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Use of Solar-Powered Refrigeration in Resource-Challenged Areas: Potential for Effective Vaccine Conservation

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The need to improve on the performance of cold chain systems for vaccine storage and distribution in remote parts of the world has increased. Outages and absences of electricity make storage and distribution of vaccine challenging. We recently developed a new and improved solar-powered technology and have piloted its usage to monitor vaccine storage in Cameroon. We used 3 criteria in the selection of refrigeration system: suitability for the environment, integration of solar system that guarantees continuous electrical power and built-in temperature monitor and recorder to ensure controlled temperature environment with a range from 2°C to 8°C. The integrated trio-system was tested in Houston, USA followed by field deployment in remote, diverse climatic (14°C-47°C) and underserved health communities in Cameroon. Temperature readings were recorded every 5 minutes. Installations in Cameroon were done by locally trained Vianne engineers. More than 63,729 data-points were recorded and analyzed in Houston with temperatures ranging from 2.2°C to 7.7°C and a mean of 3.54°C. Preliminary data from health facilities in Cameroon also show consistent and steady temperatures within 2-8°C even with outside temperatures at 47°C in some regions. Temperature variations were consistent with opening and closing of the refrigerator. Higher temperatures within range were observed with prolonged opening of the refrigerator in Houston and Cameroon. Our results show that a well-thought system can maintain desired cold temperatures suitable for storage of vaccines and other cold-chain materials. This system is therefore ideal to eliminate cold chain issues that prevent effective and full immunization coverage globally.

Biography

Armand Ndomo is the founder and President of Vianne, a Sugar Land, Texas based company with branches in Africa, that focuses on providing affordable and reliable turn-key solar powered energy solutions in Africa; especially in underserved remote rural areas. Mr. Ndomo has more than 20 years of relevant international, technical and management experience in the energy industry and is a holder of a M.S. degree in Electrical Engineering. Mr. Ndomo is an NABCEP certified PV installation professional.

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