

Operation Dynamo -- power forward

U.S. Army

BAGRAM AIRFIELD, Afghanistan (March 20, 2013) -- Operation Dynamo, a Project Manager Mobile Electric Power initiative, is designed to bring efficient and reliable power to Soldiers executing missions in some of the most remote areas in Afghanistan.

The early results show there are indeed cost and fuel savings, but perhaps more important are the reductions in aerial and ground fuel resupply missions that directly translate to reduced risk to Soldiers who recover the aerial drops or escort convoys.

Operation Dynamo is a phased project to emplace Advanced Medium Mobile Power Sources, known as AMMPS, Improved Environmental Control Units, or IECUs, and Power Distribution Illumination Systems, or PDISEs, at selected sites in the Combined Joint Operations Area - Afghanistan. The focus is on remote locations and other locations selected by U.S. Forces Afghanistan. PM MEP anticipates a reduced reliance on spot power generation and using between 40 to 60 percent less fuel once the equipment has been emplaced and units trained to operate and maintain it.

"When Operation Dynamo I began, getting power forward was the primary mission and envisioned as a one-for-one swap of theater provided equipment in the form of swapping a new AMMPS for the older tactical quiet generator," said Paul Richard, Project Manager-Mobile Electric Power lead in Operation Enduring Freedom. "When our teams went to the [combat outposts], they found that things were so inefficient and broken, that power distribution capabilities and improved environmental control units needed to be added as part of the solution."

Richard said the teams found the power needs at the sites they assessed were often greater than the available power supply, so savings were not always realized up front. The trade-off is that more combat capability was restored as well as providing power for other needs, and the savings will follow from more efficient use of fuel and equipment.

Operation Dynamo I, which is almost complete, focused on Regional Command East and began when an Operational Needs Statement was approved to field AMMPS to combat outposts, known as COPs, supporting the 173rd Aviation Brigade Combat Team during their deployment and at selected Village Stability Platforms, or VSPs, supporting the Combined Joint Special Operations Task Force -- Afghanistan, known as CJSOTF-A.

Eight COPs and 23 VSP sites chosen by USFOR-A and CJSOTF-A leadership.

The next phase, Operation Dynamo II focuses on combat outposts in the Regional

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Commands South and Southwest regions of Afghanistan. The USFOR-A Net Zero Operational Needs Statement was approved Jan. 8, 2013 to authorize work at 21 enduring COPs. Lastly, a third Operational Needs Statement is pending approval to right size power at an additional 32 VSP sites to be determined by CJSOTF-A.

The equipment works in tandem to produce power and distribute it in a manner that is more economically efficient and provides greater combat effectiveness to the end user. As briefed by Bob Thoens, PM MEP lead at the time, to the Honorable Frank Kendall, Under Secretary of Defense Acquisition, Technology and Logistics, Feb. 4, during his visit to 401st Army Field Support Brigade, some of the key early findings were that units did not have the expertise to properly emplace and use power generation and distribution equipment. The teams also found that power systems seemed to be most inefficient and failing at the remote and austere sites where the operational impact is the greatest.

Another early finding was that while commercial off-the-shelf generators are the most accessible solution to camp mayors, they are not sustainable over the long term as Logistics Civil Augmentation Program services to sustain the equipment are not always available at smaller, forward locations.

To address the problem PM MEP assembled a team of subject matter experts who could travel to the COPs to conduct an initial power assessment, and feed that information to a Tactical Power Integration engineer. The engineer would develop a power solution within 48 hours for the site with the aid of AutoDISE, an automated software system that produces highly efficient power solutions using standard Army equipment sustainable by Army military occupation specialties 91D, power generation equipment repairer, and 91C, utilities equipment repairer.

The PM MEP team would then return to the site with the new AMMPS generators, PDISE, and IECUs to install the new power solution. Before departing the site, the PM MEP team provided new equipment training that included operator and maintainer training, and remained on site until soldiers were 100 percent confident in their ability to operate and maintain the new equipment. The PM MEP Team also provided units with a 90-day push package of spare parts to sustain operation of the equipment while the unit submitted requisitions to Defense Logistics Agency for long term sustainment of the systems.

At COP 1 (actual site names omitted for security reasons), which was totally dependent on aerial resupply, the PM MEP team's new power solution saved 101 gallons of fuel per day which means four fewer aerial drops per month. This translates to restoring significant combat capability to the COP, according to Richard.

When the team arrived at COP 2 they found only three operational generators that were not able to provide power to critical force protection systems, and 90 percent of the environmental control units on site broken leaving Soldiers without heat or air conditioning. The team removed 11 non-mission capable generators and replaced them with five AMMPS and a comprehensive power distribution system. They also installed IECUs and provided operator and maintainer training and a sustainment

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package for the new equipment.

The impact of Operation Dynamo is a reliable power system that restores a unit's combat effectiveness and significantly increases operational capability and quality of life for the Soldiers on the post. While the electrical demand was increased four-fold on COP 2, the COP was still able to realize a fuel savings of 540 gallons per month.

The story at COP 3 was similar in that demand was significantly increased but the PM MEP solution still realized a fuel savings of approximately 1,700 gallons, or one tanker delivery, per month.

To assist the problem of units not having personnel with knowledge of power or how to properly set up power distribution at COPs, the PM MEP Team tested a concept to provide an Operational Energy Advisor to assist the 173rd ABCT. The OE advisor was able to travel to locations throughout the brigade's area of responsibility to assess power needs and direct what needed to be done to restore 'right-sized' power to the COP, said Richard.

"Instead of the old solution of adding more and more generators that were often grossly oversized consuming excessive amounts of fuel, the OE advisor can assist Soldiers on how to properly use power distribution systems to balance the load and provide more power with fewer generators," Richards said. "In addition, the OE advisor instructed soldiers to load the generators up to the optimum range of 70 to 80 percent of capacity, overcoming a common myth that less load on generators makes the generators last longer."

To maximize the effectiveness of the OE advisor, the advisor was integrated directly into the Brigade S7 and reported to the Brigade Executive Officer.

Besides being 21percent more fuel efficient than the TQGs they are replacing, AMMPS generators are specifically designed to prevent wet stacking, according to Richard, which is a common problem with diesel generators operating under too little load. Wet stacking occurs when too little load is put on the generator and unburnt fuel and oil in the combustion chamber is forced out through the engine's exhaust system, ultimately clogging the engine's exhaust and rendering the generator inoperable. PM MEP testing this capability during a Limited User Test where a 60kW AMMPS generator was operated for 7 days with only a 0.7kW load.

The AMMPS are built for military applications and meet military standard equipment requirements to operate in 90 percent of global severe weather and climatic environments. Commercial generators do not meet military requirements for reliability in a wide variety of environments.

According to statistics provided by PM MEP, the new generators are able to enhance power generation capability by providing the same or better capability in a smaller logistical footprint; with a 21 percent improvement in fuel efficiency; are digitally controlled; are 90 percent more efficient than their TQG predecessors; are 10 percent smaller and lighter; increased survivability in military applications; have a

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50 percent parts commonality between sizes; and, significantly reduce total ownership costs.

Additionally, military standard power generation equipment such as AMMPS are organically supported by Soldiers trained on operation, maintenance and repair who can acquire spare and repair parts through the Defense Logistics Agency supply system thus, eliminating the need for costly contractor field service representatives to service and repair the equipment.

While the initial push to field AMMPS has been to support Operation Enduring Freedom, the PM MEP Team was also tapped to do a feasibility assessment at a site in Turkey where the generators function in snow drifts and at altitude, according to Richard. Partnering with the Army's 249th Prime Power Battalion, the PM MEP led Team developed a modified power distribution system utilizing equipment already on site that resulted in a fuel savings of 12,000 gallons per month. The PM MEP Team is also providing support to U.S. Africa Command, or AFRICOM, missions by providing power solutions using AMMPS and power distribution equipment that provides needed power, plus power redundancy for back-up that will support AFRICOM's deployable Contingency Command Post.

Concurrent with fielding AMMPS, PDISE and IECUs within the Afghanistan theater of operations, PM MEP is also fielding and providing New Equipment Training to U.S. based units that are scheduled to deploy and fall in on the equipment already fielded in theater. As PM MEP completes Operation Dynamo it will shift greater focus to fielding AMMPS generators to Army units in accordance with Army force generation priorities to fully equip operational units with this capability. Already on the schedule for this summer is a fielding of approximately 500 AMMPS generators to 8th Army in Korea.

As PM MEP moves toward the future, it is already working on power solutions that will allow multiple AMMPS generators to be networked together into a microgrid that will autonomously turn generators off and on depending on the amount of power required to support mission needs. Prototype microgrids demonstrated at Ft. Devens, Mass. have demonstrated additional fuel savings of 37 percent by operating generators in a networked capability, Richard said. PM MEP hopes to begin fielding this capability a late 2014 or early 2015.

Editor's note: PM MEP falls under Program Executive Office Command, Control and Communications-Tactical (PEO C3T) and PM MEP personnel deployed to support Operation Enduring Freedom fall under the 401st AFSB.

Source URL (retrieved on 10/21/2014 - 5:58am):

<http://www.ecnmag.com/news/2013/03/operation-dynamo-power-forward>