

## Intelligent Mobile Power Distribution system Eaton's Electrical Services & Systems



# Microgrid power management solution generates significant fuel savings for operating bases

According to the Department of Defense, operational energy use represents about 75% of its total energy expenditure.

## What level of savings to expect?

In field demos, Eaton's Intelligent Mobile Power Distribution system has reduced fuel consumption by more than 30%.<sup>1</sup>

Reducing demand for energy on the battlefield is a key military challenge. By increasing the energy efficiency of operations, the military is able to limit the risks that troops face as they use, transport and store energy, and minimize the amount of defense dollars spent consuming energy.

A key contributor to the DOD statistic is the "fully burdened" price of fuel for forward operating bases (FOBs), which is the actual cost of buying, moving and protecting gallons of petroleum to support systems during combat. With this "fully burdened" price escalating to peaks upward of \$40 per gallon, supplying battlefield generators with fuel has reached an annual price tag of nearly \$15 billion.

To address this issue, Eaton has developed the reliable, energy efficient Intelligent Mobile Power Distribution system.

By transforming an independently operating system of generators into a demand-managed microgrid, Eaton's solution can manage the output of generators as an intelligent system, providing power when and where it is needed, instead of employing all generators at all times. As a result, the system has been tested to reduce fuel consumption by more than 30%.<sup>1</sup>

To demonstrate the impact of the solution, a U.S. Military FOB in Afghanistan reliant on dozens of generators recently tested Eaton's Intelligent Mobile Power Distribution system. Prior to the test, the base consumed approximately 2000 gallons of fuel per day, which resulted in an annual expense of nearly \$8.5 million.

Following the Intelligent Mobile Power Distribution system enhancement, the same system was able to lessen its fuel consumption by more than 1300 gallons per day, enabling a complete return on investment in less than two weeks.

Adding to its fuel efficiency benefits, the demand-managed solution is compatible with all leading generator manufacturers, which eases installation and enhances system scalability.

Eaton's Intelligent Mobile Power Distribution system also provides bases with the power surety needed in critical battlefield environments by using the same intelligent load management technology that enables dramatic fuel savings. This technology prevents grid collapse caused by generator fault by shifting demand onto supporting generators to provide a constant, safe supply of power.

To further increase the effectiveness and efficiency of FOB generation systems, our solution can be enhanced with optional solar and energy storage connectivity, allowing seamless integration into renewable energy microgrid installations.

Power efficiency, reliability and safety are your imperatives—and our mission.

<sup>1</sup> Results may differ based on loading.

# EATON

Powering Business Worldwide

## What challenges do FOBs face today?

- Tactical generators consumed approximately 357MM gallon of fuel per annum
- Approximately 63 casualties per fuel convoy (both campaigns)
- Tactical generator fuel cost approximately \$15 billion per year (\$25-\$42/gal)

## What an FOB needs:

- Reduction in fuel consumption
- Guarantee of continuous power for force life support
- Electrical distribution surety and safety
- Reduced generator logistics

## What are the advantages of Eaton's Intelligent Mobile Power Distribution system design?

- Application of proven power distribution products in reliable grid architecture
- Demand dispatch controls employed by conventional generators (future AMMPS modification)
- Load and distribution management for surety and safety
- Load management prevents grid collapse during generator fault

## Eaton's Intelligent Mobile Power Distribution microgrid power management system's autonomous microgrid is implemented with COTS products and platform controls

- Demand-based control of DG for enhanced fuel efficiency
- Frequency-based contingency load management
- Ring bus grid for reliability and safety

## Customer demonstration

### Customer requirements

For demonstration purposes, Ft. Devens had an immediate requirement for 2x pre-production test systems. In addition to their demonstration needs, they also had a concurrent requirement for 80x pre-production test systems.

## Results

Through Eaton's Intelligent Mobile Power Distribution system, Eaton was able to demonstrate the following benefits at Ft. Devens:

- Demonstrated fuel savings >37% <sup>1</sup>
- Load management prevented grid collapse during generator fault
- Ring bus design isolated power line fault while continuing service to remaining loads

<sup>1</sup> Results may differ based on loading.



## Solution components

Qty.	Amperes	
<b>200 A Intelligent Distribution Manager</b>		
1	200	Input 456
2	200	Output/throughput
2	100	Output
4	60	Output
2	20	Single-phase output configurable load management
		Power metering
		Remote resettable 200 A circuit breakers
<b>TQG and AMMPS Generator Dispatching and Power Sharing</b>		

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