

Brainstorm: Military & Aerospace

Edited by Jason Lomborg

How can the U.S. military more fully incorporate green technologies and how will they improve operating efficiency?



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[1]

Fuel and the cost of delivering it to our troops is a major concern for the military. Troops rely heavily on gas-powered generators and batteries for energy during foreign operations. The military has been slowly introducing alternative fuel sources that increase efficiencies (more power, less fuel) which is both better for the environment and requires less fuel to transport.

One example of a green technology that can benefit the military is replacing gas-powered generators with fuel cells. Fuel cell technologies are cleaner, quieter and more efficient than fuel-burning generators. Because fuel cells use an electrochemical process (vs. combustion), the process gives off low to zero toxic emissions making indoor operation possible. Maybe even more importantly, fuel cells run silently, which is a critical benefit when operating in enemy territories.

In addition, a portable fuel cell (running on liquid methanol) can be used to charge rechargeable batteries in the field -- replacing the countless disposable batteries currently being used with a relatively small quantity of recyclable fuel cartridges. This means fewer heavy batteries need to be transported and air dropped to remote military bases increasing efficiencies and lowering fuel and battery costs over the long term.



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The US Army Department for Environmental Affairs will be the first to you tell that their mission is to protect the nation, not to be environmentally-friendly. That being said, the military has made great strides recently in the “green” arena, aiming to use 50% renewable energy by 2020, demonstrated by the United States’ largest solar array located on Nellis US Air Force base. Military installations Outside the Continental United States (OCONUS) are required to comply with the host nation’s local laws regarding waste management and energy and water usage, which generally are far stricter than environmental laws back on US soil. Meeting global environmental regulations clearly demonstrates room for improvement in this ongoing challenge, while ensuring that neither safety of personnel, the security of the nation, nor the mission’s success will be compromised.

While factors driving this move include politics and money, ultimately it is human life pushing this change. Case in point: one in 24 deaths in Afghanistan are in fuel and supply convoys.

Recent trends indicate that the US military will continue to move towards greener technologies. Virtualization and advanced power management in various components highlight industry advancements, enabling militaries across the planet to cut costs and utilize COTS equipment wherever possible.



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Awareness of environmental issues is driving sustainability initiatives at the grassroots community level, multi-national corporations, and among governments globally. Even in military applications, designers and contractors are increasingly seeking energy-wise solutions. Highly-specialized military applications require components and equipment that can withstand harsh conditions, subject to water, extreme temperatures, wind, sand, vibration and impact. Today’s military

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contractors and suppliers no longer need to sacrifice cost, performance and energy-efficiency for ruggedized construction. From avionics to marine applications and radar systems, a broad portfolio of energy efficient interconnect technologies is available from Molex. Migrating proven commercial electronic technologies into military applications helps contractors strategically contain costs and reduce energy, while ensuring superior performance and reliability on the frontline in mission computers, flight control systems, electronic warfare and other critical deployments. Rugged interconnect systems and solar panel array junction boxes can decrease fossil fuel consumption in remote military outposts. Innovative LED lighting modules reduce power use in ground and shipboard applications. High power connectors for hybrid vehicles boost efficiency of military tactical vehicles. These and other Molex advanced fiber optics, flex circuit assemblies, RF/antennas, high-speed cable assemblies and connect solutions, and LED lighting solutions for aerospace, defense and marine applications can deliver the total package—sustainability, performance and lower overall cost.



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As more and more industries and companies are becoming green, the cost of not adapting is becoming prohibitive. The RoHS initiative has significantly impacted the cost and availability of tin lead plated components. In many instances, pure tin components are procured and then have to be post processed to remove the tin plating and replace the plating with tin lead. This added processing increases the cost and lead time of the components and systems required to support the military. Also, the cost of supporting both green and non-green processes in factories becomes prohibitive. We have also seen some inconsistencies in the green and RoHS requirements from the prime defense contractors. These conflicting requirements on adds to the complexity of competing in the military industry. In some cases, manufacturers have exited the military market due to these additional costs and complexities. If the military can find a way to maintain the stringent reliability requirements necessary to support the US military market while incorporating more standard green processes, the cost and availability of military components will be significantly improved.

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