

RAND study: No direct military benefit from use of alternative fuels by armed forces

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If the U.S. military increases its use of alternative fuels, there will be no direct benefit to the nation's armed forces, according to a new RAND Corporation study.

Any benefits from investment in [alternative fuels](#) by the U.S. Department of Defense will accrue to the nation as a whole rather than to mission-specific needs of the military, researchers found. The study is based on an examination of alternative jet and naval fuels that can be produced from coal or various renewable resources, including seed oils, waste oils and algae.

In response to a congressional directive for a study on alternative and synthetic fuels, the U.S. Department of Defense asked RAND to analyze whether alternative fuels can meet the needs of the nation's military in a climate-friendly and affordable manner. RAND also was asked to examine the goals and progress of the efforts of the Army, Navy and Air Force in supporting the development of alternative [fuel production](#) technology, and in testing and certifying alternative fuels for military applications.

"To realize the national benefits of alternative fuels, the military needs to reassess where it is placing its emphasis in both fuel testing and technology development," said James Bartis, lead author of the study and a senior policy researcher at RAND, a nonprofit research organization. "Too much emphasis is focused on seed-derived oils that displace food production, have very limited production potential and may cause

greenhouse gas emissions well above those of conventional petroleum fuels."

The military also has invested in advanced technology to produce [jet fuel](#) from algae-derived oils. According to the study, algae-derived fuel is a research topic and not an emerging option that the military can use to supply its operations.

From the perspective of technical viability, a number of alternative fuels can meet military fuel requirements. But uncertainties remain regarding their commercial viability -- namely, how much these fuels will cost and what effect they may have on the environment, particularly in terms of greenhouse gas emissions.

"The Department of Defense consumes more fuel than any other federal agency, but military fuel demand is only a very small fraction of civilian demand, and civilian demand is what drives competition, innovation and production," Bartis said. "Further, we found that testing and certification efforts by the military services are far outpacing commercial development."

Researchers concluded it makes more sense is for the military to direct its efforts toward using energy more efficiently. Providing war fighters with more energy-efficient equipment such as aircraft or combat vehicles improves operational effectiveness, saves money and reduces greenhouse gas emissions.

The RAND study found that Fischer-Tropsch fuels -- alternative fuels produced via an updated version of a process used by Germany during World War II -- are the most promising option for affordably and cleanly meeting specifications for military fuels. Environmentally sound production requires that carbon dioxide emissions at the production plant be captured and sequestered. With carbon dioxide capture, the study

finds that Fischer-Tropsch fuels derived from a mixture of coal and biomass can have lifecycle [greenhouse gas emissions](#) that are less than half of those of petroleum-derived fuels.

Most of the defense department's efforts in alternative fuel development are geared toward proving technical viability rather than establishing a process that yields demonstrating affordable and environmentally sound production. The latter two components are notoriously hard to accomplish, as evidenced by the length of the Department of Energy's efforts in fuel cell and solar photovoltaic technology development.

The study's recommendations include:

- The Department of Defense should complete testing and certification of Fischer-Tropsch liquids for use in 50/50 fuel blends, but testing at higher concentrations is not appropriate considering the very limited commercial production anticipated over at least the next decade.
- Minimize resources directed at testing and certification of hydrotreated renewable oils, including oils derived from seed crops (e.g., camelina) and algae. Testing and certifying these fuels in high-performance propulsion systems used by the military is simply not on the critical path for resolving the uncertainties associated with these fuels.
- Considering the absence of military benefits, the Department of Defense and Congress should reconsider whether defense appropriations should continue to support the development of advanced alternative fuel technologies.
- If the Department of Defense is to continue to support alternative

fuels, its role and the Department of Energy's role need to be clarified.

- For technical, logistical and security reasons, research directed at advanced concepts for forward-based production of energy should focus on electric power as opposed to specification-grade military fuels for use in weapon systems.

More information: The study, "Alternative Fuels for Military Applications," can be found at www.rand.org

Provided by RAND Corporation

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