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BEFORE

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SUBCOMMITTEE ON ENERGY AND MINERAL RESOURCES

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My name is Milton R. Copulos, and I am president of the National Defense Council Foundation.

I would like to thank Chairman Gibbons for giving me the opportunity to speak with the Committee today and I would also like to commend him for his leadership addressing our nation's perilous energy dependence.

A HEADLONG RUSH INTO DISASTER

America is rushing headlong into disaster. What is worse, however, is that it is a disaster of our own design.

More than three decades have passed since the 1973 Arab Oil Embargo first alerted the nation to its growing oil import vulnerability. Yet, despite this warning, we are now importing more than twice as much oil in absolute terms than we did in 1973, and the proportion of our oil supplies accounted for by imports is nearly double what is was then. What makes this dependence even more dangerous than it was three decades ago is the fact that the global market has become a far more competitive place with the emerging economies of China, India and Eastern Europe creating burgeoning demand for increasingly scarce resources.

Indeed, over the past decade the Chinese economy has grown at a frenetic pace, officially estimated at 9.2 percent in 2005. India's growth rate for that year was 7.1 percent. In Eastern Europe, Belarus grew at 7.8 percent, the Czech Republic at 4.6 percent and the Ukraine at 4.4 percent. This compares with 3.5 percent for the United States, 2.1 percent for Japan and 1.7 percent for the European Union.

As a result of this explosive growth, oil consumption in the developing countries is expected to increase at a rate of 3 percent annually over the next two decades. But even this figure may severely understate the problem. Indeed, China alone has accounted for 40 percent of the total increase in world oil consumption over the past several years. India

too is rapidly expanding its consumption with a 28 percent increase predicted over the next five years.

Moreover China plans to add 120 million vehicles to its automobile fleet over the next decade, ultimately requiring 11.7 million barrels per day of new crude oil supplies. Nor it is alone in expanding vehicle use. Consider this fact: in 1970, there were 246 million privately owned vehicles in the world. Today, there are 800 million and 60 million new cars are produced each year. As a result, even with retirements, by 2025, the global vehicle fleet is expected to reach 1.1 billion.

Given this burgeoning demand, even conservative estimates suggest that more than 30 million barrels per day of new oil supplies will be required by the year 2025 just to service the developing world's requirements. When Europe and the Americas are included the requirement is closer to 40 million barrels per day. As a result, EIA estimates that the world will consume over 120 million barrels of oil daily in 2025. It is doubtful that new supplies sufficient to meet this skyrocketing demand will be found from conventional sources.

UNCERTAIN SUPPLIERS

Nor is it just the potential physical shortfall of resources that is a source of concern. An even greater concern lies in the instability of U.S. sources of oil imports.

The top six sources of U.S. oil imports, Canada, Mexico, Saudi Arabia, Venezuela, Nigeria and Iraq account for 65.1 percent of all foreign crude reaching our shores and 38.9 percent of total domestic consumption. Of these, four, Saudi Arabia, Venezuela, Nigeria and Iraq provide 38.2 percent of oil imports and 22.6 percent of total consumption. For a variety of reasons, none of the four I just mentioned can be considered a reliable source of supply.

Venezuela's President Hugo Chavez is a vocal opponent of the United States who has twice threatened to cut off oil shipments to the U.S.

Nigeria's production has been repeatedly disrupted by civil unrest, and some 135,000 barrels of oil per day are lost to theft.

Last month, a terrorist attack on the massive Saudi oil processing facility at Abqaiq was barely thwarted, but not before two of the terrorist's explosive-laden cars were detonated. Moreover, this was not the only instance of an attempt to disrupt the flow of Saudi oil. In the summer of 2002, Saudi Interior Ministry forces blocked an al-Qaeda plot to attack and cripple the loading dock at Ras Tanura which handles 10 percent of the world's oil supplies.

Attacks on oil facilities in Iraq are a frequent occurrence.

Nor are the attacks on U.S. oil supplies a coincidence. In December of 2004, al-Qaeda issued a fatwa that said in part:

"We call on the mujahideen in the Arabian Peninsula to unify their ranks and target the oil supplies that do not serve the Islamic nation but the enemies of this nation."

The fatwa went onto declare:

"Be active and prevent them from getting hold of our oil and concentrate on it particularly in Iraq and the Gulf."

Clearly, given the instability that characterizes four of our top six sources of oil, the question is not whether we will experience a supply disruption, but rather when. The disruption could occur as a consequence of a terrorist act, or could result from a politically motivated embargo. In the end, it doesn't really matter why a disruption occurs, because the consequences would be identical, and severe.

THE CONSEQUENCES OF DISRUPTION

The supply disruptions of the 1970s cost the U.S. economy between $2.3 Trillion and $2.5 Trillion. Today, such an event could carry a price tag as high as $8 Trillion – a figure equal to 62.5 percent of our annual GDP or nearly $27,000 for every man, woman and child living in America.

But there is more cause for concern over such an event than just the economic toll. A supply disruption of significant magnitude, such as would occur should Saudi supplies be interdicted, would also dramatically undermine the nation's ability to defend itself.

Oil has long been a vital military commodity, but today has taken on even more critical importance. Several examples illustrate this point:

- A contemporary U.S. Army Heavy Division uses more than twice as much oil on a daily basis as an entire World War II field army.

- The roughly 582,000 troops dispatched to the Persian Gulf used more than twice as much oil on a daily basis as the entire 2-million man Allied Expeditionary Force that liberated Europe in World War II.

- In Operation Iraqi Freedom, the oil requirement for our armed forces was 20 percent higher than in the first Gulf War, Operation Desert Storm, and now amount to one barrel of refined petroleum products per day for each deployed service member.

Moreover, the military's oil requirements will be even higher in the future.

Therefore, a shortage of global oil supplies not only holds the potential to devastate our economy, but could hamstring our armed forces as well.

THE HIDDEN COST OF IMPORTED OIL

While it is broadly acknowledged that our undue dependence on imported oil would pose a threat to the nation's economic and military security in the event of a supply disruption, less well understood is the enormous economic toll that dependence takes on a daily basis.

The principal reason why we are not fully aware of the true economic cost of our import dependence is that it largely takes the form of what economists call "externalities," that is, costs or benefits caused by production or consumption of a specific item, but not reflected in its pricing. It is important to understand that even though external costs or benefits may not be reflected in the price of an item, they nonetheless are real.

In October of 2003, my organization, The National Defense Council Foundation, issued *"America's Achilles Heel: The Hidden Costs of Imported Oil,"* a comprehensive analysis of the external costs of imported oil. The study entailed the review of literally hundreds of thousands of pages of documents, including the entire order of battle of America's armed forces and more than a year of effort. Its conclusions into divided the externalities into three basic categories: Direct and Indirect economic costs, Oil Supply Disruption Impacts and Military Expenditures.

Taken together, these costs totaled $304.9 billion annually, the equivalent of adding $3.68 to the price of a gallon of gasoline imported from the Persian Gulf.

As high as these costs were, however, they were based on a crude oil refiner acquisition cost of $26.92. Today, crude oil prices are hovering around $60 per barrel and could easily increase significantly. Indeed, whereas in 2003 we spent around $99 billion to purchase foreign crude oil and refined petroleum products, in 2005 we spent more than $251 billion, and this year we will spend at least $320 billion.

But skyrocketing crude oil prices were not the only factor affecting oil-related externalities. Defense expenditures also changed.

In 2003, our armed forces allocated $49.1 billion annually to maintaining the capability to assure the flow of oil from the Persian Gulf.

I should note that expenditures for this purpose are not new. Indeed, last year marked the 60th anniversary of the historic meeting between Saudi monarch King Abdul Aziz and U.S. President Franklin Roosevelt where he first committed our nation to assuring the flow of Persian Gulf oil – a promise that has been reaffirmed by every succeeding President, without regard to party.

In 1983 the implicit promise to protect Persian Gulf oil supplies became an explicit element of U.S. military doctrine with the creation of the United States Central Command, CENTCOM. CENTCOM's official history makes this clear stating in part:

"Today's command evolved as a practical solution to the problem of projecting U.S. military power to the Gulf region from halfway around the world."

I am stressing the long-standing nature of our commitment to the Gulf to underscore the fact that our estimates of military expenditures there are not intended as a criticism. Quite the opposite, in fact. Without oil our economy could not function, and therefore protecting our sources of oil is a legitimate defense mission, and the current military operation in Iraq is part of that mission.

To date, supplemental appropriations for the Iraq War come to more than $251 billion, or an average of $83.7 billion per year. As a result, when other costs are included, the total military expenditures related to oil now total $132.7 billion annually.

So, where does that leave us?

In 2003, as noted, we estimated that the "hidden cost" of imported oil totaled $304.9 billion. When we revisited the external costs, taking into account the higher prices for crude oil and increased defense expenditures we found that the "hidden cost" had skyrocketed to $779.5 billion in 2005. That would be equivalent to adding $4.10 to the price of a gallon of gasoline if amortized over the total volume of imports. For Persian Gulf imports, because of the enormous military costs associated with the region, the "hidden cost" was equal to adding $7.41 cents to the price of a gallon of gasoline. When the nominal cost is combined with this figure it yields a "true" cost of $9.53 per gallon, but that is just the start.

Because the price of crude oil is expected to remain at least within the $60 range this year, expenditures for imports are expected to be at least $320 billion this year. That amounts to an increase of $70 billion in spending for foreign oil in just one year. That increase would raise the total import premium or "hidden cost" to $825.1 billion, or almost twice the President's $419.3 billion defense budget request for fiscal year 2006. If all costs are amortized over the total volume of imports, that would be equivalent to adding $5.04 to the price of a gallon of gasoline. For Persian Gulf imports, the premium would be $8.35. This would bring the "real" price of a gallon of gasoline refined from Persian Gulf oil to $10.86. At these prices the "real" cost of filling up a family sedan is $217.20, and filling up a large SUV $325.80.

But, can anything be done about this enormous drain on our economy?

The answer to that question is yes. But first we must clearly understand what is needed.

DEFINING THE PROBLEM

The simple truth is that we do not suffer from a lack of energy resources. Rather, what we suffer from is a lack of the political will and public consensus to use them.

As Pogo said, "We have met the enemy and they is us."

What then can we do?

The first step is to recognize that the immediate problem we face is how to assure adequate fuel supplies for the 220 million privately owned vehicles on the road today and for the vehicles and aircraft upon which our military relies. Within the civilian fleet, vehicles have an average lifespan of 16.8 years. The average age of our civilian vehicle fleet is 8.5 years. Therefore we will require conventional fuels or their analogs for at least a decade, even if every new vehicle produced from this day forth runs on some alternative.

The military's tactical fleet presents an even more complex problem. DOD assigns a twenty-year service life to vehicles when they are initially acquired. Upon reaching the twenty-year mark, however, they are recapitalized, in essence adding an additional two decades to their expected service period. For example, the HUMMVV, one of the most basic vehicles was first introduced in 1985, and will be in service for the foreseeable future. Therefore, for all practical purposes we must assume that our tactical fleet will be around for at least forty years.

For aircraft, the service life can be even longer.

The venerable B-52 Stratofortress, was first introduced in 1955, and is expected to remain in service at least until 2040. The C-130, first introduced in 1956, is still in production today, 50 years later. The F-15 Eagle was introduced in 1976, thirty years ago, and the F-16 Fighting Falcon in 1978, twenty-eight years ago.

So, clearly, conventional fuels will remain a military necessity for decades to come.

But there is another problem associated with our military fuel requirements: the move to a single fuel.

SPECIAL CONSIDERATIONS FOR MILITARY USE

In 1990, the Department of Defense initiated implementation of the "Single Fuel Concept," or SFC. The notion of going to a single fuel grew out of operational problems encountered in Europe in the early 1980s. The idea was straightforward enough: simplify fuel logistics by having one type of fuel for all aircraft and ground vehicles. This would hopefully lower costs and improve performance. DOD selected JP8 as their choice as a single fuel.

The only problem with this decision is that it presumes adequate refinery capacity to produce JP8 in the required quantities. In peacetime operations, DOD uses around 277,000 barrels of motor fuel per day. In combat operations this figure will rise to 450,000 barrels per day or more. Unfortunately, in conventional refineries, only around one-eighth of a barrel of oil is converted into jet fuel. Therefore, some 3.6 million barrels of oil would have to be processed in order to produce the 450,000 barrels of JP8 the military is likely to use in a major regional conflict.

The potential impact of a sudden increase in the military's need for jet fuel was demonstrated dramatically during Operation Desert Storm when Saudi Arabia invoked force majure provisions of its contracts in order to divert all of its jet fuel production to the war effort. The ensuing global jet fuel shortage caused prices to spike sharply. As a result of the price increase, Eastern Airlines, which was already in financial trouble, could not sustain operations and on January 18, 1991, it closed its doors after 65 years in business.

So, how can we address the civilian and military need for conventional fuels in an ever-tightening market? One answer is to use one of our most abundant fuels: coal.

COAL IS AN ANSWER

America is the Saudi Arabia of coal. Our nation has 275 million tons of demonstrated recoverable reserves, 26 percent of the world total. Further, the technology to convert coal into useable motor fuel has existed since the 1920s and has been in widespread use since the 1930s.

During World War II, Germany, lacking domestic oil resources, initiated a massive program to produce synthetic fuels. At its peak, in 1944 Germany was operating 25 synthetic fuels plants that produced an average of 124,000 barrels of synthetic fuel per day to power its military.

Currently, South Africa produces around 200,000 barrels of synthetic fuel from coal per day, and has just won approval from British aviation authorities to use an aviation fuel that is a 50/50 blend of synthetic and natural products. In addition, Shell Oil is currently operating a 14,500 barrel per day Fischer-Tropsch gas-to-liquids plant in Malaysia, and plans to build three large facilities in Qatar have been announced. These include a 140,000 barrel per day plant being built by Shell, a 160,000 barrel per day plant being built by Conoco and a 120,000 barrel per day plant being built by Marathon. In total, some 1.7 million barrels per day of G-T-L capacity are under consideration worldwide.

The idea of using domestic coal to produce synthetic motor fuels is not new.

In June of 1942 the House Committee on Mines and Mining held hearings on the potential to produce gasoline, rubber and other products from coal. In August of the following year the Senate Committee on Public Lands and Surveys held additional hearings on the production of synthetic liquid fuels from coal. As a consequence of these

hearings the Synthetic Liquid Fuels Act was approved on April 5, 1944 authorizing the expenditure of $30 million to fund a five-year synthetic fuels demonstration program.

In 1946, West Virginia Representative Jennings Randolph said:

"We cannot survive a prolonged famine in liquid fuels. We must not rely on uncertain foreign sources. It is in the interest of national security, it is imperative that an American synthetic liquid-fuels industry be established as soon as possible before another national emergency."

Given this early interest, what happened?

The advent of cheap oil from the Middle East undercut the economic viability of synthetic fuels.

Unfortunately, this process would be repeated time and time again whenever it appeared that economic conditions would finally provide a favorable environment for synthetic fuel production.

Today it appears that the economic conditions necessary to permit using America's vast coal resources have finally materialized.

How then can accomplish the task of transforming coal into useful motor fuels?

Perhaps the easiest way would be to use what we know works: the Fischer-Tropsch process.

MAKING LIQUID FUELS FROM COAL

The process of making synthetic liquid fuels begins with converting coal to a gas. This can be accomplished through a variety of methods, all of which heat coal to create a char that reacts with carbon dioxide and steam to create what is called a "*synthesis gas*." This *synthesis gas* is a combination of hydrogen and carbon monoxide. The *synthesis gas* is then subjected to an iron or cobalt catalyst through the Fischer-Tropsch process to create a "*syncrude*" that can be refined into the desired fuel.

There was considerable interest in the United States during the late 1970s and early 1980s regarding the use of the Fischer-Tropsch process to produce synthetic fuels. At the time, however, it was estimated that a crude oil price of around $45 per barrel was required to make synthetic fuel competitive. Therefore, the collapse of oil prices in the mid-1980s undermined its economic viability and most projects were abandoned.

Since that time, there have been advances in the Fischer-Tropsch technology that have reduced costs significantly. More important, it is now likely that a floor for oil prices has been established at between $55 and $65 per barrel. At this level, the production of synthetic fuels from coal is clearly economic.

But there are factors other than the direct economic costs that make an investment in developing a synthetic fuels capability prudent.

First of all, unlike production of fuels from crude oil, the product mix derived from *syncrude* can be tailored to meet specific needs. For example, as noted earlier, the Department of Defense has moved to establish a uniform fuel for all of its vehicles and aircraft. It is possible to tailor synthetic fuel production to meet this specific need.

A second point lies in the economic impact of moving to a domestically-based source of liquid fuels. Our current import dependence has robbed the nation of at least 2.4 million jobs as a consequence of the hemorrhage of capital flowing abroad. Not only would this capital outflow cease, but hundreds of thousands of additional high-paying jobs would be created within the domestic economy to build and operate the new synthetic fuels industry.

A third point is that fuels created through this process can be designed to have superior environmental qualities. Indeed, one of the major products of the Shell synthetic fuel plant in Malaysia is ultra-low sulfur diesel fuel.

Finally, it is important to remember that some portion of every dollar we spend on oil from abroad makes its way into the hands of individuals who wish us harm. The simple truth is that international terrorism stands on two financial pillars: oil and the drug trade. To the extent that we reduce the revenues generated by either of these activities, we hinder the ability of terrorists to operate.

Clearly, the creation of a domestic industry to manufacture synthetic motor fuel from coal will entail an enormous expenditure of capital and scientific and technical resources. This cost, however, pales when compared with the estimated $825.1 billion annual price tag of our profligate import dependence. Still there are factors which must be overcome to make the potential of coal liquids a reality. Among the most important is market uncertainty,

From the time of the earliest efforts to develop a domestic industry to produce motor fuels from coal, the uncertainty over oil prices has been a major barrier to obtaining the financing necessary for such an undertaking. In the period immediately following the Second World War, just as experiments were proving the practicality of producing liquid fuels from coal, the discovery of vast, inexpensive supplies of oil in the Middle East cooled interest in this research. When, in the wake of the 1973 Arab Oil Embargo and 1979 Iranian Oil Boycott, interest in coal liquids was renewed, predatory moves by Saudi Arabia to dramatically reduce prices again stopped efforts cold.

Today, it is doubtful that such a dramatic turn in prices will occur again, but fears of such an eventuality are hindering the investment climate. There are a number of things, however, that can be done to address this situation.

First, Congress could establish a floor price for oil at around $45. This has the advantage of being fuel-neutral. The simple fact is that virtually all alternative forms of motor fuel suffer from the same problem as coal liquids – they cannot compete with cheap oil. Yet, as I noted earlier, there are other "hidden costs" that are not accounted for but are nonetheless real. By creating a floor price, we guard against the prospect of a predatory move by the producing nations to destroy alternative fuel options in the early stages of their development.

A second thing that can be done is to help encourage the production of alternative fuels such as coal liquids by having the government enter into purchase agreements with guaranteed prices. If prices rise, and I believe they will, the government will actually save money with such a program. Should prices be deliberately crashed, in order to eliminate the competition coal liquids or other alternatives represent, the investors who risked their funds to give the nation greater energy security would have some measure of protection.

A third thing that this Committee, specifically, could do would be to send a letter to the Department of Defense urging it to make fuels produced through the Fischer-Tropsch process a standard for DOD. This would at a minimum make defense planners take a serious look at the Fischer-Tropsch process as a means of assuring adequate fuels of a consistent quality.

A final incentive that might be considered would be to provide royalty relief for fuels produced for the Department of Defense from domestic coal resources.

Obviously, all of these options entail some sort of financial outlay or exposure. The level of exposure, however, is minimal when considered against the background of the enormous "hidden costs" and military vulnerability our current import dependence creates. The question, therefore, is not, whether we can afford such a program, rather it is whether we can afford any additional delay in its implementation.

The simple fact is that our nation is in dire peril due to its excessive dependence on imported oil. But the situation is far from hopeless. We have the resources necessary to provide our nation's energy needs if we can only find the political will to do so.