Power Generation

Cummins Hybrid Power System

CAPEX optimized TCO reduction for your cell sites

A hybrid solution is the hybrid operation of the generator set with batteries and one or more renewable energy sources, like solar or wind, in combination with an intelligent Power Optimizer, to dramatically reduce fuel consumption and CO2 emissions by operating the generator set for shorter periods at higher efficiency.

Advantages:

- Reduced fuel consumption
- Prolonged generator and battery life
- Improved site up time
- Reduced maintenance costs
- Reduced CO2 emission

Conventional approaches to generator set hybridization have primarily focused on reducing generator set run time as the means to lower operating expense (OpEx), which results in a wide range of unpredictable fuel savings. Cummins proposes two metrics: Tower Energy Efficiency and Tower Energy Efficiency (fuel) (TEE and TEE_f) that allow comparisons between hybrid systems. The use of TEE and TEE_f allows the optimization of the hybrid system, resulting in predictable fuel savings of up to 75%.

Our energy working for you.™

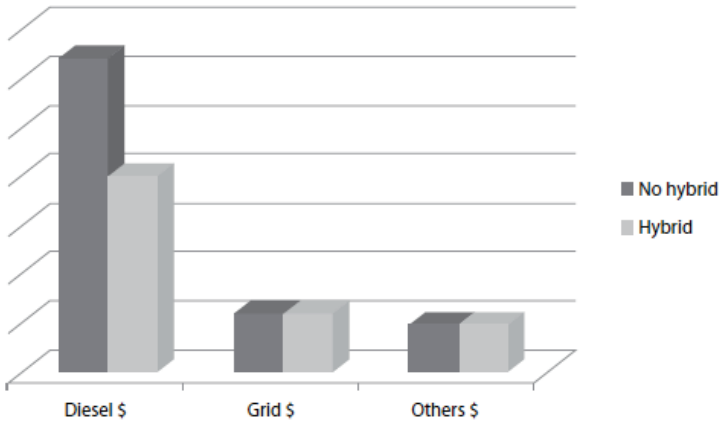
NAF-5621-EN

powertotelecom.com

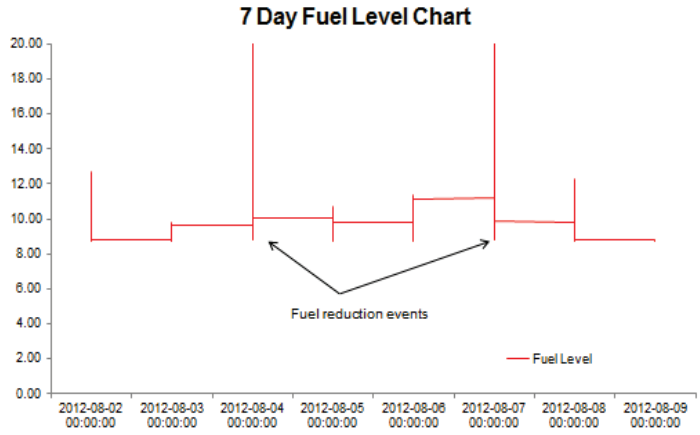
Typical claims of reduction in run hours by up to 75% result in a wide range of unpredictable actual fuel savings.

Conventional Approach
OpEx Reduction

Reduced generator set hours



Fuel consumption monitoring



Conventional approach to hybrid power systems focuses on reducing generator set run time (in hours) and/or monitoring fuel pilferage as the primary means to OpEx reduction.

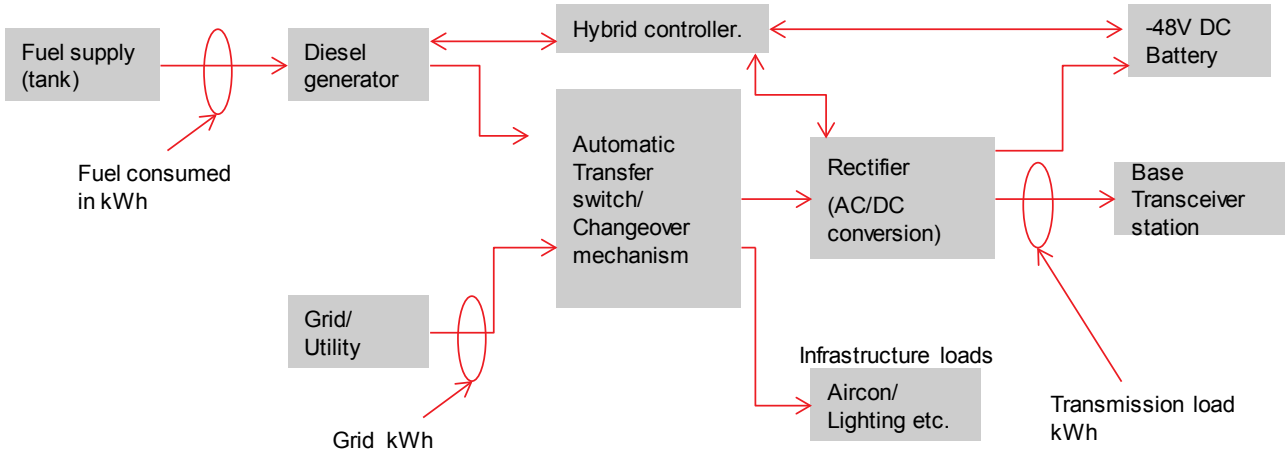
Our energy working for you.™

NAF-5621-EN

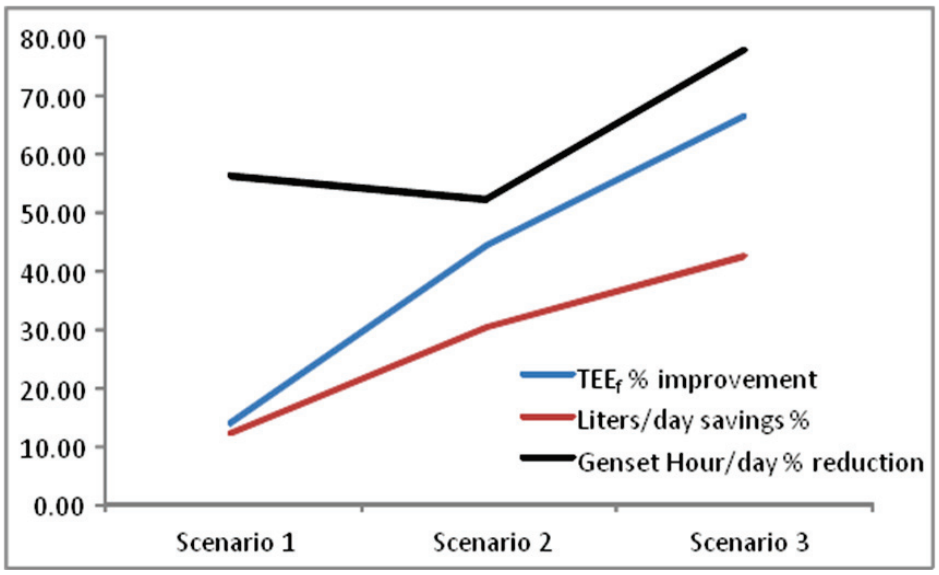
Predictable fuel savings improvement of up to 75%.

Cummins' Approach
Solution Optimized

Improve overall system efficiency



$$TEE_f = \frac{\text{Transmission Load kWh}}{\text{Fuel Consumed kWh}} \qquad TEE = \frac{\text{Transmission Load kWh}}{\text{Fuel Consumed kWh + Grid kWh}}$$



The Cummins hybrid power system aims to maximize overall system efficiency by improving the ratio of available energy utilized by transmission loads to the fuel consumed in KWh. Additionally, it provides features such as battery condition monitoring and maintenance predictability that improve the overall lifecycle performance of the system.

NAF-5621-EN

Cummins Power Optimizer

The Cummins Power Optimizer gives telecom operators access to multiple solutions designed to reduce cost of ownership as well as the environmental impact of their sites while increasing reliability.

From generator hybridization to clean power sites including solar and wind power, the Power Optimizer controls and manages all system components and monitors energy demands, alarms, and climate readings. For efficient network operation, all data of equipped power sites can be made available to a Network Operation Center (NOC).
Its flexibility and expandability allow the Power Optimizer to grow with the operator's needs. Monitoring features like surveillance cameras or new energy components, such as solar panels, can be integrated whenever required.

Benefits

- Reduction of site OPEX of up to 75% through:
  - Reduced fuel consumption
  - Longer generator and battery lifetime
  - Reduced servicing and travelling
  - Preventive maintenance
  - Theft prevention of fuel and equipment
- Increased reliability and availability of site
- Reduced CO2 emissions
- Full site transparency

Features

- Suitable for grid and off-grid setups
- Easy integration of existing equipment
- Modular system architecture allows for scalability
- Sophisticated energy management architecture
- Advanced battery management capabilities

Applications

Hybridization

- Control and management of all system components
- Cost and load profile optimized energy generation
- Advanced energy management
- Increased battery and generator lifetime

Monitoring

- Monitoring of all site parameters
- Central monitoring from NOC
- SMS alarm for service staff
- Customized reporting
- Lower maintenance efforts
- Cell site, equipment and fuel security monitoring

Our energy working for you.™

NAF-5621-EN

Technical Data – Cummins Power Optimizer

Physical Dimensions	
Power Optimizer	Height 3 HU, Depth 19” H 132 x D 483 x W 305 mm incl. handhold Depth without handhold: 282 mm
Installation Depth	280 mm + Wiring
Weight	~ 5,9 kg (with battery ~ 7,2 kg)
Electrical	
Supply Voltage	-36 to -72 VDC / 19 to 36 VDC /100 to 240 VAC
Power Consumption	< 30 W
Operational Temperature	0 to 50°C
Relative Humidity	10 to 90% (non condensing)
Storage Conditions	-20 to +85°C, 0 to 95% relative humidity
Standards	
EMC (CE)	EN 61000-6-1 & 6-3
Protection Grade	EN 60529 (IP20)
Connection Ports	
Alarm Outputs / Dry Contacts	16 Relay change-over contacts, max. 0,5A / 230V
Analog Input	20 configurable 0-20 mA / 0-5, 0-10, 0-30 VDC 4 voltage measurement -100-0 VDC 8 Pt 1000
Digital Input	12 electrically isolated low level: 0-2V, high level: 4-35V
Analog output	2 ports 0-10 VDC
Communication Interfaces / Remote Monitoring	
Wireless	GPRS Quad band CS1-CS4, CSD 9.6k; SMS
Ethernet	RJ 45 10/100 BaseT
Serial	RS 232, RS 485 (optional)
USB	2.0
Onsite Monitoring & Control	
Control Panel	5 way keypad & 4-line LCD-display configuration and monitoring
Ethernet Interface	Advanced configuration, monitoring
LED	Status / Error indication Under- and overvoltage Status of relays / alarm contacts
Customizable Data Logging	Lifetime sensor log (10 years), Events, Errors
Power Optimizer Modules	
Genset Management Module	Genset efficiency Genset monitoring
Fuel Management Module	Fuel consumption Fuel level and delivery supervision Fuel theft and contamination
Battery Management Module	Battery monitoring Battery lifetime extension features
Aircon Management Module	Smart scheduling State of health monitoring Efficient cooling solutions
Remote Access Module	Remote monitoring and control Predefined and customized reports
Site Security Module	Site access control Intruder alarms

NAF-5621-EN

Different components of the Cummins Hybrid Power System

Product Line		Key Benefits
Generator Set		• Generator sets from 8 to 80 kVA • Best in class generators for standby and prime application • Options for extended service hours, integrated ATS & high capacity fuel tanks • Best in class reliability and fuel consumption
Power Optimizer		• Modular and scalable configuration • Optional modules for Hybrid scalability • Security, maintenance and remote communications capability • AC and DC measurement systems
Cabinet		• Indoor and outdoor cabinets • Configurable in blocks up to 28kW • With or without integrated batteries • AC and DC switchgear • Lightning protection • Cooling and heating
Batteries		• Best in class deep discharge battery • Optimized for lifecycle and performance • Modular and scalable system
Battery Health		• Battery health and condition monitoring • Maintenance predictability and life cycle optimization
Solar System		• Solar controller • Solar panels • Other mounting and installation hardware
Wind System		• Wind controller • Wind turbine • Other mounting and installation hardware
Software / Monitoring		• System Administration (for IT) • Client software • Remote Monitoring and Management (for remote users) • Security and maintenance monitoring

Our energy working for you.™

NAF-5621-EN

The Cummins COSMIC approach to Total Cost of Ownership (TCO) reduction

C CAPEX optimized for the lowest TCO.

O Optimized for maximized efficiency to achieve your financial and environmental goals.

S Scalable for both green and brown field sites to meet existing site optimization and future expansion requirements.

M Modular design to meet your site specification and operating conditions for easy installation.

I Integrated global and local service support.

C Cummins' reliable power delivered through our core value of Customer First.

Capabilities include comprehensive network power systems planning services, site surveys, system configuration, equipment deployment and commissioning for the following site categories:

Green field solution
Turnkey solutions with complete systems for new cell sites and/or network.

Brown field solution
Optimize power systems for multiple sites in the existing network.

Site upgrades
Complete or partial systems for individual sites.

Site security and maintenance
Monitoring and security solutions for existing or new cell sites.

Our energy working for you.™

NAF-5621-EN

North America
1400 73rd Ave. NE, Minneapolis
MN 55432, USA
Phone: 1-763-574 5000
Fax: 1-763-574 5298

Asia Pacific
10 Toh Guan Road, #07-01,
TT International Tradepark
Singapore 608838
Phone: 65-6417 2388
Fax: 65-6417 2399

Brazil
Rua Jati, 310, Cumbica
Guarulhos, SP 07180-900, Brazil
Phone: 55-11-2186 4195
Fax: 55-11-2186 4729

China
8 Wanyuan Street, Beijing Economic
and Technological Dev. Area
Beijing 100176, P.R. China
Phone: 86-10-6788 2258
Fax: 86-10-6788 2285

Europe, CIS, Middle East and Africa
Manston Park Columbus Ave.
Manston Ramsgate, Kent CT 12 5BF
United Kingdom
Phone: 44-1843-255000
Fax: 44-1843-255902

India
35A/1/2, Erandawana,
Pune 411 038, India
Phone: 91-020-3024 8600
Fax: 91-020-6602 8090

Latin America
3350 Southwest 148th Ave.
Suite 205, Miramar, FL 33027, USA
Phone: 1-954-431 5511
Fax: 1-954-433 5797

Mexico
Eje 122 No. 200 Zona Industrial
San Luis Potosí, S.L.P. 78395
Mexico
Phone: 52-444-870 6700
Fax: 52-444-824 0082

Power Generation

powertotelecom.com