

## GreenLamp Light 4 Life Solar Suitcase Project: Key Performance Indicators (KPIs) (B)

| Project name: Solar Suitcase Project for 145 (+17) Rural Health Centres in Ethiopia |   |         |                      | Date: August 2014 - July 2017 (36 Months) |           |           |           |           |                    |
|---|---|---------|----------------------|---|-----------|-----------|-----------|-----------|--------------------|
| Your name: GreenLamp  |   |         |                      |   |           |           |           |           |                    |
| KPI / KI  | Description of Outputs  |         | BASELINE<br>0 months | 6 months                                  | 12 months | 18 months | 24 months | 30 months | FINAL<br>36 months |
| 1   | # of Solar Suitcases installed and operational                            | Target  | n/a                  | 72  | 145       | 145       | 145       | 145       | 145                |
|   |   | Reached | 17                   | 36  | 134       | 157       | 162       | 162       | 162                |
| 2   | # of active Health Centre Staff trained in Solar Suitcase use             | Target  | n/a                  | 216                                       | 435       | 435       | 435       | 435       | 435                |
|   |   | Reached | 51                   | 269                                       | 632       | 705       | 568       | 588       | 566                |
| 3   | # of women of childbearing age impacted by the project                    | Target  | n/a                  | 414,000                                   | 833,750   | 833,750   | 833,750   | 833,750   | 833,750            |
|   |   | Reached | 97,800               | 185,700                                   | 762,700   | 831,900   | 904,000   | 922,400   | 928,600            |
| 4*  | # of deliveries using Solar Suitcases (cumulative)                        | Target  | n/a                  | n/a                                       | n/a       | n/a       | n/a       | n/a       | n/a                |
|   |   | Reached | 0                    | 2,376                                     | 13,915    | 31,163    | 50,007    | 65,630    | 80,520             |
| 5*  | # of total deliveries in Health Centres with Solar Suitcases (cumulative) | Target  | n/a                  | n/a                                       | n/a       | n/a       | n/a       | n/a       | n/a                |
|   |   | Reached | 0                    | 5,411                                     | 30,373    | 68,988    | 113,461   | 152,611   | 191,182            |

### Quantifiable Outcomes

- Reduced number of births with inadequate lighting
- increased number of births attended by certified midwives
- Improved identification of delivery complications that require referral to next healthcare level

\*NB: Indicators 4 and 5 are Key Indicators, but not *Key Performance* Indicators. Targets are therefore not applicable. Please see the report section below entitled "Explanation of Key Performance Indicators vs. Key Indicators" for further information.

A brief narrative update for each KPI shown above (including justifications for any changes and delays):

KPI 1: During the project, 145 new solar suitcases were installed and successfully maintained in an operational state in addition to the ongoing operation and maintenance of 17 existing solar suitcases (baseline). Due to the geographically-dispersed nature of the rural health centres, and time to train staff in each location, it took more than a year for the bulk of the new installations to be completed (117 out of 145, or 81% of new installations were complete by 12 months, giving a total of 134). By 24 months, all solar suitcases (162, or 100%) were installed and operational.

KPI 2: 51 health centre staff were already trained and active at baseline in the 17 existing SS installations. The original target was to train 2 staff and 1 supervisor per additional solar suitcase installation, however, significantly more than this were trained. This was in response to a variety of factors, including a keen interest in training among other health centre staff and mitigation for staff turnover. The majority of training took place in the first half of the project, with the number of active trained staff peaking at 18 months. The decrease between 18 and 24 months was due to staff turnover. From 24 months onwards number of active trained staff stabilised, averaging 3.5 staff per health centre.

KPI 3: At baseline, the existing 17 solar suitcases were already reaching populations with 97,800 women of childbearing age. As more solar suitcases were installed, this number steadily increased until all 162 suitcases were installed at 24 months, with 904,000 women of childbearing age impacted by the project. Health centre population catchment sizes varied from around 4,000 to around 60,000 people, therefore the overall increase was only roughly proportional to the number of solar suitcases installed. After 24 months, several health centres reported gradual increases in their catchment population, possibly due to population migration and/or re-zoning. The overall number of women of childbearing age impacted by the project therefore continued to increase gradually to 928,600 by the end of the project.

Key Indicator 4: This shows the cumulative number of deliveries which used solar suitcases during the project reporting period. It should be noted that not every health centre reported data every month, therefore some extrapolation was necessary. In months 0 – 23, an average of 74% of health centres reported data. From month 24 until the end, a random sample of 80 health centres was used (~50%). By the end of the project reporting period, it was estimated that solar suitcases had been used in 80,520 deliveries. These are all deliveries that would *not* have had adequate lighting if the solar suitcases had not been available.

Key indicator 5: This shows the total number of deliveries in health centres with operational solar suitcases. As above, the actual data from reporting health centres has been extrapolated to represent the remaining health centres. By the end of the project reporting period, there had been an estimated 191,182 deliveries in health centres with operational solar suitcases. These are all deliveries that would have been *at risk* of having inadequate lighting if the solar suitcases had not been available. Of these, an estimated 190,354 resulted in live births (not reported in the above table).

In summary, all KPI targets were either met or exceeded by the end of the reporting period. Additional key indicators demonstrated that the project positively impacted the health and safety of a large number of mothers and new-born babies.

## Explanation of Key Performance Indicators vs. Key Indicators

Indicators 1, 2 and 3 are **Key Performance Indicators (KPIs)**. They represent metrics that are directly within the control and responsibility of project implementing partners and are critical to the achievement of project objectives.

KPI 1 shows the number of Solar Suitcases installed and operational. For solar suitcases to provide adequate lighting during childbirth, and positively impact mother and child wellbeing, they must not only be installed, but also remain operational. The operational status of solar suitcases can be negatively affected by factors such as wear and tear, component failure and incorrect use. It is the direct responsibility of the project implementing partners to ensure that solar suitcases remain operational and that issues relating to function and maintenance are promptly identified and addressed. Monitoring the installed and operational status of solar suitcases is therefore a **Key Performance Indicator** for the project.

KPI 2 shows the number of active health centre staff trained in Solar Suitcase use. Reaching and maintaining a sufficient number of trained staff in each health centre is essential for ensuring that solar suitcases can be used to fill the critical electricity gap and provide adequate lighting for all deliveries. Trained staff are also necessary to ensure that solar suitcases are used correctly, thereby prolonging the lifetime of their components and reducing maintenance costs. The number of trained staff can be negatively affected by issues such as staff turnover. The project implementing partners are ultimately responsible for ensuring that every health centre has a sufficient number of active trained staff (minimum of 2 per health centre), and for training more where necessary. This is therefore a **Key Performance Indicator** for the project.

KPI 3 shows the number of women of childbearing age impacted by the project. This is based on the reported “catchment” of each health centre (i.e. the population served by the health centre) and the percentage of Ethiopian population who are women of childbearing age (23%). It represents the total number of women with the potential for childbirth who therefore stand to benefit from the availability of a solar suitcase at their local health centre. The project implementing partners do not have control over the catchment area of specific health centres, however they can select which health centres will have a solar suitcase installed. As such, they do have control over the total population reached by the solar suitcase project and this indicator can therefore be classified as a **Key Performance Indicator**.

Indicators 4 and 5 are **Key Indicators** for demonstrating project impact. They show the number of deliveries that used solar suitcases (4) and the total number of deliveries in health centres with solar suitcases (5). However, they cannot be classed as *Key Performance Indicators (KPIs)* and allocated *targets* because the number of deliveries cannot be controlled by the project – it is affected by many external factors that are beyond the control of this project.

To illustrate this point with examples, a decrease in the total number of deliveries (**Key Indicator 5**) could be caused by the increased use of family planning methods (contraception) in the local community, or it could be caused by changes to socioeconomic factors, weather, political unrest, etc. Likewise, an increase in the total number of deliveries at health centres could be caused by improved health-seeking behaviour, easier access to the health centre, an increase in the number of pregnancies, etc. With the possible exception of improved health-seeking behaviour, none of these factors have any bearing on the performance of

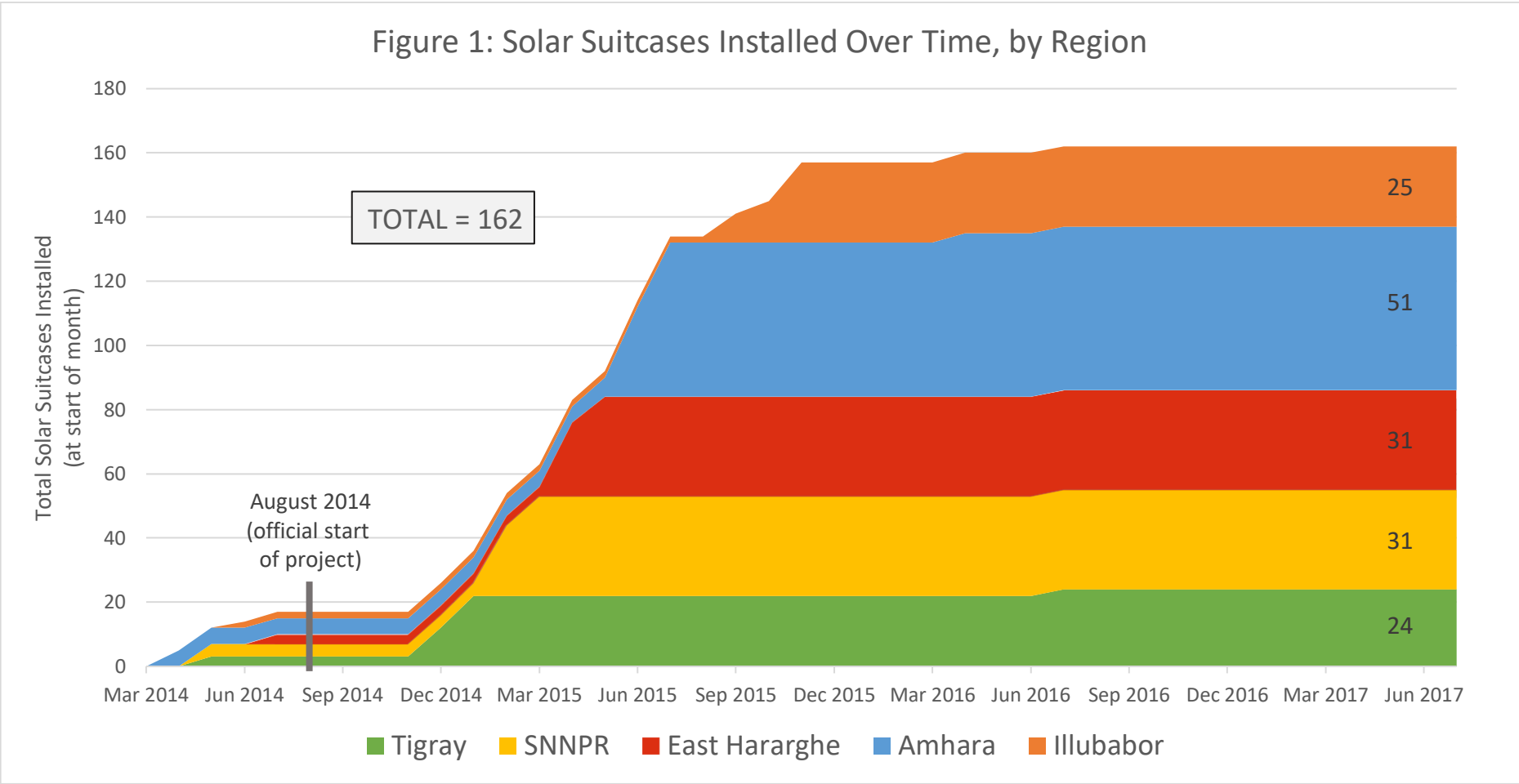
the project, yet they can all influence the total number of deliveries. Therefore, increases or decreases in the total number of deliveries at health centres cannot be used to draw conclusions about the performance of the solar suitcase project.

Furthermore, since solar suitcases are used to provide adequate lighting during childbirth when no mains electricity is available, the performance of the project is linked to whether the solar suitcase is *available* to fill this critical gap. For health centres that have an unreliable supply of mains electricity (as opposed to no mains electricity), the suitcase can be permanently available, but the exact timing and duration of power outages (and how they coincide with births) affects whether the solar suitcase is actually used. Consequently, the number of births that use a solar suitcase (**Key Indicator 4**) only tells us how often they are needed – the absolute number of uses can go up or down without having any bearing on the performance of the project.

As stated above, while indicators 4 and 5 cannot be used to measure performance, they are both **Key Indicators** for demonstrating project impact. Indicator 4 (# of deliveries using Solar Suitcases) demonstrates how many births would otherwise have had inadequate lighting if the solar suitcases had not been available – **the solar suitcases directly impacted mother and child safety for all of these births**. Indicator 5 (# of total deliveries in Health Centres with Solar Suitcases) demonstrates how many births were at risk of having inadequate lighting if the solar suitcases had not been available. The presence of a solar suitcase in these health centres meant that it did not matter what time of day the birth took place or whether the mains electricity was working, there would be adequate lighting for the birth – **the solar suitcases therefore indirectly impacted mother and child safety for all of these births**.

### Narrative Summary of Progress in the overall Project Period (August 2014 to July 2017)

During the overall project period, 145 new solar suitcases were successfully added to the 17 existing solar suitcase installations, serving a total of 162 electricity-deficient rural health centres in Ethiopia (24 in Tigray, 31 in SNNPR, 31 in East Hararghe, 51 in Amhara & 25 in Illubabor). Due to the geographic dispersal of these rural health centres, and the training needed for health centre staff in each location, it took over a year for the bulk of the installations to be completed. Figure 1 below shows the progress of installations over time and clearly demonstrates the unrelenting nature of the installation schedule.

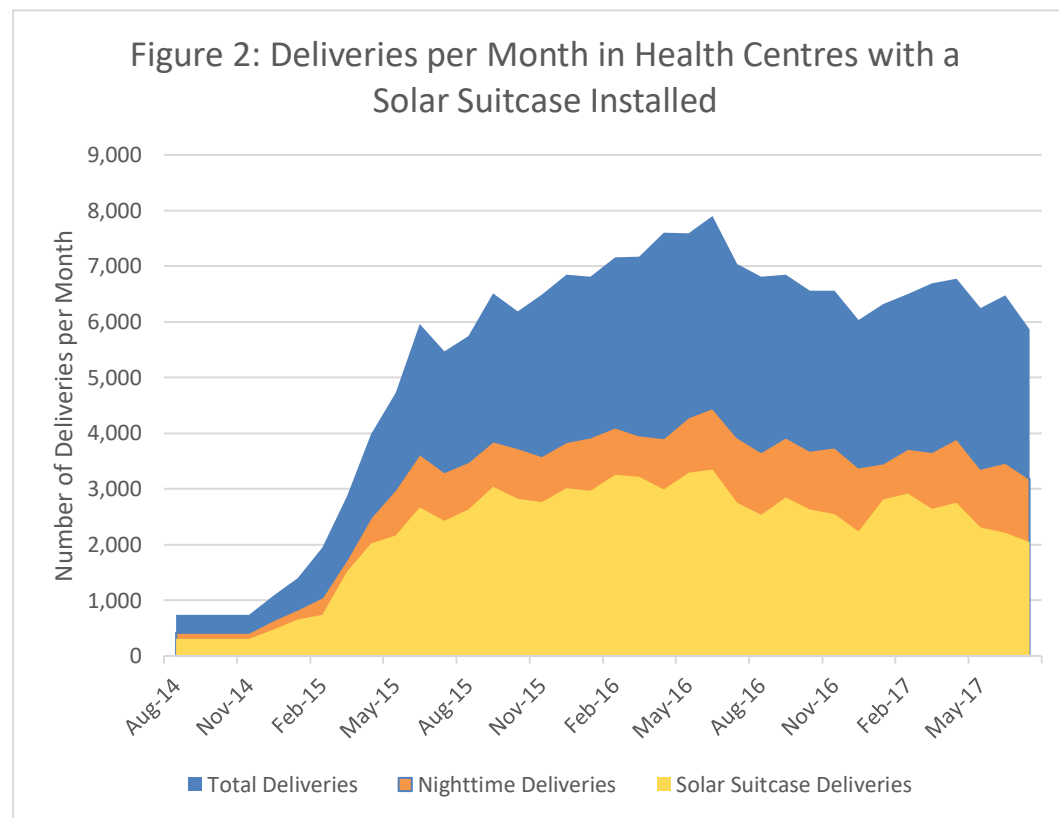


During the project, several health centres, most notably those in the Amhara region, experienced intermittent problems keeping the solar suitcases operational and repeat visits from technicians were necessary. However, extended periods of downtime were rare and by the end of the project all 162 solar suitcases remained in operational condition. As the project progressed, it became apparent that the Solar Suitcase batteries were weakening quicker than expected and would need replacing before the end of the project. In order to respond quickly and ensure Solar Suitcases remained operational, GreenLamp organised and funded the first round of battery replacements. A detailed MoU was then developed with Regional Health Bureaus for ongoing maintenance and battery replacement. Support from external suppliers and the Ethiopian Federal Ministry of Health helped to expedite the process of parts availability and import. The project implementing partners also provided refresher training to Health Centre staff regarding how to maximise solar suitcase battery life.

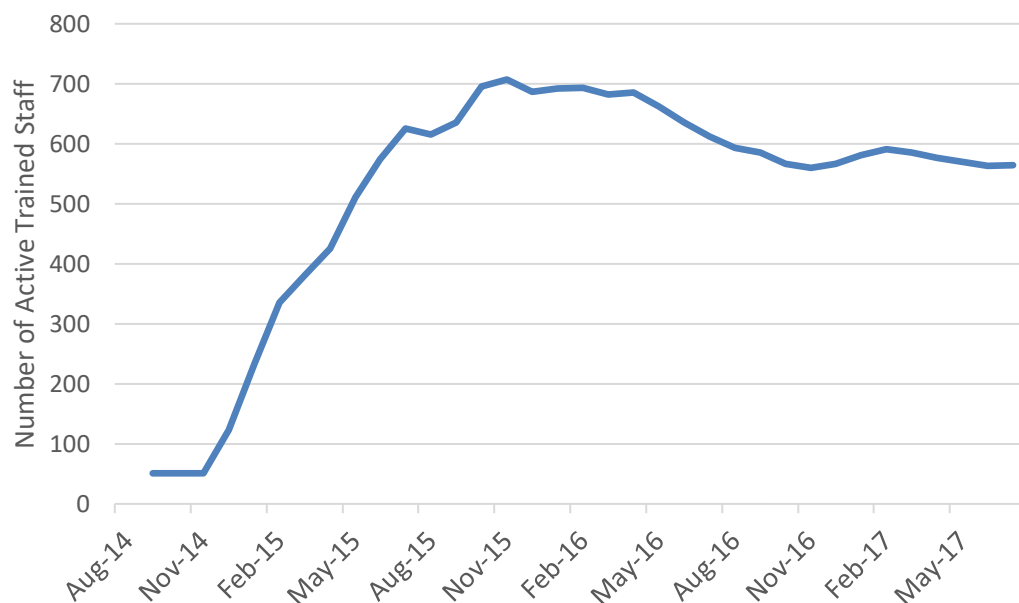
By the end of the project period, solar suitcases had been used in 80,520 deliveries – every single one of these is a delivery that would *not* have had adequate lighting if the solar suitcases had not been available, thereby putting the health of mother and child at risk. Solar suitcases were therefore directly responsible for 80,520 instances of improving safety for mother and child during childbirth.

In total, there were 191,182 deliveries in health centres with solar suitcases available (190,354 of which resulted in live births). The presence of a solar suitcase in these health centres meant that it did not matter what time of day the birth took place or whether the mains electricity was working, the solar suitcases ensured that there would be always be adequate lighting for the birth. The solar suitcases were therefore indirectly responsible for improving mother and child safety in all of these deliveries. Figure 2 shows the number of deliveries per month in health centres with solar suitcases installed.

Solar suitcases were used in about 74% of all night time deliveries during the project (42% of total deliveries). The proportion remained relatively consistent throughout the duration of the project. On average, each health centre used the solar suitcase in 18.3 deliveries per month (~219 per year). As mentioned above, all 162 solar suitcases remained operation at the end of the reporting period (with maintenance MoUs agreed with Regional Health Bureaus to ensure they are maintained in working order). If usage figures remain consistent in the future, solar suitcases will continue to be used in over 35,500 deliveries per year, every year, across all 162 health centres. They will also continue to provide a “safety-net” for every delivery (~84,000 in total per year, across 162 health centres).



**Figure 3: Number of Active Health Centre Staff who are Trained to use Solar Suitcases**  
(estimated totals based on collected sample data)



During the project, over 700 health personnel and supervisors were trained at health centres in addition to 25 regional technicians and 24 district (Woreda) heads. The total trained is significantly more than originally envisaged. This was in response to a variety of factors, including a keen interest in training among other health centre staff and a mitigation for staff turnover. From the perspective of project performance and operation, staff sometimes move to different health centres or cease to work altogether, therefore it is important to monitor how many trained staff are *actively* working rather than the absolute number trained.

Figure 3 shows the estimated total number of *active* health centre staff (i.e. those currently working at project health centres) who have been trained in the use of solar suitcases. Decreases and fluctuations are largely due to staff turnover; however, some variances are also caused by the extrapolation of incomplete data. Unfortunately, not all health centres reported their staff numbers every month (even when other data was reported), therefore the graph represents a best estimate based on the data that was reported. Incomplete data also makes it impossible to know the absolute total number of staff trained during the project, but it is known to be in excess of 700.

In addition to training health centre staff in the use of solar suitcases, midwives were trained to enhance the quality and compassion of care alongside their normal midwifery skills as well as improving skills for data collection, reporting and communication. The project also boosted the use of medical technology in rural health centres (for example with the use of Foetal Dopplers, contained in each Solar Suitcase). Health officials reported that the overall quality of care for delivering mothers has been significantly improved by the project and that Foetal Dopplers were helping to diagnosis of foetal health problems during pregnancy. Furthermore, health centre staff reported that the improved tools at the health centre and the availability of adequate lighting throughout the night was positively impacting the health-seeking behaviour of pregnant women in the community.

At a broader level, the project had a positive impact on collaborative relationships within Ethiopia's health sector, particularly between Federal and Regional entities. The Ethiopian Federal Ministry of Health (FMoH) was a strong advocate of the project and offered their ongoing support, including by pledging to cover the tax for future imports of Solar Suitcases and replacement batteries (once the maintenance MoU were finalised with Regional Health Bureaus). Key decision makers in Ethiopia's health sector expressed a keen interest to expand the installation of solar suitcases to more health centres and more regions in Ethiopia.

**TABLE 1: Summary of key data over project duration**

| <b>Metric</b>  | <b>Estimated baseline or target over 36 months for 145 HC*</b> | <b>Collected sample data from 80-135 health centres over 32 months</b> | <b>Extrapolated for 162 health centres over 36 months**</b> | <b>Average per health centre per year</b> | <b>Average per health centre per month</b> |
|--|--|--|---|---|--|
| Total population impacted  | 3,625,000  | 1,993,809  | 4,037,464   | 24,923                                    | 24,923                                     |
| Women of childbearing age Impacted <i>(23% of total)</i>             | 833,750<br><i>(23%)</i>  | 458,576<br><i>(23%)</i>  | 928,617<br><i>(23%)</i>                                     | 5,617                                     | 5,617                                      |
| Total Deliveries   | 152,200  | 120,536  | 191,182   | 519<br><i>350 (initial est.)</i>          | 43<br><i>29 (initial est.)</i>             |
| Total Live Births  | no data  | 120,014  | 190,354   | 517                                       | 43   |
| Night time deliveries <i>(% of total)</i>                            | 82,188<br><i>(54%)</i>   | 68,780<br><i>(57%)</i>   | 108,592<br><i>(57%)</i>                                     | 296                                       | 25   |
| Night time live births   | no data  | 68,379   | 108,384   | 296                                       | 25   |
| Night time deliveries using solar suitcases <i>(% of total)</i>      | no data  | 50,898<br><i>(42%)</i>   | 80,520<br><i>(42%)</i>                                      | 219                                       | 18   |
| Number of HC staff trained <i>(plus more at regional level)</i>      | 290 midwives + 145 heads <i>(+49 regional)</i>                 | >700<br><i>(+ 49 regional)</i>   | >700<br><i>(+ 49 regional)</i>                              | n/a                                       | n/a  |
| Number of HC-level staff trained & active at end of reporting period | 290 + 145<br><i>(3 per HC)</i>                                 | 279<br><i>(~3.5 per HC reporting)</i>                                  | 566<br><i>(~3.5 per HC)</i>                                 | n/a                                       | n/a  |

**Table 2: Ongoing impact of the 162 solar suitcase installations included in this project**

| <b>Metric</b>  | <b>Average per health centre per month</b> | <b>Average per health centre per year</b> | <b>Total for each additional year, across all 162 health centres</b> |
|--|--|---|--|
| Total population impacted                                | 24,923                                     | 24,923                                    | 4,037,464  |
| Women of childbearing age Impacted <i>(23% of total)</i> | 5,617                                      | 5,617                                     | 928,617  |
| Total Deliveries   | 43   | 519                                       | >84,000  |
| Night time deliveries using solar suitcases              | 18   | 219                                       | >35,500  |