maxEnergy ENERGY SOLUTIONS

DC MICRO-GRIDS

SPECIALIZED SOLAR SYSTEMS®

Working at the electrification frontier

maxEnergy offers an exciting new **ecosystem approach** for the supply of energy to locations that are beyond the reach of grid supply systems in Africa.

With many successful projects completed in collaboration with universities, governmental organizations, NGOs and businesses, this approach has fostered economic transformation in disconnected and indigent communities with new business start-ups, job creation and possibilities.

Based on a pay-for-energy-usage business model and using solar power generation for energy delivery, a percentage of recaptured revenue supports product expansion, employment and sustainability.

Roll-out of solar electrification on a utility scale

Built on the backbone of entrepreneurship and micro-economies the data has been carefully evaluated over many years and strategic partnerships have been formed. **maxEnergy** Specialized Solar Systems would like to demonstrate the true sustainable scalability of its solar products by offering venture-capitalists a turnkey solar electrification framework by:

Supplying solar products with remote functionality to generate clean, efficient renewable energy for placement in disconnected communities;

Offering well priced and attractively packaged options that are made up of efficient DC electrical appliances. These packages will include the very basics of energy appliances and progress to more sophisticated offerings for dwellings, businesses, schools and other establishments;

Providing a secure and integrated Online platform for ecosystem management with a host of features, such as remote system monitoring, client billing, vendor management, customer notifications and automated system switching;

Incorporating strong support structures with comprehensive training, intricate planning procedures, successful product placement and providing basic leadership and business knowledge skills leading to greater economic activity.

Solar technologies: smarter & faster energy supply

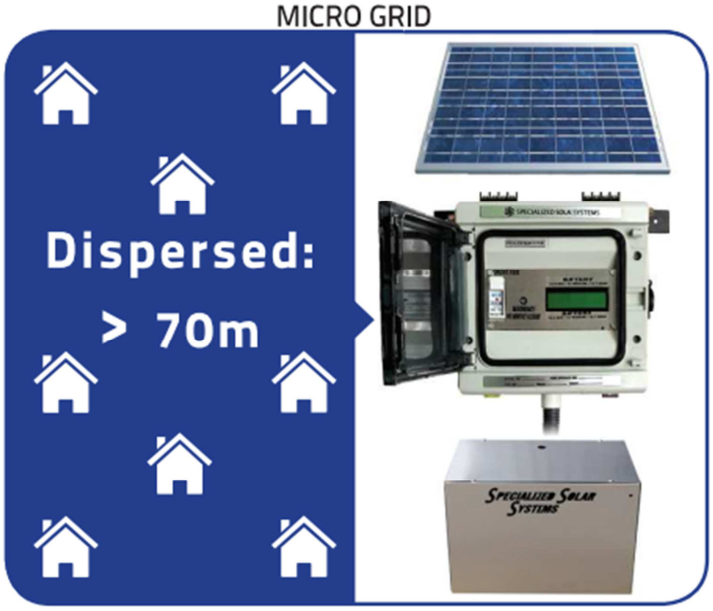
Solar power stations being the future of energy supply having the potential to fill gaps in grid infrastructure smarter and faster, generating efficient energy, offering energy metering and remote communication with switching options.

Solar power stations are used as an energy source for powering energy efficient DC energy appliances. Specialized Solar Systems solar generation offerings are demarcated as follows:

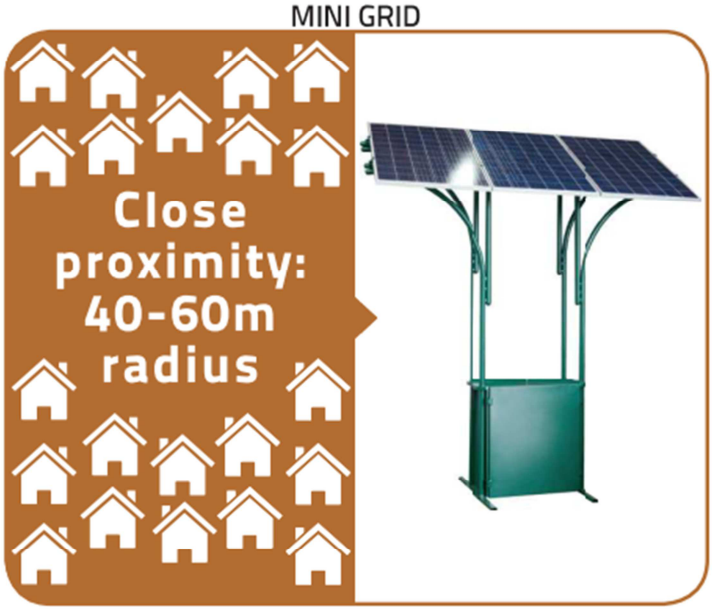
Micro grid: The micro grid range of solar products are ideal for scattered environments where the distance between installations is large and the demographics sparse. The unit is installed at an individual's premises where the energy is produced and used. This is also known as de-centralized solar energy supply.

Mini grid: The mini grid solar solution was developed to supply energy to multiple dwellings from a central location and has many applications, options and configurations. This is also known as sub-centralized solar energy supply and is ideal for informal settlements and congested environments.

MICRO GRID



MINI GRID



Specialized Solar Systems **utility-based solar management solution** supplies all the necessary tools required for system management through a secure, configurable tiered-user online platform for remotely managed solar energy supply.

Utility-based solar energy management framework

The core architecture design is to securely assist with the management function by providing an integrated framework for remote system monitoring, GPS system allocation, client and system management, billing options, vendor management and automated system switching in a simple and intuitive user interface that is accessible anywhere where there is an internet connection.

The framework allows for the creation of independent utilities or ecosystems where administrator users are created then assigned to their own unique environment. Vendors (P.O.S) are set up and managed by these administrators.

Using a pay-for-energy-business model, the vendor business model is based on a wallet fund system. For a vendor to dispense energy, funds must be available in their account thus eliminating risk for the independent utility.

Adequate training is provided in all the framework functions in 3 modules. The cloud-based framework is constantly monitored and support is always available.

The solution is now used extensively in many off-grid solar electrification projects where remote administrators and their ground operations rely on real-time data to fulfill their operational criteria.

Efficient DC powered appliances enhancing lifestyles

Along with energy access, customers are provided with **efficient DC powered appliances** that improve their quality of life. These appliances support the very basics of indigent energy needs and progress to more expensive comfort appliances enhancing the available options to a customer as their energy requirements grow. The online management platform facilitates the process with automated debiting, vendor management and automated remote power switching in the event of non-payment. **Standard with our systems are marked Green !**

 **LED DC TV (42000003)** 15" TFT LCD Panel | Aspect Ratio: 16:9/4:3 Resolution: 1024 x 768 60Hz Colour system PAL, NTSC, SECAM |3W x 2 | HDMI	 **DSTV DC DECODER(42000008)**	 **196LDC SOLAR FREEZER (41000003)** A 12V DC solar powered freezer that can be thematically controlled to act as a fridge	 **158L DC COMBO FRIDGE/ FREEZER(41000002)** A 12V DC solar powered fridge and freezer combo unit
 **DC PLUG BOX (17000002)** Supplies 10A 12VDC outputs for TV, Radio, DSTV(Satellite TV) Connection point for cellphone charging and AC inverter	 **LIGHTS & LAMP FITTINGS** ES27 Fittings (44100002) Lamp shades (99030030) 3W LED Interior lights (44000002)	 **SPOTLIGHT (15000009)** External 2.4W, 54 LED spotlight	 **ON/OFF SWITCHES** Wall mounted (44100004)
 **DC DESKTOP FAN (42000010)** DC powered cooling fan	 **AM/FM RADIO (42000006)** 12V DC AM/FM radio	 **INVERTER** 350W AC Pure sine wave inverter	 **CELL PHONE CHARGING** USB cell phone charging adapter

Utility Based Solar Management

The use of solar energy production as a primary source of electrification for large scale and a diverse demographics coverage is the culmination of many years of product development with leading solar manufacturers and component developers for low cost solar energy solutions. A world first solar solution is now available and provides an easy to use, tiered-user, online framework for sustainable and remotely managed energy supply.

The integrated solution is used extensively in many off – grid electrification projects where remote system management and on the ground management rely on real time data for client and system management.

Main Features:

- Solar system management with remote switching
- User administration and management
- A variety of automated billing options
- Stock control with system logistics
- Advance security features
- End- User interaction
- Detailed reporting and system overview
- Audit trail system and user logging
- Utility control and access
- Can be connected to utility as backup when available.

Efficient Implementation and Management Process

Efficient setup and implantation protocols have been at the foundation of the management program development. The skills now required to implement a completely automated off-grid solar energy supply environment with vendor outlets(point of sale) can be acquired with very little training

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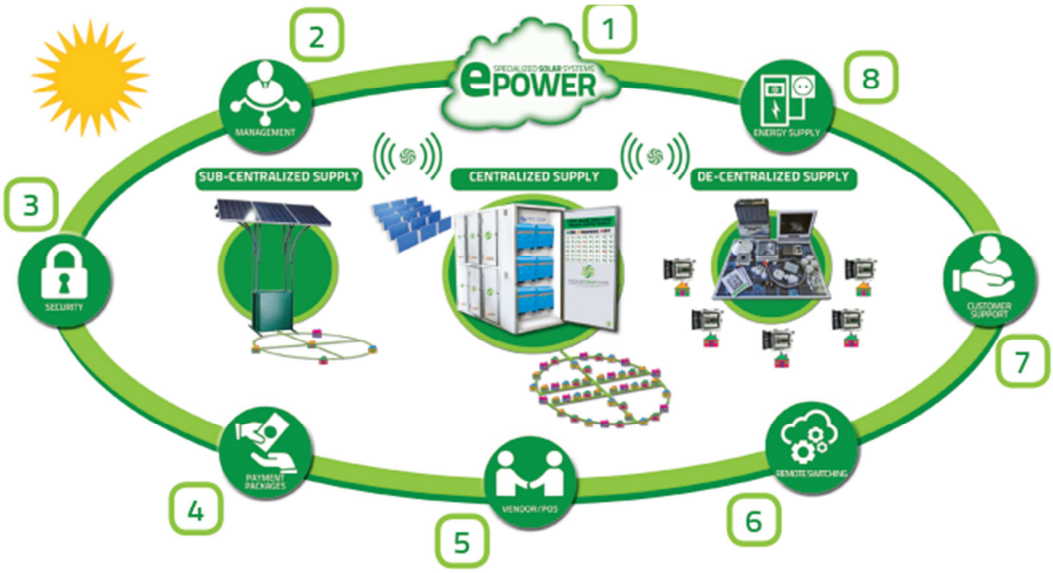
Overview



[1] Solar Energy Management Framework

maxPower (EPOWER) is centralised on-line solar system management framework that is accessible with any modern internet browser. It is built on dedicated and reliable cloud services and allows the creation of system management clusters for solar energy service providers(utilities)for efficient management of macro and micro solar energy solutions.

maxEnergy with its funders can partner with potential Municipalities or districts to enable communities to receive solar energy in remote and off grid areas where currently no electricity is available. This all done in affordable tier structure that suits the individual clients financial situation. Payment packages or invoicing methods are then defined with customers information and system data capturing. This information is then allocated to the management solar system for automated system and end user management functionality.

[2] Management

The frame work provides the management of:

- Various billing options.
- Solar System information
- Solar system stock allocation via GPS with map overlay
- Remote switching with customer notification
- End – user data capturing
- Historical data records
- Security level multi logging All user access control with specific defined parameters per region.
- Full audit training logging. All user and system activity
- Comprehensive training and skill transfer
- Vendor facilitation.
- Local Trained management and service providers (trained and skilled by maxEnergy.

There are many features that are available on the utility-based solar energy management platform.

[3] Security

The management framework has advanced user-rights security features that allows management to specify which users are allowed to use or view the advanced features that the framework offers. The system also blacklists the IP address of multiple log-in attempt failures.

[4] Payment Packages

The management framework supports automated billing services that can be set up and then allocated to a solar system. The payment packages work primarily with upfront payments for energy usage and once allocated, perform an automated pay-for-energy-usage function. All payment packages include an option switching function that allows the solar system to be charged to varied status- ON WARNING and off –all dependant on the user account balance and the allocated payment package. The user can also be notified of the different status changes via SMS or email.

The available payment package options are:

- **Contract payment package;** A contract payment package is a rental based option with monthly up front billing includes status change switching as an option. A monetary value is set for the energy supplied as per max tier selected. This will be deducted periodically on certain day, each month.
- **Other payment methods will be considered per order.**

[5] Vendor /POS

The management incorporates a vendor application that runs separately to the main framework and has an API interface into the main platform. This works through any modem internet browser on dedicated cloud servers. A vendor outlet can be established anywhere where there is an internet connection and is managed via a wallet funding system that allows management of vendor funds.

Vendors will be able to receive payments and print invoices or mini statements for the end user as a proof of payment.

Vendor transactions happens in real time . Example: if a unit is OFF and a payment is processed that result in a system status change to ON, the transaction will update the system status immediately if criteria is met. The vendor module is created and managed within the time frame.

POS Process

- The vendor records end user system number, ID or telephone number, as a search criteria.
- Vendor confirms details and confirms value and system status.
- Vendor confirms with end user amount and payment.
- The Vendor inputs the payment value
- The transaction is completed with a printed invoice or SMS to end user.
- All status is automatically updated

[6] Remote switching

The remote switching has the ability to be verified by the solar system using SMS or data sources. The various system states are either ON (Green) WARNING (Orange) or OFF (Red). The switching happens when payment criteria are not met and can also be intervened manually, dependant on user administration rights.

[7] Customer support

The management system supports end-user registration and that allows them to log into their own dashboard via API through any modem internet browser. The dash board gives the end –user an overview of their system status, notification ,detailed account history, outstanding amounts, payment details for electronic funds transfer and energy suppliers support information.

[8] Customer support

The management framework allows thresholds to be defined and set by management. For example. If a system is designed with specifications to deliver a maximum of 500 watts of daily consumption. Once this threshold is exceeded the system will automatically switch OFF. Then reactivate in the new daily (period). This allows to meet requirements of the original design specifications.

[9] Optional Extra

Solar Geyser can be supplied on request on any package as an additional energy fee.

maxEnergy selection

Each home will be supplied in different tears as shown below. Yellow indicates additional product supplied per home in different max categories. Packages can be extended and new price to client will be supplied ensuring that entry level clients have access and can add to current system.

Current technical solution systems and living-standard-enhancement products

DC appliances are supplied with manufacturers' warranties by major brands. The appliances are safe, efficient, cost-effective.

Our Range

Max -1

DC Plug Box for DC Products * 1 x External flood light *2 internal lights with ES27 fittings and shades *3 Wall Switch * DB Board *GSM Management system *Blue tooth control for MPT and settings * Solar Cell phone charger leads

Complete with Mini Energy station to operate 40 Homes within 20 Metres from station

Max -2

DC Plug Box for DC Products * 1 x External flood light *4 internal lights with ES27 fittings and shades *5 Wall Switch * DB Board *GSM Management system *Blue tooth control for MPT and settings * Solar Cell phone charger leads *DC RADIO 15” LED TV

Complete with Mini Energy station to operate 40 Homes within 20 Metres from station

Max -3

DC Plug Box for DC Products * 1 x External flood light *4 internal lights with ES27 fittings and shades *5 Wall Switch * DB Board *GSM Management system *Blue tooth control for MPT and settings * Solar Cell phone charger leads *DC RADIO 15” LED TV * 2 Plate stove *LPG Gas Bottle

Complete with Mini Energy station to operate 40 Homes within 20 Metres from station

Max -4

DC Plug Box for DC Products * 1 x External flood light *4 internal lights with ES27 fittings and shades *5 Wall Switch * DB Board *GSM Management system *Blue tooth control for MPT and settings * Solar Cell phone charger leads *DC RADIO 15” LED TV * 2 Plate stove *LPG Gas Bottle* DC Fridge 158Lt

Complete with Mini Energy station to operate 20 Homes within 20 Metres from station

Max -5

DC Plug Box for DC Products * 1 x External flood light *4 internal lights with ES27 fittings and shades *5 Wall Switch * DB Board *GSM Management system *Blue tooth control for MPT and settings * Solar Cell phone charger leads *DC RADIO 15” LED TV * 2 Plate stove *LPG Gas Bottle* DC Fridge 158Lt * 1.2KW Inverter AC *AC Ready Box with 15 Amp Plug& Earth leakage

Complete with Mini Energy station to operate 20 Homes within 20 Metres from station

Legal and regulatory compliance

design and implementation standards comply with South African legislation and regulations

Legislation: Generation

- Non-Grid Electrification Policy
- Electrification of Un-proclaimed Areas Policy
- Free Basic Electricity (FBE) for Republic of South Africa
- National Energy Regulator Act

Legislation: Environmental

- National Environmental Management Act

Legislation: Consumer

- Consumer Protection Act
- National Credit Act

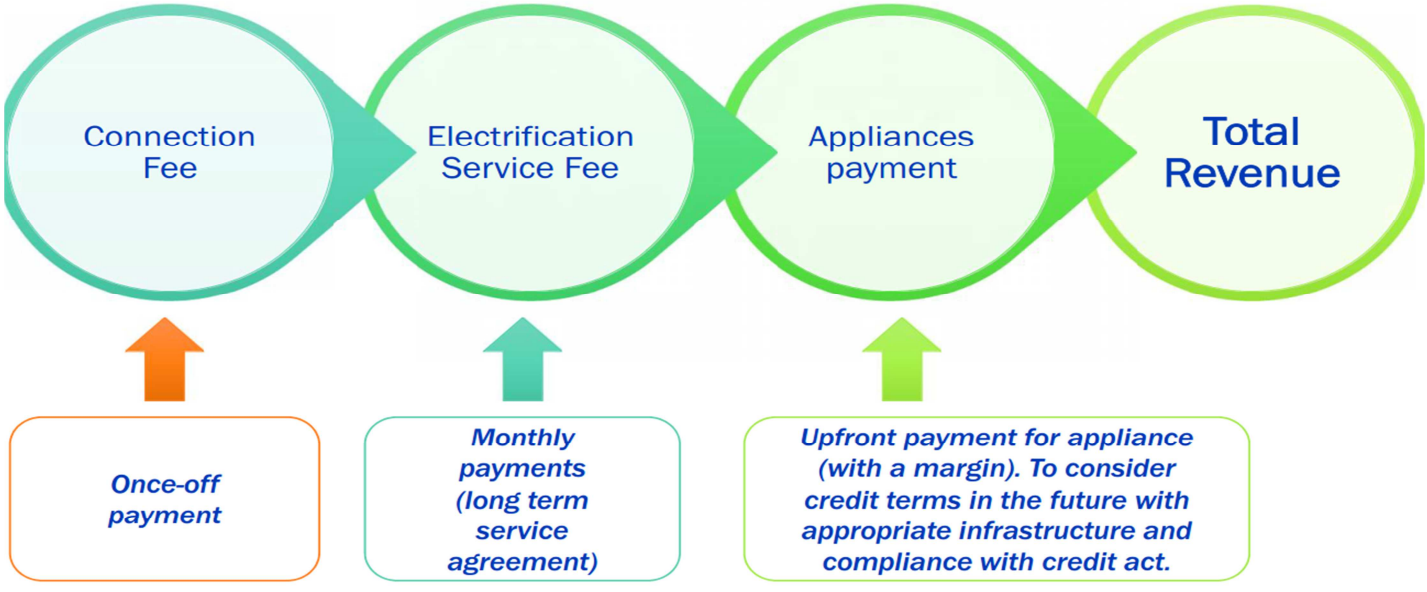
Standards Board*

- NRS 052-1: 2012
- SAN 959-1: 2012

** There is no specific standard for national electrification of informal settlements in the form of DC distribution. However, there is a framework for the implementation of photovoltaic systems in individual homes, schools and clinics. The NRS specifications are developed in collaboration with Standards South Africa (StanSA), the standards division of the South Africa Bureau of Standards*

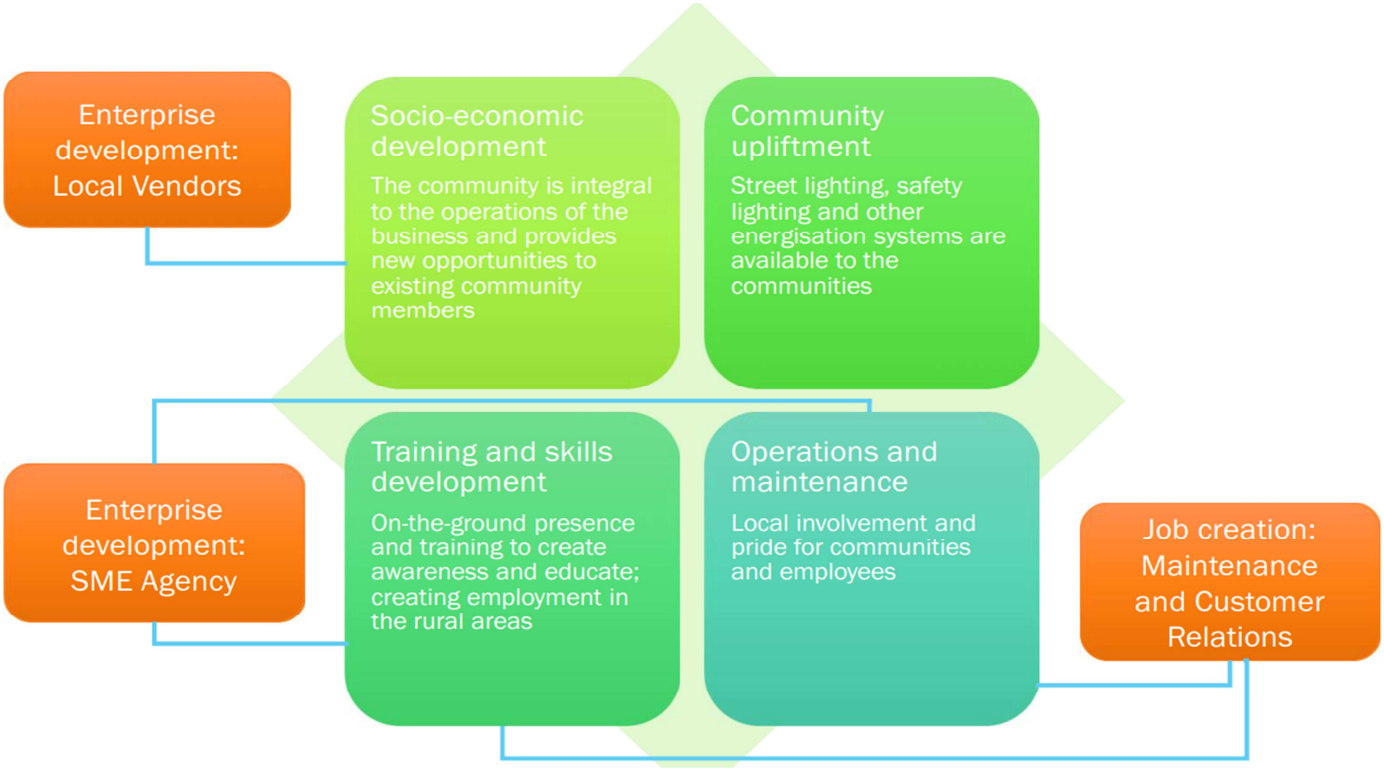
Revenue model

revenue via 3 streams



Enterprise development, job creation and community upliftment

The business provides opportunity for SME and community development.



Operations and Maintenance: Remote System Management

ePower pay-for-energy-usage system: A remote and online management utility system that provides all the necessary tools for sustainable remote solar energy and client management

ePower System

Energy supply
- Remote system control via GSM technologies of DB boxes
- Automated supply: Warning/Off/On

Management
- Comprehensive record keeping and administration of data
- System records: stock allocation via GPS
- Detailed audit trail
- Detailed reporting

Customer management
- Client records
- Payment and account history
- Definable payment packages: Weekly, Monthly payment / contact / PAYG

Security
- Tiered, multi-user security and access control
- All user system interaction is logged
- Privileges assignment on all framework functions

Vendor management
- POS: payment and receipting logging
- Remote vendor management framework

Theft

Damage

Vandalism

Non-payment

Customers selling appliances

Risk mitigations inherent in the business model:

- **Community sense of ownership:** Because of the pre-set implementation procedures, ownership is shared between the utility (generation components) and the customers (appliances)
- **Maintenance protocol:** under Agency KPI's, the trained utility representative is required to inspect each customer premises at least once a month
- **Utility management software:** non-payment is mitigated by automation of supply; real-time monitoring provides reports of consumption and connections to the systems mitigating tampering and illegal connections
- **Revenue collection protocol:** the vendor wallet system ensures upfront of payment to the utility and passes a portion of credit risk to the vendor
- **Cost-recovery protocol:** non-payment is mitigated by repossession of installed hardware

Physical risk mitigations:

- **Alarm system:** the sub-centralised system has an internal alarm installed that is be activated by customer to warn neighbours that tampering or theft is in process (linked to community sense of ownership)
- **Anti-theft devices:** the hardware is installed in anti-theft format, preventing removal without alerting the community to theft attempts: software capability to ensure non-functioning of hardware unless installed within the DC Go framework

Project Price would depend on quantity and financial offering from our funders. We will soon offer payment terms as per or similar to utility scale operations off Grid. Please note this system can be connected to AC supply as a backup.