

Creating Energy Efficiency on the Battlefield

How to reduce fuel consumption through the use of intelligent power

A White Paper

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Today's military is facing an energy efficiency crisis unlike any before. From unstable oil prices to the high risk of transporting fuel to a lack of field configurable equipment on the battlefield, soldiers need power sources that are both fuel efficient and flexible enough to be used during any mission, no matter its location or objective.

Enter intelligent power – generators that connect to form a single power grid and provide users with an energy efficient field facility that can easily be reconfigured from one mission to the next.

An Overview of the Fuel Consumption Crisis

The Department of Defense (DoD) is the single largest consumer of energy in the United States. Such consumption has led the U.S. military, especially those units deployed to Iraq and Afghanistan, to face a series of problems.

Unstable Oil Supply

Operational forces do not obtain fuel through shipments from the United States, but rather through oil purchased from sources located near the theater of operations, forcing the military to rely on a turbulent commercial global petroleum market.

Since the attacks on September 11, 2001, the world has seen oil prices change radically and frequently, making it difficult for the DoD, which traditionally operates on a six year Future Year Defense Plan (FYDP), to allocate funding for fuel properly. Though the latter half of the past decade has seen oil production seemingly stabilize, rapid spikes in price continue to force the DoD to remove funds from various programs to pay for fuel.

Peak oil, or the time when half the world's oil supply will have been used and production will begin a permanent decline, also poses a concern for the future availability of fuel. While scientists debate whether or not peak oil will occur this century, experts agree that the world will be challenged to meet future energy demand.

Costly Transportation

Moving fuel across the battlefield has proven to be a high-risk operation. In June 2008, for example, 44 trucks carrying 220,000 gallons of fuel through Afghanistan to Bagman Air Field were destroyed during attacks on the convoy.

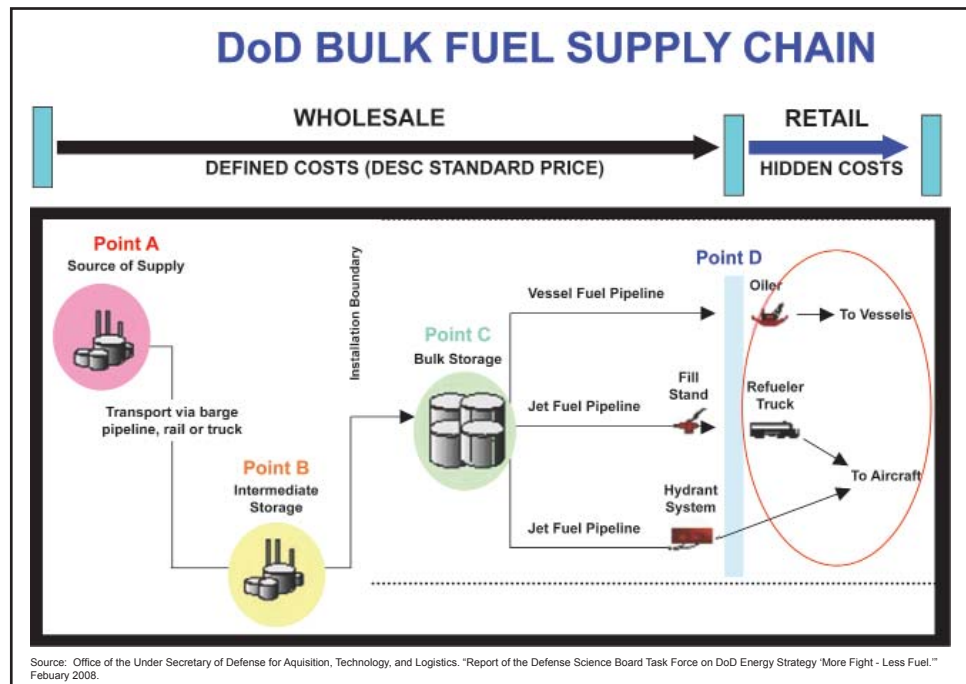
Combat forces are continuously used to protect fuel sources during such transport missions, removing them from actual combat operations and putting them at greater risk of attack.

Additionally, the monetary costs of transporting oil, including those accrued from the use of fuel trucks, oiler ships and personnel are high.

Lack of Flexibility

Because of such great fuel dependency, current military equipment provides users with little flexibility. With transportation of fuel continuously proving to be both dangerous and costly, moving fuel-powered equipment from one location to another as needed is a difficult task and limits soldiers' mobility.

Furthermore, larger field facilities, such as tactical operations centers that integrate a plethora of fuel-driven equipment, demand continuous maintenance – creating a heavy logistics burden.



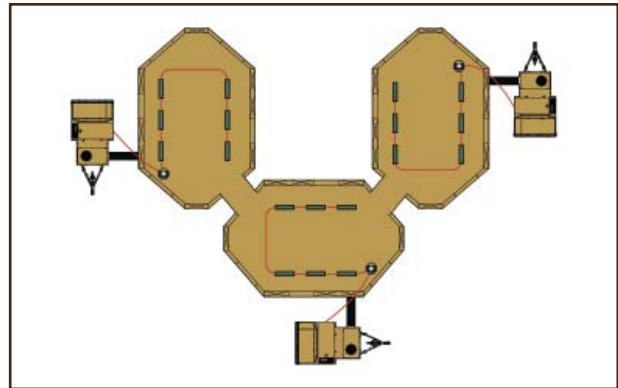
The steps of transporting fuel to soldiers in the field. While the cost of transporting oil from Points A to D are included in standard charges, the additional costs of transporting beyond Point D are traditionally paid by the military and difficult to predict.

Generators – The Real Problem

While military weapons unquestionably use a great deal of fuel, the largest power consumer during wartime are the generators needed to power the environmental control units, heaters, lighting, communications gear and refrigeration integrated into mobile facilities.

Traditionally, generators used to power tactical operations centers have been designed to run on “island mode” - operating independently of one another and almost always providing more power than as is required. These generators do not run based on the amount of power needed for a facility to operate, but rather are sized to run peak loads, continuously running on partial loads and producing power less efficiently. This not only creates unnecessary run-time hours and uses exorbitant amounts of fuel, but causes maintenance issues, such as wet-stacking, a common problem in which unburned fuel begins to clog the exhaust system due to running an engine on partial loads.

Many of these generators are also difficult to transport, providing users with little mobility and making the integration of additional generators to meet operational requirements extremely burdensome.



Generators running on “island mode.” From a power perspective, the above tactical operations center (TOC) is comprised of three separate facilities that each require its own generator and do not share any power lines. Even if one generator could satisfy the power needs of the entire TOC (example: at night when lights, computers, etc. are turned off), all three must run at all times. This wastes fuel and creates unnecessary run-time hours.



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Smart Systems – The Real Answer

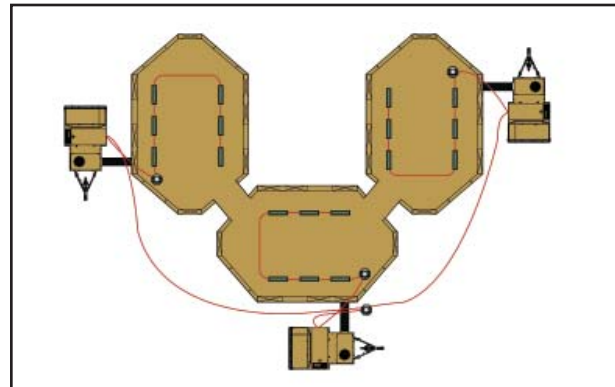
Generators featuring a digital smart system help reduce unnecessary fuel consumption and establish more efficient, flexible mobile facilities.

Digital smart systems allow users to parallel generators to operate as a single power grid that only supplies the power needed to meet a facility's immediate operational requirements. More simply put, smart systems allow users to connect multiple generators and turn off unneeded units to ensure that a facility will only use the amount of power it needs to operate - no more, no less.

The benefits of these generators include:

- **Fuel Efficiency.** Smart systems connect multiple generators to run together as a single power grid. Only the number of generators needed to run a facility at any given time will actually be used, reducing overall fuel consumption. Additionally, these generators are designed to run near full loads, often at close to 90 percent, to further achieve maximum fuel efficiency.
- **Reduced Maintenance.** By turning off unnecessary generators, smart systems minimize engine run-time hours and prevent issues commonly experienced in the field, such as wet-stacking, reducing the need for maintenance.
- **Flexibility.** Smart system generators can be interconnected, allowing users to integrate additional generators into a field facility as their power requirements change from mission to mission.

While many power technology companies are beginning to explore ways to build more efficient generators, one company, DHS Systems LLC, has introduced an entire line of DRASH Intelligent Power Technology™ (IPT) Trailers - trailers equipped with smart system generators for greater efficiency on the battlefield.



Digital smart systems allow personnel to connect multiple generators to run together as a single power grid and reduce fuel consumption. In the above TOC, all generators are working together to power the facility as one grid.

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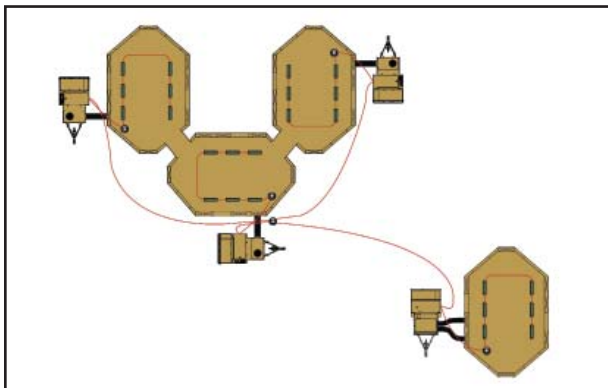
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DRASH Intelligent Power Technology (IPT) Trailers – An Energy Efficient Solution

Designed to meet users' unique power generation needs, DRASH Intelligent Power Technology™ (IPT) Trailers allow personnel to connect multiple generators to run together in parallel, not only helping to reduce current military fuel consumption, but reducing maintenance and providing users with greater flexibility as well.

Fuel Efficiency. By allowing for parallel operations to create a single power grid that runs the optimal number of generators at any given time, DRASH IPT Trailers provide only enough power to meet the immediate needs of a field facility. This reduces unnecessary run-time hours and, ultimately, fuel consumption.

Additionally, IPT Trailers can be connected to well-insulated shelters to help reduce heating and cooling loads and create an even greater energy efficient operations center.



DRASH IPT Trailer Systems can be reconfigured to meet users' power needs as they change from one mission to the next. Here, IPT Trailers from two separate TOCs have been connected to create an even larger power grid. This field connection can be made using a simple connector-based system without the need for hard-wiring.



Reduced Maintenance. In addition to reducing the amount of fuel used, reduced run-time hours also minimize the need for logistical support. Load shedding and anti-wet stacking further help to achieve this.

Flexibility. Because IPT Trailers can be connected as a single power grid, facilities can easily be reconfigured based on a mission's operational requirements.

Additionally, all DRASH Trailers are designed to operate in terrain acceptable for military vehicles, making the transport of generators from one location to the next an easy process.

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Features of DRASH IPT Trailers

DRASH IPT Trailers combine digital smart system technology and DRASH Utility Support Transport (UST) Trailers that have been deployed by U.S. and NATO forces around the world to create a demand responding power system for optimal efficiency.

Features of the trailer system include:

- **Power Management System** with automatic start/stop capabilities only runs the number of generators needed to meet immediate power requirements. Load sharing ensures that the demand for power will be equally distributed among generators left running.
- **Plug-and-Play** capabilities allow users to connect additional IPT Trailers as needed. Simple connectorized cabling eliminates the need for any hardwiring.
- **Load Shedding** turns off low-priority equipment to prevent brownouts during sudden peaks in demand.
- **Anti-Wet Stacking** prevents engine from being clogged with unburned fuel.

- **Optional Power Distribution Units (PDU)** distribute power to branch circuits, utility extension cords and lighting fixtures throughout the facility.
- **Military-Tested Trailers** allow for easy transport of generators through even the harshest terrain.

Additionally, DRASH IPT Trailers can be connected to insulated soft-walled shelters, such as DHS Systems' dual-walled DRASH shelter, to help reduce heating and cooling loads, and ultimately, overall fuel consumption.

Part of the U.S. Army's Standard Integrated Command Post System (SICPS), DRASH shelters are available in 45 models ranging in size from 109-1,250 square feet. Unlike most soft-walled shelter systems, DRASH shelters are available with thermal insulation up to an R-Value of 3.5, helping to reduce fuel consumption by minimizing the amount of heating and cooling needed to maintain ambient temperatures within the field facility.



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Conclusion

With the future availability of fuel unclear, today's military must find ways to reduce fuel consumption if they hope to create energy efficient, flexible facilities from which they can run operations on the battlefield. Intelligent power allows users to connect multiple generators to form a single power grid that reduces fuel consumption and can easily be reconfigured from mission to mission.

To learn more about DRASH IPT Trailers:

Visit
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