Green Power for Mobile

In Partnership with the Netherlands

Telecoms Renewable Energy Vendors/ESCOs Landscape in India: Revised version

IFC International Finance Corporation
World Bank Group

Introduction

This India Vendor Catalogue document aims to present a landscape of the main green solutions vendors and ESCOs (Energy Service Companies) providing products and services to the mobile telecoms sector in India. This document is helpful to Mobile Operators and Tower Operators in India considering the deployment of green solutions on their network.

This document can help those who want to have an overview of the main green solutions vendors in India. Each vendor was sent a Request for Information (RFI) to gather information about their products, operation, footprint, number of units deployed, existing contracts with operators etc. Please feel free to contact each vendor using information included in each profile.

Prior to the vendor listing, we are presenting a short introductory analysis of the Indian Mobile market based on our current intelligence of the Indian Market (according to Wireless Intelligence latest data and reports) and public information available from vendors, tower operators and mobile operators.

Update on the India Mobile Telecom Market

Slower Growth due to Regulatory Challenges

At the end of 2011, there were approximately 893,845,838 mobile subscribers in India[1]. This represents a market penetration of 71.51%, lower than the average mobile penetration in the Asia Pacific region at 78.25%.

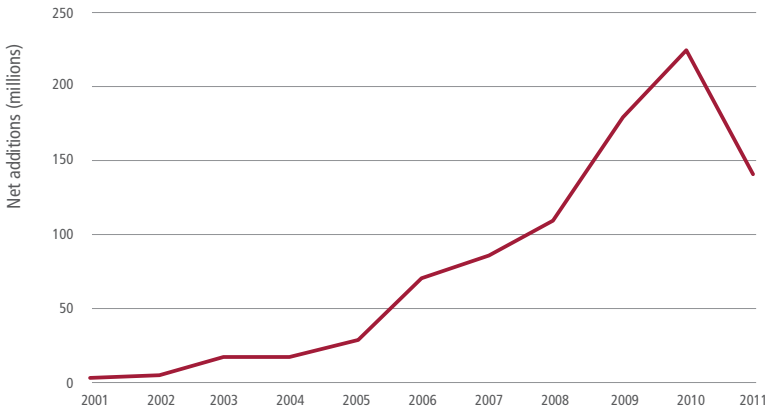
According to the latest Wireless Intelligence data, the total Indian mobile connections grew by 19 percent year-on-year in 2011, a much lower rate than the 48 percent average growth recorded over the previous three years. Total yearly net additions in 2011 declined to 141 million from 227 million a year earlier. The slowdown was even more pronounced in Q4 2011, where quarterly net additions were recorded at 20 million, compared to 60 million a year earlier.

This general slowdown in the Indian market has been partly triggered by new regulatory rules applied to the mobile market after the so-called '2G licensing scam.' In early February 2012, India's Supreme Court ordered the cancellation of 122 regional mobile licences, after realizing 2G licences were issued under controversial circumstances by the office of disgraced former telecoms minister, A Raja.

Since Q1 2008, 120 networks have launched across India's 22 circles. This new decision could impact almost 10 percent of the country's mobile users, according to Wireless Intelligence. If these new operators now can't buy back their licences, they will have to shut down within the next four months.

The slowdown has seen many operators begin to report negative net additions. In Q4 2011, Tata Docomo recorded a 5.3 million decline in connections compared to previous quarter, while new entrants Videocon Mobile at (-826,398) and Ping Mobile (-32,461) also saw declines.

Figure 1: Net Additions in Million (4Q2011)



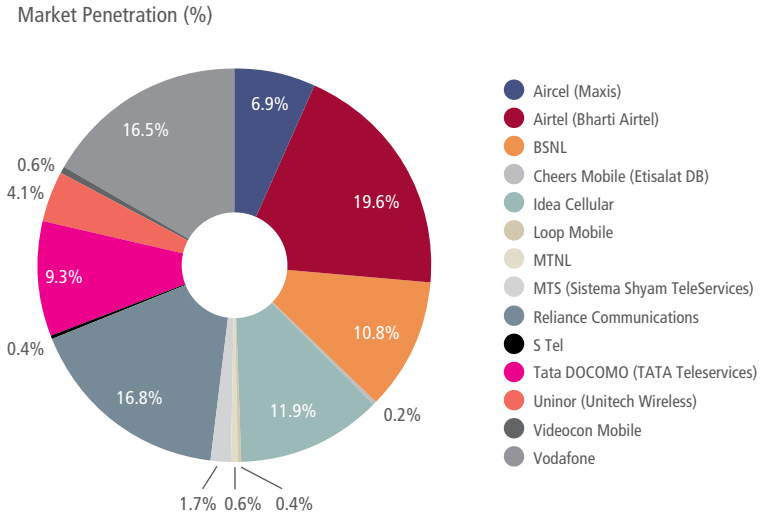
Source: Wireless Intelligence

1 Source Wireless Intelligence 2012

Meanwhile, the Telecoms Regulatory Authority of India (TRAI) has identified that almost 30 percent of the estimated current total of 900 million mobile connections in country are inactive, putting the total number of 'active' connections at about 650 million.

In this turmoil, the market share of the main mobile operators remains quite stable compared to a year ago, with the private players such as Bharti Airtel Limited, Reliance Communication, Vodafone, Idea Cellular, Aircel and Tata Indicom, still leading the market.

Figure 2: Mobile Operators Market Share in India (4Q2011)



Source: Wireless Intelligence

Increased Efficiency and Green Networks

At present, it is clear that future growth in the country will come from demand in rural areas. **According to the TRAI, rural penetration in India only increased by 17 percentage points between 2009-11 to 36 percent, while urban penetration has increased by 58 percentage points to 161 percent over the same period.** This is a clear indicator that urban areas have been at the centre of competitive efforts from mobile operators and that demand in rural areas – which to date represent only one third of the country's total connections – is still largely untapped.

If these areas are still untapped, many operational and financial challenges remain to better reach locations with no or unreliable access to the electricity grid, and where the Average Revenue per User is below 2 USD (1.98 USD at 4Q11). To target these challenges, India is clearly taking a proactive regulatory approach towards increased efficiency and sustainable power solutions for the country mobile telecom networks.

Earlier this year, the TRAI published a new set of recommendations to encourage the Indian mobile telecom industry to switch to renewable technologies. According to this new set of rules, "**at least 50% of all rural telecom towers and 20% of the urban towers are to be powered by hybrid power (Renewable Energy Technologies & Grid power) by 2015 and a further 75% of rural towers and 33% of urban towers are to be powered by hybrid power by 2020.**" The new rules further state that "service providers should adopt a voluntary code of practice encompassing energy efficient network planning, infra-sharing, deployment of energy efficient technologies and adoption of Renewable Energy Technology (RET) to reduce carbon footprints."

This new set of rules creates a tremendous opportunity for green solutions vendors in India and sends a clear message to the mobile industry, urging the industry to have a transparent carbon footprint and reduce greenhouse gas emissions. Today there are a few thousand sites being powered by renewable solutions (mostly solar). Based on our estimates, this could represent up to 200 k towers by 2015 using some forms of renewable energy or battery hybrid solutions to reduce diesel consumption and hence reducing their greenhouse gas emissions.

Taking the example of Bharti Infratel, the tower operator company managing 45,000 sites in India, states they have deployed 1,200 solar sites so far, uses 3,400 free cooling units, 50 DCDG and 1,800 high efficiency power management systems. In the coming years, the company is planning to add 1,500 more solar sites, 1,500 DCDG, 2,000 high efficiency power management systems and 50 fuel cell systems.

Vendor Listing

Disclaimer: the information presented below is as communicated by vendors. GSMA sent a Request for Information early February 2012 to a list of vendors operating in India and collected feedback during a six-week period between early February and mid March 2012. Information received was not revised, edited or corrected on any submissions. This is not an exhaustive list of all green solutions for telecom vendors active in India.

The listing we are providing below summarises a majority of vendors active in the Indian mobile telecoms market. Our segmentation is based on the type of products/services a vendor or an ESCO is provided on the mobile telecom market in India. We count 6 categories:

- ESCO
- Mini grid
- System Integrator
- Solar Equipment
- Wind Equipment
- Network equipment
- Fuel cell
- Battery
- Telecom Power management

If you represent a vendor and would like to be included in a further release of our India Vendor Catalogue (this document is updated every 6 months), please contact us at greenpower@gsm.org

Table 1: India Telecom Vendor Listing (Updated Q1 2012)

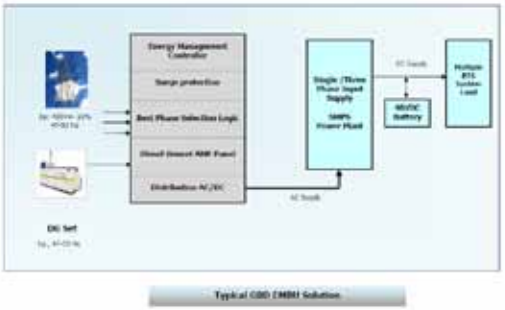
Company	Core Competencies
Luminous TeleInfra	ESCO
Plug Energia	ESCO
Next Gen PMS	ESCO
OMC	ESCO
MBCEL (Mosar Baer Clean Energy Limited)	ESCO
KMR Energy	ESCO
Sun Source	ESCO
AirLiquide/Axane	Fuel Cell
DESI Power	Microgrid Operator
Husk Power	Microgrid Operator
SunEdison	Solar Equipment
Tata BP solar	Solar Equipment
Alta XinTong Solar	System Integrator
Delta Energy	System Integrator
Bhaskar Solar	System Integrator
VNL	Network Equipment
Eltek India	Telecom Power Management
Zephyr Corporation	Wind Equipment
E-Hands Energy	Wind Equipment

Luminous Teleinfra Limited

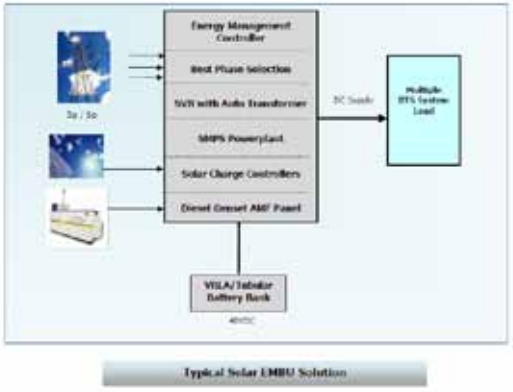
Company Background

Luminous Teleinfra Limited (LTI) is focused on Managed Services offerings which include innovative products and advanced technological solutions from in-house and technology partner's eco-system portfolio with an objective to reduce energy OpEx for telecom operators and telecom towers companies.

Hybrid solutions include:
1. Grid Battery Hybrid



2. Solar Grid DG Battery Hybrid (option to include micro wind solution):



Year the Enterprise was Founded

2008

Product and Service Description

Innovative, Integrated, Infrastructure Solutions for telecommunication and other energy-intensive applications, LTI provides a range of smart products and solutions.

Leveraging on proven competence in Application Engineering together with its well-honed capability in Project Management, LTI offers Managed Service with fixed energy on to telecom Operators and tower companies.

Maturity of Enterprise

Application	Region
Solar	50 of towers with solar solutions: ■ 202.5 mw units produced
Wind Turbines	9 of towers with wind solutions: ■ Each of 5 kw (3.2 wind +1.8 Solar) Capacity
Solar Hybrid Solutions	75 units with D.G battery solutions
Battery Providers	200 high temperature, fast charging battery units installed in telecom industry
Network Equipment	255 of sites where your equipment is in use
Controllers	200 of controllers sold to telecom industry (solar or power controller, PIU for battery/gen cycling)
Solution Providers	205 of towers served
Generators	205 of generators sold to telecom industry
Operation & Maintenance	Manage to cluster (50 sites) in Bihar for 6 months

Financial Savings

We design and implement Energy Saving solutions for BTS tower sites and manage day-to-day operations under Fixed Energy Model.

The Managed Services offering is built on boutique of Energy Saving solutions on various technology platforms.

Managed services delivery model has predefined set of processes, methods and tools to achieve desired KPI's. It consists of activities within site Audits, design, build, integrate and operations.

Geographic Footprint

All over India.

Clients List
Aircel
BSNL
VIOM
TTSL
Tower Vision

Contact
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Executive Vice President
– Business

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Mobile
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0124-4959202

Green Power for Mobile

Plug Energia

Company Background

As one of India's rapidly emerging business entities, Plug Energia Limited is a leading energy consultancy in the sustainable energy sector, with expertise ranging from business consulting, green energy solutions and carbon advisory, to on-field project implementation and project management. We're headquarters in New Delhi, India with branch offices in Gurgaon & Mumbai with a 20,000 square-foot manufacturing facility in Haryana with dedicated production test facilities based on lean manufacturing principles.

Plug Energia team have considerable experience with the technological and practical issues associated with renewable energy development, carbon emission reduction and rural electrification projects and has deployed various green technology solutions in India e.g. Direct hydrogen & reformer based fuel cell, Solar Photovoltaic, Wind & Hybrid backup energy solutions, Bio-mass, On-site gas generation solutions, Free-cooling units etc.

Today, the company is entering a new phase of rapid growth, in line with the global imperative to tackle climate change and environmental challenges by bringing together its expertise in energy efficiency, renewable energy technologies and carbon market solutions.

Product and Service Description

Plug Energia is a leading ESCO and full-service energy solutions provider. Utilizing industry-leading energy expertise, operational discipline and innovative technology, we develop, design, and build comprehensive energy-related solutions e.g. direct hydrogen, reformer & on-site gas generation based fuel cell, Solar Photovoltaic, Bio-mass, Wind & Hybrid backup energy solutions for powering telecommunications and industrial equipment's. The company is proactive in entering into partnerships with technology leaders across the world, thus drawing technological expertise to create solutions that brings real, tangible results that our customers value.

Geographic Footprint

India, South-East Asia, Middle-East, Africa.

Client List
Vodafone
IDEA Cellular
Indus Towers
Aircel

Company
Plot #7645,
G T Karnal Road,
Delhi, India 110007

Telephone
+91-99999-13966

Email
marketing@
plugenergia.com

Website
www.plugenergia.com

Next Gen PMS Pvt. Ltd.

Company Background

NextGen was incubated at NSRCEL, IIM Bangalore in 2009. NextGen operates in two domains of waste to energy and emission management and sustainability. It is led by a young and passionate team from the best universities in India including IITS, IIMs and BITS-Pilan. It's long term goal is the create sustainable development through technological and social innovations.

Some of NextGen's achievements in the past few years include:

- Selected as one of India's most promising cleantech startups by CII (Confideration of Indian Industries) and WRI (World Resources Institute)
- Selected by Business Today as one of India's Most Promising Startups for 2011

Year the Enterprise was Founded

2009

Product and Service Description

NextGen has developed an in house biogas technology for decentralized organic waste to energy application, focusing on urban needs of reliability, hygiene and aesthetic values. The biogas plant can be designed to process waste right from 25kgs/day to more than 50tons/day. The plant can take in variety of inputs right from food waste to garden waste to human waste. The gas so generated can be either used to substitute LPG or can be used to produce electricity.NextGen also works with organizations to estimate, analyze and reduce their carbon and water footprints. Some of NextGen's prestigious clients in this space include Reserve Bank of India, Intel, MNRE, ICICI Bank, Tetra Pak, Pidilite Industries, Rane Industries, United Breweries, Infosys amongst others.

Geographic Footprint

NextGen has offices in Bangalore, Mumbai and New Delhi. NextGen has expanded its operations to Sri Lanka, Maldives and Hong Kong.

Contact
Abhishek Humbad

Company
5, N.S.Raghavan Centre for Entrepreneurial Learning, Indian Institute of Management Bangalore, Banerghatta Road, Bangalore– 560076 Karnataka, India

Website
nextgenpms.com/

Email
abhishek.humbad@nextgenpms.com

OMC

Company Background

OMC is a new power company that provides Micropower – small scale energy – to mobile networks and rural communities in emerging markets. Simply put: power, everywhere.

Our customers are tower companies, mobile infrastructure companies and mobile operators, as well as rural communities, in emerging markets – all requiring reliable, renewable and cost-efficient power with zero Capex.

Year the Enterprise was Founded

2011

Geographic Footprint

Currently operating closed pilots in Uttar Pradesh and Haryana, India. Pilots in India, ongoing discussion in Kenya and Tanzania.

Contact
Ganapathi Srinivasan

Company
OMC - Omnigrid Micro-power Company Pvt. Ltd.
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Gurgaon – 122 001,
INDIA

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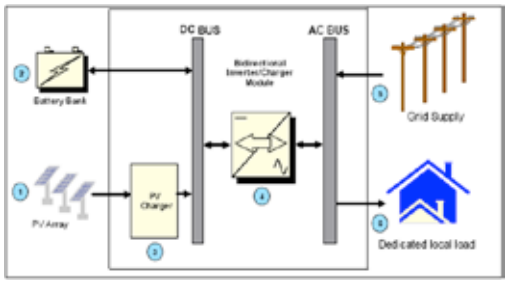
Moser Baer Clean Energy Ltd



Company Background

Moser Baer Clean Energy Limited (MBCEL) was incorporated in September 2008 with a strategy to undertake development of solar power projects worldwide. MBCEL is a project developer, owner and operator of solar power projects. MBCEL is a Moser Baer promoted company, established for setting up solar PV power projects in India and in international geographies. It is India's largest solar power development company with a presence in key international markets. MBCEL has 250 MWp under development across multiple states in India and a project portfolio of over 200 MWp in Europe to be developed by 2012.

Year the Enterprise was Founded

Sep, 2008

Product and Service Description

- Moser Baer Clean Energy Limited (MBCEL) is India's leading solar power development company with a presence in key strategic international markets, viz., Germany and Italy
- Backed by a strong promoter group with a successful track record of establishing globally competitive businesses
- Backing of Global Investors to Power Business - Blackstone, Macquarie, IFCI
- Funding Support for Solar Projects: IDBI, IFC, Deautsche Kredit bank, Hypovereins Bank
- Group's presence across the value chain - Manufacturing, EPC, Development
- Experienced Management team with a demonstrated track record in power project development in India
- Moser Baer emerges as first company to achieve Commissioning of Asia's largest solar project of capacity 30 MW in Gujarat

Financial Savings

Business model for telecom towers in ESCO form.

Geographic Footprint

India - Gujarat Project, Rajasthan Project, Orissa Project, Tamil Nadu Project, Gujarat Ground Project, West Bengal Project.

Germany - Meissen Ground Project, Wittenberge Ground Project, Lauta Ground Project, Thuringan Ground Project, Nordendorf Ground Project.

U.K - Trefullock Ground Project.

Italy - Sardinia Greenhouse Project.

U.S - California Ground Project.

Client List
VIOM Networks
Huawei
BSNL

Contact
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Telephone
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Fax
+91-11-47624229

Website
www.moserbaersolar.com

KMR Infrastructure

Company Background

KMRI designs, finances, installs and operates renewable energy plants and offers customers power purchase agreements (PPA) that help them go green while reducing operating cost and avoiding capital expenditure.

KMR infrastructure's distributed energy model is developed by extensive study of 40 different renewable energy programs across the world, in conjunction with energy group of the World Economic Forum (WEF Davos) group. The company created a best practice framework identifying various key elements needed to make a scalable network of small renewable energy projects. Using this framework the company identified many target markets in Asia and Africa and has been rolling out their first set of projects based a robust financial and operational delivery platform.

KMR Infrastructure has developed a "Franchise Fund" model that will help small scale renewable energy based franchises by creating an end-to-end industry value chain that will provide assistance in all areas starting from project conception, financing, technology selection, procurement, project management, operations support and training and after sales maintenance and service.

Geographic Footprint

Asia and Africa.

Contact
Krishnan Raghban

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Chennai 17,
India 600 017

Email
krishnan@
kmrinfrastructure.com

Website
kmrinfrastructure.com

SunSource Energy Pvt Ltd

Company Background

SunSource Energy, is a Delhi-based, MNRE Accredited, CRISIL-rated solar System Integrator with over 30 years of solar design-engineering experience within its team. SunSource Energy has been active in the Indian market since 2010, and delivered several off-grid solutions in various parts of India, ranging from 1-2kW to 100 kW. In addition, SunSource has designed and engineered a 1 MW solar power plant in Bhivani, Haryana, which has already been synchronized with the grid under the IREDA RSSGP scheme, and is exceeding simulated performance.

SunSource Energy also provides design-engineering services for solar PV power plants and has delivered over 300 MW's of preliminary and detailed designs to clients. SunSource Team has several decades of technical and commercial solar experience globally across different verticals.

Year the Enterprise was Founded

January, 2010

Product and Service Description

SunSource Energy Pvt. Ltd is a Developer, Engineer and Builder of solar photovoltaic (PV) projects. SunSource partners with parties interested in solar PV projects (landowners, developers, investors) to assist them with solar energy services that include project development, engineering, procurement and construction (EPC), as well as operation and maintenance (O&M) of solar power plants. From planning and feasibility to the turnkey handover of photovoltaic systems, SunSource Energy offers its customers and partners high quality system components from selected manufacturers along with a complete range of services to meet all their solar energy needs.

With extensive experience, a technology agnostic approach and hands on knowledge of global best practices in solar energy projects, SunSource offers the best solar solutions for all solar energy needs and requirements. India's Ministry of New and Renewable Energy (MNRE), with verification from CRISIL, India has recognized SunSource as a Channel Partner, allowing us to simplify the solar solution even further.

Financial Savings

SunSource Energy can provide various engagement models to the telecom tower companies, including and not limited to pure play solar EPC model, Solar BOO model and a comprehensive model including the normal operational and maintenance activities.

Geographic Footprint

Pan India.

We have been favorably impressed with SunSource's timely and detailed deliverables. Their breadth of engineering resources dovetails nicely with the technical resources that are resident within our organization.

ECS Energy, Ltd.

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Adarsh Das

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110020, India

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Website
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com

Air Liquide

Company Background

Air Liquide is the world leader in gases for industry, health and the environment. It offers innovative solutions based on continuously enhanced technologies. Air Liquide produces and distributed air gases (oxygen, nitrogen, argon, rare gases, etc.) and many other gases, including hydrogen. For nearly 50 years, Air Liquide has mastered the entire hydrogen chain for industrial applications, from production through to distribution at customer sites. In addition to its significant production capacity, Air Liquide operates a distribution network that is adapted to the needs of all its customers, the world over. By leveraging this experience and this unique expertise, Air Liquide has taken up the challenge of developing hydrogen as a vector of clean energy. Today, Air Liquide occupies a unique role in this sector, managing the production and distribution of hydrogen as well as the production of clean power via fuel cells.

Year the Enterprise was Founded

1902

Product and Service Description

Air Liquide offers hydrogen fuel cell based energy solutions to markets where hydrogen brings an immediate and measurable benefit: portable energy, emergency back-up energy, some industrial uses, small vehicles and isolated sites. It has developed a specific offer for the stationary power market based on PEM-fuel cells type (proton exchange membrane).

Air Liquide expertise in the field originates from the ten plus years of activity of its fully owned subsidiary, AXANE, which has developed and commercialized fuel cell systems for niche or early markets for which there is no satisfactory alternative or green energy solutions such as portable power generation, extended backup power, off-grid sites, etc…

Maturity of Enterprise

Air Liquide today features a significant experience in the field of power supply, continuous or as back-up, to stationary applications such as telecom towers. It is currently offering a full backup and service offer including deployment, systems maintenance as well as the entire management of the hydrogen supply chain. Following the success met by its offer in Europe, Air Liquide is now entering the Indian market with a techno-commercial solution adapted to the specific requirements of the Indian telecom industry. Air Liquide has been engaged in a demonstration program with a leading Telecom Infrastructure operator since mid 2011 and intends to turn into commercial operations mid 2012.

Geographic Footprint

Air Liquide, historically present in Northern India, is currently strengthening and enlarging its geographical presence in the Western and Southern part of the country with the commissioning of new industrial gas production units, making its presence nationwide.

Company
A-24/9 Mohan
Co-operative Industrial
Estate
Mathura Road
New Delhi 110 044

Telephone
011 4055 0200

Website
www.airliquide.com

Decentralised Energy Systems India Pvt. Ltd. (D.E.S.I. Power™)

Company Background

DESI Power™ is focused on creating an empowered rural India where green energy is a means to achieve economic development of the region. The mission of DESI Power is to promote the reduction of endemic rural poverty through local job creation driven by electricity generation from power pants based on local resources of renewable energy for local micro-enterprises, businesses and energy services for lighting, pumping for irrigation, modern biomass based cooking fuels, drinking water, cold storage, etc.

DESI Power was founded in 1996 by an outstanding technocrat Dr. H.N.Sharan, who is a world renowned energy expert, together with Dr. Ashok Khosla, Founder of Development Alternatives, New Delhi and an internationally reputed environmentalist.

Category of Company

Off-Grid ESCO

Year the Enterprise was Founded

1996

Product and Service Description

DESI Power builds and operates decentralized electric power plants using renewable sources such as biomass, bio-fuel, hydro, solar, etc. It also establishes the rural ecosystem for access to electricity and economic development around it. The ecosystem includes power plants for electricity generation, energy services including micro/mini grids for electricity distribution, capacity building, and microenterprise development.

DESI Power undertakes end-to-end activities of for decentralized power plants using biomass gasification, biogas, or solar technologies. It includes site surveys to access the demand and resource supply, preparing DPRs, setting-up the plants and running them. It undertakes agro forestry and biomass and bio-waste management such as assessment of sources, procurement, processing and preparation. It also sets up mini- and micro-grids to deliver power to the customers, and manages the electrical distribution system.

Another key activity and expertise of DESI Power is training and capacity building. It trains the workforce not only to run its own operations but also to support other enterprises in the ecosystem. It not only mobilizes the villager by forming cooperatives and societies, but also helps them set up microenterprises to enable them to progress in the socioeconomic value chain. Some of the microenterprise activities taken up or enabled by DESI Power include clean cooking energy solutions, drinking and irrigation water solutions to the farmers and villagers, and local micro enterprises such as rice mills, oil expellers, etc. Thus, the solutions provided by DESI Power create a complete ecosystem for the economic development of the village.

Geographic Footprint

Currently operates in Bihar, Madhaya Pradesh, Karnataka. Plan tot extend to all North East and North states in India.

Maturity of Enterprise

3 plants under <100kW. More than 200 consumers.

Client List
Bharti Infratel
Vodafone

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Aklavya Sharan

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Above Amanath
Co-operative Bank,
RT Nagar Main Road
Bangalore 560032, India

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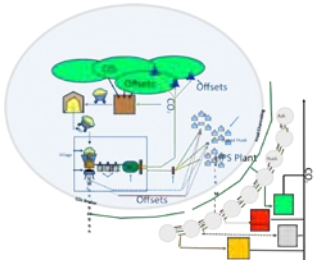
Husk Power Systems Private Ltd



Company Background

Husk Power Systems is a social enterprise, provides off-grid rural electricity solutions. The company designs, installs and operates biomass-based power plants. Each plant uses proprietary gasification technology to convert rice husk and other abundant agricultural residue (procured from local farmers) into electricity, which is then distributed to rural households and micro-enterprises through a micro-grid system – providing a better quality, cheaper way to meet their need for energy. This technology cost-effectively converts agricultural residue (rice husk, mustard stems, corn cobs, certain grasses etc.) into electricity.

In doing so, HPS creates an ecosystem around each plant by providing income generation opportunities to local farmers and entrepreneurs, and creating employment – a high percentage of whom are women. This enables sustainable development within the communities it serves.

Category of Company

Off-Grid ESCO

Year the Enterprise was Founded

2008

Product and Service Description

HPS provides end-to-end renewable energy solutions by installing 12-kW to 100-kW 'mini power plants' and then wiring villages and hamlets of up to 4000 inhabitants to deliver electricity on a pay-for-use basis. A typical plant can serve two to four villages within a radius of 1.5 kilometers, depending on size and population. The plant employs local villagers who are then trained by HPS to conduct plant operations. Consumers pre-pay a fixed monthly fee ranging from US$2 to 2.50 to light up two fluorescent lamps and one mobile charging station. This offers consumers savings of at least 30% over competing kerosene and diesel energy sources (annual savings of up to US$50) and a lighting package that can serve the whole household.

Geographic Footprint

Bihar, Uttar Pradesh, Nepal, Uganda & Tanzania.

Maturity of Enterprise

In just four years HPS has installed 84 mini-power plants, providing electricity to over 200,000 people spread across 300 villages, while employing 350 people through its operations.

"Electricity is scarce in Bihar and there are many problems because of that. In Tamkuha there used to be a lot of theft. Snakes and dogs would bite, transportation was difficult and my children couldn't study after sunset. I want my children to study and my son to be an engineer. Since the electricity came, my children can study even at night. It is also good for business. This little plant has done what big power plants couldn't do. I used to live in darkness and now I live in a world full of light. "

Ragunath Prasad Chauhan, HPS customer, Tamkuha, Bihar

Contact
Ratnesh Kumar, Director

Company
Husk Power Systems Pvt. Ltd. Opp. Shiv Mandir, Near National Seed Corporation, Shastri Nagar Market, Sheikhpura, Patna- 800 014
Bihar, India

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Sun Edison

SunEdison is developing and operating hundreds of solar plants throughout the world, representing 100.6 MW of clean photovoltaic (PV) capacity.

Geographic Footprint

Indian Subcontinent, East Asia, Middle East and South East Asia.

Latest Press Releases

May 2010 - SunEdison, an MEMC Company, and First Reserve Announce Joint Venture to Fund Up to $1.5 Billion of Solar Energy Projects

http://www.sunedison.in/press_releases.php?id=96

SunEdison, the solar energy development division of MEMC Electronic Materials, Inc. (NYSE: WFR), today announced an agreement with First Reserve Corporation to establish a joint venture which could provide for the acquisition of up to $1.5 billion in current and future SunEdison solar photovoltaic energy projects.

SunEdison is one of the world's leading solar project developers, with more than 350 solar electric power plants constructed and under management. First Reserve is one of the world's largest private equity and energy infrastructure investors, with $20 billion under management.

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Tata BP Solar

Tata BP Solar is a joint venture of BP Solar (51%) with Tata Power (49%). Tata BP Solar has played an active role in developing the Indian solar market over the last 20 years during the phase when only off-grid products such as solar lanterns and home lightings systems and solar street lights could be sold in India. The company has established rooftop and free field solar power plants and megawatt-scale grid connected solar power plants in Germany, Spain, USA, Australia and Italy.

The company has a cell manufacturing capacity of 84 MW and module manufacturing capacity of 125 MW.

Geographic Footprint

India

Latest Press Releases

March 2011 - Tata BP Solar Receives FICCI Annual Award 2008-09 From India Finance Minister

http://news.oneindia.in/2011/03/03/tata-bp-solar-ficci-annual-award-2008-09-aid0102.html

Tata BP Solar added another feather to its cap as the Union Finance Minister, Mr Pranab Mukherjee, presented the company with the "FICCI Annual Award 2008-09 for Outstanding Achievement in Environmental Sustainability of Business" at the 83rd Annual General Meeting of the Federation of Indian Chamber of Commerce and Industry (FICCI) on Tuesday 01 March 2011.

April 2010 - Tata BP Solar Expands Solar Manufacturing Capacity by 62% to Serve Growing Solar Market in India

http://www.tatabpsolar.com/newspaper_gleaning.php?k_id=Tata-BP-Solar-Expands-Solar-Manufacturing-Capacity-by-62--to-Serve-Growing-Solar-Market-in-India

August 2009 - NXP Semiconductors today announced a development partnership with Tata BP Solar India ltd, a joint venture of BP Solar and Tata Power, under which Tata BP intends to use various electronic solutions for solar applications developed by NXP. These solutions have been developed by NXP as per the requirements of Tata BP. Both companies are looking at a long-term partnership that will see the development of a range of products.

http://www.solarfeeds.com/tata-bp-solar-nxp-co-operate-to-develop-solar-solutions/

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ALTA-XinTong Solar

ALTA-XinTong is the leading provider of 3rd Generation, fully Integrated Solar hybrid power systems for telecom towers. We set the standards for "All DC" solar power systems for solar telecom towers in China and have a track record of more than 9,000 autonomous solar telecom systems. Our patented MPPT controllers are designed and produced in-house.

We offer "All DC" solar power systems customized for the India telecom industry. Our customized solutions come with remote monitoring capabilities and web based night vision surveillance system. Our solutions eliminate the use of diesel and reduce operating expenses by 90%. We don't just offer clients a solar System; we provide a turn-key solution that is sustainable and economically viable.

- The 1st to Supply All DC Solar Power Systems to Chinese Mobile Operators
- Developed Technical Specs for All-DC Solar System for Communication
- Equipment
- National Patent -MPPT (Max Power Point Tracking) Solar Controllers
- ISO9000, CE and National Electrical & Electronic Inspection
- 14 years hands on experience in integrated solar control systems
- 9,000 Solar Telecoms Power Systems in China

Our potential clients are major mobile operators and tower companies in emerging and developed economies.

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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.

Energy Management

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.

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Environ Energy Corp. India Pvt. Ltd.

Environ Energy Corp, has been the leading Solar Energy Solution Provider in the country for more than a decade now. Formerly known as Shell Solar, the company has more than 200,000 installation spread over entire South East Asia & Europe.

- Largest Solar Photovoltaic-Solution Provider
- Energy to Rural India through Solar PV, which is Reliable, Durable, Affordable & Pollution Free
- PV Solutions through Innovations with Sustainable Technology & Micro Financing
- International quality with 5 Years - 20 years Warranty
- Committed Team of Service Engineers & Marketing Personnel
- Awarded the Prestigious Rajiv Gandhi Akshay Urja Award for maximum Rural Household Electrification
- Introduction of Monthly Payment facility through Rural Banks & Financial Institutions
- Innovative & simple SPV Solutions for Various Applications

Product and Service Description

The Energy Management System from Bhaskar Solar is capable of handling various Energy Sources like Solar, Wind EB & Diesel Generator with Energy & Load Management function. Energy source can be prioritized based on several factors like cost, availability etc. and is user settable. Comes with remote monitoring & dedicated NOC solution.

Financial Savings

More than 15-20% savings in OPEX Model

Geographic Footprint

More than 100 outlets in 11 cities throughout India and 50 offices worldwide. Global branches in Argentina, Sri Lanka & Singapore.

Project Locations

India, Bangladesh, Nepal, Sri Lanka, Indonesia Philippines, Switzerland, Netherland, Abu Dhabi, Brunei.

Client List
Indus
Idea
VIOM
Vodafone
Bharti Airtel
Tata Communication

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VNL

VNL has developed the WorldGSM™ system, a solar powered turnkey GSM and broadband system specifically developed for rural areas with ARPUs of less than $2-3 per month. WorldGSM™ is the first commercially viable GSM and broadband system that is independent of the power grid. It runs exclusively on solar power and requires no diesel generator backup. It is also designed for simple delivery and deployment by local, untrained workers – all resulting in zero OPEX, dramatically lower CAPEX, and near zero maintenance. VNL follows a unique Cascading Star Architecture to deploy WorldGSM networks.

The key elements in a WorldGSM rollout are: Rural site for coverage; Village site for capacity; BSC and MSC. This architecture enables the use of the same IP based transmission for both GSM and broadband. VNL also offers a completely solar-powered broadband kiosk solution that operates on Wi-Fi to bring internet to village communities and schools. VNL's system is being used to connect rural communities in India, Asia, Africa and Latin America.

Geographic Footprint

Asia, Africa,Latin America.

Latest Press Releases

August 2011 - USOF India Certifies VNL's Multi-Award-Winning Solar-Powered GSM System
http://www.vnl.in/blog/2011/press-release-usof-india-certifies-vnl's-multi-award-winning-solar-powered-gsm-system/

February 2010 - VNL Wins Green Mobile Award for Best Green Programme Product or Initiative at Mobile World Congress
http://www.vnl.in/blog/2010/live-from-mobile-world-congress-vnl-wins-green-mobile-award-for-best-green-programme-product-or-initiative/

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ELTEK SGS PVT. LTD.

Eltek SGS Pvt Ltd (a wholly owned subsidiary of Eltek ASA Norway) having it's Head Quarters & Manufacturing facilities accredited with ISO9001: 2008, ISO 14001:2005 & OHSAS 18001: 2007 certifications. Offering a host of products & solutions for varied needs of the clients. Eltek has it's own building and infrastructure having nearly 40,000 sq. ft factory in Pace City II, Gurgaon- Haryana (India).

Capabilities:

- Engineering and System Dimensioning
- System Assembly
- Warehousing and Spares holding
- Repairs
- Training

With over 150,000 installations, Eltek is a dominant player in India having distinction of powering & servicing more than 1/3rd Telecom infrastructure sites 24x7 thru pan-India service support network.

Globally, Eltek has a long history with more than 40 years of experience as a leading global provider of highly efficient & reliable Telecom Power Solutions. With more than 2200 employees world-wide, offices in 30 countries and business activities in more than 100 countries, Eltek has a strong global position giving it a unique capability to serve global customers.

Year the Enterprise was Founded

1996

Product and Service Description

SMPS based modular DC Power Supplies, TEC approved Power Plants, Green Telecom Utility Manager (TUM), Integrated Power Management Systems (IPMS), Solar Hybrid Solutions, DC-DC Converters, Rectifiers, Solar Charge controllers, Inverters, Hybrid Controllers, Remote Monitoring Systems, Battery Health Monitoring Systems & a host of customized solutions.

Technology leadership has always been a cornerstone of our strategy and a major reason for our success. Eltek devotes much of its R&D efforts to the development of new state-of-the-art designs, which have the quality and functionality expected in modern telecommunications networks.

Our products & solutions are based on the high efficiency (HE) conversion technology to maximize the power availability & offer customers a unique opportunity to substantially save Energy, Money and the Environment.

Engineering & System dimensioning services, site survey & planning, installation, commissioning, acceptance testing & after sales support services viz: AMC, repairs, training, etc.

Financial Saving

Eltek's financing solutions enable operators to acquire full solutions with no upfront capital expenditure. We structure transactions to suit our client's needs and budgetary requirements. Now you can rent or lease our High Efficiency products and let energy savings completely offset the rental or leasing cost with a positive ROI from Day 1.

Geographic Footprint

Pan-India, all the telecom circles including North-East.

Maturity of Enterprise

Eltek in India has nearly 400 sites already operational with Customized Hybrid Solutions (DG, Grid, Battery, Solar etc. configured to client needs) and are constantly striving to increase the foot-print.

Client List

Airtel
Vodafone
Idea
Reliance
BSNL
Tata
Aircel
Indus Towers
Bharti Infratel
VIOM
GTL
Towervision
ATC

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Zephyr Corporation

Zephyr Corporation Ltd was established in 1997 in Japan as a specialist manufacturer of Micro Wind Turbines (MWT), named Airdolphin™. Zephyr is a privately owned company headquartered in Japan with offices in Sweden and USA. All development and manufacturing is done in Japan from Japanese materials. More than 5,000 of Zephyr's turbines have been installed worldwide. Zephyr is an expert in wind turbine products and member of AWEA and EWEA (American and European Wind Energy Associations). Zephyr holds several patents and other IPR concerning the Airdolphin design and functionalities.

During 2007, Zephyr started its international expansion and has today over 600 units installed in Europe alone. The Airdolphin series is currently distributed in more than 40 countries by over 30 distributors. In 2009, Zephyr ramped up its telecom business and has deployed turbines for over 100 sites with 15 different operators in various configurations, both off grid, in combination with PV, and smart grid.

Year the Enterprise was Founded

1997

Product and Service Description

Zephyr manufactures three different turbines, all with the same hardware and measurements:

- Airdolphin Mark-zero, 24 VDC (Off Grid)
- Airdolphin PRO, 48 VDC (Off Grid)
- Airdolphin GTO, 250 VDC (On Grid/smart grid)

All Airdolphin turbines:

- Are small and lightweight - diameter of 1.8 m and 18 kg. This means that they can be quickly and easily installed in existing towers rather than a separate custom-built tower. This speeds up deployment and reduces CAPEX
- Have the highest power-to-size ratio on the market
- Support a modular approach where one or multiple turbines can be used to match each sites' power need
- Have excellent low-wind performance as well as high-wind energy production (up to 2.5 - 65m/s)
- Have a built-in AC-DC converter and battery charger (Pro and Mark zero)
- Have a high durability, with no external screws, enabling maintenance free operation and 15 years life expectancy
- Have a built-in automatic breaking system

Financial Savings

The cost of buying and installing two Airdolphin 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 ofsolar panels required would be 20 m2 at an estimated fixed cost of EUR 25,000 - 30,000. OPEX costs would include security.

Maturity of Enterprise

Wind turbines: 114 towers with wind solutions and 190 units producing less than 10 kW. Network Equipment: 114 sites where our equipment is in use. Operation & Maintenance: 114 towers served.

Geographic Footprint

Worldwide.

"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 Magic´, managing director at Energyplus.

Client List

Vodacom, South Africa
Vodafone, Spain
Turkcell, Turkey
Vipnet, Croatia
Etisalat, Egypt
Etisalat, UAE
MTC Namibia
Orange, Madagascar
T-Mobile, Croatia
Syriatel, Syria

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E-Hands Energy (India) Pvt Ltd

Focused on wind energy based hybrid solutions; E-Hands Energy in partnership with Eveready Diversified Products Pty Ltd, South Africa offers the Kestrel brand of micro wind turbines to the Asian market. Established in 2008, E-Hands Energy has executed several hybrid solutions across India and other geographies. E-Hands Energy's expertise in integrating various sources of renewable energy is widely acknowledged by large Government and private entities in India. One of the key expertises of the Company is the high altitude deployment (system successfully operating at 17,000 feet in Ladakh). The highly skilled talent pool of E-Hands Energy is supported by regional partners at 12 locations across India; essentially all the States with adequate annual average wind speed to make Kestrel deliver the required energy. The hybrid renewable energy (RE) solutions are offered with wind as the central theme of the package. Our hybrid system powers the track signals of the railways, mission critical application.

Product and Service Description

The solutions ranges from 0.8KW (600W of wind + 200W of SolarPV) to 7KW (3.5KW of wind + 3.5KW of Solar PV). The key advantage of wind+ solar PV hybrid solution is that in locations where the wind speed is adequate; this hybrid solution could drastically cut down; if not eliminate, the diesel consumption of single or two BTS(OD) telecom towers/ sites. We also have the expertise to mount our turbine, Kestrel e400i (3.5KW, 48V DC) on the top of the telecom tower (without causing any interference to the antenna's tilt/azimuth), turbine's hub at 40 to 50 meter height .This helps the turbine generate significant energy; far higher than the equivalent capacity of Solar PV; hence minimising the space required at the telecom site for deploying the RE solutions. Even in the smallest of the telecom tower (GBT/RTT) sites, we can configure a 10-12 KW hybrid RE.

In support of the Community Power initiative of GSMA, Kestrel offers a unique, patented DC –DC water pumping solution .Reference site in Vijayawada, AP delivers 60,000 litres of water/day.

E-Hands Energy offers the option of CAPEX and OPEX models to the telecom sector. More details are available at **www.kestrelwind.co.za** and **www.ehandsenergy.in**

Geographic Footprint

Among the telecom circles, our operations and reference sites are spread across Tamilnadu, Karnataka, AP, UP (West)/Uttarakhand, Himachal Pradesh, MP, UP (East), Delhi, Maharashtra&Goa, West Bengal and Gujarat.

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