced by the rural poor in the Philippines.

IV. Appendix

1) Permanent Health Facilities by Location

<table>
<thead>
<tr>
<th>Facility Name</th>
<th>Location Type</th>
<th>Region</th>
<th>Suitcase Serial Number</th>
<th>Installation Date (m/d/y)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alang-alang</td>
<td>RHU</td>
<td>Leyte</td>
<td>000849</td>
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<tr>
<td>Albuea</td>
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<td>7/4/2014</td>
</tr>
<tr>
<td>Almagro</td>
<td>RHU</td>
<td>Samar</td>
<td>000869</td>
<td>7/9/2014</td>
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<tr>
<td>Balangiga</td>
<td>RHU</td>
<td>East Samar</td>
<td>000871</td>
<td>6/25/2014</td>
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<tr>
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<td>RHU</td>
<td>Leyte</td>
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<td>7/1/2014</td>
</tr>
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<td>Basey</td>
<td>RHU</td>
<td>Samar</td>
<td>000909</td>
<td>6/26/2014</td>
</tr>
<tr>
<td>Bato</td>
<td>RHU</td>
<td>Leyte</td>
<td>000910</td>
<td>7/3/2014</td>
</tr>
<tr>
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<td>Leyte</td>
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<tr>
<td>Daram</td>
<td>RHU</td>
<td>Samar</td>
<td>000911</td>
<td>7/8/2014</td>
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<tr>
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<tr>
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<td>RHU</td>
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<td>000862</td>
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<td>Facility Name</td>
<td>Location Type</td>
<td>Region</td>
<td>Suitcase Serial Number</td>
<td>Donation Acceptance Date (m/d/y)</td>
</tr>
<tr>
<td>-------------------------</td>
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<td>---------</td>
<td>------------------------</td>
<td>----------------------------------</td>
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<tr>
<td>Hilongos II RHU</td>
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<td>000881</td>
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<td>Isabel RHU</td>
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b) Cebu

<table>
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<th>Facility Name</th>
<th>Location Type</th>
<th>Region</th>
<th>Suitcase Serial Number</th>
<th>Donation Acceptance Date (m/d/y)</th>
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<td>BHS</td>
<td>Cebu</td>
<td>000651</td>
<td>5/22/2014</td>
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<tr>
<td>Bogo</td>
<td>BHS</td>
<td>Cebu</td>
<td>000858</td>
<td>5/22/2014</td>
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<td>Bunakan</td>
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<td>5/22/2014</td>
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<tr>
<td>Langub</td>
<td>BHS</td>
<td>Cebu</td>
<td>000897</td>
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<td>BHS</td>
<td>Cebu</td>
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<td>Nailon</td>
<td>BHS</td>
<td>Cebu</td>
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<td>San Remigio</td>
<td>BHS</td>
<td>Cebu</td>
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<tr>
<td>Talisay</td>
<td>BHS</td>
<td>Cebu</td>
<td>000655</td>
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</table>

c) Palawan

(Pending installation details)

2) Temporary Health Facilities and First Responders Directory

<table>
<thead>
<tr>
<th>Municipality</th>
<th>Location type</th>
<th>Region</th>
<th>Organization/Beneficiary</th>
<th>Suitcase Serial Number</th>
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<tbody>
<tr>
<td>Abuyog</td>
<td>Midwife</td>
<td>Leyte</td>
<td>Jacinto and Marie Rose Managbanag</td>
<td>000367</td>
</tr>
<tr>
<td>AlangAlang</td>
<td>Midwife</td>
<td>Leyte</td>
<td>Mary Ann G. Pulma</td>
<td>000385</td>
</tr>
<tr>
<td>Carigara</td>
<td>Midwife</td>
<td>Leyte</td>
<td>Carmen Riel</td>
<td></td>
</tr>
</tbody>
</table>
3) Full Map of Solar Suitcase Deployments

Map Key:
- Red (11) = Permanent Health Clinics (Zuellig Family Foundation)
- Blue (40) = Permanent Health Clinics (Engender Health Philippines)
- Green (4) = Permanent Health Clinics (Andres Soriano Foundation)
- Orange (8) = Temporary Health Facilities
- Purple (10) = Solar Suitcase Emergency Response Repository

4) Key Partners Directory

<table>
<thead>
<tr>
<th>Name</th>
<th>Organization</th>
<th>Position</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. Ted Esguerra</td>
<td>National Disaster Relief Network</td>
<td>Physician</td>
<td><a href="mailto:rescueone_ems@hotmail.com">rescueone_ems@hotmail.com</a></td>
</tr>
<tr>
<td>Jim Ayala</td>
<td>Stiftung Solar Energie - Philippines</td>
<td>Chairman</td>
<td><a href="mailto:jim.ayala@solar-energy-foundation.org">jim.ayala@solar-energy-foundation.org</a></td>
</tr>
<tr>
<td>Laura Estachel</td>
<td>We Care Solar</td>
<td>Co-Founder and Executive Director, CNN Hero</td>
<td><a href="mailto:laura@wecaresolar.org">laura@wecaresolar.org</a></td>
</tr>
<tr>
<td>Paddy</td>
<td>All Hands Volunteers</td>
<td>Director of International Assessments and Disaster Response</td>
<td><a href="mailto:Paddy@hands.org">Paddy@hands.org</a></td>
</tr>
</tbody>
</table>
5) Training Forms and Partner Agreements

a) Partnership Agreement Form:

**PARTNERSHIP AGREEMENT**

This Partnership Agreement is made and entered into in the City of Makati, Philippines by and between:

**FOUNDATION FOR RURAL ELECTRIFICATION AND DEVELOPMENT** (FREED), also known as STIFTUNG SOLARENERGIE – SOLAR ENERGY FOUNDATION PHILS. (StS), a not for profit organization and an authorized partner of WeCareSolar for the deployment of Solar Suitcases in the Philippines whose mission is to empower communities in the Philippines by providing them with sustainable access to solar energy, duly organized and existing under the laws of the Republic of the Philippines with principal office at 2nd Floor, State Building Bldg., 186 Salcedo Street, Legaspi Village, Makati, Metro Manila, Philippines, represented herein by its Chairman of the Board, MR. JAIME I. AYALA, hereinafter referred to as “StS”;

- and -

**PARTNER ORGANIZATION**, a non-stock, non-profit social development foundation, duly organized and existing under Philippine laws, with office address at **OFFICE ADDRESS**, herein represented by **AUTHORIZED REPRESENTATIVE**, in her official capacity as **DESIGNATION**, and hereinafter referred to as “PARTNER”

- and -

The **MUNICIPAL GOVERNMENT OF <LGU>**, a local government unit duly created and existing by virtue of laws of the Republic of the Philippines with principal office address at the **<Address>**, represented herein by **<Name of Mayor>**, in his official capacity as **Municipal Mayor**, and hereinafter referred to as “Municipal Government of <LGU>”;

**WITNESSETH:**

**WHEREAS**, StS has been authorized as Philippine Custodian of Solar Suitcases containing maternal healthcare equipment by WeCare Solar;

**WHEREAS**, as Custodian, StS is responsible for designing and implementing the distribution of the Solar Suitcases to benefit rural communities with no or limited access to both electricity and primary healthcare;

**ADDITIONAL RATIONALE FOR THE PARTNERSHIP**
WHEREAS, the Municipal Government of <LGU>, RATIONALE FOR LGU AS PARTNER

NOW, THEREFORE, the parties hereby agree to jointly implement the “Light for Health” Program, details of which are indicated below:

I. SCOPE OF PARTNERSHIP
This partnership agreement defines the tripartite partnership between StS, PARTNER, and the Municipal Government of <LGU> (herein, each referred to as “Party” and collectively as “Parties”) to coordinate and collaborate on the recovery of maternal and child health services in the Municipality of <LGU> through the Light for Health (L4H) Program.

II. COVERAGE OF THE PROGRAM
The Light for Health (L4H) primarily aims to help equip health facilities in rural municipalities in providing more efficient and reliable maternal health support to the community through sustainable access to energy. Specifically, the L4H program aims to:

a. Support the operations of the rural health facilities in providing better maternal health care to pregnant and expectant mothers in the community;

b. Donate one (1) Solar Suitcase to Municipal Government of <LGU> in support of its maternal and child health services in the aftermath of Typhoon Haiyan; and to,

c. Ensure that the municipal health staff and other relevant LGU staff are equipped and resourced on the proper use, management and maintenance of the Solar Suitcases.

One (1) Solar Suitcase will initially be donated to each of the beneficiary health institutions in the Municipal Government of <LGU>, listed in Annex 1: Directory Listing of Beneficiary Institutions, mainly for use in its maternal and child health services, pending certain conditions and documentations in this Agreement.

III. ROLES AND RESPONSIBILITIES

1. StS Roles & Responsibilities:
Under the L4H program, StS shall:

1.1. Ensure that the contents of the Solar Suitcase is complete, and that all components are functioning properly;

1.2. Train relevant LGU staff on use and maintenance of the Solar Suitcase upon turnover;

1.3. Contract the services of an expert to install the donated units;

1.4. Conduct at least one (1) visit to the beneficiary RHU to monitor Solar Suitcase condition, and to reinforce RHU orientation/training, and to assess management/maintenance practices;

1.5. Provide technical support to troubleshoot and repair the Solar Suitcases when needed, based on clauses set in Section 3;

1.6. Generate feedback from the rural health workers on the utilization of the Solar Suitcase; and

1.7. Facilitate the post-installation support by the contracted installation expert for the beneficiary RHUs.

2. PARTNER Roles & Responsibilities:
For the L4H program, PARTNER shall:

2.1. Facilitate the coordination between StS and the Municipal Government of <LGU>:
2.2. Organize and coordinate the conduct of activities in the provinces, as mentioned in Annex 1 of this Agreement, pertaining to the donation, most particularly the turn-over, user training and user re-orientation;

2.3. Provide logistical assistance and/or counterpart in the conduct of the aforementioned activities;

2.4. Provide basic technical support on the field to the municipality on the proper utilization and maintenance of the solar suitcase;

2.5. Designate field staff to regularly monitor the utilization of the solar suitcases as part of the field staff’s responsibilities;

2.6. Provide recommendations to StS on the utilization and management of the solar suitcases by the Municipal Government of <LGU>; and,

2.7. Provide other technical recommendations, as may be deemed necessary.

3. Roles & Responsibilities of the Municipal Government of <LGU>:

3.1. Ensure the proper utilization and maintenance of the Solar Suitcase;

3.2. Ensure transfer of knowledge on the proper utilization and maintenance of the Solar Suitcase with other staff assigned to the health facility where the Solar Suitcase is to be used;

3.3. Assign one (1) relevant LGU staff to act as the over-all coordinator responsible for the safe-keeping and maintenance of the Solar Suitcase;

3.4. Assign one (1) relevant LGU staff to act as the technical support responsible for the troubleshooting and repair of the Solar Suitcase;

3.5. Execute a Municipal Board Resolution establishing a Maintenance Fund for the Solar Suitcase, amounting to Php10,000.00 per Suitcase received. This Maintenance Fund shall be managed by the beneficiary RHU for the maintenance of the suitcase, which includes cost items listed below, and is subject for replenishment by the Municipal Treasury:

3.5.1. Repair or replacement of parts of the Solar Suitcase that are damaged;

3.5.2. Installation management monitoring by the installation contractor, to be conducted once every six (6) months;

3.5.3. Transportation and logistics costs of StS staff/s when there is a need for StS to re-visit the RHU due to repair and other suitcase-maintenance concerns and alternatively transportation costs for the Solar Suitcase if it needs to be returned to Manila for repairs;

3.6. Ensure the immediate repair and replacement of parts of the Solar Suitcase within 14 days by contacting PARTNER should any problems occur with the Solar Suitcase;

3.7. Implement procedures and regulations for utilization of the solar suitcase;

3.8. Submit program-related reports, herewith attached as Annex 2: Suitcase Report & Feedback Forms, by the end of each month within the first three (3) months, to StS and PARTNER, which may include the following data:

- Number of beneficiaries and types of health services provided with the support of the solar suitcase (number of births, check-ups, and other possible health services conducted with the use of the solar suitcase);

- Maintenance and possible issues encountered related to the use of the solar suitcase; and

3.9. Prepare annual maintenance plan for the Solar Suitcase, including assignment of specific responsibilities, funding plan, and periodic maintenance checks.
IV. EFFECTIVITY AND DURATION
This Agreement shall be based on cooperation in good faith and shall take effect upon signing hereof by
the parties, and will remain in full force and effect within 90 days from the date of signing.

V. AGENCY AND EMPLOYER-EMPLOYEE RELATIONSHIP
The parties to this agreement are in no way agents, employers or employees of each other. As such, each
party shall be responsible for its own acts and/or that of its agents and employees, and shall indemnify
and hold the other parties free and harmless from any and all claims, liabilities or damages arising from
its failure to observe the terms of this agreement and/or applicable laws and regulations.

VI. AMENDMENTS AND MODIFICATIONS
This Agreement may be amended and modified from time to time, in writing, signed and acknowledged
by StS, PARTNER, and the Municipal Government of <LGU>, in which, amendments and modifications
shall be attached to the original copy of this instrument.

VII. TERMINATION
This Agreement may be terminated by either party prior to the expiration, thereof in whole or in part, if
all parties agree in writing that the continuation of the Program will not produce beneficial results. All
parties shall agree upon the termination conditions, including the effective date, and in the case of partial
termination, the portion to be terminated.

IN WITNESS WHEREOF, the Parties have hereunto affixed their signatures on the ___ day of May 2014
in __________________, Philippines.

STIFTUNG SOLARENERGIE –
(PARTNER)
SOLAR ENERGY FOUNDATION PHILS. (StS)

___________________________________

JAIME I. AYALA
Chairman

PARTNER ORGANIZATION

AUTHORIZED REPRESENTATIVE

Designation

MUNICIPAL GOVERNMENT OF
<LGU>, <PROVINCE>
<NAME OF MAYOR>
Municipal Mayor

Signed in the presence of:

______________________________  ______________________________

ACKNOWLEDGEMENT

Republic of the Philippines  
______________________________  

BEFORE ME, a Notary Public for and in the above jurisdiction, personally appeared the following:

<table>
<thead>
<tr>
<th>Name</th>
<th>Identification #</th>
<th>Date/Place Issued</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lemia L. Simbulan</td>
<td>_________________</td>
<td>_______________</td>
</tr>
<tr>
<td>Jaime I. Ayala</td>
<td>_________________</td>
<td>_______________</td>
</tr>
<tr>
<td>&lt;NAME OF MAYOR&gt;</td>
<td>_________________</td>
<td>_______________</td>
</tr>
</tbody>
</table>

Known to be the same persons who executed the foregoing instrument and acknowledged to me that the same is their own free will and voluntary act and deed.

This instrument consisting of six (5) pages including this page wherein this Acknowledgement is written and is signed by the parties and their instrumental witness on each and every page hereof.

WITNESS MY HAND AND SEAL, this ______ day of ________, 2014 at ______.

NOTARY PUBLIC

Doc. No.___
Page No.___
Book No.___
Series of 2014
b) RHU Monthly Feedback Form:

STS-ZFF LIGHT FOR HEALTH PROJECT

Month : __________________________
Name / localisation of facility : __________________________

How many women have given birth during the month ? __________________________
How many of them have given birth between 6 P.M and 6 A.M? __________________________
How many of them gave birth using the solar suitcase ?

1) Tell us briefly what happened during this month ?

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

2) What are the benefits of the Solar SuitCase ? / How was it used ?

________________________________________________________________________
________________________________________________________________________
3) Tell us more about the changes induced by the SolarSuitcases? How was it before? And now?
c) RHU Weekly Maintenance Monitoring Report

<table>
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<th>At 6 PM</th>
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<td>Total of the week</td>
<td>6:00 AM</td>
<td>6:00 PM</td>
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<td></td>
<td>Total green light of the week</td>
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<td>Total yellow light of the week</td>
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<td>Total red light of the week</td>
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<td>Total of the week</td>
<td>6:00 AM</td>
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<td>Minimum voltage of the week</td>
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<td>Maximum voltage of the week</td>
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</tbody>
</table>

Name / localisation of facility:

Submitted by:

Designation:

Contact No.:

Signature:

Works Cited


