



Green Power  
for Mobile

## GPM Vendor Directory



# Introduction

The GSMA Development Fund's Green Power for Mobile programme has sought information on the capabilities, products and services of the vendor community within the industry in an attempt to evolve and regenerate the current [vendor listing page](#).

For Green Power for Mobile, we sought vendors who support the sale of renewable energy systems to cell towers of the mobile industry. Specifically:

- a) Equipment manufacturers of renewable energy equipment selling into the telecoms sector at commercial scale
- b) System integrators deploying renewable energy systems on behalf of mobile industry clients
- c) Telecoms equipment vendors with renewable energy solutions
- d) Energy service companies (ESCOs) providing Power Purchase Agreements (PPAs) for base stations.

For Community Power from Mobile, we sought vendors who provide products or services in which power is distributed to local, off-grid communities near the base station either via device charging (handsets, lanterns or household batteries), or mini-grids. Specifically:

- a) Equipment manufacturers of power distribution systems to allow device charging (handsets, lanterns or household batteries) at base stations
- b) Energy service companies (ESCOs) providing Power Purchase Agreements (PPAs) for base stations in parallel to providing power to the local community.

These submissions have been collated to produce this Green Power for Mobile Vendor Catalogue. The vendors within this catalogue have been ordered alphabetically and subsequently index at the back according to their specialist field. We hope that this catalogue will provide a snapshot of the current market and is organised in a clear and concise way. We intend to keep this catalogue a dynamic document with relevant updates on a quarterly basis. If you are a vendor and are interested in making a submission to the Vendor Catalogue in time for the next update, please contact [greenpower@gsm.org](mailto:greenpower@gsm.org)

This list of vendors is not GSMA approved or vetted but is intended to be a useful starting point for operators when making enquiries. Additionally, please note that GSMA have not revised any of content in these submissions. Any changes have been merely to the format for consistency purposes.

# Contents

Company	Page				
Alcatel Lucent	2	Delta Group	16	Proven Energy	32
Altobridge	3	d.Light	17	Prudent Energy Corporation	33-34
Ameresco Solar	4	EGG	18	Qowisio	35
Apollo Solar	5	Electro Power Systems	19	Renewable energy venture ltd	36
Barefoot Power	6	Eltek Valere	20	Solarc	37
Bergey	7	Emerson Network Power	21	SolarKiosk	38
Caterpillar	8	Fenix International	22	Starfire Mobile	39
Cell & Sat	9	Flexenclosure	23	Steca Elektronik	40
CellMax	10	Idatech	24	Suntrica	41
Circadian Solar	11	Intivation	25	Tesuco	42
Clay Engineering	12	Narada Asia Pacific Pte Ltd	26	Toughstuff International	43
Clean Power Systems	13	Pamoja	27	VNL	44
Clear Stream Techonology	14	Phaesun France SAS	28	Zephyr Corporation	45
Cool Energy	15	Phocos	29	Zigor	46
		PNN	30	Index	47
		PowerOasis	31		

# Alcatel Lucent

Alcatel Lucent AL is one of the biggest telecom equipment providers worldwide; the company focuses on fixed, mobile, and converged networking hardware, IP technologies, software, and services.



AL is providing its renewable energy products under the Alcatel Lucent's "Green Touch" initiative, which aims to reduce the emissions produced by networks a thousandfold. This initiative was launched in January 2010, including several major network operators, including China Mobile, AT&T, Portugal Telecom and Swisscom, and a host of research institutes and component manufacturers.

## Latest Press Releases

**May 2009 - Bharti Forms India Telecom Alliance with Alcatel-Lucent**

[http://www.businessweek.com/globalbiz/content/may2009/gb2009051\\_422522.htm](http://www.businessweek.com/globalbiz/content/may2009/gb2009051_422522.htm)

Bharti Airtel has entered into a joint venture with Franco-American telecom gear maker Alcatel-Lucent to manage its landline and broadband business, expanding its tested strategy of outsourcing technology functions to focus more on marketing and sales.

## Project Locations

Global

### Company

Alcatel Lucent  
14th & 15th Floor  
Tower C, DLF Cyber  
Greens DLF City, Phase III  
Gurgaon 122002, Haryana

### Website

[alcatel-lucent.com](http://alcatel-lucent.com)



# Altobridge

Altobridge is an R&D-focused, wireless network solutions provider. Its founding vision was to remove the technical and commercial barriers that denied remote communities affordable mobile voice and internet connectivity.

Since its creation in 2002, Altobridge has designed, patented and commercially deployed technology innovations that have bridged the digital divide; breakthrough solutions that now enable mobile network operators, particularly in low and lower-middle income nations, to affordably connect unconnected communities. In its early years, Altobridge developed and commercially deployed the solutions behind the world's first commercial GSM service on board passenger aircraft, and the world's first commercial deployment of GSM connectivity on board deep-sea merchant maritime vessels globally.

\*GSMA Association 2010, Informa Telecoms & Media 2010

# ALTOBRIDGE™

## Connecting the Unconnected

Advancing from these breakthroughs, Altobridge focused its resources on solving the technical and commercial barriers that prevented mobile network operators from cost-effectively extending their networks, beyond their urban strongholds, to population centres in rural and remote regions throughout emerging markets - communities yet to reap the social and economic benefits of mobile connectivity. Today, 1.6 billion adults - 23% of the world's population globally - are not connected to a mobile network. In Sub-Saharan Africa, rural mobile penetration rates are below 10% in most cases.\*Altobridge has set about removing the three greatest barriers that mobile network operators face in terms of rural and remote network expansion, namely: (1) the capital costs involved in deploying traditional infrastructure, such as 30+ metre telecoms towers, which operators perceive to be pre-requisite for rural deployment; (2) the operational costs required to drive power-hungry base stations

on transceivers; (3) the monthly transmission costs (the backhaul costs) incurred to deliver voice calls and mobile data traffic to and from users' devices.

Altobridge has achieved this through a series of patented and patent-pending technologies, namely, Altobridge Data-at-the-Edge™ (data optimization in wireless networks), Local Connectivity™ (local voice switching) and Split Architecture™ (transmission and power optimization). These technologies, individually and combined, drive down communications delivery costs for mobile network operators by reducing backhaul and power consumption costs.

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### Company

Kerry Technology Park,  
Tralee, Co. Kerry Ireland

### Website

[altobridge.com](http://altobridge.com)

### Email

[info@altobridge.com](mailto:info@altobridge.com)

### Telephone

+ 353 66 719 0210

### For further information, please contact:

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Development

[gerry.collins@altobridge.com](mailto:gerry.collins@altobridge.com)



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# Ameresco Solar

## Company Background

**Ameresco Solar is one of the world's most experienced off grid and poor grid renewable energy solutions provider, whose core personnel have collectively 300+ years global experience in the design, engineering and project management of solar, hybrid and cycle charge power systems, with many working in the industry for over 20 years**

### Client List

Angola Telecom	Wataniya Maldives
Tigo DRC	Telesur Surinam
Indosat Indonesia	AT&T USA
Telkomsel	Tigo Guatemala
Mobitel Cambodia	Verizon USA

**"Ameresco Solar has supplied multiple photovoltaic and hybrid power systems to QTEL Group OPCOs. Their engineering knowledge and experience of the renewable power systems are commendable and their after sales support to the Group has been excellent so far. We look forward to continue working with Ameresco Solar."**

Qtel International



With tens of thousands of successful installations worldwide since the 1980's, ranging from simple standalone solar systems to complex hybrid power solutions with extensive remote monitor and control capabilities, our experience in providing reliable and economically feasible renewable power solutions for the global telecom industry is unsurpassed. Ameresco Solar power solutions offer the network operator a strategy to significantly lower OPEX while providing a quick return on investment (ROI).

## Product Description

Renewable energy power solutions are offered to the global telecom industry including standalone solar, solar/diesel hybrid, solar/diesel/wind hybrid, solar/fuel cell hybrid, and cycle charge (CDC) system solutions.

Our services include the design, engineering, integration, installation, and training of solar, hybrid and cycle charge power solutions for sites without access to the utility grid, access to poor utility grid, as well as retrofitting existing telecom sites operating primarily off diesel generators, resulting in significantly lower OPEX.

## Geographic Footprint

**Worldwide:** Africa, Asia, SE Asia, Middle East and Americas.

### Company

Ameresco Solar  
3939 Newton St.  
Denver, CO USA 80211

### Web

[www.amerescosolar.com](http://www.amerescosolar.com)

### Email

[cpinelli@ameresco.com](mailto:cpinelli@ameresco.com)

### Telephone

+1.720.855.8601



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# Apollo Solar

Apollo Solar is an engineering, manufacturing, and sales organization with over 40 years of expertise in the design and manufacture of power electronics for NASA, the US Military, and numerous Fortune 500 clients.

Apollo Solar now provides a new generation of highly reliable and highly efficient Complete Off-Grid PV Power Systems in a full line of inverters, charge controllers, and communications modules, quickly integrated through modular design for fast, fail-safe installation and use.



Apollo Solar PV for Telecom System® in IP66 Enclosure



Apollo Solar is also the recent recipient of the U.S. Department of Energy (DOE) Contract Award, under the Solar Energy Grid Integration System (SEGIS) Program, for the development and deployment of a grid-interactive Solar Inverter Control and Communications System for the Smart Grid. Apollo Solar specializes in innovative heat-reduction electronics design which increases system performance and component reliability while reducing the upfront and life-of-system costs of the solar energy generated.

## Product and service description

Built on the robust T80 and T80 High-Voltage-Input (200Voc) battery charge controllers, the Apollo Telecom Systems integrates MPPT, State-of-Charge data and energy charge management with monitoring communications into a single product. The Apollo Systems include circuit breakers for all power lines, robust lightning surge protection, optional ground fault protection on all PV inputs and combiner-box breakers for multiple PV inputs. Complete remote monitoring via local wire,

ethernet, or cellular modem, with optional SNMP Gateway and custom screens and alarms. Designed for 48 volt, positive-ground (+) battery, the Systems are certified to UL1741 & CSA C22.2 No. 107. With remote monitoring of the PV source, batteries, load current, and internal charge controller functions, data is logged every 10 seconds on: Voltage and current on PV input, batteries, load, internal and battery temperatures, Battery-State-of-Charge, Energy Harvest, Diagnostics, and Alarms on all vital parameters such as load disconnect on low battery State-of-Charge.

## Geographic footprint

Apollo Systems are installed and operating on every continent.

Existing client list (must be public information) (maximum 10 company names – must be telecoms clients)

Client testimonials/quotes (three quotes – maximum 100 words in total)

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### Company

Apollo Solar  
23 FJ Clarke Circle  
Bethel  
CT 06801  
USA

### Name

Daniel TwoEagles

### Email

daniel.twoeagles@  
apollosolar.com

### Telephone

US 203 790 6400



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# Barefoot Power Ltd

## Company Background

Barefoot Power, a social for-profit enterprise, manufactures and distributes solar phone charging, lighting products and business development services to people at the base of the global economic pyramid. Our mission? To bring affordable renewable energy and efficient lighting to 5 million people by 2012 and 10 million people by 2015 and help eradicate energy poverty.

How will we do that? Barefoot Power strives for operational excellence. By bringing electricity to millions of people that currently use kerosene lighting and walk far for phone and battery charging, we plan on reversing the traditional process of rural electrification.



## Product Description

Barefoot Power has developed a guaranteed product range of low-cost, expandable DC lighting and phone charging systems. With experience in over 20 countries, our products have undergone substantial development and redesign as a result of in-field product testing. Barefoot offers specialized "business in a bag" training for entrepreneurs interested in developing micro-franchises. Products are also distributed through solar dealers, microfinance institutions, and telecommunication partners. These partners are supported by Barefoot Power with marketing and awareness-building activities, innovative financial support systems and after sales warranty services.

### **Barefoot Power offers different solutions to the 5 types of telecom companies identified:**

Operators, tower owners + operators, tower owners, distributors, hardware companies.

**Financial Benefits:** Barefoot Power offers an opportunity for telecommunication companies. According to GSMA, offering charging solutions, telecoms can improve ARPU by 10-14% and operators can add an incremental US\$3.2 billion of potential revenue per month. By making phone charging accessible and reducing the cost of charging, customers could invest in airtime.

## Geographic Footprint

Africa and India.

**Company**  
Barefoot Power Ltd  
79 Morrissett  
Bathurst, NSW,  
2795, Australia

**Email**  
info@barefootpower.com



# Bergey Windpower Co.

## Company Background

**Bergey Windpower is the leading worldwide supplier of small wind systems to the telecoms industry. Over 2,500 Bergey 1 kW and 7.5 kW wind turbines are installed at telecom sites in over 40 countries. Bergey small wind turbines have just three moving parts, need no scheduled maintenance, and carry the longest warranties in the industry.**

## Client List

Safaricom	AT&T
Smart	Vodafone
Orange	Motorola
China Mobile	MTS
MTN	Ericsson



Bergey has over 400 dealers worldwide and works with many of the leading radio equipment suppliers. Bergey turbines have been powering telecom sites since 1982 and projects with Bergey turbines have received top green telecom awards from GSMA and Africom.

## Product Description

The Bergey Excel 1 is a 2.4m rotor diameter 1 kW, 48 VDC turbine with an MPPT controller capable of producing 2 – 6 kWh per day. It can be installed on a side boom or on its own tower. Multiple 1 kW units are commonly installed at a site. The Bergey Excel 10 is a 7m rotor diameter 10 kW, 48 VDC turbine with an MPPT controller capable of producing 20 – 60 kWh per day. It can be installed on top of the antenna tower or on its own tower. A 5 kW

5.9m rotor diameter turbine will be available summer 2011. Bergey offers guyed and self-supporting towers to 47m, complete wind/solar/diesel hybrid kit, system design services, installation and supervisory services, and training. Wind resource data and performance predictions are available for sites worldwide. Preliminary design services are free of charge.

Bergey equipment, and other U.S. kit, is available under U.S. EXIM Bank financing with attractive rates and terms up to 18 years.

## Geographic Footprint

Worldwide.

**“The Bergey turbines are quite reliable and are lowering our OPEX by 75%.”**

John Barorot, CTO, Safaricom

## Company

Bergey Windpower Co.  
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Norman, OK 73069 USA

## Contact

Mike Bergey, president

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mbergey@bergey.com

## Telephone

+1-405-364-4212

# Caterpillar

## Company Background

Caterpillar has been manufacturing gensets and electric power systems for more than 80 years. Supported by the worldwide Cat® Dealer network, Caterpillar offers generator sets, systems, and rental units for industry applications including telecommunications, healthcare, manufacturing, commercial, construction and residential.

Caterpillar has expanded its expertise and global service network to offer hybrid power solutions for telecommunications applications, which includes advanced products, technical expertise, Customer Support Agreements, maintenance contracts and dealer support.



In 2010, Caterpillar has been named to the Dow Jones Sustainability Indexes (DJSI) for the tenth straight year and once again has been recognized as the sustainability leader in the Industrial Engineering sector. Since 2005, Caterpillar has published an annual sustainability report, with detailed performance information and data and highlights about specific projects that support our sustainable development efforts. Visit [Caterpillar.com](http://Caterpillar.com) to view.

## Product Description

Caterpillar is powering change by leveraging technology and innovation to enable our customers to become more productive by providing products, services and solutions that use resources more efficiently. Each year our power generation products provide approximately 10.5 million MWh of electricity globally from renewable resources.

Caterpillar is bringing hybrid power solutions to telecommunications customers.

### To learn more:

Cat Hybrid Power

### For more information about power generation products:

Caterpillar  
Olympian

## Geographic Footprint

Worldwide network of Cat Dealers  
Presence in more than 240 countries.

Dealer Locator

“Oman Mobile is very satisfied with the total assistance provided by Oasis. Oasis Trading and Caterpillar could answer Oman Mobile’s requirement; including fuel management.”

Oman Mobile Telecommunications Company LLC

**Company**  
CATERPILLAR Sarl  
Geneva –Switzerland

**Contact**  
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+41 78 624 95 57



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# Cell & Sat

## Company Background

Cell & Sat develops innovative products to optimise the Total Cost of Ownership of remote GSM sites. Cellular coverage of rural areas, in particular in emerging countries, is crucial to reach the "Bottom of the Pyramid" users. New technologies allowing to reduce CAPEX as well as recurring OPEX can ensure that this demand is met in a cost-effective way.

Cell & Sat has developed a system optimizing combined cellular, solar power and satellite backhauling operations. This system is designed as an add-on to remote site operations and is independent of the GSM and satellite vendors' equipment.



## Product Description

Building on its generic system architecture Cell & Sat has made available on the market the agama<sup>®</sup> product line. This system is specifically designed as a solar only charge controller suite for small sites (less than 300-500 W) with remote management and central supervision and control. Further the agama<sup>®</sup> Phone Well<sup>™</sup> application provides Mobile Network Operators with a tool to flexibly tune the power consumption of remote sites and therefore reduce the number of solar panels they require, enabling alternative site designs and considerably reducing the otherwise prohibitive costs of logistics and site building. In the case of satellite backhauling, the agama<sup>®</sup> Phone Well<sup>™</sup> application allows to share the satellite bandwidth amongst several sites, a significant OPEX reduction factor.

Through its focus on remote cell sites, Cell & Sat has acquired a strong expertise in their business case and technical aspects and can also provide consulting advice to Mobile Network Operators, Satellite Operators or Service Providers as well as System Integrators.

## Geographic Footprint

Worldwide.

### Company

Cell & Sat  
15 rue du Colonel Driant  
75001 Paris,  
France

### Web

[www.cell-sat.com](http://www.cell-sat.com)

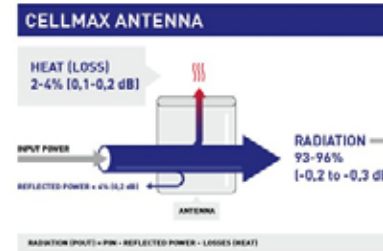
### Email

[contact@cell-sat.com](mailto:contact@cell-sat.com)

# CellMax Technologies AB

## Company Background

The company was founded 2001. Founders and staff have extensive experience both from leading technology companies within the cellular industry as well as from the operator community.



CellMax has brought to market a disruptive technology that will totally change the antenna industry. Today CellMax works closely with leading mobile network operators, system vendors and systems integrators to deliver optimal performance to cellular systems worldwide.

Our headquarter is located in Kista Sweden where we have our R&D, Operations - and Management team.

## Product Description

Conventional antennas on the market typically provides energy efficiencies of around 65% or less meaning that 35% or more of the Energy Signal generated in the radio base station is lost inside the antennas. The patented CellMax high efficiency antenna is unique and not matched by any other antenna manufacturer in the world. The CellMax antenna is 96% efficient while other manufactures antennas are in the 50-75% efficiency range. The CellMax High Efficiency Antennas are hence in a class on its own,

CellMax antennas exceptional performance characteristics allows operators to achieve:

- Dramatic increased geographical coverage
- 30% fewer sites - same coverage and capacity - means lower CAPEX and OPEX
- Net traffic increase thanks to significantly higher over-all signal strength
- Increased Data speed and Throughput 25-30%
- Reduced power consumption
- Radical improvement of energy efficiency - saves the environment

For a given KPIs in a roll out, OPEX and CAPEX can be reduced with 20-30% with Cellmax High Efficiency antennas deployed, compared to a network with conventional antennas.

## Geographic Footprint

**Sweden:** Headquarter

**USA:** Subsidiary

**India:** Representative office

**Globally:** Distributors & Agents

## Company

CellMax Technologies AB  
Kista Science Tower  
16451 Kista  
Sweden

## Email

info@cellmax.se

## Telephone

+46 8 755 12 80

# Circadian Solar

## Company Background

Circadian Solar is a turn-key provider of the next generation of Concentrator Photovoltaic (CPV) systems. CPV is a solar technology that makes use of very high efficiency (>40%) photovoltaic cells.

CPV uses low cost concentrating optics to capture and convert the sun's radiant light energy into electricity by focussing the solar power onto these small photovoltaic cells.



High concentration factors enable reduction in the area of expensive cell material to ~ 0.2% of the overall solar collection area. Solar tracking ensures that this optical arrangement is always aligned to the sun as it moves across the sky, with the benefit of two to three times the energy yield than fixed flat plate PV.

Circadian's unique Ultra Power Density approach to CPV is to combine the benefits of holistic system design with its high-efficiency cell development program to break new ground in overall system efficiency, cost and reliability.

Circadian Solar's systems are aimed at off-grid and grid connected applications in the high direct sunlight regions of the world (the "Sunbelt"). Circadian adopts an applications approach to power solutions for sectors such as telecoms, mining, hotels/resorts, water treatment, schools and hospitals, as well as utility scale power generation.

## Product Description

Circadian Solar delivers turn-key CPV system installations. We manufacture and supply the systems, carry out the installations and develop and implement the applications.

## Geographic Footprint

Markets are sunbelt countries and regions of high sunlight intensity.

### Company

Circadian Solar  
One Sovereign Court  
Sir William Lyons Road  
Coventry  
CV4 7EZ  
United Kingdom

### Contact

Richard Sammut  
Business Development  
Manager

### Email

richard.sammut  
@circadiansolar.com

### Telephone

+44 2476 323211



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# Clay Engineering Ltd

## Company Background

Established in 1998 our experience with PV, Wind and Micro hydro generators enables us to design and supply efficient and cost effective power solutions based on proven renewable energy technologies.

We also provide DC Power Systems for the telecommunications and power utility industries with both mains and generator AC supplies. We have over 200 sites installed in Fiji and Vanuatu including over 60 telecommunication remote power sites. Renewable energy projects have been conducted in Vanuatu, Tonga, Kiribati, Samoa and Cook Islands.

## Client List

Vodafone Fiji	Telecom Vanuatu
Telecom Fiji	Digicel Vanuatu
Digicel Fiji	Tonga Telecomms Corp

“CEL has established itself as a trusted and reliable provider of off-grid renewable power systems with a total of fourteen sites now commissioned and three presently under construction. Their hybrid off-grid power systems have contributed to the success of Vodafone’s expansion into rural areas of Fiji.”

Vodafone Fiji



## Product Description

We offer a complete design, supply, install and maintenance service for renewable energy and diesel hybrid telecommunication power systems. Our system solutions offer high functionality for efficient system control with our proprietary network management system providing system performance information, data logging and alarm management. We are distributors for leading equipment suppliers and offer competitive solutions with low OPEX that are constructed to endure the Pacific’s tropical maritime climate.

## Geographic Footprint

South Pacific.

## Company

Clay Engineering Ltd  
13 Carpenter St.  
Raiwai  
Suva  
Fiji Islands

## Email

sales@clayengineering.com

## Telephone

+679 3363880

# Clean Power Systems

## Company Background

Clean Power Systems (CPS) is a power optimization company operating in the telecoms sector, delivering power solutions to mobile network operators. We deliver complete power optimization solutions for base station sites (BTS) in regions where grid power is unavailable or unreliable.

We are the architects behind clean power system design and provide all components of the solution to deliver the "whole product" which includes diagnosis, design, equipment, monitoring, and maintenance. Our solutions reduce diesel runtime hours on existing generators currently powering the telecom sites, thus significantly reducing the OPEX associated with running the site.



CPS was founded in March 2010 to drive clean and renewable power into the telecoms space. The CPS team cumulatively has 80+ years in Global Telecoms, Power and Renewable Energy within emerging markets. Additionally the management team at CPS maintains a vast network of channel partners who operate across 29 countries providing local knowledge and expertise.

## Product Description

CPS solutions include hybrid battery cycling, PV/Solar, wind, remote monitoring & reconfiguration of existing systems. Our SolSite™ solution provides telecom operators with OPEX savings of 30%+, reduces maintenance costs and allows a 2-3 year payback period. The modular solution addresses the following pain points:

- Remote sites: costly service & maintenance
- Theft: diesel, equipment, rising diesel prices
- Limited space for alternative energy

The SolSite™ presents a compelling business case for OPEX reductions, and unlike alternative solutions in the market, the SolSite™ offers two unique & valuable attributes:

- Safeguarded Solar
- More power in limited space

The unique cylindrical design of SolSite™ PV allow solar to be mounted on the tower, the ground or on any rooftop. The versatility in application is not typical when compared to traditional flat PV panels. As a result, the asset is safeguarded and makes optimal use of typically unused real estate (tower) to generate power.

## Geographic Footprint

**Africa:** Kenya, Uganda, Tanzania, Sudan, Somalia, Burundi, Congo, DRC, Niger, Mali, Ghana, Gabon, Senegal, Mauritius  
**Middle East:** Afghanistan, Kuwait, Iraq, Israel  
**Latin America:** Bolivia, Panama, Costa Rica, Peru, Argentina, Chile, Ecuador, Colombia, Haiti  
**Asia:** India

## Client List

Leadcom Integrated Solutions Ltd  
Jarlso Towers  
Telecom operators

## Company

1st St,  
Suite 407  
Hoboken NJ 07030

## Contact

William Bubenicek

## Email

Bill.bubenicek@clean-power-systems.com

## Telephone

+1 201 766 1399



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# Clear Stream Technology

## Company Background

**CLEAR STREAM TECHNOLOGY (CST)** represents mobile network rollout experience with a focus on innovative energy management solutions.

Being part of the mobile communication revolution in Africa for the past 17 years give us enormous insight of the local market allowing us to address key issues when it comes to Energy Management of network infrastructure.

## Client List

Vodacom South Africa  
MTN Swaziland



With Mobile Network Operators (MNO) needing to reduce operational cost especially those operating in developing regions, CST offers a fresh and unique approach to address this challenge. We are passionate about optimizing the use of existing mobile network power infrastructure, improving energy performance and leading change in the implementation of green energy for networks in Africa and other developing regions. We are completely dedicated to the cause of green but we also understand Africa and its challenges therefore our commitment lies with sustainable models for the implementation of green energy in Africa's mobile networks.

## Product Description

Our business unit: Energy Management (EMU), provides a comprehensive range of services and solutions to address the energy needs of a mobile network. In addition we fully believe in contributing in a positive manner to social economical programs and a cleaner energy source for these networks.

Our approach is innovative, comprehensive, flexible and completely unique. Our portfolio consists of:

- Energy managed service – deployment of energy optimization and alternative energy solutions as a partner through managed services.
- Network energy profiling, planning and deployment.
- Innovative Products – Dynamic battery cabinet with controller developed by CST achieving major on-site energy savings.

This product consumes 2-3% of current conventional cooling for indoor sites and is the most cost effective way to reduce energy consumption on indoor sites.

## Geographic Footprint

**Africa:** Mauritius, South Africa, Nigeria, Tanzania and Mozambique.

## Company

Clear Stream Technology  
Level 2,  
MaxCity Building,  
Remy Ollier Street,  
Port Louis, Mauritius

## Contact

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## Email

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## Telephone

+230 217 5100



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# Cool Energy, Inc.

Powering a Clean Tomorrow™

## Company Background

**Founded in 2006, Cool Energy, Inc. (CEI) is a high-technology power conversion equipment company located in Boulder, Colorado.**

**Cool Energy engineers have designed and demonstrated a novel Stirling engine called the SolarHeart® Engine.**



The primary market for this engine is advanced Waste Heat Recovery (WHR) systems for military, commercial, industrial, and remote power applications. The SolarHeart Engine captures the exhaust and cooling jacket waste heat produced by electrical gensets, fuel cells and micro-turbines and generates electricity to improve their fuel efficiencies by up to 20%, including some applications in which payback time can be as low as one year.

## Product Description

Cool Energy has demonstrated three generations of heat recovery engines, and is building pilot engines for demonstration systems. The prototypes have achieved 2kW output levels at over 16% conversion efficiency.

The pilot systems being manufactured are 3kW engines intended for use with remote gensets from 10 kW to 30 kW in power. Cool Energy is seeking genset manufacturing partners and pilot deployment opportunities to demonstrate the efficiency improvements available to telecom operators with their remote gensets.

## Geographic Footprint

Cool Energy has pilot systems operating or planned in the US, France, and Italy.

Dealers are being established in most of the EU, Australia, Canada, Great Britain, New Zealand, South Africa and India.

**“We are very pleased to be able to receive one of the Cool Energy Stirling engines for our system demonstration at the Hilton Hotel in Malta.”**

Luigi Crema of the Renewable Energies and Environmental Technologies unit of FBK

**Company**  
Cool Energy, Inc.  
5541 Central Avenue  
Boulder, CO 80301

**Contact**  
Samuel Weaver

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info@coolenergyinc.com

**Telephone**  
+303-442-2121

# Delta Group

The Delta Group is the world's leading manufacturer of switching power supplies and DC brushless fans, as well as a major supplier of power management solutions, components, visual displays, industrial automation, networking products, and renewable energy solutions. Our mission is to provide innovative, clean and efficient energy solutions for a better tomorrow.

## Client List

Vodafone Turkey  
Mail.ru  
Orange Poland  
Togocell  
Etisalat MISR

Saudi Telecom  
Motorola/NSN  
MTN Networks  
Maroc Telecom  
Mobilink Pakistan

Qtel Group  
Zain Group  
Mobinil Egypt  
Mobily Saudi (Etisalat Saudi)  
Saudi ITC

“The key reason for choosing Delta was its wide product range. A total solution not only makes life easier but also enables significant cost savings.”

Vodafone Essar.



We revolutionize telecom power market standards by bringing energy efficiency to the system level. Our cutting-edge control and monitoring solutions include the most efficient power conversion modules, cooling options and renewable energy sources in the market. Thanks to our broad product portfolio and global resources, we can provide our telecom customers with highly efficient, total power solutions.

RenE solutions use renewable energy or a combination of renewable and other energy sources, such as mains power or diesel generators. Renewable energy sources ensure reliable telecom services in areas where mains power is unreliable or unavailable.

Delta's EnergE rectifiers are an efficient and sustainable solution to power conversion. They set a new standard in energy efficiency: many models meet the highest energy-efficiency standards of up to 95% or more. The plug-and-play EnergE rectifiers can also be installed as an upgrade to your existing system.

Available in different configurations, Delta OutD cabinets are designed to protect equipment from external threats in all climates from the tropics to the arctic. In addition to traditional cooling methods, Delta's new hybrid cooling options revolutionize the cost structure of thermal management. For systems designed for EMEA and SA, Delta has developed two new hybrid solutions. Both hybrid systems, a combination of AV+AC and a combination of HEX+AV, lower operational as well as capital expenditure.

In the EMEA region, Delta is headquartered in the Netherlands and has operations in 17 countries.

## Geographic Footprint

Worldwide.

## Company

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Green Power  
for Mobile

# d.light design

## Company Background

d.light design is an international consumer products company serving people without access to reliable electricity. d.light has offices in USA, East Africa, India, Hong Kong and China, and serves customers in over 35 countries.

We aim to enable households without reliable electricity to attain the same quality of life as those with electricity. By 2020, we aim to have improved the lives of 100 million individuals.

## Client List

World Bank	US Marines
Jet Li One Foundation	UNDP
Total	SKS Microfinance



d.light is financed by leading social enterprise funds Omidyar Network, Acumen Fund and Gray Matters Capital; with investment from prestigious venture capital firms including Nexus India Capital, Draper Fisher Jurvetson, Garage Technology Ventures, the Mahindra Group.

## Product Description

The d.light S250 is a dual purpose solar light and solar mobile charger. The d.light S250's bright white light illuminates a room similarly to a 3 to 5 Watt incandescent lamp, and is up to 5 times more energy efficient. It provides 10 times more light than a kerosene lantern.

The d.light S250 also charges the most popular mobile phones on the market. It keeps personal mobile phones fully charged even when AC power is unavailable or inconvenient.

## Geographic Footprint

Sub-Saharan Africa, India, Southeast Asia, Latin America and Middle East.

"With this light we're very happy, because the money we've spent until now on kerosene – we no longer buy kerosene. Money that we used to spend on kerosene, we now save to build our home and for school fees."

Nizufrom FundesaunEsperanaEnclave, Oecusse, East Timor.

## Company

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# EGG-energy Tanzania Ltd.

## Company Background

For many in Sub-Saharan Africa, the missing link to electricity access is last-mile distribution. In Tanzania, 80% of the population lives within five kilometers of a transmission line, but only 10% has access to electricity (only 2% in rural areas). This infrastructure gap results in a large market opportunity.

EGG-energy offers its customers a source of energy that is safer, cleaner, and more convenient than currently available alternatives (e.g. kerosene, dry cell batteries, car batteries, and generators used to light homes and power small electric appliances).



EGG-energy offers its customers a source of energy that is safer, cleaner, and more convenient than currently available alternatives (e.g. kerosene, dry cell batteries, car batteries, and generators used to light homes and power small electric appliances). We target three Bottom of the Pyramid segments: rural households, small businesses and low-income urban homes. Building a modern, efficient distribution system in this context will open a variety of opportunities to EGG-energy.

Founded by Engineering PhDs and MBAs from MIT and Harvard, EGG-energy brings together a unique combination of management, engineering, and development expertise to the business of providing power to local communities.

## Product Description

EGG-energy links electricity sources to customers through a battery subscription service:

- Electricity from a grid connection or from an off-grid power station is packaged into

portable, rechargeable, and affordable batteries that are owned and maintained by EGG-energy.

- For an Installation Fee, trained EGG-energy electricians install lighting systems for customers.
- For a Subscription Fee, a customer purchases the right to swap a battery for a pre-specified period of time. In addition to powering lights, customers can also use their EGG-energy batteries to charge cell phones and power radios.
- Customers can exchange their depleted battery for a fully charged one at any time, by paying a small swap fee at an EGG-energy charging station or distribution point.

This versatile and mobile battery-based power distribution system is the first step to realising EGG-energy's vision of becoming a large-scale distributor of clean and affordable power in Sub-Saharan Africa.

## Geographic Footprint

Tanzania.

"EGG-energy has helped me increase income for my phone charging business. I've also decreased my monthly electricity expenditures."

Local Mobile Phone Charging Entrepreneur

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# Electro Power Systems

## Company Background

Founded in January 2005, headquartered in Torino and production factory in Aosta – Italy Electro Power Systems (ElectroPS) is a leading designer and manufacturer of innovative fuel cell systems for back-up power applications.

Making fuel cells accessible to everyone is the core concept behind our product strategy and our goal is to help eliminate the use of lead-acid batteries and diesel gensets.

### Client List

Telecom Italia  
3 Hutchinson  
MTN

France Telecom  
China Mobile  
Teliasonera



Lead by co-founders, VC-backed, ElectroPS has won several Awards (among others: 2005 Italian National Award for Innovation; 2009 we won the GSMA's Mobile Innovation EMEA as "Most Innovative Product Enabling a Greener World"; 2009 "Global Cleantech 100"; 2010 GP Bullhound's "Top 25 Cleantech European Companies") and shows solid growing revenues while hundreds of its products are installed in Europe, North and Central America, Africa and Asia.

## Product Description

ElectroPS successfully developed and commercialized ElectroSelf™: the first no-emission, self-recharging fuel cell system specifically designed for mobile operators looking for significant savings and enhanced reliability. ElectroSelf™ can produce its own hydrogen from water and can therefore guarantee power generation in the most remote locations. It makes fuel cells largely adoptable since it doesn't need any logistics for cylinder

replacement and can work both parallel to the grid or off-grid (using renewables to self-produce hydrogen). During power outages it generates power by combining Hydrogen (H<sub>2</sub>) and Oxygen (O<sub>2</sub>), producing only water as a by-product. The power system engages automatically whenever external power fails. Whenever power is available it generates its own hydrogen fuel by electrolysis of the de-mineralized waste water from the power generation phase. It does this automatically whenever there is external power available, keeping the H<sub>2</sub> tank full. Thanks to its high efficiency and the no-need of fuel replacement, ElectroSelf™ is characterized by a very low OPEX. When compared to legacy technologies (Diesel+Batteries) and Fuel Cells competitors, ElectroSelf™ reveals a better performance on the Total Cost of Ownership evaluation mainly because it consumes electricity and not diesel fuel with its expensive logistics.

## Geographic Footprint

Europe, America, Asia and Africa.

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Green Power  
for Mobile

# Eltek Valere

## Company Background

Eltek Valere is a high efficiency power electronics expert with more than 40 year experience with DC power systems for the telecom infrastructure. With a revenue of USD 565 million we are number 2 in the market in terms of revenue, but stands out as the technology leader with a drive towards energy efficiency and OPEX saving.

Eltek Valere is a truly global company with more than 2200 employees worldwide, located in more than 30 facilities and delivering to more than 100 countries.

### Client List

Viettel	GrameenPhone
Beeline	Indosat
Millicom	Maxis
China Telecom	Globe Telecom
Etisalat	Vodafone



Since launching the Flatpack 2 HE (High Efficiency) series of rectifiers, more than 200,000 (Jan 2011) have been installed, demonstrating an impressive field performance. Our telecom heritage together with an intensive focus on renewable energy has put us in a position to create hybrid solutions that are unmatched with regards to efficiency, system power density and level of integration – all 100% according to Telecom standards and expectations.

### Product Description

ELTEK VALERE'S pure solar and hybrid power solutions are based on industry-leading building blocks, fully integrated into coherent, complete and flexible solutions – with one single controller overlooking all energy sources, flow and storage. The entire installation is easily and efficiently monitored and controlled over the Internet by means of advanced, yet user friendly monitoring software, with relevant system data fed from the Smartpack controller which at all times oversees critical parameters and general system performance.

With the market leading High Efficiency (HE) technology the solution from ELTEK VALERE is maximizing the contribution of the renewables without compromising telecom specifications. When a diesel generator is part of the solution advanced monitoring and control maximizes its energy output as well. All modules including solar converters and wind converters have galvanic isolation, separating any input from the telecom load. In the ELTEK VALERE solution one single controller controls all the passives.

**Finance:** Our financial structuring experience enables operators to acquire full solutions with no upfront capital expenditure, instead paying from savings generated or increased income. We structure transactions to suit the individual cash flow and budgetary requirements of our clients. We can demonstrate a positive ROI from Day 1.

### Geographic Footprint

Worldwide.

“Vodafone Greece collaborates with Eltek Valere to implement hybrid operation at the majority of rural sites operating continuous generators. The project which started on Jan 10 and is currently more than 300 sites which operate as “hybrid” using the functionality of Eltek’s Smartpack controller.”

Head of Network Deployment and Operations for Vodafone Greece.

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Green Power  
for Mobile

# Emerson Network Power

Emerson Network Power provides innovative infrastructure solutions that maximize reliability, deployment speed and efficiency for communications networks. We are experts in leveraging hybrid technology to minimize OPEX costs and reduce the carbon footprint associated with GSM in areas with limited access to grid power.

Emerson's infrastructure solutions keep telecommunications and IT networks up and running regardless of whether the content is voice, data or multimedia.

Trust and enlist Emerson to manage all aspects of your critical infrastructure needs.



## Product Description

Hybrid energy solutions from Emerson offer smart integration of renewable and traditional energy sources for indoor or outdoor environments in off-grid or on-grid peak shaving applications. Our reliable DC power supply systems in combination with hybrid power sources such as solar, wind, diesel and batteries, provide intelligent site management and integrated control.

### Hybrid energy solutions from Emerson:

- Reduce energy consumption significantly with integrated energy optimization and temperature control technologies
- Minimize carbon footprint by an average of 30% utilizing hybrid energy solutions
- Maximize energy savings with eSure™ high efficiency rectifiers
- Leverage modular enclosure designs that enable flexible expansion and easy maintenance in the field
- Achieve significant OPEX savings through

remote monitoring and comprehensive battery management capabilities

An integral part of our hybrid energy solutions is the eSure™ high efficiency rectifier. When compared to traditional rectifiers in the market today, eSure™ DC power technology significantly reduces CO2 emissions and operational costs, offering the highest efficiency in the industry at 97 percent. Efficiency can be boosted even further with ECO mode, a patented technology in our advanced controllers. By running only the number of rectifiers required for normal load conditions, maximum energy optimization can be achieved.

## Geographic Footprint

Worldwide.

### Company

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# Fenix International

## Company Background

**Fenix International is a renewable energy company that produces affordable power solutions for mobile network operators and the millions of subscribers living off the grid.**

**Our products deliver clean and reliable power to subscribers and authorized resellers in electricity-challenged environments, enabling operators to increase ARPU and provide services to underserved and new customers. Fenix is a for-profit corporation based in San Francisco, California with customers across multiple frontier markets.**



## Product Description

The Fenix ReadySet is a plug & play, portable power station that charges multiple phones simultaneously and powers appliances ranging from lights and fans to netbooks and Wi-Fi hotspots. The ReadySet's intelligent battery charges from many sources including the Fenix Solar, the Fenix Velo, as well as grid/mains power. The Fenix Solar is a rugged 15 watt solar panel that charges the ReadySet in one day. The Fenix Velo is a sturdy 100 watt peak bicycle generator that installs in seconds and charges the ReadySet in one hour. Fenix also offers a variety of ReadySet compatible accessories and appliances for phone charging, lighting, health and entertainment.

## Geographic Footprint

**Field trials underway in:** Angola, Ghana, Kenya, Mali, Papua New Guinea, Rwanda, Tanzania, Uganda and Yemen.

**"Top 11 companies to watch on 2011."**

Africa Telecoms Magazine.

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# Flexenclosure

Flexenclosure is a specialist provider of intelligent and “green” site power management solutions that have been especially developed for off-grid markets in developing countries. The company’s revolutionary E-site base station site solution, with the Community Power option, has the proven ability to bring both communications and power to rural people in remote areas that previously had access to neither.

## Client List

Safaricom  
Airtel  
MTN  
Eritel  
Millicom



# flexenclosure

Flexenclosure develops and deploys modular energy solutions that enable mobile operators to serve old and new, often rural, markets in an efficient and cost effective way. Flexenclosure’s turn-key modular “green” energy solutions are based on renewable energy sources and are flexible, prefabricated, adaptable to local conditions and quick to install. Flexenclosure’s product range contains solutions from power systems to complete data centers.

## Product Description

E-site is an energy solution that enables base stations to be powered mainly by renewable energy (sun and wind). There is a battery bank for storage of generated energy and the wind turbines have been modified and perfected for this particular purpose. The key ingredient is Diriflex, the real-time control system used to optimize the performance of the solution.

The E-site solution has proved to reduce base stations’ diesel consumption and CO2

emissions, by as much as 90 percent when they are running on a 24/7 basis, and to reduce energy related operating expenses by over 80 percent. The ROI is high and the long-term TCO low. This enables operators to profitably roll out base stations in areas that have so far been unprofitable to operate in due to low average revenues per user, lack of access to the electricity grid and high costs for diesel fuel and maintenance.

Community Power is an E-site product developed together with Ericsson. It also comes as a standalone system. The system provides the possibility to share the power produced by E-site with the surrounding local communities to power e.g. mobile and battery chargers, street lights, clinics, schools etc.

The complete Community Power solution allows for full integration with the operator’s messaging and billing systems, including central management of energy distribution to local outlets and appliances based on end-user energy purchases using their mobile phones.

“On E-site solution we believe the product is very good and a step in the right direction in making GSM sites more power efficient. We particularly like the intelligent power monitoring system and the innovation to have wind turbines designed for telecoms. The great reduction in generator running hours is a welcome move towards a green economy.”

Samuel Mugo Kimani, HoD Regional NW Dep, Safaricom.

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Green Power  
for Mobile

# IdaTech

## Company Background

IdaTech provides clean energy backup power solutions for mobile networks. Our fuel cell systems supply extended run backup power at telecom sites when there is loss of electrical power due to severe weather conditions or limited grid capacity.

Fuel cells are a clean energy alternative to diesel generators. Typically, diesel generators are used for backup power at telecom sites, but generators can be unreliable, costly to maintain and have significant environmental impact due to their high emissions. IdaTech's fuel cell systems offer telecommunication companies a clean energy alternative to lower their greenhouse gas emissions and carbon footprint.

"We installed over 60 Reformer Based IdaTech fuel cell systems in our local telecom network in both Islands of Trinidad & Tobago. These systems are highly reliable, providing backup power to DLC (Digital Loop Carriers) and Cellular sites when there is an electric grid loss."

Precision Power And Air (Caribbean) Ltd.



Our products are addressing customer needs in many countries around the world, especially those that are adopting green initiatives and encouraging alternative energy solutions.

## Product Description

IdaTech's fuel cells provide solutions for applications requiring up to 15kW of backup power generation. Our fuel cell systems can be fueled by compressed hydrogen or a reformer based system which converts a liquid fuel, methanol and water, into hydrogen to power the system. Reformer based fuel cell systems support backup power requirements for days instead of hours.

IdaTech's current product line includes:

- ElectraGen™ ME System - Fueled by HydroPlus liquid fuel, and available in 2.5 or 5 kilowatts and +24 or -48 volts configurations, the system is composed of a fuel reformer, fuel cell module, and fuel tank integrated into one compact system.
- ElectraGen™ H2-I - Fueled by hydrogen, and available in -48 volts, 2.5 or 5 kilowatts configurations, The system is composed of a fuel cell module and electronics.

In addition to the backup power product line, IdaTech is developing prime power systems for clean energy off-grid sites.

## Geographic Footprint

Africa, Asia, Australia, Caribbean, Europe, Latin America and North America.

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# Intivation

## Company Background

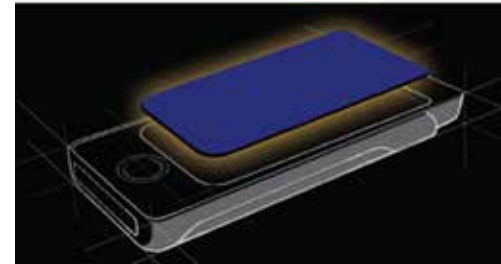
Intivation was founded in 2003 to develop and market innovative, patented converter technology that enables the development of efficient solar powered mobile devices that actually work in daily life. We work with the world's top manufacturers and technology brands to develop high quality, innovative mobile solar devices. Devices powered by Intivation are being sold in over 30 countries across the world. We have offices in Amsterdam and Hong Kong and licensed agents in Africa, Latin America, the US and India.

### Client List

ZTE	Vodacom	UTL
Umeox	Airtel	MTN
Xpal	Orange	Simvalley
Digicel	Econet	
Vodafone	Safaricom	

"Solar-powered handsets are clearly the way to meet the needs of power-challenged users across the globe. While the idea of solar-powered handsets has been around for some time, it has taken the leadership of Digicel and the technology and manufacturing skills of its partners Intivation and ZTE to make the Coral-200-Solar handset a reality."

Tom Bryant, SVP Global Operations, Digicel.



## Product Description

Intivation SunBoost<sup>3</sup> makes it possible to effectively use a single solar cell, avoiding the negative effects of partial shading. Partial shading happens all the time in daily use of portable devices. With Intivation's integral, dynamic maximum power point tracking there's no need to add another controller – thus saving cost and space – to achieve the best charge performance in common light conditions. This results in a solid charge, even on a cloudy day. With the Sunboost<sup>3</sup> platform we're taking solar powered devices to a new level. Whether you are making a solar phone, a lamp, or a wireless sensor, and regardless of your level of expertise, Intivation has a high performance, top quality and easy to use solution for you. Technologically, SunBoost<sup>3</sup> provides several important improvements. Its core technology is more efficient than our previous solution, offers a broader power range, works even better in low light (low power) conditions, and has a dramatically lower standby current. By integrating required components for a good charge into our new IC, we have been

able to reduce both your total BOM cost as well as the solution's total footprint to the level that even the smallest devices can now benefit from this technology. In short: a better charge, and a smaller, more cost efficient solution. Based on our state-of-the art SunBoost<sup>3</sup> technology platform, we have developed an easy to integrate solar module for portable devices: SunBoost<sup>3</sup> Smart Cell. This module combines high-performance solar cells with the latest generation of Intivation's award winning boost converter technology to provide a plug-n-play solution to power portable consumer devices using natural light. Whether you are developing a solar powered mobile phone, media player, outdoor lighting or a battery pack, the SunBoost<sup>3</sup> Smart Cell range of solar modules will make your product development easier, reduce engineering costs and manufacturing risk, simplify your logistics, improve product quality and it will give you the world's best solar charge.

## Geographic Footprint

30 Countries in Africa, Asia, Europe, and Latin America.

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Green Power  
for Mobile

# Narada Asia Pacific Pte Ltd

## Company Background

Narada Asia Pacific has been established since 2005 offering the supply, distribution, service and installation of all Narada valve regulated lead acid (VRLA) batteries. Narada Asia Pacific is a 100% owned subsidiary of Narada Power Source and is responsible for all business within the Asia Pacific region.

Narada equip with the most advanced technologies and equipments in research & development, and is one of the most potential manufacturer for storage batteries in the fields of telecom power source, environment friendly power source, storage application and motive power system.



Our Asia Pacific distribution hub is located in Singapore; which is the one of the leading global port for quick and easy shipments across Asia, Europe and the Americas. Narada Asia Pacific holds stock of all the high volume battery types used in the Telecoms and renewable energy market allowing for delivery within days anywhere in Asia.

## Product Description

Narada is a global leader in stored energy solutions with a First class VRLA R&D center with more than 10 million RMB investment qualified as National Independent Laboratory (CNAS).

Our Chief Scientist Mr Herbert Giess (The Chairman of TC21, the battery division of IEC standards) manages a team of 50 engineers includes 18 masters degrees holders to create innovation products for the market places.

The company has got ISO9001&TL9000 certificate from TUV Germany, becomes the first storage battery firm which got TL9000 certificate of quality management system standards in telecom trade in China.

Narada wide range VRLA Battery products

- Front Terminal 12V battery
- 2V AGM batteries up to 3000AH
- Premium Solar Cyclic Battery
- High Rate
- Tubular GEL OPzV battery (DIN Standard)
- Tubular OPzS battery (Flood battery)
- Top Terminal Telecom battery
- High Temperature
- Polymer GEL battery

## Geographic Footprint

Worldwide.

"Narada batteries were easy to install, the documentation was excellent, and the batteries have performed exceptionally well in these harsh environments. I will certainly continue to specify and recommend Narada to my clients."

Director - International Operations AMERESCO Solar

## Company

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Green Power  
for Mobile

# Pamoja Cleantech

## Company Background

Pamoja Cleantech is a global born social business initiated at the COP 15 Climate Conference in Copenhagen. The team is a young international multi-disciplinary team with extensive experience in renewable energy engineering, natural resource management, market and business intelligence, social empowerment and skills training.

Pamoja Cleantech established research collaboration with the Royal Institute of Technology, Aalto University, Makerere University and the Ugandan Industrial Research Institute to develop new services and products to meet the Community Power opportunity.



This research collaboration has initiated a demand driven product development. The project is currently in process and Pamoja invites the industry for co-creation. The goal is to design an off-grid platform for sustainable energy, ICT and life services, which excite local entrepreneurship in rural communities. The product is called the Green Plant.

## Product Description

The Green Plant is a hybrid energy system that combines solar PV and biomass gasification technologies. Through the integration of the local community we build short-cycle operations providing feedstock for the power plant. This supply chain is complemented by a sustainable agro-forestry program to guarantee reliable fuel supply. One by-product of the process is called bio-char, a valuable fertilizer, which stores carbon in the soil. This approach to energy production creates a local symbiotic system which nurtures sustainable development and strengthens the customer base of the telecom industry.



Pamoja Cleantech provides services and consultancy for the energy supply of telecom companies. We offer feasibility studies of integration of renewable energy systems, demand evaluation, assessment of energy efficiency, and formulation of sustainability strategies.

## Geographic Footprint

Sweden, Finland, Germany, India, Uganda, Mozambique and Zambia.

“The Green Plant is an off-grid platform for Sustainable Energy, ICT and Life Services exciting local entrepreneurship in rural communities.”

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# Phaesun France SAS

## Company Background

Phaesun GmbH, has been specializing in the sales, service and installation of Off-Grid photovoltaics and wind energy systems since it was founded in 2001.

As one of the leading system integrators in Off-Grid energy systems on an international scale, Phaesun offers products of all renowned manufacturers in this trade. International project management, systematic customer training and technical support complete the services offered.

### Client List

Dialog Axiata Plc	Getesa
Telma Mobile	Ericsson
Maroc Telecom	Ethio Telecom
Algerie Telecom	Onatel
Telkom SA	Meditel



In the renewable energy world, Phaesun is one of the world's leading solar companies in Off Grid activity with background in PV starting 20 years ago. Phaesun is one of the major companies in off grid solutions for the emerging countries. Phaesun headquarters are in Germany; and subsidiaries and associated companies in France, Eritrea, Greece, Sudan, Kuwait and Panama and falls back on a worldwide network of partners and distribution channels. In France, it also has innovation activities in which Phaesun invests annually for photovoltaic research and development.

## Product Description

The Phaesun business activities include two divisions. The "Solar Component and Sales Division" is responsible for the wholesale distribution of selected, high quality Off-Grid-components. Phaesun acts as an intermediary between manufacturers and wholesale customers worldwide. The "Solar Systems and Installation Division" is a service division, realizing entire projects for Off-Grid

applications (for rural, pumping, telecom and oil and gas segments) including system sizing, design, manufacture, assembly, delivery and support services to its customers.

Through Phaesun off Grid skilled centre for the development, design, engineering, implementation of solar power solutions, Phaesun offers both hardware and software with modular pure solar site and hybrid solar and diesel sites (AC or DC Bus) including data logging and remote control software, array antitheft solutions, project services (FAT, SAT) Phaesun is involved with various partners in a permanent solar solution development program aiming at technology package improvement (offer development, energy storage) and TCO optimization (CAPEX-OPEX-RoI)

## Geographic Footprint

**Around the world:** Phaesun Group (Phaesun GmbH, Phaesun France SAS, Phaesun Asmara, Phaesun SA Panama) and its network of associated companies have a worldwide presence.

"The stand alone photovoltaic systems do not require continuous maintenance. Thus the solar energy provides the BTS with reliable source of energy. And thanks to PhaeSoft remote maintenance software and energy management system PNGM, data are remotely transmitted to our headquarters via GSM communication."

### Company

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# Phocos

## Company Background

Phocos AG is one of the world's leading manufacturers of solar charge controllers and components for autonomous energy supply.

Energy-saving DC devices, such as lamps and cooling/refrigerating devices complete the product range. Products developed and produced by Phocos enable to use the sun's energy in an efficient and environmentally-friendly way.



## Product Description

The company founders were particularly focussed on off-grid applications: solar island solutions with no connection to the national grid. The demand for such autonomous systems is particularly high in rural regions of developing and emerging nations. However, the demand of off-grid solar systems is also continuing to rise in industrial nations. The reason for this lies in the lower installation and operating costs and mobile usage options.

Phocos charge controllers are persuasive in industrial contexts due to their professional engineering and technology, their reliability – and not least to their affordable price.

## Product recommendations

### Industrial & Telekom Applications

- MPM System
- CIS
- PL Series
- SPS Series

### Rural Electrification

- Pico Lamp - Multifunctional LED light
- CA /CML/CXN
- 12/24V Compact Fluorescent Lamps
- DC Refrigeration

### Company

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Green Power  
for Mobile

# PNN Group

## Company Background

PNN is a Pan-African technology service provider that began operations out of Nigeria in 1998, playing a significant role in the development of the communication and power sectors of the economy through the provision of various services. PNN expanded into Ghana, Rwanda and Uganda in 2008, and the United Kingdom in 2009.

Plans are underway for operations in at least 20 African countries by 2015. PNN is made up of over 200 staff employed in Africa comprising of both expatriates and indigenous persons.

### Client List

MTN Uganda	Airtel Nigeria
Warid Uganda	MTN Nigeria
Etisalat Nigeria	Swap Nigeria



## Product Description

PNN service offering is centered round the provision of technology solutions to communications and power sectors. These are:

**Retail Services** – Distribution, Value Added Services & Mobile Content.

**Infrastructure Services** – Communications & Power Infrastructure deployment and maintenance services. Renewable & Alternative Power Services.

**Consultancy Services** – Regulatory, ICT, Carbon Asset Development & Training.

PNN is currently developing a model that will allow it deploy power to off grid communities with GSM operators being anchor tenants under a Power Purchase Agreement. The community power system is a renewable power plant network made up of solar, wind and hybrid solar-wind generators. The power package rides on a micro-grid power distribution system where electricity is produced from a scalable mesh of generators using clean energy sources. The component

generators range in power from sub-10KW to 1MW units. The result is the ability to generate critical power for both rural and urban communities.

The individual solar panels are made of high-end mono-crystalline wafers with maximal power packed into individual panels. The panels are mounted on poles in a patent-pending arrangement that provides maximal power for a given setup-solar only or part of a solar/wind hybrid system. The wind systems include state-of-the-art horizontal and vertical axis wind turbines designed to operate under diverse wind conditions, ranging from low to extreme wind speeds.

## Geographic Footprint

Currently operational in Nigeria, Ghana, Rwanda, Uganda and United Kingdom. Will be operational in Liberia, Sierra Leone, Tanzania, The Gambia, Burundi and Kenya by June 2011.

### Company

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Green Power  
for Mobile



# PowerOasis

## Company Background

**PowerOasis helps MNOs to proactively manage their wireless network power to improve energy efficiency, minimise power costs and increase site availability, thus bringing power supply, operations and financial management under an unprecedented level of control and predictability. Our solutions have demonstrated their ability to manage power in a mixed vendor network, for on-grid, off-grid or unreliable grid base stations and for both existing sites and new site additions. PowerOasis solutions are deployed in networks and delivering real value today.**

## Client List

Mobile Network Operators  
Network Equipment Providers

Managed Services Providers  
Tower Companies



We offer a unique combination of expertise in wireless network power, alternative energy and mobile telecommunications and PowerOasis has established itself as an innovator and thought leader in its field.

## Product Description

We address three critical elements required to deliver high quality, dependable wireless network power management solutions with quantifiable business benefits:

- Telecoms power specific financial and technical consultancy to plan, rollout, optimise and support complete turnkey solutions to maximise return on investment

- Power controllers to reduce diesel consumption and operational costs for generator powered base stations using smart generator-battery hybrid control with optional renewable solar and wind energy
- Software applications to support centralised wireless network power management including financial, service and operational reporting and business process automation

## Geographic Footprint

Europe, Middle East, Africa and South East Asia.

**“Vodafone Qatar’s renewable energy solution, is one of the most innovative and best-performing solutions that we have tested so far.”**

Jenny Howe, CTO Vodafone Qatar

## Company

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BATH  
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UK

## Contact

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Green Power  
for Mobile

# Proven Energy

## Company Background

Proven Energy is an industry leader in small scale wind with over 3,500 wind turbines in the field spanning 60 countries and every continent. Proven Energy's high performance wind turbines have been engineered and manufactured in Scotland for 30 years.

Inspiration, innovation and a commitment to development have ensured these wind turbines yield over 30 million hours runtime per annum and contribute between 12% and 15% of global installed capacity in the small wind sector.

## Client List

Alcatel-Lucent  
PowerOasis  
Motorola

"The collaboration with Motorola was a world first for us, resulting in an innovation that we are all proud of. We are enjoying the benefits of this solution and will be deploying more solar-wind powered base stations to many rural settings to provide cost effective energy solutions to our rural areas."

Albertus Aochamub, general manager, MTC, Namibia.



The Proven Energy range of wind turbines has been designed as downwind machines with passive yaw, pitch and coning control producing maximum yield in a wide range of wind speeds.

## Product Description

The nature of Proven Energy wind turbines means that they perform well in all wind speeds and don't cut out even in the highest winds.

Proven Energy products stand out from other small wind turbines because of its patented blade assembly, which allows the wind turbines to regulate their speed, maximizing output. As the wind gets stronger, the blades pitch and cone to reduce their aerodynamic efficiency. This lets the Proven Energy wind turbine maintain a high output even in the fiercest storms, unlike many turbines which need to be put on brake to protect themselves at high wind speeds.

Proven Energy has a range of products which is tailor-made to meet the challenges of small wind. The Proven 7 has a Referenced Annual Energy of 4,700 kWh per annum and is therefore ideal for telecoms base stations or any other unmanned or remote installations.

## Geographic Footprint

Global company based in Scotland in USA supplying every continent and over sixty countries.

## Company

Proven Energy  
The Torus Building  
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Scottish Enterprise  
Technology Park  
East Kilbride  
Scotland, G75 0QF

## Contact

Peter Griffiths

## Web

[www.provenenergy.com](http://www.provenenergy.com)



Green Power  
for Mobile

# Prudent Energy Corporation

Prudent Energy, a leading clean energy company, is the designer, manufacturer, and integrator of the patented Vanadium Redox Battery – Energy Storage System (VRB-ESS®) – a large-capacity energy storage system delivering high performance with low operating costs. The Vanadium Redox Battery (VRB®) is a patented advanced energy storage system that is safe, environmentally friendly and operates at the lowest cost of any flow battery technology.



The VRB® can be described in several ways. It is:

- An electrochemical system that efficiently converts chemical energy to electrical energy, and vice versa, based on the reduction and oxidation of different forms of the element Vanadium.
- A 'flow battery' that rapidly charges and discharges, offering unlimited deep cycle capability.
- An on-demand energy storage system where:
  - a) The electrolyte never wears out and overall maintenance costs are extremely low;
  - b) Energy (electricity) can be stored in liquid form, at room temperature, almost indefinitely;
  - c) Operators can easily add energy and power in modular fashion over time.
  - d) It can be charged and discharged to any state of charge with no adverse effects on life cycle.

## Product and Service Description

Prudent's 7kW-rated units are sold separately (on a containerized basis or otherwise depending on customer needs) for use at telecom base stations in remote areas around the world. These small systems have been proven reliable and high-performing in over 20 installations in North America, Europe and Africa.

Conventional VRLA battery systems used in telecommunication cell sites are designed to act as backup devices for infrequent, short power interruptions per year. However, Prudent's enhanced kW-class, 8-hour maximum deep cycling storage system, now in its third generation, allows off-grid or weak grid telecom sites to cycle repeatedly or integrate in hybrid form with diesel, wind, or photovoltaic generation. VRB-ESS® units operating in Africa typically deliver an attractive two-year payback by reducing O&M costs and extending diesel engine life.

### Financial Savings

Typical opex savings on an off-grid site running 24 hour per diesel generators is 50%. Total Cost of Ownership saving over 4 years is 35% compared to conventional VRLA battery storage systems.



### Geographical Footprint

Global, off-grid and poor grid installations.



### Client Listing

#### kW-Class (VRB kW-Class®) Projects

Application	Region
Telecom service provider	Turkey
Telecom service provider – diesel usage reduction/ green off grid cell sites	East Africa
USA installations at various sites (extreme conditions) and on islands	USA
UAE telecom application – off grid diesel reduction	Middle East
Commercial end user PV integration	China
Italian Energy services provider – integrated with PV. Peak shaving	Italy
Telecom service provider – weak grid support	Hungary
Korean clean tech research university	Korea
Green Energy services provider – integrated with renewables	Slovakia
Telecom off-grid service provider – integrated with PV	India

#### Company

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# Qowisio

Qowisio is specialized in the provision of a 100% wireless 'end to end' solutions to improve the management and the monitoring of telecom site's power resources.

Qowisio helps mobile operators to decrease significantly your Operational expenditure:

- 1) Saving by 65% to 80% fuel on GSM site working 24H on genset
- 2) Reducing the frequency of site visit
- 3) Detecting and reducing fraud (fuel theft in the tank ...)
- 4) Cross checking invoices from subcontractors (detect refuel volumes, KWH)
- 5) Reducing diesel overstock



## Product Description

- Qowisio Fuel tank monitoring: supervision of the fuel tank
- Qowisio Power Metering AC: generator and grid power AC power quality and consumption
- Qowisio Power Metering DC: DC power information (power, consumption, current, voltage)
- Qowisio Generator Monitoring: remote automatic start/stop of the generator, running time of generator, basic alarms
- Qowisio Hybrid solution: Automatic start/stop of the generator according to batteries load measurement and calculation (batteries provisioning as an option)
- Qowisio Tri-brid solution: Automatic start/stop of the generator according to batteries load measurement and solar panel power delivery ( batteries provisioning and solar panels as an option)
- Qowisio site management extension (temperature, door open/close, dry contacts etc...)

## Geographic Footprint

Qowisio has a world wide coverage through local partners and representatives.

**Company**  
Qowisio  
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ZA du réseau  
49800 Andard  
France

**Name**  
Xavier EME  
Sales Director

# Renewable Energy Ventures (K) Ltd.

## Company Background

Renewable Energy Ventures (K) is a provider of renewable energy services, technological solutions and consultancy, based just out of Nairobi, Kenya.

Its activities include marketing solar lanterns as the core part of its activities. This project runs under the title "The Solanterns Initiative."

### Client List

Jopat Trading	Technology Electronics	High Tech Electrical &
G & G Electronics	Al-Fasin Electronics	Electronics
Pramtec Chemist	Angie's Electronics	Embassy Crystal Electricals
LiokiLoki Shop	Kericho Industrial Supplies	



**Goal/Mission:** The goal of the Solanterns Initiative is to replace one million kerosene lamps with solar lanterns, to reduce greenhouse gas emissions, reduce health risks and damages (originating from poor indoor air quality and kerosene ingestion) and cut lighting costs/make poor households' money go farther by significantly cutting costs for lighting. It also aims at creating employment for the off-grid communities through provision of an alternative safe energy source for mobile charging as well as household lighting facilities as a business.

## Product Description

Our product is a solar-powered lantern which goes by the retail name Sun King Pro, produced by Greenlight Planet Inc., USA. It is ten times as bright as a kerosene lamp, more economical than the latter, has better value than other solar lanterns in terms of lighting duration, robustness and price and has an efficient mobile charging facility in addition.

Solanterns provides its products through 3 main distribution channels:

- Direct retail to distributors/retailers e.g. supermarkets, electronic stores, energy centers etc.)
- Large scale retail to NGOs for their distribution to schools, off-grid communities in their working area etc.
- Retail to youth-entrepreneurs, who rent the solar lanterns to their customers

The Solanterns Initiative's main financial source is the director's investment.

## Geographic Footprint

Solanterns has an established network of retailers covering most of Kenya. We also have existing distributors in South Sudan, Uganda and Tanzania, where connections to local people and decision-makers already exist.

"...I'm now able to pay for my college fees..."

Muigai a youth solantern entrepreneur in Juja, a rural outskirts off Nairobi.

### Company

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# Solarc

## Company Background

**SOLARC Innovative Solarprodukte GmbH increasingly concentrates on project work and is fast gaining recognition as a key player in very specific fields of the PV-solar market: solar autarkic and mobile solutions.**

**SOLARC is the right address for those companies seeking a reliable and experienced but also innovative partner to develop, produce and eventually market a solar power supply to their product or even a complete new solution using solar energy as power source.**

## Client List

Orange (France Telecom)



SOLARC works alongside renowned companies specialized in other sectors, complementing its know-how and therefore being able to stand not only as a mere component supplier but also as complete solution provider, from the prototype to the serial run. SOLARC's product development not only results in successful one-time cooperation projects, but often has a decisive impact on serial-run product design and sets the basis for a complete new product by us or by our partners. Likewise, the know-how acquired during the development and redevelopment of standard products has been of great use to define customized versions for a specific project.

## Product Description

SOLARC is specialized in 4 major technology or component areas:

- Design, development and production of customized small solar modules (crystalline and thin-film, outdoor and indoor) for BIPV solutions such as solar chargers or off-grid powered systems

- Design, development and production of charging electronics especially design for low-power solar off-grid applications (i.e. featuring a MPP tracker): charge controllers, DC-DC converters
- Solar irradiance measuring handset (MacSolar product family). To yield-check existing PV installations or as elementary tool to plan and forecast the output of future developments (Handset for datalogging + software for simulation)
- Complete product development of solar-powered products such as solar chargers for mobile handsets, solar-powered vehicle tracking solutions (GPS solar) or OEM irradiance sensors. Completely customized, from the first drawing to the serial run

## Geographic Footprint

Germany, Netherlands, Austria, Switzerland, United Kingdom, France, Italy, Spain, Belgium, Mexico and USA.

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# SOLARKIOSK

## Company Background

**THE SOLARKIOSK provides a complete solar based community power business model, combined with suitable tools and equipment. This model enables variations of local retail businesses in previously untapped markets worldwide.**

**The modular kit-of-parts design creates a flexible third party energy platform with its excess capacities for strategic partners. Our main focus is to establish a sustainable energy source for telecommunication applications that range from base station supply to handset charging.**



THE TEAM consists of the founders of two well established companies with unique assets: the internationally renowned and award-winning architects, designers and urban planners at GRAFT architects and SOLAR23 dev plc, an experienced and well connected solar system integrator based in Addis Ababa, Ethiopia. In 2010 we were encouraged by GIZ (German development agency) in a joint venture to develop the SOLARKIOSK.

## Product Description

The SOLARKIOSK provides substantial advantages for mobile Telecom, the biggest success story and still the fastest growing market in 21st century off-grid markets. Mobile Telecom as an example allows off-grid areas to surpass the previously normal process of a centralized grid development due to the new mobile technology at hand.

Energy providers and consumer good distribution concepts need to follow into the emerging off-grid markets. The SOLARKIOSK is a tool for both

The smallest sizes of the SOLARKIOSK are 2 x 3 meter and 3 x 3 meter cubes which can be extended according to customer demand. A modular kit of parts allows a scalable module both for increased need of electric energy (telecom tower) or additional spatial growth.

## Geographic Footprint

**Africa:** Ethiopia, Angola, Zambia, Kenya, Uganda, South Africa, Morocco, etc.  
**South America and South Asia:** Licensing in Development  
**Europe, Middle East:** Industrial Prototype Research

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# Starfire Mobile Ltd

## Company Background

Starfire is a UK based company which rebranded last year from Tattu Mobile Ltd.

We design and distribute a wide range of niche mobile devices aimed at addressing specific market opportunities and needs, with a strong focus on solar devices.

## Client List

Zellco  
APUA  
CM Network



## Product Description

**Issue:** To date most solar chargers on handsets tend to only top up the battery, not fully charge also a large % of income in some markets spent on charging batteries.

**Solution:** The Genesis Charger is a standalone device that enables a complete charge in less than one day. In Africa payback including a spare battery in less than 3 months (sub \$8). Compatible with the vast majority of entry level handsets in the market (using BL4c and BL5c batteries)

# Starfire

## Geographic Footprint

Zimbabwe, Antigua and Denmark.

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# Steca Elektronik GmbH

## Company Background

As a leading supplier of products for the solar electronics industry, Steca sets the international standard for the regulation and control of solar energy systems. In the three market segments PV grid connected, PV off grid and Solar thermal, the Steca brand is synonymous with innovation and vision.

In conception, development, production and marketing, the company is committed to the highest quality standards. Currently Steca's head-office in Memmingen, Germany employs over 600 people. With over 20 years of experience in solar electronics, Steca is known worldwide for quality, innovation and service.



## Product Description

Steca develops and manufactures top-quality products made in Germany which, thanks to their long lifetime, ensure extremely low costs. Today, modern and professional electricity supplies are necessary in every part of the world. For these supplies, the focus is on high industrial demands, flexibility, environmental sustainability and reliability. Steca system technology for hybrid and telecommunication systems unites these aspects, thereby creating a basis for the forthcoming multimedia and communication age. Examples are solar charge controllers, inverters, hybrid solutions, monitoring equipment and high efficiency DC loads.

## Geographic Footprint

Worldwide.

### Company

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### Telephone

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Green Power  
for Mobile

# Suntrica Ltd

## Company Background

Suntrica Ltd (est. 2006) in Finland is developing and marketing advanced, high efficient and environmentally friendly solar harvesting technology and products. Suntrica's vision is to become the fastest growing and most profitable global company to supply solar chargers for the mobile and consumer electronics industry.

Suntrica's mission is to design cost-efficient, universal and easy-to-use solar chargers and intergrated charging technologies that are effective in improving the operating time of mobile and consumer electronic devices.



Suntrica is committed to facilitate awareness about the importance of using ambient energy sources and environmental-friendly technologies to make the solar powered future of mobile and consumer devices a reality.

Suntrica is committed, from its part, to decrease the carbon footprint thus reducing the effects of the climate change.

## Product Description

Suntrica designs, contract manufactures and markets easy-to-use flexible personal solar chargers for use with portable battery-powered devices. Suntrica's solar chargers are versatile accessories that provide instant, reliable and renewable power to mobile phones, MP3/4 players, GPS receivers, digital cameras and smartpads, notebooks etc. Suntrica products range from 1W up to 150W output.

The product platforms comprise of own charging algorithms, electronics and ASICs, flexible thin-film photovoltaic panels, battery packs and all packaged to functional, durable and attractive casing designed by leading Nordic designers.

## Geographic Footprint

Worldwide.

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Finland

**Web**  
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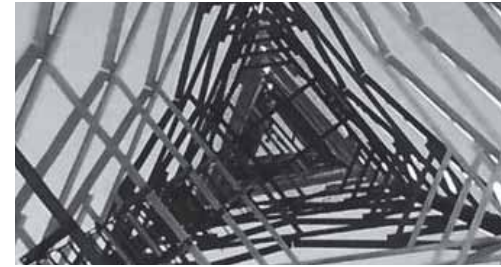
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# Tesuco Telecommunications

## Company Background

With an international footprint and the resources of the 60 year old multi national parent company, Tesuco Services, the African Telecoms technologies integrator is perfectly equipped to support operators in their bids to roll out GSM, Transmission and V-Sat infrastructure.

Tesuco Telecommunications specialises in the design, manufacture, installation and maintenance of Full Turnkey Telecommunication and Alternative Power Solutions. The holistic approach taken by Tesuco Telecommunications allows for CAPEX and OPEX savings through innovation in every aspect of a Green site build:



Quick Deployment Base (QDB) stations; able to be built on virtually any soil condition reducing costly wet materials, innovative equipment cooling techniques conserving power, high voltage MPPT solar technology, tower mountable high-output wind turbines and intelligent variable speed load adaptive generators, to name but a few. Tesuco Telecoms has the resources to Design, Manufacture, Install and Maintain Telecommunication infrastructure.

Tesuco Telecommunications also has strong CSR and CSI initiatives in place, further adding value to each holistic alternate power site build through community upliftment and skills transfer.

## Product Description

Design, Supply and Maintenance of Alternative Power Systems including Solar, Wind and Hybrid Combinations thereof;

Energy Efficient Site Builds, Design, Manufacture & Supply of Towers (Mono, Lattice, Astra Base, Scissor) Engineering (Civil and Structural), Deep Cycle Batteries and Battery Backup Systems, Solar Systems and PV Technology, Site Management Systems, Integrated Energy Efficient Systems, Variable speed Load Adaptive Fuel Efficient Generators, DC Generator Systems (Supply and Maintenance), Wind Turbine & Wind Power Technology (Supply and Maintenance), High Efficiency Air conditioners, Equipment Cooling Systems and Equipment Shelters.

## Geographic Footprint

USA, France, Hong Kong, South Africa, Lesotho, Zambia, Mozambique, Malawi, Angola, Tanzania, Namibia, Zimbabwe and Botswana.

## Company

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Green Power  
for Mobile

# ToughStuff International

## Company Background

ToughStuff has developed a solar panel and mobile phone connectors which allow people living off-grid to charge their phones for free, harnessing the power of the sun. This home-based solution means that consumers don't have to travel to charge their phone, and have no need to leave it at a communal charging station.

This solar charging kit combines durability, high-performance and affordability making it perfect for off-grid mobile users. The solar panel also charges an LED light, radio connectors and a battery pack – this modular approach means that consumers can build their own energy solution with multiple benefits.



ToughStuff operates at scale producing affordable solar-powered energy solutions for the developing world. ToughStuff products are affordable, aspirational and convenient, and very popular with consumers. The mobile charging kit retails at less than \$10. ToughStuff sources products from quality-assured manufacturers with substantial production capacity.

## Product Description

In off-grid areas, phones often remain switched off and money (often around 30% of total mobile expenditure) is spent on charging rather than airtime. The ToughStuff solar charging kit provides a way for customers to charge phones for free, meaning that handsets are active for longer. Studies have shown a 10-14% ongoing uplift in ARPU once customers have access to a solar charger – this represents a significant revenue-generating opportunity.

Working with ToughStuff therefore enhances the economic viability of investing in rural base stations. The increase in ARPU that results from customers having a solar charger means that payback time on new infrastructure investments is reduced.

Mobile operators can also benefit from improved customer acquisition and loyalty. Bundling a ToughStuff charging kit with a phone represents a clear incentive to purchase from one provider over another. Co-branding of the product is possible, further improving brand awareness.

## Geographic Footprint

Offices in the UK, Kenya, Nigeria, South Africa, Madagascar and Hong Kong.

"Samchi Telkom, Safaricom's premier retailer in Kenya, is rolling out ToughStuff's solar mobile charging solution nationwide, across all of its outlets. Having started with a small pilot, consumer demand for ToughStuff was so high that Samchi quickly sold out in all eight pilot stores! Samchi is delighted to provide such beneficial products to consumers whilst making healthy margins."

Samchi Telkom

**Company**  
ToughStuff International

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# VNL (Vihaan Networks Limited)

## Company Background

**VNL - Vihaan Networks Limited, was founded in 2004. VNL's WorldGSM™ rural infrastructure solution is the first example of microtelecom, the re-engineering of telecommunications to meet the needs of rural and remote communities.**

**VNL has over 300 members led by Rajiv Mehrotra, Founder Chairman & CEO and a management team with deep experience of the telecoms business.**

**For their pioneering work VNL received GSMA's 2010 "Green Mobile-Best Green Programme Product or Initiative" Award, and was named a Technology Pioneer 2010 by the World Economic Forum.**



VNL is a member of the Shyam group of companies – India's leading diversified telecommunications group ([www.shyam.co.in](http://www.shyam.co.in)) The group has a history of successful initiatives in telecommunications. Since 1974, Shyam has been focused on creating value through innovation in telecoms R&D, equipment manufacture, solar powered network infrastructure, integrated network and radio backhaul, security and surveillance solutions, mobile services, broadband services, carrier neutral digital infrastructure services, neutral host indoor coverage, and VSAT media broadcasting services.

## Product Description

VNL makes WorldGSM™ – the solar powered rural telecom infrastructure solution that enables operators to build a sustainable – and profitable – business model to provide voice and data services to low ARPU communities. This is in areas with little or no grid power, where networks rely heavily on diesel generators. WorldGSM™ is scalable and

provides small, low cost alternatives to expensive centralized communications infrastructure equipment and offers a unique model of sharing and huge savings of CAPEX and OPEX. WorldGSM™ is deployed with VNL's Cascading Star Architecture™ - an incremental rollout solution that separates capacity from coverage. It is interoperable with equipment of all major manufacturers.

The integrated solution simultaneously supports both GSM and ISP and can be deployed in any combination – standalone GSM or high speed broadband, alternatively with a mix of both. Multiple operators can share the complete infrastructure (BTS, BSC, backhaul, power system and antennas) with huge savings in cost. It also opens up a new microtelecom business model where operators can partner with local entrepreneurs to accelerate deployment and reduce costs.

## Geographic Footprint

India, South Asia, Africa and Latin America.

**Company**  
VNL  
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# Zephyr Corporation

## Company Background

Zephyr Corporation's small wind turbines are being used by operators to power base stations – and repeaters – at both on-grid and off-grid locations. Our turbines can be used as the sole source of power or combined with solar and/or diesel generators. For existing diesel sites we can save operators up to 100% of fuel costs.

Our turbines are small, light (17.5kg) and can be installed on existing towers. They generate power at very low wind speeds – from 2.5 metres per second.

## Client List

Turkcell  
T-Mobile

"Zephyr Corporation's turbines easily out-performed the others we tested generating reliable power which means a stable supply for the base stations of T-Mobile."

Zvonko Magić, managing director at Energyplus.



Established in 1997, we have installed 4000+ turbines at homes and retail sites. We entered the telecoms market in 2009 after extensive R&D produced a range of turbines specifically for the telecoms market and have operator customers worldwide. We are members of AWEA and EWEA (American and European Wind Energy Associations).

## Product Description

Zephyr Corporation's turbines:

- Power all types of base stations - GSM, WCDMA, WiMAX, wifi and TETRA
- Can be used as the sole source of power or combined with solar and/or diesel generators
- Can be installed at new sites or used to retrofit existing sites
- Small & lightweight - diameter of 1.8 m and 17.5 kg. This means that they can be quickly and easily installed on existing towers rather than needing a separate custom-built tower = reduced CAPEX & easy installation

- Able to start deliver energy at lowest wind speed of any turbine on the market today - 2.5 m/s = 5.6 mph
- Can still generate power when there is virtually no wind by using previously generated power to rotate
- No maintenance required, controlled remotely

**OPEX/CAPEX:** The cost of buying and installing two of our wind turbines and batteries on an existing tower to power a typical GSM Base station requiring 600-1000 watts with 6-7 m/s of average wind is EUR 14,000 –20,000. OPEX is zero with remote maintenance and control. The cost of diesel for this base station would be EUR 12,000 – 15, 000 per year. By comparison the number of solar panels required would be 20 m2 at an estimated fixed cost of EUR 25,000 - 30,000. OPEX costs would include security.

## Geographic Footprint

Worldwide.

## Contact

Mats Vilander  
General Manager EMEA

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# ZIGOR CORPORACIÓN S.A.



## Company Background

**Zigor develops high-technology power electronics since 1998, offering tailor-made solutions for self-consumption and on-grid connections.**

**Zigor is a leader creating innovative solutions in Network Quality, Telecom, PV Solar Systems and Turnkey Power Electronics.**

### Client List

Telefónica Móviles España

Claro Chile

Leadernet Sistemas y Telecomunicaciones

Dauphin Telecom

Ufinet-Union Fenosa Redes De Telecomunicación

Landkom

Thales Transport, Signalling & Security Solutions

Axtel

Euskaltel

Telmex

Tradia Telecom

Zigor offers Renewable Energy, Industrial, Electrical and Telecommunications markets the widest range of personalised solutions to revolutionise the technology markets, guaranteeing the construction of a future based on uninterrupted and incident-free power supplies that along with optimizing energy savings allows to their clients to obtain greater profitability from their investments and by optimising energy saving.

Our team of professionals makes it possible for Zigor to be a technological leader in R+D+I Europe, taking part in the most ambitious international projects of the sector. As leading company in the technology markets, Zigor is present in the international markets with subsidiaries and commercial offices all around the world.

### Product Description

Focusing on Telecom markets, Zigor has developed turnkey power electronics solutions:

- RCPU Wimax 12V/24W-56V/45W switching power supply
- Telsis APS - Switching Mode Rectifier/ Battery Charger

- Powercomm I,II and III with SNMP Network-Management Protocol Converter - New range of Rectifiers/Switching Mode Battery Charger for Telecom demands
- Solar KIT BTS 500 hybrid solution. Zigor develops tailor-made solutions both in self-consumption and on-grid connections
- Large range of AC back-up solutions to cover any of your technical and economical needs, at a competitive cost (surge protectors, UPS)

Zigor has taken a step forward in traditional maintenance services opening an Innovative Monitoring Center of Energy and Services in Mexico in order to offer the maximum security in electricity support. This Monitoring Center controls and detects the status and running of the power ing units under long distance control. At the moment Zigor is monitoring systems in Spain, Colombia and several places in Mexico and we are sure the opening of this monitoring center will help our clients to optimize their business processes and energy saving.

### Geographic Footprint

UK, USA, México, Brasil, Chile, Colombia, Argentina and Hong Kong.

**“Zigor has become the main supplier of Claro Chile for its ERNC systems. Zigor Chile develops turnkey projects for powering remote telecom stations for renewable solutions for Claro and, has taken care of power equipment supply, installation and civil works, among others, of San Fabian de Alico, Guayacan, María Elena Tocopilla, Candelarioa, Guayanca and Hornitos projects.”**

Nizufrom FundesaunEsperanaEnclave, Oecusse, East Timor.

### Company

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# Index

## Solar Power

Ameresco Solar	4
Apollo Solar	5
Circadian Solar	11
Intivation	25
Phaesun France SAS	28
Phocos	29
Solarc	37
SolarKiosk	38
Steca Elektronik	40

## Wind Turbine

Bergey	7
Proven Energy	32
Zephyr Corporation	45

## Fuel Cells

Electro Power Systems	19
Idatech	24

## Battery

Narada	26
Prudent Energy Corporation	33-34

## Network Equipment

Alcatel Lucent	2
Altobridge	3
CellMax	10
VNL	44

## Controller

PowerOasis	31
------------	----

## Operations & Maintenance

Clear Stream Technology	14
PPN	30

## Solutions Provider

Cell & Sat	9
Clay Engineering	12
Clean Power Systems	13
Clear Stream Technology	14
Delta Group	16
Eltek Valere	20
Emerson Network Power	21
Flexenclosure	23
Phaesun France SAS	28
Qowisio	35
Tesuco	42
Zigor Corporation	46

## Generator

Caterpillar	8
Cool Energy	15

## Community Power Solutions Provider

Barefoot Power	6
d.Light	17
EGG Energy	18
Fenix International	22
Flexenclosure	23
Pamoja	27
PNN	30
Renewable energy venture ltd	36
SolarKiosk	38
Toughstuff International	43

## Off-Grid Solutions

Barefoot Power	6
Fenix International	22
Solarc	37
Starfire Mobile	39
Suntrica	41
Toughstuff International	43

