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# Assuring Supply through New Energy Alternatives and Opportunities

## The Defense Energy Support Center

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### INTRODUCTION

The Defense Energy Support Center (DESC), a field agency for the Defense Logistic Agency (DLA), has the unique mission of providing the Department of Defense (DoD) and other federal civilian agencies with energy solutions to support missions and operations worldwide. This mission requires DESC to actively engage in different energy field opportunities, while continually expanding its support role by exploring emerging technological advancements and energy and fuel commodities to ensure that its customers receive the most effective and efficient products and services.

In the current operational environment, supporting customers located around the globe requires the ability to not only supply energy and fuel commodities to remote locations but also to provide sustained supply of those commodities. Factors such as impact to the environment, energy use, fuel prices and commodity availability and development are all considered while sustaining the energy supply. Volatility, changes or sensitivities in any of these, or other factors further support the need for ongoing expansions of resources, research focused in the energy and fuel field, and efforts to establish alternative energy sources and opportunities.

Filling the role as an energy and fuel supplier, DESC is supporting programs and initiatives that involve renewable energy, synthetic paraffinic kerosene, waste-to-energy technology, algae oil, and the ASTM B20 specification for commercial biodiesel. DESC is reaching forward to not only assist DoD entities with facilitating their renewable projects but also to support the ongoing efforts for federal civilian agencies as they work to achieve federally-mandated goals. These programs focus on increasing the use of energy alternatives and technology such that it can become infused in the DESC mission.

### SUPPORTING ENERGY REQUIREMENTS

Through contract solicitations, procurement and administrative contractual oversight, DESC works to assist its DoD and federal civilian clientele in the procurement process so they can attain their energy requirements, whether operational or political in nature. The procurement process for required support of these initiatives is a challenging one, and DESC personnel provide technical and often innovative expertise to acquire the necessary resources. Following the development of specific solicitations that meet needed energy and support requirements, DESC reviews submitted contract proposals from capable industries and companies, awards the contracts, and maintains contractual oversight until the contract expires. In some circumstances, DESC is able to consolidate several energy requirements into one solicitation, supporting multiple customers at one time and then overseeing their energy sustainment needs for the contract duration.

### BRANCHING INTO RENEWABLE ENERGY

DESC recently developed the Renewable Initiatives Branch within its Installation Energy Business Unit. The branch provides contracting support to assist military and federal civilian agencies with projects intended to use renewable energy sources to supply power to installations.

#### Solar Energy and Hydrogen

The Defense Energy Supply Center has been involved with several efforts to provide power to facilities from the renewable solar resource (see Figure 1). For example, DESC is collaborating with the Department of Energy's (DOE) Princeton Plasma Physics Laboratory to construct a solar photovoltaic (PV) array at the laboratory. Rooftop and ground-mounted PV arrays will be constructed to convert solar energy to electric power to supply the laboratory with a renewable energy source.



**Figure 1. Photovoltaic array.**

DESC also supports the use of PV systems at DLA locations, such as the Defense Distribution Depot San Joaquin in Tracy, California. These systems will generate electricity to create hydrogen to run warehouse forklifts (see Figure 2) during a two-year demonstration project. This program seeks to expand the use of hydrogen as an efficient and effective energy carrier.

Forklifts used in DLA warehouses are currently powered by lead acid batteries or propane. The use of hydrogen fuel cells would decrease required maintenance space within the warehouses where the batteries must be charged and later allowed to cool. Unlike forklifts that are powered with propane, forklifts powered by hydrogen fuel cells have clean emissions in which the only output is water vapor. This contributes to a healthier work environment.

There are currently three contracts under the two-year demonstration program, but DESC expects more awards in the future. Participating locations for this demonstration project include the Defense Distribution Depot in Susquehanna, Pennsylvania,

and Robins Air Force Base, Georgia. Fuel cells have been implemented to power approximately 40 forklifts at Susquehanna and approximately 20 at Warner Robins.

These demonstration projects have the potential to expand the traditional hydrogen energy role and open opportunities and operational settings where hydrogen may replace less efficient energy sources.



**Figure 2. Fueling a forklift with hydrogen.**

### Synthetic Fuels as an Emerging Energy Source

Synthetic fuels derived from the Fischer-Tropsch process are emerging as an operational fuel source for the military. The Air Force plans to complete certification testing of the Fischer-Tropsch 50:50 blend of synthetic and conventional fuels for weapons platforms and equipment by 2011. By 2016, the Air Force will be prepared to cost competitively acquire 50% of the Air Force's domestic aviation fuel requirement via an alternative fuel blend in which the alternative component is derived from domestic sources produced in a manner that is greener than fuels produced from conventional petroleum. The Air Force is working toward a goal to acquire 50:50 synthetic fuel blends to sustain half of its domestic aviation fueling requirements by the year 2016. DESC is helping the Air Force with this fuel goal by awarding three contracts to support Air Force certification efforts, and they are expecting to award more over the next few years.

The potential growth in demand of synthetic fuels requires DESC to remain proactive and anticipate future requirements. The 2009 DESC Alaska Synthetic Fuels Industry Summit is intended for this purpose. The Summit brings together DoD colleagues, energy and fuel subject matter experts, industry professionals and organizations, and political stakeholders in the Alaskan communities. The convening of these groups not only allows collaboration but also provides DESC with an opportunity to lay out the specific plan for pursuing a pilot program for Fischer-Tropsch synthetic fuels support.

The Alaska Synthetic Fuels pilot program has the goal of providing Fischer-Tropsch synthetic fuel to cover DoD JP-8 requirements in the state of Alaska. In addition, the program can potentially fulfill other DoD and federal civilian agency jet fuel and ground diesel requirements within the state.

### Waste-to-Fuel

Going "green" is increasingly taking on more meaning and having greater impact in terms of supporting operations and energy sustainment. The DoD and the military services are engaging in a new initiative to reduce garbage while producing fuel by converting waste to fuel. This initiative supports one of the green initiative goals of the military branches, which is to reduce dependence on fossil fuels and operation footprints.

A prototype project involving DESC is now providing waste-to-fuel test units to six participating Army installations and one Defense Logistics Agency site. These units employ microorganisms that excrete specific enzymes which break down components of biodegradable waste into useful hydrocarbons. Essentially, biodegradable waste can be easily and efficiently converted into fuel, soil and other marketable products.

The biowaste degradation through bacterial action has the potential capability of producing longer, unique hydrocarbon strands. This bacterial action occurs while releasing hydrocarbon-based oil, which can then be processed into useable fuel; in this case diesel fuel is the targeted product. Additionally, one of the by-products made from the process is potting soil, which can be used on Army installations. Throughout the one-year testing phase, DESC will evaluate these products to determine their potential use as diesel fuel.

The test units provided to the DoD are mobile and comprised of a 45-foot trailer with ten reactor units, ten fuel receivers and a control office. The control office staff records and analyzes the biodegradable waste, bacterial strain, fuel output and energy inputs.

DESC and contracted bioenergy specialists oversee testing to ascertain and validate the hydrocarbon types produced by the test units and establish whether the fuel produced is usable. Following the one-year testing phase, these specialists will determine if the fuel output and waste breakdown is successful and ready for equipment testing.

The test units are being implemented and operated at Fort Stewart, GA; Fort A.P. Hill, VA; Fort Bragg, NC; Fort Benning, GA; Fort Lewis, WA; and Fort Drum, NY. One unit will also operate at the Defense Fuel Support Point in San Pedro, California.

### THE WAY AHEAD

The origin of DESC dates back to World War II, when its mission was to administer the critical petroleum requirements during the war. Currently, that mission includes supporting the DoD and other agencies in a multitude of energy solutions while assisting them in successfully achieving energy requirements, both today and through sustainment practices for the future.

Energy solutions involving wind, solar, algae and more are potential opportunities with benefits that are being tested, evaluated and implemented over time. DESC is committed to engaging in these initiatives to ensure that its customers attain their energy requirements while aiding in ongoing efforts to operate within federal mandates. These programs and others support the increasing energy alternatives and technology that is expanding and becoming infused into the DESC mission.

**Ms. Kelly Widener** is the public affairs officer for the Defense Energy Support Center located at Fort Belvoir, Virginia. Among her other duties, she is the public affairs officer for the center's publication *Fuel Line*. *Fuel Line* highlights and covers topics in the fuel and energy fields including alternative fuels and renewable energy. The publication can be found on the center's website: <http://www.desc.dla.mil/>.