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THE MILITARY COST OF SECURING ENERGY

by

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Executive Summary

Let our position be absolutely clear: An attempt by any outside force to gain control of the Persian Gulf region will be regarded as an assault on the vital interests of the United States of America, and such an assault will be repelled by any means necessary, including military force.

–President Jimmy Carter, Third State of the Union Address, 1978

The United States requires freedom of action in the global commons and strategic access to important regions of the world to meet our national security needs. The well being of the global economy is contingent on ready access to energy resources...current trends indicate an increasing reliance on petroleum products from areas of instability in the coming years, not reduced reliance. The United States will continue to foster access to and flow of energy resources vital to the world economy.

–Department of Defense, National Defense Strategy, 2008

High gas prices and a prolonged war in Iraq have made energy security a key issue in the Presidential elections. Despite the rise in gas prices, what Americans pay at the pump does not reflect the true costs of filling up their cars and trucks. Each year, the U.S. military commits resources to securing access to and safeguarding the transport of oil and other energy supplies. These costs do not show up in the market valuation of gasoline, heating fuel or other end uses, but are paid for instead by American tax dollars.

Knowing the military costs of securing energy is important for a few reasons. For one, U.S. soldiers' well-being is put at risk in the pursuit of securing energy. Secondly, the tax dollars spent on enhanced military activities have opportunity costs; in other words, the same tax dollars could be spent on improving education, repairing bridges, or addressing other needs, even other national security needs. Third, since the market price does not indicate the true cost of production and consumption, it results in market failure and overconsumption of energy. If the market price reflected the true cost, the quantity demanded by consumers would decrease, leading to more conservation, and making renewable, non-polluting energy alternatives more viable. In short, the true price of energy supplies would facilitate a transition away from fossil fuels, lead to greater energy independence and lessen the impact on the environment.

While energy security is a vital national interest and has been incorporated into military objectives and strategies over the past half century, the task of putting a dollar amount on the proportion of military resources devoted to defending energy resources is complex. The link between military strategy and budgeting is not readily apparent and military resources are multi-purpose with respect to missions and strategies.

Still, this is not the first analysis of its kind. Researchers from conservative and liberal perspectives as well as government organizations have published studies over the past twenty-five years. Previous studies are based on outdated military budget breakdowns, or focus solely on Persian Gulf oil. As national security strategy increasingly stresses diversifying energy supplies across regions and types of energy, we have modeled our study on the global pursuit of all energy supplies.

We employ two different methodologies to estimate the range of possible military expenditures for securing access to energy supplies for fiscal year 2009. Our results are based on a range of primary materials including the Department of Defense budget materials, unclassified military strategy documents, and posture statements and other testimony by Department of Defense officials. We also estimated the dollar amount without including the costs of the Iraq War, and then with a portion of the cost of the war. Our findings are:

	Peacetime	w/ Iraq War
Method 1	\$97.0 billion	\$208.9 billion
Method 2	\$103.5 billion	\$215.4 billion

This report is released in the context of the National Priorities Project's work on energy, the goal of which is to issue a rigorous analysis of the link between U.S. military strategy and the global pursuit of energy, and to propose alternative policies including increased funding for the development of renewable energy.

The implications of this study are clear: If we are to decrease our global military footprint and reduce the potential for future conflict, we must decrease our dependence on non-renewable energy supplies. This must coincide with a national campaign for a significant and sustained investment in clean, renewable energy and conservation. Not only will this reduce our military budget, but will also decrease our nation's contribution to climate change.

The complete project of the National Priorities Project can be found at http://www.nationalpriorities.org/Energy_Security.

Introduction

The high price of gasoline and a lengthy war in Iraq have focused the public's attention on energy. Both presidential candidates have responded with promises to do something about high energy prices either through more drilling or investment in renewable energy technologies. But the price at the gasoline pump or the household utilities bill does not capture the true cost of energy. The extraction, refining, distribution, and consumption of energy result in what economists refer to as *externalities*. An externality is when the consumption or production of a good leads to additional costs (or benefits) for a third party. For example, the consumption of a gallon of gasoline releases pollution in the air, which has an impact on people's health and leads to global warming. The additional, external costs of cleaning up contaminants and attending to health care issues are not reflected in the price at the pump. Instead, other individuals or communities pay the additional costs of health care and global warming.

Another externality of energy consumption is the military cost of ensuring access to energy supplies in other parts of the world. This report offers a preliminary estimate of this cost. Each year, the U.S. military commits resources to securing access to and safeguarding the transport of oil and other energy supplies. These costs are not captured in the market valuation but are paid by American taxpayers. This is important for three reasons. For one, U.S. soldiers' well-being is put at risk in the pursuit of securing energy. Secondly, the tax dollars spent on enhanced military activities have opportunity costs; in other words, the same tax dollars could be spent on improving education, repairing bridges, or addressing other needs, even other national security needs. Third, since the market price does not indicate the true cost of production and consumption, it results in market failure and overconsumption of energy. If the market price reflected the true cost, the quantity demanded by consumers would decrease, leading to more conservation, and making renewable, non-polluting energy alternatives more viable. In short, the true price of energy supplies would facilitate a transition away from fossil fuels, lead to greater energy independence and lessen the impact on the environment.

From the National Security Strategy, 2006 (p. 28), Objective VI, Strategy 2:

Opening, integrating, and diversifying energy markets to ensure energy independence.

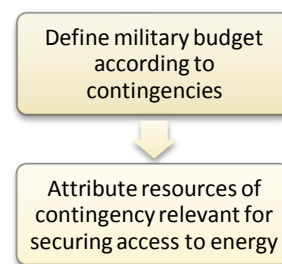
"The key to ensuring our energy security is diversity in the regions from which energy sources come and in the types of energy resources on which we rely."

This report offers an estimate of the military cost of securing access to energy. Previous studies on this topic have relied on outdated budget breakdowns and military planning scenarios, or have solely focused on oil and the Persian Gulf. These studies make clear the struggle to identify the cost. Securing access to energy is a national interest, and national interests are incorporated into military objectives and strategies, but teasing out the amount of resources devoted to securing energy is far from a simple task. Many military planning documents are classified. How, when, and where military resources are deployed is not always apparent. Military planning has shifted from threat-based planning, where the size of the force was planned in light of specific threats, to capabilities-based planning, where the size of the force is guided by its ability to accomplish particular goals, regardless of perceived or real threats. This shift has made deconstructing the military budget even more complicated. Another difficulty lies in the issue of multi-purpose resources. For example, a patrolling Carrier Battle Group may be present to secure both cargo ships carrying non-energy supplies and oil tankers from piracy.

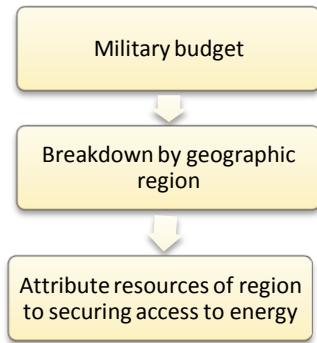
Our study stresses the global pursuit of energy supplies rather than the narrow focus on oil and the Persian Gulf. The National Security Strategy, a document released periodically by each administration, identifies its security priorities and strategies for dealing with them. In the most recent National Security Strategy (2006), the Bush administration declared a strategy of diversifying energy supplies across regions and across types of energy. The Persian Gulf is critical in any discussion of energy, but increasing strategic focus has been placed on other areas of the world that have energy reserves. The U.S. obtains most of its imported energy supplies from countries outside the Persian Gulf. The movement of energy across pipelines and through international waters is also relevant to any discussion of military resources. Finally, we note that military strategies are broader than access to oil. In particular, natural gas and securing the shipping of liquefied natural gas, are increasingly critical.

In order to estimate the cost of securing energy, we developed two different methodologies, which incorporate different assumptions. Presented first is a view of military spending via force-construct planning of the Two Major-Theater War strategy (2-MTW). In effect, military planners size the force to fight two wars in two different regions of the world. The second methodology is composed of two distinct steps. First, we broke down the military budget according to region of the world. We then estimated the proportion of activities in each region that can be attributed to securing access to energy.

Method 1: Force-Construct Planning



Method 2: Regional Breakdown



We have used extensive information from the Department of Defense, including posture statements and unclassified strategy documents. The results presented in this paper are preliminary. As the project continues to evolve, we will obtain more detailed information from the Department of Defense through Freedom of Information Act requests, and as we refine our exploration of military activities by region, we will continue to build upon this initial study. We hope

that publishing these estimates now will launch a larger debate about the way in which we use our military resources and our priorities around energy spending.

Our research findings indicate that \$97 billion to \$103.5 billion of the Department of Defense spending for fiscal year 2009 will be used to secure access to energy, if we exclude all spending on wars in Afghanistan and Iraq. Including a portion of the cost of the Iraq War increases the range to between \$209 billion and \$215 billion.

The next section, Part 1, briefly reviews previous studies on the military costs of oil. Other papers reviewed for this project are listed in the bibliography. In Part 2, we explain the trajectory from national security strategies to military strategies and the military budgeting process, which serves as background to our two methodologies. In Part 3, we present the results from a methodology that assumes military resources are allocated according to the 2-MTW force-planning construct. Part 4 provides an overview of supply and demand of energy according to region of the world. Part 5 explores the geographical organizational structure of Department of Defense commands. The Unified Command Structure enables an analysis of military resources by region as well as the proportion of those resources devoted to securing access to energy. Part 6 presents the results of our second estimate, which are derived from military resources by region of the globe. The Conclusion provides implications for future research.

Part 1: Previous Studies: Outdated and Focused Only on the Persian Gulf

This report is not the first study of its kind by either independent researchers or government organizations. Researchers from both conservative and liberal perspectives, as well as the Government Accountability Office and Congressional Research Service, have studied the questions posed here. Previous estimates are

outdated, restrict the methodology to consider only the Persian Gulf, and omit important non-oil sources of energy, such as natural gas.

Delucchi and Murphy (2008) published the most recent estimate of military expenditures to secure oil. The base numbers for their estimate are derived from defense budget studies by Ravenal (1991) and Kaufmann and Stienbruner (1991), written more than fifteen years ago. To arrive at estimates for 2006, they multiply the base numbers by 0.5 percent-1.5 percent per year. The authors conclude that \$26.7 billion-\$73.3 billion annually is spent to defend oil interests in the Persian Gulf.

Kaufmann and Ravenal's work is interesting and provides a starting point for a methodology. Kaufmann, a military budget expert, offered breakdowns of the military budget according to the resources committed to the defense of each region in numerous publications for different fiscal years (Kaufmann 1986; 1989; 1990; 1992; Kaufmann and Steinbruner 1991). Kaufmann in (1992) presents a breakdown of the fiscal year 1990 budget where \$66.6 billion out of \$326.4 billion (in 1993 dollars), or 20 percent of the total Department of Defense (DOD) budget is spent on defending the Persian Gulf. In stark contrast, he estimates that only \$7.8 billion or 2.4 percent DOD budget is spent on the non-nuclear defense of the Continental United States. Little money and military resources were devoted to securing the homeland. But Kaufmann and Ravenal's calculations were made at a time when defense strategy was threat-based, as opposed to today's capabilities-based planning. They were also prepared shortly after the Cold War ended, whereas today's planning and strategy are significantly different. Delucchi and Murphy used these numbers as a best estimate of regional breakdown, though starting from a breakdown relevant to the current military strategy, planning, and budgeting would improve the accuracy of their results.

In 2003, Copulos, representing the National Defense Council Foundation, published a study estimating the costs of securing Persian Gulf oil. This estimate was updated in 2007 to take into account the Iraq War. Copulos attempted to estimate the number of troops devoted to U.S. Central Command, the U.S. Department of Defense's geographical combatant command responsible for the Persian Gulf. He argued that 50 percent of the costs of Central Command should be attributed to protecting oil. With some other adjustments, he arrived at an estimate of \$49.1 billion annually, given conditions he believed existed in 2003. The 2007 update does not include an explanation of the methodology, but includes some or all of the costs of the Iraq War. Including the war increases the 2007 estimate to \$137.8 billion.

Copulos' 2003 estimate was based on the GlobalSecurity.org website¹ compilation of the "best available" order-of-battle of forces deployed in Central Command's part of Southwest Asia, as well as U.S. European Command forces in Turkey participating in Operation Northern Watch," the U.S. air patrol over Iraq (GlobalSecurity.org 2003). This order of battle included troop movements due to preparations for the Iraq War, so it presented a larger number of troops in Central Command than was typical. It also included troops belonging to the European Command, and not just Central Command as noted. But, as we demonstrate below, a proportion of resources devoted to European Command should be included in any assessment of military resources committed to the Persian Gulf region since its positioning and relative strength is due in part to its proximity to the Middle East.

Two government organizations also presented estimates of the costs of securing Persian Gulf oil, but did not employ a methodology. In 1991, the General Accounting Office (GAO, now the Government Accountability Office) asked the Department of Defense to report how much money was spent on missions related to Southwest Asia. According to the DoD, only \$27.2 billion was spent over a ten-year period. In other words less than \$3 billion per year was resourced solely for Southwest Asia. The DoD also claimed that even if the U.S. had no interests in Southwest Asia, it was likely to continue these expenditures because they were needed for contingencies in other regions (GAO 1991). The Congressional Research Service claimed that oil was only one of many military concerns in the region (CRS 1992). Delucchi and Murphy (2008) deconstruct point by point the CRS argument and establish why oil is much more than a minor military concern in the region.

Unlike these previous studies, our analysis uses current budgetary and other Department of Defense information to establish an estimate of the cost of defending energy in fiscal year 2009. Like Delucchi and Murphy, we agree that the GAO and CRS grossly understate the scale of DoD spending on the defense of Persian Gulf oil supplies. We also take a wider view: The military plays a role in safeguarding access to oil in regions other than the Persian Gulf, and devotes resources to other energy supplies besides oil. Prior studies ignore the transport of oil and the importance of the Navy in securing commerce, 95 percent of which is by sea. Land-based pipelines also consume military resources.

In this preliminary paper, we explore different assumptions about military strategy and planning to establish alternative methodologies for arriving at a dollar amount spent to secure access to overseas energy supplies. Further exploration and refining of our work may narrow the range, but for now we trace the implications of two different methodologies. One estimate is based on the implications of military force planning. A second methodology establishes the amount of military resources

¹ Globalsecurity.org was launched in 2000 for the purpose of providing background information and following developing news stories in the fields of defense, space, intelligence, weapons of mass destruction, and homeland security. Its mission is to provide as reliable facts about these fields as possible.

according to geographic region and then estimates the proportion of these resources needed to secure energy supplies. We do not believe either methodology offers a precise dollar amount, but rather a stylized magnitude of the resources necessary to secure access to energy supplies outside the United States.

We have made extensive use of Department of Defense reports and other materials including Combatant Command and other posture statements, Combatant Command Internet website information, personnel and procurement statistics from the Statistical Information Analysis Division, and budgetary data from the Office of the Under Secretary Comptroller's Office. Reports from the Congressional Research Service, Government Accountability Office, Energy Information Administration, and selected other sources have also informed our results.

Part 2: Background: Military Strategy, Policy and Budgets

In theory, military budgeting flows from a process that begins with the White House identifying national interests. The Secretary of Defense identifies a defense strategy. The Joint Chiefs of Staff then design a military strategy informed by the defense strategy.

The Department of Defense develops plans by identifying military objectives and strategic concepts in response to the declared national interests. An example offered in the *U.S. Army War College Guide to Strategy* (Cerami and Holcomb 2001, Appendix I) is that one national interest is access to Middle East oil. This national interest falls into one of four broader categories: defense of the homeland, economic well-being, favorable world order, and promotion of values. Access to Middle East oil falls into the category of economic well-being. Interests are also defined according to degree of intensity: vital, important, and peripheral. Generally, oil is considered a vital interest since, if unfulfilled, there will be *immediate* consequences for core national interests. In other words, economic well-being would be immediately diminished. Continuing with the training manual's example, an objective to meet that national interest would be to secure sea lines of communication, primary maritime routes between ports, in the Middle East. Naval forces generally protect sea lines to keep them open for commerce, or close them to hostile parties. The strategic concept that follows would be for U.S. naval forces and embarked land forces to maintain a presence in the Eastern Mediterranean and



Indian Ocean. The allocation of military resources derives from the strategic concept. For example, one Carrier Battle Group, a Marine Expeditionary Unit, a Joint Task Force, or other unit or combination of units, carry out certain activities. The types and frequency of activities of these units are specified. The specified resources then have budgetary implications.

National interests are declared in the National Security Strategy, a document periodically released by the administration, which presents its current security priorities. The National Security Strategy has generally not been a revolutionary document, though in 2002, the Bush administration embraced an aggressive militarism allowing for the possibility of unilateral action and pre-emptive attacks. The most recent National Security Strategy (2006) listed nine essential tasks to advance U.S. interests, such as ending tyranny abroad and promoting economic growth through the promotion of free markets. The document also laid out a number of strategies for addressing these tasks: for example, providing assistance to support free elections and reforming the international finance system. The 2006 document is much more focused on collaborative action and diplomatic efforts than the stridently militaristic document of 2002.

The Secretary of Defense's National Defense Strategy (NDS) is supposed to be guided by the National Security Strategy. The most recent National Defense Strategy, released in summer of 2008, speaks to the potential for a renewed tri-lateral Cold War with Russia and China. It identifies three national interests:

...protecting the nation and our allies from attack or coercion, promoting international security to reduce conflict and foster economic growth, and securing the global commons and with them access to world markets and resources.

(Department of Defense, 2008, p. 6)

The five objectives of the NDS are to defend the homeland, win the long war, promote security, deter conflict, and win our nation's wars. Strategies to achieve the above objectives are:

- Shape the choices of key states,
- Prevent adversaries from acquiring or using weapons of mass destruction,
- Strengthen and expand alliances and partnerships,
- Secure U.S. strategic access and retain freedom of action,
- Integrate and unify efforts.

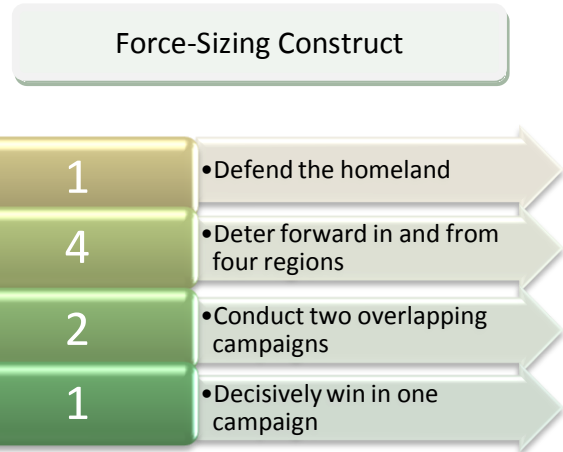
Securing access to energy supplies is within the parameters of the fourth strategy:

The United States requires freedom of action in the global commons and strategic access to important regions of the world to meet our national security needs. The well-being of the global economy is contingent on ready access to energy resources...current trends indicate an increasing reliance on petroleum products

from areas of instability in the coming years, not reduced reliance. The United States will continue to foster access to and flow of energy resources vital to the world economy.

(Department of Defense, 2008, p. 16)

The most recent National Military Strategy, released in 2004, stated that the National Defense Strategy (referring to the 2005 NDS) implied a 1-4-2-1 force-sizing construct. The military needs enough forces to defend the homeland (1); deter forward in four regions (4); conduct two overlapping campaigns (2); and decisively win in one campaign (1).



Many of the documents relating to planning are classified. For example, the Secretary of Defense issues the Defense Planning Guidance document to the Commander-in-Chief and Services. The Commanders issue Program Objective Memoranda which detail the program requirements for the Services over the next six years. The Secretary of Defense's approval results in the Program Decision Memoranda. These memoranda are turned into Budget Estimates Submissions, which, with the Secretary of Defense's approval, become the Program Budget Decisions which will comprise the President's Budget Request to Congress. While the public may access the President's Budget Request and the Department of Defense's budget justification, the other planning and programming documents are classified. The justifications provided for a weapon system, for example, are unhelpful to the outsider in understanding why the Department of Defense deems the weapon system necessary for military strategy:

The UH-60 BLACK HAWK is a twin engine, single rotor helicopter that is designed to support the Army's air mobility doctrine for employment of land forces in the 21st century. The BLACK HAWK is used in the performance of the Air Assault, General Support, and Aeromedical Evacuation missions. It is designed to carry a crew of four and 11 combat-equipped troops, or an external load up to 9,000 pounds. It performs the missions of transporting troops and equipment into combat, resupplying the troops while in combat, and performing the associated functions of aeromedical evacuation, repositioning of reserves, and command and control.

(Department of the Army, Procurement, Vol. 1, p. 26)

The Department of Defense budget justification and the President's budget request offer few indicators as to how the money relates to the mission. The budget is divided according to personnel; operations and management; procurement; research, development, test and evaluation; military construction; family housing;

and other (miscellaneous) expenses. The National Defense budget, also referred to as Function Area 050, includes the above, plus atomic energy defense activities, which are part of the Department of Energy, and other defense-related activities. The latter account for less than 1 percent of spending. Other military spending not included in 050 is international security assistance, which includes military assistance and other military programs, some of which may be related to the protection of the foreign regimes on which the U.S. depends for its energy supplies.

Part 3: Method 1: Estimating the Military Costs of Securing Energy Based on the 2-MTW Force-Planning Construct

One way to think about military strategy and the Department of Defense budget is through the lens of the force-sizing construct. Force planning has changed in the post-Cold War era from threats-based, where specific threats were identified and the force was sized to win against the potential threats, to capabilities-based planning. Capabilities-based planning currently indicates that the force should be sized such that it can wage and win wars against two enemies in different regions. This is known as the 2-MTW (Two-Major-Theater War) force-sizing requirement. Beyond the 2-MTW, the homeland must be defended and enough capacity for minor contingencies is planned in other areas, such as Latin America. In practice, one of the theater wars is assumed to be with North Korea and the other in the Persian Gulf.

The practice of the 2-MTW force-sizing construct leads experts such as Barry Posen (2008) to state: “Since the end of the Cold War, a Persian Gulf contingency was taken to justify half of the U.S. conventional force structure” (Posen 2008, p. 6). In other words, if the budgetary requirements of strategic forces are excluded from the military budget, and the overhead is proportioned between strategic and conventional forces, half of the budget for conventional forces can be attributed to a war or significant military operation in the Persian Gulf.

To estimate the proportion of the military budget committed to a Persian Gulf contingency, we began with a breakdown of the total obligational authority² for the Department of Defense by program. This breakdown already excludes programs outside of the Department of Defense and therefore does not include nuclear weapons activities based in the Department of Energy. In order to estimate the amount for conventional forces in fiscal year 2009, we began by excluding several

² Total obligational authority is a creation of the Department of Defense and not used by other federal agencies. It most closely resembles budget authority in meaning and in magnitude. Traditionally, the federal budget is presented in *budget authority*, or the amount provided by federal law to enable agencies to incur obligations, and *outlays*, or the actual payments which liquidate an obligation. Put another way, *budget authority* is the amount congress appropriates that enables agencies to enter into contracts, and outlays are how much is actually paid in a time period, such as a fiscal year.

programs from conventional forces: the \$9.9 billion budgeted for strategic forces, as well as C3, intelligence, and space (\$77.6 billion)³; research and development (\$52.8 billion); support for other nations (\$2.2 billion); and special operations forces (\$9 billion). We included general purpose forces (\$201.9 billion), mobility forces (\$13.5 billion), and Guard and Reserves forces (\$38.4 billion) as defining conventional forces. We attributed a proportion of central supply and maintenance (\$22 billion); training, medical, and other (\$70.6 billion); and administration and association (\$18.8 billion) to our defined conventional forces and the non-conventional forces according to their relative size. The result was an estimate of \$323.5 billion for conventional forces.

Following Posen, we might have assumed that half of the conventional forces amount could be attributed to the Persian Gulf. Instead, we assumed that small contingencies and conventional forces defense of the homeland are also planned for, and that 40 percent of conventional force spending should be attributed to a Persian Gulf contingency. The resulting estimate is \$129.4 billion.

**Table 1: Department of Defense
by Program and Estimated Persian Gulf Share,
FY2009
(in billions of dollars)**

Program	FY09	Estimate
Strategic forces	\$9.9	\$0
General purpose forces	\$201.9	\$80.7
C3, intel and space	\$77.6	\$0
Mobility forces	\$13.5	\$5.4
Guard & Reserve forces	\$38.4	\$15.4
Research & development	\$52.8	\$0
Central supply & maintenance	\$22.0	\$5.5
Training, medical & other	\$70.6	\$17.7
Admin & Assoc	\$18.8	\$4.7
Support of other nations	\$2.2	\$0
Special operations forces	\$9.0	\$0
Total	\$516.8	\$129.4

Source: Office of the Under Secretary of Defense, (Comptroller), National Defense Budget Estimates for FY2009.

The issue then becomes the weight with which oil and other energy supplies have driven planning. For example, if instability in Persian Gulf countries could potentially reduce U.S. access to energy supplies, and that is the main driving force for devoting so many military resources to the region, then the proportion should be close to 100 percent. If there is significant national interest in the region outside of energy, then the proportion might be substantially less.

While it is true some shipping other than energy supplies travels through the chokepoints of the Suez Canal, Straits of Hormuz and Bab el-Mandab, there is little other interest in the region that is not energy-related. The existence of unstable governments in the region is not enough to attract military presence. Unstable governments also exist in regions of the world that see little of the U.S. military. For example, the southern region of Africa has, at times, garnered American military interest because of Cold War proxy conflicts, but otherwise the U.S. has had little to no interest in the region. The U.S. government, and more specifically

³ C3 refers to the technology that enables acquiring, processing and disseminating information across components of the force.

the military, takes little to no action in spite of cruel dictatorships, harmful human rights practices, and undemocratic governments. The Middle East region has a U.S. military presence that is rooted in the presence of oil.

Since World War II when American officials identified the oil fields of Saudi Arabia as a vital national interest, the U.S. has had a security interest in the region. The relationship continued to grow and change over the decades, but was ramped up in 1980 by the Carter Doctrine. In 1980, President Carter “decreed that the United States would henceforth assume the primary responsibility for the defense of the Gulf” (Klare 2005, p. 46). The crisis in Iran indicated that no power within the region allied with U.S. interests was strong enough to act as regional policeman. To fill this gap, President Carter formed the Rapid Deployment Joint Task Force which would eventually be turned into a Unified Combatant Command under President Reagan (Klare 2005). Until this point, geographical combatant commands existed for the Pacific (U.S. Pacific Command) and Europe (U.S. European Command) as well as South America (U.S. Southern Command). The formation of U.S. Central Command to establish and enhance the American military presence and oversee operations in the Persian Gulf indicated the significance of the Middle East to U.S. interests. But the history that led to the creation of the command signifies one clear point: U.S. interests in the region are tied to oil. Even the more recent commitment to rooting out terrorism is partially tied to oil. The U.S. military safeguards oil facilities and the transport of oil against terrorist attacks.

Given the history of U.S. security doctrine and policy with respect to the Middle East, we attribute 75 percent of the Persian Gulf contingency to securing access to energy. In other words, ***we estimate that \$97 billion of the proposed \$516.8 billion for the Department of Defense in fiscal year 2009 can be attributed to securing energy supplies.***

The proposed budget does not include spending on the wars in Afghanistan and Iraq. At this point in time, it is not clear how much the Congress will authorize for the on-going conflicts. ***If Congress appropriates the same amount as it did in fiscal year 2008, this would add \$149.2 billion for the Iraq War alone.⁴ If we include 75 percent of that amount in our total for securing energy supplies, the total increases to \$208.9 billion.***

This method is a generalization which starts with the overall force-sizing construct and breaks down the budget according to force-sizing rather than more specific military strategies. In the absence of energy in the Persian Gulf, the Department of Defense might still plan for another major contingency elsewhere in the world, although it may be more difficult to justify such large budgets year after year.

⁴ Belasco (2008, p. 16) estimates that \$149.2 billion was appropriated for the Iraq War for fiscal year 2008. This includes \$3.8 billion in Department of State and Department of Veterans Administration funding.

There are a number of conservative assumptions in this estimate. For example, research and development funding is not included, though it plays a role in conventional weaponry and war. We do not include any funding of special operations, though 85 percent of deployed special operation forces in fiscal year 2005 were to the Central Command's area of responsibility, which is focused on the Persian Gulf. This was an increase from 20 percent in fiscal year 2000 (GAO 2006, p. 31). We also do not include the present value of the significant future costs that will be incurred due to the Iraq War, such as treating long-term disabilities of veterans and disability benefits.⁵

This top-down approach of applying the force-sizing construct is unsatisfying for a few reasons. It obscures more specific military strategies. It only considers the Persian Gulf and precludes the possibility of military strategies elsewhere in the world relating to securing energy supplies. To address these considerations, we consider a more bottom-up approach and examine the commitment of military resources by geographic region of the world.

Part 4. An Overview of Energy Supply and Demand

Another approach to estimating the number of U.S. military resources required to secure access to energy supplies is to examine how many military resources are devoted to each region of the world, and to evaluate the proportion of those resources needed to securing access to energy. In order to do that, we first turn to an overview of the positioning and transport of global energy supplies. All of the data and statistics provided below are available from the Energy Information Administration of the Department of Energy unless stated otherwise.

The National Security Strategy (2006) identifies a key strategy for U.S. security with two important components, both regarding the supply of energy:

- (1) Diversification in the regions of the world from which energy supplies are sourced; and,
- (2) Diversification in the types of energy.

But the driving force to ensure access to supply is the recognition of the growing demand, and consequences of demand, for energy supplies. The Energy Information Administration projects world energy consumption to increase by 50 percent between 2005 and 2030. While the U.S. and other developed countries will have modest growth in energy demand, the industrialization of countries such as India and China will push demand growth. OECD countries, generally high-income developed countries are projected to have less than 1 percent average annual

⁵ See Stiglitz and Bilmes (2008) for more on future costs of the Iraq War.

growth in consumption of energy through 2030, compared to a 2.5 percent average for non-OECD countries.⁶ The rapid industrialization of China and India indicate an average annual growth of 3.4 percent and 2.9 percent, respectively.

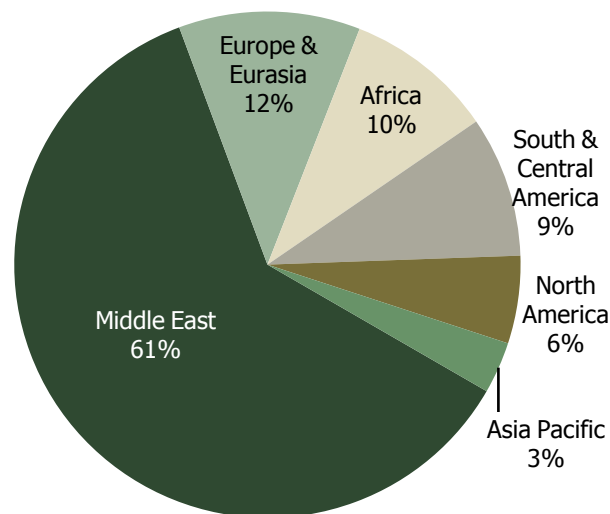
Supply and Demand for Oil

The U.S. is by far the world's largest consumer of petroleum, commanding nearly one-fourth of world consumption. Imported oil is necessary to fulfill the growing demand. In spite of being the third largest petroleum producer, the U.S. imported nearly 60 percent of the oil it consumed in 2007. Petroleum is the largest source of energy in the U.S., making up 40 percent of energy consumed, 70 percent of which was used in the transportation sector.

China is the second, but distant second, largest consumer of oil with less than 9 percent of world consumption. The relative population sizes provide some perspective. The U.S. has about 4.5 percent of the world population compared to China's one-fifth. As the rapidly industrializing and populated countries of China, India (with more than 17 percent of world population), and others grow, there will be increased demand for oil and increased competition to obtain access to global energy sources.

The ten largest producers of crude oil are Saudi Arabia with 12.1 percent of world production, Russia with 11.7 percent, the U.S. with 10 percent, Iran with 4.8 percent, China with 4.6 percent, Mexico, Canada, United Arab Emirates, Venezuela and Norway. While this list appears like a broad spread across regions of the world, the presence of proved petroleum reserves tells a different story. The Middle East has more than 60 percent of proved oil reserves. Europe and Eurasia follow in distant second with 11.6 percent. Africa has 9.5 percent of proved oil reserves and South and Central America have 9 percent. North America has only 5.6 percent, and finally, Pacific Asia has 3.3 percent (British Petroleum 2008, p. 6). The implications of this

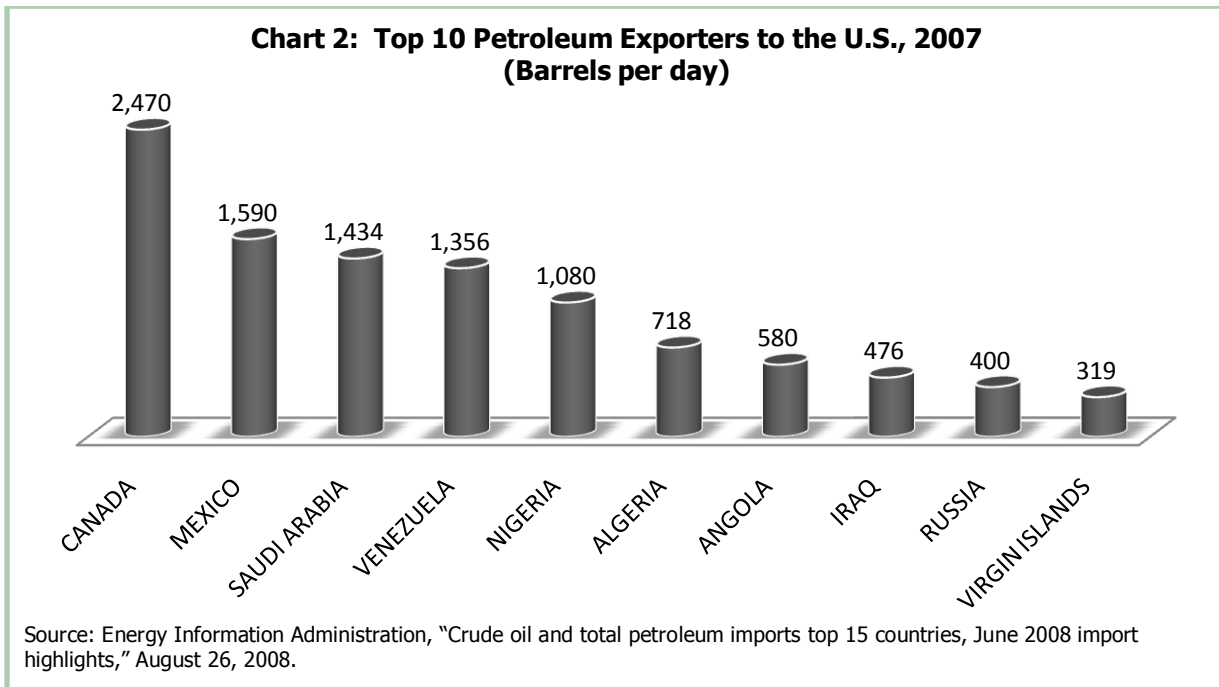
Chart 1: Proved Oil Reserves



Source: British Petroleum, *BP Statistical Review of World Energy*, June 2008.

⁶ The Organization for Economic Co-operation and Development (OECD) is an organization of 30 countries initially developed out of the Marshall Plan following World War II. The members are essentially high-income countries with three defined as upper-middle income economies (Poland, Mexico and Turkey).

distribution are clear. The U.S. and other countries can diversify their oil imports to some extent, but the Persian Gulf reserves exceed any other part of the world by a vast margin.



Given the importance of the Persian Gulf in foreign policy, it may be surprising to some that more than half of petroleum imports to the U.S. are from the Western Hemisphere. Only 16 percent of imports are from Persian Gulf countries. The top five exporters of petroleum to the U.S. in 2007 were Canada (18 percent), Mexico (11 percent), Saudi Arabia (11 percent), Venezuela (10 percent), and Nigeria (8 percent), as indicated in Chart 2. African countries made up 21 percent of imports to the U.S., and the growing importance of the continent is illustrated by changes over the past decade. Between 1997 and 2007, the U.S. increased imports by one-third. Canada (27 percent) and Nigeria (13 percent) were the two largest contributors to that increase with Russia, Iraq and Algeria making up 12 percent each of the increase. Together these five countries accounted for three-fourths of the increase in U.S. imports.⁷

Supply and Demand for Natural Gas

The next most consumed type of energy in the U.S. is natural gas, which makes up nearly 24 percent of total energy consumption. The U.S. produces natural gas, but imports make up 16 percent of total demand; and while its production is projected

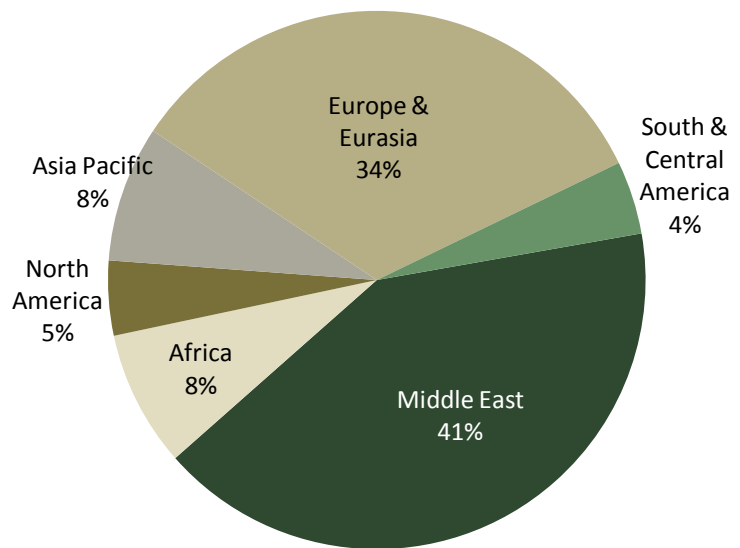
⁷ Imports from some countries, such as Venezuela, declined over the decade.

to remain approximately constant through 2030, imports will make up the difference in growing demand.

Imported natural gas is primarily brought in through pipelines from Canada and Mexico, but increasingly, liquefied natural gas (LNG) helps meet the growing demand. Liquefying natural gas enables the energy to be transported great distances without pipelines because it decreases the volume, making it more practical to move via the oceans and seas by tankers and to store at ports and distribution points. By 2015, the U.S. will import more LNG than traditional pipeline-delivered natural gas. U.S. allies Japan and South Korea are the largest importers of LNG, constituting more than half of global demand. The largest exporter of LNG to the U.S. is Trinidad and Tobago (58 percent), followed by Egypt (15 percent), Nigeria (12 percent), Algeria (10 percent) and Equatorial Guinea (2 percent), according to the Energy Information Administration.

Like oil, natural gas deposits exist outside the Persian Gulf, but large reserves remain focused in a few particular areas. The Russian Federation has 25 percent of proved natural gas reserves, followed by Iran (16 percent), Qatar (14 percent), and Saudi Arabia (4 percent). Large reserves are also found in the former Soviet republics of Kazakhstan, Uzbekistan, and Turkmenistan. Middle East countries together account for 41 percent of proved natural gas reserves, pointing again to the importance of the Persian Gulf in world energy markets.

Chart 3: Natural Gas Proved Reserves



Source: British Petroleum, *BP Statistical Review of World Energy*, June 2008.

Other Sources of Energy

Other sources of energy constitute much less of a strategic concern. The U.S. is a large consumer of coal, which is the nation's third largest source of energy, after petroleum and natural gas. More than 90 percent of coal is consumed to create electricity, and more than half of electricity is produced by coal. Yet, the United States has vast coal reserves, more than oil or natural gas. One-fourth of the world's coal reserves are in the U.S. While potential competitors for energy such as China also consume coal on a large scale, China too has large reserves. Coal is polluting and emits more carbon dioxide than natural gas or oil, so it is far from an ideal source of energy.

Renewable energy and nuclear energy are best produced and consumed locally. For example, a hydroelectric dam can create electricity, but moving electricity far from its point of production is inefficient. While this is also true with coal, the coal itself can be moved to a production facility. Wind, solar, and water power are less transportable. Nuclear energy may be a source of pride for many countries as they acquire the technology, but it is frequently unpopular with the public because of the danger from accidents and the transport and storage of waste.

Moving Energy Across the Globe

Every day, 39.8 million barrels of crude oil and 15 million barrels of petroleum product are imported and exported around the world. Millions of tons of energy crisscross the Atlantic, float around the African continent, and travel over land through pipelines across Asia and Europe (British Petroleum 2008, p. 21).

About half of world oil production is moved by tankers through fixed maritime routes. Six key chokepoints, narrow passages which connect key water bodies along maritime routes, are important in the transit of oil. The Strait of Hormuz, which connects the Persian Gulf and Gulf of Oman, and the Strait of Malacca, which lays between Indonesia, Malaysia and Singapore and connects the Indian Sea with the Pacific Ocean, are the two most strategic oil transit chokepoints. The Suez Canal and Bab el-Mandab, both located in the Middle East, and the Turkish Straits, important for Caspian Sea oil production are also key chokepoints. The Panama Canal also is significant, but is declining in importance as modern oil tankers are too large to fit in the canal (EIA 2008a). Keeping these chokepoints open, some of which are as narrow at points as 1.7 miles or even 750 feet, is an important role for the U.S. Naval Forces.

Maritime and pipeline transport are also critical to world trade in natural gas. About 550 billion cubic meters of natural gas are moved through pipelines around the world. Half that amount, 226 billion cubic meters of liquefied natural gas, is transported across the oceans and seas, and this amount is increasing.

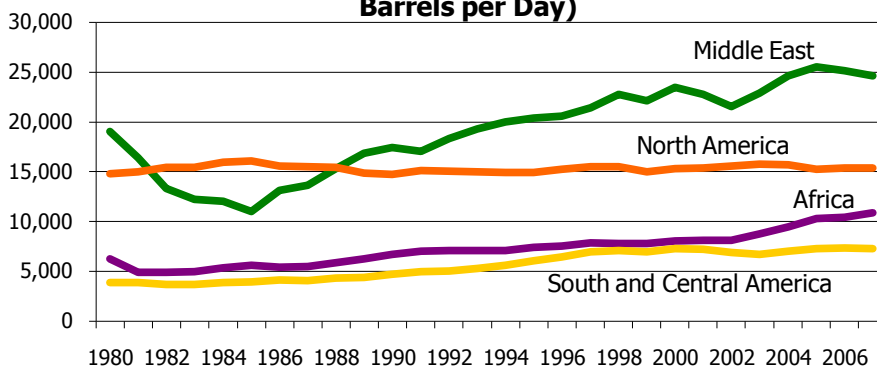
The Outlook of Energy and World Trade

South and North America are critical sources of U.S. energy supplies. Energy-producing countries in Africa are increasing production, as shown in Chart 4, and U.S., European, and Chinese companies are becoming more involved in exploration and drilling. Yet, the Persian Gulf has the most significant known reserves in both oil and natural gas, and its production of liquid fuels has been rising significantly since the mid-1980s.

Both maritime and pipeline transport of energy supplies pose security risks. Piracy and terrorist attacks are significant problems in various parts of the world. Nigeria, Indonesia, Tanzania, Somalia, and India were at the top of the list of high-

risk areas for piracy in 2008, according to the International Maritime Bureau. As the movement of energy around the globe increases, so will the need to address international crime.

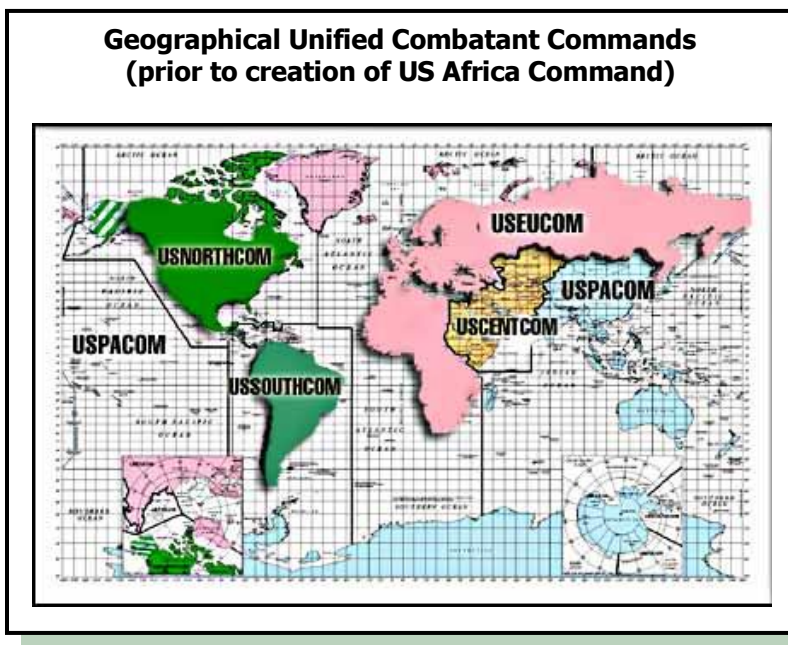
Chart 4: Production of Crude Oil, NGPL, and Other Liquids, and Refinery Processing Gain, 1980-2007 (Thousand Barrels per Day)



Part 5. The Defense of Regions Around the Globe

The Department of Defense has four branches of armed forces – the Army, Air Force, Navy and Marines – and numerous defense-wide agencies that serve different functions such as the Defense Intelligence Agency and the Defense Logistics Agency. The armed forces and the agencies are elements of the budgetary presentation of the Department of Defense, so it is possible to know the budget of the Army as well as the budget of a specific agency. But breaking down the budget this way does not indicate where the resources are actually deployed.

Relevant to this report is another form of DOD organization. There are ten Unified Combatant Commands, six of which have command over geographic regions of the world, and four of which have supporting functions. The U.S. Joint Forces Command, headquartered in Norfolk, Virginia, trains and provides



conventional forces for commanders around the world. The U.S. Special Operations Command coordinates special operations and operations against terrorist networks. It also has component units under each of the geographical Combatant Commands. The U.S. Transportation Command coordinates global deployment and distribution in support of the Combatant Commands' missions, the Secretary of Defense and the President. The mission of U.S. Strategic Command includes deterring attacks on U.S. vital interests, ensuring freedom of action in space and cyberspace, and other capabilities relevant to nuclear operations. It is also the lead organization for coordinating Department of Defense activities concerning weapons of mass destruction.

Each of the other Unified Combatant Commands has responsibility for a region of the world and coordinates and conducts missions in its region. Prior to 1980, only three geographical combatant commands existed. U.S. Pacific Command, U.S. European Command, and U.S. Southern Command were all formed during or shortly after the end of World War II. In the 1980s, U.S. Central Command was created with responsibility for the Persian Gulf and nearby countries and waters. In 2002, U.S. Northern Command was established to coordinate the Department of Defense's homeland security activities. Since 2007, U.S. European Command has been responsible for coordinating the "standing up" of the last and sixth Unified Command, U.S. Africa Command, complete as of October 2008.

Each of these Unified Commands is responsible for the DOD activities in a particular region of the world. Sometimes two Unified Commands cooperate to coordinate operations in a country or water body or share responsibility. Each has component units from the branches of the Armed Forces, making these truly joint commands. The next section provides an overview of each geographic command, explaining its missions, history, and current operations as relevant to the securing of energy supplies.

U.S. Northern Command

U.S. Northern Command (USNORTHCOM) was established in 2002 to anticipate, plan, and conduct homeland defense and civil support operations. Its area of responsibility (AOR) is the continental United States, Alaska, Canada, Mexico, and surrounding waters extending outward five hundred nautical miles. It includes the Straits of Florida, and shares responsibility with U.S. Southern Command for the Gulf of Mexico. USNORTHCOM's most important mission is homeland defense, and its current top priority is building capabilities to respond to chemical, biological, radiological, nuclear, and high-yield explosives whether accidental or terrorist-initiated (Renuart 2008, p. 5). According to its more recent posture statement, it is known more for coordinating the Department of Defense's response to disasters in the U.S., such as the Santa Ana winds-driven wildfires in California and air evacuation in anticipation of Hurricane Dean, than for homeland defense

(Renuart 2008, p. 11). The Unified Command is also responsible for the direction of missile defense operations in its AOR and Hawaii.

General Victor E. Renuart, Jr., U.S. Air Force, is commander of USNORTHCOM as well as the North American Aerospace Defense Command (NORAD). Neither of these commands is subordinate to the other; they share complementary responsibility for homeland defense. NORAD, established fifty years ago, is a joint U.S.-Canada organization that patrols and provides surveillance over Canadian and American airspace.⁸

Maritime awareness is an expanding mission of USNORTHCOM and NORAD. In fact, the NORAD agreement was expanded in 2006 to include it. USNORTHCOM supports the Department of Homeland Security in port security and the protection of maritime commerce, and coordinates with the U.S. Coast Guard maritime security and defense. Maritime awareness for NORAD and USNORTHCOM also means securing the waters approaching North America from vessels with intelligence-gathering capabilities or ships that are of interest to law enforcement.

The homeland defense mission of USNORTHCOM and NORAD as well as the increased focus on maritime security inherently includes securing access to energy supplies. Port security can involve protecting storage of LNG. A significant portion of maritime commerce is the transport of energy, particularly petroleum. Refineries, pipelines, extraction, and other facilities connected with energy are part of the critical infrastructure which USNORTHCOM protects. Yet, USNORTHCOM accounts for a relatively small number of troops, totaling around fifteen thousand. Its primary mission and secondary priorities are directly concerned with homeland defense. For this reason, we do not include any of the budgetary resources associated with USNORTHCOM, NORAD, or other strategic forces in our estimate as they largely represent funds for deterring and defending physical attacks on North America.

U.S. Southern Command

The area of responsibility for U.S. Southern Command (USSOUTHCOM) includes South and Central America, the Caribbean, the waters adjacent, the Gulf of Mexico (shared with USNORTHCOM), and a portion of the Atlantic Ocean. USSOUTHCOM is charged with promoting security and cooperation, and conducting military operations throughout its area of responsibility.

The history of USSOUTHCOM is rooted in the defense of the Panama Canal, an important transit route and chokepoint for trade. Half of the commerce passing through the Canal originates in the U.S. or is destined for the U.S. Securing the Canal is more important to trade in products other than oil and energy. While the

⁸ NORAD is probably better known by the average American for tracking Santa Claus on Christmas Eve.

U.S. Department of Energy's Energy Information Administration considers the Panama Canal one of six important world oil chokepoints, its importance is declining since it is too narrow for many modern oil tankers. Only half a million barrels per day of crude and petroleum products passed through the canal in 2006. To put this number in perspective, the U.S. consumes more than twenty million barrels of oil per day. The government of Panama is planning to expand the Canal, but the expansion will not be sufficient to accommodate many modern oil tankers, though it would open the Canal to the transport of liquefied natural gas (LNG) and greater flows of coal from South America, especially Colombia. Currently, almost all LNG tankers are too large for the Canal. If this planned expansion happens, defense of the Canal may become more critical to energy supplies, especially as the production and transportation of LNG are on the rise.

Central and South America are critical trade partners of the U.S. Nearly 40 percent of total U.S. trade flows within the hemisphere. The countries of the region are an "important source for oil, metals and other commodities," while serving as a market for U.S. exports (Stavridis 2008, p. 4). In 2007, Venezuela was the fourth largest exporter of petroleum to the U.S. and Trinidad and Tobago was the source for more than half of LNG imports.

USSOUTHCOM is headquartered in Miami, Florida and has component units from the four services: Army South, Air Forces Southern (12th Air Force), Naval Forces Southern Command (the 4th Fleet), and Marine Corps Forces South. Special Operations Command South (USSOCSOUTH) controls all Special Operations Forces in the region and operates a Joint Special Operations Task Force when necessary.

Three joint task forces make up the other components of USSOUTHCOM. Joint Task Force Bravo operates an air base in Honduras, and cooperates with other nations on humanitarian and counterdrug operations. Joint Interagency Task Force South also coordinates counterdrug air and maritime operations in the Caribbean Sea, Gulf of Mexico, and the eastern Pacific. Joint Task Force Guantanamo conducts detention and interrogation.

The Fourth Fleet was re-established in July 2008 and indicates a renewed military interest in the region. The move has been interpreted by some as relating to the leftward drift of governments in the region, along with the discovery of substantial oil reserves and other natural resources in the region (Flynn 2008). Keeping sea lines of communication open is a critical objective of USSOUTHCOM.

According to the most recent posture statement of USSOUTHCOM, the U.S. does not:

...see any conventional military threats to the United States developing in the region, nor do we foresee any major military conflict between nations in Latin

America or the Caribbean. Although some historical competition and occasional tension between neighbors do exist, we are confident that any disagreements will be resolved through dialogue...not through state-on-state violence.

(Stavridis 2008, p. 7)

Instead, the Commander of USSOUTHCOM points to Iran, now establishing closer political and economic ties with countries in South America, as a dangerous influence, promoting anti-American messages and potentially introducing radical Islam into the region.

The amount of oil imported from Central and South America, especially given that it is not part of the Persian Gulf region, combined with democratically elected governments that are critical of the U.S., may explain the renewed military interest in the region. There are few to no known threats to U.S. interests in the region, making it otherwise difficult to justify an enhanced military presence. Yet, concrete evidence that military strategy is currently concerned with securing access to energy in the region is also absent. One example indicates the type of activities that may be happening, and that may be more widespread than currently known. In 2002, U.S. troops trained a battalion of men to protect a 500-mile Columbian pipeline from attack. While examples like these exist, they remain anecdotal at this time. Inevitably, a large share of all commerce with the region is oil and other energy supplies. If we did not import energy supplies from abroad, there would be less call for Naval resources to be patrolling the region to secure commerce against piracy and other criminal acts. Until we obtain more detailed information about military priorities in the region, we choose not to include any of the military resources devoted to Central and South America and the Caribbean in our estimate of securing access to energy.

U.S. Pacific Command

U.S. Pacific Command's (USPACOM) mission is to "promote security and peaceful development in the Asia-Pacific region by deterring aggression, advancing regional security cooperation, responding to crises, and fighting to win." It is the oldest, and largest in terms of land mass of all the Unified Commands. Its area of responsibility covers 50 percent of the Earth's surface from the west coast of the U.S. mainland to the east coast of Africa, excluding certain waters. Its AOR includes Hawaii and shares responsibility for Alaska with USNORTHCOM. It also includes the eastern portion of Russia, though U.S. European Command includes Russia within its AOR. North Korea, the other presumed major military contingency, is within USPACOM's area of responsibility. China, rapidly developing and with the world's second largest military, is also in the region.

About 20 percent of active-duty military personnel are assigned to USPACOM. USPACOM includes component units from the four services: Army Pacific; Marine

Forces Pacific, which has nearly one-half of all active-duty Marines; Pacific Fleet, which includes the 3rd Fleet and the 7th Fleet; and Pacific Air Force, which includes the 4th, 5th, 7th, 11th and 13th Air Force. Special Forces Pacific coordinates Special Forces operations in the theater. U.S. Forces Japan, U.S. Forces Korea, Alaska Command, and a number of small centers and task forces are also components of USPACOM.

There are three important considerations with respect to the Pacific region and USPACOM's role in securing access to energy supplies. For one, the Strait of Malacca, connecting the Indian and Pacific Oceans, is considered by the Energy Information Administration as one of the two most strategic oil transit chokepoints. Around fifteen million barrels of oil per day passed through the Strait in 2006. It is the shortest route between the Persian Gulf and eastern Asia countries, including a potential threat (China) and key allies in the region (Japan and South Korea).

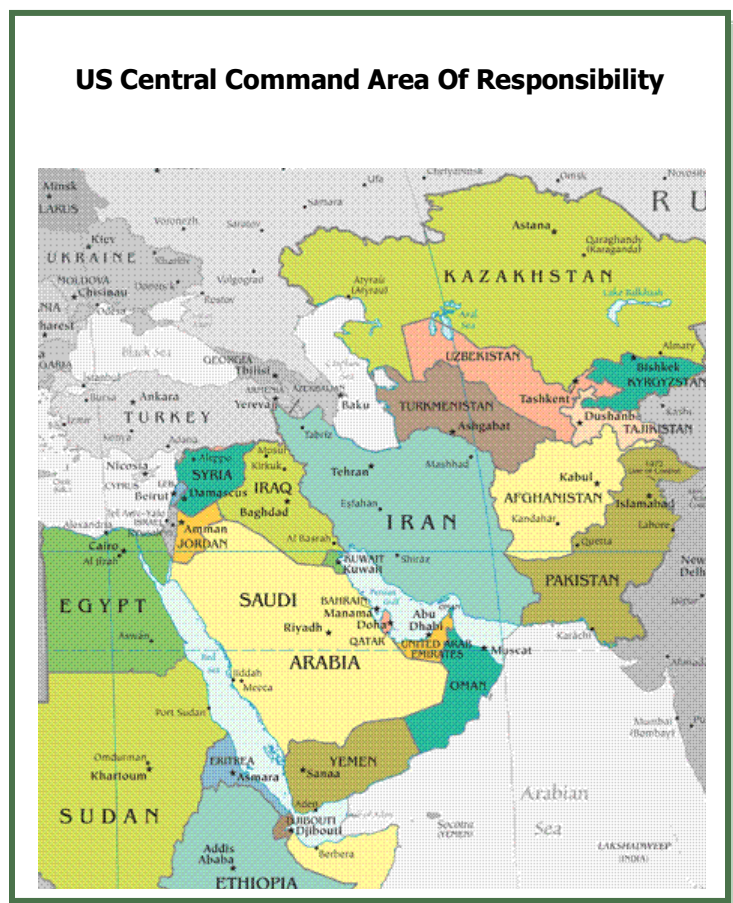
Secondly, keeping the sea lines of communication open for Japan is the responsibility of USPACOM. This, too, is energy-related as Japan is almost entirely dependent on imported energy, much of it from the Persian Gulf.

Thirdly, USPACOM is a regular contributor of troops to U.S. Central Command, which has the Persian Gulf in its area of responsibility. According to the most recent posture statement by the Commander of USPACOM, Admiral Keating, thirty thousand of USPACOM-assigned personnel will be sustained in the U.S. Central Command area of responsibility in 2009.

For these reasons, we have included 20 percent of the military resources devoted to the region as related to securing energy supplies.

U.S. Central Command

Previous studies examining the external costs of oil focused on the Persian Gulf for good reason. Copulos (2003), for example, arrives at an estimate of military resources devoted to securing oil by taking 50 percent of the resources expended on the region.



With 61 percent of oil reserves, and 41 percent of natural gas reserves, the Middle East is exceedingly important to the present and future access of energy. Any DoD document or briefing regarding this region mentions its vast reserves of oil. The region also includes one of the world's most strategic chokepoints for the transport of oil, the Strait of Hormuz, through which 43 percent of the world's petroleum products transit (Dees 2007). Two of the other most important chokepoints for oil transport are also in the region. The Suez Canal saw 4.5 million barrels per day pass through in 2006, and 3.3 million barrels per day passed through the Strait of Bab el-Mandab.

The U.S. Central Command (USCENTCOM) is the Unified Command responsible for the Middle East. The formation of USCENTCOM was directly due to the region's importance as a source of oil. President Carter set up the Rapid Deployment Joint Task Force in 1980 to increase U.S. military presence in the region. Out of the Task Force, USCENTCOM was established in 1983 under President Reagan. The regional strategy was primarily focused on a Soviet invasion of Iran until 1988, when the focus moved to Iraq. Since 2002, USCENTCOM has played a larger role in the Horn of Africa, which also has energy supplies, and in the Central Asian republics, which are "playing an increased role in world energy markets" (Fallon 2007).

USCENTCOM's stated public mission is similar to other Combatant Commands: promoting development and cooperation, responding to crises, and deterring state and transnational aggression. Since 2001, the war in Afghanistan has been in its AOR, and since 2003, the Iraq War has particularly consumed military resources.

USCENTCOM has components from the four services: Army Central (3rd Army), Naval Forces Central (5th Fleet), Air Force Central (9th Air Force), and Marine Corps Central. Special Operations Central conducts all special operations in the region, and currently about 85 percent of Special Operations forces are assigned to USCENTCOM.⁹

U.S. Naval Forces Central Command (NAVCENT) plays a particularly significant role in the region. At any given time, Naval troops represent 60–80 percent of total U.S. troops in the AOR. NAVCENT also oversees three primary combined joint task forces. Combined Task Force 150 conducts maritime security operations in the Gulf of Aden, Gulf of Oman, the Arabian Sea, Red Sea, and the Indian Ocean. Combined Task Force 152 conducts maritime security operations in the South and Central Arabian Gulf, and participates in the wars in Afghanistan and Iraq. Combined Task Force 158 maintains security in and around the Al Basrah and Khawr Al Amaya Oil Terminals.

⁹ A Government Accountability Report stated that 85 percent of Special Operations forces that were deployed were in the U.S. Central Command region in 2006. Other testimony confirms that 80 percent or more are in the region.

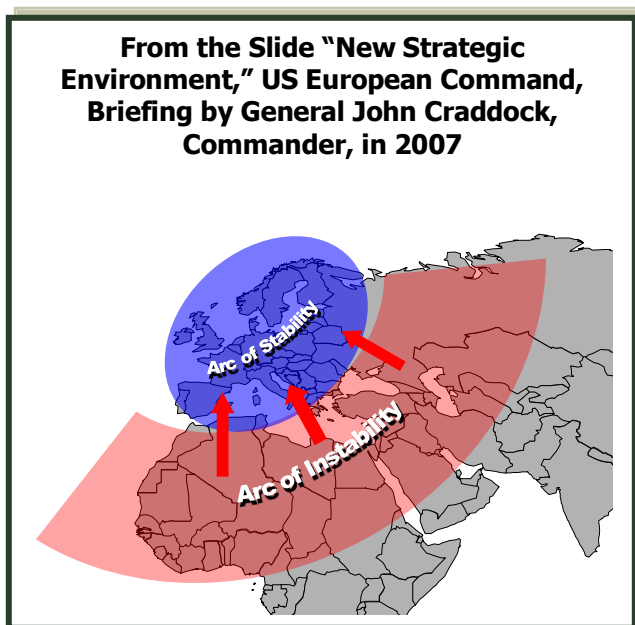
Because of the history of U.S. Central Command, and its evolving responsibilities connected with energy supplies in the Middle East, Africa and Central Asia, at least 50 percent of military resources in the region, if not 75 percent, should be included in the final estimate of military resources connected with securing access to energy.

U.S. European Command

Previous studies focused on USCENTCOM, but U.S. European Command (USEUCOM) is without question relevant to any research on securing access to energy supplies. USEUCOM is the only forward-headquartered geographical Unified Command. Prior to the formation of U.S. Africa Command, its area of responsibility included ninety-three countries on three continents—Africa, Europe and Asia—making up one-third of the world’s landmass, and 60 percent of world’s coastal regions. USEUCOM is connected with securing energy through its strategic priorities, and the ways these priorities are executed across its AOR and beyond.

Although historically USEUCOM was designed to defend Western Europe against a Soviet invasion, it is now postured to project power beyond its area of responsibility. Its focus is moving east, toward the Caspian Sea area, and south, toward the Persian Gulf, as new strategic interests emerge. The troops, bases, and equipment assigned to the Unified Command are positioned in an “arc of stability,” surrounded by an “arc of instability” from the Gulf of Guinea with its vast oil reserves, to Iraq (Craddock 2007).

USEUCOM is a conduit for logistical support and a force provider for the wars in Iraq and Afghanistan. It trains and prepares AOR coalition forces for those wars. Around 95 percent of all troops deployed to Iraq flowed through EUCOM, and forty-four thousand came directly from the European theater. One of its eight strategic priorities is supporting operations in Iraq and Afghanistan. Its component unit, U.S. Air Force Europe, is key to providing air forces and airlifts for the wars in Iraq and Afghanistan. By 2007, nearly twenty thousand sorties were flown by EUCOM-assigned troops, who also moved 360,000 tons of equipment and materiel (Craddock 2008). Prepositioned supplies in the European theater have been drawn down for military operations in USCENTCOM’s area of responsibility. In both theory and practice, the forces of EUCOM are trained and readied for military operations outside of Europe, and in particular, the Persian Gulf.



Another strategic priority is improved energy security for Europe, Eurasia, and the Black Sea region (Craddock 2008). Since the Commander of USEUCOM is dual-hatted as NATO's Supreme Allied Commander in Europe, it follows that USEUCOM strategy would be consistent with NATO strategy. And NATO strategy has become increasingly focused on energy security, beginning with the update in 1999 of NATO's Strategic Concept, the document that lays out the alliance's objectives along with the military and political means to achieve them. The 1999 update highlighted NATO's concern that a disruption in the "flow of vital resources" could affect alliance security. Since then, as energy markets have tightened, and Europe and the U.S. face increasing competition from China and India over energy supplies, the vulnerabilities of NATO countries to energy disruption have come to the fore. Of particular concern are lines of transportation and communication, particularly through the Strait of Hormuz and the Persian Gulf. At the 2006 Riga Summit, NATO explicitly directed the Council in Permanent Session to look into NATO's potential role in protecting the energy interests of its allies. This mandate was followed by a report, delivered at the Bucharest Summit in 2008, entitled "NATO's Role in Energy Security." It included five recommendations for ways that NATO could support energy security: information and intelligence fusion and sharing, projecting stability, advancing international and regional cooperation, supporting consequence management, and supporting the protection of critical infrastructure. The progress of this endeavor will be reviewed at the next summit in 2009.

USEUCOM is also focusing more on the Caspian Sea, as the area becomes increasingly important to Europe and the rest of the world for its energy reserves. While Kazakhstan is in USCENTCOM's area of responsibility, the Caspian Sea is in USEUCOM's AOR, and EUCOM has maritime security cooperation efforts. Both Unified Commands also signed a Memorandum of Agreement to develop the maritime security capacities of Kazakhstan and Azerbaijan (Craddock 2007).

The Caucasus' geostrategic location makes these countries critical for the U.S. and its allies. The countries of the Caucasus "provide alternative hydrocarbon sources from the Caspian Sea and alternative routes of access to Central Asian hydrocarbon reserves. It is an important region for European energy diversification" (Craddock 2008, p. 7). The theme repeats when Craddock speaks about Azerbaijan and Georgia in his testimony:

Its [Azerbaijan] close proximity to Iran, Russia, and Caspian Sea energy resources makes it important to U.S. strategic interests. Azerbaijan and Georgia provide access to Central Asian hydrocarbon reserves, which, together with Azerbaijan's own resources, provide an important alternative energy source for our European Allies. An example of the region's growing importance to the global market is the Baku-Tbilisi-Ceyhan pipeline, bringing oil from the Caspian Sea to the Mediterranean.

(Craddock 2008, p.7)

Naval Forces Europe (NAVEUR) is increasingly focused on Black and Caspian Sea activities as well as off-shore Africa (Craddock 2008, p. 24). NAVEUR coordinates maritime security in the Caspian Sea. The Caspian Regional Maritime Security Cooperation Program involves Naval Forces Europe (NAVEUR) to promote maritime security, and since the Caspian Sea borders with U.S. Central Command, NAVEUR works closely with NAVCENT to promote security interests in the region (Craddock 2008, p. 19). A majority of the exercises by Marines Forces Europe were in the Black Sea/Caucasus region and in the Gulf of Guinea off of western Africa, another area with energy supplies. These exercises are increasing (Craddock 2008, p. 28).

A third strategic priority, engaging Russia to mitigate its negative influence, could also be considered as connected to energy security.¹⁰ USEUCOM's most recent posture statement by General Craddock spoke to energy issues. As for Russia, "[W]ith the resurgence of energy revenues, Russia has begun leveraging its will on former Soviet bloc nations that are leaning towards the west. This is an alarming political trend that EUCOM must contend with" (Craddock 2007).

Within USEUCOM's area of responsibility lies Turkey, an important crossroads between Europe and Central Asia and the Persian Gulf. Again, according to General Craddock:

Turkey's geostrategic location, European orientation, and enduring relationship with the United States make it a bridge of stability between the Euro-Atlantic community and the nations of Central Asia and the Persian Gulf. Its international lines of communication are an important factor in energy security.

(Craddock 2008, pp. 5-6)

Finally, USEUCOM was also responsible for establishing the newest Unified Command, U.S. Africa Command. As of October 1, 2008, USEUCOM's area of responsibility is reduced to fifty-one countries. Yet, the creation of the new command, is also tied strongly to energy security.

For all these reasons, at least 50 percent of the substantial military resources devoted to USEUCOM should be included in the final estimate of the cost of security access to energy.

¹⁰ The other strategic priorities are to maintain the relevance of the U.S. in NATO, increase EUCOM activities with the rest of the U.S. government, ensure successful transition of AFRICOM to a fully-operational COCOM, support NATO out-of-area operations, and adjust EUCOM basing to support cooperation activities and wartime operations. The standing up of AFRICOM as well as the adjustment to wartime activities are also connected with energy security.

U.S. African Command

As of October 1, 2008, U.S. Africa Command (USAFRICOM) is fully operational and independent of USEUCOM. Strategic access to mineral deposits and the significance of Africa's position along principal sea lines of communication garnered the attention of U.S. strategic planners in the early 1980s. Until then, planners had little interest in Africa, other than Cold War posturing. Most of the African countries were not even assigned to a Unified Command. In 1983, the revised combatant plan assigned all countries below the Sahara, other than those which bordered the Red Sea, to USEUCOM. The northeast corner of the continent was later assigned to USCENTCOM. USPACOM held responsibility for waters along much of the east coast, with the Atlantic fleet (later U.S. Joint Forces Command) responsible for much of the waters along the west coast. This remained largely unchanged for two decades (Catoire 2000-01).

Even though Africa became assigned to, and divided between, various Unified Commands, it still remained at best a secondary concern for those commands. As USEUCOM became increasingly focused on issues to its east—Russia and former Soviet states—and USCENTCOM was preoccupied by key oil-producing states, Africa was not a priority (Catoire 2000-01). Yet, no region of the world had as many U.S. military actions as Africa during the 1990s (Henk 1997-98).¹¹

By the turn of the century, interest in the continent changed. People such as Richard Catoire of the U.S. Army War College began to call for a Commander-in-Chief for a newly established African command. The Assistant Secretary of State, Walter Kansteiner, noted that African oil is of national strategic interest:

As we all start looking at the facts and figures of how many barrels per day are coming in from Africa, it's undeniable that this has become a national strategic interest for us...[African oil] will increase and become more important as we go forward.

(Kansteiner, 2002, p. 11)

The increasing importance of African oil in terms of imports, but also in terms of further diversification away from the Middle East, finally led to the creation of U.S. Africa Command. Vice President Cheney's 2001 energy report noted the importance of African energy supplies.

In 2006, Secretary of Defense Donald Rumsfeld called for a new African Command, which was approved by President George W. Bush the same day that Secretary Rumsfeld left office later that year. USEUCOM was assigned the task of standing up USAFRICOM, which became final in October 2008. According to its first posture statement, delivered to Congress in March 2008:

¹¹ Interventions include noncombatant evacuations, election support, humanitarian relief, and support of UN withdrawal in Somalia. See Henk (1997-98).

AFRICOM's security goals and effects work to prevent attacks emanating from Africa against Americans, secure U.S. strategic access, and preserve unhindered movement along the AOR's lines of communication.

(Ward 2008, p. 8)

Europe is fueling an increasing proportion of its oil and natural gas consumption from North Africa. The economic security of Europe is tied to stability in Northern Africa, and therefore that stability is in the U.S. national interest (Ward 2008, p. 6). The Unified Command is also concerned with piracy, theft, and oil bunkering (organized theft) along the nearly two thousand nautical miles of Gulf of Guinea:

Large-scale oil theft in the Niger Delta is a significant problem. Shipping ports, transit areas, harbors, oil production, and transshipment areas are largely unobserved, uncontrolled, and vulnerable to attacks by terrorist groups, criminal gangs, or separatist militias. Corruption and complicity at all levels of government only serve to exacerbate this problem.

(Ward 2008, p. 5)

AFRICOM's activities include taking over the Combined Joint Task Forces-Horn of Africa, originally coordinated by USCENTCOM. The Task Force was deployed with fifteen hundred troops in December 2002 to root out the terrorists which would flow from Afghanistan as a result of the U.S. invasion. Not only did this fail to happen, but there was no real indigenous threat (Lawson 2007). The Task Force currently conducts activities and cooperation programs along the Red Sea, Gulf of Aden, and Indian Ocean, with countries including Kenya and Tanzania, in accordance with EUCOM and PACOM (Ward 2008, pp. 8-9).

AFRICOM is also active in building maritime security capacity to prevent damage to oil company platforms and property, theft of oil, and general piracy, most notably in the Gulf of Guinea. The Maritime Domain Awareness initiatives will address maritime challenges in the Horn of Africa, the Southwest Indian Ocean, and the Gulf of Guinea (Ward 2008).

Since Africa Command is new and there is little information available, we have chosen to frame the regional breakdowns under the Unified Combatant Command structure that existed prior to the creation of Africa Command. Resources such as troops or bases are generally included in EUCOM figures.

Part 6. Method 2: The Costs of Access to Energy by Region

Assessing the military resources committed to each region is difficult. There is no budgetary information that suggests a breakdown by region. The vast majority of troops based in the United States are assigned to U.S. Joint Forces Command, which oversees training and coordinates assigning troops to the geographical and

other Unified Commands. Moreover, the global military posture has moved toward a CONUS-based focus, where more troops are based in the Continental United States (CONUS) and not in other countries. Hostility toward overseas U.S. military bases has resulted in protests and backlash. Given today's technology and speed of airlift, troops and equipment can be readily moved where needed. However, this makes assessing the military commitment by region more difficult. The extent of basing in a region does not fully indicate U.S. strategic intent toward a region. Nor does the permanent basing of troops. Our analysis of regional commitment is based on piecing together information from posture statements; other Congressional testimony; Unified Combatant Command websites; and other Department of Defense information on troops, bases, and prepositioned supplies.

Estimating spending based on this information is fraught with methodological issues. By using personnel figures (e.g., numbers of troops or brigades), the quality of data is inconsistent and incomplete. For example, according to the Statistical Information Analysis Division (SIAD) of the Department of Defense quarterly report issued in March 2008, there were 946 military personnel stationed in Cuba at Guantanamo. Its December 2008 report listed 917 military personnel. According to a February Joint Chiefs of Staff Powerpoint slide, as of February 22, 2008, there were two thousand personnel deployed for detainee operations. Since these numbers are so similar between December and March, and the February Joint Chiefs of Staff presentation was in February, we assume that the Joint Chiefs of Staff number includes others deployed for detainee operations, but not present in Guantanamo, or at least not included in SIAD's data collection.

Estimating regional strength by the existence of bases is also problematic. The Base Structure Report, the Department of Defense's annual inventory of real property, does not list any bases in Saudi Arabia even though the U.S. had troops and equipment based at Prince Sultan Air Base. The unpopularity of American troops on Saudi soil has led to a redeployment to Qatar, but a number of troops remain at Eskan Village in Saudi Arabia. Less information and comparable data exists about these "cooperative security locations."

Prepositioned supplies indicate to some extent where the Department of Defense believes it may need to tap into extra equipment and supplies in case of military operations. The placement of various prepositioned supplies mirrors our conclusion about military interest in each region: These supplies are generally placed for a Pacific theater, and a Persian Gulf conflict.

The positioning of troops and bases also reflects the 2-MTW force-construct planning. Troops and bases are located in Europe, where allies exist, positioned to act on military operations in the oil-producing Persian Gulf region, and in the Caspian Sea, where oil and natural gas are in ample supply. USEUCOM has become increasingly focused south-toward the Persian Gulf and Africa, and east-toward the Caspian Sea. USCENTCOM is focused on the Persian Gulf region.

While it also oversees military operations in Afghanistan, these are trivial compared to active operations in Iraq. USPACOM, the largest Unified Combatant Command, controls the Pacific Fleet, ensures transit through the Straits of Malacca (potentially blockading it in a future conflict), and lends troops to USCENTCOM when necessary. USPACOM necessarily cooperates with USEUCOM regarding Russia, and USCENTCOM regarding maritime security in bordering waters.

From available information, we estimate that USPACOM has the most troops assigned to it. USSOUTHCOM is the smallest command, and there are few troops stationed or deployed in Central and South America and the Caribbean.

The most surprising finding from our research on troop assignments is how few are actually attached to USNORTHCOM. The primary defense of the United States territory is nuclear deterrence, requiring few conventional forces. U.S. military strategy does not include a large-scale conventional invasion of the U.S.

Table 2: US Overseas Bases and Assigned Troops by Unified Combatant Command Area of Responsibility

Combatant Command	Assigned Troops (Est.)	Bases (Acres)	Bases (Replacement Value in Millions)
CENTCOM	40,000	41,012	\$3,604
EUCOM	100,000	202,661	\$64,294
PACOM	300,000	201,187	\$53,265
SOUTHCOM	10,000	29,677	\$2,786
NORTHCOM	15,000	NA	NA

Source: Authors' Estimates based on posture statements, Unified Commands' Internet websites, data from the Statistical Information Analysis Division of the DoD, and the Department of Defense, Base Structure Report, Fiscal Year 2007 Baseline.

U.S. overseas military installations are primarily located in USEUCOM and USPACOM. But the official military installations inventory by the Department of Defense is misleading. The list of installations does not include cooperative security locations. For example, a cooperative security location exists in El Salvador for USSOUTHCOM, and numerous locations exist in Saudi Arabia and other areas of USCENTCOM.

Our analysis estimated the distribution of conventional military resources by region according to the presentation in Table 3. The total estimate for conventional resources is the same as we developed using the first method, \$323.5 billion. We then applied 50 percent of USCENTCOM's, 50 percent of USEUCOM's, and 20 percent of USPACOM's military resources to approximate those employed to secure access to energy. ***The total for this second method was very close to the first:***

\$103.5 billion is tied to securing access to energy in fiscal year 2009. Also, as with our first method, if we assume that Congress appropriates a similar amount of money for the Iraq War for fiscal year 2009 as it did in fiscal year 2008, the amount rises to \$215.4 billion.

Table 3: Estimates of Military Resources, FY2009 (in millions)

Unified Command	Total Resources	Linked to Securing Energy
CENTCOM	\$58,229	\$29,115
EUCOM	\$97,049	\$48,524
PACOM	\$129,398	\$25,880
SOUTHCOM/NORTHCOM	\$38,819	0
TOTAL		\$103,518

Part 5. Conclusion

In the end, both methodologies arrived at similar estimates of the military costs associated with securing access to energy. *Without including costs of war, we estimate that approximately \$100 billion out of the military budget is spent to fulfill the mission of securing access to energy in fiscal year 2009. If we include three-fourths of the spending on the Iraq War, the figure doubles.* Without war, securing energy access accounts for about 20 percent of the Department of Defense budget. With the majority of the Iraq War spending included, the proportion rises to nearly one-third of the budget.

Table 4: Overview of Estimates for FY2009 (in billions)

	Peacetime	w/Iraq War
Method 1	\$97	\$208.9
Method 2	\$103.5	\$215.4

The numbers are large and yet conservative. For one, it is difficult to argue that the U.S. government invaded Iraq for any reason other than its oil reserves and its position in an energy-rich region. Yet, we did not include all of the spending on the Iraq War nor the present value of future costs which are projected to be in the trillions. We also included only half of the resources we estimate were devoted to the Persian Gulf region and the surrounding countries of USCENTCOM. It is likely that interest in the region might be trivial if there were no fossil fuels. U.S. military policy also appears to be increasingly focused on energy supplies with the creation of the new U.S. Africa Command, and the re-deployment of the 4th Fleet in South America.

By publishing these estimates now, we accomplish two important objectives. We ask the questions and offer answers which will hopefully induce others into this line of research. Secondly, since we are publishing our numbers and methodology, if

anyone disagrees with the proportion we have attributed to securing energy in a particular region, she can re-calculate and offer a different viewpoint.

A more precise calculation could involve listing, documenting, and costing out specific operations such as Naval patrols to maintain the Straits of Hormuz. But at this time, the information needed to provide that level of detail is not publicly available. It may be possible to refine the methodologies we employed by improving our estimates of resources devoted to each region of the globe. We await responses to a number of Freedom of Information Act requests to help us in this task. It may be possible, though tremendously time consuming, to evaluate every budget justification item and estimate the proportion that can be attributed to operations related to the mission of securing access to energy resources. We continue to collect and process information and will further refine our estimates. Yet, the importance of this issue dictates that we cannot await the perfect methodology, or the perfect set of assumptions, or the complete level of information needed for a better estimate. A tremendous volume of resources is expended each day to secure access to energy supplies. Until further information and study provide a better estimate, we note the significant opportunity costs of dependency on fossil fuels.

Even if the military costs were lower than we have estimated, the salient point is that these costs are not included in the market valuation of energy, which is an externality leading to market failure. This market failure is not trivial. The price of a good in a market is a signal to both consumers and producers. If the price does not reflect the true cost of production, consumers purchase more of the good than would otherwise be the case. With respect to energy consumption, this market failure is disastrous. Consumption of fossil fuels leads to pollution and global warming. The correct valuation of energy in markets would lead to a transition away from fossil fuels and toward renewable and clean-burning energy sources.

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