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Papers due for peer review:	**Monday, 15 October 2018**
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Techno-economic Study of Solar Lighting Systems for Rural Communities

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Summary

This work explores the implementation of solar based lighting systems to replace kerosene lamps in rural communities in Fiji .

1.0 Introduction:

According to the global status report by IRENA, 1.06 billion people, accounting for 14% of the world population, lived without electricity by the end of 2015. The Pacific Island Countries (PICs) continuously struggle with difficulties in providing modern energy services to their population living in widely dispersed small islands. A rough estimate of 40 percent households did not have access to grid electricity in Fiji in the year 2012. Many Remote communities do not have access to grid connection due to the geographic barriers while the low energy consumption makes them relatively unattractive to utilities. Hence, fossil fuels are heavily relied upon for lighting needs with approximately 10% of the population in Fiji depending on kerosene lamps for lighting. This number is much higher in countries like PNG and Solomon Island. Use of traditional fuels poses a major health hazard to the users and leads to environmental degradation as well. The World Health Organization reported that household indoor pollution accounts for 7.7% of all the deaths globally. Typical kerosene lanterns provide 1 to 6 lux of useful light while normal standards suggest 300 lux of light for studying and accomplishing other fine activities. Hence, studies and other fine actives are either limited to day time or performed in poorly lit environment, straining the eyes of the user.

The drawbacks of using traditional fuels for lighting has triggered a lot of interest in Renewable Energy (RE) sources for energy needs in remote areas in terms of distributed energy systems. Solar home systems and small solar lighting systems play a vital role in providing access to sustainable lighting needs to remote population.

This work deals with the performance monitoring of several solar lighting systems which are commercially available in Fiji and other PIC markets and carrying out the socio-economic impact of these lights in remote communities.

2.0 Background

The study is based in 4 rural communities in Fiji namely: Namau in Ba; Valelawa 1 & 2 and Lagalaga in Labasa. These remote communities did not have access to grid connection and depended on traditional fuels for lighting needs. This had a lot of constraints on community members, especially women and children whereby fine tasks such as weaving and studies were limited to day light hours only. Moreover, kerosene had to be brought from use of kerosene lanterns posed fire hazards, while users were exposed to indoor pollution which would have severe health impacts.

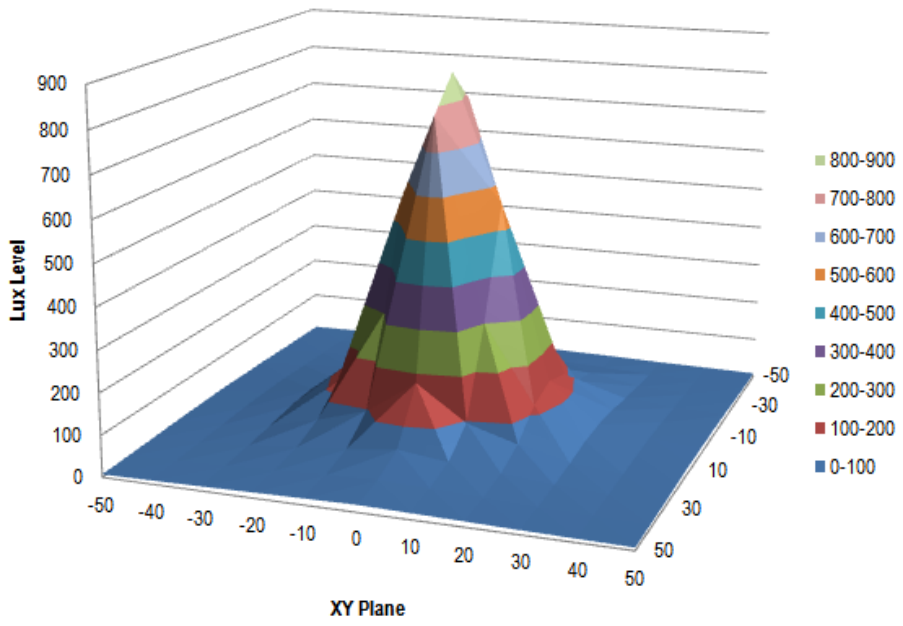
3.0 Objectives

The main objectives of this study were to assess the performance of solar lighting systems that are commercially available in Fiji markets in terms of techno and socio- economic viability in remote community settings. Technical performance assessment of the lights included testing; charging and discharging characteristics, and illumination

levels. Community engagement (Talanoa) played a vital role in assessing the socio-economic impact analysis of the solar lighting system in remote settings. The study also looked at the prospects of micro financing in order to assist the rural households .

4.0 Methodology

The efficacy of various lighting systems were tested using Fraunhofer ISE standalone LED lighting systems quality screening test method. This included testing of; PV modules, Battery capacity, charge controller, autonomous life, illumination levels, mechanical durability and LED long- term test. The second methodology used was site visitation for questionnaire-based survey, personal interviews and Talanoa sessions to find the socio-economic impact of switching to solar lighting systems from traditional fuels. The study aims to provide sustainable energy to areas facing energy poverty and aims to achieve SDG 7 and associated targets.



Fig, 1 Illuminance results for a test light.

5.0 Main findings

Small solar lighting systems can play a major role in alleviating challenges posed by fuel lamps. It is important that there are standards in place to ensure good quality systems/lamps are available to consumers. Micro financing facility can be very useful in moving the poor section of the communities towards sustainable lighting future.

6.0 References

Akella, A. K., Saini, R. P., & Sharma, M. P. (2009). Social, economical and environmental impacts of renewable energy systems. *Renewable Energy*, *34*(2), 390-396.

Mills, E. (2003). *Technical and economic performance analysis of kerosene lamps and alternative approaches to illumination in developing countries.* Berkeley, California: Lawrence Berkeley National Laboratory.

Nandi, S., & Sawkar, S. (2007). Intensity of artificial lighting in living room and study area of urban residential homes in Dharwad city. *Journal of Human Ecology, 21*(1), 63-64. doi: http://doi.org/10.1080/09709274.2007.11905953