The Oil Drum
DISCUSSIONS ABOUT ENERGY AND OUR FUTURE

A Growing Military Concern...

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One of the most critical aspects of military operations is the reliance on fuel. I was struck by that as I am currently half-way through the video series based on Daniel Yergin's "The Prize" and have just watched the segment on the Second World War. Access to oil was critical to success. Assuring that access has, as a result, been a critical part of military preparedness. It is therefore interesting to see, courtesy of Leanan and the Energy Bulletin (pdf available at that site), that the one-time general in charge of the U.S. Army Material Command, is now, as a scholar at West Point, concerned enough about oil supply to write a paper. The paper begins

> Without ready alternatives to replace ever more costly and scarce oil, we are entering an age of uncertainty and insecurity unlike any other that could include economic stagnation or even reversal. Although the military will always have access to the fuel required for national security missions, the costs will rise substantially in the near future and require the reallocation of resources from other critical mission elements and programs.

The military has, through time, become even more dependent on fuel to meet its mission. The paper notes that it now takes about 16 times as much fuel per soldier as it did in World War 2.

> The true cost of moving fuel, however, is even higher In 2004, during periods of heavy equipment movement, it is estimated that the military used over 4 million gallons of fuel per day in Iraq. This estimate is for both U.S. and coalition forces; however the majority of this fuel is used by the U.S. Army. To meet this need, DOD uses in excess of 5,500 trucks to deliver fuel from Kuwait, Turkey and Jordan. In comparison during World War II, on 24 August 1944 during Operation "Red Ball", Allied Forces used 1.8 Million gallons per day.

The paper concludes that a significant effort must be made to change the culture so that energy efficiency is both a factor in equipment design, and also in use, both in the direct facets of the military mission, and in the support train that must provide for it.

The concern extends beyond the Army and West Point, we have noted in earlier posts the report from the Corps of Engineers (pdf file) that discussed this topic. More recently, at the beginning of July the Defense Advanced Research Projects Agency (DARPA) issued a Broad Agency Announcement (BAA) on Biofuel Generation. The overall concern is because the military is currently using around 400,000 bd.

> In fiscal 2004, the U.S. military consumed 144.8 million barrels of fuel, spending $6.7 billion, according to the Defense Energy Support Center (DESC). Last year it consumed only 128.3 million barrels, but spent $8.8 billion, as the average price per barrel rose by almost 50% to more than $68. For 2006, DESC estimates the military will need 130.6 mb and pay more than $10 billion for it.

The DoD has largely standardized on jet Fuel (JP-8) as the common fuel for the services, and it occupies more than 70% of the purchase requirements. Jet fuel has two significant relevant requirements in the military specification, one relating to energy content, and one to cold flow characteristics. (Fuel must flow at minus 50 degrees, the temperature at the height at which jet aircraft fly).

Recognizing the need for a new source, DARPA issued this BAA, anticipating that biodiesel (though would be willing to accept a demonstrated alternative) would be a likely source for sustainable economic production of jet fuel. However DARPA also recognizes the factor of cost and so it seeks a process and source that will be both secure, and of sustainable price, into the foreseeable future. They anticipate that this will, for those reasons, be from a biological origin.

To illustrate the need for a new process, rather than existing technology, they used soy bean oil as an example source. The conventional method for turning biodiesel to JP-8 uses the Fischer-Tropsch process. This path has been evaluated by the Government and was found to have an efficiency of between 8 & 15%. Assuming 10% for illustration, means that 10 gallons of soy fuel are required for 1 gallon of JP-8. If soy oil costs $2 a gallon, this give the source fuel cost alone for a gallon of JP-8 to be $20.Further this does not address the potential increase in price of the oil as the need for an additional 160 million gallons a day impacts the market. Neglecting the latter issue, DARPA is first concerned to find a process that will be at least 60% efficient (bringing the fuel stock price down to around $3 a gallon), with the hope that it can be ultimately brought to 90%.

In addition to the technology required to make the conversion (which must be validated to supply DARPA with 100 liters of JP-8 in 18 months), the agency is concerned to ensure that there is a plan in place to provide a sufficiency of fuel at the required price, when needed (the production plan) and a plan must also be in place to commercialize the product and thereby (since DoD only uses around 17% of the national jet fuel need, the rest going to commercial planes) to reduce long-term the cost of the fuel to DoD.

Putting these three different events together it would appear that the military are definitely becoming more concerned to ensure that they are going to be sufficiently mobile into the future. They, rather obviously, are not convinced that the supplies of fuel that they need, are going to be there from conventional sources. It will be interesting to see how fast this "conversion" moves to other agencies.