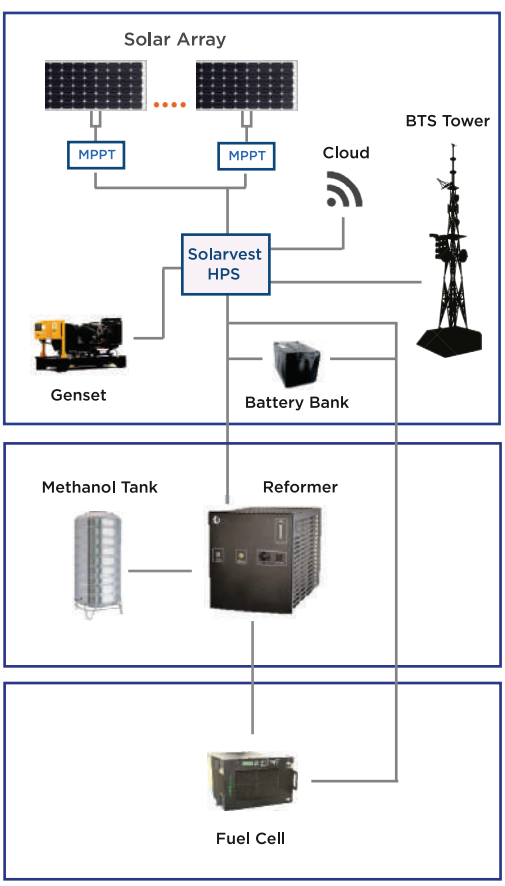
SOLARVEST
ENERGISING THE NEXT

REFORMATION POWER SYSTEM

INTELLIGENT POWER MANAGEMENT FOR BASE TRANSCEIVER STATION (BTS) SITES

Solarvest's Reformation Power Solution (RePS) uses the very affordable and efficient reformation process using highly energy dense Methanol fuel onsite to create the power needed. The RePS combines Solar Panels with a Reformer, Hydrogen Storage, and Fuel Cells with the Hybrid Power Systems (HPS), to efficiently monitor and control all aspects of the system. This means that the system dramatically reduces the need for refueling and has very low maintenance requirements making it perfect for remote sites where refueling is very expensive or troublesome.

SOLUTIONCOMPONENTS



	SOLARVEST HPS	SOLAR ARRAY	REFORMER
SYSTEM	Smart Hybrid Systems Hub	Solar Panels	Methanol Storage Tank
	System Controllers	Mounting System	Methanol Reformer
	Sensors (as required)	MPPT	**FUEL CELL**
	Rectifier	Solar Controller	Hydrogen Fuel Cell
	Inverter	**GENSET**	
	Power Distributor	Diesel Generator	
	Surge Protection	Fuel Tank	
	Indoor/Outdoor Cabinet	**BATTERY BANK**	
	Redundancy Switch	Batteries	
	Remote Communication	Battery Management System	

Reformers provide a simple and cost effective solution for BTS Towers with the additional benefits of having a small carbon footprint while being efficient, quiet and a safe power production. Methanol has a very high energy density that dramatically reduces the number of refueling trips needed to the site.

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SOLAR PANELS, FUEL CELLS & REFORMERS

Fuel cell systems have revolutionized the application of reliable backup power for critical equipment. This technology provides several advantages over traditional backup power methodologies - batteries and internal combustion generators - as the sole power solutions. Like batteries, fuel cells provide current directly to the DC bus, but have a significantly increased service life and decreased maintenance costs, as well as a smaller footprint for longer runtimes. Installation is accomplished with ease. Additionally, fuel cell runtime, as with a generator, is a function of fuel storage, but with few moving parts and lower maintenance. Using a Reformer for Hydrogen Production provides an efficient, quiet, and cost effective solution with a significantly lower pollution output compared to diesel generators. It also reduces the need for number of times for refueling and maintenance which is significant for remote locations.

ADVANTAGES & CHALLENGES

PARAMETERS	ADVANTAGES	CHALLENGES
EMISSIONS	Low CO2 Pollution Low Noise Pollution	None
CAPEX	Solar prices dropped significantly over the last 5 years	Fuel Cells and their Reformers are still not common items so generally built to order and there for expensive with fairly long leadtimes.
OPEX	Dramatically reduced refueling needed Fuel Cell and reformer reduce maintenance to 1-2 times a year Fuel Cell can be used to reduce deep cycling of the Battery Bank enabling longer battery lifetimes Methanol fuel is less in demand in small qualities so less likely to be stolen.	Reformer has slow start up from cold, so generally must be on hot-standby which uses fuel Cleaning required of the panels and the water filtering Increasing the number of systems automatically creates more potential failure points and therefore more monitoring nodes are needed.
SUNSHINE AVAILABILITY	Average 1500Wh/m² Annually	Monsoon seasons and mountainous rainforest locations.
SOLUTION CONFIGURATIONS	Easily integrated hybrid solution with plug and play solutions No Generator or grid connection provides a onsite low pollution system.	Intermittent sunshine availability requires equipment automation to optimise solar photovoltaic usage. A higher capacity solution leads to a higher CAPEX investment.
STORAGE	Load balancing and trickle charging.	In low solar capacity sites need to balance the CAPEX vs OPEX to optimise the overall cost of the system

RELIABLE

N+1 or 1+1 redundancy is designed into the system Modular fault-tolerant design enables advanced management of fuel cell membranes.

MODULAR

Modular system design means easy hot-swappable maintenance in seconds, without tools, and while continuing to provide power to the customer load. With a fault-tolerant design, we can ensure continued power to customer equipment, using larger power modules building blocks. Multiple bus and multiple voltage scenarios are easy to accomodate.

SCALABLE

The systems allow us to configure the power to suitthe load from 1kW to 20kWs Scalable Hydrogen storage provides for up to hundreds of hours of runtime.

LOW MAINTENANCE

Annual air filter inspection Refueling not needed as fuel generated onsite Mean time to repair - minutes Advanced diagnostics and self-testing.

ENVIRONMENTALLY FRIENDLY

Hydrogen in, power and warm water out No emmissions Low noise signatures under 60 dBA @5 feet.

ENVIRONMENTALLY- HARDENED

Operating temperature range from -40°C to 50°C Field-proven ability to perform during hurricanes, tusanmis and other harsh weather Diverse geographic locations.

MONITORING AND CONTROL

Remote / local system configuration and status monitoring for historical and operational data.

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