Energy Policy 61 (2013) 306–316

Contents lists available at ScienceDirect

Energy Policy

journal homepage: www.elsevier.com/locate/enpol

The military and energy: Moving the United States beyond oil

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HIGHLIGHTS

- The drive for less oil is about cost, combat maneuverability, and climate change.
- Culture of oil, lagging research and development, and lack of leadership pose challenges.
- Ultimately, the US Congress questioning the necessity to replace oil could derail the effort.
- Lessening operational oil use could take several decades of sustained leadership.

ARTICLE INFO

Article history:
Received 23 November 2011
Accepted 27 May 2013
Available online 11 July 2013

Keywords:
Oil
Military
United States

ABSTRACT

Energized by service members wounded and killed protecting fuel convoys in Iraq in the mid-2000s and stunned by the oil price spike in 2008, the Department of Defense (DOD) had already started to seriously address energy challenges when the Obama Administration took steps to accelerate these actions. Real-world events, a growing military realization of threats and opportunities, and an Administration intent on fostering American leadership in clean-energy innovation have coalesced to promote change across the military services in the energy domain. This has been particularly evident in the Department's efforts to lessen its oil consumption. However, the ability to turn policy into practice has met numerous challenges from within and without the defense establishment. The question remains whether the DOD will be able to move beyond oil in a significant way. By examining a series of US government policy documents and programs, this article seeks to analyze the motivations behind the drive by the DOD to reduce oil consumption, to identify the challenges in meeting this objective, and to analyze efforts underway by the Department. Given that replacing oil for the largest transport fleet in the world will take several decades, it will require a sustained leadership from senior military officials.

1. Introduction

Energized by service members wounded and killed protecting fuel convoys in Iraq in the mid-2000s and stunned by the oil price spike in 2008, the Department of Defense (DOD) had already started to seriously address energy challenges when the Obama Administration took steps to accelerate these actions. Real-world events, a growing military realization of threats and opportunities, and an Administration intent on fostering American leadership in clean energy have coalesced to promote change across the military services in the energy domain. This has been particularly evident in the Department's efforts to lessen its consumption of fuel, or oil derived products (gasoline for light vehicles, diesel for trucks, jet aviation fuel, and fuel oil in ships) through efficiency and alternative energy sources. However, the ability to turn policy into practice has met numerous challenges from within and without the defense establishment. The Department understands that its efforts are tied to a broader set of issues that will require the support of the US Congress and the research and development community.

The question remains whether the DOD will be able to move beyond oil in a significant way. By examining a series of US government (USG) policy documents and programs, this article seeks to analyze the motivations behind the drive by the DOD to reduce oil consumption, to identify the challenges in meeting this objective, and to analyze efforts underway by the Department.

Earlier authors recognized that the US military's oil dependence weakened US national security (Hall, 1992) and offered US Navy jet fuel production strategies for a Persian Gulf crisis (Hadder et al., 1989). Articles have advocated for new battlefield energy technology (Adams et al., 2010), metrics for measuring operational energy use (Bochman, 2009), and metrics for measuring operational energy cost (Lovins, 2010). Roege (2011) discussed the need to create a single logistical network for all sources of energy to better match future demand in different terrains. Kiefer (2013) argued

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http://dx.doi.org/10.1016/j.enpol.2013.05.102

that using liquid biofuels for military transport was a 'false promise' due to an inadequate supply and an energy intensive production process. Beyond this, none of the Service's leading journals – the US Army War College's *Military Review,* the US Air Force's *Aerospace Power Journal, and* the Navy War College's *Review* – have articles covering energy. And, absent is a journal article analyzing the US government's energy policy as it relates to the military.

This article seeks to redress this by first providing an overview of the US military's dependence on oil and reduction targets. The next section suggests three reasons for the military to reduce the amount of petroleum-based fuels: keeping costs under control, improving combat maneuverability, and adapting to the effects of climate change. Following this, three challenges are identified that may hamper reducing oil consumption, including a culture of cheap oil in the military, lagging research and development in alternative fuels, and lack of sustained leadership. Ultimately, even as the first two challenges are gradually being overcome, factions within the US Congress questioning the necessity to replace oil could derail the effort. The article concludes that replacing oil derived products for the largest transport fleet in the world could well take several decades, and will therefore require a sustained leadership from senior military officials.

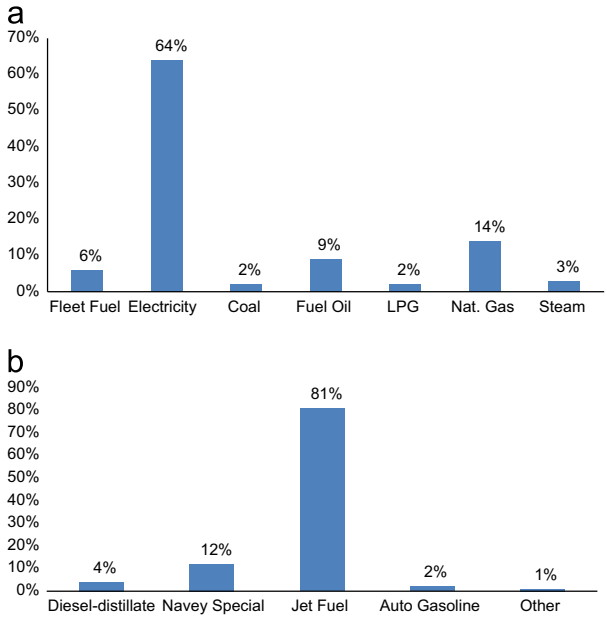

Fig. 1. DOD energy costs FY2010.
Source: Department of Defense, 2011a. Data from FY2010 Federal Energy Management Report.

2. The US military's oil dependence and reduction goals

The US military's oil dependence reflects that of the United States as a whole. The United States is 4% of the world's population, but consumes a quarter of its oil. US consumption of oil rose an average of 2% annually up until the global financial crisis of 2008, then dipped through 2010, but climbed once again (Energy Information Agency, 2012). The country has remained heavily dependent on oil for energy, particularly for transportation. The United State's energy consumption by end-use has varied according to sector, with transportation consuming almost 30% of total energy demand, 94% of this derived from fossil fuels (Energy Information Agency, 2012).

Within the United States, the DOD is the single largest purchaser of energy and DOD's energy use in FY2010 constituted about 80% of the federal government's use of energy (Schwartz et al., 2012, p. 2). Oil derived products are used in transport (tactical and non-tactical), 500 domestic installations, and battlefield generators to supply electricity for powering communications equipment, heat and air units, charging batteries, and preparing meals (Assistant Secretary of Energy, 2006). An estimated 75% of oil products purchased by the military are used for operational energy required for training, moving, and sustaining military forces and weapons platforms (Burke, 2012) (see Fig. 1(a) and (b)). The remaining 25% of energy use is used for installation energy, primarily in the United States. The Air Force is the largest consumer of fuel out of all military branches, accounting for 53% of petroleum use. By comparison, the Navy makes up 28%, the Army 18%, and the Marines and Coast Guard less than 1% of total DOD fuel consumption. Aircraft are by far the main consumers of DOD's petroleum use (over 70% in 2003), followed by ground vehicles at 15%, ships at 8% and installations at 4% (Andrews et al., 2006, p. 19).

DOD energy consumption and cost has varied over the 2000s. From 2000, when the Department began to publish detailed data of its energy consumption and cost (see Fig. 2), operational energy consumption, which is all oil derived products, rose over a decade 100 trillion of BTUs (British Thermal Units) in equivalent usage. Operational energy costs, meanwhile, increased eight-fold, from US$ 2 to 16 billion. Facilities energy consumption, on the other hand, remained fairly steady, and the costs for this energy, which has increasingly included a mix of renewable energy sources and far less fuel oil, rose US$ 2 billion. A great part of decreased facilities costs was due to the closure of older buildings and the retrofitting and new construction of more energy efficient facilities. Overall, fuel costs increased substantially from the early 2000s until 2012, reaching $17 billion for about 117 million barrels of oil in FY 2011, or 2.5% of DOD's total outlays (Schwartz et al., 2012).[2]

Throughout the 1970s and into the 1980s a series of congressional legislation was passed, setting goals and providing incentives for greater efficiency, including fuel use. However, while Congress set specific energy-reduction targets for DOD installation energy, it did not for operational energy. The Federal Energy Management Program was established in 1973. In 1992, the program mandated a 10% energy reduction goal be established for federal buildings measured against a 1985 baseline. When budgetary constraints hit the DOD in the 1990s, the Clinton Administration made addressing high energy usage and rising costs of fuel a major policy priority. Executive Order (13031) "Federal Alternative Fueled Vehicle Leadership," (Clinton, 1996) propelled an effort underway to acquire non-oil use vehicles and to create the refueling infrastructure to accommodate them. Executive Order 13123, "Greening the Government Through Efficient Energy Management" (Department of Energy, 2000) put to paper a practice for federal agencies that the DOD had adopted in the mid-1990s to better track energy usage in its facilities. A third Executive Order 13123 implementation plan led the DOD to set three goals: reduce energy and water consumption, take advantage of deregulated energy commodity markets, and privatize the utilities infrastructure on military installations (Department of Defense, 1999).

The Defense Science Board (2001) subsequently issued a report on energy, however, that detailed the Department's shortfalls in its approach to energy use. The report recommended that the Department make energy a factor in key Departmental decisions

[2] Data provided to the Congressional Research Service from the Defense Logistics Agency-Energy (DLA-E). See Schwartz et al, 2012, p. 1, fn 6 and p. 2, fn 9 for data sources and calculations.