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OIL SECURITY AND THE NECESSITY FOR GLOBAL COOPERATION

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INTRODUCTION

At the beginning of the 20th century, oil (petroleum) represented four percent of the world's consumed energy. Today oil supplies 40 percent of the world's energy, 96 percent of which is transportation energy¹. The global demand for oil continues to grow at an alarming and unsustainable rate. It is becoming increasingly more difficult to make meaningful oil discoveries, and known oil reserves are now primarily located in unstable developing nation states or within remote geographic regions far from consuming nations. While nations have always competed for oil, it seems more and more likely that the race for the remaining last big reserves will be the dominant geopolitical theme of the 21st century.

The U.S. is on the verge of a new kind of war—between those who are seeking oil and are increasingly willing to go out and secure it, and those determined to disrupt its flow to promote their agenda. As demand for oil increases, as global oil production continues to lag behind demand, as terrorists increasingly target oil production and infrastructure, and as producers such as Iran, Saudi Arabia, Venezuela, and Nigeria grow more unstable, the struggle to maintain access to adequate energy supplies--always a critical mission for any nation--will become even more challenging and uncertain and will require more resources, political attention, and military intervention to secure.

BACKGROUND

What has historically fueled and sustained the growth of the U.S. economy has been oil. As a result, the economic growth and quality of life Americans enjoy today is beyond comparison. Today, approximately 62 percent of U.S. energy usage is in the form of oil.

For many years after the beginning of its commercial exploitation, the U.S. could support its growing demand for oil simply by drilling and pumping more oil out of the ground within its own border. However, by 1973 the U.S. was importing 34.8 percent of the petroleum it consumed. Today, imports total 67 percent of consumption. Even though the U.S. remains the third leading producer, trailing only Saudi Arabia and the former Soviet Union, U.S. dependence on foreign oil continues to grow².

U.S. oil reserves equate to less than three years of the current daily consumption rate. No significant oil fields have been discovered in the U.S. (or throughout the world) since the 1970's, and the strategic petroleum reserve (barrels held by the government) is only approximately 90 days of supply. Furthermore, with 510,000 oil wells already pumping oil in the U.S. at an average of 10.5 barrels per well per day, marginal cost of production is

quickly approaching marginal revenue produced. In other words, it is no longer cost effective to drill more pumping wells. The best producing well in the continental U.S. only produces 4,000 barrels per day. By the end of 2005, the U.S. crude oil production was 4.86 million barrels per day, the lowest level in more than 50 years³.

According to data from the latest British Petroleum Statistical Review of World Energy, ninety-nine percent of the world's oil comes from 44 oil producing countries. At least 24 of these nations are past their peak in production capability and now in terminal decline. In total, world oil production, with the exception of the Middle East, peaked in 1997⁴. Peaking means that the rate of oil production can not increase; it also means that production will thereafter decrease with time. Eighteen major oil-producing countries are now past their peak production, and their combined annual output has dropped by over a million barrels a day since 2003⁵. The general consensus is that global oil production will peak by 2010; however, the U.S. peaked in 1970, Russia in 1987, the U.K. in 1999. Saudi Arabia, the third biggest supplier to the U.S. is projected to reach peak production by 2010⁶. Canada, the U.S.' biggest supplier, reached peak production in 1973 and has since been in decline⁷. Today, only one barrel of oil is found for every six consumed. Major oil companies are now replacing dwindling reserves by acquiring other oil companies instead of exploring for new fields⁸.

Middle East producers are increasingly unable to offset reduced production by other nations, while at the same time attempting to meet growing global demand. To put this situation into perspective, in 2003 Algeria produced 1.1 million barrels per day; a new Algeria would need to be created in the Persian Gulf each and every year beyond 2010 just to keep up with the projected increase in demand. Meaningful production increases are only possible from Iraq, Saudi Arabia, Kuwait, and the United Arab Emirates⁹.

If forecasted production and consumption patterns prove true, in short order OPEC will control the oil market completely—in the face of its own shrinking production capacity-- and by 2020, 83 percent of the global oil reserves will be controlled by Middle Eastern nations. At current consumption rates, Middle East reserves will run out in 80 years¹⁰.

While the U.S. continues to be the greatest consumer of oil, many of the oil producing nations are not enamored with the U.S. “Nearly two-thirds of the world’s oil reserves come from chronically unstable, violence-prone Middle East countries whose dislike of American culture and policies has been forged for decades”¹¹.

Changing Global Consumption Demographics

It should come as no surprise that as other nations move from agrarian based economies to industrial based economies, they too would become growing consumers of oil. In 1970, the U.S. share of the world consumption of oil was 31.4 percent. By the end of 2005 it had fallen to 25 percent, even though its daily consumption rate has risen by 65 percent¹².

World oil consumption is expected to grow 60 percent by 2020, or at an annual rate of 14 percent. Energy demand in general is expected to grow by 50 percent over the next 20 years, of which 40 percent will be met by oil. The two countries with the highest growth rate of consumption of oil are China and India, whose combined

population accounts for one third of the world's population. In 2003, with a 5.6 million barrel per day consumption rate, China became the second leading oil consumer, surpassing Japan and Germany¹³.

China, the fifth leading producer of oil has to import 41 percent of its oil to meet its growing demand. In 2003 alone, China's crude oil imports increased 30 percent. Over the course of the next two decades China's and India's oil consumption is expected to grow at an annual rate of 7.5 percent and 5.5 percent, respectively, whereas the industrialized countries of the world have forecasted growth of a mere one percent. When considering that the average American consumes 25 barrels of oil per year compared to the average Chinese (consuming only 1.3 barrels per year), and the average Indian (less than one per year), China's and India's per capita consumption rates are likely to increase well into the future¹⁴.

ECONOMICS

The U.S. dependence on oil is deeply rooted in the economy, national infrastructure, and consumer habits. It is directly linked to all market sectors because all depend on oil-consuming capital. As of 2003, two-thirds of oil consumed in the U.S. went to meet transportation needs; one-fifth was consumed by industry. For the record, one standard 42-gallon barrel of crude oil makes about 19.5 gallons of gasoline, 9 gallons of fuel oil, 4 gallons of jet fuel, and 11 gallons of other products, including lubricants, kerosene, asphalt, and petrochemicals to make plastics and agriculture products. Even though energy expenditures have declined from about 14 percent of GDP in 1980 to only 7 percent today, oil is just as significant to U.S. GDP because much of its cost is hidden in the prices of goods and services¹⁵.

Increasing fuel and transportation costs and the relative fuel inefficiency of American vehicles have caused U.S. dependence on oil to be greater than ever. The U.S. consumes 45 percent of all gasoline produced in the world, yet represents only five percent of the world's population¹⁶. In spite of President Bush's energy program emphasizing more efficient use of oil and research and development of alternative energy sources, it will take many years before any significant improvements or breakthroughs reduce America's oil consumption. For the U.S. to sustain a targeted annual economic growth of three percent, oil consumption within the U.S. will have to continue to increase.

Economic Impact of Oil Supply Shortfalls

The greater the supply shortfall, the higher the price increases; the longer the shortfall, the greater will be the adverse economic affects. Virtually certain are increases in balance of trade differentials, inflation and unemployment, declines in the output of goods and services, and a degradation of living standards. Without timely mitigation, the long-run impact on the developed economies will almost certainly be extremely damaging. Already, one-third of the U.S. total trade deficit is from oil imports. During 2005, the U.S. imported approximately 275 billion dollars' worth of oil. The figure closely approximates the cost of OIF/OEF from Sep 2001-Dec 2005.

Developing countries suffer more than the developed countries from oil price increases because they generally use energy less efficiently and energy-intensive manufacturing accounts for a larger share of their GDP. On average, developing countries use more than twice as much oil to produce a unit of output as developed countries, and oil intensity is increasing in developing countries as commercial fuels replace traditional fuels and industrialization/urbanization continues. The vulnerability of developing countries is exacerbated by their limited ability to switch to alternative fuels. In addition, an increase in oil import costs can also destabilize trade balances and increase inflation more in developing countries, where financial institutions and monetary authorities are often relatively unsophisticated. This problem is most pronounced for the poorest developing countries.

If shortfalls were to persist, high but stable prices would encourage conservation and investment in alternatives. Prices that repeatedly skyrocket and then plummet could devastate entire economies and discourage long-term investment. The worst impact would be suffered by those nations and those aspects of national economies that could not obtain oil at any price affordable to them. Supply interruptions would likely occur with greater frequency and for increasing lengths of time as global oil production is gradually reduced¹⁷.

Oil price increases have preceded U.S. recessions since 1969, and virtually every serious oil price increase was followed by a recession. Thus, while oil price spikes may not be necessary to trigger a recession in the U.S., they have proven to be sufficient over the past 38 years. Oil supply disruptions over the past three decades have cost the U.S. economy approximately 4 trillion dollars. Future supply shortfalls associated with the peaking of oil production could cost the U.S. even more than all of the oil supply disruptions since the early 1970s combined. For the U.S., each 50 percent sustained increase in the price of oil will lower real U.S. GDP by approximately 0.5 percent. If oil prices were to double, U.S. GDP would drop by a full percentage point. Again, if the U.S. continues to seek an annual sustained economic growth of 3 percent, a 50-100 percent increase in oil prices would lower that growth by 16-33 percent¹⁸.

The effects of oil shortages on the U.S. are also likely to be asymmetric. Oil supply disruptions and oil price increases reduce economic activity, but oil price declines have an even less beneficial impact. Oil shortfalls and price increases will cause larger responses in job loss than job creation, and many more jobs may be lost in response to oil price increases than will be gained if oil prices were to decrease. Furthermore, the subsequent inflation caused by oil price increases would adversely affect short-term and long-term interest rates, causing them to rise--possibly leading to stagflation similar to that experienced during the oil crises of the 1970s¹⁹.

COMPETITION FOR OIL AND GEOPOLITICAL FALLOUT

Since the end of the Cold War, the oil rich regions--the Persian Gulf, the Caspian Sea basin, and the South China Sea--have become important strategically. Behind this shift in strategic geography is a new emphasis on the securing of oil supplies. Economic competition drives international relations, and competition over access to these vital economic assets has intensified accordingly. An interruption in the supply of oil would entail severe economic consequences; the major importing countries now consider the protection of this flow a significant national concern²⁰.

In 1980 mounting troubles over oil prompted President Jimmy Carter to create what would be known as the Carter doctrine, which states that “any attempt by an outside force to gain control of the Persian Gulf region will be regarded as an assault on U.S. vital interests and will be repelled by any means necessary (including military force) in order to keep the oil flowing”²¹. While serving as U.S. Secretary of Energy under the Clinton administration, Spencer Abraham expressed the importance of oil and economic strength. “Energy security is a fundamental component of national security. Military force will be an increasingly important prerequisite to safeguard the flow of foreign oil”²². President Bush, and then-Secretary of Defense, Donald Rumsfeld, has stated that the protection of America’s oil supplies is the most important national security priority. In fact, the very first military objective during the 2003 invasion of Iraq was to secure the oil fields and refineries of southern Iraq, and when entering the city of Baghdad, the military made it a priority to seize the oil ministry building²³.

With global energy consumption rising by an estimated two percent annually, and demand soon to outpace production, competition for access to shrinking oil reserves will only grow more intense in the years to come²⁴. The U.S.’ growing dependency on foreign oil will likely reach 90 percent by 2020; therefore the U.S. economy will become increasingly vulnerable²⁵. The new U.S. defense secretary, Robert Gates, who in 2005 took part in a war game simulating disruptions to oil trade, concluded that the U.S. had few short-term fixes if supplies were interrupted²⁶. Not only would oil supply disruptions hurt the U.S. economy, it would adversely affect the U.S. military, which consumes oil in quantities greater than most nations of the world. As strong as these views and concerns are, they are equally held by Chinese leaders regarding their country’s national security and economic well-being. China’s minister for state land and resources remarked in 2002 that rising demand for imported oil will “increase supply side risks...and will damage the country’s capacity to ensure its oil resources as well as economic and political security”²⁷.

Competition is growing among consuming nations for oil within the Middle East, Central Asia, Latin America, East and South China Seas, and Africa. African oil is arguably the most contested. The U.S. currently receives 15 percent of its oil supplies from Africa, as compared to 22 percent from the Persian Gulf. Within the next ten years, the U.S. could be relying on Africa for a quarter of its oil supplies according to the U.S. National Intelligence Council. Nigeria is the fifth biggest source of U.S. imports, with the U.S. accounting for half of Nigeria’s oil exports²⁸. Given the fragility of many African nations, particularly oil-exporting nations and those vulnerable to harboring terrorist groups, the U.S. is building a network of military bases and diplomatic missions whose main goal is to protect American access to oil in volatile places such as Nigeria, Cameroon, Chad, and Sao Tome—and, as important, to deny that access to China, India and other large consumers of oil²⁹. China currently derives a quarter of its oil imports from Africa, with oil interests in Algeria, Angola, Chad, Sudan and developing interests in Equatorial Guinea, Gabon, and Nigeria³⁰.

When the U.S. cut ties with Sudan, China aggressively filled the void. China conducted much of its drilling behind perimeters of bermed earth guarded by troops to protect against rebel attacks³¹. China has now made Sudan its largest overseas production base. China National Petroleum Corporation (CNPC) owns 40 percent of the Sudan’s Greater Nile Petroleum Operating Company and pumps over 300,000 barrels per day in Sudan. Another

Chinese firm, Sinopec, constructed a 1,600 kilometer (1,000 miles) pipeline to Port Sudan on the Red Sea--where China's Petroleum Engineering Construction Group built a tanker terminal--bringing Sudanese oil to the international market. While approximately only seven percent of Chinese oil imports come from Sudan, it equates to 400,000 barrels per day--or 80 percent of daily oil exports from Sudan. Sudan is now the seventh biggest oil producer in Africa after Nigeria, Libya, Algeria, Angola, Egypt, and Equatorial Guinea³². The geopolitical implication of this tolerance for instability by countries seeking strategic access to oil (such as China)—much as Britain, Japan, and the U.S. did in the years leading up to World War II—is that the likelihood of destabilizing countries like Sudan rises exponentially³³.

In 2004, the United Nations Security Council was forced to water down a resolution condemning atrocities in the Darfur region of Sudan to avoid a Chinese veto. China abstained in the vote of a final weaker resolution. China's growing energy partnership with Sudan represents one of a number of areas where Sino-U.S. energy interests diverge. With Sudan and Iran together supplying China with 20 percent of its oil imports, U.S. attempts to contain these regimes bring it into direct confrontation with China's energy security policies³⁴.

China has also expanded its military presence in the region, having deployed peacekeepers to Liberia in December 2003--two months after Liberia switched its diplomatic recognition from Taiwan to China. China has also sent a peacekeeping contingent to the Democratic Republic of Congo, as well as providing uniforms to Mozambique's army, helicopters to Mali and Angola, and weapons to Namibia and Sierra Leone. Many more of China's diplomatic initiatives in Africa are in direct conflict with U.S. policy toward the region. For example, China supplied US\$1 billion in arms to both Ethiopia and Eritrea during their war from 1998-2000. Internal crises ranging from poverty to poor governance and civil war, coupled with China's attempt to secure energy resources by offering these nations military assistance, aid, or arms-for-oil could exacerbate instability in the region³⁵.

The U.S. and China are not the only nations aggressively seeking energy resources in Africa. Recently, Korea National Oil Corporation obtained 65 percent of oil and gas production rights in Nigerian offshore blocks, while India's Oil Natural Gas Corporation, Videsh, obtained a 25 percent stake. South Korea and India are the world's fourth and sixth largest energy consumers, respectively. India also holds a stake in the Greater Nile Oil Project in Sudan, having invested U.S. \$700 million in Sudan's oil sector. China and India have also been engaged in direct competition for African energy resources, as seen in October 2004 when China outbid India to buy an interest in an offshore block in Angola³⁶.

Elsewhere, China is actively pursuing Russia as its major supplier³⁷. China and Japan have been engaged in a diplomatic battle over access to the big oil fields in Siberia. Japan, which depends entirely on imported oil, is seeking a 2,300-mile pipeline from Siberia to coastal Japan. China sees Russian oil as vital for its own “energy security” and is pushing for a 1,400-mile pipeline south to Daqing, China³⁸.

China's most controversial oil approach has been made to a country America once regarded as its most trusted oil ally: Saudi Arabia, the largest oil exporter in the world. In return, the Chinese have offered the Saudis access to

what will be the world's biggest energy market and has provided it sophisticated Chinese weaponry, including ballistic missiles and other hardware that the U.S. and Europe have refused to sell to the Saudis³⁹.

China has also made an alliance with Venezuela, who is now threatening to cut off oil exports to the U.S. entirely, while giving China as much as it wants. Venezuela is the fourth biggest supplier of oil to the U.S. China also has a long standing alliance with Iran and has supported Iran's efforts to develop nuclear power amid much protesting from the U.S. and Western Europe allies. China is aggressively forging alliances and attempting mergers with other countries' national oil companies such as Burma, Ecuador, Egypt, Indonesia, Iraq, Kazakhstan, Kuwait, Libya, Oman, Peru, Thailand, and Yemen⁴⁰. China even attempted to purchase Unocal by outbidding Chevron. The sale was subsequently stopped by the U.S. Congress over national security concerns.

OIL INFRASTRUCTURE AND TERRORISM

Infrastructure

Energy sources are both economical and political strategic assets both for the producer countries and for the consuming countries. In the case of oil infrastructure (e.g., pipelines), they also benefit the countries of transit, and in many cases are considered of strategic international or regional importance. There are over 400,000 miles of above ground pipelines⁴¹, 6,000 offshore platforms⁴², and oil pipelines carry roughly half of the world's oil⁴³.

The ex-Soviet republics of Central Asia recognize oil to be the quickest way for them to secure their economic and political independence, sought to exploit their oil reserves. The undeveloped, isolated, and politically unstable nations of Uzbekistan, Kazakhstan, Tajikistan, and Turkmenistan share the majority of the region's oil wealth. Since these countries are all landlocked, they all depend on their neighbors for access to Western markets via pipelines⁴⁴.

According to testimony before the U.S. House of Representatives in March 1999 by the conservative think tank, Heritage Foundation, Azerbaijan, Kazakhstan, Turkmenistan and Uzbekistan together have 15 billion barrels of proven oil reserves. The same countries also have proven gas deposits totaling over nine trillion cubic meters. Another study by the Institute for Afghan Studies placed the total worth of oil and gas reserves in the Central Asian republics at around U.S. \$5 trillion⁴⁵.

Extending 1,760Km, the Baku-Tbilisi-Ceyhan pipeline project (BTC) (lying underground) has enabled the transport of crude oil from Azerbaijan's Caspian fields through Georgian territory to Turkey's port on the Mediterranean. At its maximum capacity in about 2010, it will carry a through-flow of one million barrels of oil a day, and will be the central element of a projected \$20 billion investment package that includes up-and downstream projects. The Azeri and Georgian governments have seen BTC as their lifeline to Turkey and Europe rather than simply a pipeline. The BTC pipeline also addresses a U.S. policy imperative helping it to isolate Iran in the Caspian as well as in the Persian Gulf as punishment for its continued sponsorship of international terrorist

groups perpetrating attacks against American and allied interests and for its ongoing effort to develop nuclear capabilities⁴⁶.

Pipelines from Kazakhstan over land to China, from Turkmenistan across the Caspian Sea to Azerbaijan, and from Turkmenistan through Afghanistan and onward to Pakistan and India, have been seen as means for reorienting regional export routes toward new markets. Afghanistan is looking into laying oil and gas pipelines to the untapped petroleum reserves of Central Asia. Not only can Afghanistan play a role in hosting pipelines connecting Central Asia to international markets, but the country itself has significant oil and gas deposits⁴⁷. U.S. oil company Chevron-Texaco has partnered with a consortium including Russia, Kazakhstan, Oman, and U.S. oil company Exxon-Mobil to complete most of the work on a pipeline carrying oil from the Tengiz field in Kazakhstan to the Russian port of Novorossiisk⁴⁸.

Terrorism

The war waged by terrorists and insurgents is not against conventional armies or nation-states. It is waged against economic and social infrastructure. The operational objective of global terrorist warfare is to separate a large urban population from its infrastructure and take advantage of the collapse and chaos that result⁴⁹. There are literally hundreds of active terrorist groups and insurgencies throughout the world. The ability to disrupt production is substantially different today than any terrorist threat faced in the past. In the past, the potential of damage has always been from single large attack on a major facility or node (extremely difficult to accomplish and relatively easy to recover from). “Today’s threat is based on sustainable disruption—ongoing, easy, low-tech attacks that are nearly impossible to defend against (everything from pipeline destruction to employee kidnapping). The goals of these attackers can be divided into three complimentary categories:

1. Delegitimization of the target state: Attacks meant to “hollow out” the state, through an inability to deliver critical services or a denial of income/investment to create zones of local control.
2. Coercion of the core Western states: Either to damage the U.S. or a target state through economic means.
3. Criminal profit: By increasing the prices of oil and its refined products, the profits generated by criminal enterprise (bunkering of oil, smuggling, etc.) are radically improved”⁵⁰.

As such, terrorists pose, and will continue to pose, a constant threat to oil and gas operations, export facilities, pipelines, transports and wells. Therefore, higher costs of operating in conflict zones, and of protecting and repairing infrastructure, are factored into oil prices. Fear alone has added 4-10 dollars to the cost of a barrel of oil⁵¹. This price premium cost the U.S. \$40 billion in 2004⁵².

An Al-Qaeda document obtained and translated in 2004 indicated Al-Qaeda’s intent to target oil infrastructure, calling for...”hitting wells and pipelines that will scare foreign companies from working there and stealing Muslim treasures”. The document also highlighted the 2002 suicide bombing attack on a French-chartered oil tanker off the Yemeni coast killing a crew member and spilling 90,000 barrels of oil into the Gulf of Aden⁵³. In

mid-December 2004, Arab satellite channels aired an audiotape message by Osama bin Laden in which he called on his cohorts to take their holy war to the oil industry and to disrupt supplies to the U.S. from the Persian Gulf⁵⁴.

“Targeting oil interests is lawful economic jihad.

Economic jihad in this era is the best method to
hurt the infidels.” Al-Qaeda, 2006⁵⁵

In February 2007, a Saudi wing of Al-Qaeda posted a web statement further urging Al-Qaeda militants to attack oil facilities all over the world, including Canada, Mexico, and Venezuela. In response, Venezuela stated it would reinforce its security measures. Canada, Mexico, and Venezuela provide approximately 40 percent of U.S. oil imports⁵⁶.

Insurgents go after critical junctures in the pipeline system and focus on equipment that is difficult to repair or remanufacture. In Iraq alone, 264 acts of sabotage against oil infrastructure took place in 2004⁵⁷. Although Iraq is the most visible problem, pipelines across the world in turbulent regions are sabotaged on a regular basis. In the Caucasus, Nigeria and Colombia, pipelines have come under sustained assaults that governments seem powerless to stop. While global attention remains focused on Iraq, there is also the possibility that the U.S. will be needed to provide security for the 100,000 bpd Cano Limon pipeline in Colombia, where terrorist groups, primarily the Revolutionary Armed Forces of Colombia and the National Liberation Army, have made it the most heavily attacked oil infrastructure in the world. In 2001, the pipeline was attacked 170 times; in 2002, 42 times. The 780km pipeline has been attacked so frequently that the locals call it “the flute” because of the perforations punched in it by guerrilla attacks⁵⁸.

Most existing and proposed energy pipelines in the Caspian region run through conflict zones. In 1999, oil exports were suspended when the pipeline from Baku to Novorossiysk was ruptured due to the war in Chechnya. Restoring service required building a route by-passing Chechnya through neighboring republic of Dagestan. Chechen guerrillas fighting for independence from Russia are going after its extensive pipeline infrastructure of roughly 31,000 miles. Russia is the world’s second-largest oil exporter. Forty percent of its revenues are derived from oil. There is no better way for the Chechens to hurt the Russian economy than by disrupting Russia’s ability to export crude oil. In 2004, pipelines were blown up in Volograd, Dagestan, and Stavropol, as well as in and around Moscow⁵⁹.

Pipeline paths through Georgia are problematic where separatists in South Ossetia and Abkhazia provinces clash with the Georgian government. In one instance, terrorists knocked out two Gazprom natural gas pipelines and a critical electricity tower. The combination deprived the country of heat and light for five days. This is a great example of how:

1. Even entire nations are vulnerable to systems disruption.
2. Systems attacks can provide amazing leverage. An afternoon’s work knocked out a country for more than five days.
3. It can be repeated again and again. The attack was simple, the vulnerability is vast, and the attackers weren’t caught (nor are they likely to be)⁶⁰.

In addition, there is an increasing threat by Islamist groups operating in the Caucasus such as the Islamic Party of Eastern Turkestan, the Islamic Movement of Uzbekistan, Chechen separatists and Hizb ut-Tahrir al-Isami⁶¹. The latter group seeks to seize power and replace existing governments with a sharia-based caliphate for the purpose of jihad against the West. In response to such groups, the U.S. and Georgia have created a special military force to guard the pipelines carrying oil from the Caspian Sea to the Black Sea⁶².

Other attacks have been repeatedly waged by insurgents against oil and gas pipelines in Turkey, Indonesia, Pakistan, India, Bolivia and Myanmar. In India, a separatist rebel group called United Liberation Front of Assom, which fights for independence for oil-rich Assam state, has taken responsibility for a number of pipeline attacks. Assam is the source of some 15 percent of India's onshore crude oil production⁶³.

Attempts to fully exploit Afghanistan's petroleum reserves or take advantage of its unique geographical location as a crossroads to markets in Europe and South Asia have been hampered by continual civil strife. In 1998, UNOCAL, which held a 46.5 percent stake in Central Asia Gas (CenGas), a consortium that planned an ambitious gas pipeline across Afghanistan, withdrew in frustration after several fruitless years. The pipeline was to stretch 1,271Km from Turkmenistan's Dauletabad fields to Multan in Pakistan at an estimated cost of \$1.9 billion. An additional \$600 million would have brought the pipeline to India. Other partners in CenGas included the Saudi Arabian Delta Oil Company, the government of Turkmenistan, Indonesia Petroleum, the Japanese ITOCHU, Korean Hyundai and Pakistan's Crescent Group⁶⁴.

China has also been vulnerable to terrorist attacks against oil/gas pipelines. China's pipelines connecting the northwest district of Xinjiang with neighboring Kazakhstan is at the mercy of increasingly hostile Muslim Uighur minorities trying to break away from the central Chinese government⁶⁵. More recently, gunmen raided a Chinese-run oil field in Ethiopia killing nine Chinese workers and kidnapping seven others. An ethnic Somali rebel group claimed responsibility for the attack⁶⁶.

Twenty large oil refineries are located in 12 nations; seven of these large refineries are located in Kuwait, Saudi Arabia, India and Russia—unstable regions and/or where terrorists have been active. Only four of the largest oil refineries are located within the U.S., each processing approximately 3-4 percent of the crude oil refined in the U.S.⁶⁷

About 200,000 miles of pipeline carries oil and petroleum products across the U.S. An additional 180,000 miles of pipeline carry natural gas. While most of these lines are buried, pumping stations, terminals and other facilities could be vulnerable. Security experts have repeatedly pointed to the vulnerability of the domestic natural gas pipeline system, as well as the vulnerability of U.S. refineries operating at or near full capacity⁶⁸.

The threat of terrorism has caused pipeline operators in the industrialized nations to take steps to prevent terrorists from harming petroleum infrastructure, such as:

1. Increasing system redundancy,
2. Deploying state-of-the-art surveillance equipment,
3. Deploying aerial and ground patrols, and
4. Fortifying pipeline systems against cyber-security breaches⁶⁹.

The U.S. Pipeline Infrastructure Protection to Enhance Security Act 2002 requires every pipeline operator to now develop and implement a terrorism security program approved by the U.S. Secretary of Transportation⁷⁰. As a result, pipeline companies are putting people into previously unmanned facilities, increasing security at terminals and key pumping stations, and adding to patrols along the thousands of miles of pipes⁷¹. Measures such as this have made places in North America and Europe more secure; however, since most U.S. oil--and increasingly, natural gas--come from overseas, U.S. energy supplies can not be assured unless similar security measures are applied within nations exporting petroleum to the U.S. (e.g., the Middle East, the Former Soviet Union, Africa, and Latin America)⁷².

The global maritime commons have become a growing safety and security concern.

"On today's globalized planet, the vast oceans and crowded littoral waters present a dichotomy of essential personal and economic sustenance on the one hand, and on the other, the very real security challenge of immense areas of ungoverned or weakly controlled space. For both dimensions of the challenge, maritime security is essential."

Admiral William J. Fallon
United States Navy
Commander, U.S. Pacific Command
Remarks at 4th Annual Shangri La Dialogue
"Enhancing Maritime Security Cooperation"-5 June 2005

Increasingly, terrorism, piracy, smuggling, and the movement of Weapons of Mass Destruction (WMD) are taking place. During the first nine months of 2005, 141 ships were boarded, 15 fired upon, 11 hijacked, and 256 crewmembers taken hostage. During this same period, there were 61 pirate attacks reported on ships in Indonesia, 10 in the Malacca Straits, and 13 in Nigerian waters⁷³. This is of particular concern, for approximately 90% of global trade is facilitated by maritime shipping. The amount of shipping is likely to continue to grow as globalizing nations become increasingly interdependent. The biggest immediate threat is terrorist attacks on petroleum shipping. Millions of barrels of oil are transported by oil tankers each and every day—the fuel that fuels economies is extremely vulnerable to high-jacking or ship sinking, potentially causing environmental damage of monumental proportions. Much of the world's petroleum exports must pass through narrow straits, such as the Strait of Gibraltar, between Spain and Morocco; the Gulf of Aden, between Yemen and Somalia; and the Strait of Malacca, between the Islands of Sumatra, Indonesia and Malaysia before reaching its final destination, thus making ships extremely vulnerable to terrorist activities.

The 600 mile-long Persian Gulf and its coastal areas are the largest single source of crude oil. Three Saudi Arabia terminals and storage facilities account for approximately 18 percent of the world's daily oil consumption. The loss of any one of these sites alone would have a dramatic effect on the supply and price of oil. Additionally, territorial disputes among Gulf countries and chokepoints (like the Strait of Hormuz leading out of the Gulf) are susceptible to attacks⁷⁴.

China's concern over its reliance on the Strait of Malacca for Middle East oil imports is strategically too risky. Looking for alternative shipping routes, China has invested 1 billion U.S. dollars in Gwador port in Pakistan and agreed in principle to fund a modernization and widening of the Karakoram highway. Development of a natural gas pipeline is being considered. It would run from Pakistan's Balochistan province to China. Concerns over Pakistan's ability to secure the pipeline from terrorist attacks are holding up the project's construction⁷⁵.

An increasing number of U.S. Naval forces are being utilized to protect foreign oil shipments. The Navy's Fifth Fleet, based out of Bahrain, is spending more time patrolling the Persian Gulf and the Strait of Hormuz. The U.S. Navy's Seventh Fleet is increasingly doing similar operations in the south pacific region—and the Strait of Malacca. The western African littoral is also an area now patrolled in conjunction with several nations⁷⁶. The U.S. Coast Guard has increased patrols of the region and has conducted training, intelligence sharing and public relations exercises with numerous states including Sao Tome and Principe, Cape Verde, Ghana, Benin, and Equatorial Guinea⁷⁷. The increasing frequency of conflict, humanitarian crises, and number of nations harboring terrorists throughout Africa has led to the office of U.S. Secretary of Defense/military leadership to establish another military unified command encompassing Africa and its littoral.

Chief of Naval Operations, Admiral Mullen, suggests that there are three effects of globalization that are creating the need for a new maritime strategy. They include:

1. Expansion of interdependent world markets and economies on a truly global scale.
2. Rapid spread of ideology through the internet and the unrestricted flow of immediate communications.
3. Empowerment of a new generation of enemies, terrorists, proliferation of weapons of mass destruction, drug traffickers, smugglers and pirates.

He suggests that the Navy must redefine Sea Power and answer questions concerning what a new Maritime Strategy must do, what its elements are, and what the new strategy will encompass. "The old Maritime Strategy focused on sea control, but the new one must recognize that the economic tide of all nations rises, not when the seas are controlled by one, but rather when they are made safe and free for all." His strategic vision calls for a 1,000 ship voluntary maritime global network of national, international, and private-industry ships tied collectively together to police and secure the maritime domain.

CONCLUSIONS

For the foreseeable future, oil will remain the most viable energy source to sustain industrialized nations' economies and stimulate the growth of emerging economies. Industrializing nations, led by China and India, will continue to put demand-side pressure on oil that increasingly outpaces the petroleum industry's ability to meet demand. This growing demand, coupled with the depletion of petroleum resources, will intensify competition for oil and magnify the economic consequences of disruptions to supply.

Oil production has shifted from the developed to the developing world and has left corruption and turmoil in its wake virtually wherever it has been discovered in the developing world⁷⁸. It has been exploited in one way or

another by host governments, consuming nations, insurgents, terrorists, or criminal organizations. Oil importing nations will increasingly face ethical dilemmas as they attempt to quench their thirst for oil, and conduct business with corrupt and/or impoverished nations that do not take care of the needs of their people.

In spite of increased but varying degrees of security measures taken by nations to protect petroleum infrastructure, global terrorist groups and regional/local insurgencies—in advancing their agenda—continue to successfully target it. Future successful disruptions to the flow of petroleum will likely have an exponentially adverse effect on the price of oil and the global economy, particularly among newly industrializing nations.

Wealth generated by oil rich Middle East countries will likely continue to flow into terrorist organizations and organizations promoting radical Islam. This will likely mean further U.S. involvement in Middle East conflicts, more anti-American sentiment, and a deepening rift between the West and the Islamic world⁷⁹.

Terrorist organizations such as Al-Qaeda will likely target the oil infrastructure of those nations exporting oil to the U.S. and its allies. As such, the control over the price of oil will increasingly be in the hands of terrorists. Nations will increasingly sell their oil to those nations willing to provide foreign aid and/or oil infrastructure security assistance. Growing competition for oil will necessitate the need for the U.S. to provide some means of oil infrastructure security assistance to nations exporting oil to the U.S. The militarization of U.S. foreign energy policy will continue to grow in order to meet the challenge posed by the contemporary environment.

Collusion between global terrorists is likely in the foreseeable future. Network connections can easily be developed and open source coordination and collaboration would certainly follow. Additionally, terrorists may find useful and powerful allies among nation-states (such as Venezuela, Russia and Iran) that desire to reduce global oil production, as well as selectively withhold the sale of oil from nations such as the U.S. while supplying others. Oil exporters such as Russia and Iran will continue to adopt tit-for-tat strategies in response to U.S. policy in the Middle East⁸⁰.

RECOMMENDATIONS

The U.S. and other oil importing nations need to aggressively pursue alternative energy sources while promoting more efficient use of oil. Nations should collectively fund and research alternative energy sources, and find substitutes for petroleum based products such as plastics. The intent should be to develop alternatives advantageous to all oil consuming nations. The use of alternatives to oil, particularly for energy use, must be implemented in an orderly fashion so as not be too economically disruptive (e.g., displacing workers, manufacturers, and service providers faster than economies can retrain and reemploy them).

All nations need to become significantly more efficient users of oil. As substitutes are developed, highly industrialized nations should be the first to wean themselves from oil. Newly industrializing nations and developing nations should follow suit over time. Until then, they should benefit from cheaper oil prices as demand pressure eases due to consumption decreases among highly industrialized nations.

The U.S. should not get directly involved in nor condone a war over oil. Such as in the case of Iraq, the mere perception alone would fuel resentment toward the U.S. by its adversaries, other petroleum importing nations, and a significant portion of the American public--not to mention the human and financial costs associated with war.

In the short run, through an enhanced Theater Security Cooperation (TSC) program, the U.S. could provide security assistance to nations struggling to combat illicit activities that disrupt the flow of oil. Viable support options are a combination of civilian and military security assistance; training of host country personnel; and sharing intelligence as well as intelligence, reconnaissance, and surveillance equipment. A greater forward maritime presence would provide a stabilizing presence to nations struggling to combat those who target petroleum production and infrastructure, further providing a note of caution and deterrence through a maritime crisis response capacity. It would also give the U.S. an opportunity to work maritime security issues in cooperation with other nations, particularly those emerging regional hegemones such as China and India. Both China and India have growing interests in promoting regional security, stability, and unimpeded flow of oil. In fact, India will have the third largest Navy in the world within the next 10 years. Maritime presence coupled with surveillance equipment, intelligence sharing and technical assistance would go a long way toward protecting the transport of oil to consuming nations. However, all of this will mean that a growing number of U.S. military will be needed to protect overseas oil fields, pipelines, refineries and tanker routes.

Nations led by the U.S., China and India should be seeking to secure their collective interests vice competing amongst themselves for oil sources. Nations individually seeking to secure self-interests in today's global environment will likely do so at the detriment of others, potentially leading them into conflicts with other nations that are disruptive to global commerce and international relations.

Collective interest also means collective security and military cooperation to protect the flow of oil for the betterment of both producing nations and consuming nations. Anything short of collective security plays into the hands of insurgents and international terrorists who seek to alienate, divide and defeat national interests, particularly those of western industrialized nations. The most legitimate and comprehensive collective approach would be through a United Nations mandate, executed by a coalition of the able and willing.

Sound governance amongst fragile oil exporting states must be collectively addressed by the United Nations. A nation's dependence on imported oil should not come at the expense of the people whose nation is exporting oil, but rather to each nation's economic benefit. Governments who use oil revenues to the detriment of their citizens should be identified and held accountable through United Nations-sanctioned criteria and enforcement mechanisms that are honored by all nations. Until abusive and self-serving governments have no means to financially support their regimes, they will continue to exist at the expense of the people they govern. Finally, for oil exporting developing countries whose primary export is oil (indeed, most of OPEC), the international community must work with these nations to diversify their respective economies in order to protect their economic well-being for life after oil. The failure to do so, will likely lead to economic turmoil, political instability, and military conflict requiring international intervention.

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