

An innovative modular stand-alone technology solution providing access to affordable on-demand electricity and hot water for off-grid households, community buildings and small businesses. The system features remote monitoring functionality to facilitate mobile based FinTech and customer management for sustainable service delivery.



Prototypes were successfully field trialled at a primary school and two houses in Jamataka village, Botswana for 6 months (and ongoing). Core components of systems included:

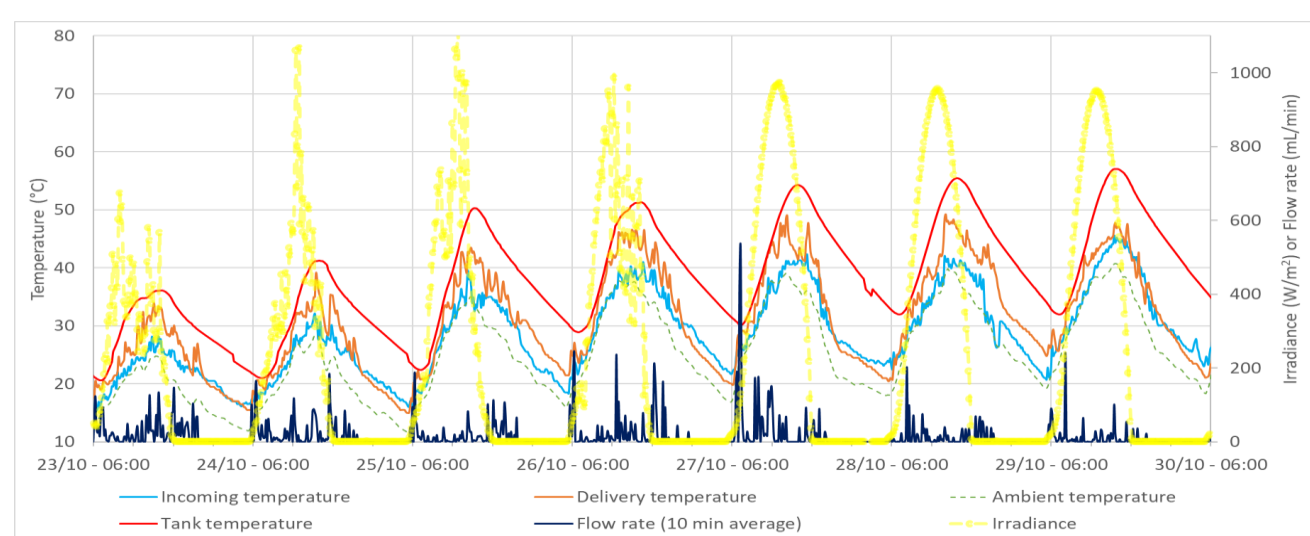
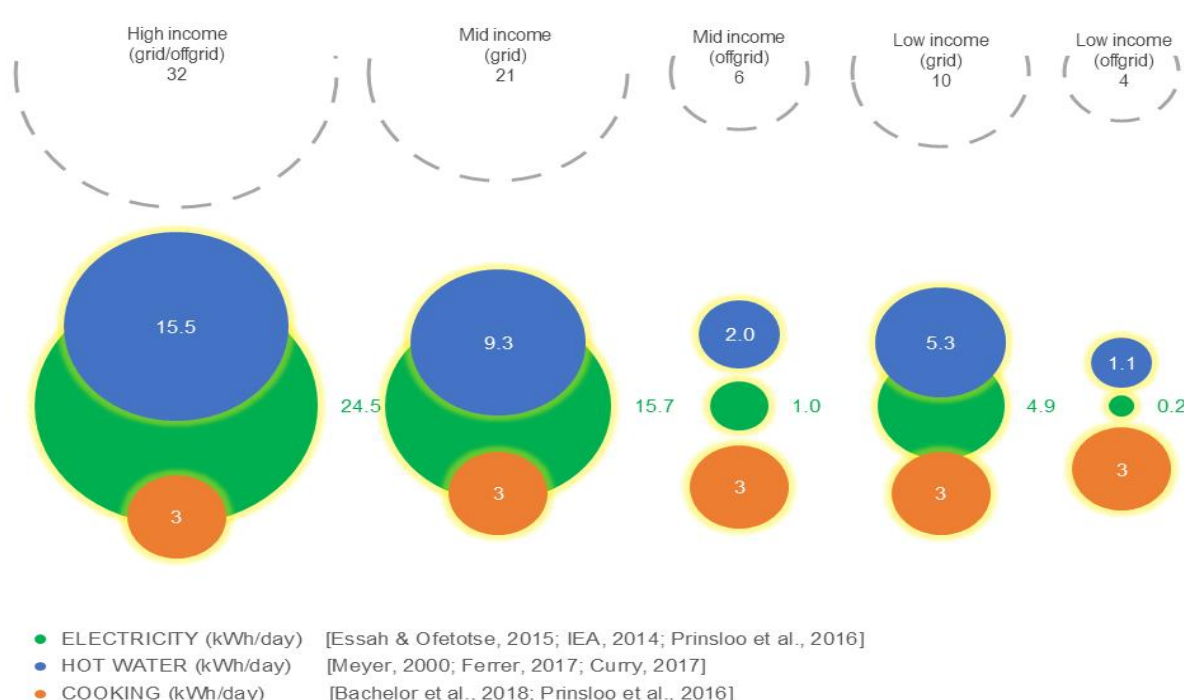
- PV module rated 280W_p / 31V_{mp} 60-cell poly-crystalline silicon with special laminate for robustness in harsh climates
- Lead-acid AGM battery rated 205Ah / 12V
- Solar charger (MPPT with 3-stages) rated 75V / 20A
- SolaCatcher water heater with integrated 28L storage tank and heat retaining liquid-vapour evacuated thermal diode
- Battery monitor & relay enabling surplus electricity cascade to boost hot water supply via a 100W immersion heater
- LoRaWAN and 2G/3G/GPRS cloud-based remote communications to collect performance data and provide system status monitoring

The project enabled initial work on development of a FinTech platform using mobile, cloud and blockchain technologies to:

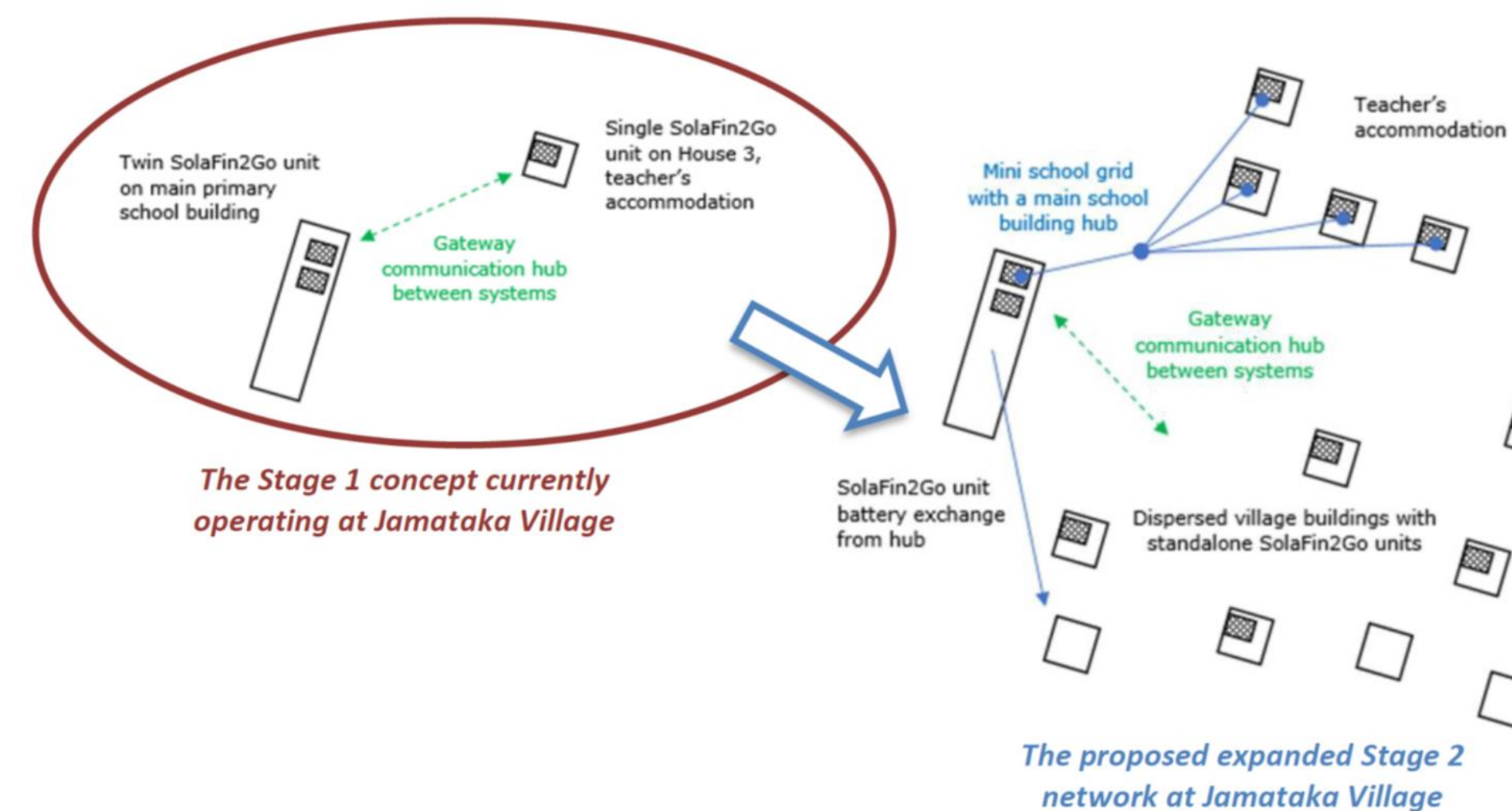
- Enable on-the-ground customer management and in-bounding of personal data (biometrics, physical address, personal details) to provide “unbanked” citizens access to affordable finance.
- Provide de-risking for investors through remote asset monitoring and simple payment processes to secure reliable returns.

Supporting research work to enable prototype design development, field trial deployment, and feasibility evaluations included:

- Review of Sub-Saharan African household energy demands and climatic data to establish a rational sizing approach.
- Laboratory testing of prototypes under solar simulated conditions.
- Collection and analysis of remotely monitored voltage, current, water flow and temperature data. This not only enables performance evaluation of the field trialled prototypes but also forms the backbone of essential business data to support future commercial service delivery.
- Results indicate that system sizing is appropriate to intended use and that electricity and hot water supplies are reliable. Observations indicate that user's electricity and hot water consumption has increased steadily over time, as anticipated.
- Technoeconomic and market evaluation defined the market gap for SolaFin2Go, demonstrated system affordability, and identified opportunities for value engineering.



Market focused real-world validation of socially inclusive prosumer business models for sustainable off-grid community energy services based on interconnecting multiple SolaFin2Go units. This scale-up project will trial a Distributed Energy Service Company (DESCO) approach for managing organically formed mini-grids and wireless grids which enable equitable and economic use of surplus solar power through energy trading & battery rental.



SolaNetwork builds on progenitor work of SolaFin2Go to curate an integrated set of affordable solar energy access solutions for **socioeconomically diverse sub-Saharan African rural communities**. The project will develop and trial a network of stand-alone devices and a unified monitoring and control system to provide real-time business intelligence and customer interfaces for the DESCO.

The project aims to fill a significant **market gap** between inadequate small solar-home-system and costly centralised mini-grids which are uneconomic in sparsely populated areas. A variety of simultaneous business models will address a diverse spectrum of customer circumstances and ownership preferences.



The project supports local **capacity building** and gender focussed **social inclusion** through:

- Knowledge exchange and business development through engagement of local sub-contractors.
- Establishment of gender-balanced DESCO run by village stakeholders to maintain and manage the SolaNetwork and generate local community income.
- Technical and business training for villagers, with particular emphasis on engaging women, to enable ongoing operation of the DESCO business as well as the SolaFin2Go and SolaNetwork hardware.
- Partnership with local academic institution for socio-techno-economic expertise and local insights.



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