Assessment of Solar Home Systems (SHS) for Isolated Rural Communities in Vanuatu Using Project Lifecycle/Sustainability Framework

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Vanuatu is a small island developing state with an archipelago of more than 65+ inhabited islands spread out over a 700km by 200km area in the South Pacific Ocean. The government of Vanuatu recognizes many potential social and economic benefits of rural electrification and prioritizes its development. But because of the geographical isolation among different islands and the under developed infrastructure, centralized power grid becomes an impossibility. Photovoltaic solar home systems (SHS) are thus increasingly utilized by both the Vanuatu government and foreign donors and as a practical and effective means to rural electrification.

This report adapted an assessment tool based on lifecycle-sustainability framework and applied it to assess solar home system (SHS) projects in rural Vanuatu. This follows from previous research in which the assessment methodology has been developed for and applied to water and sanitation projects. Three SHS project sites with different project basis were chosen for the case studies of this report. For these case studies the assessment was done both during and after the completion of the project and are compared using the lifecycle assessment methodology to help determine best practices for rural SHS projects in Vanuatu.

Recommendations of this report include modifications and weighted emphasis on the assessment tool for more relevance under SHS project context. Specifically, the separate classification of self vs. donor funding and privately owned vs. community projects is necessary for both the economic and political cohesiveness element of sustainability. In addition, rural area specific SHS component selection, design, and economic considerations are given.

Emphasizing technical design error margin in the conceptual design life stage and system hardware robustness from environmental conditions and user abuse are found to be factors that can lead to system longevity.