

# Telecom Renewable Energy Vendor/ESCOs Landscape in Indonesia



# Introduction

In 2008, GSMA launched the Green Power for Mobile (GPM) programme to promote renewable energy technology and solutions to the telecom industry. The programme is a partnership with the International Finance Corporation (IFC) and supported by the Government of Netherlands.

Indonesia, as one of the GPM global programme's focus country, has a considerable potential for green technology deployments. To build on this momentum, GSMA has conducted a working group for Indonesia's green power community. The Indonesia market analysis report is also available online in GSMA website to describe current power deployments in the telecom sector and green power deployment opportunities.

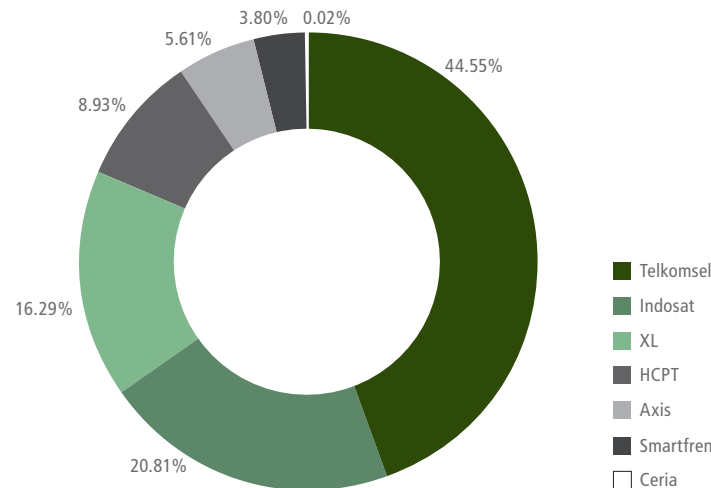
This document is part of GPM's continuing activity in the Indonesian market and has for objective to list the main vendors/service providers that operate or have interests in the Indonesia telecom market.

## Telecoms Market

GPM estimates that more than 90,000 tower sites<sup>1</sup> have been built across the country, serving 242 million people . By 2012, the mobile market penetration in Indonesia had reached almost 37%, with a SIMs per subscriber ratio of 2.63<sup>2</sup>.

The telecom market is composed of 5 main GSM mobile operators (Telkomsel, Indosat, XL, HCPT, Axis) and 3 CDMA mobile operators (Smartfren, Esia, Ceria). Based on Q4 2012 figures, Telkomsel leads the market share with 44.55%, followed by Indosat and XL<sup>3</sup>. For CDMA operators, their combined results represent less than 5% of the total market share.

Figure 1: Market Share



1 GSMA GPM Research

2 Wireless Intelligent

3 Wireless Intelligent

# Introduction

## Telecom Infrastructure Development

In 2008, the Indonesian government and the Ministry of Information and Communications Technology (ICT) released a set of infrastructure site-sharing regulations for mobile operators: the Act No. 02/PER/M. KOMINFO/03/2008<sup>4</sup>. Through these regulations, the government encourages operators to share their passive infrastructure to minimize community issues on expanding their coverage. This act also triggered the development of the tower company business in Indonesia.

GPM estimates that more than 25,000 towers in Indonesia are owned by Tower Companies with a tenancy ratio of 1.5 – 1.6<sup>5</sup>. With a site sharing/site leasing business model, the infrastructure ownership has shifted from MNOs to Tower Companies. The detail of infrastructure ownership is illustrated on Table 1 below.

Table 1: Tower Ownership

	MNO	Tower Company	Telecom Vendor	Power Vendor	Managed Services
Tower Infrastructure	X	X			
Power System Planner	X				
Power Equipment Owner	X			X	
Power Solution Provider			X	X	
Power Equipment O&M	X			X	X
Site O&M	X	X			X

## Powering up Telecom Network

By 2012, the electrification ratio in Indonesia reached 75.3%<sup>6</sup>. The geographical distance that separates one island from the other brings its own challenges to powering telecom networks. Extending the coverage in rural and remote areas raises the following barriers:

- Poor electricity grid: the availability of electricity in rural areas or small populated islands is less than 12 hours a day<sup>7</sup>.
- Transportation: the transportation to reach remote location is challenging, sometimes public transportation will only be available on certain day during a week.

To tackle this issue, MNOs have taken various initiatives to reduce their dependency on fossil energy and minimize transportation costs, implementing CDC (Charge Dis-Charge) solutions. This solution focuses on optimizing battery usage instead of running the diesel continuously GPM identifies 3,300 sites, out of the 90,699 sites deployed, which are running with this configuration.

4 Ministry of CIT – [www.kominfo.go.id](http://www.kominfo.go.id)

5 GSMA GPM Research

6 Ministry of Energy and Mineral Resources – [www.esdm.go.id](http://www.esdm.go.id)

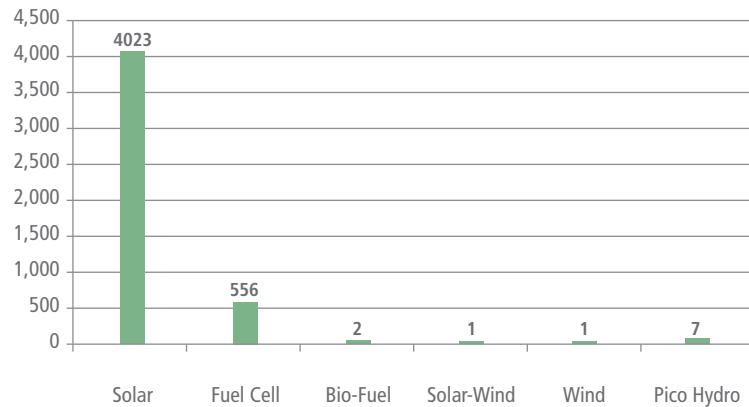
7 GSMA GPM Research

# Introduction

## Green Technology Deployment in Telecom

Looking at renewable energy deployments, GPM estimates that 4,590 green sites have been deployed in the network as shown in Figure 2<sup>8</sup>. 87% of green sites are solar based power solution, followed by fuel cell with 556 sites deployed with this green technology.

Figure 2: Green Site Categories



The adaption of green technology in Indonesia is still in the early stages while some operators have already operated multiple trials on new green technology solutions. Solar power is the preferred green solution, as Indonesia's network has a potential of around 4.80 kWh/m<sup>2</sup>/day<sup>9</sup> of solar radiation.

Telkomsel has deployed the most solar solutions, with 3,908 BTS sites – mainly in rural and isolated areas, in their network.

Fuel cell based solutions, an alternative to solar power, are also being deployed in Indonesia. HCPT has deployed 518 fuel cell sites across the country with both hydrogen and methanol fuel cell technology. The hydrogen and methanol stocks present no difficulty with regards to the production but distribution remains a challenge as MNOs need to have solid supply chain/maintenance contracts to ensure supplies at the sites.

Looking at Pico Hydro technology, 7 sites were identified running with this solution in Indonesia. Based on research from the Ministry of Energy and Mineral Resources, the potential of mini/micro hydro in the country could reach about 1,013 MW. This technology uses the velocity of water to run the turbine and generate power for the site.

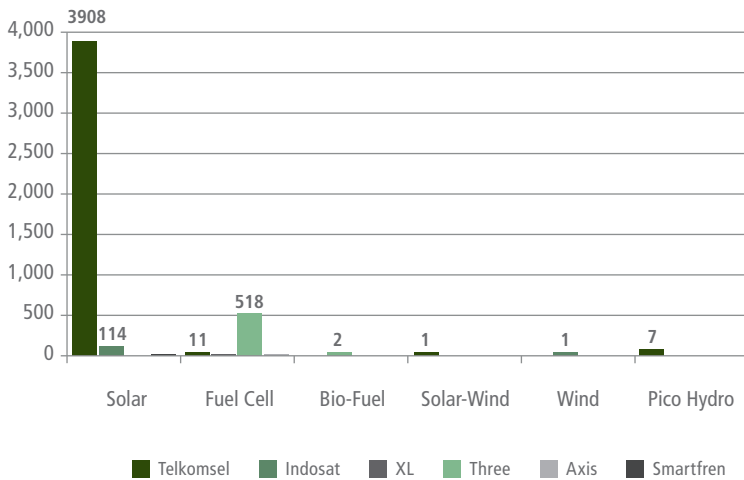
The Indonesian telecom industry does not widely use wind power. Only Indosat and Telkomsel have tried this solution. The average wind speed is between 3-6 m/s in the Eastern part of the country, where there is the most potential for the deployment of wind solutions.

<sup>8</sup> GSMA GPM Research

<sup>9</sup> Ministry of Energy and Mineral Resources – [www.esdm.go.id](http://www.esdm.go.id)

# Introduction

Figure 3: MNOs Green Technology Deployment



In Indonesia, both CAPEX and OPEX model based solutions are used to power telecom networks. The CAPEX model is the most common practice to acquire green technology solutions. However recently there has been a transition toward the OPEX model, where MNOs will pay the energy consumption on a pay-per-use basis, without spending capital to buy the green technology solutions.

The power purchase agreement (PPA) model is implemented for energy efficiency but still needs to be developed for green energy solutions.

## Vendor/ESCO Landscape

In Indonesia, many green technology solutions are available, such as: solar, fuel cell and hydro but most of the time, vendors do not offer an OPEX model green solution to telecom sector in the country, rather relying on a CAPEX model. The green OPEX model concept is just starting to be actively introduced by some vendors, but efforts are still needed to bring awareness to the market around this green outsourcing solution model.

Thus, GPM created a vendors/ESCOs listing for the Indonesian market, inviting vendors and ESCOs operating in Indonesia or having interest in entering the Indonesian market. The company profiles consist of their background, their product brief, their product footprint and their testimonials from past projects. The list comes from local and international vendors/ESCO companies.

Table 2. Indonesia Renewable Energy Vendor/ESCO Listing

Company	Core Competencies
AEG Power Solutions	Power Equipment
Ballard Power System	Fuel Cell
Caterpillar	Power Equipment
Deeya Energy	Power Solution Provider
Eltek Power	Power Equipment
Ericsson	Telecom Equipment
Exicom Tele-Systems	Power Equipment
Flexenclosure	Power Solution Provider
Fludic Energy	Energy Storage
GE Energy Storage	Energy Storage
Hariff Daya Tunggal Engineering	Power Solution Provider
Heliocentris	Energy Management
Huawei	Telecom Equipment
Northstar Battery	Energy Storage
Trojan Batteries	Energy Storage
Urban Green Energy	Wind Turbine
Westindo	Power Solution Provider
Wideband Media Indonesia	Power Solution Provider
ZTE	Telecom Equipment

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# AEG Power Solutions Sdn Bhd

## Company Background

AEG began working on large scale industrial electrification projects and always leading from the fore, AEG soon developed a globally respected name leading the world in the fields of AC and DC generation and Switching Technology.



## Product and service description

Manufacture of DC Power (Rectifier), Solar Inverter (Hybrid, Off Grid and On Grid), Inverter, Power Controller, UPS.

## Geographic footprint

With Subsidiaries in 17 Countries Worldwide, AEGPS designs, Manufactures, Sells and Services AC and DC Power Solutions for a wide variety industrial and communications applications and for the renewable energy sector.

## Client List

PT. Primatama  
Konstruksi/Telkomsel/  
CDC, Tata-BSNL/Solar,

GTL/Solar, Shanti  
Electricals/Solar, Tower  
Vision/Solar, Emmvee/

Solar, Lanco/Solar, Power  
Box/Solar, Getesa/GE  
Cycling, Winfield/Solar,

AlcatelLucent/Solar/GE  
Cycling, OPT Noumea/  
Solar, BNP/Solar

## Company

14th Floor,  
Menara Safuan,  
80, Jalan Ampang,  
50450 Kuala Lumpur,  
Malaysia

## Contact

Chandran Mohan

## Email

mohan@aegps.com

## Telephone

+60122327101



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# Ballard Power Systems

## Company Background

Headquartered in Burnaby, British Columbia, Ballard Power Systems Inc. (TSX: BLD; NASDAQ: BLDP) provides clean energy fuel cell products enabling optimized power solutions for a range of applications. We are recognized as the world leader in design, development and manufacture of zero-emission proton exchange membrane (PEM) fuel cells and are focused on accelerating commercial adoption. Ballard's products and solutions deliver tangible improvements over incumbent technologies across a range of stationary power and motive power applications.



Ballard ElectraGen™- ME Fuel Cell System for Backup Power



In addition to delivering improved business results for system integrators, OEMs and end-users alike, our fuel cell products afford major environmental benefits. With our proven technology, comprehensive range of fuel cell products and services, unsurpassed field experience and teams of highly-skilled people we have what it takes to create smarter solutions for a clean energy future.

## Product and service description

For telecom service providers, power outages can be devastating. Fuel cell backup power solutions for telecom offer numerous compelling advantages over conventional lead-acid battery and diesel generators in backup power applications.

Ballard offers a comprehensive portfolio of backup power systems, scalable from 2kW and up, to meet a range of application requirements. Ballard's fuel cell systems for backup power are designed for high reliability, long life, minimal

maintenance and provide extended runtime at an attractive lifecycle cost.

The ElectraGen™ family of fuel cell power generation systems, fuelled by either methanol or compressed hydrogen, provides backup power for both 'short duration runtime' and 'extended duration runtime' requirements. Ballard's ElectraGen™ systems offer proven financial and environmental advantages in comparison to lead acid batteries and diesel generators.

Ballard and our global network of partners provide complete, proven solutions that can be implemented rapidly and easily, providing end-to-end support for a range of application requirements.

## Geographic footprint

North America, Europe, Africa, India, China, Indonesia, Japan, and Australia.

## Client List

China Mobile	Nokia Siemens Networks	PT Hutchison	Vodacom
Idea Cellular	Orange	CP Telecommunications	Wind Mobile
Motorola	SINE Network	Telstra	

## Company

9000 Glenlyon Parkway  
Burnaby  
British Columbia  
V5J 5J8 Canada

## Web

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

## Email

[marketing@ballard.com](mailto:marketing@ballard.com)

## Telephone

+1.604.454.0900

"Integrating fuel cells with our base stations can significantly increase the resilience of the mobile networks we provide."

Nokia Siemens Networks



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# 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 high efficiency advanced products, technical expertise, Customer Support Agreements, maintenance contracts and dealer support.

In 2012, 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: 2012 Sustainability Report

## Products and Services

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 Caterpillar powers Telecom Site in Jordan see p65 Sustainability Report 2011

## Geographic Footprint

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

“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

**Email**  
Lentsch\_Vincent@  
cat.com

**Telephone**  
+41 22 849 47 45



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# Deeya Energy

## Company Background

Established in 2004, and headquartered in silicon Velly with operation in Gurgaon, India, Deeya Energy mission is to be most effective stationary energy solution that provides the lowest cost of ownership for today's mission critical applications and tomorrow's power challenges.



Deeya Energy is recognised year after year for its innovative, sustainable energy solution, including awards from Going Green, Global Cleantech, TiCon. The company's sole focus is its innovative Energy Storage Platform (ESP) family of redox flow batteries which significantly improve the cost and reliability of electricity storage and transform from short-lived, non-durable goods into long-lasting green assets.

Providing reliable energy. Reducing CO<sub>2</sub> emissions. Engineering new green technologies. That's what Deeya Energy is about: Helping companies to leverage smart energy resources while reducing their environment footprint, and saving money in the process.

## Geographic Footprint

Asia and Africa

### Contact

Moga Purushottam

### Email

Purushottam.moga@  
deeyaenergy.com

### Telephone

+65 92394042

# Eltek

## Company Background

Eltek 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 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'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 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 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 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.

### Company

No.3 Teban Gardens  
Crescent  
Singapore  
608920

### Contact

Kenneth Bodahl

### Web

<http://www.eltek.com/wip4/>

### Email

[Singapore.eltek@eltek.com](mailto:Singapore.eltek@eltek.com)

### Telephone

+65 6773 2326



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# Ericsson

## Company Background

Ericsson is a world-leading provider of telecommunications equipment and services to mobile and fixed network operators. Over 1,000 networks in more than 180 countries use Ericsson's network equipment, and more than 40% of the world's mobile traffic passes through Ericsson networks. Ericsson is one of the few companies worldwide that can offer end-to-end solutions for all major mobile communication standards.

Client List  
Worldwide



## Energy Efficient Portfolio

We offer a variety of energy-efficient products, solutions and services to help our customers reduce their environmental impact and also reduce the footprint of our own activities. Ericsson's solutions on node, site and network level are helping to minimize the power consumption while maximizing traffic. By drawing upon Ericsson's global consulting and technical capabilities, we can assist operators in every stage of the project, from initial baseline analysis through to implementation and final reporting and measurement of solutions deployed.

### Products:

- Energy Efficient Radio Technology
- Site Power & Cooling Equipment
- Alternative Energy Sources
- Power Saving Features
- Remote Site Management
- Automated Network Power Management
- Energy Efficient Network Layer

## Professional Services:

- Environmental Consulting
- Energy Assessment & Optimization
- Active & Passive Energy Management
- Lifecycle Assessment
- Data Center Efficiency
- Managed Rural Coverage
- Smart Energy Management

We work with efficient materials management to avoid hazardous substances and use resources more effectively and reduce environmental impact of manufacturing, use and end-of-life treatment. We offer free take back of decommissioned equipment in all the countries in which we operate

## Geographic Footprint

Worldwide.

"For every site where we have made Ericsson recommended changes, we can reduce power consumption by between 22% and 30%."

Mike Wright, Executive Director of Networks, Telstra

### Company

Telefonaktiebolaget LM  
Ericsson  
Torshamnsgatan 23  
Stockholm 164 83  
Sweden

### Website

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

### Telephone

+46 10 719 00 00



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# Exicom Tele-Systems

## Company Background

Exicom was founded as an Australian brand for design and manufacturing of Telecom Power Systems, The product are now designed, developed and manufactured by Exicom Tele-Systems in India to International Standards with state of art of design & production facility. Exicom Tele-Systems Ltd. has a modern State-of-Art manufacturing facility at Solan in Himachal Pradesh.

The factory is spread over an area of about 40,000 sq. ft. The factory is equipped with complete in-house PCB assembly facilities using manual insertion lines and automatic wave soldering machines for through-hole components. For SMT component assembly we are equipped with a fully automatic line complete with stencil printer, automatic pick & place machine and reflow oven. Facility also exists for assembly & testing of basic & CLI feature phones, power plants & access / transmission equipment. Fully automatic testing stations for testing of above products are available.



## Products and Services

Leading Supplier of DC Power Plants, Solar Solutions, Energy Management Systems for various types of Telecom Sites, and related NMS to major Indian operators since 1996 with indigenous technology.

Strong in house R&D group of more than 50 personnel with strength in power systems designs, related software, Network Management Systems, etc. Ability to take up custom power design requirement. Over 90% of the company's turnover is guided through in house developed products.

- Integrated Telecom Power Unit
- Switch Mode Power Supply
- Energy Management Systems
- Battery Health Monitoring Systems
- Lithium Ion Battery
- Customized Power Solutions
- Turnkey Services

## Experience

- 45,000+ Active AC-DC SMPS Power Plants supplied to various service providers
- 6000+ Energy efficiency solution deployment
- 1.5MW of Solar off grid sites delivered
- 900,000+ Liters of diesel savings achieved / year

## Geographic Footprint

Majority India, S E Asia, Middle East and Africa

## Client List

BSNL  
Indian Oil&Gas  
UP State Government

BIHAR Government  
TATA Tele-Services  
Afgan Telecom

## Company

Corporate Office  
8, Commercial Complex,  
Masjid Moth,  
Greater Kailash II, New  
Delhi-110048, India

## APAC

Exicom Tele-Systems  
(Singapore) Pte Ltd  
81, UBI Avenue 4, #6-20  
UB One, Singapore  
408830

## Contact

Yahya Abdul Latiff

## E-mail

yahya.latiff@exicom.in

## Website

www.exicomtelesystems.in

## Telephone

+65 6604 6055  
+6012 482 1820



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# Flexenclosure

## Company Background

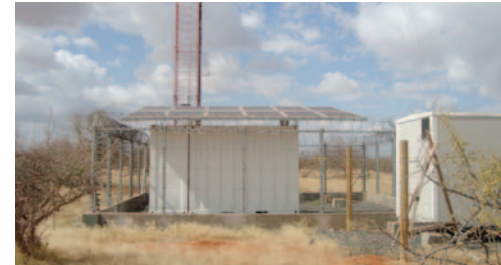
Flexenclosure is a specialist developer of intelligent power management solutions and modular data centres. We provide telecoms companies with the means to easily and cost effectively expand their networks and to improve operational efficiency and profitability. With over 20 years of experience operating in the rural telecom industry, and over 9,000 site installations in more than 50 countries worldwide, our products deliver total peace of mind particularly to customers operating in extreme environments.

### Client List

Airtel	Vodacom
MTN	Zain

"Access to reliable power is one of our biggest issues. The cost of powering base stations with diesel all across Sudan constitutes a very big chunk of our total operating expenses. Since we introduced Flexenclosure's eSite however, we have been able to reduce our dependence on diesel by almost 95%, instead using free solar and wind power. eSite has exceeded our expectations, and having been operational for more than a year I feel confident that these excellent results are sustainable."

Nizar Musa, Network Director, Zain Sudan



# flexenclosure

Our systems are fully integrated, flexible, prefabricated, factory tested for reliability, adaptable to local conditions and quick to install, with short payback period and the lowest long-term total cost of ownership.

We firmly believe in renewable energy, but not only for the sake of the environment. Our products prove that switching to green energy is an incredibly efficient way to cut operating costs.

Our objective is to be world leader in energy economy off the grid. We are a recipient of multiple industry awards in this area, including Sustainia 100 and the GSMA Green Mobile Award 2012.

## Product and service

We provide eSite™ power solutions for off-grid and bad grid base station sites. Powered by renewable solar/wind energy sources or the grid and a backup genset, eSite can deliver a 90% reduction in diesel fuel consumption, CO<sub>2</sub> emissions, and energy related OPEX compared to traditional diesel based systems.

eSite is an integrated single cabinet system, its modular setup allowing it to be tailored to suit any local site conditions. The brain of eSite is Diriflex™, an intelligent power management system that controls the generation, storage and distribution of energy in real-time. Its advanced algorithms control the whole system to maximise use of renewable energy and minimise genset use.

Also fully integrated into eSite is eManager™, a cloud or server-based all-in-one energy management toolbox providing a one-stop interface for remote and proactive management, monitoring, analysis and optimization of the performance of an entire network of eSites.

## Geographic Footprint

Headquartered in Sweden, with principal focus on Africa, Asia and the Middle East.

### Company

Eriksbergsgatan 10,  
SE-114 30 Stockholm,  
Sweden

### Contact

David King

### Email

david.king@flexen-  
closure.com

### Telephone

+46 (0)510 427 0000



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# Fluidic Energy

## Company Background

Founded in 2006, Fluidic Inc. is delivering its revolutionary energy storage technology to the forefront of clean energy storage in lieu of diesel generators and lead acid batteries. Fluidic's combination of game-changing technology, strong financial backing and proven company leadership, has enabled Fluidic to bring environmentally sustainable and commercially viable solutions to the market place. Fluidic has filed 80 patents worldwide with over 200 unique claims around its core technology.



# FLUIDICENERGY

Fluidic Auxiliary Power Systems (APS) are installed in some of the world's harshest environments and, in areas with poor, very poor, or even off-grid infrastructure with no need for cooling systems. With discharge capabilities of more than 15 hours daily, multi-year performance warranties and attractive terms, Fluidic is the first real viable alternative to the lead acid and diesel generator combination.

## Product and Services

Fluidic offers cutting-edge energy storage technology capable of ultra-long run times at the lowest possible cost, remote site management and innovative terms to provide best-in-class APS. Fluidic's solution offers customers improved cash flow through significant operating expense savings and lower capital expenditures. Beyond the compelling economic benefits, Fluidic's solution offers operational advantages over traditional batteries including improved up-time, significantly increased runtime, no DOD limitations, negligible self-discharge,

no cycle count impact on lifetime, long shelf life, non-hazardous materials and comparatively insignificant theft value. The units can operate within a wide range of outdoor environments (up to 50°C) eliminating the need for air-conditioned space. Integral to the Fluidic system is its FluidicIQ auto-diagnostics and remote monitoring, which provides real-time assessment of system health, grid availability, diesel fuel savings, CO2 reduction, outage frequency and discharge profile. FluidicIQ is available via a web interface, allowing for the optimal management and maintenance of remote sites.

## Geographic Footprint

Serving telecom operators across Asia and Latin America.

## Financing Models

Fluidic offers its APS, which includes multi-year performance warranties, guaranteed power availability, and multi-year vendor financing. Terms can be structured either as Capex or Opex arrangement according to a customer's needs.

## Company

8455 North 90th Street  
Scottsdale, Arizona 85258  
USA

## Contact

Katie Avila

## Email

contact@fluidicenergy.com

## Telephone

+1(480) 966-0242



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# GE Energy Storage

## Company Background

Durathon Battery technology originated from a pursuit of a better power source for hybrid locomotives. GE Research evaluated various battery technologies and identified sodium nickel chloride batteries as the most versatile and effective solution for applications demanding high cycle life in harsh environments.



In 2007, GE acquired Beta R&D, a UK-based company that originally pioneered the development of sodium batteries and had already demonstrated the technology's reliability and durability through decades of research and development.

To date, GE has invested over \$200 million in technology and facilities to support its Energy Storage business. A quarter of the investment has supported creation of test facilities in the US, United Kingdom, India and China. Over \$100 million of the investment supported startup of a world-class manufacturing facility in Schenectady, New York. Officially opened in July 2012, production commenced in September 2011 using the latest ceramics, powder processing and welding technologies.

## Product Description

With an energy density of 170 Wh/l, Durathon Batteries provide more energy in less space than traditional batteries. Their tolerance to severe environmental conditions eliminates the operating costs of external

heating or cooling systems, while their charge acceptance and projected lifespan of 10,000 cycles enables a reduction in fuel consumption by applications that use generators to maintain continuity of service. Each battery is equipped with an integrated Durathon Battery Management System (BMS) that provides a complete picture of the status and health of the battery throughout its long life.

## Battery Financing

GE's Capital business has expertise in creating financial solutions customized to the specific needs of telecom operators, from leasing arrangements and payment for energy to simple loans

## Geographic Footprint

Sub-Saharan Africa, Asia, SE Asia, Middle East, North America

"This is the beginning of a revolutionary technology that will change energy storage as we currently know it throughout the electrical industry, not only for telecom."

Brandon Marcus, Division Manager of Megatron-Federal.

**Company**  
1 River Road  
Schenectady, NY  
12345-6000

**Website**  
[www.geenergystorage.com](http://www.geenergystorage.com)

**Email**  
ganesh.balasubramanian@ge.com

**Telephone**  
+1 (518) 348-3467



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# PT. Hariff Daya Tunggal Engineering

## Company Background

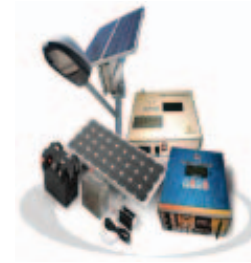
HARIFF is an Indonesian private company, dealing with improving and technology innovation, engineering services, system design, manufacturing and turnkey project in telecommunication, power system & energy sector. HARIFF was established in 1982 as a Communication System Integration Service Firm speciality in HF, VHF and UHF communication project.

## Client List

TELKOM Indonesia	Hutchison CP	LINTASARTA	BAKRIE Telecom
AXIS Telekom Indonesia	Telecommunication	XL AXIATA	ERICSSON
TELKOMSEL	INDOSAT	MITRATEL	

“Confirmed that HARIFF has supplied Rectifier & Battery to INDOSAT in 500 locations. Their products which is already used in INDOSAT since 2002 has shown good reliability and good after sales support.”

INDOSAT.



Today, computer and control technology has been well known and applied to most of HARIFF's products. Continuous Research and Development puts the engineering to be recognized specialists in industrial technology.

HARIFF's business scope is in providing solution to telecommunication problems particularly in system integration. HARIFF will bring up proper solutions to accommodate the customer's actual needs. HARIFF is known as a major provider of integrated DC power system service for cellular base station in Indonesia. Our effort in developing and providing solutions, has lead us to become a reliable partner for many customers in telecommunication and other business sectors.

## Product and Services

- **Power System:** DC Power System (Rectifier & Battery), Inverter, UPS, DC-to-DC Converter
- **Renewable Energy & Electrical System:** Street Lighting, Solar Energy Power Plant, Solar Home System, Wind Turbine, Fuel Cell, Microhydro, BIOGAS, BIOMAS
- **Primary Power Solution:** Mobile Power Bank, Hybrid Power System
- **Network Monitoring & Control:** Power Management System, Site Management System
- **Telecommunication:** WiMAX, Radio IP and OFDM

## Geographic Footprint

Nation-wide Coverage 13 Regions, 24 Area Offices & 18 Warehouse spread through Indonesia.



## Company

Jl. Soekarno Hatta 450  
Bandung 40266  
Indonesia

## Contact

Budhy Erlangga

## Email

marketing@hariff.com

## Telephone

+62227562000



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# Heliocentris Industry GmbH

## Company Background

**Heliocentris. Multi-Hybrid Energy Solutions for Telecom.**

Heliocentris is specialized in autonomous energy supply and energy efficiency solutions with the aim of replacing diesel generators with "zero-emission" products.

The company, which was founded in Berlin in 1995, develops and markets innovative and sustainable systems in power and energy generation as well as turnkey solutions for customers in industry and the academic field.

## Client List

du (Emirates Integrated Telecommunications Company)  
Telesite Ltd (Mozambique)  
Telecel (Zimbabwe)  
HCPT/Hutchison (Indonesia)



## Solutions

Heliocentris provides Energy Management and Clean Energy Solutions for wireless networks at off-grid, bad-grid and on-grid locations. With services during the entire life cycle, from consulting, planning, implementation and lifetime optimization services, Heliocentris guarantees a customer oriented and optimized offering.

"Heliocentris is the only supplier to meet and even overachieve contractual performance requirements."

(CTO HCPT Indonesia).

## Company

Rudower Chaussee 29  
12489 Berlin  
Germany

## Email

info@heliocentris.com

## Telephone

+49(0) 30 340 601 500



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# Huawei Hybrid Power – PowerCube

## Company Background

Based on the professional accumulation of ICT network over 20 years, Huawei launches PowerCube: the innovative hybrid power solution for telecommunication sites.

PowerCube focuses on saving energy and reducing OPEX through maximally improving energy transferring efficiency. Over 22,000 PowerCube have been deployed all over the world, serving more than 85 operators in 80 countries, including MTN, Zain, Airtel, Vimpelcom, Vodafone and so on.



## Product Description

PowerCube is a new generation hybrid power system. With the newest energy controlling and transferring technology, it makes full use of energy sources such as solar, diesel and grid. Diesel hybrid, grid hybrid and solar hybrid series can be selected to meet different scenarios.

The core concept of PowerCube is "Saving, Single, Smart".

### Key Characters:

- **Saving:** fuel 40%-60%, footprint 30%-70%, maintenance up to 90%
- **Single:** single platform, modular design, smooth expansion & evolution
- **Smart:** intelligent NetEco system achieves highly efficient operation & maintenance management

PowerCube realizes the maximally saving for customers by using Bit Managing Watt Technology to achieve high efficiency of

energy conversion and utilization.

As for solar hybrid solution, SolarMax technology achieves high tracking accuracy, high sensation of light, high conversion efficiency and high temperature adaptability. As for diesel hybrid solution, DieselMax technology improves efficiency in each procedure of energy flow from end to end. As for grid hybrid solution, GridMax technology maximizes using grid with fast chargeable energy storage system.

Through advanced operation support system – NetEco, PowerCube helps the operators greatly improve energy management efficiency for reducing OPEX.

## Geographic Footprint

Worldwide.

ICT network energy efficiency specialist Reliable partner for customer

### Company

Huawei Industrial Base  
Bantian Longgang  
Shenzhen 518129  
P.R. China

### Web

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

### Telephone

+86-755-28780808



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# NorthStar Battery

## Company Background

Established in 2000, NorthStar designs and manufactures premium, high performance lead-acid batteries and energy-saving battery cabinets. NorthStar products deliver longer battery life and a reduced environmental impact, at a lower total cost of ownership. Truly a global company, NorthStar has state-of-the-art facilities in the USA, Sweden, China and India, with products used in more than 120 countries worldwide.



All NorthStar high performance batteries are proudly manufactured in the USA, using the latest automated robotics technology and environmental control systems, to deliver the best consistency and reliability in the battery industry. NorthStar battery cabinets are designed and manufactured in Sweden on a fully automated production line, ensuring a low thermal conductivity, maintenance free design.

## Product and service description

NorthStar's premium telecom products include the SiteStar™ Cabinet, which is the world's most efficient battery cooling system, as well as a range of high performance long life AGM batteries. OPzV batteries are also available.

The SiteStar™ Cabinet uses active compressors and advanced airflow, ensuring optimal battery operating temperature and extended life. SiteStar™ Cabinets have ingress protection class IP55, with CE and UL approval, and a range of optional kits.

The NSB *Blue +* battery is a high-cycling battery developed for use in areas having unstable power grid conditions. It has been extensively deployed in Indonesia, Bangladesh and in African countries. It is a true uPSOC (uncontrolled partial state of charge) battery, discharge cycles may be started without the battery being fully charged without adverse effect on life. It is suitable for UPS applications.

The NSB *Red* battery uses pure lead grid developed to provide exceptionally long float life at elevated temperatures under stable AC power grid conditions.

The NSB *Yellow* battery is a high quality battery designed to compete with products manufactured in Asia.

NorthStar batteries have an impressive operating temperature range of -40°C to 65°C because of their innovative design and PPO (high modulus polyphenylene oxide) cases.

## Geographic Footprint

Worldwide.

### Company

4000 Continental Way  
Springfield  
Missouri 65803  
USA

### Asia Pacific

Menara BCA, 4515  
Jl. M.H Thamrin No. 1,  
Jakarta 10310, Indonesia  
+62 811 8822 395  
asia@northstarbattery.com

### Email

info@northstarbattery.com

### Telephone

+1 417 575 8200

# Trojan Battery Company

## Company Background

Trojan Battery Company, founded in 1925, is ISO 9001:2008 certified with U.S.-based operations in California and Georgia. As the world's leading manufacturer of deep-cycle batteries, Trojan Battery Company supplies energy storage solutions for renewable energy and backup power applications. For more information, visit [www.trojanbatteryRE.com](http://www.trojanbatteryRE.com).



## Product and service

Trojan Battery Company is the world's leading manufacturer of deep-cycle batteries, offering a complete portfolio of technologically-advanced deep-cycle flooded, AGM and gel batteries that provide maximum long-lasting performance to meet the requirements of today's advancing renewable energy systems.

## Geographic Footprint

Worldwide

### Company

Trojan Battery Company  
12380 Clark Street  
Santa Fe Springs, CA  
90670 USA

### Website

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

### Email

[dmiddleton@trojanbattery.com](mailto:dmiddleton@trojanbattery.com)

### Telephone

+1 (562) 236-3000  
+1 (800) 423-6569



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# Urban Green Energy

## Company Background

UGE delivers simple energy solutions. With projects in over 70 countries, UGE is the leading name in Distributed Renewable Energy (DRE) solutions at a global scale. We leverage proprietary tools and technology, including our OEM vertical axis wind turbines, to deliver end-to-end solutions aimed at bringing cost savings, reliability, and sustainability directly to end users.

## Client List

Verizon  
T-Mobile  
Claro



Unlike many systems integrators and product suppliers, UGE looks at our clients' energy challenges holistically before recommending an energy solution. By starting with our customers' needs, we do more than just offset the energy otherwise provided by the electrical grid or back-up generators - we provide peace of mind.

## Product and Service Description

UGE Fusion provides telecoms companies with the energy they need for a simple monthly rate. For tower owners and operators who are dissatisfied with expensive and unreliable power supply, UGE Fusion offers a complete energy solution that provides more reliable energy at a fraction of the cost. We accurately evaluate the energy resource, supply the technology, finance the project to reduce investment burden, and operate & maintain the sites, all under one roof.

Unlike other integrated solutions on the market, UGE works directly with end users at every step, from assessment, to planning and design, to financing and implementation to be sure that the solution is tailored to fit every site.

Under the UGE Fusion energy service agreement (ESA), the customer signs an agreement with UGE in exchange for guaranteed energy supply. This includes all assessment, planning, implementation, and site operation and maintenance (O&M) for the duration of the contract period. UGE offers financing where applicable, saving the customer money from day one.

## Geographic footprint

Worldwide

"The UGE Fusion system designed to power our communications tower has saved us \$30,000 per year in diesel fuel expenses."

Chinese Navy

## Company

330 W. 38th St.  
Suite 1103  
New York, NY 10018

## Web

[www.urbangreenenergy.com/fusion](http://www.urbangreenenergy.com/fusion)

## Email

[telecoms@urbangreenenergy.com](mailto:telecoms@urbangreenenergy.com)

## Telephone

+1 917 551-5283



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# Westindo

## Company Background

In 1989, PT Westindo was established in Jakarta. Westindo focuses its business on both Power Supply and Air Conditioning line.

### Client List

Telkomsel	Tellin	BIT/STP	Huawei
Indosat	Protelindo	Mitratel	Samsung
Axis	TBG	Ericsson	Esia
Telkom	Ifote	NSN	XL



## Product and Services



Sole authorized distributor for energy system and transmission solution to builders and operators of telecom network.



Sole authorized distributor for reliable backup power.



Providing as authorized distributor for Commercial AC VRF and Centrifugal Chiller.



Westindo provides value added services in form of facility and infrastructure as follows:

- Technical Assistance for design
- Local Assembly
- Battery Charging Facility
- 24 Hours Emergency Support
- Local Repair Capabilities
- Customer Care

## Geographic footprint

Jakarta, Surabaya, Semarang, Medan, Balikpapan, Makassar, dan Bali Nustra

“During these 6 years of co-operations, WESTINDO had proven to be a very professional organization with excellent support both commercially as well as technically. We have no hesitation in recommending this company for the Telecommunication industry.”

Mulia Tambunan, Presdir Telkomsel 2002

### Company

Jln. Raya Gaya Motor  
No 8 Kav M-N, Sunter,  
Jakarta Utara

### Contact

Hendry Ganda

### Web

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

### Email

[hendry@westindo.co.id](mailto:hendry@westindo.co.id)



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# PT. WMI

## Company Background

WMI is a new breed of PT. Hariff Daya Tunggal Engginering, a national private company having been at the forefront of design and manufacture of telecommunication infrastructure for more than 25 years.

## Client List

PT. Three Indonesia (HCPT)  
PT. Telkomsel Indonesia  
PT. Tower Bersama Indonesia

Protelindo  
Era Bangun Jaya  
SMARTFREN



Established in June 2008, WMI focused on Telecommunication Infrastructure Solution. Based on its "customer-first" attitude top priority, WMI provides telecommunication infrastructure solutions, as well as quality services to every clients and customers respectively. Today, WMI has grown and determined to be a true telecommunication partner that offers solutions to customer's problem from a customer's viewpoint through working together with them.

## Product Overview

WMI offers power managed service by operating and maintaining LUSYTA DC POWER SYSTEM, a Hybrid Power System generated by Diesel Genset providing constant 24h 24/48 VDC power in off-grid sites.

The solution offered includes supply, Installation, operation, and maintenance of DC Power System.

No more CAPEX required because this is OPEX model offering.

## Service Level Agreement

### Power Availability

Minimum power availability for each site: 99.5% / month

Mean Time To Recovery (MTTR) since disruption occurs : 4 (four) hours

### Power Output

- 24/48VDC 1500W
- 24/48VDC 3000W
- 24/48VDC 4500W

## Geographic Footprint

Riau dan Kepri, Sumbar, Sumsel, Bengkulu, Lampung, Bangka, Kalimantan, Sulawesi, Jabalnusra.

**Company**  
Jl. Jakarta 25A  
Bandung 40272

**Contact**  
Tendy Hartiawan

**Email**  
tendy@pt-wmi.com

**Telephone**  
+62811209696  
+62818209696



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# ZTE Power

## Company Background

ZTE setup a R&D department of telecom power products in 1995, since the day it was set up the team has gained rapid development with its in-depth understanding on telecommunication technology and become one of the biggest and strongest research team in China's telecom power supply industry. There are about 1,200 employees working for ZTE power supply product line now, over 500 are working in the R&D department and 80% of them are with degree of mater or above.

### Client List

Airtel	MTN
CMPak	Mobinil
Ethiopian Telecommunications Corporation	Sudan Telecom Company Co. Ltd
Etisalat	Zambia Telecommunications
Econet	Zain

"ZTE's strong capability of fast construction and deployment, which will help we build more green sites to strongly support our telecom network. We look forward to having further cooperation with ZTE Corporation"

Mobinil



Every year, ZTE power invests over 10% of total revenue into R&D. As a dedicated and innovative company, supporting research and development of new technologies, ZTE Power has obtained more than 192 national patents in power, electricity and electronics, 85% of which are invention patents.

ZTE power has a comprehensive portfolio that includes custom telecom AC and DC power supply systems, back-up power products, UPS, green energy solutions and a range of power enclosures /accessories.

ZTE power has 10 years of experience in renewable energy solutions including solar, wind, hybrid energies. The "Energy Matrix" design system has been very effective at fostering the deployment of renewable energy sites.

## Product and Service Description

ZTE provides two types of green energy solutions. One is an integrated household system: a solar power solution and the other is a micro-grid solar hybrid power solution.

The integrated household solar power system efficiently converts solar energy and can help the owner access electricity for life. It can be used for various house appliances such as fans, lightings, device which charging handsets, household batteries etc.

The micro-grid solar hybrid power solution uses the PV module to convert solar energy into electricity and stores the electricity into batteries which power the load at night. The micro-grid solar hybrid power system can support the energy input from other source such as generators or grid power. Micro-grids are mainly used for school, hospital, vaccination refrigerators, office building, island, army and residential community.

## Geographic Footprint

Afghanistan, Bangladesh, Congo, Colombia, Ethiopia, Kenya, Mongolia, Nigeria, Pakistan, Sudan, etc.

### Company

No. 55,  
Hi-tech Road South,  
ShenZhen,  
P.R.China

### Telephone

+86-755-26770000



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