Developing a Real-Time SMS Feedback Tool for Off-grid Household Electricity Consumption

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Abstract

With the grid access standing at as low as 1 in 20 people access in Burundi, Liberia and other African countries, Off-grid energy systems have proven to be a silver-bullet to most of SSA energy access problems. Investments in the off-grid industry have grown by a 15-fold since 2012 to $276 million in 2015 with Pay-As-You-Go companies taking over 87% of the investments. It is estimated that 1 in 3 off-grid households globally will use off-grid solar by 2020, however, the off-grid system still suffers from problems, the main ones being capacity limitation, and ensuring energy efficiency amidst operation and maintenance/user errors. Energy efficiency(EE) is a very critical part of energy systems because by boosting the efficiency of production, transmission and distribution processes, it frees up resources, thereby acting as a virtual power source. Therefore, in the move to ensure sustainable and equitable energy access, EE is an indispensable part that cannot be overlooked in developing economies. In this paper therefore, a real-time SMS tool that informs off-grid households their electricity consumption through short text messages on their phones is developed. By informing users of their consumption, it is anticipated that energy awareness is enhanced thereby influencing users' behaviors and hence promoting energy efficiency. Besides awareness, majority of energy users often lack sufficient knowledge and skills to reduce their energy consumption, the tool aims to address this problem as well. The tool provides timely feedback about consumption through simple and understandable text messages. The algorithm collects data from the three main parts of the solar system i.e. power production generation, storage and consumption. This is translated into simpler SMS which are sent to the user. The paper demonstrates that it is possible to avail consumption information timely to off-grid households and this could be used to improve EE.

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