

Energy Security and National Security

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Introduction

Given that oil is now a commodity, with immediate accessibility to those that have the cash, why is energy security an issue? For most countries, reduced dependence on foreign oil is both impractical and costly. The desire to do something, coupled with unacceptable costs if anything substantive actually gets done, has produced an unusually clouded mix of sanctimonious plans, unfinished projects, and abandoned policies. Nonetheless, energy security, like the phoenix, rises again and again. Regrettably, President Bush's latest round of proposals in 2007 follow in the same tradition. Their cost will most likely preclude their implementation, and even if implemented they are unlikely to solve the energy security problem.

Much of the confusion is about what energy security means. It is difficult to design rational policies to correct an ambiguous problem. Before recommending solutions, energy security needs to be better defined. This is a complex undertaking because as energy markets have matured, the nature of the problem has changed.

Originally, energy security was a straightforward strategic objective aimed at ensuring fuel for national defense. There was thought to be a direct link between secure oil supplies and national security. The linkage was most obvious during World War II, when fuel shortages (and the fear of shortage) constrained both Japanese and German operations. During the war, fuel shortages also plagued important civilian activities. This problem surfaced again on a global level during the 1973-74 oil crisis, giving rise to the International Energy Agency's oil allocation and strategic storage programs.

The second oil crisis of 1979-80 eroded the Major Oil Companies' control of supply channels and provoked a rapid rise in the volume of spot oil sales. In a few years, the historic contract market shifted to a commodity market. The problem of fuel shortages was replaced by one of high and volatile oil prices. The rapid rise in oil prices made it clear that there was a strong and inverse link between energy costs and global economic performance. Thus, reducing

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vulnerability of the world economy to oil market disruptions, became a central objective.

Since the first Gulf War a new and far subtler threat has been associated with developed nations' dependence on imported oil. Much of the world's low-cost oil supply is concentrated in countries, where the rule-of-law is rudimentary at best. This has led to arms accumulation, regional conflicts, and political instability, as various factions compete to control resource revenue "rents". In recent years, these countries have become breeding grounds for genocide and terrorism as the anger spreads beyond their borders. In turn, the threat of terrorism has become a major national security threat for developed countries, particularly the U.S.

Two measures are suggested to mitigate the security threat associated with dependence on imported oil. First, storage programs, such as the U.S.'s strategic petroleum reserve should be expanded with an explicit commercial rather than just strategic or tactical goal. The maturity of the crude-oil futures market now allows such an expansion with minimum cost to consumers. Much larger domestic storage will enhance supply diversity and moderate OPEC's market power, providing both a strategic and commercial benefit. Second, significant resources need to be devoted to R&D in the energy sector with the objective of finding a low-cost alternative to oil. High-cost energy alternatives may reduce oil imports, but they do little to stabilize the conflict over oil revenue rents, which is now the primary problem.

Oil and war

On the eve of World War I, Winston Churchill modernized the British fleet, converting its boilers from coal to oil. The conversion, however, created a new problem - securing oil supplies, because the U.K. had no domestic oil production. The problem was resolved when the British government acquired a 51% stake in the Anglo-Persian (British Petroleum) oil company. (Yergin 1991 pp. 153-164) In pursuing the acquisition, oil prices and financial issues were a consideration for the Royal Navy, but the driving motive was security of supply - the physical availability of oil.

With its abundant domestic production, the U.S. had fewer reservations about switching its Navy from coal to oil and did so before the British; nonetheless, security of oil supply was a major consideration. Reserves from the Elk Hills and Buena Vista oil fields in California and the Tea Pot Dome in Wyoming were set aside in 1912. The reserves were intended "to provide reserves against the future depletion of resources in a time of emergency." (Wikipedia) It is interesting to note that the reserves led to the famous "Teapot Dome Scandal" in 1922. As a consequence of the scandal, most of the reserves remained locked in place until the oil market shocks of the 1970s, and the Clinton Administration finally sold the Elk Hills field to Occidental Petroleum in 1998 (ironically, at the

bottom of the oil price trough). The U.S. also divided the country into five Petroleum Administration Defense Districts (PADDs), and during World War II sponsored the development of a series of domestic pipelines. The pipeline system was designed to minimize tanker exposure from enemy submarines, but it also enhanced trade and became a keystone in the natural gas market's development.

The U.S. and the U.K. were not the only countries concerned about security of oil supplies, nor the only countries to do something about it. During World War II the Allies had a significant advantage over the Axis Powers arising from their control of vital sea-lanes and the U.S.'s substantial domestic supplies. Neither Germany nor Japan had significant oil deposits and both relied on sources that ultimately proved far beyond their control. Contemporary documents reveal that the need for secure oil supplies was a motivating factor in Japan's decision to bomb Pearl Harbor and the Nazis' decision to invade Russia. (Stern 2005, Becker 1981)

Even before the war started, the Germans had developed several synthetic coal-to-oil processes. Only one, however, (the "Fischer-Tropsch" process) was able to manufacture higher-octane gasoline. Germany began the war with a synthetic oil production capacity of 9 million barrels per year. By 1943 capacity had been increased to 36 million barrels per year and met the majority of country's demand. Even then, however, their conversion process would not allow the production of 100-octane gasoline, which was required for the most advanced aircraft. Moreover, the facilities proved highly vulnerable to Allied bombing in May 1944, when 90% of the capacity was destroyed. Germany never recovered. (Becker 1981)

Although security of energy supplies is often associated with national defense, it can often arise from political or economic motivations. After World War II, South Africa faced increasing isolation due to its policy of apartheid and its treatment of the black majority. Fearful that oil supplies would be blockaded or otherwise curtailed, it developed a synthetic oil industry based on the Fischer-Tropsch process, and, thanks to its low-cost coal, ultimately was able to produce fuels at costs not too much greater than prices charged by OPEC. Brazil, also, has a substantial alternative fuel policy – ethanol, produced primarily from sugar cane. In the case of Brazil, however, the motivations more accurately reflect the power of the agricultural lobby, rather than any overwhelming economic or political threat.

When the oil industry was immature, supply deliveries were uncertain, transportation systems were unreliable, prices were opaque, and the quality of the oils varied. Thus there was a genuine concern about the physical availability of the commodity for national defense, industrial uses, and general consumption. As World War II revealed, however, a "secure" domestic infrastructure may prove highly vulnerable to hostile attack, and recently in North America, to the

destructive power of hurricanes. In any case, the early oil industry stands in sharp contrast to today's sophisticated commodity market. Not only are prices transparent, anyone willing to pay market prices can acquire the rights to substantial volumes of oil with a simple phone call. Nonetheless, the notion of energy security remains firmly fixed in policy makers' minds, as if supplies could disappear at any moment.

The oil market shocks

The discovery of vast low-cost oil reserves in the Middle East after World War II led to low prices and remarkable demand growth. From 1960 through 1973, petroleum product demand in Japan grew by a compound rate of over 18% and the rest of the world did not fall far behind, with demand growth near 8% per year. (OECD 1976) In a period of less than two decades, oil replaced coal as the dominant fuel in industrialized countries. As oil came to dominate energy use, the vulnerability of the global economy to oil supply disruption grew in tandem.

The macroeconomic impact of radically rising oil prices is a very different problem than Churchill's concern about oil supplies for the British Navy. When oil shortages manifested themselves as high prices in the 1970s, the consequence in most developed countries was falling economic output, rising unemployment, and accelerating inflation.

The disruptions of the 1970s are now referred to as "oil price shocks" and their consequence is easily observed in the pattern of global economic growth. Following the Arab oil embargo, world per-capita GDP growth fell from 4.9% in 1973 to 0.1% in 1975, and following the Iranian Revolution, per-capita growth dropped from 2.1% in 1979 to negative 0.6% in 1982, the worst annual performance in decades. (IMF 2006) Recent research suggests that the oil price shocks were not fully responsible for the poor economic performance in the 1970s, but they certainly contributed to the problem. (Hunt 2006)

In the modern world, no industrialized country is isolated from these consequences. The economic dislocations caused by sudden oil price increases choke off consumer demand and shrivel trade. Even countries with substantial oil and gas exports suffer some consequence: they become victims of the commodity cycle of boom and bust.

The significance of oil market disruptions has not been lost on politicians and it has been integrated into policy objectives. In articulating the purpose of the U.S.-led invasion of Iraq, the National Security Presidential Directive stated: "Objectives: To conduct policy in a fashion that minimizes the chance of a WMD attack against the United States, US field forces, our allies and friends. To minimize the danger of regional instabilities. To deter Iran and Syria from helping Iraq. And to minimize disruption in international oil markets." (*Sunday Times* 2006)

The world is vulnerable to such economic shocks because oil resources are not spread evenly across the globe; instead they are concentrated in the Middle East under the control of a slender number of autocrats whose motives are often as political as commercial. Indeed, the Arab OPEC oil embargo was an explicit exercise of the “oil weapon” to further Palestinian interests to the detriment of Israel. Although some Middle East leaders have renounced use of the oil weapon, it remains an unstated threat, prejudicing policy decisions and distorting relations among oil-consuming nations. Despite three decades of policies aimed at reducing oil import dependence, U.S. oil imports continue to grow.

Oil, money, arms, terrorism, and genocide

In President Bush’s 2007 State of Union address, his energy policy (as that of his predecessors) was aimed at reducing U.S. dependence on foreign oil. The White House stated: “For too long, our Nation has been dependent on oil. America's dependence leaves us more vulnerable to hostile regimes, and to terrorists – who could cause huge disruptions of oil shipments, raise the price of oil, and do great harm to our economy.” (White House 2007) Note there is a subtle change from the stated objective justifying the second Gulf War. The problem of energy supply vulnerability is said to rest with hostile regimes and “terrorists.” It is unclear, however, how the U.S. would be singled out for such treatment or how terrorism could be of such force and magnitude to savagely impact the oil market and the global economy for a prolonged period of time. President Bush and the White House confuse the nature of the problem. The crucial issue is a growing perception in the U.S. that anxiety over oil supplies has pushed the country into a bloody, costly and imprudent intervention in the Middle East. If so, what has been the fundamental cause and how does this relate to national security and energy security?

The first Gulf War marks the beginning of a new and disturbing threat associated with the supply of oil. In August 1990 Saddam Hussein invaded Kuwait. Political rationalizations aside, it was an outlandish grab of his neighbor's wealth and a throwback to meaner times. Kuwait produced 1.5 million barrels per day and had vast oil reserves: a jewel for the crown of ancient Babylon.

There is a subtle assumption that underlies the theory of “gains from trade.” Namely, for both sides the benefits of voluntary exchange must outweigh the gains from plunder of one by the other. This is indeed the case for most tradable goods, which require wit, risk taking, and experience to produce and market. In the modern world, efforts to plunder are usually undone by the wholesale destruction of the means of production and the plunderer is left with an empty shell. This is not the case for many oil deposits, which often have vast economic and monopoly rents. At today's oil price levels, the lifting or marginal cost of producing most Middle East oil is less than 5% of its value. Moreover, the technology of producing from an existing oil field is not complex and readily

available. Think of these resources as vast storehouses of black gold, where control levies unimaginable wealth on the lucky owner irrespective of managerial skills or effort. In other words, in this case the potential benefits from plunder may easily outweigh the expected costs. Conflict over the control of oil (and to a lesser extent natural gas) easily destabilizes political and economic regimes. Such problems are often associated with the “curse of oil,” the inverse relationship between economic development and natural resource abundance.

Before turning to the special problem of Middle East oil, it is worth describing the debilitating impact of the discovery of oil on Sudan because in many ways it exemplifies the essence of the problem. The discovery of significant oil fields in Southern Sudan fueled the dispute between Animist and Christian rebels in the South and the Muslim government in the North. The oil fields were not only a provocation for the conflict; they ultimately provided the funding for genocide in Darfur (which is also linked to rebel activities following oil discoveries in neighboring Chad). It was reported that the week the Sudan oil pipeline was completed in 2000, ships laden with tanks and other advanced armaments began landing at Port Said.

Stepping back from the political, religious, and humanitarian rhetoric that clouds the Sudanese issue, it is possible to examine the perverted incentive system that motivates much of this behavior. In Sudan, as in most of the world, mineral rights are vested exclusively in the government. In the bluntest terms, whoever controls the military or police controls the oil rights, and that is an obvious path to extraordinary riches and power. Obviously the first thing a newly installed leader does is invest in arms in order to retain power. Without the rule of law, political and economic control simply passes to the strongest, and is maintained by bribes and arms expenditures, corrupting the regime and all around it.

The Sudanese tragedy is horrific, but it has little impact outside Northern Africa. Sudanese oil is only a dribble in the market. Unfortunately, similar behavior in Persian Gulf states is not contained within their borders and impacts the national security of all industrialized nations.

The economic and monopoly rents that flow to the Persian Gulf states are sometimes used to develop infrastructure, improve education, and support other activities with a positive social benefit. All too often, however, the distribution of benefits is heavily concentrated in the hands of a few, breeding resentment within the general public. Moreover, much of the rent is channeled into degenerate activities that fund conflict. The Saudi Royal Family subsidies of the radical Wahhabi Islamic schools, Iran's effort to build a nuclear bomb, and the cash payments to the families of suicide bombers are just a few examples of the corrupting impact of petrodollars. Put another way, the link between terrorism, energy security, and oil prices concerns the distorting impact of huge economic and monopoly rents that accrue to the political leaders of oil states and their struggle to obtain or keep control.

Roger Stern has detailed much of the conflict within and between the oil states of the Middle East (Stern 2005). He concludes that national security would be enhanced by efforts to lower, rather than raise, oil prices. Critical to his analysis is the conclusion drawn by Professor Adelman and others that oil prices reflect a large amount of monopoly rent. Thus, policies aimed at undermining the market power of Saudi Arabia and OPEC are not only good for consumers, they are likely to reduce tension in the Middle East and constrain the threat of terrorism.

Stern's analysis of the problem is certainly correct, but his solution may not be practical. All things equal, lower oil prices would, of course, increase rather than decrease dependence on Middle East oil, easing the immediate problem but trapping oil-consuming countries later. Moreover, it is unclear how OPEC's market power might be broken if its members' sovereignty is to be respected. In the end, policy makers stumble up against the laws of demand and supply. To get oil prices down abroad, somehow oil consumption must be cut back at home; short-run pain must be endured to achieve long-term benefits. This is a notion that does not enrapture most politicians, and it explains why many obvious measures to improve energy security have floundered.

Addressing the multi-faceted problem

Reliance on imported oil is a unique dilemma that has baffled policy makers for over three decades. Fundamentally, the problem arises from an uneven distribution of oil resources. While high-cost alternatives are in abundant supply, low-cost oil is found in a limited number of spots around the globe. Unfortunately, nearly all of the low-cost supply is concentrated in the Middle East, with all its attendant political problems. The policy dilemma has been compounded by confusion. Energy security means different things to different segments of the public. Until the problem is adequately defined, the debate will be riddled with incomplete solutions.

First, consider the historic problem of access to resources. A long-lasting global conflict similar to World War II is simply not a likely event. The weapons arsenals of advanced nations are deliverable in a matter of minutes, not days, months, or years. Long before mechanized ground or naval forces run out of fuel the world would be devastated to the point that it would not matter who had the last drop of oil. An exchange of nuclear weapons would so devastate the global economy that concern about exchange rates, economic growth, unemployment, and the usual indicators would evaporate in the clouds of atomic dust. It is an unthinkable and irrational future and not one that can be easily impacted by shifting energy policy.

Second, consider the problem of economic vulnerability. It will surprise many to know that this has been and will continue to be a diminishing problem. In 1973, Middle East oil production represented 18.4% of the world's primary

energy consumption. By 2005, it had fallen to 11.5%. (BP 2006) Middle East oil has been replaced by oil discoveries all over the globe, nuclear power, renewable energy, and especially natural gas. As long as prices stay high, this problem solves itself. This explains why the recent oil price rise has not had the same impact on global economic growth, as did the earlier events.

While high oil prices diminish economic vulnerability in the long run, they exacerbate motives that lead to conflict and terrorism in the short run. Eventually, the low-cost advantage of Middle East oil will be eliminated. As fabulous as Persian Gulf giant oil fields are, they will sooner or later be depleted. Like the fabled ghost towns of gold and silver mining, the infrastructure will be left to decay, the populations will migrate to healthier climates, and the flow of black gold will halt. Energy policy ought to focus on accelerating that trend.

Policy dilemmas

Policy makers' conventional toolbox is simply not adequate to cope with the many facets of the energy security problem. Consider the two most obvious options likely to have an impact: stimulate new domestic supplies by opening previously unexplored regions and/or tax oil use, discouraging consumption and fostering the development of alternative resources. (There are, of course, a plethora of regulatory options that can substitute for these direct economic incentives.)

Accelerated development of domestic resources is cynically referred to as the "drain America first" policy. In some circumstances such a condemnation is unwarranted. For example, if the inherent risk in the oil import market is short-lived, then accelerated development of domestic supplies, even if they are depleted in a few decades, can resolve the problem. Alternatively, if the new supply is a permanent replacement for imported oil (such a reliance on renewable resources) then it is an obvious solution. The fundamental problem, however, in replacing imported oil is the cost of doing so - a cost that will be borne by the environment and by consumers. There is no doubt that the U.S. has the technology and the capital base to effectively eliminate imported oil within a decade (the Project Independence goal) but the high cost of substitutes is politically unacceptable and unjustified by the economics, because there are other solutions.

Alternative measures

As explained, the fundamental concern about relying on imported oil is the fact that costs vary greatly and the lowest-cost sources are concentrated in the hands of unpredictable decision makers that live in nasty neighborhoods. There is a twofold solution: first, supply sources need to be diversified and resource control needs to be placed in the hands of rational economic agents. Second, a low-cost alternative to oil needs to be identified and promoted. It does little good to

develop high-cost alternatives, since they simply accelerate competition for the control of low-cost oil supplies and intensify conflict in the Middle East.

Past policies have languished on an unfounded axiom: imported oil must be replaced by domestic alternatives. One policy measure, however, stands out as generally successful – the U.S. Strategic Petroleum Reserve (SPR). The SPR has not been tapped often (as in during the Gulf Wars and following the 2005 hurricanes), but when it has been used it has proven its value. Its existence has also tempered use of the oil weapon. The primary problem with expanding the SPR is the cost. So far, the oil in the reserve has been bought and paid for by the U.S. government and it has been a large item in the budget. President Bush's 2007 proposal to double its size only adds to the cost and does not solve the fundamentally economic problem of high oil prices, because the reserve is not designed to be a price-stabilizing mechanism.

On the other hand, SPR storage costs themselves are relatively small because the oil is stored in natural salt domes. Oil fields (like the Elk Hills reserve) are also a form of natural storage. However, the oil can only be removed at a relatively slow pace. Removal of oil stored in salt domes is only limited by the amount of installed pumping capacity. As the name implies, the SPR is viewed as a strategic reserve - it is not intended to play a commercial role. As such, it is not designed to deal with today's problems of terrorism, which are often motivated by isolation, elitism, greed, and narrow self-interest.

Given the present structure of the oil market, the salt dome storage can be expanded by private interests with little or no cost to the government and limited impact on consumers. This is because private interests can count on stored oil as an asset, which defrays the cost.

Consider a straightforward plan. Oil importers could be required to store one barrel of oil for every five they import. In turn, the oil could be released anytime after six years of storage, or earlier if the government lifted the restriction. As long as the rights to the stored oil can be resold, the impact on domestic oil prices is significantly moderated. This is because the value of oil to be delivered six years in the future in today's market is often more valuable than oil delivered today. For example, on January 29th, oil for delivery in March 2007 was worth about \$54 on the NYMEX futures exchange, while oil for delivery in December 2012 was worth \$6 more, about \$60 per barrel. Thus, the primary costs of such a storage program are the salt dome caverns, pumping facilities, and interest rate discount of the future price in the contract. The government need play no role other than to manage and regulate the storage requirement.

As the program unfolds and matures, a large volume of oil would exist in diversified private hands outside the Middle East, making it much more difficult for OPEC to exercise market power. Over time, economic rents would continue to accrue to oil-state potentates, but monopoly rents would dissolve.

It might be argued that consumers would pay for such a plan indirectly. That is, increased demand in world oil markets would drive up prices. Such a criticism is, in part, correct, but only in part. OPEC's ministers have often argued that oil in the ground is worth more than oil in the market, and some seem to believe it. Storage outside OPEC that is explicitly aimed at reducing the cartel's market power erodes this belief. Production rates in most of the world's giant oil fields could be increased if there was an incentive to do so. The threat of future competition provides such an incentive.

An understanding of the nature of the security threat should also help focus national policies aimed at developing alternatives to imported oil. The development of high-cost alternatives does little to resolve the problem. The Bush plan to greatly increase production of ethanol will help farmers in the Midwest, but it may actually exacerbate the threat of terrorism by accelerating competition for control of low-cost Middle East oil. What is needed is a low-cost alternative to oil, and that likely depends on future technological developments. Thus, energy policies should focus on R&D, rather than subsidizing known alternative energy technologies that may replace oil, but at too high a cost.

Economists have argued for decades that there is no immediate shortage of conventional oil and gas resources and thus no need to rush into high-cost options. Unlike crude oil, natural gas is widely distributed throughout the globe and it continues to displace oil. In the end, diversity is the only way to ensure security and once the globe has achieved greater diversity in energy supplies, the energy security issue will pass into history.

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