



Case Study

Solution Certification

Overview: Solution Certification

EnerSys®, Lister Petter and PowerOasis have partnered to produce the first PowerOasis Controller (D) based Certified Reference Solution to reduce diesel consumption on generator powered base stations by at least 50% whilst maximising equipment service life.

The trial was conducted at Lister Petter's Dursley facility in the UK. The partners started discussions in early 2009 and initiated the project, culminating in a three month trial that completed successfully in December 2009.

Trial Partners

EnerSys

EnerSys® is a global leader in energy storage with an extensive range of quality products backed by more than one hundred years experience of battery manufacturing and innovation. As mobile telephone networks expand into ever more remote regions of our world, many areas have no connection to a main power distribution grid, meaning that 24 hour running on diesel generator power has been the only option. In these increasingly cost and environmentally conscious times, operators are looking to reduce their environmental impact and increase their operating efficiency.

Turning off the generator and using the existing base station backup battery to support the load, then recharging it with the generator whilst also supplying the load appears a straightforward win-win solution. Unfortunately, many existing backup power batteries were never designed with this heavy cyclic, "Hybrid power" demand in mind.

EnerSys® has responded to the new demand with new technologies and new application research. The results are products developed specifically with cyclic applications in mind, and with engineering applications information to support systems design for success. The most critical consideration is reliable and consistent recharging of the battery, to ensure optimum discharge performance and life.

For more information please visit:

www.enersys-emea.com/reserve/hybrid

Lister Petter

Lister Petter have operations in the UK, USA, France, India and China, giving the company global reach and ensuring that its customers are never too far from their expertise whenever they need diesel or gas engine technology.

From its roots over 140 years ago to today, producing advanced diesel and gas-powered engines for a wide range of applications, Lister Petter have consistently set the standard in innovation, quality and reliability. With millions of Lister Petter engines in use globally, the environments and uses that they have been put to is remarkable.

Equipment "downtime" can be very expensive for phone operators, so reliable power supply is essential. Lister Petter engines have a reputation for reliably, providing base load and stand-by power to the telecommunications sector throughout Africa, The Middle East and India.

With the number of base stations globally that are powered by diesel generators set to increase by 50% over the next four years and base station loads continuing to fall due to improvements in technology and design, diesel generators are destined to be operated continuously at more inefficient loads, leading to generator damage, decreased service life and increased servicing visits.

For more information please visit:

<http://telecommunications.lister-petter.co.uk>

The PowerOasis Solution Certification Programme is central to assuring performance and therefore ROI for the telecommunications network operator.



Objectives

The primary trial objectives were to:

- Prove systems interoperability and solution operation
- Verification of consistent battery cycling throughout the trial and battery capacity at the end of the trial
- Fine tune PowerOasis Controller (D) configuration parameters
- Generate operational data to validate benefit claims
- Create a Solution Blueprint to include a comprehensive component list
- Publish installation, commissioning, support and maintenance guides
- Install remote monitoring for customer demonstrations

The Certified Reference Solution with supporting operational data will enable mobile network operators to purchase a tried and tested solution that will provide immediate OPEX savings and act as a solid platform for additional certified solutions that support differing equipment configurations.

Test Load – 1550W

A 1.55kW resistive load was used to simulate a mobile base station telecommunications equipment load.

Key Components

This table lists the main components included in the trial.

Component	Manufacturer	Make & Model	Configuration
Diesel Generator	Lister Petter	LLD140A	Running at 1800rpm, 60Hz, 3 phase, developing 10.6kWe
Batteries	EnerSys	SBS EON 190F	Arranged in six 48V strings, total capacity 1140AH
Rectifier	Benning	TEBECHOP 3000HD	Three rectifiers, 9KW total output at 92% nominal efficiency
Power Controller	PowerOasis	PowerOasis Controller (D)	44% battery maximum depth of discharge
Remote Monitoring	PowerOasis	PowerOasis Manager	Via SMS/GPRS modem



Rectifier: Benning TEBECHOP 3000 HD

With the TEBECHOP 3000 HD rectifier modules, redundant 48 V DC power systems with system ratings between 6 kW and 70 kW can be realised. The ultra compact dimensions of the 3000 HD rectifier with a power density of approximately 1 kW/dm³ is the result of intensive research and development to optimise components and airflow inside the high power section of the rectifier. Tolerant of harsh environmental conditions the rectifiers operate from -33 °C up to +75 °C ambient temperature.

Batteries: EnerSys SBS EON 190F

The batteries used in the trial are the EnerSys® SBS EONs with superior bulk charge capabilities and ideally suited to running a diesel generator for the shortest time possible to achieve full state of charge. The PowerSafe SBS EON Technology™ retains the benefits typically associated with EnerSys® Thin Plate Pure Lead (TPPL) technology (long life, high energy density, superior shelf life, etc.), but they also deliver exceptional cyclic performance in both float and fast charge applications, even in the hottest and harshest operating environments.



Extensive testing has shown that in traditional float cyclic applications PowerSafe SBS EON Technology surpasses the excellent performance of standard PowerSafe SBS designs, typically delivering a 33% increase in the number of cycles during evaluation to international benchmark standards.



Generator: Lister Petter LLD140A

Equipment “downtime” can be very expensive for telecommunications and mobile phone operators, so reliable power supply is essential. Lister Petter engines have an enviable and long established reputation for reliably providing base load and stand-by power to the telecommunications sector throughout Africa, The Middle East and India.

Test Results

The following data illustrates the results after 83 days of testing. The ‘before’ figures show the metrics when a generator is used to power the load and the ‘after’ figures show the metrics after the PowerOasis Controller (D) based solution is introduced.

Criteria	Before	After	Comments
Cumulative Generator Runtime	1992 Hours	560 Hours	72% reduction in generator run time
Daily Generator Runtime	24 Hours	6.5 Hours	
Cumulative Diesel Consumption	2681 Litres	1263 Litres	53% reduction in fuel consumption
Daily Diesel Consumption	32.3 Litres	15.2 Litres	
Battery Cycles	N/A	83	4.8 years battery life
Battery Depth of Discharge	N/A	44%	

Note:

The above figures are conservative and represent testing with new equipment in a controlled environment. With retrofit field deployments the savings will likely be greater due to the presence of larger generators, which are often in poor condition and typically adding 20% to the ‘before’ fuel consumption.

Battery Management

The following chart from the PowerOasis Manager illustrates the charging profile for the batteries over a 5-day period.



The battery doesn’t drop below 56% state of charge and always returns to 100% state of charge at the end of each cycle, which adheres to EnerSys recommendations and leads to a predicted battery life of 4.8 years.