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***The Pursuit of Energy:
A Catalyst for Conflict***

Working Paper

INTRODUCTION

For over thirty years, the annual UNIS-UN conference has provided hundreds of students from all over the world with the opportunity to explore issues of contemporary global significance in the General Assembly Hall of the United Nations Headquarters in New York City. This year's topic, **The Pursuit of Energy: A Catalyst for Conflict**, once again tackles an issue of paramount importance. As the world rapidly approaches the end of the fossil fuel tunnel—moving steadily towards that looming menace that is “peak oil”—the pursuit of energy resources is showing itself increasingly clearly to be fueling conflicts worldwide. On the political, social, and economic planes, energy dependency has left in our hands a dangerous world, hence the subject of this year's conference.

Written entirely by members of the UNIS-UN organizing committee, the articles compiled in this working paper seek to provide a context for the conference. Based largely on a series of case studies examining energy-based conflicts, supported by shorter sections on the history and future of energy, the paper aims to give conference attendees a global picture of the current energy crisis, where it came from, and where it is going. Also, for the first time, this year's working paper features a brief interview, allowing students to benefit from the insight of Hamilton College professor and oil expert Michael Klare (turn to page 9 for his interview). In addition, the paper features two student-written opinion articles on Iran's nuclear rights.

It is the hope of the UNIS-UN organizing committee that the foundation provided by the working paper will help students to benefit more wholly from this year's UNIS-UN conference, to participate more actively in it, and to take with them real insight into this pressing issue.

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CHAPTER I: A Brief History of Energy Dependency

The Industrial Revolution

The Industrial Revolution, a phase of societal and economic development which lasted from approximately 1760 to 1850, saw fundamental changes occur in many aspects of British life. Originally based on an agricultural infrastructure, England entered the era of new technology which not only transformed Britain's agricultural, transportation, communications, and social sectors, but also began the country's—and the world's—heavy reliance on natural resources.

Though the early stages of the industrial revolution were focused on agriculture and textile technology developments, the invention which really ushered in the era of unchecked energy consumption was the steam engine. A number of industries needed the ability to apply enormous power

various industries, including both urban and rural communities, and the number of cities grew rapidly.

Coal, a prominent and abundant natural resource, was the driving force behind the Industrial Revolution. By the end of the seventeenth century, wood had become a scarce resource; forests that once covered England had been destroyed to provide the population with fuel. Because of the high import prices of wood, the British turned to coal as the new source of energy. Since it had higher carbon content than wood, coal became an even more attractive substitute. Coke—a high-carbon, converted form of coal—was used to produce iron from iron ore. Using coke for heat and energy eliminated the need for charcoal, a more expensive, less efficient fuel. Metal makers then discovered ways of using



A steam-powered locomotive coasts through the Chinese countryside.

to continue production growth, and James Watt's steam engine (1769) provided a practical and efficient solution. Its application was virtually limitless, and it was a catalyst for an increased rate of industrialization. In addition, the steam engine led to the progression of the transportation sector.

The improvement of transportation and communications stimulated the Industrial Revolution. A quicker and cheaper system of transportation was needed for raw materials, manufactured products, food, and people. Trains and railroads soon dominated the transportation sector: railroads proliferated in England, growing from 1,000 miles in 1836 to more than 7,000 miles by 1852. The railways connected

coal and coke to speed the production of raw iron, bar iron, and later, steel; iron and steel were vital in making both railways and machinery. In addition, the coal was used to heat factories and homes throughout the urban areas of England, which led to the growth of cities and a greater demand for coal.

The Industrial Revolution was the origin of today's industrialized society. Through a heavy reliance on coal, the British were able to transform their agriculturally based infrastructure into one that depended upon factories and industries; thus they sparked a global trend of fossil fuel dependence which brought the world slowly and unwittingly

towards today's energy crisis. The coal phase only constituted the beginning of modern energy dependency, however; an equally important shift came with the discovery of oil.

The Shift to Oil

Even today, half of the electricity produced in the United States is generated by coal-fired power plants. From the industrial revolution until 1951, coal fueled the developed world almost singlehandedly; it was used in gas lights, steam engines, electricity plants, and for a variety of domestic purposes.

In the latter half of the twentieth century, however, another expedient fuel source rose to prominence: oil. The invention of Drake's homemade drill in August 1889 led to an increase in oil production and consumption. The following years showed a rising demand for fuel oil because it (a) became easier and cheaper to handle, (b) could be used to create stable temperatures, and (c) minimized problems associated with ashes. Use of coal and the many problems accompanying it have been gradually reduced since the end of the nineteenth century, but the increase in oil consumption has itself brought a bevy of problems, as should become clear from subsequent articles in this working paper.

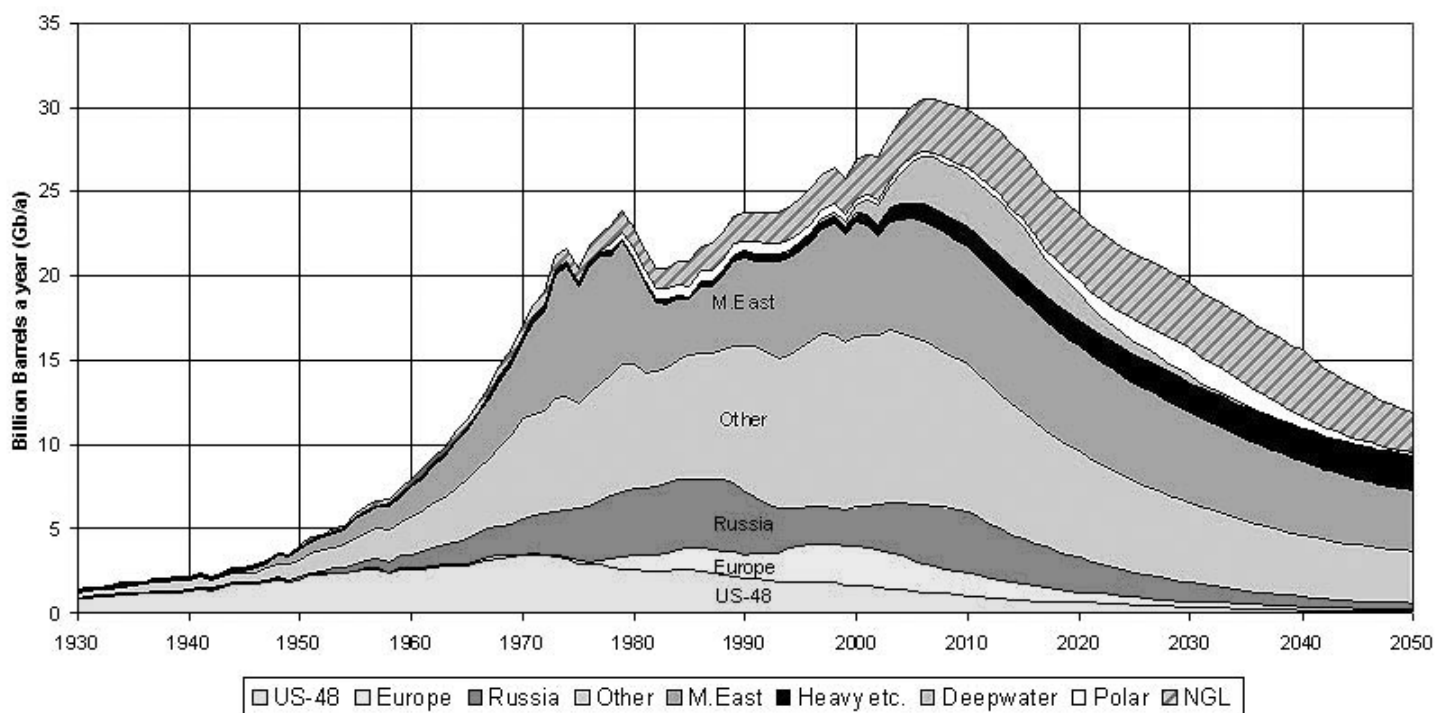
Today, many countries rely largely on oil to meet growing energy demands. According to the Energy Information Administration (EIA), the ratio between the barrels of oil

imported to barrels exported in the United States was eleven million to one million in the year 2000. The five leading suppliers were Canada, Saudi Arabia, Venezuela, Mexico, and Nigeria. Such high levels of imported oil shows how much oil the United States consumes alone. China, too—which requires vast amounts of energy to fuel its rapid development—has been vigorous in securing oil contracts. Due to its limited market, China is supplied with oil by countries such as Sudan, Angola, and Gabon.

Despite the dominance of oil over coal, the latter is still used throughout the world even though it too poses environmental challenges. Today, 40% of the world's electricity is supplied by coal. The biggest market for coal is Asia because many countries do not have the natural energy sources to provide their energy needs. Asia currently accounts for 56% of the global coal consumption. Japan, Taiwan, and Korea, for example, import huge quantities of steam coal for electricity generation and coking coal for steel production.

Though coal is still an important resource, oil dominates today's energy markets. The rapid consumption of this precious resource is predicted to increase despite warnings of diminishing reserves. Both coal and oil pose a danger to societies and the environment, and yet they continue to prevail over more sustainable sources of energy.

OIL AND GAS LIQUIDS 2004 Scenario



Projected oil reserves 1930-2050 according to the Association for the Study of Peak Oil.

CHAPTER II: Case Studies

AFRICA

Darfur

It is no secret that the Darfur region of the Western Sudan is currently plagued by poverty and genocide. Over recent years, constant warfare and socio-political conflicts have claimed innumerable lives and left much of the region's population homeless. Unfortunately, the cause of this tragedy stems largely from the abundance of oil in southern Darfur. Many believe that the genocide is occurring between the Arabs and Africans; it has become evident from recent actions, however, that the Sudanese Government and its militia are the aggressors against the civilians in Darfur.

The conflict began in 2003 when the Sudanese Government initiated a spate of killings in the Darfur region, claiming the lives of approximately 200,000 civilians. The Sudanese Government, in turn, is supported and funded by large investment companies, namely the China National Petroleum Corporation (CNPC). Due to its rapidly increasing demand for oil to fuel its growing industries, the Chinese government has invested in many oil-rich nations, Sudan being its most successful investment. At present, the CNPC has set up a fifteen million-ton oil field in under two years, as well as a system capable of processing about 500,000 barrels per day. Over 60% of Sudan's oil exports are sent to China, where they account for 7% of Chinese oil consumption. The CNPC lends its support to the Sudanese regime in exchange for the privilege of mining the country's oil rich south. Thus Sudan's resources are not only contributing to the booming

Chinese economy, but also—in an indirect manner—to the machinery used to perpetuate the genocide in Darfur.

China's petroleum investments directly support the Sudanese government, which in turn finances dubious military activities. The CNPC is an international entity which gets its financial backing from stock trade, and has been cited as the savior of the Sudanese regime and economy. Sudan's President Omar Al Bashir recently stated: "Just when countries give us sanctions, God gives us oil."

Much of this oil, which is Sudan's main export, is mined by the CNPC, facilitating the blend of financial resources within the government services for the purchase of military equipment—the very same military equipment used to spur on the conflict in Darfur. The CNPC gave at least \$5 billion to the Sudanese government, and yet Sudan's poverty rate remains astoundingly high—testament to the regime's disproportionate military spending and rampant corruption.

China's need for oil is also likely to have motivated their \$13 million donation to the Sudanese government, much of which funded a renovation of the Sudanese Presidential Palace. It is evident that the Chinese government and the CNPC are intent on investing in Darfur's untapped oil sources and maintaining a friendly relationship with the Sudanese regime in order to protect their interests; it seems they are prepared to ignore the brutality of the government towards its civilian population.

China is a permanent member on the United Nations Security Council and, despite having publicly condemned the ongoing genocide in Darfur, opposes sanctions proposed by other United Nations member states. Some claim that China's sole interest is in protecting its oil-drilling rights at all costs. And if it means exercising its powers at the highest level to ensure its position in the oil mining world, it would appear that this is the course CNPC and China are willing to take.



*Adjacent and across (top):
Young orphans from Darfur, victims of a conflict
fueled in part by oil, have been sent to refugee
camps in neighboring Chad (as pictured).*



Nigeria

The Niger River Delta plays host to the fifth largest source of US oil imports. These vast petroleum reserves attract western governments and oil corporations, sparking conflicts between local people, bandits, the Niger armed forces, and the corporations themselves. Ever since Shell discovered oil in the 1950s off the coast of the Niger Delta, this area has played a prominent role in the global race for oil. However, the local population feels they haven't benefited from the influx of western corporations, leading to resentment and violence throughout the region.

Oil activities have caused unrest since 1990, when the Ogoni and Ijaw people clashed with the oil companies. The Ogoni people occupy the area southeast of the Niger River. When oil was discovered in this region in 1957, Shell and Chevron began to seize land there. Meanwhile, the Nigerian Company began to distribute more land to oil companies while neglecting to give the native inhabitants full compensation. By 1994, over 2000 civilian deaths had been caused as a result of oil endeavors.

Relationships between indigenous groups like the Ijaw and the Itsekiri have also deteriorated since the discovery of oil in the region. The Ijaw had always been envious of the favoritism shown towards the Itsekiri, who have been granted trading rights. The oil crisis has only deepened these divides.

Even as conflicts between them grow, the native people continue to sabotage the oil companies' infrastructure. Oil

operations in Nigeria are hardly smooth, and oil companies have felt the backlash of their economic exploitation from the nation's people. Rebel groups take 300,000 barrels of oil a day from the main pipelines, and the Chevron-Texaco Company has had to pay \$750 million to compensate for sabotage. As the oil companies develop their security, tensions grow and villages and lives are taken. Nevertheless, Shell is determined to stay in Nigeria. They deny that their operations have caused problems in the region; according to a Shell spokesman, "We don't agree with that conclusion. We are committed to our operations in Nigeria."

Yet oil companies now face the possibility of being blamed and sued for these deaths. In March 1998, Chevron Texaco was ordered to stand trial for the deaths of nine Nigerians. Another lawsuit indicted Shell for conspiring with Nigeria's former military regime to cause the hanging of nine Niger River Delta activists. Both oil companies deny these allegations.

The oil crisis still rages in Nigeria. As our world continues to rely on oil for industrial and commercial purposes, oil-rich regions like the Niger River Delta continue to be exploited with little regard for indigenous populations and human rights in general.



In Nigeria, a man watches a flame roaring at one of the country's many oil refineries.

NORTH AMERICA

U.S. Dependence on Oil

The United States is one of the largest consumers—if not *the* largest consumer—of the world’s natural resources. With a large economy and a wealthy populace, its people can generally afford to buy cars, refrigerators, air conditioners, and other amenities. This comes at the cost of heavy oil and natural gas consumption. The USA—whose government pays little attention to energy issues—is very dependent on imported energy, and this has had a negative effect on its foreign policy.

Energy dependence becomes all the more complicated when a nation relies on its trade partners for natural resources. The United States, with 5% of the world’s population, uses 25% of the world’s oil, which could be disruptive as the dependency on oil is continually rising. Oil has long dominated the transportation sector (it now accounts for 68%) as

“Growing oil dependence creates a major problem for the United States”

a result of its relatively low cost and its convenience for storage and transportation. Such dependence on oil in the US transportation system makes oil vital to the US economy. If oil remains a major fuel source, the import dependence is expected to rise in the next few decades.

The growing demand for oil will further increase the problems that are already seen in the world petroleum market. In the coming decades, the amount of low-cost oil is predicted to decline, which will only create higher prices for the cost of production and transportation. US administration has thus far done little to reduce dependence on foreign oil, and has instead pursued an increasing number of oil investments abroad. Even if other large consumers—from Western Europe to Japan as well as India and China—rely on foreign oil, none of them share the foreign policy responsibility of the United States.

Still, the United States has become much more energy efficient in the last few years. Although it imports oil from Canada, Mexico, Saudi Arabia, Venezuela, and Nigeria, it has 22 billion barrels of oil reserves. Increasing domestic production is an effective strategy to serve as a model for other nations to expand exploration and production activities. Even technology can help the United States to turn away from its dependence on oil and, subsequently, introduce renewable sources of energy into everyday life.

Growing oil dependence creates a major problem for the United States. Slowing the rising oil demand can only be achieved if it successfully reduces its consumption. In the coming decades—when oil reserves decrease and the price of oil rises—the policies that the United States implements will be important as they will impact the economy as well as the people.

Rising Oil Prices

Oil prices in the United States have been rising rapid-

ly due to the heavy reliance on increasingly scarce oil as a source of energy. Twenty years ago, American experts agreed that there was more oil than needed, but now, there is not enough. The world is approaching what geologists call the Peak Oil Point, or the time when the demand for oil is more than the supply, and we need to act quickly.

The U.S. imports 58% of all oil produced, two-thirds of this percentage being imported from foreign countries. Oil is in demand for a variety of reasons. Firstly, 45% of each barrel is used to produce gasoline. The remainder of each barrel is used for heating oil, diesel fuel for trucks and buses, petrochemicals, propane and asphalt. Industries use substantial amounts of oil in order to produce items such as textiles, tires, pesticides and plastics. When the price of oil increases, the production costs for these industries also rise and their profits are reduced. This is why high oil prices threaten to shrink industrial production.

From 1940 to the early 1970’s, oil prices were gener-

ally level. At this time, the government of the United States had slowed national oil production to control prices, but this meant that more and more oil had to come from overseas. Unfortunately, there was a massive bump following this period due to OPEC (Organization of Petroleum Exporting Countries) taking control of the oil prices.

In 1980, the average monthly price of oil per barrel was \$38. Since then, the cost of oil has skyrocketed. By September 2003, oil was worth \$60 a barrel. Despite the decrease of prices in the winter of 2004, it rose to new heights in March 2005. In January and February of 2006, prices rose again by 3.7%. Further increases were seen in August 2006, and one year later, in September 2007, oil prices rose to an all-time high of \$80. A barrel of crude oil now costs over \$90, and prices momentarily jumped past \$100 in early 2008.

In August 2005, Hurricane Katrina crippled the oil flow from the Gulf Coast, which is the largest domestic oil source for the U.S. market. Power failures halted oil production at two major on-shore pipelines and 10% of the nations refining industries were not in operation in the wake of the devastating storm. Disasters such as this, in addition to labor strikes, fires, and terrorist attacks on oil refineries contribute to the rising oil prices, but they are not the heart of the issue as they have a more short-term effect.

Historically, the Western World has consumed large amounts of oil in comparison with developing nations. But with economies in formerly underdeveloped countries like India and China booming, vast oil consumption continues to spread, thus increasing global dependence and demand for oil, and accordingly, its prices.

The United States is the number one consumer of oil, and it only accounts for 5% of the world’s population. If the demand and prices for oil continue to increase as expected, there can be only more conflict to come.

SPECIAL FEATURE:

Interview with Professor Michael Klare

Michael Klare is a professor of peace and world security studies at Hampshire College as well as the defense correspondent of The Nation. He has written a multitude of books on global issues, including Blood and Oil: the Dangers and Consequences of America's Growing Dependency on Imported Petroleum and Rogue States and Nuclear Outlaws: America's Search for a New Foreign Policy. His new book, Rising Powers, Shrinking Planet: The New Geopolitics of Energy, will be released in March 2008.

Blood and Oil discusses the role that oil plays in America's foreign policy and how it leads to the support of corrupt and unjust regimes. In the book, Klare warns that protecting oil interests in turbulent regions will inevitably lead to military involvement in these areas.

To what extent do you think the Iraq war was fueled by oil interests? And to what extent is the prolonged civil war also fueled by oil?

I believe the war in Iraq was fueled by geopolitics: a

“The elites who shape American foreign policy have always viewed the procurement of oil from the Middle East as their number one priority”

struggle by the United States to ensure that it alone remained the dominant power in the Persian Gulf region and that any challenger—in this case, Saddam Hussein—would be eliminated. But then you must ask: why would the United States seek to be the dominant power in the Persian Gulf? The answer: because the Gulf houses two-thirds of the world's remaining untapped petroleum reserves, and whoever controls the Gulf controls the economic pulse of the world economy. So it is U.S. policy to ensure that this country, and this country alone, wield that power. So in this sense, the war in Iraq is about oil.

The civil war in Iraq is also about oil, but in a different sense: it is about who controls the distribution of revenues that are secured by the sale of oil to foreign consumers. Each of the various factions—Kurds, Sunnis, and Shiites—has a different vision of how those revenues should be shared, and are fighting, in part, to ensure that their vision prevails. The Kurds and Shiites want an Iraq in which the regions control the distribution of oil revenues; the Sunnis are fighting for an Iraq in which the central government (in which Sunnis would have a significant voice) would control the distribution.

You've talked about American hypocrisy with regards to claims of bringing democracy to the Middle East while supporting repressive regimes. Could you expand on this?

The elites who shape American foreign policy have al-

ways viewed the procurement of oil from the Middle East as their number one priority, trumping all other considerations. Because many of the countries in that region are unstable or divided along ethnic and religious lines, the U.S. has always favored strong central governments—often monarchies or authoritarian governments—that can maintain stability and ensure the uninterrupted flow of oil. Historically, the regime that has been most favored by Washington in this manner is the Saudi Royal Family: The U.S. government first promised to defend the House of Saud in return for privileged access to Saudi oil in 1945, and this promise has remained a central feature of U.S. policy in the Gulf until this day. Over time, the U.S. has also supported other monarchies and regimes in this manner, including the Shah of Iran, who was restored to power with U.S. help in 1953, and the government of Kuwait. None of these regimes can be considered truly democratic, nor has the United States made a concerted effort to push them in that direction.

How do you propose that the US end its dependence on foreign oil?

By reducing its consumption of petroleum. This, of course, requires the imposition of much tougher fuel-efficiency standards for motor vehicles and the more rapid development of alternative sources of energy, especially liquids obtained from non-food biomass.

How is the drive for oil impacting Sino-Russo-American relations?

On one hand, the United States and China have begun competing with one another more aggressively for access to foreign sources of oil, especially in Africa and Central Asia. This has entailed not only traditional economic means of competition, through the power of the purse, but diplomatic and military means, including the transfer of arms and military equipment to gain the support of governments in these areas. Also, because the United States remains the dominant power in the Persian Gulf area and can theoretically cut the flow of oil from the Gulf to China in the event of a future Sino-American crisis (say over Taiwan), China has sought to develop alternative sources of supply that are less vulnerable to American military power—and Russia appears to them as an attractive option in this regard. So China is trying very hard to increase its reliance on oil and natural gas imports from Russia.

LATIN AMERICA

Mexico

Ever since the discovery of oil in Mexico in the 1900s, the country's oil industry has experienced a series of peaks and downfalls. Highlights include providing 25% of the world's oil at 193 million barrels in 1923. However, in 1938 President Lázaro Cárdenas nationalized the petroleum industry and what first seemed like a productive monopoly soon turned sour. Banning the foreign capital and expertise which had dominated the Mexican oil industry for so long damaged the economic growth and development of the country at a

engaged in further exploration, [found] fresher reserves, and purchased capital goods and technical expertise from abroad" (<http://www.country-studies.com/mexico/oil.html>). Mexico's petroleum output soared from 2.7 to 3.1 billion barrels per annum (1983-1991). In 1993, Pemex operated seven oil refineries with a total capacity of more than 1.5 million barrels per day, the eleventh largest in the world.

However, years of corruption within Pemex left behind poor administration, low productivity, and overstaffing. The Mexican government could not afford to ignore these problems because the economy was heavily dependent upon oil and it was Pemex which produced a large majority of the



Greenpeace activists fight for more sustainable energy in a country which is among the world's top oil exporters.

critical time.

Not until 1973 was Mexico able to surpass its peak oil production of the 1920s. The country accomplished this through a large increase in internal and external demand combined with the exploitation of new oil fields. As Mexico's profits rose, President Lopez Portillo "decided to increase domestic production and use the value of Mexico's petroleum reserves as collateral for massive international loans, most of which went to Pemex (state-owned company Petroleos Mexicanos). Between 1977 and 1980, the oil company received US \$12.6 billion in international credit, representing 37% of Mexico's total foreign debt." Mexico used this money to further expand its oil industry. For example, it "constructed and operated offshore drilling platforms, built onshore processing facilities, enlarged its refineries,

nation's revenues. This meant that if the Mexican government didn't want to see its economy fall into a recession, it had to do all it could to push the oil industry into a more efficient route. A tragedy involving Pemex soon sparked its change in infrastructure. The company was divided into four subsidiaries; Pemex-Exploration and Production (E&P), Pemex-Refining, Pemex-Gas and Basic Petrochemicals, and Pemex-Petrochemicals. "Each unit became a semiautonomous profit center, directing its own budget, planning, personnel, and other functions."

Recently, Mexico's former president Vicente Fox uncovered a deep-water oil field which produces up to 100 barrels per day of crude oil. Although recent reports show that the country's total oil reserves fell approximately 2% between 2003 and 2005, Mexico is still Latin America's largest oil

producer. Currently, oil comprises one third of the nation's entire income. With the discovery of this new oil field, Mexico can hope to see a further increase in employment and exports. This could not have come at a better time, as Pemex is currently facing financial difficulties. The Herald Tribune asks, "Why is the company starved for cash?" Even with the new discoveries, Pemex's total production, which is now at approximately 3.3 million barrels a day, could see a decline within ten years without the help of major investments.

Though the company is not doing so well at present, many argue that the Pemex monopoly has a positive effect on the Mexican economy. Because Pemex holds a monopoly of the country's oil markets, Mexico also benefits not being a member of OPEC, which some claim suffers from oligopoly and cartel problems; instead, it has the right to change its oil prices as it chooses, and thus it benefits from this monopoly.

Venezuela

Venezuela is home to a vast supply of natural resources such as petroleum, natural gas, iron ore, gold, bauxite, hydroelectric power and diamonds. Despite this luxury, its over dependence on the oil industry, which is subject to volatile prices and badly conducted mining operations, is endangering the rain forest, indigenous people, and the country's economy, which would crumble without this precious resource.

Venezuela owns one of the largest oil and natural gas reserves in the world. Its fields contain approximately 80 billion barrels of petroleum. Its oil supply, as alluded to earlier, is crucial to the economy as it accounts for 75% of total export income, 50% of total government income and close to 33% of Gross Domestic Product (GDP). Venezuela ranks among the top ten crude oil producers in the world, exporting 2.2 billion barrels per day, and is a founding member of the Organization of Petroleum Exporting Countries (OPEC).

Nevertheless, in 2007, natural declines in Venezuela's oil fields have diminished its national crude oil production. As a result, Venezuelan petroleum exports to the United States, its biggest trade partner, have suffered.

Natural gas is another crucial Venezuelan resource. In 2007 it was estimated that the nation held 152 trillion cubic feet of natural gas reserves, second in the Western Hemisphere (the first being the United States). But in 2006 alone, Venezuela produced and consumed one trillion cubic feet of this resource, most of which was dedicated to creating methods to aid crude oil extraction—perpetuating a vicious cycle of energy use. According to the chief government agency responsible for regulating the natural gas sector, the petroleum industry utilizes over 70% of Venezuela's natural gas production. Furthermore, in 1999, Venezuela adopted the Gas Hydrocarbons Law which opened all facets of the natural gas division to private investment. This law attempted to establish a general distribution system and an increased consumption of natural gas.

Recently, Venezuela has also developed its own domestic gas pipeline network, called the Interconnection Centro Occidente (ICO), in order to maximize domestic use of gas production. The system links the central and western regions, increasing the accessibility of natural gas to domestic consumers. It also supports re-injection, a method that amplifies crude oil extraction, in the western oil fields. Regardless of this development, there are still no pipelines exporting gas to foreign areas; however, there is speculation concerning the construction of a pipeline from Colombia to the Pacific Ocean. If this were built, it would increase Venezuelan gas exports to Asia. There is speculation that China will provide funding for such a pipeline, but no concrete arrangements have been made as of yet.

Venezuela also exports electricity, the bulk of which is sent to Brazil and Colombia. The majority of Venezuela's energy supply is provided by hydroelectricity; in 2003, it accounted for 66% of the supply. Most of Venezuela's hydroelectricity production occurs on the Caroni River in Guyana State, home to the second-largest hydroelectric plant in the world.

Overall, although oil production is a vital aspect of the Venezuelan economy, it is taking a devastating toll on the local environment. For instance, the Caribbean coast is polluted with oil. What's more, Venezuela is South America's top emitter of carbon dioxide and therefore, it is evident that cleaner measures have to be taken if the country hopes for a sustainable future.

DID YOU KNOW?	
<i>The World's Top Twenty Oil Producers</i>	
COUNTRY	2004 PRODUCTION (MEGA-BARRELS/DAY)
1. Saudi Arabia	10.4
2. Russia	9.3
3. The USA	8.7
4. Iran	4.1
5. Mexico	3.8
6. China	3.6
7. Norway	3.2
8. Canada	3.1
9. Venezuela	2.9
10. The UAE	2.8
11. Kuwait	2.5
12. Nigeria	2.5
13. The United Kingdom	2.1
14. Iraq	2.0
15. Frmr. USSR (esp. Kazakhstan)	1.9
16. Algeria	1.7
17. Brazil	1.5
18. Libya	1.5
19. Indonesia	1.1
20. Angola	0.9

ASIA

China's Increasing Demands

One of the fastest growing nations in the world, China has recently seen both rapid industrialization and an economic boom. Populated by 1.3 billion people, China is the world's most populous country and the second largest oil consumer. With its booming industry in domestic products, its need for energy is rapidly increasing, and is suspected to increase by 150% by the year 2020. Its economy has grown about 9% annually since 1978 due to foreign investments, exports, and large scale domestic production. Its economic growth has also led to a significant decrease in poverty, an increase in income level, and integration into the global market. To keep up with the demand and its own industrial needs, China is forced to increase its oil imports. Currently its oil consumption rate is growing by 7.5% per annum. This is seven times greater than that of the United States.

Incredibly, until 1993, when demand for China's exports began to soar in the world market, China produced more oil than it actually needed, allowing it to network and export oil. Most of its oil supplies came from oil fields in Daqing, which were discovered in 1959, as well as from drillings in the South China Sea and Bohai Gulf, which began in 1979. In 1990 oil consumption by Chinese industries was about 70 million tons, while in 2005 it doubled to almost 140 million tons. Between 1993 and 2005, the quantity of oil used for China's transportation grew by five times, rising from 16.8 million tons to about 100 million tons of oil per annum. Altogether, China's energy consumption has tripled astronomically in the last 15 years, reaching approximately 300 million tons or 6.5 millions of barrels per day of oil in 2005; experts predict that this quantity will continue to grow.

China's steady economic growth has also resulted in many internal changes. Its urban areas consume an estimated 35 times more energy than its rural areas. This significantly adds to the increasing energy demands. Also, as poverty decreases and a new middle class continues to grow, a demand for higher living standards emerges, which therefore results

in a higher rate of energy consumption. Higher living standards have encouraged the growth of various other means of transportation such as automobiles and airplanes. This latter development is also due to the price of gasoline in China, which is among the lowest in the world, so much so that gasoline sales in China already surpass those of many other nations. Consequently, one of the major reasons for China's increase in oil consumption during the last decade, besides its growing industry, is the population's changing taste in mode of transportation: an unprecedented percentage of the population has switched from using bicycles to driving private cars. The number of private cars owned in China today is almost 20 times larger than it was in 1991, soaring from 960,000 to approximately 20 million in 2007. Experts predict that the number will grow by another 2.5 million this year alone, and with a population of 1.3 billion people, many predict that China will not curb its high demand for oil in the near future. According to recent studies, transportation will be responsible for 50% of all oil demand by 2020 (in contrast to the 38% it holds now) and China could exceed the United States in total number of cars by the year 2030. The number of automobiles in China is growing by 19% per annum.

In relation to its consumption, however, China's oil production is relatively low. Some studies show that all of China's oil reserves could be depleted in less than 14 years, leaving China extremely dependent on foreign oil (already in 2004, 43% of China's oil was imported). The country has invested billions of dollars into oil-rich nations such as Russia, Iran, and Sudan (where its investments have sparked much controversy), and has also shown interest in Venezuela, the largest oil exporter to the United States. China now faces many energy and economic crises and has responded to its increasing demand by encouraging domestic production and maximizing output from its existing resources. It has also tried to increase the use of renewable energy sources. However, growth in renewable energy is slow and the vast majority of China's energy demands are still fulfilled by unsustainable and environmentally harmful sources. Every week, two new coal plants are built in China. According to the International Energy Agency, Chinese oil imports will equal today's U.S. imports by the year 2030. Despite China's efforts to import oil from various sources, it has become fairly dependant on Middle Eastern oil, with 58% of China's oil imports coming from the Middle East. Its access to oil in the region could possibly affect Chinese relations with the U.S., which so far has been aligned in terms of energy.

In order for China to support its skyrocketing economy, rising standards of living and global market demand, its energy consumption must rise. It is the second largest consumer of oil in the world and will continue to consume large amounts of this valuable resource, thus making it a key player in the energy crises of today.

DID YOU KNOW?

A few statistics on China:

- population of 1.3 billion
- used to have a surplus of oil but now imports almost half its energy supply
- economic growth has been at 9-10% since 1978 and its oil consumption rate currently rises at 8% per annum
- CO₂ emissions will match those of all other countries combined by 2030 if current growth continues
- the number of cars has risen twentyfold since 1991 (from 960,000 to 20 million) and continues to grow rapidly

Malaysia

Malaysia's oil and gas industry is the 25th largest in the world; the country is also southeast Asia's second largest oil producer after Indonesia. Its industry not only affects the world's energy market but also the rate of employment and the economy of the country. Since the discovery of oil in 1910 and the first offshore sighting of oil in the 1960s by Shell, the country has become a significant part of the global oil markets, because of its enormous oil and natural gas reserves. In 2003, Malaysia exported up to 230,200 barrels per day. This dependence on the country's natural resources places the country's economy at great risk.

The nation's economy is based mostly on trade with countries such as the United States and Singapore. The Malaysian government encourages direct foreign development, and, according to statistics taken in 1999, the US ranked first among all the countries investing in Malaysia. While there was a notable amount of US investment in electronics and chemicals, 60% of the \$10 billion the US invested in the region was in oil and gas.

Malaysia's economy is based primarily on exports. Until the 1970s, Malaysia's economy was focused on plantations and rubber. Since then, Malaysia has added palm oil and hard wood as major items of export, but the area of most economic growth has been in oil and natural gas. Recently,

the manufacturing sector also has grown in importance and it has helped the nation's economy expand 7.3% annually from 1990 to 1999. In 1997, Malaysia's annual budget included revenues of about \$23.1 billion and expenditures of about \$19.72 billion. The value of gross domestic product (GDP) was \$313.2 billion in 2006. Services accounted for 43% of the GDP; oil and natural gases, 46%; and agriculture, forestry, and fishing, 11%.

Malaysia's oil reserves, like those all around the world, are a fragile resource which will not guarantee the country long term prosperity. According to Oils & Gas Journal, Malaysia held approximately 5.6 billion barrels in 1996, but by January 2007, Malaysia's reserves dropped to about 3.0 billion barrels. At this rate Malaysia's reserves will last about another twenty years, and the state of Malaysia's reserves not only affect the economy but also the rate of employment. During recent years, Malaysia has greatly increased its production of oil and natural gas in order to meet the rising demand of the domestic and international markets. The country plays host to roughly forty oilfields and five oil refineries.

As we have seen, Malaysian oil plays an important role both in the country's economy and in world oil markets. If the country continues to rely so heavily on fossil fuels, however, they risk jeopardizing their economy.



An oil rig off the coast of Malaysia.

EUROPE AND RUSSIA

The EU and Energy

The EU, short for the European Union, consists of 27 different member countries situated on the European continent. It was formed after World War II for two reasons: first, it was meant to prevent another world war, and second, to assure an economically and politically stable future for its member states. As it grew larger, so too did its infrastructure, and the number of member states continues to expand. As with any growing nation or conglomeration of nations,

to increase the market and production of sustainable energy as well as develop new and existing methods of creating sustainable energy. These include wind-energy, biomass, hydroelectric, nuclear, and solar power. At this point, sustainable and reusable energy constitutes about six percent of the European Union's energy supply. In an attempt to cut back on foreign gas and oil imports, the EU has declared that it will try to double its reliance on renewable energy sources by 2010. Spearheading this effort is the ITER, short for International Tokamak Engineering Research project, which, once completed, will provide thirty-one times more power than



A recent meeting of EU representatives.

the issue of energy must be taken into consideration. As of 2007, the four major oil producing nations within the EU—Norway, Denmark, the United Kingdom and Italy—were all suffering from a general decline in their oil production.

Consequently, many nations in the EU are becoming dependent on imported foreign oil and gas. Russia, being nearby and large enough to supply the necessary resources, is the EU's principle source of oil. However, this dependency has serious political and economic consequences. One of these consequences is that when the supply of natural gas and/or oil from Russia is decreased or shut off, it will have a major impact on the nations of the EU. For example, when Russia got into a dispute with a few of its neighbors, namely Ukraine, oil exports were cut off and the EU suffered from an energy shortage. For this reason, the EU has declared that by 2020, a number of strategies to reduce oil consumption must be put into action, including the usage of new sources of reusable energy, such as nuclear energy, and mandating that a percentage of cars and trucks be run on an assortment of bio-fuels.

With oil production on the decline, the EU is attempting

the second largest existing reactor in existence. Although problems like the decreasing supply of oil and increase of carbon emissions still exist, the EU is well on its way to decreasing its oil demand from foreign suppliers and increasing its dependence on sustainable and reusable energy.

Russia and the Arctic Circle

Buried beneath the melting ice of the polar caps in the Arctic Circle are reportedly rich mineral and other natural resources. These valuable resources are becoming especially important due to the ever-rising prices of oil and the decreasing supply of other natural resources which are estimated to be around 10 billion tons of oil and gas. Possession of these resources would add significantly to any country's wealth in the coming years if the polar ice caps should melt. Knowing this, on August 2nd, 2007, Russia took the first step in claiming its "rightful territory" in the Arctic Circle by planting its national flag in the underwater arctic seabed. The success of the mission brought much pride and sense of accomplishment to Russia.

"Our task is to remind the world that Russia is a great Arctic and scientific power," said Artur N. Chilingarov, the

leader of the expedition and a veteran polar explorer. Indeed, the success of the mission has shown the world that Russia's technological and scientific advances are admirable. However, admiration is not the only outcome of Russia's expedition. Their bold move has caused tension to surface between Russia and other countries, as well as among environmentalists who are concerned about how the exploitation of these resources might affect the Arctic environment.

One of the most ardent reactions of disapproval to Russia's excursion was voiced in Canada in the days following the event. Peter MacKay, Canada's foreign minister, stated the following on CTV television: "This isn't the 15th century. You can't go around the world and just plant flags and say, 'We're claiming this territory.'" Russia responded to this comment by stating that it was merely marking its rightful territory. "The goal of this expedition is not to stake out Russia's rights, but to prove that our shelf stretches up to the North Pole. There are concrete scientific methods for this," stated Russia's foreign minister, Sergey V. Lavrov.

Surprisingly, this small scale conflict has been the only public reaction to Russia's actions. If any other country condemns the mission, it has done so silently. Most seem to regard the expedition as an ostentatious publicity stunt on Russia's behalf.

The race for the Arctic has only just begun. Though Russia is the first world power to follow through with such a feat, it is probable that other countries will soon follow in its footsteps. Canada, Denmark, Norway, and the United States have Arctic Ocean coastlines and have rights to economic zones within 200 miles of their shores. Denmark has already taken action and sent scientific expeditions to study the opposite end of the ocean-spanning ridge and to seek proof that it is torn from the continental shelf north of Greenland. Canadian officials, too, have suggested that they would like to build military bases in the Arctic. The hydrocarbons, mineral resources, and land development offered within the Arctic Circle, according to geologists' estimates, could be key to future national wealth and power.

While wealth and power are crucial for any country, many are concerned that seeking fossil fuels in the Arctic Circle is only a temporary and environmentally harmful solution. If countries desire these resources, it is almost certain that they will not work to preserve the polar ice caps and would feel no guilt in letting them melt. The results of this could be catastrophic and result in global flooding and a diminishing environment for wildlife in the Arctic Circle. The question for scientists now is how to obtain the resources while still preserving the environment.

Scientists and government officials worldwide have observed that Russia's actions will have a domino effect on other countries with territories along the Arctic coast and that it is only a matter of time until the Arctic seabed boasts an array of different national flags. One can only hope that these neo-imperialist powers will make an effort to protect the Arctic environment in their quest for resources.

Chernobyl

On April 26th 1986, a nuclear power plant in the city of Chernobyl, Ukraine exploded, causing widespread destruction and damage. This explosion affected different areas in the USSR; not only did it cause health and environmental problems, but it also resulted in economic deficiencies because the city relied on that source of nuclear energy for much of its power supply.

The accident was caused in part by a poorly designed reactor and in part by the employees of the power plant. That reactor was the fourth out of six at that power station to explode. It was not producing a sufficient amount of energy to maintain stability and the employees of that station failed to properly monitor the activity of the reactor. The decrease in stability caused a power surge which sparked the explosion. A large force of steam pushed off the reactor's cover plate, releasing fission products into the atmosphere, and allowing air to enter burning graphite and fuel in the reactor. As a result, the graphite moderator burned for days, emitting radio active waves of approximately 14EBq into the environment. In addition to emitting radioactive materials into the environment, the fires caused approximately 5,000 tons of boron, dolomite, clay, sand, and lead to drop onto the core that released radioactive particles.

One of the immediate effects of the explosion was that tens of thousands of people had to be evacuated from Chernobyl and surrounding cities. In addition, hundreds of thousands of people were involved in helping with recovery and cleaning up the damage. Therefore, a large number of these people were exposed to radiation, which posed a health threat.

Exposure to this ionizing radiation produced by fission reactions like those taking place in the Chernobyl plant poses potential health threats, which were experienced both by workers at the plant and by those involved in cleanup. The amount of damage upon a person's health from radiation depends on the amount of exposure. Exposure to radiation causes problems in the organs, tissue and attacks the bone marrow. It affects the tissue by causing an interference with the replacement of mature cells. Therefore it disrupts the body's ability to maintain the structure of the tissue so it can not properly function. Many people developed thyroid cancer as a result of the radiation. Over 2000 people died in the immediate aftermath of the accident, and the radiation continues to claim victims even today.

Other long-term effects included damage to local agriculture and to the Ukrainian economy. Many of the large local farmlands were damaged by the radiation and some livestock was born with deformities. Also, in the aftermath, Ukraine was deprived of a major source of energy since it lacked oil as a natural resource. Consequently, it became reliant on Russia to provide sources of energy (such as fuel, gas and even nuclear energy), and the country became indebted to Russia, as it still is. A lack of natural energy resources, costly public medical expenses, and exorbitant debt

to foreign countries were some of the causes of the great economic downfall that Ukraine and neighboring countries experienced. Meanwhile, the usage of nuclear power came to be questioned by various international organizations and the USSR. If there was one positive consequence of this catastrophe it was that all Soviet-designed reactors were modified to be safer and more stable to avoid similar occurrences in the future. Nevertheless, the accident at Chernobyl raises questions about the safety of nuclear energy even today, and it continues to be cited by opponents as an example of this resource's flaws.



The physical aftermath of the Chernobyl explosion (left) and its reaction from the media (above).

*At right:
Fragments of a tragedy.*



MIDDLE EAST

Saudi Arabia

The modern-day kingdom of Saudi Arabia, located on the Arabian Peninsula, is the world's largest continuous sand desert as well as one of the most oil-rich regions. Commercial production of oil in the kingdom began during World War II, after petroleum was discovered there in 1936, and eventually, Saudi Arabia became the world's leading oil producer and exporter. The accelerated development of oil industries led to rapid economic growth, which transformed the kingdom. Newfound wealth allowed for the creation of social programs, for example: Saudi Arabia was now capable of providing its people with free healthcare and education.

Oil industries are found all along the Persian Gulf and make up about ninety percent of Saudi Arabia's exports. As a result, the country has become a major trading partner of many oil-importing nations including the United States,

ports, exports, security, and development, both developed important bilateral trade and development agreements. Their relationship continues to benefit them both as Saudi Arabia exports oil to the United States, and the United States exports their products to Saudi Arabia. Therefore a close friendship has developed between the two, and the Saudi government has been involved in both the Gulf War and Operation Iraqi Freedom. Though their relations have been questioned after September 11, 2001, they remain very strong, as the US and Saudi Arabia are diplomatic, military, and financial allies, working together in the campaign against terror.

Iraq

The United States' economy is extremely reliant on foreign oil, considering that oil makes up one third of the US's imported trade. This long-standing dependency has been a trigger for war between the United States and Iraq.

Iraq, prior to the war, benefited greatly from its abundant

***“Oil now accounts for 95% of Iraq’s foreign trade earnings ...
[yet] the Iraqi economy is currently undergoing a period of stress”***

Great Britain, South Korea, Singapore, Japan, and many European Union member states. Saudi Arabia's oil revenues account for over ninety percent of their exports and almost seventy-five percent of all government revenues.

In 1974, Saudi Arabia's economy grew rapidly due to the demand for oil and rise in petroleum prices. Thus it gave Saudi Arabia a chance to expand foreign trade, resulting in increased imports.

Yet as more oil fields were drilled around the globe, the country's production of ten million barrels per day reduced to two million barrels per day by 1985. Saudi Arabia settled on a policy that established a goal to maintain the stability of the international oil market. By 1999, the country was able to raise global oil prices, along with many other oil-producing countries, through a campaign led by the Organization of Petroleum Exporting Countries (OPEC). Also, in that same year, Saudi Arabia was able to form the Super Economic Council in order to create and form policies that would reform or advance industrialization and education.

Saudi Arabia returned to prominence in the oil markets, bringing its daily production capacity to twelve million barrels. Saudi ARAMCO (Arab American Oil Company) became one of the world's leading producers of natural gas, and the country gained popularity among foreign companies, including the World Trade Organization (WTO). When Saudi Arabia became interested in foreign products as well as services, the country joined the WTO in the year 2005 by signing the Trade Investment Framework Agreement with the United States.

The United States and Saudi Arabia first established relations in the 1930s. With a common interest in oil im-

supply of oil, the third largest in the world. The country's vast oil reserves have been a key factor in its economic development since oil became the global energy standard, and oil now accounts for 95% of Iraq's foreign trade earnings. Consequently, oil plays a significant role in Iraqi politics. Because the United States is the world's largest oil consumer, its economic and political stability is extremely dependent on Iraqi oil.

Oil is considered a major factor in the war that is being fought in Iraq today. Due to the United States' dependency on oil, many government officials believe that the nation's top priority is to secure a steady supply of this precious resource so that they can maintain economic stability, even if it means engaging in armed conflict.

Though economic interests are often regarded as a primary cause of the Iraq war, the Iraqi economy is currently undergoing a period of stress. Before 1990, Iraq was one of the most prosperous and economically advanced countries in the Middle East. It had a large middle class, an advanced technical capacity, and, compared to other Middle Eastern countries, good education, decent health care, and educated women who contributed to the economy. However, Iraq as a centralized economy lacked the legal, regulatory, political, and economic institutions which form the basis of market economies. After years of a heavily controlled economy and a decline caused by a succession of wars—particularly following the war which continues to ravage the country today—the Iraqi economy is suffering, and the US government hopes to revive it by establishing a liberal, free market Iraqi economy. So far, they have attempted to accomplish this through the CPA (Coalition Provisional Authority), which has implemented some major regulatory and legal reforms

that have established the foundation of a market economy.

However, the long-term impact of those reforms is uncertain for three reasons. First, security and political problems in Iraq continue to obstruct economic reconstruction efforts. Second, the CPA is an occupying power, and the status of its legal reforms after June 28 is unsure. Third, the CPA pursued its economic program without much Iraqi input, and there is questioning whether the Iraqi government will later pursue CPA's goals and ownership. Even if an Iraqi government followed the CPA's laws, Iraq's institutions and enforcement methods might not be well enough prepared to ensure their survival in a country and region traditionally hostile to some of the changes the CPA has imposed, such as allowing foreign ownership of Iraqi assets. It will not be CPA's legal reforms but Iraq's new interim government and the transitional government to usher in a market economy in the coming years that will decide the future of

Iraq's economy. However, the United States could be blamed for placing too high a priority for the future shape of Iraq's economy without first effectively meeting the basic needs of Iraqis like security, basic services, and jobs. To make Iraqis desire a market economy, Iraqis must see concrete improvements in their lives coming from opportunities created by their economy. So far there are inadequate public services, unemployment, and insecurity.

Most would argue that the need to secure oil is not a valid excuse for the loss of hundreds of thousands of Iraqi civilians and thousands of American soldiers, as well as the damage done to the Iraqi economy and infrastructure. Yet many still claim that oil is necessary if we hope to preserve the present way of life, and that without it, society will suffer. The Iraq war is not the first oil-based war and will probably not be the last.



American troops (above) and militant Iraqi protesters (right).



SPECIAL PHOTO FEATURE:
The War in Iraq



*Clockwise from top left:
Two men examine the remains of a shelled building;
a man mourns the loss of his child in a bomb attack;
Iraqis protest against American intervention
after the death of a civilian.*

The United Arab Emirates

The United Arab Emirates (U.A.E.), a federation of seven states in the Middle East, has a diverse economy that makes it one of the most developed countries in the world, according to many socio-economic studies. Before 1962, the United Arab Emirates' economy was comprised exclusively of pearl cultivation, fishing, and farming.

Since 1962, the economy has been dominated by petroleum and natural gas exports. Even though the economy is expanding and the country's infrastructure is becoming more self sufficient, the U.A.E. relies heavily on oil production and exportation, mainly from its largest city, Abu Dhabi. Oil currently comprises 45% of the United Arab Emirates' exports. In 2003, the U.A.E. produced an approximate average of 370,000 m³ of oil per day. Abu Dhabi was responsible for 85% of this production, which is 314,500 m³. The remainder was generated by Dubai.

Estimations show that at its current rate of oil production, Dubai has less than ten years' worth of petroleum left; other Emirates have even less. The need for oil conservation is the key factor driving the diversification of the U.A.E. economy. New sectors are being created, which promote economic growth through tourism and international finance. These new sectors are now part of the economy, and as a result oil production is decreasing: between 2001 and 2002, oil production was reduced by some 4,000,000,000 dhiraams (U.A.E. currency).

In 2001, the United Arab Emirates' economy accumulated 221,751 million dhiraams in total through exports, and 52,181 million of those dhiraams were gained through the exportation of crude oils and petroleum.

Another important part of the United Arab Emirates' economy is tourism, which is dependant on the development of airline transportation. Etihad and Air Arabia are two new airlines joining the ranks of the old favorites Emirates (which gathers approximately three billion dhiraams each year) and Gulf Air. Also, the growth of tourism is associated with the enormous development of hotels, restaurants and other tourist attractions. Another major attraction is the recent project known as "The World", a group of man-made islands in the shape of the continents.

Agriculture still plays a key role in the economy of the United Arab Emirates. In spite of its arid climate, farm-land throughout the U.A.E. covers approximately 891,089 acres. This land is used to cultivate date palms, mangoes, tomatoes, beans, cucumber and pepper. Furthermore, a new project is being developed, which incorporates vertical farming and the reduction of deforestation.

Another old practice of the United Arab Emirates, fishing, still plays an important role in the U.A.E. economy. Recently, the fishing industry has grown dramatically. The conditions and standards of fishing boats have improved, so that fishermen can stay out at sea for longer periods of time. However, these growths have consequently decreased fish

stocks, and there are new laws concerning the business. It is illegal, for example, to catch an undersized fish, and to use less than one and a half inch mesh in fishing nets.

The economy of the U.A.E. in general is changing drastically and, in the eyes of many people, for the better. Though the country remains a primary oil exporter, its government has taken responsible measures to diversify its economy in order to ensure a sustainable future, and, in doing so, has reduced energy consumption.

Iran

Today, Iran has an abundant supply of natural resources. It has been proven that Iran's oil reserves hold at least 95 billion barrels, outnumbered only by Saudi Arabia, whose deposits contain 260 billion barrels, Canada (170 billion barrels), and Iraq (115 billion barrels). Some analysts think that there are still undiscovered deposits in the Caspian waters where Iran's massive oil field at Azadegan was discovered in the southwestern province of Khuzestan in 1999. In the same year, two major oil fields near Gavaneh were also discovered, which contained over 100 million barrels. Iran is hoping to increase its production capacity by as much as 7 million barrels a day by the year 2024.

The actual size and number of Iran's oil reserves are unknown. Some analysts were skeptical about the size of Iran's Bushehr field, which increased its oil reserves from 95 to 130.8 billion barrels. It has been speculated that Iranians were double counting their existing reserves. Regardless, Iran is a huge player in the oil industry. In recent years, Iran has been producing between 3.5 and 4.2 billion barrels per day. This adds up to 4% of the total global oil production. More importantly, if Iran's oil supply is disrupted, there will be a global shortage that would cause the price of oil to increase dramatically and affect every country in the world.

The world's growing need for Iran's oil shows the increasing global demand and the diminishing capacity of the existing suppliers to satisfy that demand. The world's oil reserves are slowly becoming inaccessible. According to the International Energy Agency, the Persian Gulf producers would have to spend about \$523 billion on new equipment and technology between the years 2001 and 2030 in order to increase output and meet the rising global demand. This net expense would not only create financial and technological problems, but also political ones because the cost would have to be supported by international loans.

Because the US sees Iran as a rogue state, American authorities claim that the country's vast deposits of oil solidify the economic and political threat posed by Iran, resulting in mistrust and hostility between the two nations. This tension is undermining US power in several ways. It is putting an increasing strain on America's relationship with many of its international allies, especially Japan, Pakistan, and those in the European Union, who continue to rely on Iranian oil. Iran is developing stronger political ties with American rivals such as China, Russia, and India. Beijing's new political

relationship with Tehran has been created by a growing Chinese demand for oil. For Russians, Iran's natural resources create many business opportunities.

Few countries are enthusiastic to join a US-led embargo on Iranian oil. Even though the US would like to see its European allies impose an oil embargo on Iranian oil, they cannot. Many of these allies import huge quantities of Iranian oil: Japan imported 572,000 barrels per day in 2004, Korea 105,000, and Western Europe 620,000. Their economies are oil-dependent and are far more likely to see an increase in oil prices.

Iranian negotiators said they would stop exporting oil if any country imposed sanctions. Some analysts argue that

they would not carry out this threat because the Iranian foreign exchange earnings are dependent on oil exports. If Iran does carry out this threat, it would injure its economy.

Iran plays a key role in today's oil industry. It will be interesting to observe what kind of challenges Iran will bring about in the future and how the major powers of the world will respond. Whether or not more oil reserves are discovered there, Iran will continue to support the growing global demand for oil for many years, and profit as a result; the question remains as to how Iran's increasing economic power will affect global power relations.

KEY QUESTION:

War on Iran?

Many argue that the United States is inevitably en route to another conflict with yet another oil-rich nation. This time, it has the Islamic Republic of Iran in its sights. Though relations between the two have been sour since the Iranian Revolution of 1979 (some argue it's been shaky since the CIA coup in 1953), never before have we been bombarded with more media coverage of a possible military strike against Iran. The official reasons have been force-fed to us in dozens of news reports, newspapers and websites: Iran's disputed nuclear program, their dictatorial regime, their backing of Shiite militia groups in Iraq, of Hezbollah in Lebanon and of Hamas in Gaza, and their refusal to accept the state of Israel. The Bush Administration and neo-conservative pundits have even compared diplomatic engagement with Iran to the appeasement of Nazi Germany before the Second World War. Amidst all this war-mongering rhetoric, one familiar yet crucial point has been excluded in the build up to war. Just as with the run up to the invasion and occupation of Iraq, oil has not been mentioned as a motivating factor.

Seeing as there is no current occupation in Iran to examine, one must use Iraq as the model. The initial justifications cited for the Iraqi invasion were Saddam Hussein's WMD program and his harboring of Al-Qaeda. When these premises were shown to be false, the Bush administration said that spreading democracy became the primary purpose of its occupation. As Iraq unfolded into civil war, many began to question US presence in the country and to this day, the military seems stuck in the quagmire that has emerged from this botched invasion. But, it seems that while ongoing US presence upsets Americans and Iraqis alike, the Bush administration perseveres. Perhaps this is because they still see lucrative potential in the country's oil reserves. The current projected cost of the war is a trillion dollars, which is dwarfed by the potential income of Iraq's oil (about 350 billion barrels multiplied by \$100 a barrel, perhaps more). One of the first laws passed by Iraq's new government concerned oil distribution, giving the Iraqi National Oil Company 17 of the existing 80 oilfields, leaving the rest and all undiscovered oilfields to Western companies.

How does Iran's oil history compare? From 1909 until 1951, the British held hegemony on Iranian oil reserves, taking up to 85% of its oil profits. In 1953, democratically elected Prime Minister Mohammad Mossadegh nationalized the oil; that same year, he was overthrown in a CIA operated coup d'etat and replaced by Shah Mohammad Reza Pahlavi, who would remain in power until the Iranian revolution of 1979. Iran was also one of the founding members of OPEC (Organization of Petroleum Exporting Countries) in 1960.

The US has a number of interests in Iran which it has skirted in discussion of a potential war. First, Iran controls the extremely important Strait of Hormuz, where about 20% of the world's oil supply comes out of. The Islamic Republic has frequently threatened to close the strait at the sign of any type of aggression, which would affect the global economy. Also, looking in the long run, controlling the oil markets of Iraq, Iran and Saudi Arabia would secure the United States' hold on the oil market, as well as the region (Iran and Syria are the only two countries in the region whose governments remain opposed to US interests). Having a hold on the oil markets might make the Chinese and Russian governments more dependent on the US market, as opposed to the other way around.

Oil has been "overlooked" amidst the steady drumbeats of war between the two countries. The reasons that the Bush administration has provided for an attack are eerily similar to the build up to Iraq, and the Islamic Republic, while under heavy scrutiny at home, remains defiant to American pressure. An invasion of Iran would be costly, both in money and casualties for both sides, yet it seems this fact has been ignored by both governments during this period of tension.

Opinions: Should Iran be allowed access to nuclear technology?

Affirmative

Lately, the Bush administration, the mainstream media and the so-called international community have been vociferous in condemning Iran for its uranium enrichment program. Yet Iran has consistently denied developing nuclear technology for any purpose other than public use. Iran is a signatory nation since 1968 of the Nuclear Non-Proliferation Treaty (NPT), an internationally recognized treaty to prevent the spread of nuclear weapons across the globe. It is based on the three pillars of non-proliferation, disarmament, and the right to peaceful nuclear energy. The treaty was born out of the Cold War in the attempt to reduce the then-seeming threat of a nuclear World War between the United States and the Soviet Union. Currently, 189 countries have signed the treaty, five of which possess nuclear weapons (The United States, The United Kingdom, France, Russia, and The People's Republic of China). Four major non-signatories include India, Pakistan, Israel and North Korea. India and Pakistan have openly tested nuclear weaponry while Israel's nuclear weapons system is an open secret to most informed observers. North Korea is currently in the process of dismantling its nuclear program in exchange for relief from years of sanctions and isolation.

Recently, Iran has come under fire for its nuclear program, particularly from NATO allies in the region. The country insists that its program is for energy uses while the USA and its allies argue that Iran is trying to build a nuclear weapon. Iran's nuclear program actually started in the 1950s (when it was a US ally) as part of the Atoms for Peace program. Until 1979, Iran was offered frequent treaties from The United States to help build nuclear technology. When Iranian-American relations crumbled during the Iranian Revolution, the Hostage Crisis, and the Iran-Iraq War, all nuclear activities were halted. In the 1990s, Russia and Iran began a joint research committee, which gave Iran access to Russian nuclear experts, and it is estimated that in the late 1990s, Iran began the enrichment process in secret.

In 2002, AliReza Jafarzadeh, a spokesman for the People's Mujahedin of Iran, revealed the existence of an underground uranium enrichment facility in Natanz and a heavy water facility in Arak. Iran's case was brought to the IAEA (International Atomic Energy Agency), the UN's nuclear watchdog. In November 2003, the IAEA confirmed that Iran had broken one of the pacts of the NPT by not revealing its nuclear enrichment program when it had first started it. Iran then let IAEA regulators into the country to inspect the program, as well as regulators from France, Germany and Britain. Furthermore, Iran signed additional protocol to halt enrichment and allow IAEA inspectors to examine employees, documents of procurement and government run military workshops in return for verifiable technological aid and eco-

conomic incentives. Over the next two years, the EU and USA did not fulfill their end of the bargain and Iran once again resumed uranium enrichment, this time publicly. The image of a nuclear Iran coupled with the fiery rhetoric of Iran's then newly elected president, Mahmoud Ahmadinejad, propelled the nuclear standoff to new heights.

On October 27th 2007, after four years of investigation by the IAEA, Mohammad ElBaradei, Director General, was interviewed by the Herald Tribune and asked the following: "...Have we seen Iran having the nuclear material that can readily be used into a weapon? No. Have we seen an active weaponization program? No." The article also stated that, "ElBaradei said he was worried about the growing rhetoric from the U.S., which he noted focused on Iran's alleged intentions to build a nuclear weapon rather than evidence that the country was actively doing so. If there is actual evidence, ElBaradei said he would welcome seeing it."

While the IAEA is continuing to investigate, the United States and its allies continue to worry about a number of issues with Iran's nuclear program. First, they wondered why, with Iran's abundant oil reserves, the country would revert to nuclear energy when it is more expensive to do so? Also, a nuclear Iran would weaken US influence in the region and perhaps pose a threat to US allies. Above all, the USA considers Iran's nuclear program to be illegal and wants it halted immediately. Israel also worries that if Iran gets a weapon, they will aim it straight at them.

I disagree. Iran has plenty of reasons to divert away from fossil fuels. First, oil is a finite resource and it is Iran's main source of income. Any government in power in Iran cannot afford to neglect planning for future sources of income and energy. Tehran is also one of the most air-polluted cities in the world. Reducing its reliance on fossil fuels would help in solving the drastic pollution problem that currently ails the country. Reducing its usage of these very same fossil fuels would also temporarily be economically beneficial to the country, especially when buyers like China and the USA are desperate for oil at record high prices.

There is no doubt that secret uranium enrichment breaks one of the articles of the NPT, yet Iran has not failed to follow any of the IAEA's directions after the incident. Iran has been defiant of resolutions passed by the UN Security Council (whose permanent members include USA, UK, France, China and Russia), and is consequently under international sanctions. Pressed by the disproportionate influence of the United States and its allies, this issue often pushed to the top of the Security Council agenda.

In spite of an NIE (National Intelligence Estimate) report in December 2007 that stated with a "high level of confidence" that Iran had halted its nuclear weapons program in 2003, the United States still accuses Iran of illicit activity. Its claim that Iran's nuclear program is illegal also draws a

hint of hypocrisy. Although not deemed completely innocent quite yet, Iran's program has stayed closer to the line of IAEA inspections than that of Israel, Pakistan and India, three staunch US allies. India has an estimated 50-200 nuclear weapons and, in 2006, signed a treaty with the US allowing that country nuclear plants for energy use. This decision caused an uproar, considering that India is not confined by any international law as it isn't a signatory of the NPT. Pakistan received aid from the CIA and European engineers in the 1970s to build a stockpile of 25-50 weapons. Israel, the fiercest supporter of military intervention in Iran, has an estimated 100-200 nuclear missiles, all of them technologically superior to any Iran could ever be capable of building, as Israel was aided by the USA.

While the exact meaning of his remarks on Israel is being debated, it is clear that Mahmoud Ahmadinejad isn't Israel's biggest fan. This does not change anything, though. The President in Iran barely holds more than a title, as the country's true policies are dictated more by the Supreme Leader, Ayatollah Ali Khamenei, and the Assembly of Experts.

Let us assume that Iran gets a working nuclear missile tomorrow. Iran's immediate neighbors include Armenia, Georgia, Azerbaijan, Turkmenistan, Afghanistan, Pakistan, Iraq and Turkey. They are also very near India, Israel, Egypt, Syria, Jordan, Saudi Arabia, the U.A.E., Qatar and Bahrain. Of these seventeen countries, fourteen are either close US or Israeli allies. Three of them have a substantial number of US troops or US bases. As ex-French President Jacques Chirac said in an off the record statement in the New York Times in January 2007, "Where will they [Iran] drop it, this bomb? On Israel? It would not have gone 200 meters into the atmosphere before Tehran would be razed." The other charge is that Iran could supply terrorist organizations with nuclear weapons, a charge that seems frighteningly reminiscent of charges brought against Iraq before the American invasion and occupation.

Iran's current regime is despotic, tyrannical and cruel, and does not respect many human rights. However, the Iranian regime is not irrational. They have spent the last thirty years clinging on to power, enjoying its benefits despite public discontent. It would be political suicide for the mullahs to launch or sponsor any attack, let alone a nuclear one on any country in the region.

Negative

The question of whether or not Iran should be allowed to have nuclear power has been a question subject to a great deal of debate. The current U.S. Administration, the international community, and much of the world's press have been adamant in their refusal to approve any attempt by Iran to develop a nuclear program. I agree with them for a number of key reasons. First of all, Iran has consistently defied the Security Council and has broken the Nuclear Non-Prolifera-

tion Treaty in the past; second, if Iran is allowed to develop any sort of nuclear program then it will generate a great deal of instability in an already volatile Middle East; and third, Iran's government is simply too unstable to be allowed to handle nuclear material.

Iran makes a great deal of the fact that it has complied with the NPT, which I must admit is for the most part true; however, this overlooks the fact that in 2002 it was revealed that Iran had indeed broken terms of the Treaty. In fact experts believe that the Iranians had been developing a nuclear program in secret for a good number of years. Thus Iran has already proven that it cannot be trusted, by violating the terms of a Treaty it signed by choice. While the IAEA has been granted access to a number of documents and facilities in Iran and has been able to verify that the Iranian regime is not engaging in illegal weapons programs using declared supplies of nuclear material, they concede that they have no way of monitoring any undeclared material, as Iran has not allowed the IAEA to implement more intrusive procedures. This suspicious move, coupled with Iran's clear disregard for the rules agreed upon by the international community and the U.N., only reinforces the idea that Iran is an untrustworthy and even dangerous nation that cannot be allowed to possess nuclear power.

My second point is that a nuclear Iran poses a grave threat to any hopes of peace in the Middle East. Iran has been a growing power in the region and it has been proven that it is exerting its influence in a number of conflicts in the Middle East. In the U.S.-occupied Iraq, the U.S. military has proven that Iran is involved in an attempt to further its own goals in the chaotic nation at the cost of stability. Arms and money have been secretly smuggled to a number of Shia militias in Iraq, such as the Mahdi Army, a radical militia under the command of equally radical cleric Muqtada Al-Sadr, militias that have carried out numerous attacks on U.S. personnel and have been a leading factor in the continuing crisis in the country. Support for a number of terrorist organizations involved in the Israeli-Palestinian-Lebanese conflict has also been traced to Iran. Hezbollah, a Shia resistance group that is responsible for attacks on Israeli troops and civilians, has received considerable aid from Iran as well as from Syria, another dictatorial regime with clear links to Tehran. The major powers of the region such as Saudi Arabia and Israel already have tense relations with Iran and allowing that country to get its hands on any form of nuclear power would strain the relations between them even more. The situation in the Middle East is a delicate one, one that can easily plunge into even more horrific violence and chaos. An uninhibited nuclear Iran would certainly cause a great deal of chaos and mistrust and it is entirely possible that it might be just the spark to light the entire region aflame.

The third and final point I wish to make is that the Iranian regime is so unstable that it cannot be trusted with nuclear materials. Even if its intentions are to use it merely for en-

ergy, the radical and repressive theocracy that runs Iran has no way to ensure that material meant for a benign purpose does not fall into hands that wish to use it for anything but that. A safe and secure nuclear power plant simply cannot be supported by the structure of the current Iranian regime. They do not have the resources, manpower, and expertise to equip a fully functional and completely secure power plant. In the face of a terrorist attack or even an accident at the power plant, Iran would be unable to cope and the consequences would be devastating not only for Iran but also for its neighbors. Iran's Mullahs and Ayatollahs hold the reigns in the country, yes. But they are by no means secure in their position, and if they were to be overthrown, a great deal of nuclear power would fall into the hands of an unknown new regime and much of those materials could be lost and end up in the hands of terrorist organizations. Take for example Iran's firebrand of a President, Mahmoud Ahmadinejad, a

man who has denied the Holocaust and declared that Israel should be wiped off the map. While the Mullahs may not be willing to jeopardize their positions of power, President Ahmadinejad is a wild card. And a wild card with nuclear materials is a risk that the international community cannot take. While it may be true that the current regime does not have the power to launch a nuclear attack on any other nation, that does not mean they cannot give materials to groups that have every intention of doing so. Say what you will, but the fact remains that Iran is a nation which lacks the capacity to maintain safe and secure nuclear programs, even if their reputation and intention were pure—which, as they have consistently proven, they are not.



Rival leaders Mahmoud Ahmedinejad (above) and George W. Bush (right) continue to dispute the right of Iran to pursue nuclear efforts.

INTERNATIONAL ISSUE:

Corporations and Energy

A critical part of the energy conflict lies in the hands of corporations. In today's world, corporations are faced with the moral decision of whether to switch to alternative energy sources or continue using cheaper—and less sustainable—methods of production. The decision to keep faith in oil reserves is socially and environmentally dangerous but economically beneficial in the short term. Though most corporations continue to exploit fossil fuels and are responsible for a large percentage for global energy consumption,

have included climate adjustment in cars without CFCs, no asbestos, bi-fuel methane driven cars, and using PremAir radiators that convert harmful ozone into oxygen. Finally, they have created the Flexifuel cars this year, which use alternative methods of energy to power their cars. Through their numerous modern techniques in the production of environmentally friendly cars, they have succeeded in reducing the amount of energy they spend on making each car from 2.25 MWh in 2002 to 1.6 MWh to 2006.

“Most corporations continue to exploit fossil fuels and are responsible for a large percentage of global energy consumption”

several corporations have confronted the problem of energy consumption and usage. These include CMS, Volvo, and the Continental Automobile Corporation.

The CMS Corporation is a public utility company which supplies electric power and natural gas to most of Michigan (six of Michigan's ten million residents). CMS President David Joos recently announced the following: “We plan to invest \$6 billion in the utility over the next five years in energy efficiency, renewable energy, environmental and customer service enhancements and new power generation and are seeking changes to Michigan's electric deregulation law to support these investments.” The corporation's core principles are based on what they call “The Three Es: Environment, Energy and Economy,” in hopes of creating a cleaner, less wasteful utility as they believe that a clean environment, sustainable energy policy, and solid economy are tightly linked. Simultaneously, CMS employees work to protect the quality of Michigan's priceless natural resources in countless ways. Joos said, “The water we drink, the air we breathe, and the fragile natural networks that support biodiversity are as important as the electricity and natural gas we bring to homes and businesses.” To date, however, CMS' energy strategy has been to obtain gas and oil reserves from all around the world in order to increase production and provide electricity in Michigan.

Volvo is another important corporation making changes with regards to energy consumption and usage. Established in 1927, Volvo is presently one of the most prominent global car companies. For making a single line of cars in 2006, the company employed 6,800 people in five continents: Europe, North America, South America, Australia and Asia. Furthermore, Volvo has supported cleaner ways of fueling their cars for years. In 1992, for instance, they were one of the first car corporations to make an environmentally-gearred car. Since then, their environment friendly ideas

Continental Automotive Systems, which manufactures car components, was founded in 1906 by Alfred Tevez and has its world headquarters in Frankfurt, Germany. Continental boasts forty-four plants in fifteen countries and its sales reached five billion dollars a year in 2006. It helps promote global energy conservation by leading innovation in hybrid cars, which are not completely dependent on gasoline. In 2003, their hybrid technology provided power to cars through a combination of an electric battery and gasoline fuel. The utilization of the electric battery reduced fuel consumption by 10-15% and also cuts down on the vehicles' CO₂ emissions, thus reducing air pollution. Additionally, Continental contributes to the environmental cause by ensuring that its manufacturing sites adhere to environmental codes. In their plant in Ingolstadt, they built energy efficient facilities by having active cooling of the ceilings through ground water, layout of open space in cooperation with the public authorities and facilities which recycle rainwater for use in the operations of the plant. In their plant in Nuremberg, Continental uses returnable packaging for its products, which saves over four metric tons of waste. In their plant in Haldensleben, they have saved fifteen tons of plastic waste through the recycling of fan impellers. They also encourage the recycling of old tires. For example, in 1992 they established a facility in Hanover, Germany that converts 2.5 million tons of old tires into sandals, doormats, and surfacing for sports courts. If these tires were not recycled, they would end up in landfills or dumps.

Unfortunately, these three environmentally responsible companies still represent a minority among corporations, most of which continue to rely on unsustainable production methods. Until the remaining corporations realize that letting go of fossil fuels is not only necessary but financially viable in the long run, however, the world is not likely to escape the vicious cycle of energy dependency.

CHAPTER III: The Future of Energy

Hydroelectric Power

Hydroelectric energy is one of the oldest and most efficient types of renewable energy. It uses kinetic waterpower to create electricity and is relatively profitable since large bodies of water, dams, as well as huge tidal waves can be used to generate hydro energy with maximum efficiency. It is also able to fulfill large demands for electric power in a short amount of time, which is necessary in today's world.

Throughout the world, about 20% of electricity has been generated through hydro energy, with Canada leading as the number one producer of hydroelectricity. Hydro energy is environmentally safe, because it does not produce any greenhouse gases or any other type of air pollution and leaves behind no harmful waste products. At the present rate of its usage, hydro energy prevents the burning of 22 billion gallons of oil and 120 million tons of coal annually. The main environmental drawback of hydro energy is that it might alter some currents when the dams are put to use on large bodies of water. This may potentially threaten the wildlife living within proximity of the dams. However, scientists believe that with enough research this problem could be fixed. Countries such as Norway, who rely on hydro energy for 99% of their electric demands, noticed a positive influence on both the environment and the country's economy.

Besides being environmentally friendly, hydro energy is very cost-effective, as it is able to convert 90% of the available energy in the water into electricity. Even the most advanced fossil fuel plants can only convert 50%, which shows just how resourceful hydro energy could be if fully devel-

oped. Additionally, hydro energy does not require the waste of any expensive fuels, since moving water is available in virtually all parts of the world, and is still renewable. As testament to its favorable cost, the cost of running hydroelectric generators and dams in the United States is approximately 85 cents per kilowatt-hour, which is cheaper than the use of nuclear energy, fossil fuels, or natural gas. Also, due to the availability of water, there is less of a chance of any country relying on foreign suppliers or starting regional conflicts over this type of energy. Besides the obvious economic advantages, hydropower dams have been used in a few cases as the grounds for recreation facilities, bringing benefits to entire communities. Hydroelectric projects *have* been known to have some undesired social ramifications, as is most obvious in the case of China's Three Gorges Dam, but these can be avoided in most cases with sufficient planning.

For all the above reasons, it is logical to say that hydro energy is both highly cost-effective and environmentally friendly. If expanded, this type of alternative energy would undoubtedly help reduce the damage done to the environment while providing the world with the electricity it needs.

Wind Power

The future of wind-powered energy is looking good. The high price of oil, coupled with increasing awareness of global warming and other factors, may spur the growth of this relatively new source of energy. In the long run it is economically and environmentally beneficial to use wind power, as it provides constant, renewable energy.

*A long row of
wind turbines.*



In order to turn wind into energy, a wind turbine is required. The wind turbine operates in the opposite fashion of a fan; it takes wind and turns it into energy while a fan takes energy and turns it into wind. Wind turbines have three blades for optimum performance. Ideally a wind turbine would be placed on a flat plain which has an average of at least fourteen miles per hour of wind.

As a result, wind farms are becoming increasingly common, and are being found throughout the world. Wind farms in the United States have the capacity to generate twelve thousand nine hundred and twenty-five MW (Mega-Watts) of electricity, and there are many projects planned to increase this capacity by at least five thousand MW's. The US Department of Energy plans for six percent of electricity to come from wind power by the year 2020. Despite this, the United States ranks only third world-wide in wind capacity. As of June 2007, Germany was in the lead with a capacity of twenty-one thousand two hundred eighty-three MW, around twice as much as Spain's thirteen thousand four hundred MW capacity.

Europe as a whole has set goals to begin to rely on renewable energy to a greater extent in the future. European Union officials hope to meet the following goals by the year 2010. 5.5% of all of Europe's energy will be powered by wind. Wind also will provide energy for thirty-six million households and eighty-six million people in Europe. The cumulative avoided fuel costs will be worth approximately 15.2 billion pounds sterling. The annual carbon dioxide savings will be about one hundred and nine million tons. The cumulative carbon dioxide savings will be five hundred twenty-three million tons. The cumulative saved external costs are estimated at around 9.4 to 24 billion pounds. Their final goal, to be achieved by the year 2020, includes the installation of about one hundred eighty thousand turbines, of which around seventy thousand would be stationed offshore. This would generate around 12.1% of the electricity used by Europe. These wind turbines will produce enough power for eighty-five million households and one hundred ninety-five million people.

India is also heavily invested in wind power, having the fourth largest wind energy capacity in the world, immediately following the United States. The country's capacity is nine thousand ninety-three MW, and plans to increase this amount. India has also created the Ministry of New and Renewable Energy, which among other duties, sets goals for the amount of the country's electricity generated by wind energy. India plans for about ten percent of its energy to be generated by wind power by the year 2010, and an additional 10% by the year 2020.

In conclusion, wind powered energy will almost certainly play an important role in the future of cleaner and renewable energy sources. The plans of many countries have already been set into action through the construction of wind farms, aiming to reduce reliance on fossil fuels.

Solar Power

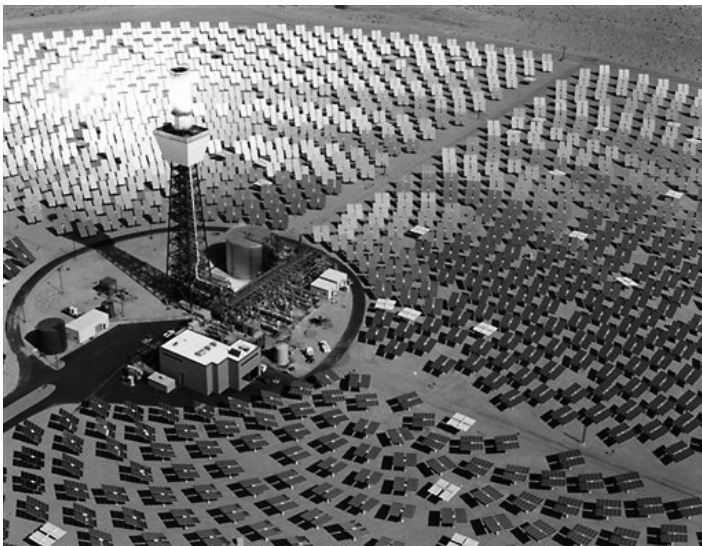
Solar energy is a potential frontrunner in alternative energies because it can be converted into either electricity or heat, and can be used for water distillation. Heating, cooling, and ventilation are possible through the use of solar energy, by using equipment such as a solar power tower or a solar dish. If solar energy became a main source of energy, not only would the environment benefit, but the conflicts associated with fossil fuels could be averted. Energy from the sun is almost eternally renewable and, if used effectively, could reduce carbon dioxide emissions by 15%.

As affordable solar technology is still in development, the switch to solar energy would not come without drawbacks. Although this source is non-threatening to the environment and decreases the amount of energy expenditure, it is not as reliable as some of the current resources in the short run. The disadvantage lies in the fact that the weather is volatile. Solar energy is not constant and when the temperature and weather vary in different regions, the corresponding energy source would as well. Less sunlight means less heat and energy, resulting in a significant decrease in energy reserves.

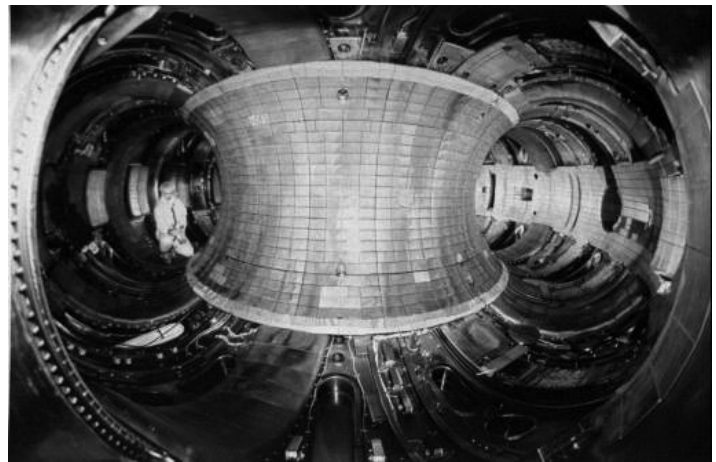
It is encouraging that the use of solar energy has nevertheless increased worldwide in recent years and is still rapidly increasing. In Israel, 90% of homes heat their water with solar energy, and in 2004, Chinese authorities deployed over 13 million square meters of solar water heating systems.

Both governments and non-governmental organizations have been helping countries develop solar energy programs. The most popular of plans is sponsored by UNEP (United Nations Environmental Program), which is helping 100,000 people in India finance solar power systems. Countries such as Japan, Germany, India, Tunisia, Morocco, Indonesia, and Mexico have also experienced great success in their process of change, heightening interest in the global solar energy market. Solar power is not limited to developed countries; some of its applications, in fact, are easier put to use in less developed nations. In some parts of the world, for example, solar cookers, with the capability to reach 320 degrees Celsius, are used to cook food. However, the application of this resource varies depending on the local level of development. The use of solar cookers is realistic in a small village, but would not be as feasible in a large city where the apparatuses would need to be distributed to millions of citizens.

Becoming a solar energy-based society would be challenging, and, in most cases, would take a long time. However, the change is possible, and the long-term benefits are worth the short-term struggles and sacrifices. In the long run, solar power may prove to be beneficial to both economies and the environment, possibly even relieving some political tensions along the way.



*Below and left:
Futuristic-looking photovoltaic installations.*



*Below:
The production of ethanol.*



Ethanol

Ethanol is a renewable liquid fuel created by grain and corn that can be used as a substitute for gasoline. The demand for this new source of energy is growing rapidly despite controversy regarding its environmental and economic benefits.

The US is a major producer of ethanol, and has the fastest growing ethanol industry in the world. US plants are capable of producing 4.8 billion gallons of ethanol per year. Brazil is also a key ethanol producer, converting surplus sugarcane into fuel.

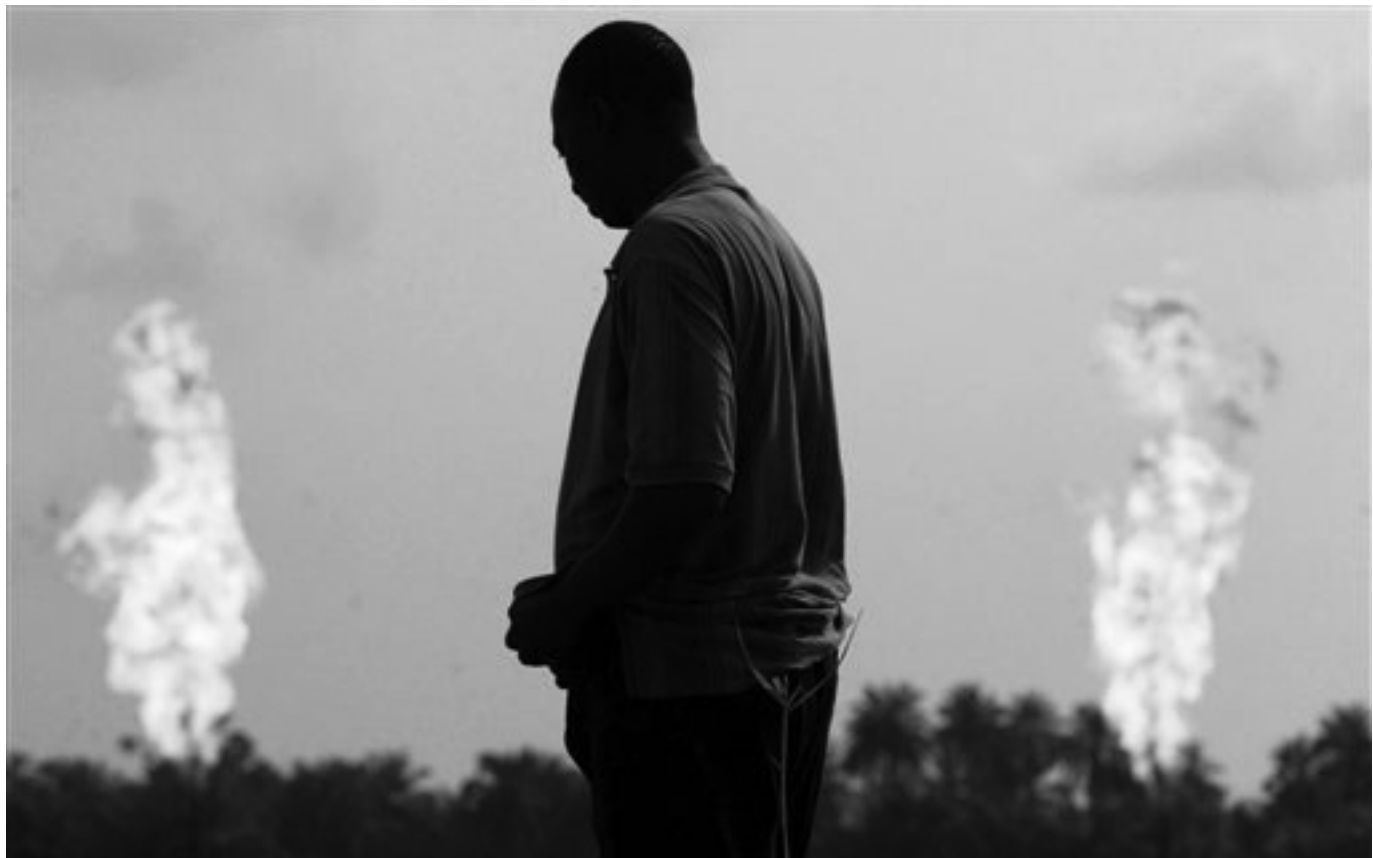
Due to its environmentally friendly composition, burning ethanol releases little CO₂ into the atmosphere. For this reason, some statistics suggest that ethanol use reduced greenhouse gas emissions by some 7.8 tons in 2005 in the US. Although this is a positive effect, the downside of using ethanol is that it is costly to produce. The process of making ethanol may be simple but it requires using machinery, harvesting crops and transporting; consequently, it costs more to produce a gallon of ethanol than it does a gallon of gasoline. Although the US is a firm supporter of ethanol use, other countries may have a hard time adjusting to this renewable energy source because of the high costs. Ethanol production has been cited as a cause of food shortages in Mexico; furthermore, the environmental benefits of ethanol

remain in some dispute.

Nevertheless, the use of ethanol has been dramatically increased over the past years. It is tremendously favored due to its environmental friendliness, and as the world's population continues to expand, demand for ethanol and other bio-fuels will increase correspondingly, resulting in less dependency on gasoline.

CONCLUSION

If this working paper aims to convey one message, it is that the pursuit of traditional energy sources—oil, especially—will always act as a catalyst for conflict. Just as the flames of an oil refinery flare up in the powerful photograph below, so too will the flames of oil-based conflicts continue to do so in Africa, Asia, the Middle East, even the Arctic Circle.... No continent will go untouched in the struggle for oil if nations do not make an immediate and drastic effort to curb their dependency on fossil fuels. And though the issues touched on in this working paper have no obvious solution, it is our hope that these articles have at least provoked a desire to achieve change. If nothing else, they must at least have opened the eyes of students to the problems that face our generation. Over-reliance on fossil fuels can only promise a future filled with the same political, economic, social, and environmental problems which scar our world today; yet alternative energy sources like those presented in the last chapter continue to offer a glimmer of hope. If each of us strives for a sustainable future and pushes our governments—on both the local and the national scales—to do the same, then the oil-fueled injustices in our world may one day be redressed. It is with this understanding that we hope you emerge from the 2008 UNIS-UN Conference.



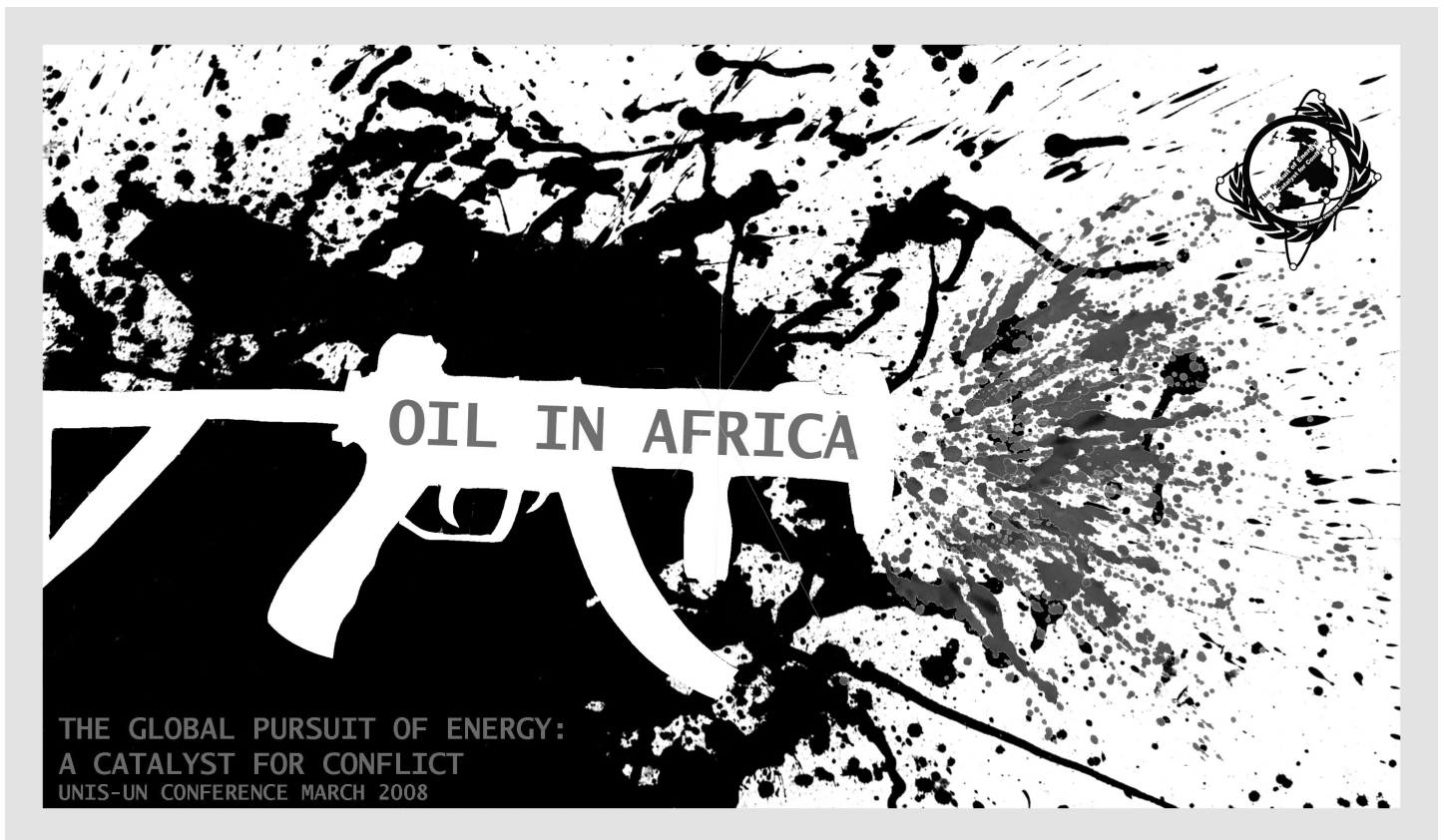
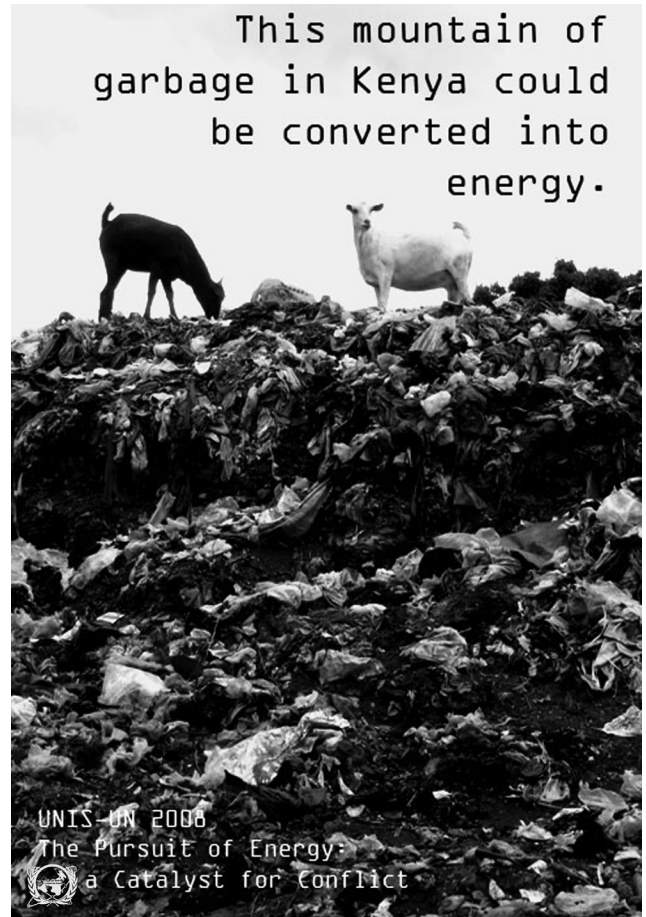
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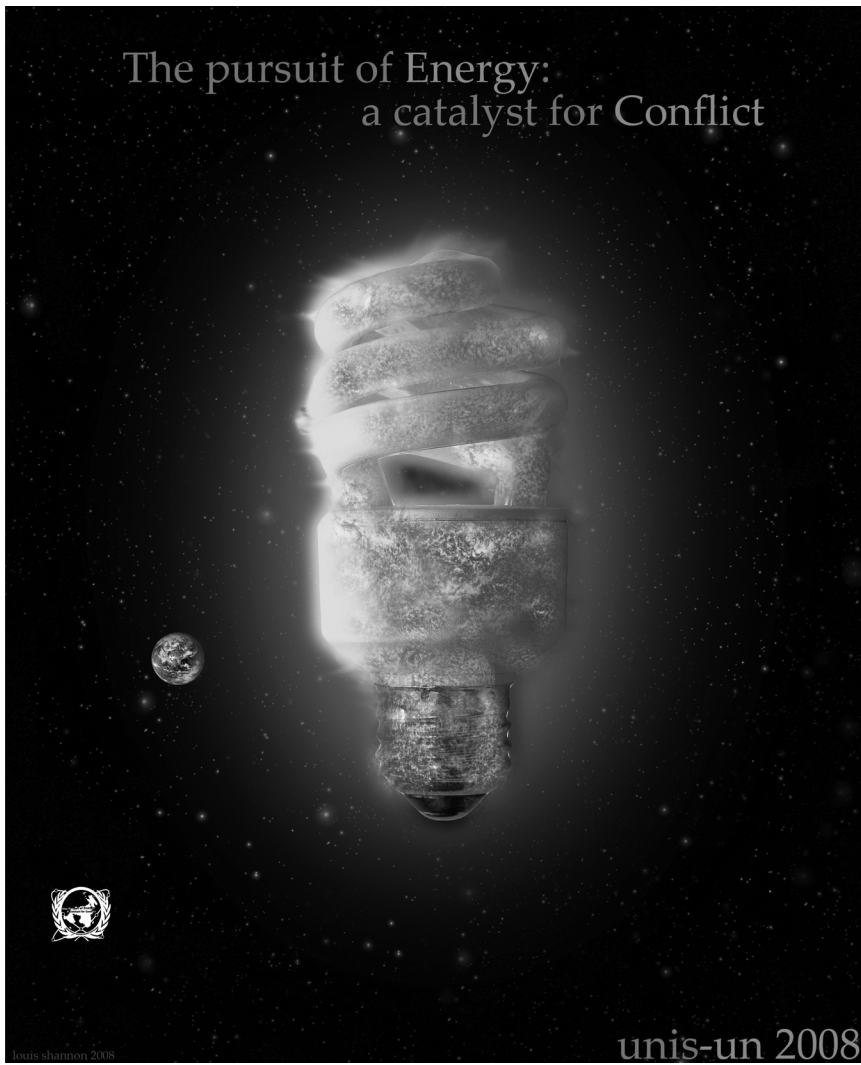
Posters by UNIS IB Art Students

Based on the topic of this year's conference

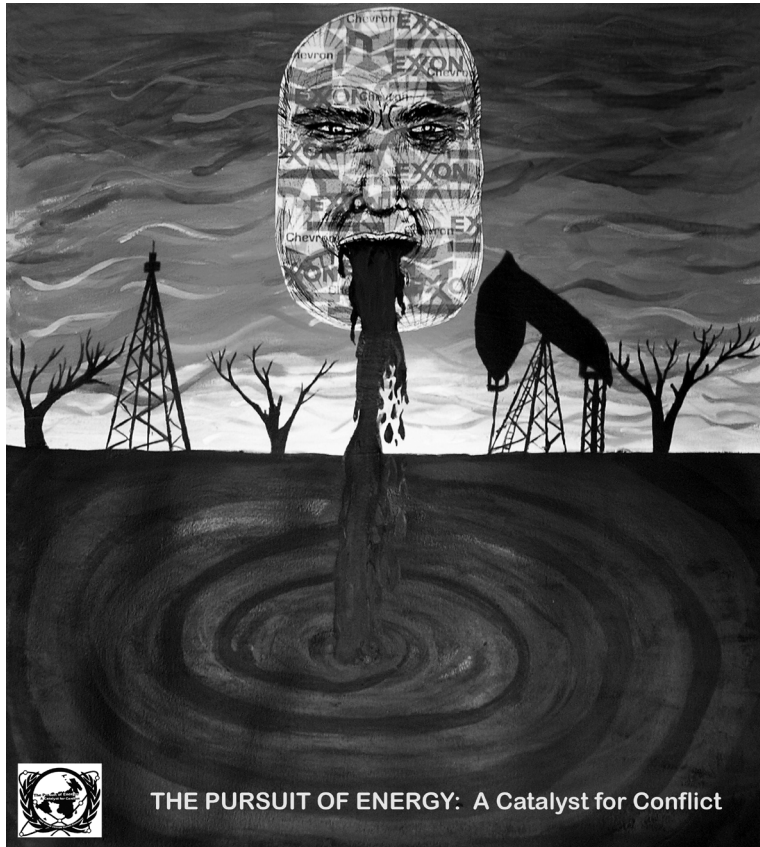
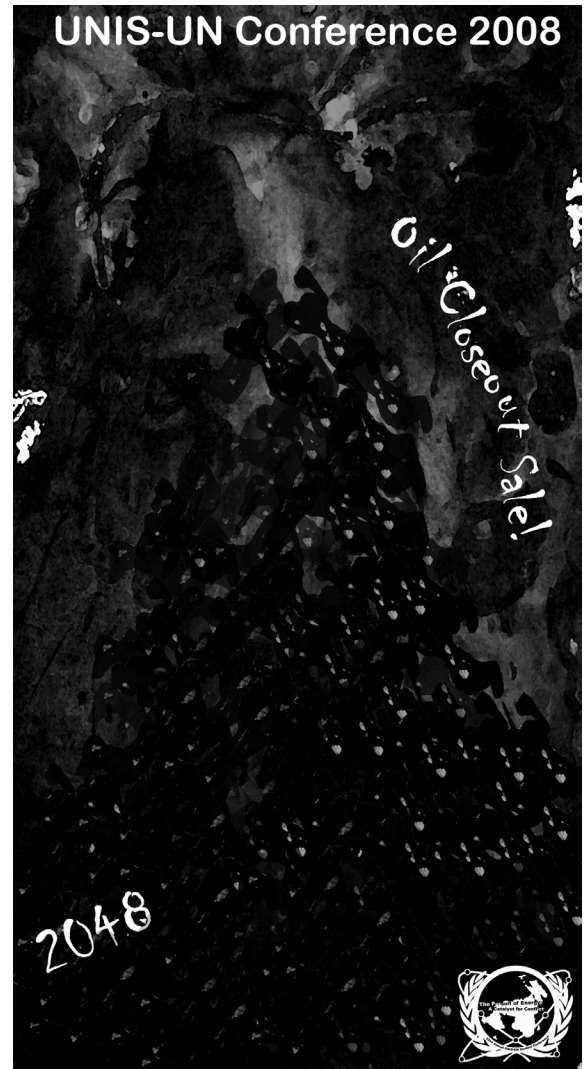


*Clockwise from top-left:
Christine Choi, Veronica del Rosario,
Anayvelyse Mossman*





*Clockwise from bottom-right:
James Mason, Caroline Carmignani,
Louis Shannon*



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