



A Project of Rotary E-Club Serving Humanity (District 9705, Australia and Worldwide)

PNG in Perspective (all PNG statistics are best available)

Processing some 10 million outpatients and 200,000 inpatients pa, there are in PNG (2019 estimates):

- 28 hospitals;
- 551 health centres;
- 2,000 aid posts;
- 4,400 "health workers", including Church health workers; and
- 5 nurses per 10,000 (2013).



From these numbers it is obvious that much of the patient care takes place in the more remote health centres and aid posts.

According to the World Health Organization's Global Health Workforce Statistics, OECD, PNG has:

- .5 nurses and midwives per 1,000 of population, 2018, compared to Australia with 12.8, 2017; and
- .1 doctors per 1,000 of population, 2018, compared to Australia with 3.7, 2017.

How would the Australian population cope or accept these numbers?

Solar Case Background

Putting aside the issue of availability of skilled medical staff, one of the major issues facing developing nations is access to and the reliability of electricity supply, something we take for granted. In remote medical centres and health clinics access to power supplies can be a major impact on patient outcomes. In addition, in these days of COVID19, holding a torch or mobile phone in one's mouth while trying to deliver a baby or using a conventional glass thermometer are far from ideal options. Alternatively, relying on a spirit lantern is an equally dangerous scenario. But, these are just some of the realities faced in remote medical centres in PNG (and other third world nations).

We became aware of the need for a reliable portable light source through the work of fellow Rotarian, Wendy Stein, OAM, PHF. Wendy has been operating her medical boat,

the Kula Spirit, in and around Milne Bay Province, PNG for many years focused on women's health/education and fertility control. In addition, Wendy has tirelessly travelled to many parts of PNG spreading the word on birth control and women's health.

Our research on the subject lead us to the US entity, We Care Solar - see <https://wecaresolar.org> . Despite numerous approaches they would not share their IP etc with us; further, the cost of landing their units in Australia was in the order of AUD3,500. That entity started in 2010 and in 2015 received a USD1mil grant from the UN to further their activities - in many respects validating their product, the cause and their work in developing nations around the world.

We Care Solar now has in excess of 6,500 of their units spread across the globe doing almost exactly what we propose. However, the overall scope of their activities is much broader than we propose. We are focused on providing light.



The Rotary Solar Case

Web research soon revealed that there were many versions/variations of this type of case/concept. Having a preliminary idea of the need, we eventually found Durst Industries (Aust.) Pty Ltd. (See <https://durst.com.au> .) Durst volunteered to join us/partner in developing a fit for purpose case for PNG, designed preliminary as a battery bank, light source and charge base - The Rotary Solar Case was the output of that collaboration.

The Rotary Solar Case was thus developed as an aid to enable safer delivery of babies and to help reduce instances of maternal mortality in remote regions/villages of PNG that otherwise lack a reliable power source.

Initially three pilot Cases were ordered - two for PNG and one to demonstrate and bench test. In conjunction with the Rotary Club of Boroko, we elected to field test the two PNG Cases in remote health centres/clinics out of Port Moresby. Our testing capacity has been limited by resource limitations in PNG imposed by COVID.

At this stage we have focused on making a better battery pack for light, recharge etc. providing basic lighting accessories. We have not sought to educate nursing staff nor provide 12 volt DC medical equipment for use with the Case, although these are readily available. We have tried to keep our initial objectives simple.

Our battery pack provides 40Ah power compared with 25Ah from the We Care Solar unit. Testing suggests that with an external solar panel of say 120 watts and up to 8 hours of sunlight, we can run three room lights for 24 hours, plus recharge phones, hand lights etc and maintain a full charge for night use in the the health centre, community hall or study area for students.

Each Case will require an external, roof mounted solar cell of the order of 120|160 watts (this is a finding from our trial, the lid mounted solar cells included with the Pilot units were not sufficient - we can do better). At the suggestion of the Rotary Club of Boroko it is

intended that the receiving community fund the supply and installation of this external solar cell unit as part of their commitment to the Case.

Depending on the size of the roof mounted charging solar cell, the Case can also run a small portable 12 volt DC refrigerator at around 4 degrees c. plus lights etc.

While our core objective is to provide healthcare workers in the more remote regions with reliable lighting, a mobile communication charge facility, and power for medical devices using solar electricity eg foetal doppler, digital thermometer, the Cases also offer villages light where there was otherwise darkness, for education and other village community / school activities.

Objective

Our long term goal is a production run of 100 units. This is small in comparison of the estimated 2,000-2,500 remote medical/ health centres in PNG. Initial costing base / budget is attached. On the ground distribution logistics, training, maintenance etc is still to be fully addressed - it has not been possible in the current COVIDE environment. In addition, production depends on funding thus a significant "contingency" has been included in this budget.

Of course our Case's application is not limited to PNG, most developing countries in our Asian region including New Briton, Honiara, Timor Leste, Solomon Islands, Cambodia, Myanmar, India, Nepal etc could also benefit.

What's in a Case?

- Water / dust proof / shockproof case
- 500Wh / 40Ah LiFeP04 Battery
- Maximum Power Point Tracking (MPPT) solar controller
- External photovoltaic cell input
- Battery capacity metre
- 3 Channel switched / fused outputs
- 6 x USB Ports
- 3 x 12 volt DC outputs - cigarette style plug compatible
- 3 X DIN sockets
- Internal storage compartment
- Charge socket for 12 volt DC input via dedicated 240 AC volt lithium iron phosphate battery (LiFePO battery) charger
- Charge input socket for external solar cell
- Manual / Wall chart

Cost

Refer attached Budget. We have no operational overhead at present. With a production run of 100 Cases Durst estimate per unit cost at between \$1,000 and \$1,200 per Case plus accessories at some \$450 per Case and other costs at \$270, total cost per Case approximately \$1,900 - \$2,400*. (* Includes 25% contingency.)

Other references:

Relative to We Care Solar Case:

- <https://wecaresolar.org/2012/01/23/making-mothers-and-babies-safe-in-uganda/>
- <https://wecaresolar.org/2020/11/02/the-power-of-partnership-pathfinder-international-ethiopia/>

Other- also see attached testimonials:

- <https://a4wh.org> - Australians for Womens Health - Dr Ray Hodgson, OAM, PHF, Rotary International's Zone 8 Humanitarian Award 2018 -2019, Dr Ray is building a hospital in Nepal funded by donations and the fitout by The Rotary Foundation. Dr Ray's book Heartbreak in the Himalayas (<https://a4wh.org/bookmodule/>) is an emotional read that starts with the lights failing in the middle of an operation. If you wish to read another book about why we are doing this also read The Hospital by the River - by the late Dr Catherine Hamlin, OAM (see <https://www.booktopia.com.au/the-hospital-by-the-river-catherine-hamlin/book/9781743537817.html>).

These conditions exist in PNG, directly and indirectly, plus many other islands in our region.

- <https://www.livingchildinc.org.au/about-us> - Sara Child, Nurse and midwife educator - see their moving video "Health in the Margins - Midwives Save Lives" at youtu.be/dTBhg0_ORaM
- <https://www.facebook.com/spacimpikinini/> - Wendy Stein OAM and Kula Sprit program
- **"The crisis of governance in PNG's power sector"** <https://devpolicy.org/the-crisis-of-governance-in-pngs-power-sector-20210714/>

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