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Fuelling the Force: A Problem of Oil

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Synopsis

The provision of energy for operations in peacetime or conflict has always been a challenge for military forces. High energy prices can cause enormous strain on military budgets, with potential impact on military performance.

Commentary

AMIDST RECENT geopolitical instability in the Middle East – notably tensions between Israel and Iran, and among other regional stakeholders – oil prices have soared to a high of over US$120 per barrel on 13 April, before stabilising around the US$100 range. Yet this is not the first time in recent years that the world had seen such elevated oil prices.

Between January 2007 to July 2008, oil prices more than doubled to a historical high of US$150 due to frenzied global speculation and the inability of oil production to keep up with demand.

Energy and military forces

High oil prices can have budgetary consequences for military forces. For example, military budgets in the Asia-Pacific were hit particularly hard during the 2008 oil crisis. The Australian Defence Force (ADF) had been compelled to look into energy-saving initiatives after incurring more than A$420 million in fuel expenditure during the previous financial year.

It was reported that each 10 per cent hike in oil prices will set the ADF back by A$42 million. Even in South Korea, concerns over military readiness were raised after high oil prices forced the government to reduce training and routine operations for its forces, including cutting flight hours for its aircraft and keeping older and less efficient naval vessels in port.

Similarly, high oil prices spurred the Japanese military to cut training exercises as well as operate vehicles at slower speeds to reduce operating costs. Despite these measures, its maritime forces had reportedly sought additional funding to cover increased fuel expenditures in its 2009 budget.

More than just dollars and cents

Modern military forces are highly dependent on robust platforms that offer speed, reliability, and payload capacity. Look beyond the array of technology that is visible at first glance, however, and one will find internal combustion or jet turbine engines that remain conceptually unaltered since their genesis decades ago. With the exception of nuclear-powered naval platforms, military vehicles require regular resupply of fuel to remain operational.

For example, a 2009 Deloitte study noted that fuel stores alone account for approximately 50 per cent of the supply tonnage required to sustain modern forces for battle, drawing upon the United States' highly mobile but energy-intensive conduct of contemporary operations in Afghanistan and Iraq as evidence.

Moreover, deployed forces are particularly vulnerable to fuel supply disruptions because of the uncertainties and dangers inherent on the battlefield, and ensuring a steady supply of fuel to enable combat units to execute their objectives can pose significant challenges for military forces. Firstly, fuel costs are greatly magnified when it is required to be delivered to combat platforms far from the rear lines. When taking into account the cost of transporting and protecting the fuel from the point of commercial purchase to the consumers at the front, fuel that typically costs a few dollars per gallon can easily skyrocket to hundreds of dollars.

The reason for this issue is as simple as it is surprising – the ever-present fuel and supply trucks, the workhorses in any military logistics infrastructure, consume prodigious amounts of fuel in order to deliver fuel and supplies to the fighting units.

This problem is further exacerbated when the supply lines have to be protected, which only increases the energy consumption across the spectrum of operations. The second, and perhaps more sobering concern, is the human cost of high energy dependence. Studies have proven that these logistical lines are vulnerable to attack. For example, a report by the US Army Environmental Policy Institute noted that at least 132 casualties were directly attributable to fuel supply operations during Operation Iraqi Freedom (OIF) in 2007. In contrast, a newspaper register of American casualties for OIF in the same year reported a total of 902 casualties.

Intervention – a critical analysis

Given the energy burden of contemporary military operations in peacetime and war, a number of nations have stepped up policy reviews and research into alternative energy and propulsion technologies. For example, the United States government has begun to institutionalise energy considerations in future military platform acquisition programmes via the "Fully Burdened Cost of Energy/Fuel" analysis, which includes the fuel provision costs to operate a vehicle throughout its life-cycle.

This policy, if fully implemented, should pave the way for more prudent decision-making in military acquisition processes, while encouraging industry to strive for energy efficiency in their products. Other less prominent, but nevertheless important, initiatives call for accountability and sensible utilisation of energy in military operations.

While policy seems to be on the right track to tackle this issue, technological options seem to be lagging behind. Some of the key thrusts of mainstream research, for example, aim to replace petroleum fuels with alternatives such as biofuels and hydrogen. Such fuels have been tested on a number of military platforms, including high-performance aircraft such as the fifth-generation F-22 Raptor fighter. But the alternative fuel option simply replaces one form of fuel for another, which does not address the issue of high operational energy demands.

While alternative fuels may have the potential to ease reliance on geopolitically unstable sources of petroleum, it does not alleviate the need for the constant resupply of forces on the field. Other innovations revolve around the use of alternative technologies such as hybrid-electric or fully-electric propulsion for land and naval platforms. Such options, however, are still immature for widespread military use.

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